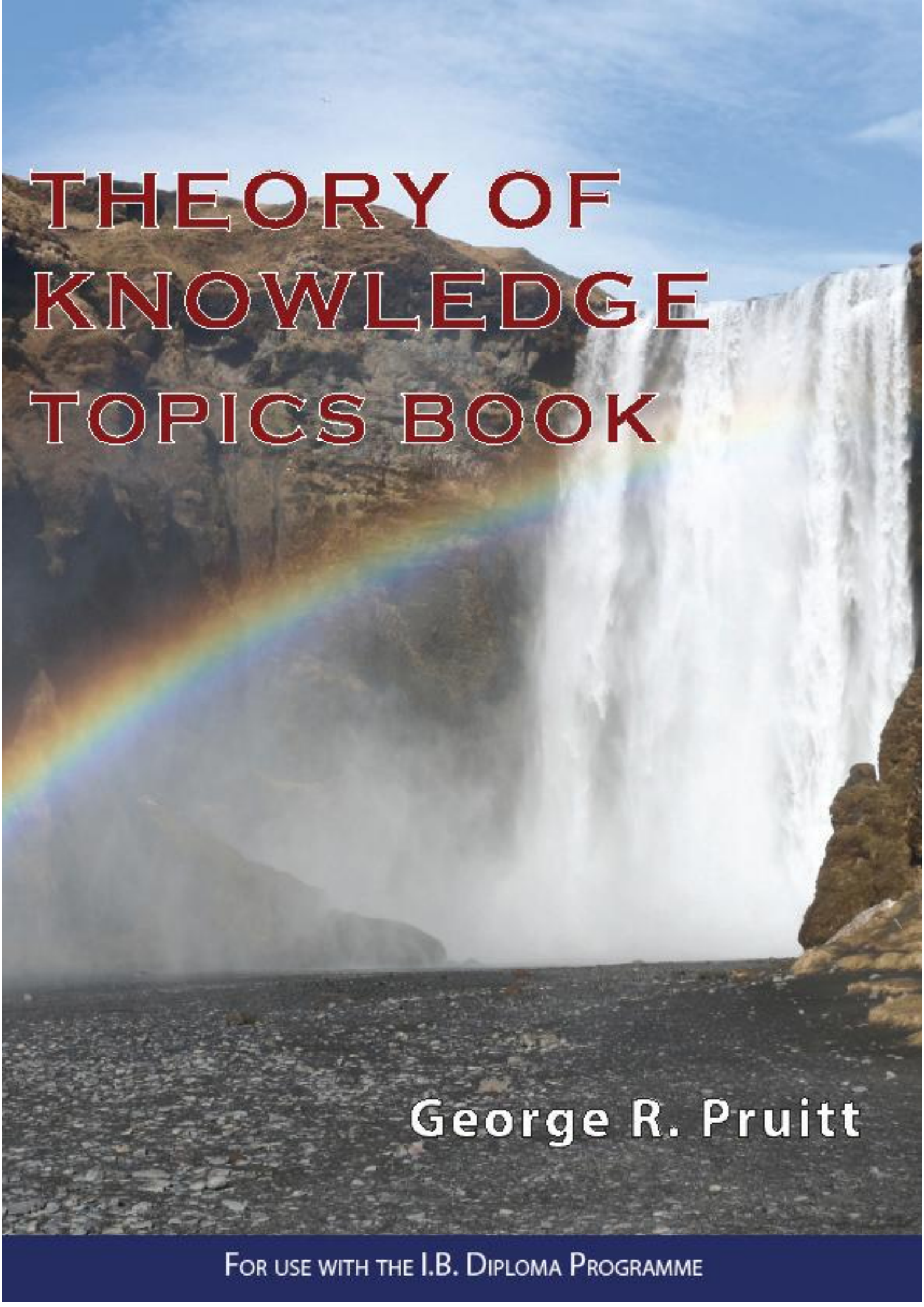
THEORY OF KNOWLEDGE
TOPICS BOOK
George R. Pruitt
For use with the I.B. Diploma Programme

ISBN: 978-1-921917-26-4

Cover design by Key-Strokes.

Published by: IBID Press, Box 9, Camberwell, 3124,Victoria. Australia

PREFACE

This collection of topics for further discussion and suggestions for class activities was created as a supplement to Theory of Knowledge: A New Synthesis. The latter book is directed to any readers interested in exploring in considerable depth some of the many issues related to theory of knowledge. It was not meant to serve as a stand-alone student textbook, though for the sake of convenience the units were organized in terms of the International Baccalaureate's Theory of Knowledge course. Teachers and students in classes exploring theory of knowledge issues can certainly find in that book many useful starting points for class discussions and inquiry. However, the book itself is directed to general readers.

This supplement, on the other hand, is specifically directed to teachers and students engaged in active learning. Active learning is an approach to teaching and learning that gives the learner opportunities to take charge of learning. Instead of just listening to teachers, reading selections from assigned texts and taking notes passively in a lecture-style class, students engaged in active learning must construct their own knowledge. These students:

1. discuss what they are learning with one another.

2. ask each other about what they don't understand.

3. share their experiences and debate one another.

4. teach one another lessons or mini-lessons.

5. identify problems, gather information and solve them.

6. engage in role-playing.

7. connect what they are learning to what they have learned before.

8. learn by working with others as a team.

9. make learning plans for themselves.

10. reflect on the quality of these plans.

11. reflect on whether they use their learning time well.

12. write down questions about what they are learning and share them.

This supplementary collection of topics and activities presents ideas and questions to be discussed and engaged in an open, supportive and respectful learning environment. The focus is on discovery and a collaborative search for answers rather than on direct instruction by the teacher.

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This search should encourage students to cultivate an open mind, to take risks and to question their basic assumptions, opinions, biases and prejudices. It should also help students to understand that thoughtful people may answer important and open-ended questions differently and that none of the answers offered will be uniquely right. In such an environment, students can and should advance their opinions humbly and tentatively while listening with sympathy and openness to the different opinions that others may offer. They should also give themselves and others ample encouragement to change their minds and to recognize that "a foolish consistency is the hobgoblin of small minds" (Ralph Waldo Emerson).

Students and teachers in an active learning theory of knowledge course should certainly keep class journals and reflect regularly on the learning adventure. What ideas or topics have excited your curiosity or passion? Have you been able to identify hidden biases in your everyday thinking? Have you been inspired to take a hard second look at some of your beliefs or perspectives? What topics or questions would you like to learn more about? Where might you profitably begin your exploration of these? What additional activities might help you and those with whom you are learning to approach important knowledge questions from promising new angles?

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One of the great insights that the developers of the IB Theory of Knowledge course have advanced over the years is that TOK issues **arise in context**. They arise as we are constructing responses to and, ultimately, knowledge about, what we encounter in our daily lives.

The effective TOK teacher and student will always be alert to how almost every item that he or she reads about in the news or learns about during discussions—while participating in what the comedian Flip Wilson has called "The Church of What's Happening Now"—**can and does** link with provocative TOK topics.

This is the beauty of the "real-life situation" component of the TOK course. In this companion volume, readers will discern these links right away.

To develop this book of topics for further discussion and to generate interesting activities, we have regularly read newspapers, books, stories and such and have taken copious notes about what we have observed happening in the world around us. We have, in other words, frankly searched for these links. Exploring the "Church of What's Happening Now" has greatly helped us in putting together these pages.

We have to draw an artificial line and simply have faith that we have assembled enough material for a suitable companion volume that teachers and students in active learning environments can use profitably right now.

In order to see how this is a process with no beginning or end, though, let's take a quick look at some files and notes that we were **going to use** to update the companion you now see but had to put aside in the interest of drawing this line.

For example, one article we printed asks whether we can really "know" if the climate is changing. If we do not, does it make sense to impose substantial costs on the economy now in order to avoid possibly benign changes in the future?

Or consider this. Japan hosted a recent summit of leaders of the leading economic states. It was held near the grounds of the holiest shrine of the Shinto native (indigenous) religion in Japan. Despite constitutional restrictions, some would like to see this indigenous religion play a more prominent role in Japanese society. Yet half of the country's Shinto shrines may soon close down because there are no priests to take care of them. Does the disappearance of this religion from daily Japanese life suggest the loss of a valuable knowledge framework as well?

Or consider this important issue. Formal schooling provides the people of our world with a valuable source of second-hand knowledge in the service of laudable goals such as mutual understanding and mutual respect.

However, as one of the articles we cut from a magazine suggests, the greatest untapped "resource" around the world may not be gold or oil but the female half of the population. Recent movements such as "Let Girls Learn" suggest that the most effective weapon against terrorism is not a drone but a girl with a book and a sincere and passionate desire to learn about other people in other places. Maybe in the future we can use this article.

Or consider this provocative item. The Chinese Communist Party recently reaffirmed its verdict condemning the Cultural Revolution as "unshakably scientific and authoritative". Can verdicts (or knowledge) really ever rise to that level of certainty?

We recently learned that the landmark American television series "Roots" has been recreated and "recontextualized" for the "Black Lives Matter" era. More to the point, the producers of the remake concluded that there is simply too much **new and valuable information and knowledge** about the atrocities of the era that "Roots" chronicles, about the societies of Western Africa of the time, and about the daily lives of the people who were enslaved. The original "Roots" got a lot of things wrong. This has inspired producers to get it right this time. What does this say about the possibility of achieving a high degree of "certainty" when making knowledge claims?

How about this file? It's a review of a book just published called *Black Hole Blues* by Janna Levin (2016). The author describes an effort to build an apparatus that will detect sonic messages in the cosmos as some entity makes contact with us through gravitational waves, an apparatus first envisioned by Einstein in his famous 1915 paper on General Relativity. This dream is taking shape as the Laser Interferometer Gravitational-Wave Observatory, a one-billion-dollar project funded by the National Science Foundation that highlights an important TOK theme—how our imagination and our tools shape one another.

We had a brief look at a new novel called *Hystopia* by David Means (2016). It explores the idea of "programmed amnesia" as a possible solution to historical trauma. This particular novel imagines a President Kennedy who has survived assassination attempts and has created legions of damaged veterans of the war in Vietnam.

Again, another file is a collection of notes about recent novels emerging as dystopian fiction from the so-called Arab Spring. Many writers who experienced the Arab Spring first-hand are using science-fiction tropes to approach controversial subjects such as atheism, homosexuality and historical traumas that writers previously regarded as "off limits". How are these writers using the arts and its knowledge framework and exploring imagination, language and empathy, all in an effort to get at **historical** truths by writing fiction?

This question goes to the very core of the new TOK curriculum and its focus on the **interdependence** of ways of knowing and areas of knowledge that we achieve in our unending quest to construct knowledge that is valid, reliable, stable and useful.

As we have indicated earlier in this preface, we have decided to draw a line at version 9.5, so these files will have to wait for future updates.

We could have waited another week or two and could have drawn the line at, say, version 10.0. That does not mean that it would have been a better place to stop, though.

We are only trying to make **this important point.** TOK issues arise in the context of the Church of What's Happening Now. We will be better (and humbler) teachers and students of the subject if we can admit this at the outset.

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Students in the twenty-first century have an obligation to develop a respect for the wealth of knowledge acquired across a variety of times and cultures; to adopt a critical approach to the construction of knowledge; to understand how different academic disciplines interact, both among one another and among the various sources of our knowledge; to formulate knowledge questions and participate in honest debates about them; to become familiar with the kinds of justifications that can legitimately be advanced in these debates; and to discover, ultimately, why the examined life leads to responsible action in the world and full expression of our humanity.

Fulfilling such an obligation is a tall order, of course. If *Theory of Knowledge: A New Synthesis* and this supplementary collection of topics for further discussion and activities for the active learning classroom can be of some small assistance to students and teachers who wish to rise to this challenge, then preparing these materials will have been well worth the candle.

ACKNOWLEDGEMENT

Thanks to the following student artists whose works grace these pages: Yuri Asai (Brain in a Vat), Ayumi Nakano (Buttons, Raven's Matrix, Tok Pisin), Yuzuno Sugimoto (School Crossing), Miku Okuda (Expert Opinion, Post Hoc Rooster and Sun), Riko Yamada (Verbal Overshadowing), Sora Yamane (Bullets Dropping), Maya Kawajiri (Celestial Teapot) and Yuki Suzuki (Photo of Violinist).

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In discussing good questions (that are not, however, good knowledge questions) some of the more "off-the-wall" questions we posed are inspired by the quirky questions that readers routinely submit to Cecil Adams for his newspaper column and online site "The Straight Dope".

CONTENTS

UNIT ONE
HOW DO WE KNOW?

For Further Discussion

1. Do you agree or disagree with the following quote? "My view is that there is such a thing as being too open-minded. I am **not** open-minded about the earth being flat, about whether Hitler is alive today, about claims by people to have squared the circle, or to have proven special relativity wrong. I am also not open-minded with respect to the paranormal. And I think it is wrong to be open-minded with respect to these things, just as I think it is wrong to be open-minded about whether or not the Nazis killed six million Jews in World War II" (Douglas Hofstadter).

2. Make up an example illustrating the fallacy called the argument from ignorance.

3. How would you go about trying to prove that a species has, in fact, become extinct?

4. According to the astronomer and writer Carl Sagan, "extraordinary claims require extraordinary evidence." Do you agree or disagree?

5. Some people believe that the Loch Ness monster exists. Others believe that some religious people are able to make their bodies float off of the ground. Which of these claims do you think is less likely to be true?

6. "That which can be asserted without evidence can be dismissed without evidence" (Christopher Hitchens). Do you agree or disagree with this position?

7. In 1968, author Erich von Daniken wrote a book called *Chariots of the Gods*. In it, he claimed that artifacts such as the pyramids in Egypt, the statues of Easter Island and the monuments at Stonehenge suggest that ancient visitors from outer space gave advanced technology to ancient peoples on Earth. How much evidence would you need in order to be convinced of this claim?

8. List five things that you are certain of.

9. Think of some examples of beliefs that you think are wrong or even dangerous. Describe these.

10. "People who believe absurdities will commit atrocities" (Voltaire). Do you agree or disagree with this statement?

11. Think of some of the words and phrases in our language that point to the idea of seeing from a perspective. Think of four examples in English or in your native language.

12. How would you define the word "culture" in one or two sentences?

13. Who do you think is the greatest writer and the greatest scientist of all time? Compare your answer with the answers that your classmates give. Do you think that people from different cultures will make different choices?

14. Can you think of some words or phrases or concepts that have different meanings for people from different cultures? Share these with your classmates and explain your thinking.

15. A teacher in America asks a young Korean boy, who has just moved to the U.S., how old he is. The boy says, "I used to be ten. Now I am eight." How can you explain this answer?

16. A group of Japanese businessmen are on a train in Mexico. The train arrives at the main terminal in a distant town. It is precisely on schedule. The Mexican passengers around them all stand up and start clapping and laughing? Why? The Japanese are confused by this response. Why?

17. Describe how different cultures might have a different sense of space, a different sense of fairness and different ways of greeting one another. Describe some of these.

18. Think of your native culture. Is greater importance given to universal rules or to particular circumstances that require special treatment? Does your culture value the individual or the group more? Are feelings generally unstated or stated very subtly? Are they, instead, expressed openly and directly? Does one gain status in your culture by his or her achievements or because of birth, age, position or connections? Do people in your culture live in harmony with the environment or seek to control it?

19. Describe briefly an example of miscommunication or misunderstanding that you have experienced and that can be attributed to differences in cultural perspectives.

20. Suggest how one element from the folklore of your native culture can illustrate one or more of its cultural beliefs or attitudes.

21. UNESCO claims that cultural diversity is "the common heritage of mankind" that "is as necessary for humankind as biodiversity is for nature". Do you agree or disagree with this statement?

22. Some people say that the biggest political divide in a democracy is not between the left and the right but between people who are passive and people who are engaged and concerned about politics. Do you agree or disagree with this statement?

23. Describe a map that has persuaded you to revise an opinion or belief that you have held.

24. "Common sense consists of those layers of prejudice laid down before the age of 18" (Albert Einstein). Do you agree or disagree?

25. Some musicians are blind. No astronomers are blind. Some astronomers are musicians. Is this logically true?

26. "There are two ways to slide through life: to believe everything or to doubt everything; both ways save us from thinking" (Alfred Korzybski). Do you agree or disagree?

27. Does it matter what we believe is true? Is there any harm in believing claims that are demonstrably false?

28. "I know that if I tease my little sister, she will squint her eyes and close her mouth tightly." Is this a knowledge claim? If it's true now, could it conceivably be false in the future?

29. Do you believe that the end of the search for knowledge in the natural sciences is now in sight?

30. Do you feel pity for our ancestors for knowing so little? Or do you feel that we are no better intellectually and morally than people who lived thousands of years ago?

{See Appendix I for a sample of student responses}.

Activity I

Important Terms Defined or Illustrated

For each example, quote or definition below, encourage students to connect it with a term that might be useful for them to learn. The teacher may prepare large cards with the terms written on them that students may examine. Or the teacher may write them on a whiteboard or project them on a screen for all the students to see. The terms could include some or all of the following: paradox of mapmaking, argument from ignorance, confirmation bias, fallacy, gullibility, counterclaim, coherence, mental map, ways of knowing, pragmatics, common sense, certainty, skepticism, radical doubt, relativism, perspective, straw man argument, coherence, paradox, evidence, paradigm shift, deduction, personal knowledge, knowledge claim, culture, shared knowledge, the problem of knowledge, tautology, propaganda, metaphysical claims, induction. Encourage students to come with their own terms if these are unfamiliar or do not seem appropriate. Students may also identify multiple terms that seem appropriate to them, so long as they explain their reasons for thinking so.

1. "The human understanding when it has once adopted an opinion (either as being the received opinion or as being agreeable to itself) draws all things else to support and agree with it" (Francis Bacon).

2. "You cannot prove beyond a doubt that global warming exists. It has been extremely hot in the past and a lot of ice has melted. Therefore, global warming does not exist."

3. "Your argument is persuasive. However, there are some important arguments that your opponents have made that you should consider more carefully."

4. "There's a sucker born every minute."

5. "A map that is perfect would be useless."

6. "I believe this knowledge claim because it fits in with the system of beliefs that I have inherited from my culture."

7. "We all have some ability to make judgments that are usually (but not always) sound, even though we might not have a formal education. This is part of being human."

8. "I am going to question all of my former opinions" (Rene Descartes).

9. In daily discourse—the arguments that we make with our friends, the articles we read in the newspaper, the speeches that politicians deliver in the public square—one hears arguments that are illogical, even though many people fail to see that they are.

10. "If we could see others the way they see themselves, it would change everything about how we relate to each other" (Mike Messerli).

11. "That heavy bodies fall faster than light ones was once obvious. That bloodsucking leeches cure most diseases was once obvious."

12. "Even if these claims are extremely improbable, I believe that they are worth examining."

13. We come to know things in numerous ways—through our senses, through reasoning, through emotion, through language, through faith, through imagination, through intuition and through memory.

14. You must not take the concepts of your own society or even of a historical period for granted. You must question everything, even the proposition that you exist and that life is not merely a dream. This may lead you at times to the discovery that the Emperor is naked, that his splendid clothes are nothing but the products of your fantasy.

15. "I've only been here for a couple of days, but I really like it. The people in this town are really friendly."

16. What is a common word that we use to describe "the learned patterns of behavior (i.e. traditions and customs) characteristic of a society"?

17. "There are an infinite number of prime numbers (numbers divisible only by one and themselves)."

18. "I believe this knowledge claim because I can immediately see that it is useful."

19. We often reason from statements (assumed to be true) to a conclusion. Sometimes this is called "top down" reasoning or "reasoning from the general to the particular".

20. We've only been around in the cosmos for a little bit of time. We are strongly influenced by history and culture. What we believe is a matter of common sense now might be viewed as naïve and completely wrong by future generations.

21. "My opponent thinks that our current educational system is perfect. I beg to differ. I think we need to make some fundamental changes if we are going to have any chance of being competitive in this new century."

22. "Either he will win the election or he won't."

23. Scientists often make careful observations. Then they reason from particular examples or facts to suggest the application of general rules or laws.

24. "The laws of physics are not open to doubt."

25. Throughout history, governments have sought to control and release information, sometimes false, in an effort to influence people's beliefs.

26. "We receive as friendly that which agrees with us and resist with dislike that which opposes us; whereas the very reverse is required by every dictate of common sense" (Michael Faraday).

27. "There are four people suspected of the murder. Two are women. One is a butler who has a terrible back injury. The fourth is the victim's business partner. The victim was killed in the bathroom and carried (not dragged) to his bed. Neither woman was strong enough to lift the body. The butler could not lift it because of his injury. Therefore, the business partner must have committed the crime."

28. These are claims that involve ideas about life or existence that are beyond the physical world.

29. "There is no strong evidence for the existence of UFOs, but I am willing to admit that they might exist."

30. This term refers to a fundamental change in approach or underlying assumptions in an area of knowledge that can lead to changes in the worldview that most people hold.

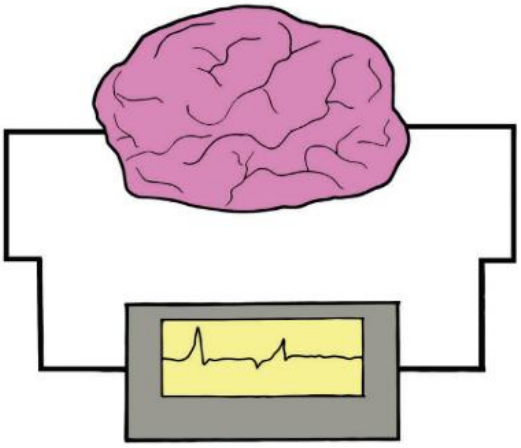
31. Human perceptual and cognitive imperfections play a role in deceiving us with respect to matters of great importance.

32. "If it disagrees with experiment it is wrong. It does not matter how beautiful your guess is. If it disagrees with experiment it is wrong. That is all there is to it" (Richard Feynman).

33. These are assertions that are opposed to our own. We must consider them carefully when making our case.

34. This is something that does not make sense to us or that seems counterintuitive or contradictory.

35. Who is to say that we are not really brains in a vat and that all that we perceive is not all illusion? Can we really have **any** knowledge about the world? It seems not.



ACTIVITY II

DEDUCTION OR INDUCTION

Deductions usually are "top-down" and move from the general to the particular. This is not always the case, but it is usual. The conclusion of a deduction has to be true if the general statements preceding it are assumed to be true.

Inductions are usually "bottom-up" and move from the particular to the general. This is not always the case, but it is usual. The conclusion of an induction is not absolutely certain. You can make the conclusion more probable by adding statements to support it, but the conclusion can never be 100 percent true.

Consider this example:

1. Saburo is 80 years old.

2. He cannot run a mile in under four minutes.

This may be true, but it could be false. Encourage students to make additional statements that might make the conclusion in (2) more likely. Here is, perhaps, a more persuasive argument.

1. Saburo is 80 years old.

2. He has arthritis in his legs.

3. He has never run a mile in less than four minutes.

4. He has difficulty breathing.

5. He cannot run a mile in under four minutes.

In this case, the conclusion is probable but not absolutely certain. You can make it certain by adding the statement: "He is paralyzed below his neck." But in this case, the conclusion is no longer an induction. It is a deduction!

The following statements are either deductions or inductions. Please label each statement as one or the other.

1. All people throughout history have made mistakes. Therefore, they will certainly make them in the future.

2. German shepherds are dogs. My pet is a German shepherd. Therefore, my pet is a dog.

3. Bullet trains in Japan are safe. In fifty years, not one person has died in a bullet train crash.

4. Dark matter has never been "seen" by scientists. Still, without that sort of glue, galaxies would fall apart. Therefore, dark matter exists.

5. Sherlock Holmes and Dr. Watson are on a camping trip and getting ready to sleep. Holmes tells Watson that he sees thousands of stars. He asks Watson what this means. Watson says that it will be a nice day tomorrow.

6. Sherlock Holmes and Dr. Watson are on a camping trip and are getting ready to sleep in their tent. The tent is made of opaque green canvas. Holmes tells Watson that he sees thousands of stars. He concludes that there are large holes in the canvas at the top of their tent.

7. "I have seen thousands of trilobite fossils in my life. I have never seen one alive. They must be extinct."

8. "I believe that the sun will rise tomorrow. I have been living for many years now, and the sun has always come up in the morning. I have every reason to believe that it will do so tomorrow."

Activity III

Evidence of False Claims

Write four "knowledge claims" about yourself. Make these as varied as possible. Three of these claims must be, in fact, true. One claim must be false. For example:

"I have three older brothers."

"I speak three languages fluently."

"I collect stamps."

"My father owns a company that makes sporting goods."

Second, form groups of three persons. Each person in the group examines the knowledge claims that the others in the group have written. Then, each person in the group has three minutes in which to ask questions of the others. The person doing the questioning is seeking to discover which claims are false. However, direct questions are not allowed. You cannot say, for example: "How many languages can you speak fluently?" "Do you really collect stamps?" "How many older brothers do you have?"

Now, have a full-group discussion. Share your findings and answer the question: "How do we know that a given claim is false?" In particular, focus on these questions:

1. Which claims were easy to test?

2. Which claims were difficult to test?

3. Did you rely only on verbal language or did you note body language to reach conclusions?

4. Did your relationship with the person you interrogated affect the kinds of questions that you asked?

5. What did you consider to be adequate evidence of a false claim?

ACTIVITY IV

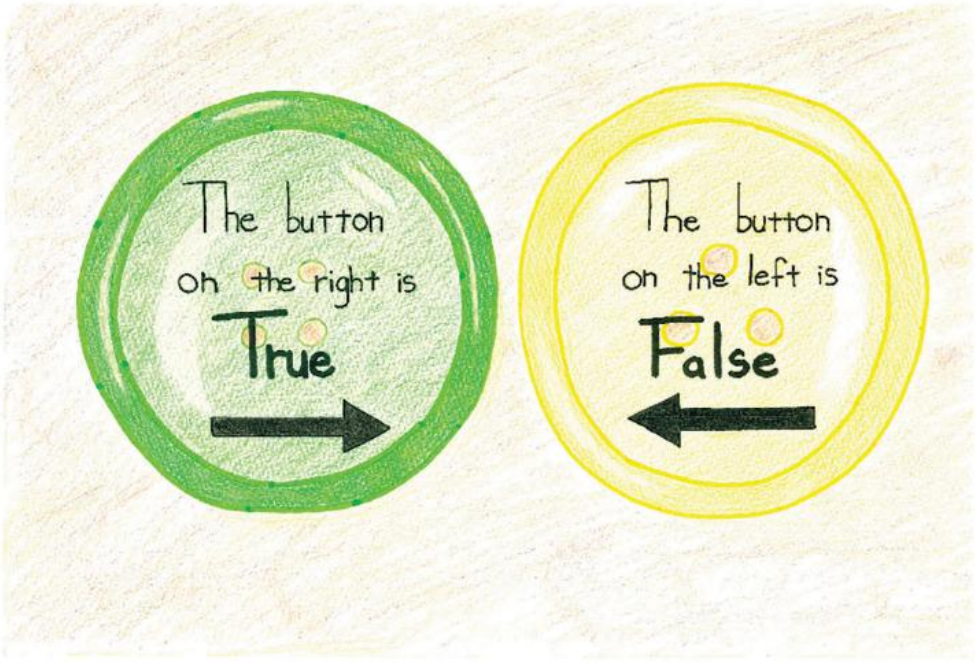
PARADOX

A "paradox" as an argument that leads to what seems to be a conclusion that strikes us as baffling or contradictory. Consider the following paradox and discuss your reaction to it.

A traveler came upon an old man sitting at the intersection of two small roads. The man said: "The first thing said to you by the first person you meet today will not be true. Trust me. Don't believe what he says."

The traveler was confused. This was the first thing said to him by the first person he met that day. The old man sensed his confusion. He said, "What I said is **both** true and not true."

But that's not possible, is it?



Activity V

Silent Debate

Take seven minutes to draw a large map of the world on a large sheet of construction or similar paper provided by the teacher. Do not look in a book or at another map.

After seven minutes, walk silently around the room and look at the maps that your classmates have made. Write comments on the empty parts of the paper around the maps that they have drawn, again without saying a word aloud. Take time, while doing so, to read what your classmates have written.

This activity should take no more than fifteen minutes.

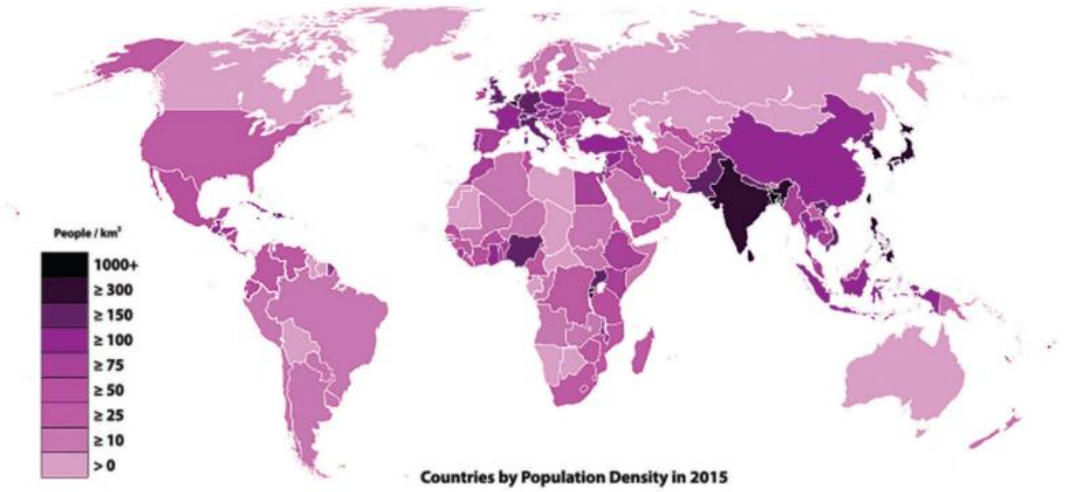
ACTIVITY VI

MAP QUEST

Maps can be used for many purposes. Discuss how the following maps might help us to put certain questions into perspective or pique our intellectual curiosity. Students should discuss their reactions to these maps and talk explicitly about how shifting perspectives can be surprising, useful or both.

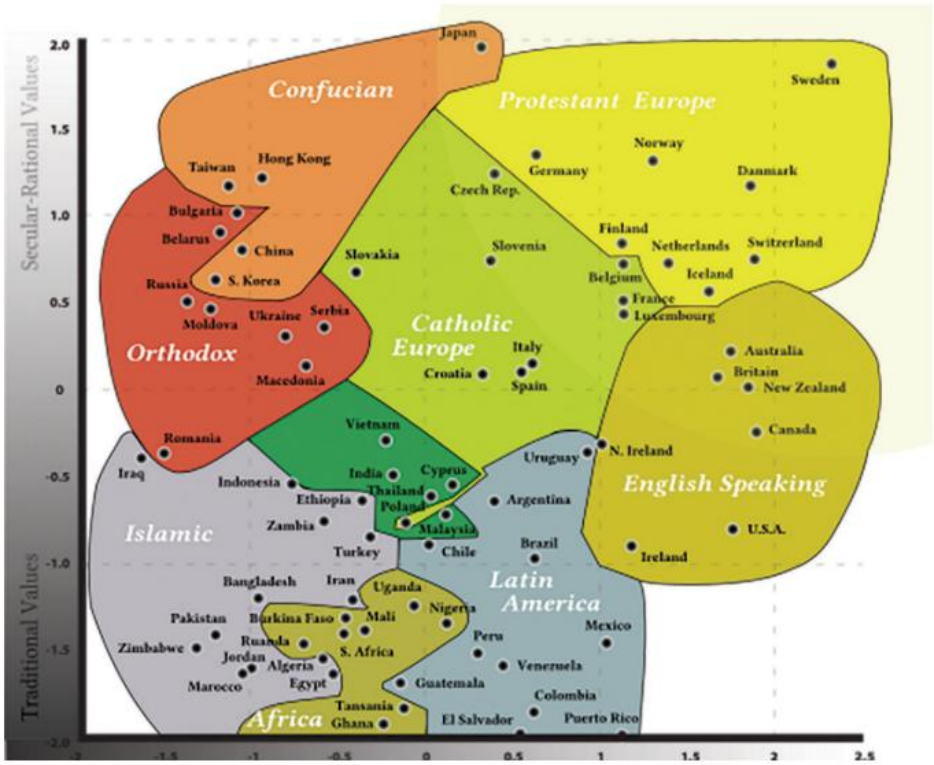
1. World Population Map

Some cartographers have used population to determine the relative sizes of the countries but have tried to keep the shapes of the countries recognizable where possible. Suppose that you were to do this with the following map. How would the physical dimensions of the countries differ? What would happen to Canada and Australia? Why would they virtually disappear from the map?



Countries by Population Density in 2015

2. World Map of Values



Is this map at all useful or accurate? What biases might have influenced the construction of this map? How do survival values and self-expression values differ?

Perhaps it will be easier to read this map if you keep in mind that traditional values emphasize religion, parent-child relationships, obedience to authority and traditional family values. Traditional societies usually oppose suicide, divorce and abortion and tend to be nationalistic. Secular-rational societies have opposite preferences.

Survival-oriented societies emphasize physical and economic security and tend not to trust or welcome outsiders. Societies that value self-expression give high priority to tolerance, equality and political inclusion.

3. Word Frequency Map

Some maps use word frequency software data (the most "searched for" terms or terms appearing online) to pick the word that is most used by people from different countries. Here are some of the results from one such search. Do any of these results surprise you? Speculate about why these words might be so frequently encountered in these countries.

USA=War

Canada=Quebec

India=South

Mexico=Indigenous

Australia=New

China=Dynasty

UK=Ireland

South Korea=North

North Korea=South

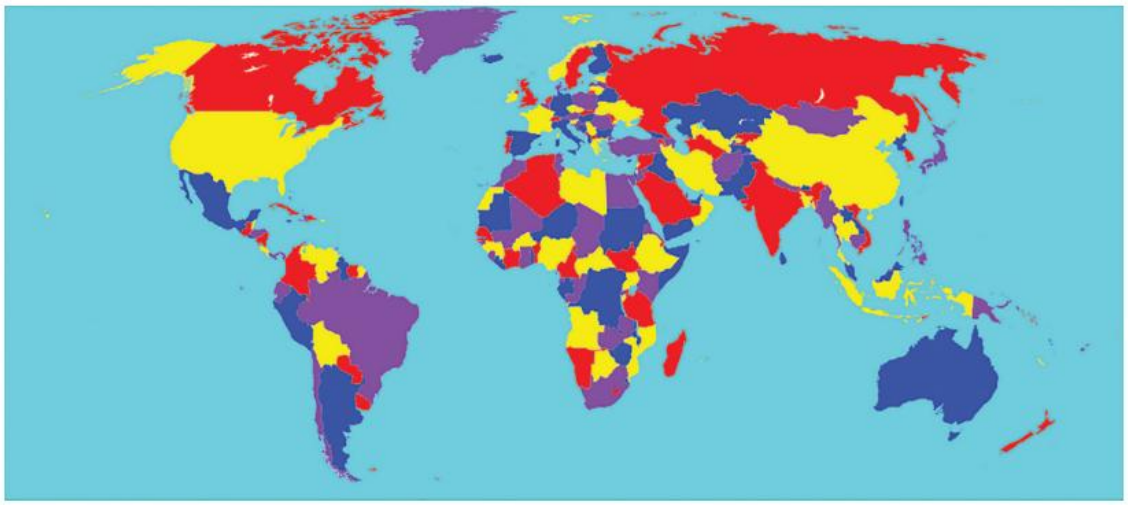
France/Japan/Finland/Sweden/Norway/Germany=World

Greenland=Denmark

Spain=War

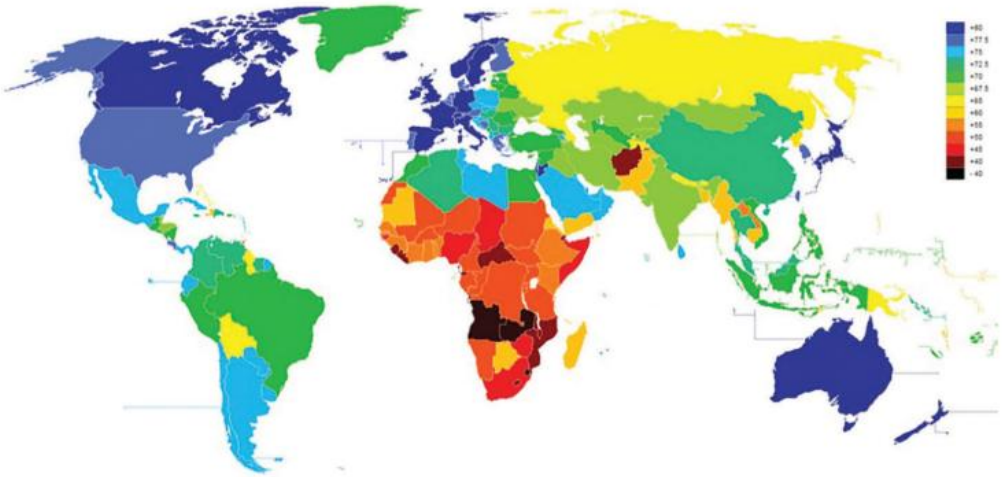
NZ/Madagascar=Island

4. The Four-Color Theorem



There is a famous theorem in math called the four-color theorem. It holds that no more than four colors are required to color the countries of the world map in such a way that no two adjacent regions have the same color. Two regions are not adjacent if they only share a corner point and not a common border. Do you think that one can make a three-color map of the world using the same conditions? Do you think mapmakers care about the four-color theorem?

5. World Life-Expectancy Map

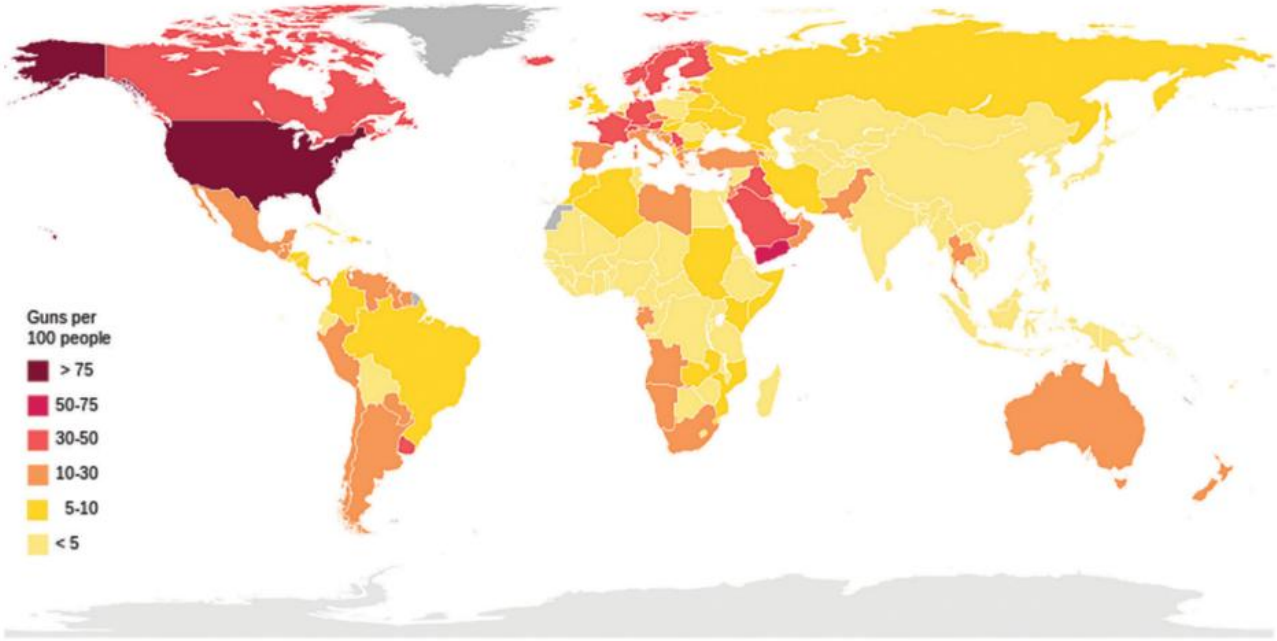


According to this map, Japan, Switzerland and San Marino have the longest life expectancy. The thirty-two countries with the lowest life expectancy are in Africa. Of course, this data raises many uncomfortable questions about why there are such disparities. However, do you think that this kind of map—as a map—is likely to be more or less "accurate" than, for example, a map of human happiness?

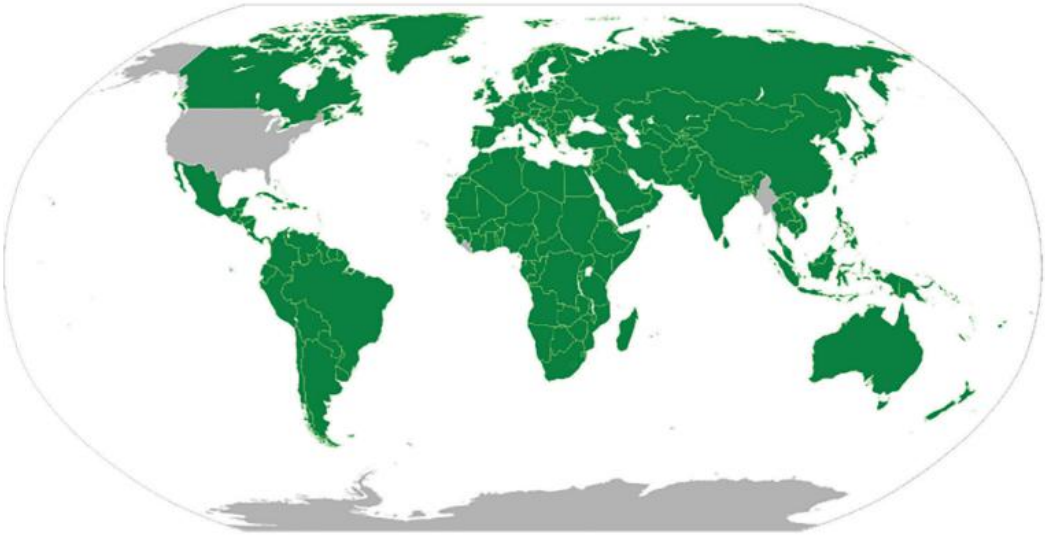
6. World Gun Ownership Map

This map of world gun ownership is problematic in a number of senses. Ask students to speculate why this might be the case. After the students have had ample time to discuss possible problems, mention these points if they did not come up and ask students to share their reactions. First, the map is based on an estimate of individually owned guns in each country per 100 people of each country. The margin of error for some countries (such as Yemen) is very high, while the margin of error for others (such as the USA) is very low and the count is quite reliable. Second, people may possess multiple firearms. This is especially the case in the USA. Third, in some countries such as Israel and Switzerland, many people possess government issued guns, which are not counted.

The USA has the most guns per resident, followed distantly by Serbia and Yemen. Tunisia has the fewest. Japan has very few guns per capita. In all countries with very low ownership rates, strict gun regulation is in force.



7. Countries that Have Not Officially Adopted the Metric System

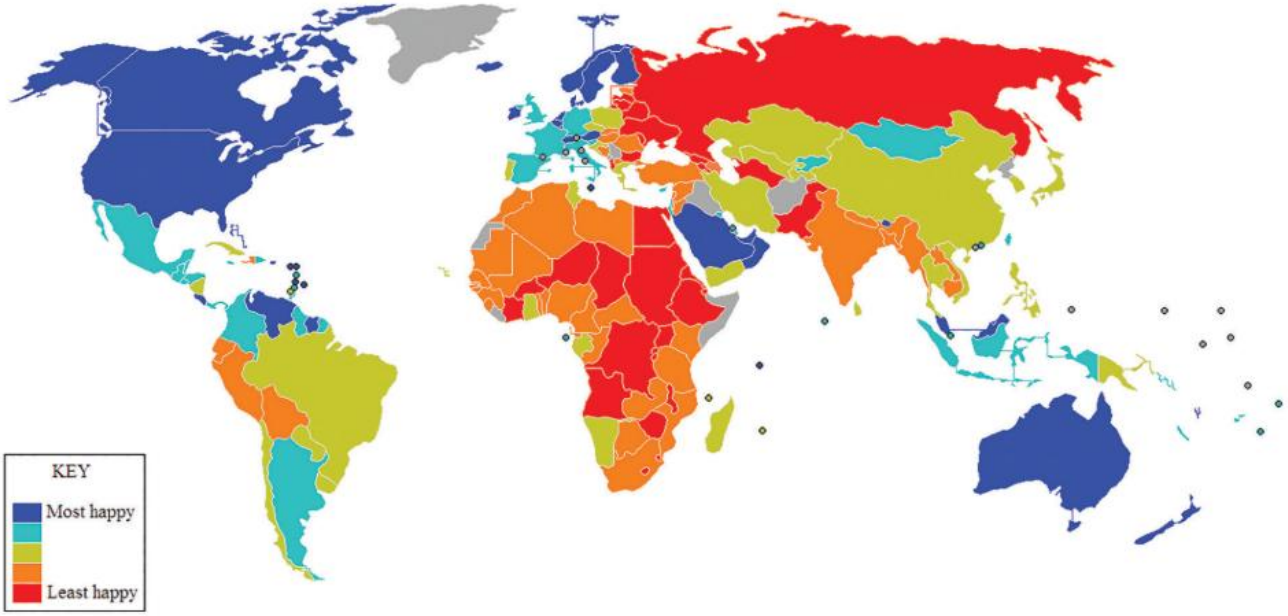


8. Countries Never Invaded by the United Kingdom

See the following site for a graphic representation of the countries of the world (21 of 22 indicated) that have never been invaded by the United Kingdom. Does this map surprise you? How do you reconcile this map with the well-known phrase "Pax Britannica"?

http://www.telegraph.co.uk/history/9653497/British-have-invaded-nine-out-of-ten-countries-so-look-out-Luxembourg.html

9. World Happiness Map



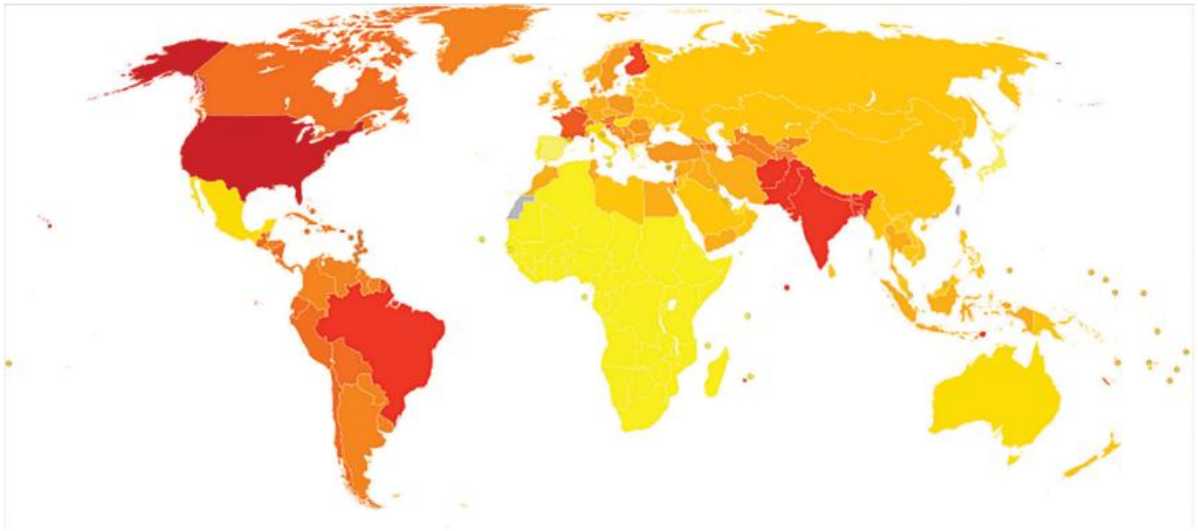
The teacher may wish to discuss the criteria that one might consider in making this sort of map. Ask students why this sort of map might be controversial. It's certainly difficult to assign concrete numbers to an abstract emotional state such as happiness. The makers of this map used three criteria when asking people questions—general satisfaction with life and people's positive and negative feelings on the day prior to being surveyed.

According to this map, Denmark, Switzerland, Norway and the Netherlands are the happiest countries. Togo, Benin, Central African Republic, Burundi and Rwanda are among the least happy.

Do these results surprise you? Before seeing this map, which countries would you have predicted would be happiest and least happy?

Can you think of other criteria that might change the data and thus result in a different map of the world?

10. World Map of Clinical Depression



Gray indicates no data. Light yellow indicates 700 cases per 100,000 individuals. Bright red indicates 1450 + cases per 100,000 individuals.

Clinical depression is, by definition, diagnosed by a licensed medical practitioner. What does this suggest about the reliability of this map? Even if people in all countries had comparable access to medical practitioners, what about people whose feelings of debilitating sadness do not meet the criteria for a diagnosis of clinical depression? Can we learn anything of use from this map?

Other Map Resources for Active Learning

In general, teachers can examine the wonderful resource "Forty Maps that Explain the World", published by the *Washington Post*.

https://www.washingtonpost.com/news/worldviews/wp/2013/08/12/40-maps-that-explain-the-world/

Included are the following twenty maps plus twenty other maps that can serve as provocative discussion starters:

Political map of the world c. AD 200

Where people are most and least welcoming to foreigners

The world's major writing systems

The best and worst places to be born

World map of major religions

The countries where the people are most and least emotional

A European missionary's map of Africa c. 1908

Where the people are most and least racially tolerant

The world's most and least ethnically diverse countries

Where the people feel the most and least loved

A Russian professor thinks the U.S. will break up into these four countries

Who loves and hates America

How the U.S. and China compare on global popularity

Where people are the most and least tolerant of homosexuality

Languages and dialects of the Middle East and Central Asia

Where people smoke the most and least cigarettes per person

Economic inequality around the world

Global crop yields are stagnating

The best and worst countries to be a mother

Child poverty in the developed world

See also "Forty More Maps that explain the world":

https://www.washingtonpost.com/news/worldviews/wp/2014/01/13/40-more-maps-that-explain-the-world/

ACTIVITY VII

STRAW MAN

The straw man is a type of argument in which you misrepresent what someone says to make it easier to attack. You can exaggerate. You can misinterpret on purpose. You can even make up something that the person didn't even say if the people you are talking to believe you. This is a dishonest and unfair way to make an argument.

Example:

Smith: "I think that the government needs to spend more tax money on education and health care."

Jones: "I am surprised that Mr. Smith hates our country so much that he is willing to cut defense spending and leave us open to attack by our enemies!"

Make a Straw Man Argument!

(1) Smith: "The snail darter is a small fish that lives only in this one part of this one river. It's almost extinct. If we build a meat processing plant here, the pollution from the factory could destroy the snail darters. We should not build it. We have to protect the fish from extinction.

(2) Smith: "We should not hire untrained workers to give tickets to people who park their cars illegally or when the parking meters expire. We should let the police do this. They have to patrol the neighborhoods anyway. They can do this job."

(3) Smith (to his wife): "We need to clean out these closets. They are stuffed with junk that we never use."

(4) Smith: "We should teach teenagers about how to have safe sex."

(5) Smith: "We should convert at least one lane on all major streets in the center of the city to bicycle-only lanes."

(6) Boy (to his Mom): "Can we please get a pet dog?"

Mom: "No. I don't think that it's a good idea."

(7) Peter Singer: "Killing animals to satisfy our preference for certain kinds of food is wrong."

(8) Dad: "We need to conserve fuel. We should use bicycles more often, walk when possible and take the subway."

(9) Meat Lover: "I think it's natural for human beings to eat meat. Our most distant ancestors were hunter-gatherers and relied on meat to live."

(10) Politician A: "I believe that we should abolish the death penalty."

{See Appendix II to this text for possible straw man arguments in response to the prompts in this activity}.

ACTIVITY VIII

GOOD KNOWLEDGE QUESTIONS?

Which of the following are good knowledge questions? Why? Which of the following are not good knowledge questions? Why? What areas of knowledge are implicated in the following questions?

Remember that knowledge questions ask how we construct and evaluate knowledge. These questions do not lend themselves to a single correct answer. They are open questions that are the sources of many of the most impassioned debates and controversies that confront us. We express knowledge questions in general terms.

Although we might generate different but equally plausible answers to the knowledge questions that we confront, we must always arrive at answers that are reasonable. In doing so, we must respond adequately to reasonable counterclaims that others may make while at the same time understanding that our personal perspectives may influence both our analysis and the answers that we ultimately give.

In formulating these knowledge questions, it's important that we use general terms and not the specialized language or the methods of academic disciplines from which these questions arise.

1. What methods are used in history to go about understanding the past?

2. What would happen to you if you were to drink seawater?

3. Can emotions ever be rational?

4. Why can't humans regenerate limbs the way some species can?

5. Why did the United States fail to achieve unconditional victory in the war in Vietnam?

6. To what extent is perception more reliable than reason?

7. Does your handwriting provide clues about your personality?

8. Is it possible that the knowledge that we most value is the knowledge for which we can provide the strongest justification?

9. Did Spartan mothers really smile when they learned that their sons had fallen in battle?

10. Why do some children believe that the moon is made of green cheese?

11. Are reason and emotion equally necessary in justifying moral decisions?

12. Why are the star and crescent moon symbols of Islam?

13. When should we discard explanations that are intuitively appealing?

14. If everyone in China jumped out of their seats at once, could they change the Earth's orbit?

15. Does our language influence our emotions?

16. Why are manhole covers round?

17. Are reason and perception ever free of emotion?

18. Do ostriches really bury their heads in the sand?

19. Is it an oversimplification to claim that some ways of knowing give us facts while others provide interpretations?

20. Do taller male candidates usually win elections?

21. In areas of knowledge such as the arts and the natural sciences, do we learn more from work that follows or from work that breaks with accepted conventions?

22. How important is it to be consistent in our moral reasoning?

23. Is absolute certainty achievable in mathematics?

24. When do fish sleep?

25. Are some ways of knowing more likely than others to lead to the truth?

ACTIVITY IX

LEFT (LIBERAL) OR RIGHT (CONSERVATIVE)?

At the French Assembly of 1789, the delegates who favored preservation of the royal system sat on the right side of the chamber. Those who favored change sat on the left. The terms right and left have stood for conservatism and liberalism ever since.

Do you think that the following claims are liberal or conservative? Why? Feel free to disagree with what your classmates say, but be sure to give a reason for your position. Is the position a pragmatic one or does it rely on the existence of a certain kind of moral matrix? Consider the following six matrices: care/harm, fairness/cheating, loyalty/betrayal, authority/subversion, sanctity/degradation, liberty/oppression. [See Jonathan Haidt, The Righteous Mind: Why Good People are Divided by Politics and Religion (2012).]

Note that the matrices identified above are descriptive of what people think to be right and wrong. They are not all "normative" in the sense of identifying what ought to be right and wrong. In other words, people may have reservations about calling some of these concerns "moral" as opposed to "political".

1. People start off from positions of inequality (with respect to wealth, access, power and privilege and so forth). Government should guarantee access to basic education, health care and basic goods such as food and shelter to all of its citizens.

2. "The rich get richer and the poor get poorer."

3. Government should not mess with the free market. It should not impose excessive regulations since these will lead to the destroying of incentives and create inefficiency in the economy.

4. Government should regulate businesses to make sure that workers get fair wages and enjoy safe working conditions.

5. Taxation should be progressive. The rich should pay a larger share of the taxes, as a percentage of assets, than the poor.

6. Businesses, not governments, should own and manage institutions such as schools and prisons.

7. Government should uphold family values and not recognize the marriages of those who are gay.

8. "Wealth trickles down."

9. Sexuality, gender roles and childbearing decisions are private matters. Governments should protect the rights of citizens and not impose social controls or the values embraced by the majority of citizens.

10. Governments have no business creating welfare programs and giving tax money to people who are poor. Individuals can give to charities if they want their money to be used in this way.

11. Taxation should be kept to a minimum and should not be progressive.

12. Governments should spend money on national defense but as little as possible beyond that.

In small groups, students may attempt to come up with two to three claims that they consider politically conservative and two or three claims that they consider politically liberal. Then they should share their statements with the whole class and invite comments.

Some people believe that recent events such as terrorism, the 9-11 terrorist attacks, terrorist attacks by ISIL, and the costly wars in Iraq and Afghanistan have "profoundly reset the playing field of politics." (Nader Mousavizadeh, "Domestic policy in the West transformed by the Islamic State", Japan Times, April 26, 2016).

In small groups, read aloud the following paragraphs from this same article and comment about the possible change in the meaning of the words liberal and conservative in this new world order.

> "Across the West, domestic policy debates—ranging from immigration to law enforcement to education—are now refracted through the lens of the new terrorism. Because of the Islamic State-related attacks in the United States and Europe, the line between foreign and domestic policy is gradually being erased.
>
> Distinctions of left versus right or liberal versus conservative now obscure rather than illuminate the policy decisions confronting governments. Today, an anti-immigrant policy can just as easily emerge from the political far left as from the far right.
>
> The metastasizing crisis of confidence in mainstream politics may have been sparked by the Islamic State atrocities in Paris, Brussels, Istanbul and San Bernardino, California. But it is rooted in something deeper: a corrupting gulf between the professed values of democracy and civil rights in Western policies, and the reality of the ways national interests in stability and security are pursued both at home and abroad."

ACTIVITY X

THE PERILS OF SECRET KNOWLEDGE

Daniel Ellsberg was an analyst for the Pentagon and famously leaked the so-called Pentagon Papers to the New York Times at the height of the Vietnam War. The documents were top secret and outlined American war objectives. Their publication was highly controversial and contributed to the cause of those opposed to the war.

In his book Secrets: A Memoir of Vietnam and the Pentagon Papers (2003), Ellsberg recounted advice about the Vietnam War and about the danger of secrecy that he gave to Henry Kissinger just after the latter was named Secretary of State in 1968.

Ask students to read this and to comment about what this might tell us about the limits of knowledge and the nature of "expert" opinion.

Ellsberg told Kissinger that he was now going to have levels of clearance far higher than "top secret" now that he was Secretary of State—perhaps twenty levels higher. He would be exhilarated by the information that would be available to him, but he'd realize that he'd been a "fool" for having ventured his opinions without having had access to that information. Then he would get used to getting top-level information and would come to view others as fools for not having it. After that, he would come to realize that there were limitations to even this top-level information.

"In the meantime," Ellsberg explained, "it will have become very hard for you to **learn** from anybody who doesn't have these clearances." A person with this kind of information will deal with a person who does not have the clearances "only from the point of view of what you want him to believe and what impression you want him to go away with, since you'll have to lie carefully to him about what you know. In effect, you will have to manipulate him. You'll give up trying to assess what he has to say. The danger is you'll become something like a moron. You'll become incapable of learning from most people in the world, no matter how much experience they may have in their particular areas that may be much greater than yours."

UNIT TWO
WHAT IS KNOWLEDGE?

For Further Discussion

1. "Information is acquired by being told, whereas knowledge can be acquired by thinking" (Fritz Machlup).

2. Sophisticated computers now routinely defeat the world's best chess players. Does this mean that computers can achieve knowledge?

3. What is the difference between true knowledge and simply remembering accurate information?

4. Have you ever crammed for a test, memorized information that appeared on the test but felt later that you did not really understand the subject? What does this tell you about the distinction between information and knowledge?

5. Do cultures overlap?

6. Can you belong to more than one culture?

7. Will the Internet eventually make so-called "brick-and-mortar" schools obsolete?

8. Is having access to the Internet a basic human right?

9. If you were responsible for hiring a new teacher for a high school, what qualities would you look for? Would these qualities be different depending on the subject to be taught?

10. Do you think that all governments should be pressured to switch to the metric system so that there is a universal language of weights and measures across borders?

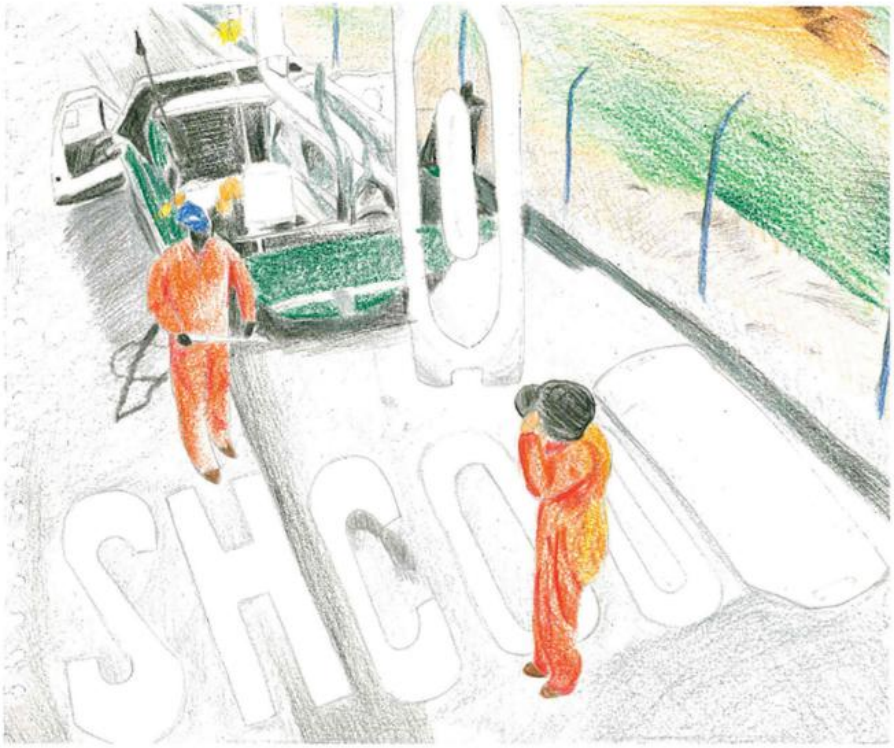
11. Why does no one use a ten-hour clock instead of the traditional twelve-hour clock? Would it make more sense to make the switch?

12. Do you think that the Internet contributes not to an embrace of diversity but instead to homogenization? Do you fear that, in the future, people everywhere are going to be reading the same content, watching the same movies and listening to the same music?

13. Some have claimed that the Internet broadens our horizons while at the same time narrowing our minds. Do you agree or disagree?

14. Some have said that Wikipedia, a website whose content is created by unpaid amateurs, is a good place to start a research project but a bad place to end it. Do you agree or disagree? Why?

15. "Schools should seek not only to impart knowledge to students but also to instill national and cultural pride." Do you agree or disagree with this statement?



16. As fast as you can, count from one to ten. Then, as fast as you can, recite the letters of the alphabet from A to J. Now combine the tasks. Say "1-A, 2-B" and so forth all the way to "10-J". Which method is faster? What does this say about multitasking?

17. Does your school promote an ideal of "good citizenship"? If so, how would you describe this ideal?

18 "Wisdom is the right use of knowledge." Do you agree or disagree? Is there a difference between the two terms?

19. Can a young person ever know what it's like to be old and fragile?

20. Describe what garlic tastes like.

21. "Propaganda is to democracy what violence is to dictatorship" (Noam Chomsky).

22. Describe how to whistle a tune.

23. "We can never be sure of anything that only we ourselves know and no one else" (Hannah Arendt).

24. Describe an experience you have had in which thinking too much has made it difficult or impossible for you to act.

25. Describe a work of art or a piece of music that has moved you. Are you able to communicate to another person what is special about that art or music?

26. Do you think that citizen journalists are just as reliable as professional journalists? Explain your position.

27. "In the Internet age, knowing where to locate information is more important than having it on the tip of your tongue or stored in your memory." Do you agree or disagree?

28. A recent survey of high school students from South Korea and China conclude that over two-thirds of them were influenced by images in the movies of students at American universities. What do you think about this? Is this evidence that the media wields dangerous and inordinate influence in our world today?

29. A recent survey of high school students from South Korea and China concluded that over two-thirds of them were influenced by images in the movies of students at American universities. What do you think about this? Is this evidence that the media wields dangerous and inordinate influence in our world today?

30. If a nuclear war and the ensuing nuclear winter annihilated all human beings, but many libraries and electronic databases survived, would there still be knowledge available on our planet?

31. Think of a group of people such as veterans of foreign wars who have had the same experiences and often socialize with one another. To what extent do they have secret or incommunicable knowledge that is not shared outside of their group?

32. Does personal knowledge play a greater role in some areas of knowledge than in others?

33. Describe some of the dangers to which personal knowledge can lead us if we are not careful to invite other people to scrutinize our claims and our opinions?

34. Without consulting the Internet or an encyclopedia, explain what makes the sky blue.

35. Suppose that a farmer asks his dairyman where his prize cow Daisy is. The dairyman says she is in the field grazing. The farmer goes to the fence to confirm this. He sees the shape of his favorite cow and reports back to the dairyman. The dairyman, though, just to make sure, takes a closer look. He finds the cow grazing in a hollow, not visible from the fence. There was a piece of paper with black and white coloring caught in a tree. It looked from a distance just like Daisy. The farmer believed he saw Daisy. It is true that she was grazing in the field. However, was the farmer **justified** in believing this? Did he really know that Daisy was safe and accounted for?

36. "Overconfident professionals sincerely believe that they have expertise, act as experts and look like experts. You will have to struggle to remind yourself that they may be in the grip of an illusion," (Daniel Kahneman).

37. "Baloney, bamboozles, careless thinking, flimflam, and wishes disguised as facts are not restricted to parlor magic and ambiguous advice on matters of the heart. Unfortunately, they ripple through mainstream political, social, religious, and economic issues in every nation" (Carl Sagan).

38. In Latin there is a famous phrase attributed to Pliny the Elder. "Ne supra crepidam sutor iudicaret." It means: "The shoemaker should not judge beyond the shoe." Do you agree?

39. Do you think that Bollywood and Hollywood have an influence on where students from around the world want to study when they attend university?

ACTIVITY I

KNOWLEDGE CLAIMS

Think about the following knowledge claims. What kind of knowledge do they represent? What are sources of the knowledge? Is it obvious (intuition)? Do you remember it (memory)? Do you believe it without other evidence (faith)? Does it feel right (emotion)? Did you hear about it or read it about it (language)? Does the claim depend upon the evidence of your senses (sense perception)? Did you figure it out on your own (reason)? Do you know because you can empathize (imagination)? Also indicate whether you think that the knowledge claims are improbable, unlikely, possible, probable or certain. Finally, all of these statements take the form of "personal" knowledge statements. Which statements, though, are very personal and which are more public and shared?

1. I know that I am mortal.

2. I know how to play the alto saxophone.

3. I know New York City very well because I was born and raised there.

4. I know that murder is wrong.

5. I know that licorice candy is delicious.

6. I know that if I correct my friend's English he will get upset with me.

7. I know that the sky is blue.

8. I know that there are more cases of the Ebola virus reported in Africa than in Europe.

9. I know how pick a winner at the racetrack.

10. I know that there is a God and that he rewards those who seek Him.

11. I know how to solve algebraic equations.

12. I know that there is no life after death.

13. I know that my brother would never do such a thing.

14. I know that Sirius is the brightest star in the night sky.

15. I know that tomorrow morning the sun will rise again.

16. I know that ice cubes are cold.

17. I know that James must be feeling very devastated by the news.

18. I know how to make an origami crane.

19. I know that my mother is lying to me.

20. I know Paris of the 1800s very well because I have read all of Balzac's novels.

21. I know that atoms have electrons and other particles.

22. I know that there are more people in Brazil than in Paraguay.

23. I know that Annie is wearing a pink shirt and blue jeans today.

24. I know that my son did not commit the crime of which he is accused.

25. I know that lemons are sour.

ACTIVITY II

IMPORTANT TERMS DEFINED OR ILLUSTRATED

The following are examples, quotes or definitions illustrating or explaining terms that are important in discussing knowledge issues. Please match each example, quote or definition with one of the following terms: thick concept, empiricism, shared knowledge, acquaintance, personal knowledge, multitasking, urban legend, experiential knowledge, verbal overshadowing, knowledge question, indoctrination, authority worship, groupthink, wishful thinking, agenda setting, sensationalism, literary canon, incommunicable knowledge, justified true belief, intelligent design, critical thinking, bias blind spot, dark money, Ockham's razor, false balance or algorithm. Note that a single term may apply to more than one of the examples, quotes or definitions in the sentences that follow. The teacher may wish to write these terms on large cards in a way that is visible to all students as they consider the examples.

1. Some people think that there is nothing wrong with driving and talking on a no-hands cell phone at the same time.

2. One cannot give a short definition of the word "truth" that is complete. It's too complex. One learns the meaning of the term through experience and reflection.

3. Knowledge is gained ultimately through sense perception only.

4. This is a type of knowledge that is gained through acquaintance and practical knowledge (know-how).

5. This is a list of the written works of prose and poetry with the greatest literary and cultural value.

6. "And the cumulative worldwide buildup of knowledge over time converts science into something only a little short of a transnational, trans-generational meta-mind" (Carl Sagan).

7. Many people who are asked to give a verbal description of a face that they have seen actually have more trouble recognizing that face later on than someone who does not give such a description.

8. The mass media often report events that appeal to the emotions but are relatively trivial compared to issues that affect people globally and are thus more newsworthy. Cynics say that this tendency is related to the need to increase viewership and readership.

9. When you are given two theories that are equally supported by the evidence, you should choose the theory that is simpler.

10. Some people believe that the almost incomprehensible complexity of the human visual system provides evidence that there is a Creator.

11. Lobbies for powerful interests often funnel anonymous donations into the political process. This can cause a power distortion that affects our quest for knowledge.

12. He has a pet conspiracy theory about the bombing of that federal building. However, he has no evidence to support this theory. It seems that he just wants it to be true.

13. She thinks that she is the only one who is thinking about this issue clearly and rationally. That's why she is urging her colleagues to follow her advice.

14. Some call for giving equal time in the classrooms to Creationism and the theory of evolution, even though the evidence for the latter is far greater.

15. There is no way that I can share with you the astonishment and the terror that I felt when I first looked into the eyes of this infamous killer.

16. I know this because I believe that it is true, and I have good reasons for thinking so.

17. In evaluating knowledge claims, we must always think clearly and with an open mind and reach conclusions that are informed by the available evidence.

18. It's unfortunate but true that many very smart people know a great deal about their narrow field of study and almost nothing of any other field. They have great depth of understanding but no breadth.

19. I heard that people are sometimes attacked, put to sleep with drugs and then wake up missing one kidney that the attackers have stolen in order to sell it on the black market.

20. This term refers to a precise set of rules that specifies how to solve certain problems.

ACTIVITY III

GOOD KNOWLEDGE QUESTIONS?

Which of the following are good knowledge questions? Why? Which of the following are not good knowledge questions? Why? What areas of knowledge are implicated in the following questions?

Remember that knowledge questions ask how we construct and evaluate knowledge. These questions do not lend themselves to a single correct answer. They are open-ended questions that are, as we will see when we analyze real-life situations, the sources of many of the most impassioned debates and controversies that confront us. We express knowledge questions in general terms.

Although we might generate different but equally plausible answers to the knowledge questions that we confront, we must always arrive at answers that are reasonable. In doing so, we must respond adequately to reasonable counterclaims that others may make while at the same time understanding that our personal perspectives may influence both our analysis and the answers that we ultimately give.

In formulating these knowledge questions, it's important that we use general terms and avoid the specialized language or the methods of the academic disciplines from which these questions arise.

1. Who should decide how freely people are allowed to express themselves in a democratic society?

2. What is the definition of an equilateral triangle?

3. How many languages are spoken in the world today?

4. Is reason the only way of properly understanding the world?

5. To what extent do the arts shape the way we view the world?

6. Can we understand the divine without faith?

7. To what extent does the seafood industry in Thailand rely on the labor of unpaid workers?

8. Is it ethical for consumers in more prosperous countries to pay cheap prices for goods because of the low wages of workers in poorer countries that manufacture or harvest them?

9. What knowledge do we lose when a language becomes extinct?

10. How does the Internet work?

11. Does the Internet provide us with reliable knowledge?

12. What, exactly, are pulsars and how are these different from quasars?

13. To what extent are there power distortions discernible in the news provided to us by the mass media?

14. Is science a way of knowing or an area of knowledge?

15. Can people really survive direct lightning strikes without suffering permanent effects?

16. Why is skin cancer more common now than in ancient times?

17. To what extent is science subject to continual revision?

18. Is it true that certain ninjas in the past mastered the art of walking on water?

19. Is there a hierarchy of art forms that allows us to judge some types of art as "higher" or "better" than other types?

20. Can graffiti ever be considered art?

21. Why can't we use a giant magnifying glass to convert salt water to fresh water?

22. Are turkeys so stupid that they will look up in the sky when it is raining and drown?

23. What causes the meaning of words to change over time?

24. What is the difference between yams and sweet potatoes?

25. To what extent is our capacity to reason affected by our cultural perspectives?

26. Can a translation of a literary work ever be "definitive"?

27. Did Jesus have brothers or sisters?

28. Is consciousness something immaterial and apart from the brain and the nervous system?

29. To what extent is our knowledge of the past based on myths and distortions of the truth?

30. To what extent do our expectations influence our observations?

31. What is the Heisenberg principle?

32. Can the act of observation change what is observed?

33. Is wind power cost-effective?

34. Does the quinine in tonic water prevent malaria?

35. Can the arts provide us with a new way of seeing the world?

36. Is emotion the dominant way of knowing in the arts?

37. What happened to the colonists at Jamestown?

38. Can we ever know what happened to the colonists at Jamestown?

39. Can snakes tie themselves into knots that they can't get out of?

40. What distinguishes the language of birds, whales and bees from the language of human beings?

ACTIVITY IV

WAYS OF KNOWING AND JUSTIFICATION

The following are justifications or grounds given for making knowledge claims. Which ways of knowing (WOK) are implicated by each of these?

1. The weather report on the television news program predicted that it would rain all day tomorrow.

2. That makes sense to me. If we walk five miles an hour, we should be at the campsite before the sun goes down.

3. When I saw the exhibition of photographs of inmates in the concentration camps of World War II, I felt lonely, sad and ashamed to be a human being.

4. I saw him running down the sidewalk. He had a gun in his right hand. I remember feeling afraid. I hid behind a building but peeked out to see where he was going.

5. The only way that you can beat the zone defense in basketball is to sink the twenty-foot shots. My father is a basketball nut. He taught me this.

6. In the Bible it says that eating shellfish and wearing jackets made of a combination of linen and wool are wrong.

7. The tacos that they serve at this restaurant are really delicious.

8. Results of a recent survey suggest that the ruling party will not win reelection.

9. I worked it out by using the mathematical equations that we are learning in class.

10. I have always longed to be an actor on the stage. I know that this is my calling.

11. People have been complaining about the quality of life here for as long as I can remember.

12. I know that she is the one who took the wallet. I saw her put it into her pocket.

13. Both of my sisters were born deaf. Living so closely with them for so many years, I know what it's like to go through life with this disability, even though I am lucky to have the ability to hear.

14. Something told me to jump out of the way. It wasn't until a second later that I saw a car out of control veering toward me as I was walking on the crowded sidewalk.

15. I know that God exists and that He forgives the sins of those who are humble and who repent.

ACTIVITY V

PARADOX

Recall that we defined a "paradox" as a believable argument that leads to what seems to be a contradictory or an unbelievable conclusion.

A man tells his children that he will have a surprise for them sometime next week. It could be on any day. He tells them it will be sometime between Monday and Friday.

The man cannot really give the "surprise" on Friday. If he has not given it beforehand, his children will expect it. It won't be a surprise.

If he waits until Thursday, his children will understand that he cannot give it Friday and that it must be on Thursday. However, in this case, too, the children will expect the present.

If the children know that the surprise cannot be on Thursday or Friday, it cannot be given on Wednesday for the same reason. The children will expect it. It won't be a surprise. Tuesday and Monday are out for the same reason.

So the man, who really wants to cheer up his children, cannot really surprise his children. Or can he?

Activity VI

Silent Debate

Take seven minutes to draw a diagram. In the center of a sheet of construction paper, draw a small circle and write the word "Knowledge" in it. Then attach eight "spokes" leading outward and give each spoke the name of one of the ways of knowing. Outside of the spokes place eight rectangles, each one containing the name of one area of knowledge. Place each area of knowledge rectangle closest to the ways of knowing spoke(s) with which you most associate it. You can put one area of knowledge next to several ways of knowing. Do not look at what your classmates are drawing.

After five minutes, walk silently around the room and look at the diagrams that your classmates have made. Write comments on the empty paper around the diagrams that they have drawn, again without saying a word aloud.

ACTIVITY VII

TOPPLING THE SADDAM HUSSEIN STATUE: VISUAL REPORTING BIAS

In April of 2003, after the United States had invaded Iraq, U.S. military forces, using an armored vehicle, helped a group of Iraqis pull down an enormous statue of Saddam Hussein. When the U.S. forces first arrived, a Marine climbed a ladder and draped an American flag on the face of the statue. The flag was quickly removed, however, and then the statue was toppled. Images of the toppling of the statue were instantly conveyed around the world.

Examine the photograph below. Then in small groups or as a class, discuss the questions or statements that follow.

1. After the fall of the Berlin Wall in 1989, the worldwide media showed countless images of people in many different countries toppling statues of Vladimir Lenin and other Soviet leaders.

2. Most of the journalists covering the Iraqi invasion were staying in a hotel facing the square where the statue was toppled.

3. The *Chicago Tribune* reported, "Few of the U.S. news outlets emphasized how small the crowd of Iraqis around the statue really was."

4. Some researchers noted that most visuals of the toppling of the statue that appeared in U.S. newspapers and on U.S. television stations were shot at close range, making it difficult to estimate how many individuals were in the crowd.

5. Many of the photos that appeared in U.S. newspapers showed crowds of jubilant Iraqis welcoming the Americans, hugging one or two of the American "liberators". Most of the photos were close-ups right around the base of the statue and gave the impression that a large crowd of similarly disposed people was present for this event.

6. On the Internet, long-range photos suggested sparse crowds and little support for the U.S. "invaders" were quickly posted and proliferated.

7. Photos appearing in *Le Monde* (France) and other newspapers opposed to the U.S. invasion used the long-range photographs of the toppling of the statue.

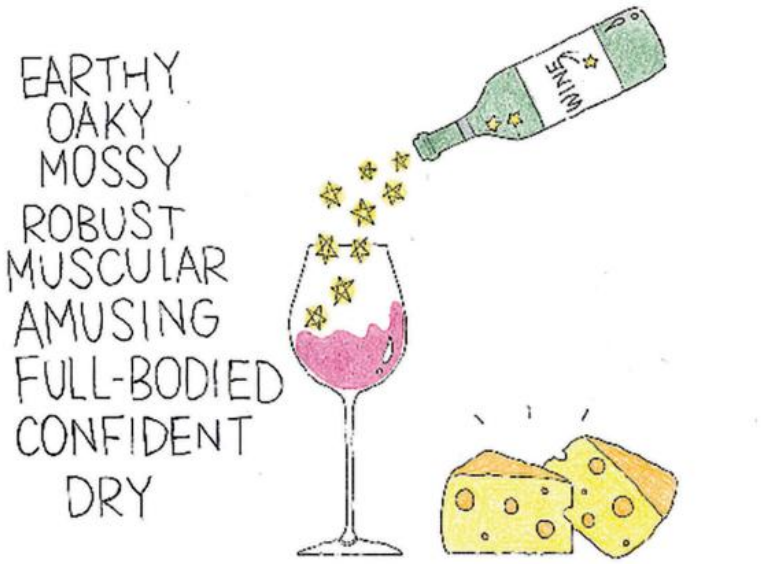
Useful Link: See the following link for an interesting non-photographic account of the toppling of the statue. How does reading this inform us in a way that viewing a photograph or series of photographs cannot? How much is the medium the message?

http://www.newyorker.com/magazine/2011/01/10/the-toppling

ACTIVITY VIII

VERBAL OVERSHADOWING

Suppose that you see the following advertisement for a wine. Would the verbal descriptions entice you? Would they prepare you well for the way you will perceive it when you drink it? How can these descriptions actually limit or set our taste experience in confines from which we might find it difficult to escape? If someone repeated these adjectives when you sipped a glass of wine, do you think that you could identify the wine later in a blind taste test with two or three other glasses of wine?



ACTIVITY IX

PRACTICE, PRACTICE, PRACTICE: LOOKING AT SOUND BITES

In 2002, the Philadelphia 76ers were eliminated in the first round of the NBA playoffs. The previous year, they had advanced to the finals. The team's star player, Allen Iverson, gave an infamous interview to the press. He was asked about missing practice. In his subsequent answers to questions, he repeated the word "practice" twenty-two times, most of the time in a playful, mildly critical or ironic fashion, to highlight his many grievances and frustrations with the team's front office, the coach and events in his personal life.

This "rant" was repeatedly aired on television, radio and the Internet and quoted frequently in newspapers in the days and weeks after the press conference. Given this relentless focus on his negative comments about "practice", it became difficult for Iverson to escape the suggestion that one reason the team failed in the playoffs was because of his "cavalier" attitude toward practices.

Most people did not understand the context and the background that more careful reporting of the episode might have brought to the awareness of the public.

In small groups, read the following quotes and observations and discuss how these might have altered perceptions if they had been presented to the public as often as the "sound bites" focusing on Iverson's dismissive attitude toward "practice".

1. Iverson was a "franchise player" who had been an NBA Most Valuable Player and three-time NBA scoring champion in the years leading up to the press conference. Most people would probably agree that one could not reach such heights in the sport without having practiced a great deal. He would later (in 2016) be inducted in the Hall of Fame.

2. Iverson was a small athlete by NBA standards. He was 6.0 feet in height, and he weighed only 160 pounds. NBA basketball is an extremely physical game and players are often injured. Iverson himself frequently played with injuries. He said, in the same press conference: "If I can't practice, I can't practice. If I'm hurt, I'm hurt."

3. Most 76ers fans would agree with Iverson when he said, in the course of that same press conference, that he would "play every game like it's my last" and that he would "die for" victory in a real game.

4. In the same press conference, Iverson said that he recognized the importance of being a team leader and the importance of practice. "But we're talking about practice, man. What are we talking about? Practice. We're talking about practice, man." "We ain't talking about the game! We're talking about practice, man. When you come to the arena, and you see me play…you see me play, don't you? You see me give everything I got". Many reporters at the conference laughed.

5. The reporter who asked him the question leading to the previous answer said, in response to Iverson's question: "Absolutely."

6. In the days before the conference, rumors were swirling that the 76ers were going to trade their superstar to another team. Trading a player who was considered a superstar, a franchise player and possibly the best player in the NBA was, for many fans and observers, truly astonishing.

7. Only a few hours before the conference did the coach of the team finally assure Iverson that he would not be traded.

8. The talk of his being traded, despite his being an MVP and a franchise player, was weighing on Iverson's mind. He later explained: "If you would have said something about lasagna at that point, I would have kept saying lasagna. I was already on edge."

9. Seven months before the conference, Iverson's very close friend Rahsaan Langford, was shot to death in Virginia. Iverson mentioned this, during the same press conference, as something that, along with the talk of trade, was causing him stress and that seemed to make the talk about his attitude toward practice seem silly.

10. In the course of the same press conference, he said that teachers and classmates were asking his seven-year-old daughter if they would be moving from Philadelphia, the "city I love" and "that loves me back", because there were rumors that the front office might trade Iverson to another team. This was distressing her.

11. He said in the conference that he wasn't even missing practices, maybe only one, and then only to focus on staying healthy.

12. Coaches of other NBA star players such as Charles Barkley and Gary Payton allowed them to miss practice or to attend practice but work out on their own away from their teammates at their own pace. They did this to make sure that their stars stayed healthy and would not have to be benched for injuries.

13. In high school, Iverson led both his football team and his basketball team to the state championship and was in both instances the most valuable player. After this, he was bowling with friends in a bowling alley when a racially motivated brawl broke out. Iverson was arrested for "maiming by mob", an archaic Virginia charge originally designed to respond to lynching, even though security camera footage showed him at the edges of the brawl, trying to get out of the bowling alley. Iverson and several other young black men were arrested. None of the young white men involved in the brawl were arrested. Iverson, despite the prospect of a million-dollar career in basketball, was given a five-year sentence and served time in jail before being granted clemency by the Virginia governor. Many took to the streets to protest what they saw as the racist singling out of Iverson.

14. Iverson wore many tattoos and had his hair arranged into cornrows. He also adopted the hip-hop dress and mannerisms that were becoming popular as he was becoming a superstar. Many team owners saw Iverson as "dangerous" in his adoption of hip-hop culture, especially since it led many other visible players to adopt these same fashions.

15. The NBA commissioner in 2005, three years after the infamous press conference, issued a dress code that forbade athletes from wearing jeans, do-rags, jerseys and Timberland style boots associated with hip-hop culture. The new code required athletes to wear conservative attire when coming and going to scheduled games, giving interviews or sitting with injuries on the bench. Many criticized this as an insult to young black men and the hip-hop culture that they, like Iverson, embraced. Many believe that the animus driving adoption of this code was in the background, three years earlier, when there was talk of trading Iverson, despite his superstar status.

16. A reporter wrote in a book that he later published that Iverson was drunk during this conference and that his coach had confirmed this suggestion. The coach denied this.

After small group discussions, have a general discussion in a large group about how much our lack of context and background information can cause us to misunderstand some of the issues that become hot topics in the mass media.

Invite students to suggest other issues that have received considerable attention but where background and context are insufficiently understood and might, if properly presented to the public, result in a different consensus about the "meaning" of the controversy or issue reported.

ACTIVITY X

WISHFUL THINKING IS ALIVE AND WELL

In order to influence countries such as North Korea and Sudan to comply with international law, global powers have routinely resorted to United Nations sanctions aimed at forcing refractory governments to drop weapons programs, stop attacking civilians or respect human rights and electoral integrity. They usually fail, however.

In small groups, discuss the following scenarios and how they may or may not be instances of wishful thinking:

1. In South Korea, Kim Jon Un is attempting to develop the technology to allow him to deliver nuclear weapons to the mainland. The Security Council voted to impose sanctions to force him to quit the program. What evidence exists suggesting that Kim will not? Does his toleration of widespread hunger and malnutrition among his people provide a clue about how these sanctions will turn out?

2. A spokesman for Country Risk Solutions says: "Sanctions have failed to achieve their objects, and even the success stories have a mixed record. Countries have found ways around the sanctions and can counter them?" Do you think that this is true? If so, why do global powers continue to rely so heavily on sanctions?

3. A study by Brown University focused on twenty-two sanction schemes. It found that in about ten percent of the cases, the sanctions measurably influenced behavior in the manner intended. Do you think that imposing sanctions knowing that the possibility of success is about ten percent constitutes wishful thinking? Or is it realistic and rational?

4. "The definition of insanity is doing the same thing year after year and expecting different results." Do you agree?

ACTIVITY XI

UNIVERSITIES AND MOVIES

In pairs or small groups, discuss the following scenarios and questions. After a set period of time for discussion, each group should share in a large group exactly two observations or ask exactly two questions. Then students in the whole group should respond to these observations or attempt to provide tentative answers to the questions posed.

1. Suppose that you are a high school junior and are thinking about university. You live in a country other than the United States. A classmate invites you to his beach house for the weekend. During the day you have fun outdoors, but in the evenings you watch a total of four movies—*The Graduate, Legally Blonde, The Social Network* and *A Beautiful Mind.* The films feature, respectively, the University of California at Berkeley, Harvard Law School, Harvard College and Princeton University.

2. Many students around the world have a very distinct impression that American students engage in dialogue with their professors and challenge them routinely in university classrooms.

3. Many universities are competing to lend their facilities to production companies making big-budget films. Many representatives of these universities claim that this is in their interest because it has a positive effect on the number of applicants and the quality of the applicants to the institutions that appear in well-regarded films.

4. Some claim that the portrayal of Hogwarts in the *Harry Potter* films has resulted in an increase in interest in and enrollment in boarding schools and in the number of young students studying Latin.

5. Stanford University and the University of Chicago both turned down the invitation to lend their facilities and name to the producers of the popular film Legally Blonde. Harvard University eventually agreed to cooperate.

ACTIVITY XII

JOURNALISM IN JAPAN

For decades, critics have pointed out the dangers of the so-called "press club system" in Japan. They allege that this system discourages true investigative journalism by fostering a "symbiotic" relationship between reporters and their "sources"—mainly Japan's bureaucrats and politicians, who use their leverage as exclusive providers of valuable information to steer journalists away from controversial topics.

A number of interesting questions and comments have arisen in this context. Some of these are enumerated below.

In small groups, discuss these questions and comments and then ask one student from each group to summarize the small group's thinking and tentative conclusions in a large-group context. Then invite general discussion in the whole group.

1. The popular American film *Spotlight* focuses on the Boston Globe's "Spotlight" unit, the oldest continuous investigative journalist unit in the United States, as it conducts a relentless investigation into widespread and allegedly systematic sexual abuse of minors by Roman Catholic priests in the Boston area over a period of many years. Many regard this sort of investigation as impossible in the Japanese context. Why?

2. Some say that the real purpose of the press club system is to repeat and endorse official narratives of controversial events in Japan.

3. How could intrepid editors and reporters reform the system so that reporters have the incentive and ability to expose what powerful bureaucrats and politicians don't wish to be made public and to hold them accountable?

4. Many have observed that the most visible and influential journalists in Japan have attended elite universities where they hobnobbed and developed close ties with the men and women who would become their "official sources" later in life.

5. How does the International Baccalaureate's encouragement of serious engagement of counterclaims offer a possible solution to this problem in Japan?

6. How might Japanese journalists be encouraged to develop "counter-narratives" to compete with official narratives of important current events?

7. Some speculate that the Japanese public share journalists' respect for and deference to figures of authority.

8. How should we regard glittering counter-examples such as the Mainichi newspaper's highly regarded investigation of more than ten thousand "missing" elderly persons?

9. How are we to regard the Shukan Bunshun magazine's widely lauded reporting of a recent scandal involving economic minister Akira Amari?

10. Could part of the problem be that Japanese consumers of media stories prefer simple accounts of breaking news to long stories or even a series of stories on a single topic or controversy that solicits multiple opinions and perspectives and do not rely on official sources? Is this a problem in many countries around the world? In most?

ACTIVITY XIII

THE GAWKER SQUABBLE

Recently, a billionaire named Peter Thiel secretly funded a privacy lawsuit against a privacy website called Gawker. Gawker posted a sex tape that "outed" Thiel as a gay man. This "squabble" resulted in a 140 million dollar jury award against the website.

Gawker's editorial position is basically that the public right to information is more important than any individual's right to privacy.

This issue obviously has profound implications about what constitutes knowledge or, at least, what counts as "information" that we have permission to "handle" in our current media environment.

The interesting point—and one that teachers can invite students to consider in class—is why it would be all right to post a sex tape involving a Congressman (a real "public figure" who must expect such "attacks" on privacy) but not one involving a celebrity who probably has more power to shape the world we inhabit than a Congressman.

One commentator put it this way: "The world we live in has made a presidential nominee out of a reality television star. This is the world that Gawker predicted and took up arms against" (Stephen Marche).

Privacy and the pubic right to know are two important issues all students must think carefully about when evaluating the important question: "What is knowledge?" Ask students to reflect on this assertion.

UNIT THREE
LANGUAGE AS A SOURCE OF KNOWLEDGE

For Further Discussion

1. "What something means to one individual can never be fully known or communicated to anyone else" (Lakoff & Johnson).

2. Make up two sentences that are grammatically correct but that, as far as you know, you have never heard, read or written in your whole life.

3. "Language fits over experience like a straightjacket" (William Golding).

4. Do you think that our knowledge of the world exceeds our ability to put it into words? How is this question possibly related to the claim that "a map is not the territory"?

5. "Language appears to be a unique phenomenon, without analogue in the animal kingdom" (Noam Chomsky).

6. "Colorless green ideas sleep furiously" (Noam Chomsky). Is this sentence grammatical? Does it make sense? If it's grammatical but nonsensical, what do you make of this fact?

7. Name three situations that are most easily communicated through demonstration rather than description using language. If you think of acquaintance, know-how and description, which type of knowledge is least amenable to **telling** as opposed to **showing**?

8. What evidence supports the contention that language is an innate ability?

9. Describe the senses in which we may say that language is a "double-edged sword". In other words, we all understand that language is a rich source of knowledge about the world. How, though, can it be misused or lead us into danger?

10. Name five attributes that all natural human languages share.

11. "She came into the kitchen and put her stuff on the table." What did she put on the table? Rewrite this sentence and make it more concrete and precise.

12. Suppose that you are designing a curriculum to teach a foreign language to your students. If you agree with Skinner's model of language acquisition, what techniques would you favor for instruction? If you agree with Chomsky's model, how would you approach instruction differently?

13. "Takashi's grade point average is incredible." About how high is it?

14. Some people have described a relationship with another human being as a "journey". Others have used the term "partnership". Can you think of any other metaphors to describe a relationship with a "significant other"? What do your metaphors highlight? What do they mask?

15. Read the following sentence. "He gave the girl that he met in New York while visiting his parents for ten days around Christmas and New Year's the candy." It is grammatically correct but difficult to understand. Rewrite the sentence so that it is easier to understand. Here is a hint. Put "the candy" near the verb that logically goes with it.

16. Without consulting a dictionary, write out short definitions of the following words: "rectangle", "cousin", "game" and "knowledge".

17. "Being vague is almost as fun as this other thing." Where is the humor in this statement?

18. "Matsui is over the hill for a professional baseball player. He should retire with dignity." How old is he?

19. "You can't make an omelet without breaking some eggs". This is a metaphor. In what context are you likely to hear this sentence?

20. "In most respects, you have written a fine essay." What are the weasel words in this sentence? How do they create the impression that a meaningful statement has been uttered even though the statement is actually vague?

21. What do you think that the following body language might mean: touching one's nose, touching one's ear lobes, drumming one's fingers, making a steeple out of one's fingers, biting one's nails, tilting one's head to the side, holding the palms of the hands open and facing forward, stroking one's chin or beard, taking off one's glasses when making a point.

22. In your opinion, which animals have communication systems that are most like human language?

23. Describe some features of a typical pidgin.

24. Robert Frost said, "Poetry is that which is lost in translation". Do you agree or disagree?

25. In the film *Blade Runner,* special police units known as "blade runners" have the difficult task of eliminating "replicants"—machines so sophisticated that they can pass as human beings. The irony is that the blade runners need a machine to test for "humanness". Do you think that computers will one day be so sophisticated in their use of human language that it will take another computer to tell the difference between a sample of computer conversation and a sample of human conversation?

ACTIVITY I

AMBIGUITY

In what way are the following sentences ambiguous? How might you make these sentences less ambiguous?

1. I surprised a burglar in my pajamas.

2. She wanted to learn how to dance ballet very badly.

3. The police grilled the suspect over the items they found in his knapsack.

4. I saw a man on the roof of City Hall with a telescope.

5. He fed her dog food.

6. Visiting relatives can be boring.

7. Look at the baby with one eye.

8. John struck the man with the gun in his hand.

9. A man calls 119 to report that his friend is dead. The operator says, "Let's make sure that he's dead." The operator then hears a gunshot. The man who made the call says, "OK. Now what?"

10. A man asks the pilot of his plane when they will land. The pilot says, "I can't tell." The man says, "You can tell me. I'm a doctor."

11. A mother asks the teacher, "Is my son really trying?" The teacher responds, "Yes, very much so."

12. A man asks a waiter for lamb chops. "Please make them lean," he says. The waiter asks, "To which side, sir?"

13. I escorted the customer to the changing room and then I saw her back.

14. "Free the bound periodicals."

15. She enjoyed taking photographs of models in the nude.

16. My son grew a foot last year.

17. The customer says to the waiter, "This coffee tastes like mud." The waiter says, "That's strange. It was ground this morning."

18. The blind carpenter suddenly picked up his hammer and saw.

19. Two men were reported killed by the Troy police spokesman last night.

20. He discussed his attempted suicide in an interview with a famous newscaster.

21. She discussed the violent argument with her therapist.

22. He ate the pizza on the floor.

23. Vegetarians don't realize how good meat tastes.

24. "Shoot the basketball," said the referee. "Bang!" said the player, pretending to hold a gun in his hand.

25. The head of the elite police force seeks arms.

ACTIVITY II

IMPORTANT TERMS DEFINED OR ILLUSTRATED

The following are examples, quotes or definitions illustrating or explaining important terms that may be useful in discussing language as a source of knowledge. Please match each example, quote or definition with one of the following terms: ambiguity, linguistic relativism, irony, idiom, weasel words, Universal Grammar, iconic, connotation, body language, denotation, intentionality, euphemism, back translation, denotation, definition theory, linguistic determinism, metaphor, family resemblance. Note that a single term may apply to more than one of the examples, quotes or definitions in the sentences that follow. The teacher may wish to write these terms on large cards in a way that is visible to all students as they consider the examples.

1. A person signing in American Sign Language (ASL) makes a gesture with the right hand. It looks like she is patting the heads of several children. In fact, the sign means "children".

2. "War is hell."

3. There must be a core grammar or blueprint that underlies every language spoken in the world today.

4. The language that you speak importantly influences the way that you view the world.

5. "To the best of my recollection, I never said those words to the witness."

6. He was as calm as a coiled rattlesnake.

7. When you think of the Bowery neighborhood in New York City, you think of bums sleeping on the sidewalks clutching bottles of cheap wine, flophouses and Little Saigon.

8. "The United States has provided a huge amount of security assistance to that country over the past decade."

9. "Newspeak was designed not to extend but to diminish the range of thought, and this purpose was indirectly assisted by cutting the choice of words down to a minimum" (George Orwell).

10. "She is not one to **beat around the bush**."

11. Mark Twain found a French translation of his short story "The Celebrated Jumping Frog of Calaveras County". He translated it back to English to humorous effect.

12. "No man is an island."

13. "When I turned around, I suddenly saw her duck."

14. He took a photo of the man with a boa constrictor.

15. An emu and a finch are both birds. You wouldn't say they are both prototypical of birds. However, they share some important attributes so that we can, in fact, be comfortable calling them both birds.

ACTIVITY III

EUPHEMISMS

The bold words and phrases in the sentences below are euphemisms. What is the more direct and perhaps more harsh way of saying the same thing?

1. My father, like his father before him, is an **after-death care provider.**

2. She **passed** away peacefully this morning at General Hospital.

3. He **fudged** a little when he told you that he had graduated from university with high honors.

4. "Excuse me, I have to visit **the powder room.**"

5. Operatives from the CIA subjected terrorist suspects abroad to **enhanced interrogation**.

6. "You'll be a real hot dog in this snazzy **pre-owned** car."

7. "I'm very sorry to tell you this, Taeko. You've been a great addition to this company, but we are going to **let you go**."

8. "You have to keep a close watch on her. She's **not playing with a full deck.**"

9. "This parrot has **met its Maker**."

10. There were several **ladies of the evening** standing on the street corner.

11. The **sanitation workers** in this city have recently gone on strike.

12. Carl decided in the end to undergo a **gender reassignment** operation. He now goes by the name "Carol".

13. My wife could **stand to lose a few pounds**.

14. Whenever you drop a bomb in the middle of the city, there is bound to be some **collateral damage**.

15. She has been feeling **under the weather** and won't be coming into work this morning.

ACTIVITY IV

IDIOMS

The bold words and phrases in the following sentences are idioms—expressions whose meanings cannot easily be inferred from the words of which they are composed. Explain what they mean using other words.

1. "If I were you, I would trust his judgment. He's really got **his feet on the ground**."

2. "That mean old man who lives down the street finally **kicked the bucket**. I don't think anyone around here will be sorry to see him gone."

3. "If these kids don't stop screaming and running around, I'm going to **go bananas**"

4. "If you don't pay these bills, the bank is going to take away your house and sell it. You'd better **bite the bullet** and use the money that your father left you to pay them off."

5. "We're going to give a surprise birthday party for Sheila next Saturday. Please come but, whatever you do, **don't spill the beans**."

6. "When I told my Mom that I was getting engaged to Tom, she nearly **had a cow.**"

7. "After his company went public, he was able to live **high on the hog** for the rest of his life."

8. "The man tried to get me to tell him my credit card number even when I said that I would pay in cash. It seemed a **little fishy** to me, so I went to another shop."

9. "The teacher told us that we all have to learn this poem **by heart**."

10. "The man has been hiding from the authorities for years now. But now his favorite child is on her deathbed. He's going to have to **face the music** if he wants to see her one last time."

11. "It's **raining cats and dogs**."

12. "He's **an old hand** when it comes to sailing in these waters. You'll be fine."

13. "Do you see the way he **hangs on her every word?** She's really got him **under her thumb**."

14. "You really **hit the nail on the head** this time. That's exactly why he wants you to join him."

15. "You're just **beating a dead horse**. He hates to travel. There is no way that you are going to get him to travel to Bermuda with you during the summer break."

16. "He's got a real **chip on his shoulder.**"

17. "It'll be a **piece of cake**. I'll turn in the report to you before you leave for your lunch break."

18. "My computer is broken. If I have to buy another one, it will cost me **an arm and a leg**."

19. "I'm happy to have him on the team. I have no **ax to grind** with him."

20. "The deal fell through because the bank would not lend us any money. It looks like we're **back to square one**."

21. "Are you kidding? I'd take that job **at the drop of a hat**."

22. "He was a good pitcher in high school. But his fastball isn't going to **cut the mustard** in the Big League."

23. "This is a really important speech. Let's do a **dry run** to make sure that you've got it down."

24. "You should never **put all of your eggs in one basket.**"

ACTIVITY V

CONNOTATIONS

What are some of the connotations of the following words or pairs of words? Remember that a connotation is an association, emotion or idea that goes beyond the literal meaning of a word (the denotation).

Unlike denotations, which are meanings that all in a language community can agree about, connotations can sometimes vary from person to person.

1. odor/stench

2. chatty/nosy

3. slender/skinny

4. thrifty/miserly

5. firm/stubborn

6. relaxed/lackadaisical

7. disabled/crippled

8. smart/cagey

9. quick/rash

10. kind/compassionate

ACTIVITY VI

GOOD KNOWLEDGE QUESTIONS?

Which of the following are good knowledge questions? Why? Which of the following are not good knowledge questions? Why? What areas of knowledge are implicated in the following questions?

Remember that knowledge questions ask how we construct and evaluate knowledge. These questions do not lend themselves to a single correct answer. They are open-ended questions that are, as we will see when we analyze real-life situations, the sources of many of the most impassioned debates and controversies that confront us. We express knowledge questions in general terms.

Although we might generate different but equally plausible answers to the knowledge questions that we confront, we must always arrive at answers that are reasonable. In doing so, we must respond adequately to reasonable counterclaims that others may make while at the same time understanding that our personal perspectives may influence both our analysis and the answers that we ultimately give.

In formulating these knowledge questions, it's important that we use general terms and not the specialized language or the methods of the areas of knowledge from which these questions arise.

1. Why are some chicken eggs white while other chicken eggs are brown? Do they taste different?

2. Can we learn more about human life and human personality from novels and poems than from the human sciences?

3. Why do statues of Buddha have such long earlobes?

4. Why do old people's hair turn white?

5. Can literature "tell the truth" better than other areas of knowledge?

6. An advertisement for a leading toilet paper brand claims that it lasts "25%" longer than the next leading brand. How do they know this?

7. Is zero a number?

8. Is there more agreement in the natural sciences or in the arts about what constitutes ethical behavior?

9. Are ways of knowing best conceived as distinct tools with different functions?

10. Can a computer know?

11. Why do manufacturers put childproof caps on bottles of Flintstone vitamins?

12. Does an airplane weigh more after all the passengers have eaten dinner on board?

13. Why did U.S. President Nixon resign from office in 1972?

14. How do people live in Hiroshima if radioactivity remains for thousands of years?

15. What's the difference between a tortoise and a turtle?

16. How many witches were burned at the stake during the Salem Witch Trials?

17. How does understanding differ, if at all, from knowledge?

18. How does cellophane tape work?

19. To what extent do the human sciences provide an understanding of the past?

20. Was the siege of Stalingrad the turning point of the Second World War?

21. What is the role of intention in making ethical decisions?

22. What is it about the methods of an area of knowledge that allow it to make predictions?

23. In economics, how do the supply of and demand for products establish their prices?

24. If the aim of history is not to change the future, what is it about its nature and its methods that make this aim possible?

25. What happened at the Battle of Bosworth Field?

ACTIVITY VII

LANGUAGE MAPS

Looking together at language maps is an interesting way for students to start talking about language. The following link explores a number of interesting language facts in the United States

http://www.slate.com/articles/arts/culturebox/2014/05/language_map_what_s_the_most_popular_language_in_your_state.html

See the following excellent collection of seven language-related maps

https://www.washingtonpost.com/news/worldviews/wp/2015/04/23/the-worlds-languages-in-7-maps-and-charts/

Included are the following maps:

Some continents have more languages than others.

These are some of the languages with the most native speakers.

This map shows the countries with the most and least diversity of languages.

Many popular languages are spoken in more than one country.

English is widely used as an official language.

Nevertheless most languages are spoken only by a handful of people.

This chart shows how many people learn a language all over the world.

Teachers can use these maps in different ways to encourage students to talk about their perceptions of which languages are spoken by the most people, which languages are most studied as a second language, which language or languages may be considered "common languages" of the world and so forth. Teachers may simply draw some circles of the relative size of the circles above and invite students to fill them in. There are many possibilities.

ACTIVITY VIII

LOADED WORDS/ALTERNATIVES

Many journalists who have covered long-standing conflicts have become very sensitive to the language that they use when reporting. The Israeli-Palestinian conflict is a case in point. Consider the following. Share your observations with your classmates and consider their responses.

1. During the 2nd Intifada, the Israeli's built a "security wall". Some Palestinian journalists call this an "annexation wall" or an "Apartheid wall". Can you think of a more neutral term?

2. Palestinian journalists sometimes refer to the "Israeli Occupying Forces" (IOF). The Israeli's prefer the official term "Israeli Defense Forces" (IDF). Which do you think is neutral? Are both terms non-neutral? If so, is there any acceptable alternative?

3. Civilians killed in military actions are sometimes referred to as "innocent civilians". Some editors require that journalists omit the term "innocent" and merely use the term "civilians". What do you think about this policy?

4. When dialogue breaks down in the Middle East, as it often does, each side accuses the other of engaging in "incitement" or "hate speech". Is there another, more neutral way to describe such language?

5. Some Israeli journalists refer to areas such as the West Bank, the Gaza Strip and East Jerusalem, claimed by the Palestinians but occupied by Israel after the 1967 War, as "the disputed territories". The United Nations regards them as "occupied territories". What would be the most neutral term available?

{See Appendix II for some suggested responses to these prompts} .

ACTIVITY IX

MISCELLANEOUS LANGUAGE DISCUSSION STARTERS

The following scenarios are starters only. Teachers and students are invited to raise these topics in free-ranging debates and discussions during class when considering issues related to language as a way of knowing and thus as one of many building blocks of various "areas of knowledge". No particular "outcomes" are expected. These topics merely serve to help students focus on one or more facets of the complex interaction of the human language function and the construction of human knowledge.

A. The Defenestration of Prague

In 1617, some members of the Bohemian aristocracy rebelled following the selection of Ferdinand as King to succeed Emperor Matthias. Ferdinand was Catholic. Matthias had allowed Protestants to set up a state church. Ferdinand demanded that construction of new Protestant chapels on royal lands be stopped.

His doing so led to a symbolic event. The Protestant representatives opposed to Ferdinand wished to know if the regents in the service of Ferdinand had made these demands and took responsibility for them.

In the broil that followed, the Protestants **defenestrated** the Catholic regents, throwing them onto a "dung heap". No one was seriously injured. In historical lore, this has become known as the *Defenestration of Prague* and is sometimes cited as a proximate cause of the 30 Years War, one of the bloodiest conflicts in human history.

Would the event have been remembered if it had not been so provocatively labeled? Is this an example of the unintended consequences of clever and apt use of the gift of language?

Is there any sense in which this question can qualify as a "good knowledge question"?

B. "Nationwide is on your side."

In 1964, the Nationwide Insurance Group adopted this perhaps unwieldy tagline for an advertising campaign. The company has never changed or replaced the tagline. The words are now part of the DNA of the brand

Marketing managers these days are very sensitive to criticisms from stakeholders. This has led to quick changes in the fundamental messages.

What makes it desirable for a phrase like "Good to the Last Drop" to remain a staple of the ad campaign for Maxwell Coffee for one hundred years, while other slogans disappear quickly? Is there something in the words that can help us to explain this phenomenon?

C. El Niño and La Niña

Many students have a vague idea that these two phrases describe weather cycles that occur every couple of years to explain how the Earth at the equator in the Pacific Ocean absorbs the heat of the sun in the first phase and then releases it into the atmosphere during the second.

Would students be less familiar with these phenomena had less (for want of a better word) "lyrical" descriptors been chosen?

D. The Importance of the Superlative

Mike Mansfield, one of the most respected of recent US diplomats posted to Tokyo, famously said: "Japan-U.S. relations are the most important bilateral relations, bar none."

What if he had said: ""Japan-U.S. relations are possibly the most important bilateral relations of all time.

Would the words still have become famous? If not, how can we account for this?

E. Protection of Specially Designated Secrets (2013)

Or consider the "omnibus" nature of language in instances where this quality can lead to real-world conflict and problems beyond imagination.

In the wake of terrorist spectacles such as the 9/11 Twin Tower bombings, governments around the world quickly—and, some think, ill-advisedly—passed legislation designed to make it easier to follow up on leads that might help prevent a repeat of such acts in the near future.

Many believe that this sort of legislation could lead to erosions of hard-earned civil liberties.

In Japan, the Protection of Specially Designated Secrets (2013) Act makes civil servants and journalists liable if they "leak" classified information in areas such as counterterrorism and diplomacy. This legislation is helpful not only to those who are seeking to prevent a repeat of acts of terrorism. They are also helpful to those who wish to detain dissidents and keep some people from expressing their political opinions without facing possible "criminal" responses.

F. "Immigration" : How has the Japanese government recently challenged the taboo against open discussion of "immigration" by recasting the terms of the debate and by resorting to what some view as "stealth" use of language?

Governments in many advanced economic countries must respond to the fact of a rapidly aging population. Japan faces a similar challenge. Many politicians are trying to figure out how to bring in more foreign workers without conceding the need for a reform of "immigration" policy. This is a delicate business. Japanese workers do not wish to face more competition for jobs.

Foreign workers now account for about one million members of the labor force in Japan. Recent debates suggest the need to double that figure. Foreign workers—even if the number doubles—will represent only 1.4 % of the total workforce. In most advanced countries, the figure is about 5%.

At this point, a quiet drama is unfolding. Is there a revision of immigration policy going on right now? Or are the conservatives credible when they say they will solve this workforce problem by recruiting more female and elderly Japanese nationals into this workforce? Why does the word "immigration" seem to be so powerful and worth "contesting" in this fashion? Again, we need to get "behind" the word to understand why words are so powerful in the way we create meaning and knowledge.

G. Who Dropped the Atomic Bombs on Hiroshima and Nagasaki? Are Apologies in Order? Are they possible?

The opening of the nuclear era with the atomic bombing of Hiroshima and Nagasaki in August 1945 is an extraordinarily sensitive topic that many teachers and students choose not to address directly precisely because it is so sensitive.

However, students really owe it to themselves to ask hard questions about what happened in Hiroshima those many years ago and to come to as thorough and honest an assessment of the meaning of this event as is possible.

Here are a few debate topics that have arisen in the context of a G7 meeting held in Central Japan, not far from Hiroshima. They arise in part because United States President received and accepted an invitation to speak at the 71st annual memorial.

- History books around the world indicate that an "atomic bomb" was dropped from a B-29 plane in August of 1945. Most people have no idea who the pilot was. Most of us know only that President Truman took ultimate responsibility for the decision. Does this mean that the pilot had absolutely no responsibility for his actions that day?
- In the US and in other countries, it is still possible to have debates in which many people claim that the bombing was "necessary" in order to save the lives of thousands perhaps of hundreds of thousands of soldiers if the atomic bombs had not brought the war to a decisive close so quickly. For this reason, these people claim, we must admit that from a certain perspective it was the "right thing to do".
- Focus on the word "necessary". One may argue that African slavery in the US South was necessary for the development of American capitalism. Yet who seriously will argue, these days, that slavery is ever the "right thing to do"?
- What, exactly, is an "apology"? Here, again, we can get all tripped up trying to deploy a single word in a way that does not lead to impassioned debates. Some have said that for a sitting US President to recognize the "horrors" of the dropping of the atomic bomb by speaking at the Hiroshima memorial is tantamount to giving an "apology". Does the word accommodate this interpretation?

- The use of the word "apology" is also problematic because China and the Koreas believe the Japanese government owes **their** people apologies for the practice of using "comfort women" and the mass killing of "civilians". If a US President still in office were to apologize for killing civilians in the course of demonstrating the awesome power of the atomic weapon at Hiroshima, would Japan have to reciprocate by apologizing for, among other alleged actions, mass killings of civilians in Nanking, China during World War II?

- Again, we must always keep in mind that there are different cultural nuances involved in interpretation of the loaded word "apology". In seppuku culture in Japan, for instance, a person in a leadership role can admit "responsibility" for a given action by resigning or even by taking his or her own life. This can cultivate an attitude of "forgiveness" and a willingness to move on among those who opposed the leader's actions in the first place. However, in other countries (such as the US), which are contract cultures, admitting fault and taking responsibility in this way can be synonymous with a need to be accountable.

- In 2001, an American nuclear submarine collided with a Japanese fishing boat for trainees, killing several aboard the Japanese boat. Members of the Japanese families of those killed demanded a formal apology from the commander of the submarine. He was willing to express regret. In his book, *Sorry About That: The Language of Public Apology* (2014), Edwin Battistella has written: "To the navy, it was more important to maintain control of a situation, and not admit negligence, which could be the basis for further legal claims."

- Perhaps the greatest question of all—and the one that most of us STILL cannot answer, so many years is whether or not the atomic bombing of Hiroshima constitutes a "crime against humanity". There are powerful arguments on all sides of the question. Are these just three "words"? What knowledge lies behind them? What knowledge resides in **these words**? Can these words help us to discover new and ultimately liberating and useful **new knowledge**?

UNIT FOUR
SENSE PERCEPTION AS A SOURCE OF KNOWLEDGE

For Further Discussion

1. "How do you know but that every bird that cleaves the aerial way is not an immense world of delight closed to your senses five" (William Blake)?

2. "Whilst part of what we perceive comes through our senses from the object before us, another part (and it may be the larger part) always comes out of our own mind" (William James).

3. Name some of the ways that we can extend the range of our senses. Are these extensions generally more or less reliable than our unaided senses?

4. "We cannot know what is beyond our senses." Do you agree or disagree with this statement?

5. If you see a cloud of dust rising from the ground in the distance and tell yourself that this must be a pickup truck driving at a high speed, are you making a judgment based solely on physical perception?

6. Suppose that someone asks you: "Are you out of your senses?" What image comes to your mind? Can escaping one's senses ever be interpreted as something positive?

7. What do we mean when we describe someone as a "sensualist"?

8. In many languages, as in English, there is a proverb: "Seeing is believing". Do you agree with this? Can you think of instances when this proverb is false?

9. Can a person who is red-green color-blind really understand the meaning of the adjectives "red" and "green"?

10. Which of the five major senses would you most associate with memory? Is there one sense in particular that has the power to take you suddenly and unexpectedly back to your childhood?

11. Most predators have eyes set forward in the face in the way that human beings do. Most prey animals have eyes set on the sides of their heads. What evolutionary advantages does each arrangement offer?

12. If you had to give up one of your five principal senses, which would it be? Why?

13. Humans have developed sonar technology, in part by studying echolocation in bats. Humans do not naturally possess a sense of echolocation. However, suppose that we did. How would our sense of the world be different?

14. Summarize the main arguments against the position known as "common-sense realism".

15. "The tickle is not in the feather" (Galileo). What do you think this means?

16. In English, when someone seems bothered, we often ask: "What's eating you?" Why do we not ask: "Who's eating you?"

17. Of the eight areas of knowledge, which do you think are most dependent upon sense perception? Which are least dependent upon it?

18. Can your mood or your state of being affect your perception of things? Do you, for example, see things differently when you are angry as opposed to when you are calm? Does food taste better when you are hungry?

19. The image of the blind poet or the blind musician appears often throughout history. Homer was said to have been blind. Ray Charles, Doc Watson, Art Tatum and Blind Lemon Jefferson are well-known contemporary musicians in the West who were born blind or lost their eyesight when very young. Do you think that blind children naturally create a richer world of sound than children who are not?

20. "Smells are surer than sights and sounds to make your heart-strings crack" (Rudyard Kipling).

21. Why might it actually make a good deal of sense for the majority of people living in India to avoid eating cows?

22. Many people believe that pain and taste are personal and individual experiences that cannot be shared with others. Do you think that sound and color are also subjective in this respect?

23. Can our sense perceptions ever offer us knowledge that is certain?

24. Do we see the world with greater objectivity in certain emotional states compared with others? If you think so, please describe these states and why they produce unusual clarity.

25. "Seeing is believing" is a frequently used proverb in English. However, if you put a straight stick into water, it may appear to bend. If you touch it, however, you can assure yourself that it is not bending. Should the proverb be different? Should we say: "Touching is believing"?

ACTIVITY I

SELECTIVITY

Perception is an inherently selective process. Too much happens around us at any given moment. We cannot concentrate for any length of time on all that we might sense. We simply do not have the resources to sense everything in our environment at all times. We also immediately forget some of the things that we do perceive, perhaps unconsciously deciding that they are not so important for the picture of the world that we are constructing.

Try the following exercise:

Close your eyes for one minute and listen intently. When the teacher tells you to open your eyes, write down in your notebook everything that you can remember hearing.

In groups of three or four, share what you heard. What sounds were you not paying attention to earlier?

What would you have to sacrifice in order to maintain the sensitivity to sound that you demonstrated during this one-minute exercise?

ACTIVITY II

IMPORTANT TERMS DEFINED OR ILLUSTRATED

The following are examples, quotes or definitions illustrating or explaining important terms that might be useful in discussing sense perception as a way of knowing. Please match each example, quote or definition with one of the following terms: figure and ground, empiricism, naive realism, limbic system, scientific realism, change blindness, visual agnosia, visual grouping, phenomenalism, elevator music, synesthesia, blind spot, ultrasonic, blindsight, change blindness, pheromones, camouflage, skepticism. Note that a single term may apply to more than one of the examples, quotes or definitions in the sentences that follow. The teacher may wish to write these terms on large cards in a way that is visible to all students as they consider the examples.

1. There is a place at the back of each eye where there are no photoreceptors.

2. The sense of smell can go straight into this part of the brain, which is associated with emotional responses to stimuli.

3. This view of perception holds that the external world exists but that we imposed upon its primary qualities those secondary qualities associated with our senses.

4. This is the theory that all of our knowledge is ultimately derived from our senses and not from reason, intuition or innate knowledge.

5. In one experiment, a man knocks on the door of an apartment and asks the person answering the door a few questions. Then a different person wearing different clothes comes a few minutes later to "follow up" on the first questions. The person answering the door often does not realize that he or she is talking to a different person.

6. In the hallways of the building, unobtrusive instrumental music played over loudspeakers at a low volume. Those who worked there never complained about it. When asked, most said that it was inoffensive or even soothing.

7. Some people associate different colors with different numbers.

8. This is a drawing that shows the parts of the brain associated with perception of different parts of the body.

9. Elephants have big, floppy ears that help them to perceive sounds at much lower frequencies that those detectible by human beings.

10. Some animals mark their territories by secreting liquids that other animals can smell.

11. The patient suffered brain damage that caused him to become unable to see scenes as a whole. He could only see small parts of wholes and therefore could not recognize faces or most objects.

12. This theory of knowledge holds that we can never have adequate justification for our beliefs and that knowledge is therefore impossible.

13. What we call a "desk" is really just a lot of relatively empty space in which atoms are moving at high speeds.

14. Some fish can change color to blend in with the coral where they feed and thus hide from predators.

15. If you highlight the black portion of the image and let the white portion fade into the background, you will see an image of two black faces. If you change the relative orientation, you will instead see a white vase.

ACTIVITY III

SENSORY IDIOMS

The words and phrases in bold in the following sentences are sensory idioms—expressions whose meanings cannot easily be inferred from the words of which they are composed. Explain what they mean using other words.

1. Don't trust his judgment in these matters. He is **out of touch** with the mainstream.
2. You should check out the new exhibition at the gallery downtown. It's really **out of sight**.
3. What are you doing? Have you taken **leave of your senses**?
4. He has a **nose** for lucrative real estate opportunities.
5. He can take a lock apart **with his eyes shut**.
6. I never order buffet meals. **My eyes are bigger than my stomach**.
7. You'd better be careful about trying to cheat on the test. The teacher has **eyes in the back of her head**.
8. There is more to her **than meets the eye**.
9. We can decide later. Let's just **play it by ear**.
10. You're **a sight for sore eyes**.
11. She has her **ear to the ground** and will report anything of importance to the company as soon as she can.
12. I didn't **bat an eyelash** when I heard that the police had arrested him for forging checks.
13. I am not going forward with this plan. I **smell a rat.**
14. She has exquisite **taste** in fine pottery and porcelain.
15. My brother has been **feeling blue** ever since his girlfriend moved to Europe.
16. I spent over a hundred dollars in that store **in the twinkling of an eye**.
17. This is going to come to an ugly end. I **feel it in my bones**.
18. She **looks like a million dollars** since she went on that high-protein diet.
19. I'm not **feeling myself** these days.
20. Let's just say that I gave him a **taste of his own medicine**.

ACTIVITY IV

BODY IMAGES AND PHANTOMS

The neuroscientist V.S. Ramachandran [Phantoms in the Brain (1999)] has studied patients who have suffered amputations of body limbs and who experience "phantom limbs" that sometimes cause them excruciating pain. He has even performed what he calls "amputations of phantom limbs" to relieve the "pain" that these patients suffer. He has performed these "amputations" using a mirror in a virtual reality box—a visual illusion.

This might strike us as an odd approach, but Dr. Ramachandran reminds us "that pain itself is an illusion—constructed entirely in your brain like any other sensory experience."

He has developed a couple of simple experiments or activities to demonstrate that using one illusion to erase another can make sense. These experiments can show that your own body might be a phantom, something that the brain has created for its own purposes.

1. Break into groups of three. Person 1 should sit in a chair and put on a blindfold. Person 2 should sit in a chair in front of Person 1 and face the same direction. Person 3 should stand to the right of Person 1 and take that person's right hand and guide it to Person 2's nose. Person 3 should use the index finger of Person 1's hand to tap a random pattern of long and short strokes on Person 2's nose. Person 3 should then use his or her left hand to tap Person 1's nose with precisely the same pattern. After thirty or forty seconds, Person 1 may develop the illusion that he or she is tapping his or her nose two or three feet away and that the nose has somehow become elongated in space.

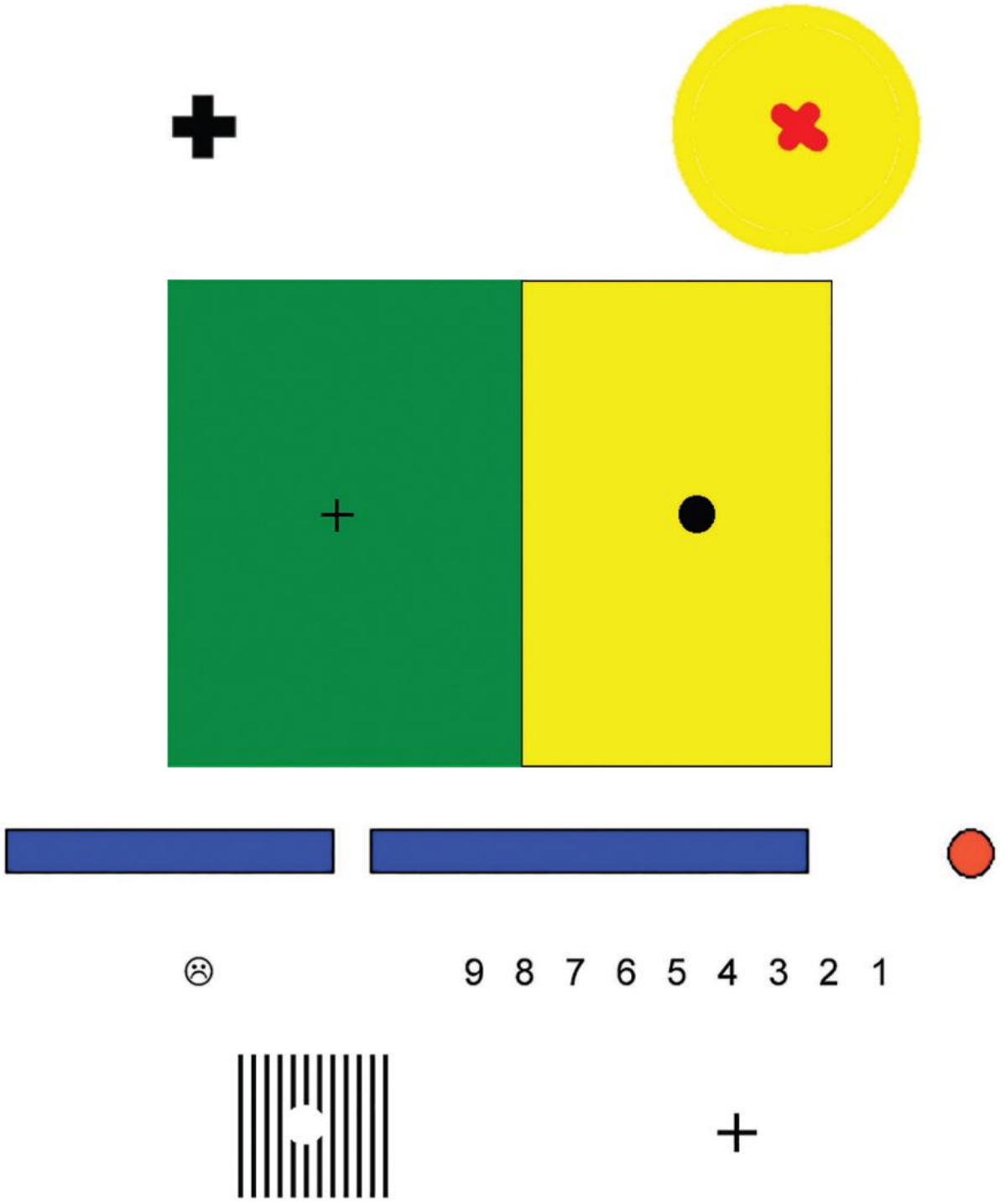
2. Break into groups of two. Person 1 puts his or her right hand behind a cardboard wall and cannot see it. Person 2 puts a rubber hand in front of the wall so that Person 1 can see it clearly. Person 2 then taps Person 1's unseen right hand and the dummy hand at the same time with the exact same pattern. Person 1 knows that he or she is looking at a disembodied dummy hand but still assigns sensation to it. This is a spooky confirmation of the fact that our body image is easily manipulated and ephemeral.

ACTIVITY V

OPTICAL ILLUSIONS, TESTS AND DEMONSTRATIONS

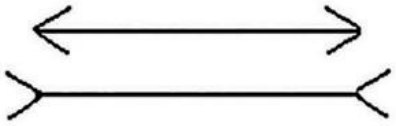
The human visual system has an amazing capacity to make guesses on the basis of fleeting and incomplete images. If you watch a rabbit behind a picket fence, for instance, your mind will fill in the missing parts of the rabbit so that you see a whole figure.

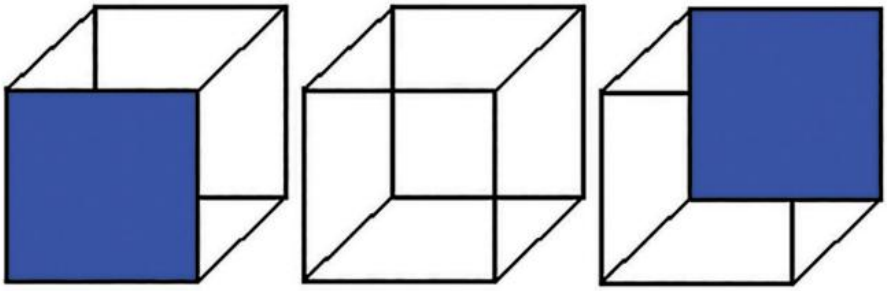
The optic disk, the area of the retina where the optic nerve exits the eyeball, is not sensitive to light. That means that all of us have a slight blind spot in our visual field. One reason that we do not notice this is because we have binocular vision. The blind spots in our eyes do not overlap, so we can compensate. But even if you close one eye and your blind spot occludes an object, the mind will fill in the blind space so that it is less noticeable. The six illusions below demonstrate this faculty of vision. In the figures below, occlude your right eye with your hand and move slowly toward the highlight in the right figure while looking at it. The figure on the left should change as the mind fills to compensate for the blind spot.

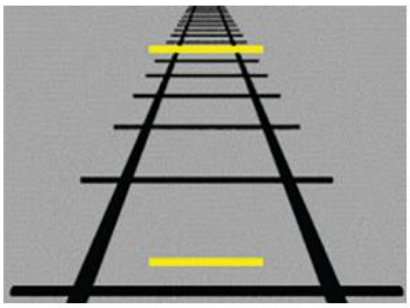


9 8 7 6 5 4 3 2 1

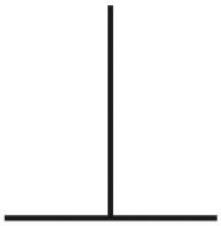
Context, figure-and-ground relationships, our expectations and our natural tendency to group perceptions in search of meaning also influence the way we look at objects. Consider the following images and share your reactions. The lines in the two figures immediately below are the same length. Why do they not appear to be so? If you stare at the cube, you can make it shift orientation in your mind's eye. The blue panels on either side will help you to do this, though they are not necessary.

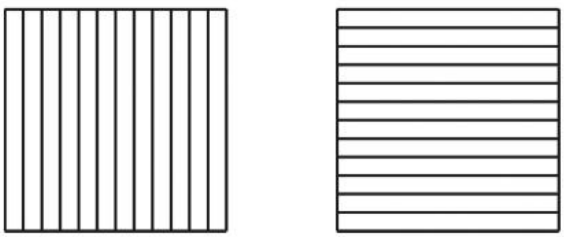




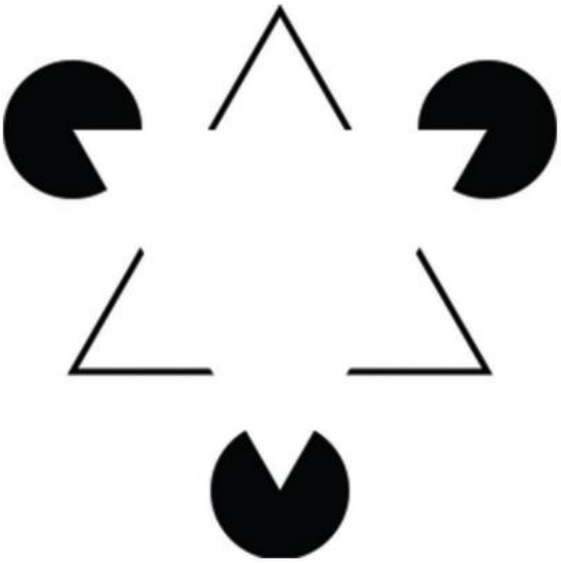


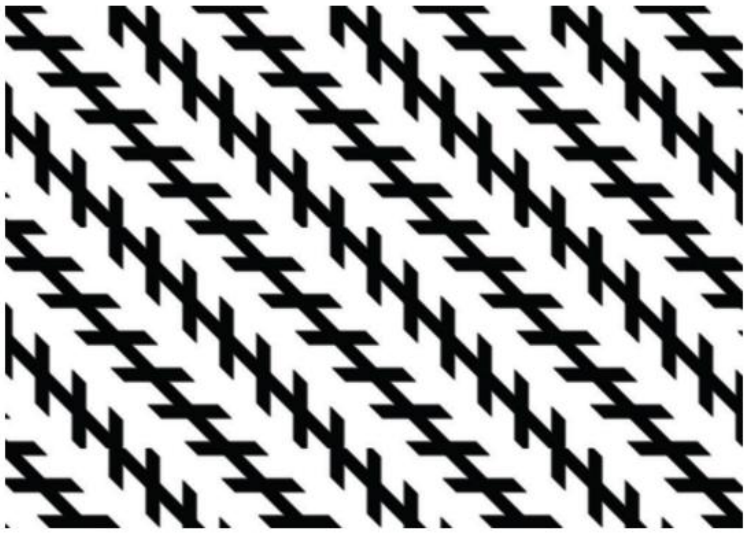
Which of the yellow lines is larger? Or are they the same size? What accounts for the illusion? This is called the Ponzo Illusion





Which bar at the top of this image (vertical or horizontal) is larger? Note how context can deceive us.





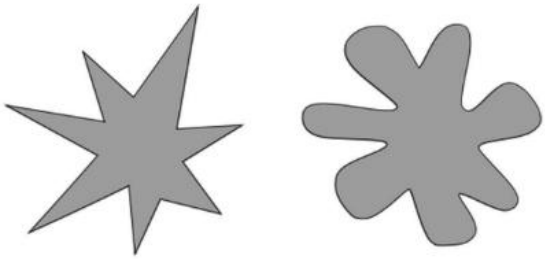
The above is the classic Zollner Illusion. The long lines are all perfectly parallel, though we perceive them otherwise. If you were to make the lines green and the background red, the illusion would disappear.

Suggestions

1. One can find many interesting "animated" optical illusions on Internet galleries. Two circles are stationary. However, the outer circle appears to be moving clockwise and the inner circle appears to be moving counterclockwise. The effect is stronger if viewed out of the corner of your eye (periphery perspective).

http://brainden.com/eye-illusions.htm

2. Two neuroscientists (Ramachandran and Hubbard), repeating a famous Gestalt experiment by Kohler, asked people from different cultures to identify one shape as "bouba" and the other as "kiki". Over ninety percent chose the left image for "kiki"(a sharp sound) and the right image for "bouba" (a rounded sound produced by the lips). Does this demonstrate a mixing of visual/auditory senses and call into question the idea that our words for things are always arbitrary?



3. This is how numbers and letters appear to some people who have vivid synesthetic abilities that associate specific colors with specific numbers and letters. Normal people and synesthetics see the same characters, but for the normal person they would all be the same color.

4. Do you see a beautiful young woman or an old woman? The old woman is easier to see for most people. To trick your eyes into seeing the young woman, imagine that the hag's left eye is the young woman's left ear. The bottom of the older woman's nose is the young woman's chin. The young woman is staring off to the left and her left eye is only barely visible. The older woman's mouth is the younger woman's necklace or dress strap.

http://www.optical-illusionist.com/illusions/young-lady-or-old-woman-illusion

5. In this famous "grouping" illusion, there is a hidden image. Once you detect the hidden image, then you will always see it thus. It becomes irrevocable as a subjective perception. Some have used this figure to demonstrate the existence of "qualia"—sensations that are not communicable, that are not the same as the physical data alone and that do not change once the perceiver has made them part of his or her experience.

http://www.weirdoptics.com/dalmatian-camouflage-illusion/

6. Some illusions illustrate the effect of an after-image. Stare at the middle of the image shown in the link below. Stare for thirty seconds. Then focus on a surface that is entirely white. When you look away, you should be able, for about five seconds, to see an illusion of the head of Jesus that looks remarkably similar to the image in the controversial Shroud of Turin.

http://www.moillusions.com/jesus-illusion/

7. Some illusions can actually give you a headache if you stare at them too long. Persons with epilepsy need to take particular care when viewing optical illusions. The swirls of black-and-white squares create the illusion of a spiral. Still, optical illusions are fascinating. The shift between what the eyes see and what the brain perceives helps scientists to gain insights into the inner workings of the human visual system.

8. See the images in the links below for an example of "hidden message" illusions.

http://www.eyetricks.com/3402.htm

http://www.marcofolio.net/other/15_cool_word_illusions.html

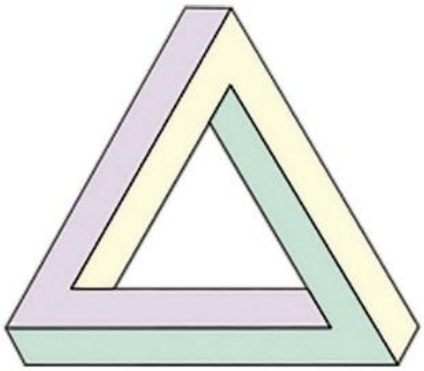
9. See the photograph of the ballet dancer embedded in the link below for a fascinating light/shadow illusion

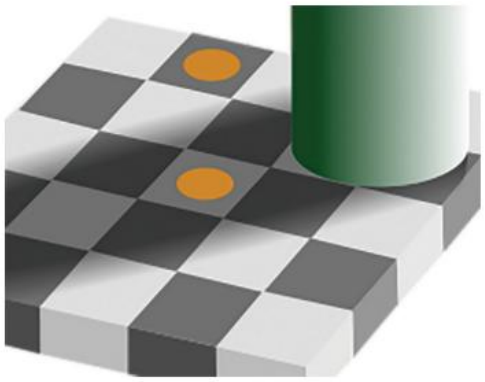
https://www.pinterest.com/pin/366621844393811185/

10. The M.C. Escher "impossible" staircase is a famous two-dimensional illusion. See the following link.

https://en.wikipedia.org/wiki/M._C._Escher#/media/File:Escher%27s_Relativity.jpg

11. The following is a two-dimensional diagram of the famous "Penrose" impossible triangle. Below the diagram is a photo of the three-dimensional version in Perth, Australia.





12. A visual scientist from the Massachusetts Institute of Technology (MIT) created this image. The two disks are the same color. The areas in which they are situated are also the same color. The shadow cast by the cylinder creates misleading contextual clues.

To see that the colors of the disks and squares are really the same, you can look through two holes punched into a white card that you hold before your face. This will remove the context.

You can also print the page on a color printer, cut out the two squares and compare them. They will be the same.

What Do You Think Now?

Do you believe that perception is an "immaculate" phenomenon?

Or, on the other hand, do you believe that perception is an "unconscious inference" that is not always physically "true", as one of the pioneers of visual studies has claimed?

Is what you believe different from both of these positions? If so, please share your opinion with your classmates and your teacher.

Other Resources

There are many interesting galleries of optical illusions on the Internet. Here are just a few.

http://www.eyetricks.com/illusions.htm

http://health-pictures.com/Color-blindness-charts.htm#.Vka3u4SzSll

http://www.moillusions.com

http://brainden.com/face-illusions.htm

http://www.grand-illusions.com/opticalillusions/woman/

ACTIVITY VI

GOOD KNOWLEDGE QUESTIONS?

Which of the following are good knowledge questions? Why? Which of the following are not good knowledge questions? Why? What areas of knowledge are implicated in the following questions?

Remember that knowledge questions ask how we construct and evaluate knowledge. These questions do not lend themselves to a single correct answer. They are open-ended questions that are, as we will see when we analyze real-life situations, the sources of many of the most impassioned debates and controversies that confront us. We express knowledge questions in general terms.

Although we might generate different but equally plausible answers to the knowledge questions that we confront, we must always arrive at answers that are reasonable. In doing so, we must respond adequately to reasonable counterclaims that others may make while at the same time understanding that our personal perspectives may influence both our analysis and the answers that we ultimately give.

In formulating these knowledge questions, it's important that we use general terms and not the specialized language or the methods of the areas of knowledge from which these questions arise.

1. What criteria could be used to organize facts into a useful system?

2. To what extent is our view of the past based on myths?

3. Do all areas of knowledge deal with facts?

4. Why is the dark side of the moon never visible from Earth?

5. To what extent does the nature of the different ways of knowing vary according to the areas of knowledge under discussion?

6. Who was the first explorer to reach the North Pole?

7. Does hypnosis work?

8. Do mosquitoes tend to stay away from heavy smokers?

9. Can one half of a duck's brain sleep while the other half is awake?

10. If you had two hours left to live, what would you do?

11. Does anything ever vanish without a trace?

12. Do birds perching on power lines ever electrocute themselves?

13. How do vultures know where dead things are?

14. What counts as evidence in different areas of knowledge? Do all areas of knowledge rely on evidence?

15. Why do some illiterate people love alphabet soup?

16. How can someone be "dirt poor" but another person can be "filthy rich"?

17. How have skeptical attitudes influenced the development of knowledge?

18. If you put a chameleon in a room full of mirrors, what color would it be?

19. When an area of knowledge presents rival systems of organized facts, on what basis can we choose among them?

20. If you are traveling at the speed of light and switch on a beam of light in front of you, what will happen?

21. Who killed President Kennedy of the United States in 1963?

22. Are there stances with respect to knowledge that might be at least as effective as that of the skeptic?

23. Is memory a reliable source of knowledge?

24. Did Marcus Aurelius persecute Christians for practicing their religion?

25. To what extent should it be expected that areas of knowledge make normative judgments (deciding what should be the case) rather than merely descriptive ones (describing what is the case)?

UNIT FIVE
REASON AS A SOURCE OF KNOWLEDGE

For Further Discussion

1. "All of our knowledge begins with the senses, proceeds to understanding and ends with reason. There is nothing higher than reason" (Immanuel Kant).

2. "Where the senses fail us, reason must step in" (Galileo).

3. "Religion is something left over from the infancy of our intelligence, it will fade away as we add reason and science as our guidelines" (Bertrand Russell).

4. "The madman is not the man who has lost his reason. The madman is the man who has lost everything but his reason" (G.K. Chesterton).

5. Do you think that logical thinking is universal?

6. Suppose that you are keeping a log of all of your encounters with swans. Over a period of several years, you have seen over four hundred. They have all been white. Can you reasonably conclude that all swans are white? How many would be enough to warrant this conclusion? Are there are other factors that you should consider when answering this question?

7. Think of discussions and debates about contemporary controversies in your own country—on television programs, for instance, or in public halls. Do people discuss these controversies calmly and rationally for the most part?

8. A woman had two daughters who were born a few minutes apart. However, they were not twins. How could this be? {See Appendix II for the answer}.

9. What is the difference between being irrational and being insane? Where do you draw the line? Why?

10. What does the phrase "thinking outside the box" mean to you?

11. Are we predictably irrational?

12. How reliable is inductive reasoning?

13. Describe one instance of discovering that you were wrong about something and, as a result, changing your mind."

14. Why do you think that people have a tendency to jump to conclusions?

15. In your opinion, what are the most common causes of bad reasoning?

16. Is it possible to doubt even the basic laws of logic such as the "law of non-contradiction"?

17. Describe one instance of the phenomenon called the "vicious circle".

18. What is the difference between reason and logic?

19. What qualities distinguish good generalizations from bad ones?

20. What is the difference between a prejudice and a generalization?

21. "Ideas matter; and so therefore does the question of reason, by which ideas live or die" (A.C. Grayling).

22. Do you believe that people are most passionate and emotional about positions or claims for which they cannot provide rational support?

23. The statistical correlation between the amount of revenue earned by game arcades in the United States and the number of computer science doctorate degrees awarded in the same country and over the same period (the last ten years) is remarkably high (0.99). Do you think that one factor is the cause of the other? Is such a possibility even worth investigating?

24. Can an argument be valid if the premises are untrue? Can an argument be invalid if the premises are true? Can you give an example of each to support your conclusion?

25. "It is an act of faith to assert that our thoughts have any relation to reality at all" (G.K. Chesterton).

ACTIVITY I

EXPLORING THE POSSIBILITIES OF IRRATIONALITY:

Although humans have distinguished themselves from other living beings because they have the capacity for rationality, there are many instances where they behave in ways that are clearly irrational. See Stuart Sutherland, Irrationality: The Enemy Within (1992) and Dan Ariely, Predictably Irrational (2008) for extended discussions of some of the examples below as well as many others.

1. Suppose that a woman (Driver A) parks her car on a steep road in downtown San Francisco. While she is gone, the car's emergency brake fails. The car rolls into a fire hydrant. Suppose that a different woman (Driver B) parks her car on the same road at another time. Again the car's emergency brake fails. This time, though, the car rolls into a pedestrian and kills him. Is Driver B more responsible than Driver A? Should we punish either Driver A or B? Should we punish Driver B more than Driver A?

2. If terrorists hijacked four flights in your country within the last year, would you travel by car rather than by plane?

3. Suppose that a patient has a .8 probability of having a disease. A positive reading on TEST Z will confirm the diagnosis, but if the result is negative, the probability will drop to .6. The treatment for the disease is unpleasant. If TEST Z is the only test available, should you administer it?

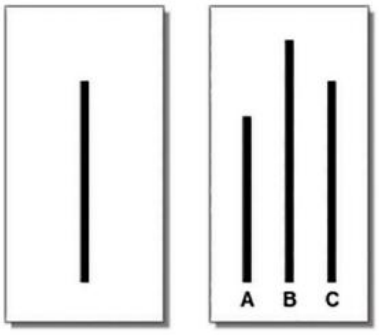
4. You tell yourself that you \5,000 is a fair price for a movie ticket. You buy the ticket at that price. Then you lose the ticket. You don't buy another ticket since you think that it will actually cost you \10,000 to see the movie and this is too much. Is this a rational calculation?

5. You are trying to decide which courses to take during your first year at university. You get into a conversation with three seniors with whom you feel an instant connection. They are friendly and "your type". They tell you that you should steer away from Professor A and take any class offered by Professors B or C. You have a "confidential guide" to courses compiled as the result of an anonymous survey of hundreds of students. Should you take the advice of your friends even if it contradicts the advice in the confidential guide to courses?

6. There are three cards. One has two white faces. One has two red faces. One has white on one side and red on another. In front of you is one of these cards. There is a red face upwards. What is the probability that it is the card with red on both faces?

7. Could you be persuaded to give electric shocks that might hurt or even kill someone as part of a psychological experiment? Would you do so if you were being paid for participating and a professor at a famous university wearing a white lab coat was overseeing the experiment?

8. Suppose that you are in a room with eight other persons whom you have never met. You are all taking part in an experiment. The experimenter shows you two cards. On one is a line that is six inches long. On the second card there are three lines of four, six and eight inches. The experimenter asks which line on Card 2 is the same length as the line on card 1. You are the eighth person to give an answer. Everyone before you has identified the eight-inch line as the right answer. Do you give this answer, too?



9. Suppose that a famous magazine offers (a) an Internet-only subscription for $59, (b) a print-only subscription for $125 or (c) a print-and-Internet subscription for $125. Which would you choose? What if only (a) and (c) were offered?

10. You see a table in a large public building. A sign above the table reads: "One chocolate per customer." Those working at the table offer two kinds of chocolates—Lindt truffles and Hershey's Kisses. The former are much more expensive than the latter in most stores. The price for a truffle is 15 cents. The price for a Hershey's kiss is one cent. Which would you choose? What if the people at the table offer the truffle for 14 cents and the kiss for free? Which would you choose?

{See Appendix II for discussions of these questions}.

ACTIVITY II

IMPORTANT TERMS DEFINED OR ILLUSTRATED

The following are examples, quotes or definitions illustrating or explaining important terms below that may be useful in a discussion of reason as a source of knowledge. Please match each example, quote or definition with one of the following terms: base rate fallacy, premise, syllogism, lateral thinking, law of large numbers, Plato, John Locke, innate knowledge, inductive reasoning, prejudice, fallacy of the converse, NIMBY. Note that a single term may apply to more than one of the examples, quotes or definitions in the sentences that follow. Not all terms will necessarily be required to complete the exercise. The teacher may wish to write these terms on large cards in a way that is visible to all students as they consider the examples.

1. "To solve this problem, you've got to be flexible and look for alternatives. The usual strategies will probably not work here."

2. This philosopher wrote thirty-five dialogues that have stood the test of time. Many regard much of modern philosophy as merely a footnote to his.

3. If you want to get a sense of the real frequency of the occurrence of a given event, you cannot focus on small samples. These will be unreliable.

4. This is an argument involving two or more premises (assumptions) that lead to a conclusion. The argument may be true or false, valid or invalid.

5. Scientists make abundant observations and then put forth hypotheses to explain the observations.

6. "We're not saying that building a new shelter for the homeless is a bad idea. However, building it here is not a good decision. It's really not a good fit with our neighborhood. My neighbors and I all agree about this."

7. "If Russia should place nuclear weapons in space, it would be a formidable military power. It is a formidable military power. Therefore, it has placed nuclear weapons in space."

8. Some rationalists claim that we have knowledge that exists prior to our sensory experience of the world. It's not clear where it came from, but they insist that it's there.

9. Almost all of us hold some unreasonable opinions that are not based a fair examination of all of the facts.

10. This term refers to the assumptions that lead to a conclusion in a logical argument.

ACTIVITY III

LATERAL THINKING: "THINKING OUTSIDE THE BOX"

Give a rational explanation for the following odd situations. You may need to question your assumptions in order to come up with a creative answer that fits the facts of the scenario.

1. Sherlock Holmes was sitting in his parlor in front of the fire on a snowy night. A snowball broke his window and came into the room. He saw three brothers—Dan, Mark and Steve Crimson—running away. Then he got a note. "? Crimson. He broke your window."

2. A man is hanging from a rope in his apartment. He is dead. There is no furniture near the body, just a puddle of water. The police rule it a suicide.

3. A man landed without harm after jumping 300 feet on his own power. He did not have a parachute.

4. Jim had a slumber party with four of his friends. Three of his friends went to sleep. Jim and his friend Mike were still awake. Then Jim finally fell asleep. When Jim woke up, he saw his friend Mike with blood all over his body. His other three friends were dead. Jim realized that Mike did not commit any crime.

5. Two guys go into a restaurant and order iced tea. The waiter pours the tea into their glasses from the same pitcher. One drinks his tea quickly. The other drinks his tea slowly. They go outside. The guy who drank his tea slowly collapses and dies. The coroner concludes that he was poisoned. Why didn't both guys die?

6. You are taking a vacation on an island in the middle of a lake in Canada. There is a tractor that pulls a cart of hay for children who want a hayride. You learn that there has never been a bridge to the island. No boat brought the tractor. It wasn't brought by air. It wasn't built on the island. How did it get there?

7. Hundreds of rich and famous persons are at a party. They are mingling and having a good time. Ten persons wearing masks and carrying weapons arrive at the party and ask the guests to put their money into bags. The robbers escape. The police don't arrest anyone because no one from the party informs them of the crime.

8. Yuki opens her eyes and looks around. Her friends have all disappeared. Still, she is not worried. Why not?

9. Miho and her brother Kenta are in the living room in their home. The electricity goes out. Kenta, who was watching television, decides to go to bed. Miho keeps on reading a book, even though there is no light.

10. Two coworkers were playing a game. The first got a score of 91. The second got a score of 63 and won.

11. A man got an operation. He decided to take a train home. The doctor told him to take his bandages off exactly one hour after the train departed. At that time, the train entered a tunnel. The man took off the bandages. Then he jumped from the train and died.

12. A king is on his deathbed. Two young men come forward. Each claims to be the king's long-lost son. The king proposes a test. The first man agrees to the test, but is sent away. The second refuses the test and is given the crown.

13. Taro and Satoru are friends who like to compete with each other. They are always challenging one another. Up until now, there is nothing that one could do that the other could not. This time, though, Taro proposes a challenge that Satoru cannot possibly meet but that Taro can meet without any problem at all.

14. Thousands of people watched a man steal something. Then, excited, the man ran home without taking what he had stolen. He was never arrested.

15. Two men are accused of murder. The jury finds one of them guilty and the other innocent. The judge is confused about how to punish the guilty party and at the same time let the innocent party go free. He consults a doctor.

16. Akiko is from Japan but was visiting her grandfather who was living in the United States. She dialed a wrong number on her phone and her grandfather died.

17. A man was wandering through the streets of a city at night. When a policeman stopped him to ask him some questions, the man said that he was looking for a place with no streetlights so that he could get a good view.

18. Lisa was about to eat some cookies in the kitchen in her home, but her mother scolded her and said to wait until after dinner. Ten minutes later, Lisa went into the living room. Her mother was there on the couch. Lisa sat next to her in a chair and ate a handful of cookies. Her mother said nothing.

19. An airline baggage attendant noticed that there was a dead dog in a dog carrier that had just arrived on a flight from overseas. He panicked, thinking that the passenger whose dog this was would be upset and might sue the airline. He found a dog that looked exactly like the dead dog. He snapped the old collar around the new dog. When the owner of the dog showed up, she started crying. She said, "There's some mistake. This is not my dog."

20. A man has to get a fox, a chicken and a sack of corn across a river. He has a rowboat, and it can only carry him and one other thing. If the fox and chicken are left together, the fox will eat the chicken. If the chicken and the corn are left together, the chicken will eat the corn. How does the man do it?

21. In his own home, a man watched a woman fall to the ground and start bleeding. He did nothing to help her.

22. Megumi sometimes travels over four hundred miles a day within a single building in Tokyo.

23. A man says that he will sell you a piece of paper on which are written all six numbers for the lottery jackpot that will be drawn next week. The possible numbers range from one to ninety-nine. You buy the piece of paper and do not doubt that the man who sold you the piece of paper was telling the truth. However, you decide not to buy a lottery ticket.

24. There is a green meadow in the middle of nowhere. Not a single person is around. A man approaching the meadow knows that when he arrives he will die.

25. A man rubs a bottle and a genie comes out. The genie tells the man that he will grant him one wish. He tells him to take a day to think about it. The man asks his mother what to wish for. She is blind. She said, "Ask for my eyesight". He asked his wife, who could not have children. She said, "Ask for a son." He asked his father, who wanted to be rich. The father said, "Ask for something valuable." The man was confused. He could only have one wish. What should he say to the genie?

{See Appendix II for answers to these puzzles}.

ACTIVITY IV

VALID AND INVALID REASONING

Are the following arguments valid? Are they, instead, based on invalid reasoning? If they are invalid, please identify the fallacy at work. For each claim, choose one of the following: valid argument, argument from ignorance, post hoc ergo propter hoc, ad hominem, special pleading, argument from poor analogy, equivocation (ambiguity), appeal to mere authority, circular reasoning (begging the question), affirming the consequent, false dilemma, hasty generalization, invalid syllogism, proof by selected instances, use of emotionally loaded language, undistributed middle term, conclusions cannot be derived from two negative premises, appeal to authority, gambler's fallacy, fast-food thinking (slogans) . For fallacies, a good way to start is to make cards from the excellent visuals at www.fallacyaday.com and use these with students for warm-up exercises and hints for this activity.

1. "The special law forbidding watering of lawns during the current drought should not apply to businesses. If we don't water the lawns in front of our stores, the customers may stop coming. That's bad for the economy in general."

2. "You say that all people over age sixty-five should get a discount when going to public museums. You're seventy years old. You would say that, wouldn't you?"

3. "The unborn have a right to life. Therefore, abortion is immoral."

4. "All Canadians are people. John is a person. Therefore, John is a Canadian."

5. "They say that one out of five persons on Earth is Chinese. How is that possible? I know thousands of people. Not one is Chinese."

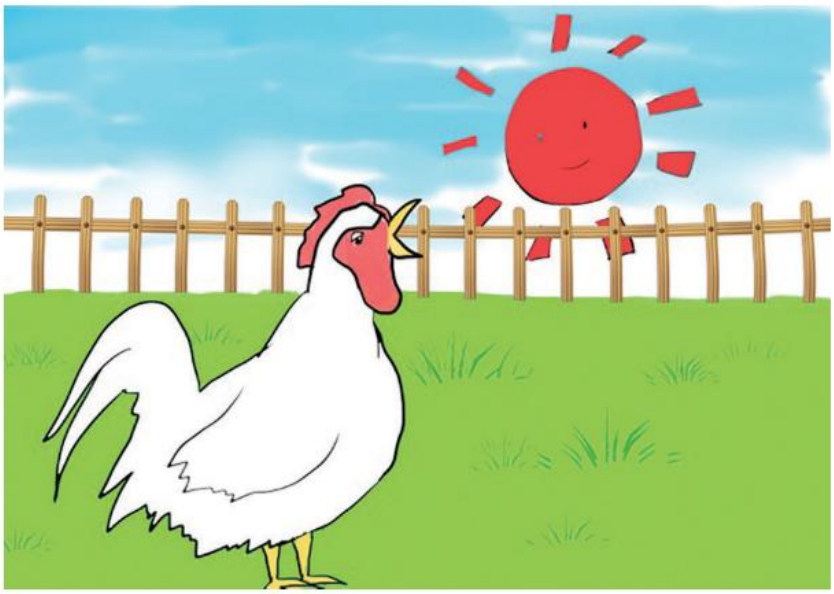
6. "No woman is perfect. Some women are presidents. Therefore, some presidents are not perfect."

7. "In the war against terror, you are either with us or against us."

8. "How can you claim that you are a vegetarian when you wear leather shoes?"

9. "I appreciate your point. I used to think that way when I was your age."

10. "After the state outlawed capital punishment, the violent crime rate soared. To get crime under control, we have got to bring back the death penalty."



11. "If we decide to abort fetuses when tests show that they have genetic deformities, where will it all stop? Pretty soon, parents will be picking out the sex, eye color and IQ of their babies."

12. "The coach is not taking the player out of the basketball game. The player has had a cold streak. He's missed nearly every shot since he came into the game. He's bound to get hot pretty soon."

13. "Nothing easy is worthwhile. Nothing good is easy. Therefore, nothing good is worthwhile."

14. "Either God created the universe, or the universe came into being out of nothing."

15. "No reptiles have fur. All snakes are reptiles. Therefore, no snakes have fur."

16. "All that is good is pleasant. All eating is pleasant. Therefore, all eating is good."

17. "I have a right to say whatever I please. Therefore, you should not try to shut me up."

18. "The preacher says that you will have immortal life only if you have faith in God. But faith means an irrational belief that is not supported by evidence. Therefore, God rewards irrational thinking."

19. "All educated people have worked hard. Some students are not educated. Therefore, some students have not worked hard."

20. "I saw a black cat cross my path this morning. Sure enough, I had a very unlucky day. We had a pop quiz in math class that I failed. Also, I lost a ten-dollar bill. It must have fallen out of my pocket when I pulled out my keys."

21. "Scientists working for the makers of this medicine say that it is the most effective remedy of allergy symptoms now available over the counter."

22. "If God exists, then there is love in the world. There is love in the world, so God exists."

23. "There are laws to make sure that our water is clean. Why can't we pass a similar law requiring television programs and movies to be free of the filth that we encounter day after day?"

24. "Whales have spouts. Gutters on roofs have spouts. Therefore, whales are gutters."

25. "If I make an exception for you, then I have to make an exception for everyone."

26. "Broad minds, like broad rivers, tend to be shallow. It's best to focus on one subject and learn it well and not to get distracted by a lot of different subjects."

27. "I've only been on campus for a day now, but I can tell you that the students at this university are all sharp as tacks. It's intimidating."

28. "I wonder if you'll understand, but let me try to spell out my argument in the simplest terms possible."

29. "More doctors smoke Camels than any other cigarettes."

30. "Charity begins at home. I am all for giving foreign aid, but we first have to make sure that our own citizens do not lack food and shelter."

{See Appendix II for discussions of these questions}.

ACTIVITY V

PRISONER'S DILEMMA

The following dilemma is quite famous. Break into small groups of three or four and discuss how you would solve this problem. Then through a spokesperson share your solution with the class as a whole.

You and another person are in jail. You have been convicted of committing a crime together. You learn that the length of your jail sentence will depend on whether or not you confess. There are three possibilities.

1. If you confess but the other person does not, you will go free. The other person will spend ten years in jail.

2. If both you and your friend refuse to confess, you will both spend two years in jail.

3. If both of you confess, you will each spend five years in jail.

You and the other person are in separate cells in the jail. You cannot communicate with one another. Should you confess or refuse to confess?

Try to think of one or two real-life situations that exemplify the prisoner's dilemma.

How might this dilemma apply to deciding whether or not to join the Kyoto Protocol (reduction of greenhouse gases) or whether or not to water your lawn during a drought when this is technically illegal?

How might this apply to two tobacco companies? If all agree not to advertise their cigarettes, for example, then all can still make a relatively modest profit. Not advertising is rational in this case because public support for regulation and even prohibition of tobacco products has been growing in intensity as health concerns become more salient.

If some companies advertise, then all companies will feel compelled to follow suit. They will in that case threaten to outrage the public even more and possibly invite strict regulation that will dramatically cut all of their profits. Should the tobacco companies cooperate or defect? What is the best strategy?

In what way does this same dilemma apply to the OPEC countries that have formed a cartel to limit production of oil and petroleum in order to keep prices artificially high?

ACTIVITY VI

GOOD KNOWLEDGE QUESTIONS?

Which of the following are good knowledge questions? Why? Which of the following are not good knowledge questions? Why? What areas of knowledge are implicated in the following questions?

Remember that knowledge questions ask how we construct and evaluate knowledge. These questions do not lend themselves to a single correct answer. They are open-ended questions that are, as we will see when we analyze real-life situations, the sources of many of the most impassioned debates and controversies that confront us. We express knowledge questions in general terms.

Although we might generate different but equally plausible answers to the knowledge questions that we confront, we must always arrive at answers that are reasonable. In doing so, we must respond adequately to reasonable counterclaims that others may make while at the same time understanding that our personal perspectives may influence both our analysis and the answers that we ultimately give.

In formulating these knowledge questions, it's important that we use general terms and not the specialized language or the methods of the areas of knowledge from which these questions arise.

1. How important is the role of reason in the law and order system?

2. Who should make the judgment about whether a person is guilty or innocent of a crime against society?

3. Do hand sanitizers cause superbugs?

4. Does reflexology really work?

5. Why does the alarm clock snooze button on so many models give you nine extra minutes, not ten?

6. Have we progressed as a society?

7. Is it possible to say whether life is better now than it used to be?

8. Will the permafrost release deadly germs as it melts because of global warming?

9. Did Isaac Newton invent the cat door?

10. What were the causes of the American Civil War?

11. Are our attributes the result of nature, of nurture or both?

12. Can human sciences ever provide us with definitive answers?

13. Do governments have a moral responsibility to tell the truth?

14. Do lobsters feel pain when they are boiled alive?

15. Why are most cough medicines flavored like cherries and lemons?

16. Can we trust knowledge that is purely personal?

17. Why do people believe in irrational phenomena?

18. If a man has a sex change, can he compete in the Olympics as a woman?

19. What is the relationship between the arts and the sciences?

20. If for every action there is an equal reaction, how does anything move?

21. Is the way that we divide up time a reflection of reality?

22. Are our hunches more influential than our reasoning processes?

23. Why does Swiss cheese have holes in it?

24. Should convicted felons who are released from prison have the same rights as ordinary citizens?

25. Does history have a beginning or end?

26. What do a society's most frequently used words say about those who live in it?

27. Should scientists have extra ethical obligations?

28. Can camels swim?

29. To what extent have ideas about the nature and role of God changed over time?

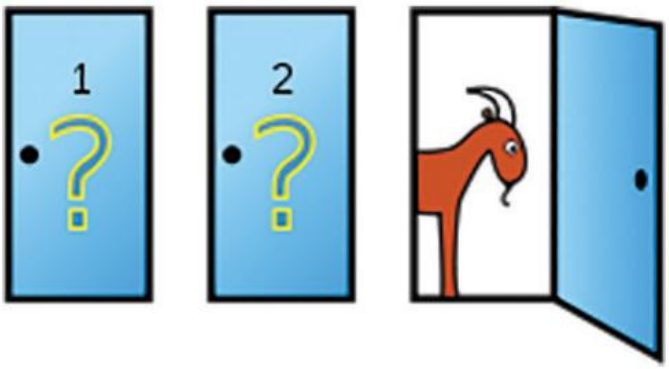
30. Do bears really sleep all winter?

ACTIVITY VII

THE GAME SHOW PROBLEM

Suppose that you are on a famous game show. The host tells you that he is going to show you three closed doors. Behind two of these there is a goat. Behind one of these there is a new car. Of course, you want to pick the door with the car behind it. If you do, you get to keep the car.

You pick door number one. The host says: "I am going to open door number three. You see that there is a goat behind it. That means that behind doors one and two are a goat and a car. You don't know which is which. Would you like to switch your choice from door one to door two? Or would you prefer to stay with your original choice?" Assume that the host must always reveal a goat behind one of the doors not chosen by the contestant.



What would you do in this same situation? Would staying with your original choice improve your odds? Would switching? Would the odds be the same either way?

{See Appendix II for a discussion of this problem}.

ACTIVITY VIII

CONVERGENT INTELLIGENCE TEST SAMPLES

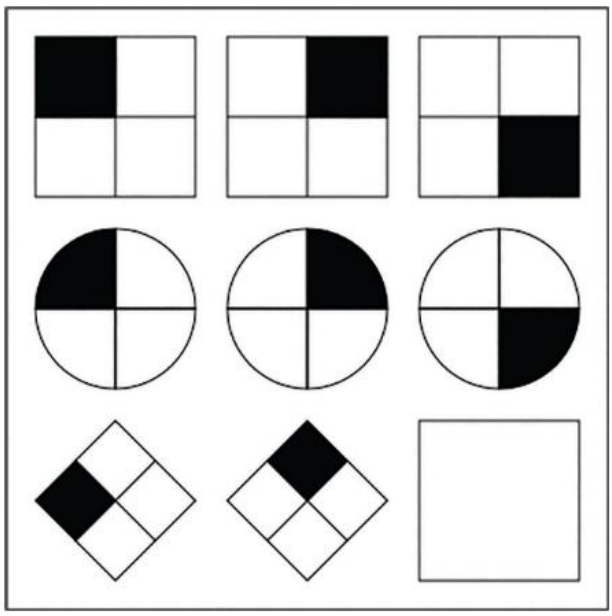
Most intelligence tests focus on convergent thinking. These tests do not give any advantage to people who have been formally educated or who have acquired a large store of knowledge of facts and procedures. These tests are designed to measure innate intelligence—the ability with which you were born.

Here are some examples of items from a pure intelligence test. There is only one right answer to each question. These examples come from a famous test called *Raven's Progressive Matrices*.

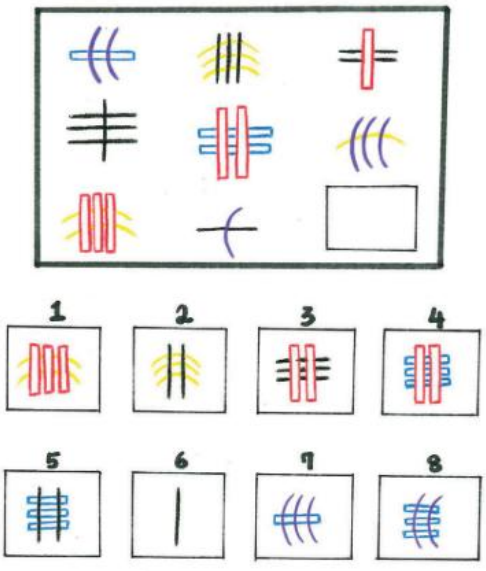
The questions start off easy and become more and more difficult. By the end, people with IQs of 160 and even 180 are stumped. The first is quite easy. The second is much more challenging. Work with a partner and see if you can figure out both. Then, as a whole class, discuss possible solutions to the much more difficult second matrix.

IQ means "intelligence quotient". Keep in mind that you have to have an IQ of about 70 to succeed in an ordinary junior and senior high school. An IQ of 100 is average. You can do well with at a good university with an IQ of 105-115 if you have proper motivation and good study habits. Albert Einstein had a 150 IQ. Some people have been measured with an IQ of over 200.

1.



2.



{See Appendix II for the answers and a brief discussion}.

ACTIVITY IX

DIVERGENT THINKING TEST SAMPLES

Divergent thinking requires us to start with a single idea or "stimulus" and then to generate as many ideas as possible. This style of thinking allows us to explore unconventional solutions. We do this when we are "brainstorming" to come up with ideas. It's most effective if you refrain from analyzing your ideas until after you have generated them. This kind of thinking is non-linear. It is spontaneous. It is a style of thinking that allows us to draw unexpected connections or find answers to tricky problems that our usual logical procedures and store of information do not permit us to solve.

Some psychologists have also called this cognitive style "lateral thinking" or "thinking outside the box". Pre-school children and children in the early grades of elementary school engage in divergent thinking all of the time. They are playful and spontaneous. They are open to making new connections and discoveries. There is a joy and humor to their learning activities that one does not see so often in older students.

Take exactly five minutes to take a "divergent thinking test" instead of a typical IQ test. Write down as many different uses that you can think for the two common nouns below. With this kind of test, we are not looking for a single right answer. Instead, we are looking for the number and uniqueness of your answers. At the end of the class, each student should read his or her list of possible uses.

1. a brick

2. a blanket.

{See Appendix II for two examples of answers generated by British secondary school students from Malcolm Gladwell's book Outliers}.

ACTIVITY X

NIMBY AND SELF-INTEREST

In an article in The Japan Times (April 25, 2016), the author describes a growing number of municipalities that have had to abandon plans for new day care centers across Japan because of opposition from local residents, despite long waiting lists and a clear need for these facilities.

Most residents opposed to the construction of the day care centers in their neighborhood oppose them on the grounds of "noise generated by children among other factors".

Others also said that the municipalities had failed to provide sufficient information about their plans and that this was fomenting a sense of "distrust".

Yet other residents said that the day care facilities would cause congestion as many parents in cars would be dropping off and picking up their children at about the same time.

These are classic NIMBY arguments. People don't oppose day care facilities on general principles, but they want them built in other people's backyards.

Let's look at the following list of facilities that municipalities need to have. What are some creative reasons that local residents might give for wishing them built in someone else's backyard? Is this sort of reasoning "rational" in any way? Please discuss these scenarios and the questions that they raise in pairs, small groups or a whole class setting.

1. Wind farm

2. Methadone clinic for heroin addicts

3. Small airport for domestic flights to relieve pressure on the large airport already in existence quite distant from the city

4. Safe evening sports facility in a safe suburb for youth living in declared drug-zones

5. Half-way house for recently released convicts

6. Abortion clinic

7. Homeless shelter

8. Soup kitchen

9. Wild animal shelter

10. Boxing gym for underprivileged children in a middle class neighborhood

UNIT SIX
EMOTION AS A SOURCE OF KNOWLEDGE?

For Further Discussion

1. "Poetry is the spontaneous overflow of powerful feelings: it takes its origin from emotion recollected in tranquility" (William Wordsworth).

2. "Nothing in life is so exhilarating as to be shot at without result" (Winston Churchill).

3. Sigmund Freud claimed that the goal of psychotherapy was "to transform hysterical misery into ordinary unhappiness". What do you think about this claim?

4. Describe one time when you became very scared but then relaxed once you had more information about what was happening.

5. "It is possible to infer character from features, if it is granted that the body and the soul are changed together by the natural emotions" (Aristotle).

6. From the perspective of natural selection, of what value is the emotion that we call **grief**? Why should it be so devastating at times?

7. To what extent do you think that feelings of embarrassment are a natural part of growing up during one's childhood?

8. Ambrose Bierce, in his dictionary, defined happiness as "an agreeable sensation arising from contemplating the misery of others." Do you think that this is, in part, true?

9. Do you think that emotions are just a leftover from our primitive past when we were focused on getting food, fighting enemies, fleeing danger and reproducing?

10. Do you think that emotional states affect your biological state? Do you think that it's the other way around? Are both true at different times? Do you think that there is a continuous loop from the emotional to the biological state and back?

11. From a book or film that you have read or seen describe a character whose reason is clouded or overwhelmed by emotion.

12. "The heart has its reasons of which reason knows nothing" (Blaise Pascal).

13. "People who are sensible about love are incapable of it" (Douglas Yates).

14. We live in an era of high-speed air travel and videoconferencing. Why do so many companies insist on doing business face-to-face, even if this means spending lots of money to send their employees overseas for these meetings?

15. Do you think that it's possible for a whole nation or other large group of people to feel a collective sense of shame?

16. What are the six things that you are most afraid of? Can you explain why you have these fears?

17. Do you think that reason or emotion plays a larger role when people decide to get married to one another?

18. In your opinion, what are the grossest things that people in your culture eat?

19. Can you think of an evolutionary reason why human beings are capable of falling madly in love with one another?

20. Our emotional expressions are generally not under our voluntary control. Why not? What price would we pay if we could feign disgust, happiness, sadness, grief, anger, contempt, contentment and so forth?

21. What do we mean when we say that "there is a method to his madness"? Does this suggest that there is not really a firewall between emotions and reason?

22. "Reason is always and everywhere the slave of the passions" (David Hume).

23. Why do you think that people feel **guilty** about something that they have done but that nobody witnessed or discovered?

24. "Man is a rational animal who always loses his temper when called upon to act in accordance with the dictates of reason" (Oscar Wilde).

25. Do you believe that **sympathy** is nothing more than an emotion designed to earn for us **gratitude** from those we help?

ACTIVITY I

GOOD KNOWLEDGE QUESTIONS?

Which of the following are good knowledge questions? Why? Which of the following are not good knowledge questions? Why? What areas of knowledge are implicated in the following questions?

Remember that knowledge questions ask how we construct and evaluate knowledge. These questions do not lend themselves to a single correct answer. They are open-ended questions that are, as we will see when we analyze real-life situations, the sources of many of the most impassioned debates and controversies that confront us. We express knowledge questions in general terms.

Although we might generate different but equally plausible answers to the knowledge questions that we confront, we must always arrive at answers that are reasonable. In doing so, we must respond adequately to reasonable counterclaims that others may make while at the same time understanding that our personal perspectives may influence both our analysis and the answers that we ultimately give.

In formulating these knowledge questions, it's important that we use general terms and not the specialized language or the methods of the areas of knowledge from which these questions arise. In asking good knowledge questions, we are less concerned with questions about the world itself than with our knowledge of the world. This is an important distinction.

1. To what extent is creativity linked to reason?

2. What criteria could be used to organize facts into a useful system?

3. To what extent is our view of the past based on myths?

4. Do all areas of knowledge deal with facts?

5. Do the arts provoke emotions or purge them? Do they do neither? Do they do both?

6. How do human sciences differ from the natural sciences?

7. What are the limits of statistics in the human sciences?

8. Social scientists seek to use neutral questions in their questionnaires. Is this possible?

9. What makes a theory in the human sciences convincing?

10. To what extent do the arts help us to see the world with new eyes?

11. How does prior learning influence our interpretation of art?

12. Can ethical truths ever be as certain as mathematical truths?

13. How do you make loaded dice?

14. Can our values influence or alter our perceptions?

15. Is historical objectivity possible?

ACTIVITY II

GALLERY OF FACIAL EXPRESSIONS

Discuss the facial expressions captured in some or all of the forty photographs collected in the impressive gallery linked below.

http://www.smashingmagazine.com/2009/04/40-captivating-photos-that-depict-human-emotion/

Are they expressions of primary emotions (happiness, sadness, fear, anger, surprise, disgust) that are universally recognized? Or are other emotions at work? What makes you think so? Please discuss these photographs in groups of three or four.

ACTIVITY III

GALLERY OF MASTERPIECES

Discuss the facial expressions captured in the following paintings and details of paintings. Are the expressions of primary emotions (happiness, sadness, fear, anger, surprise, disgust) that are universally recognized? Or are other emotions at work? What makes you think so? Please discuss these paintings in groups of three or four.

Jacques-Louis David

Edgar Degas

Moreau Chocarne

Edvard Munch

Auguste Rodin

Guido Reni

Statue of a Boddhisattva c. 200 AD

ACTIVITY IV

IMPORTANT TERMS DEFINED OR ILLUSTRATED

The following are examples, quotes or definitions illustrating or explaining important terms below that may be useful in discussions of emotion as a source of knowledge. Please match each example, quote or definition with one of the following terms: primary emotions, social construction theories of emotion, James-Lange theory, thalamus, subjective, placebo, somatic marker thesis, judgment theories of emotion, Stoicism, doomsday machine. Note that a single term may apply to more than one of the examples, quotes or definitions in the sentences that follow. The teacher may wish to write these terms on large cards in a way that is visible to all students as they consider the examples.

1. In controlled studies, doctors often administer to one group of subjects a "medicine" that is not actually a medicine.

2. This is a part of the limbic system in the brain that is associated with the emotions.

3. Some anthropologists believe that emotions are not primarily physiological but are determined by specific cultures and are a kind of learned behavior.

4. A small group of emotions that includes disgust, fear, anger, happiness, sadness and surprise appear to be encoded in facial muscles and to be universally experienced.

5. This doctrine holds that we should keep our destructive emotions in check so that we can calmly reflect on and live in tune with the rational principles governing nature.

6. Some have speculated that the emotions are the ultimate guarantors of one's sincerity since they cannot be controlled or counterfeited by the intellect and are clearly advertised.

7. Emotions are not so much physiological phenomena as assertions of our values, goals and beliefs.

8. Emotions highlight positive and negative aspects of possible courses of action that we are holding in mind while making decisions.

9. Some of our emotions are based upon our own thoughts and ideas that only we can know directly and immediately. In other words, they are not objective.

10. Crying causes us to be sad. Trembling causes us to feel fear.

UNIT SEVEN
FOUR OTHER SOURCES OF KNOWLEDGE

Further Discussion

1. "Intuition is simply rapid cognition with the required knowledge partially swept under the carpet, all courtesy of emotion and much past practice" (Antonio Damasio).

2. Do you think that we can achieve insights by means of intuition and deductions that require no appeal to experience (sense data)?

3. Some say that faith is not a way of knowing but a way of believing. Can you say the same thing about emotion, memory and even reason and sense perception?

4. "We must respect the other fellow's religion, but only in the sense and to the extent that we respect his theory that his wife is beautiful and his children smart" (H.L. Mencken).

5. What is your earliest memory? How much of this memory is your own and how much of it was formed by what your parents or loved ones told you subsequently?

6. In many courts, evidence from lie detectors is not admitted because it is not sufficiently reliable. Should some eyewitness testimony be inadmissible for the same reason?

7. "I have learned that faith means trusting in advance what will only make sense in reverse" (Philip Yancey).

8. "Intuition favors the prepared mind."

9. "Without risk there is no faith. Faith is precisely the contradiction between the infinite passion of inwardness and objective uncertainty" (Soren Kierkegaard).

10. Some have argued that "intuition" is a redundant term, that our other sources of knowledge (including emotion) cover everything that we mean by "intuition" and that the term adds nothing new. Do you agree or disagree?

11. "Intelligence is the wife, imagination is the mistress and memory is the servant" (Victor Hugo).

12. "Imagination is the real and eternal world of which this vegetable universe is but a faint shadow" (William Blake).

13. "What we hold in our heads—our memory, our feelings, our thoughts, our sense of our own history—is the sum of our humanity" (Richard Eyre).

14. Have you ever had a strong hunch that something was going to happen and it did? Have you ever had a strong hunch that something was going to happen and it didn't?

15. "Memory is the mother of all wisdom" (Aeschylus).

16. "Imagination grows by exercise and, contrary to popular belief, is more powerful in the mature than in the young" (Somerset Maugham).

17. Is intuition a source of personal knowledge only, or can we arrive through our intuition at knowledge that we can share with others?

18. "Every great advance in science has issued from a new audacity of imagination" (John Dewey).

19. "Faith is spiritualized imagination" (Henry Ward Beecher).

20. Some people claim that an unreliable memory is a godsend. If our memories were more accurate, we might find that episodes from the past better left forgotten would haunt us and make us miserable.

21. What does it mean to "have faith in yourself"?

22. "Intuitions are the judgments, solutions, and ideas that pop into consciousness without our being aware of the mental processes that led to them" (J. Haidt & C. Craig).

23. Do you think that our prejudices or deeply held beliefs can contaminate our memories?

24. What is the role of imagination in planning our future?

25. Some say that faith is belief without justification. Others suggest that there is justification for belief by faith, but it is of an unusual sort. Mystical experience and divine revelation are possible examples of this.

26. The musician Arthur Russell has an album called "First Thoughts, Best Thoughts". What does this title suggest to you if you are thinking about it from a TOK perspective?

ACTIVITY I

GOOD KNOWLEDGE QUESTIONS?

Which of the following are good knowledge questions? Why? Which of the following are not good knowledge questions? Why? What areas of knowledge are implicated in the following questions?

Remember that knowledge questions ask how we construct and evaluate knowledge. These questions do not lend themselves to a single correct answer. They are open-ended questions that are, as we will see when we analyze real-life situations, the sources of many of the most impassioned debates and controversies that confront us. We express knowledge questions in general terms.

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In formulating these knowledge questions, it's important that we use general terms and not the specialized language or the methods of the areas of knowledge from which these questions arise. We are less concerned with questions about the world itself than with our knowledge of the world. This is an important distinction.

1. Are scientific theories subject to revision?

2. Are conclusions from experiments in the human sciences subject to multiple interpretations?

3. How is science taught in schools?

4. Can we talk meaningfully about integrity in science?

5. Does emotion have any role to play in the scientific method?

6. Is our connection with the past less credible once eyewitnesses of historical events have died?

7. Should our behavior be constrained by the rules of religions in which we do not believe?

8. What historical conditions made possible the construction of the notorious concentration camps in Germany during World War II?

9. For what reasons does the American President deliver the annual State of the Union address?

10. Can language changes allow us to chart the development of a society in more general terms?

11. What role does music play in different societies?

12. Are emotional responses to music universal?

13. What were the main themes that Shakespeare addressed in his most famous plays?

14. Can creative artists play a role in the development of scientific knowledge?

15. What are the main differences between British and American English?

16. How can the study of history help us explain the differences between two languages that share many common elements?

17. Do we have an ethical obligation to study science?

18. Would a brain transplant change your personality?

19. Are hurricanes getting worse and more frequent?

20. How important is visual information in helping us to acquire knowledge of the past?

21. To what extent do we romanticize the past?

22. Why do we seem always to get itches in places that we can't reach with our hands?

23. Does the death penalty reduce violent crime?

24. Is it ethical to try citizens of another country by the laws of the country that they happen to be visiting when they commit a crime?

25. Does technology help or hinder us in our quest to understand and know our world?

26. Can salt substitute kill you?

27. Is it possible to become so bored that you die?

28. Is it still possible that there are places on Earth where we might discover an unknown animal as big or bigger than human beings?

29. What is "the God particle"?

30. What conclusions did Stanley Milgram come to as a result of his famous experiments on obedience?

ACTIVITY II

SOCIAL INTUITIONS

The drawing, two variants of which you can find in the links below, is quite well known. The illusion is meant to encourage you to ask whether you can judge a person's character simply by looking at him or her.

From one perspective, this is a drawing of a person's face. Can you "read" something into this face? Do our social intuitions function in an analogous way? Can we pluck from the features of a face that we encounter evidence of loyalty, trustworthiness, courage, strength, weakness, infidelity, falsity or cowardice?

http://www.moillusions.com/liar-illusion/

http://brainden.com/word-illusions.htm#prettyPhoto[pp_gal]/3/

ACTIVITY III

MYERS-BRIGGS TYPES

Please take this sample test. Mark the following statements as true or false. In some cases, a statement will seem more or less true or false. Which is the stronger sense that you have? There are NO RIGHT ANSWERS to this test. Be honest.

1. I remember events as snapshots of what actually happened.

2. I solve problems by leaping between different ideas and possibilities.

3. Sometimes I pay so much attention to facts, either present or past, that I miss new possibilities.

4. I am pragmatic and look at the bottom line

5. I remember events more as an impression of what it was like than as actual facts or details of what happened.

6. I am interested in doing things that are new and different.

7. I solve problems by working through facts until I understand the problem.

8. I trust impressions, symbols and metaphors more than what I actually have experienced.

9. I trust experience first and trust words and symbols less.

10. Sometimes I think so much about new possibilities that I never look at how to make them a reality.

11. I like to see the big picture, then to find out the facts.

12. I start with facts and then form a big picture.

These questions are from the Myers-Briggs Personality Test. This test identifies personalities according to four dimensions. The second dimension is called "sensing" (S) and "intuition" (N).

Do you pay more attention to information that comes in through your five senses (sensing) or do you pay more attention to the patterns and possibilities that you see in the world that you perceive (intuition)?

It's important to note that not one end or the other of the dimension is better than the other. Everyone spends some time sensing and some time using intuition. The question is how strongly you are oriented to one or the other.

Those who are strongly sensing types (S) marked the following statements as true: 1, 3, 4, 7, 9, and 12.

Those who are strongly intuitive types (N) marked the following statements as true: 2, 5, 6, 8, 10 and 11.

Are you more sensing or intuitive? Are you a little more of one than the other or much more of one than the other? Do the results of this quiz confirm what you already knew about yourself or do the results surprise you?

After you take the test, share with a group or the whole class whether the results surprised you or confirmed what you already suspect about your personality. Do the results that your classmates got surprise you or confirm what you already suspected?

ACTIVITY IV

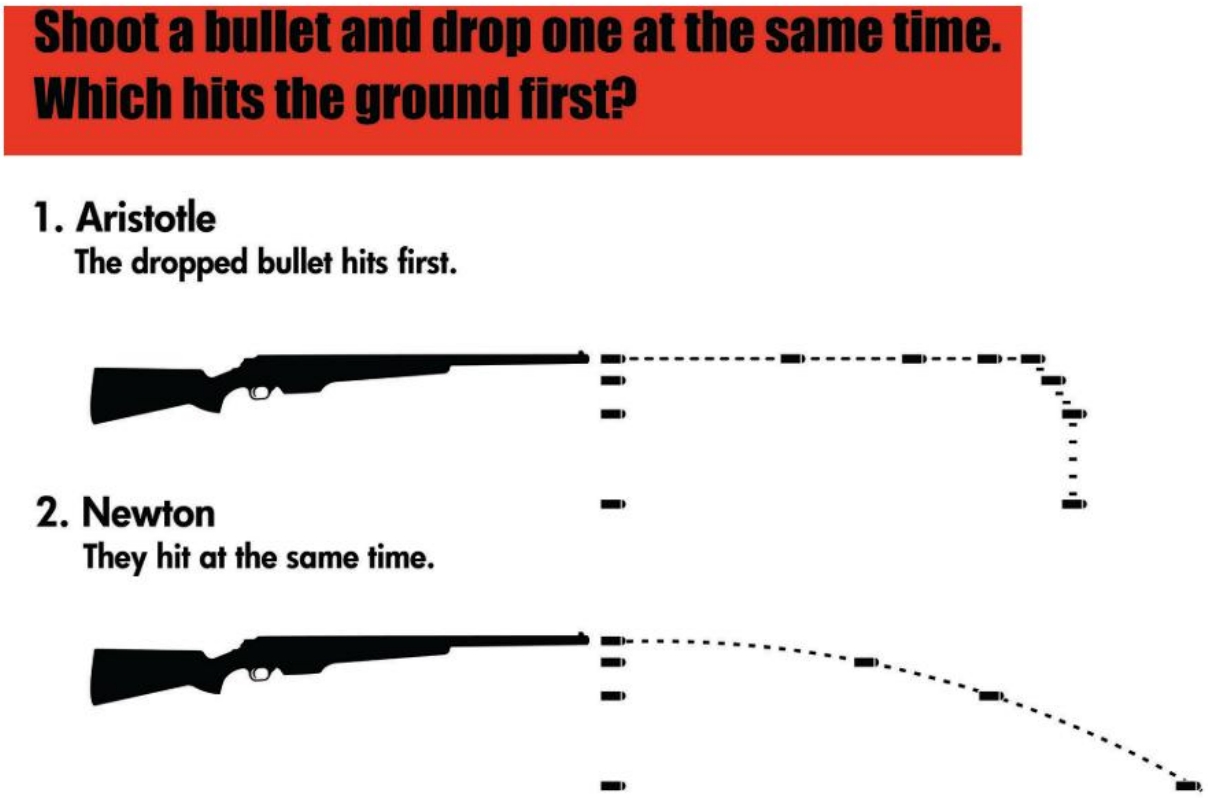
INTUITION PROBLEMS

1. The Birthday Problem

Imagine a room with twenty-three people in it. What are the chances of two of the people in this room having the same birthday?

2. Shooting and Dropping Bullets

Suppose that you have a gun aimed horizontally in one hand and a bullet in the other. You fire the gun and drop the bullet at the same time. Which hits the Earth first?



ACTIVITY V

FACTS AND MYTHS ABOUT MEMORY

Which of the following statements do you think are true? Which do you think are false?

1. Human memory works in much the same way as a video camera.
2. Memory function is localized in the brain. An injury to that portion of the brain can totally disable memory functions.
3. Hypnosis can help subjects retrieve lost memories.
4. The testimony of one confident witness should be sufficient to secure a conviction in criminal court.
5. Things that we don't expect to see generally grab our attention and cause us to remember them.
6. People who suffer amnesia in most cases forget their names and identities.
7. Once you have experienced something and remember it, that memory is permanent and does not change.
8. Forgetting generally occurs gradually rather than all at once.
9. Some adults have photographic memories that allow them to memorize large chunks of data in a short amount of time.
10. People who are sexually abused as children can lose their memories of these events and recover them later in therapy.

ACTIVITY VI

FAITH AND REASON

Please discuss whether and why you agree or disagree with the following propositions regarding faith and reason.

1. There is no way to reconcile faith and reason. They are by definition opposed to one another.
2. Reason is morally neutral and universal.
3. Reason should displace religion. Faith is primitive. We've outgrown it.
4. Reason does not involve faith at any level of its discourse.
5. Faith is gullible agreement to something that cannot be proven.
6. Reason is concerned only with observable facts.
7. Faith and reason are compatible. They operate in different realms.
8. Faith is emotional and sentimental.
9. Reason assumes that the universe is entirely materialistic.
10. Faith is irrational when it requires belief contrary to what the scientific evidence suggests.

Do you believe in an invisible celestial teapot orbiting Earth?

ACTIVITY VII

IMAGINATION AND HORROR

In Jane Austen's novel Northanger Abbey (1817), Catherine Moreland, the "heroine", is a young, unmarried woman who has grown up in a sheltered environment in a parsonage in rural England. She is naïve and has "learned" much about the world through her reading of Gothic horror novels such as Ann Radcliffe's The Mysteries of Udolpho (1794).

Her reading has influenced her to "read" people in black-and-white terms. In the world of these novels, "such as were not as spotless as an angel might have the dispositions of a fiend." One major theme of the novel is that maturation requires that one let go of such simplistic thinking and realize that in most people's hearts and habits there is "a general though unequal mixture of good and bad".

In pairs or small groups, read aloud the following passages. After each reading, engage in a free discussion about the nature of imagination—its merits and its perils and whether we, like Catherine, must resolve to discipline this powerful way of knowing in order for it to serve us well, paying particular attention to the details and tone of each passage and noting the cumulative effect of each passage as a marker of Catherine's coming of age.

A. When Catherine meets her friends Henry and Emily Tilney and they invite her to Northanger Abbey, their estate, Catherine is excited because she has always imagined, from her reading of Gothic horror novels, what it might be like to experience the atmosphere of an actual ancient castle or abbey. Henry, with whom she is developing a romance, and who is worldlier than she is (and has also read many Gothic novels himself), attempts to show her how her imagination can mislead and agitate her. He begins the following conversation.

> "And are you prepared to encounter all the horrors that a building such as 'what one reads about' may produce? Have you a stout heart? Nerves fit for sliding panels and tapestry?"
>
> "Oh! yes—I do not think I should be easily frightened, because there would be so many people in the house—and besides, it has never been uninhabited and left deserted for years, and then the family come back to it unawares, without giving any notice, as generally happens."
>
> "No certainly. We shall not have to explore our way into a hall dimly lighted by the expiring embers of a wood fire—nor be obliged to spread our beds on the floor of a room without windows, doors, or furniture. But you must be aware that when a young lady is (by whatever means) introduced into a dwelling of this kind, she is always lodged apart from the rest of the family. While they snugly repair to their own end of the house, she is formally conducted by Dorothy the ancient housekeeper, up a different staircase, and along many gloomy passages, into an apartment never used since some cousin or kind died in it about twenty years before. Can you stand such a ceremony as this? Will not your mind misgive you when you find yourself in this gloomy chamber—too lofty and extensive for you, with only the feeble rays of a single lamp to take in its size—its wall hung with tapestry exhibiting figures as large as life, and the bed, of dark green stuff or purple velvet, presenting even a funereal appearance? Will not your heart sink within you?"
>
> "Oh! But this will not happen to me, I am sure."

B. Henry does not believe this. He continues to taunt her with a rich description of what she might encounter upon arriving at Northanger Abbey.

> "How fearfully will you examine the furniture of your apartment! And what will you discern? Not tables, toilettes, wardrobes, or drawers, but on one side perhaps the remains of a broken lute, on the other a ponderous chest which no efforts can open, and over the fireplace the portrait of some handsome warrior, whose features will so incomprehensibly strike you, that you will not be able to withdraw your eyes from it. Dorothy, meanwhile, no less struck by your appearance, gazes on you in great agitation, and drops a few unintelligible hints. To raise your spirits, moreover, she gives you reason to suppose that the part of the abbey you inhabit is undoubtedly haunted, and informs you that you will not have a single domestic within call. With this parting cordial she curtsies off—you listen to the sound of her receding footsteps as long as the last echo can reach you—and when, with fainting spirits, you attempt to fasten your door, you discover, with increased alarm, that it has no lock."
>
> "Oh! Mr. Tilney, how frightful! This is just like a book! But it cannot really happen to me. I am sure that your housekeeper is not really Dorothy. Well, what then?"

C. Henry continues to build up the imaginative suspense. She finds a secret underground passageway and a chapel, finds a dagger, a few drops of blood perhaps in a room along the way, some implements of torture and comes at last to a cabinet made of ebony and gold and finds a secret compartment in a drawer containing sheets of a manuscript, the last testament of "wretched Matilda". She starts to read but her candle suddenly expires. As Catherine shows signs of real agitation and alarm, he cannot keep from laughing.

> Catherine, recollecting herself, grew ashamed of her eagerness, and began earnestly to assure him that her attention had been fixed without the smallest apprehension of really meeting with what he related. Miss Tilney, she was sure, would never put her into such a chamber as he had described! She was not at all afraid.

D. When she arrives at Northanger Abbey, she is at first disappointed that it does not seem to resemble the abbeys of her imagination. But she then makes a survey of the guest room where she stays and finds a stashed "manuscript" in the chest drawers. It turns out to be a laundry list that some servant has forgotten there. She begins to view the father of Henry and Emily with great suspicion, letting her imagination run away with her. The father is aloof and brusque. His wife died suddenly nine years ago when, Catherine believes, the children were away. She suspects that the father treated her cruelly and has either murdered her or is keeping her hostage in a secret room. She grows increasingly agitated by visions of this act that her imagination all too easily feeds her in her naïve and immature state. Finally, Henry discovers her coming down a staircase after she has surreptitiously inspected the room where the mother had died. She confesses to Henry the chain of thoughts that led her to suspect his father of doing some foul deed. He tells her that she is entirely wrong. He assures her that he was present at the time of his mother's illness and that everything possible had been done for her. His father is gruff and perhaps aloof and selfish, but he is not evil. He reproaches Catherine more gently than he might have.

> Dear Miss Morland, consider the dreadful nature of the suspicions you have entertained. What have you been judging from? Remember the country and the age in which we live. Remember that we are English, that we are Christians. Consult your own understanding, your own sense of the probable, your own observation of what is passing around you. Does our education prepare us for such atrocities? Do our laws connive at them? Could they be perpetrated without being known, in a country like this, where social and literary intercourse is on such a footing, where every man is surrounded by a neighborhood of voluntary spies, and where roads and newspapers lay everything open? Dearest Miss Morland, what ideas have you been admitting?"

E. Embarrassed and ashamed, Catherine reflects for half an hour on what has happened. She senses that her folly has been almost criminal. How can she ever forget this morbid, absurd curiosity that her imagination has fed? She makes a resolution.

> [I]t had been all a voluntary, self-created delusion, each trifling circumstance receiving importance from an imagination resolved on alarm, and everything forced to bend to one purpose by a mind which, before she entered the abbey, had been craving to be frightened. She remembered with what feelings she had prepared for knowledge of Northanger. She saw that the infatuation had been created, the mischief settled, long before her quitting Bath, and it seemed as if the whole might be traced to the influence of that sort of reading, which she had there indulged.

F. General Tilney, the father of Emily and Henry, has acquired false information leading him to believe that Catherine has "great expectations" and will become the leading heiress in Fullerton, her hometown. He is anxious to promote Henry's interest in Catherine and almost singlehandedly woos her with hints, compliments and goodwill. However, a sudden reverse occurs. He becomes aware that Catherine is, in fact, from a necessitous family. The shock to his pride is profound, though it was through no fault of Catherine's that he was misled. He immediately turns her out of his house in a most insulting and uncivil fashion, sending her alone, at age seventeen, in a post chaise along unfamiliar roads to her distant home. Catherine reflects on the "journey"—physical and psychological—that she has undertaken.

> Sleep, or repose that deserved the name of sleep, was out of the question. That room, in which her disturbed imagination had tormented on her first arrival, was again the scene of agitated spirits and unequal slumbers. Ye how different now the source of her inquietude from what it had been then—how mournfully superior in reality and substance!
>
> Her anxiety had foundation in fact, her fears in probability; and with a mind so occupied in the contemplation of actual and natural evil, the solitude of her situation, the darkness of her chamber, the antiquity of the building, were felt and considered without the smallest emotion; and though the wind was high, and often produced strange and sudden noises throughout the house, she heard it all as she lay awake, hour after hour, without curiosity or terror.

Activity VIII

Fanny Price on Memory

In Jane Austen's novel Mansfield Park (1814), Fanny Price is the daughter of a drunken sailor who lives with her wealthy uncle and aunt. They have taken her in as an act of charity. She is often mistreated and reminded of her status as the recipient of their charity. However, she eventually becomes an important member of the family.

One day, she is taking a walk in a shrubbery with Mary Crawford, a young woman who is her rival for the affections of her cousin Edmund. Fanny is amazed at how much the shrubbery has changed in the three years since she saw it last. This inspires her to comment on the "wonderful" nature of the "operation of time" and the "changes of the human mind".

In pairs or small groups, read Fanny's thoughts about this topic aloud and discuss your reaction to them. Afterwards, share your reactions with the class as a whole.

> "If any one faculty of our nature may be called more wonderful than the rest, I do think it is memory. There seems something more speakingly incomprehensible in the powers, the failures, the inequalities of memory, than in any other of our intelligences. The memory is sometimes so retentive, so serviceable, so obedient; at others, so bewildered and so weak; and at others again, so tyrannic, so beyond control! We are, to be sure, a miracle every way; but our powers of recollecting and of forgetting do seem peculiarly past finding out."

For Further Discussion

1. "Arguing about ethics is arguing about the place of the end of the rainbow: something which is one thing from one point of view, and another from another" (Simon Blackburn).

2. "I want my lawyer, tailor, valets, even my wife to believe in God. I think that if they do I shall be robbed less and cheated less" (Voltaire).

3. Should we allow Jehovah's Witnesses to deny their children life-saving blood transfusions, since their faith demands this?

4. "It is easy for us to criticize the prejudices of our grandfathers, from which our fathers freed themselves. It is more difficult to distance ourselves from our own views, so that we can dispassionately search for prejudices among the beliefs and values we hold" (Peter Singer).

5. Can religious texts written long ago give us any moral guidance when it comes to modern ethical dilemmas?

6. Do you deserve more praise for helping out someone you despise rather than for helping out someone you love?

7. "To be without some of the things you want is an indispensable part of happiness," (Bertrand Russell).

8. "If people are good only because they fear punishment, and hope for reward, then we are a sorry lot indeed" (Albert Einstein).

9. If you felt that a law was unjust, would you feel bound to obey that law nonetheless? Is there such a thing as an unjust law?

10. "What would happen if everyone did that?" Has a parent or a teacher ever said this to you to encourage you to reconsider some action that you have taken? Describe the circumstances. How did you respond to this question? Was your response honest?

11. Do you think that it is morally inconsistent for people who regularly download their favorite music without permission from Internet sites to seek help from the police if someone steals their bicycles or wallets?

12. "Morality is only moral when it is voluntary" (Lincoln Steffens).

13. Have you ever caught yourself about to do something that you knew would be immoral and then stopped? What made you stop?

14. "Morality, like language, is an invented structure for conserving and communicating order. And morality is learned, like language, by mimicking and remembering" (Jane Rule).

15. "When moral worth is at issue, what counts is not actions, which one sees, but those inner principles of action that one does not see" (Immanuel Kant). Do you agree? Can one act well for reasons that are not admirable?

16. Do you think that people have a moral responsibility to gain skills that could be used to help others in need?

17. "Conscience is the inner voice that warns us someone may be looking" (H.L. Mencken).

18. Use Kant's approach to ethics to outline what our duty is with respect to using natural resources in a sustainable way.

19. Do you believe that people are basically good but are corrupted by society?

20. If the police in your city announced that they were going on strike and would not make any arrests during the strike, do you think that the crime rate would go up? If so, would it go up a little or a lot? Would the crime rate increase across the board or

affect mainly crimes such as theft and looting but not murder and rape?

21. "Religion without morality is a superstition and a curse, and morality without religion is impossible" (Mark Hopkins).

22. Do you think that happiness and having money are positively correlated?

23. "Certainly a tribe which believes it confers honor on its elders by eating them is going to be viewed askance by another which prefers to buy them a little bungalow somewhere" (Tom Stoppard).

24. Most people would agree that some pleasures are better than others. If this is true, does this present a problem for utilitarian philosophers?

25. If your daughter was dying of a rare disease and you could not afford the medicine she needs in order to survive, would you be morally justified in stealing the drugs from the local pharmacy?

26. "Ethics is nothing else than reverence for life" (Albert Schweitzer).

27. Do you think that it is morally inconsistent for a vegetarian to wear a fur coat made of real mink fur?

28. Do you think that it is morally inconsistent for a vegetarian to refuse to eat the meat of another living creature but to make an exception for "stolen animal products" like eggs and milk?

29. "Cooperative individuals generally survive longer and leave more offspring" (E.O. Wilson).

30. Aristotle believes that people who do bad things are not inherently bad people. The community has simply failed to educate them properly. Do you agree or disagree?

31. Suppose that a friend of yours says that it's all right to cheat on exams so long as you don't get caught. Would you agree with her or not? What arguments would you use to defend your opinion?

32. In the play Ancient Greek tragedy *Antigone*, the character of that name must decide whether to obey the king, who has refused the honor of a proper burial to his fallen enemies (of whom her brother is one), or to defy the king in order to give her brother such a burial. What do you think is the right decision? Why?

33. "The quantity of pleasure being equal, push-pin is as good as poetry" (Jeremy Bentham). Bentham refers to a popular children's game and is making the claim that there is no difference between "higher" and "lower" pleasures. Do you agree or disagree?

34. Can you imagine any circumstances under which it would be possible to say that it is fair for the CEO of a major corporation to earn 200 or 300 times more salary per year than the average employee of that same company?

35. Does Aristotle believe that one can arrive at a personal (subjective) understanding of what is right and wrong?

ACTIVITY I

PAY FOR PAIN

One of the formidable objections to utilitarianism is that it relies on a single scale of value (happiness) for measuring any particular act or policy. Let's discuss some of the problems of valuation. One of the attractions of utilitarianism is that it is a democratic theory allowing each individual to be the best judge of what makes him or her happy. In addition, every person's individual happiness is factored in the general happiness equation.

In 1934, a social psychologist named Edward Thorndike asked people to tell him for how much money they would be willing to endure certain pains, frustrations, deprivations and so forth. The following list is adapted from his original survey. Please discuss your valuations in a class discussion.

How much would someone have to pay for you to suffer the following?

1. Have to live all the rest of your life in Iceland.

2. Have one leg cut off at the knee.

3. Become unable to taste.

4. Have one upper front tooth pulled out.

5. Spit on a picture of your mother.

6. Lose all hope of life after death.

7. Eat a quarter of a pound of cooked human flesh (nobody but the person who pays you will ever know).

8. Eat a live earthworm six inches long.

9. Suffer (for one hour) pain as severe as the worst headache/toothache that you've ever had.

10. Eat only bread, milk, spinach and yeast cakes for a year.

11. Take a sharp knife and cut a living pig's throat.

12. Choke a stray cat to death.

13. Be insane through July for two years in a row with no recurrences after that.

14. Go without sugar, coffee or tea for a year.

15. Live all your life in an apartment in a big city. Friends could visit you, but you could not step outside.

ACTIVITY II

THE VIOLINIST THOUGHT-EXPERIMENT

Suppose that members of the Society of Music Lovers have kidnapped you, drugged you and hooked another person's circulatory system into yours. It seems that only you have just the right blood type to save this other person's life. It turns out that this other person, who has a potentially fatal kidney disease, is a world famous violinist. Some members of the Society, at their wits' end, have decided to use your kidneys to extract toxins from the violinist's blood for a period of nine months, at which time the violinist can be disconnected from you and you both can live a normal life thereafter.

Do you have the right to unplug yourself immediately, even though this will surely cause the death of the violinist? If you do so, do you violate the violinist's right to life or are you only depriving him of the use of your body, to which he has no right?

This thought experiment appeared in a famous paper published by the moral philosopher Judith Jarvis Thomson in 1971.

[See Appendix II for a discussion of this thought experiment.]

ACTIVITY III

GOOD KNOWLEDGE QUESTIONS?

Which of the following are good knowledge questions? Why? Which of the following are not good knowledge questions? Why? What areas of knowledge are implicated in the following questions?

Remember that knowledge questions ask how we construct and evaluate knowledge. These questions do not lend themselves to a single correct answer. They are open-ended questions that are, as we will see when we analyze real-life situations, the sources of many of the most impassioned debates and controversies that confront us. We express knowledge questions in general terms.

Although we might generate different but equally plausible answers to the knowledge questions that we confront, we must always arrive at answers that are reasonable. In doing so, we must respond adequately to reasonable counterclaims that others may make while at the same time understanding that our personal perspectives may influence both our analysis and the answers that we ultimately give.

In formulating these knowledge questions, it's important that we use general terms and not the specialized language or the methods of the areas of knowledge from which these questions arise.

1. What corporations or government entities are the largest contributors to research funding for the sciences?

2. How much justification is required to validate a hypothesis?

3. Do the different perceptual senses work together or hinder one another in the pursuit of knowledge?

4. Can the objectivity of science be undermined by the agendas of those funding research?

5. Is memory affected by our psychological state?

6. Has the popularization of science lessened its credibility?

7. Can science help us to understand why people embrace religious beliefs?

8. What is the "blank slate" theory?

9. Could you be frozen solid and then shattered into thousands of pieces?

10. Do people who suffer from false memories behave unethically when they report what they remember?

11. Can a rational person oppose the methods of science?

12. To what extent are our discoveries in mathematics based on intuition rather than reason?

13. Does it take fewer muscles to smile than to frown?

14. Can statistics help us understand the way the world works?

15. Are our views of the limits of science different now than they were in the past?

16. Do mathematicians discover truths that are really "out there" or do they simply specify rules in a complex game analogous to the game of chess?

17. In areas of knowledge such as the arts and the natural sciences, do we learn more from work that follows or that breaks with accepted conventions?

18. Why did some ancient Chinese bind women's feet?

19. Why don't spiders get stuck in their own webs?

20. Can insects get fat?

21. How can flies land upside down on the ceiling of a room?

22. Are cats smarter than dogs?

23. Should we ever punish anyone?

24. Is our sense of having free will nothing but an illusion?

25. Has the geography of every country exercised some influence on its history?

ACTIVITY IV

ETHICAL PROBES

Discuss in small groups whether you think the following stories describe actions that are morally wrong. Whether you think that they are or are not, please give some reasons for your thinking. Do your moral sensibilities admit the possibility that others may disagree with your assessment? A few of these probes are derived from examples included by Jonathan Haidt in his book *The Righteous Mind* (2012).

1. A person who is a citizen of the country in which she is living finds a very old national flag. She used to hang it on a mount in the doorframe on her front porch. It's not really presentable anymore, so she decides to tear it into strips and use the strips to wash her windows. Then she throws out the dirty strips. Nobody sees her.

2. A family discovers that its pet dog has been struck and killed by a car in front of their house. They take the corpse home, clean it, cut it, cook it and have it for dinner. No one outside of the family knows about this.

3. While taking a walk, a man sees a dog sleeping on the sidewalk. Just for fun, he kicks it hard enough to make it yelp and run away.

4. A young married woman went alone to a park, sat on a bench and read a book for the afternoon, watching the people walk by every now and again as she took a break from reading. When she went home, her husband warned her not to do this again. She did. He beat her.

5. At a family dinner, a twenty-five-year-old son repeatedly called his father by his first name.

6. A woman cooked a meal for her husband and oldest son. Then she sat down to eat with them.

7. An artist submerges a crucifix—the most sacred symbol in Christianity—in a glass jar of his own urine. He calls the object he has made Piss Christ, and it is displayed in an art museum.

8. A German computer technician posts an ad on a website announcing that he is looking for a person willing to be slaughtered and eaten. He finds someone willing to agree to do this. They make a video demonstrating that the consent is fairly given and received by two men who in what seem to be in their right minds. The technician kills the man who responds to the ad, stores the man's flesh in his freezer and eats it over a period of ten months.

9. A brother and sister, both over the age of twenty-one, travel to Europe together. They have always been close. Curious, they decided to have sexual relations with one another. Both the man and the woman use contraceptives. They vow to tell no other person and never to have sexual relations again. Their special evening in no way changes their relationship with each other or with others subsequently.

10. A customer at a restaurant has ordered an expensive steak dinner, but when it arrives at his table it is much smaller than he had imagined from reading the description in the menu. Also, it is overcooked. When the customer pays, the cashier accidentally gives him twenty dollars more in change than he is owed. The customer decides to say nothing and keeps the money.

ACTIVITY V

SOME TROLLEY SCENARIO QUESTIONS

In the main text, Theory of Knowledge: A New Synthesis, we presented a number of trolley scenarios. Please review these before tackling this activity.

Please discuss the following questions in small groups.

1. Is there a distinction between directly preventing deaths and causing them to be prevented by someone else?

2. Consider these slightly different possibilities. You divert a trolley coming down the tracks. It will hit five people if it is not diverted, but one person will be killed if the trolley takes that track. You push a fat man onto the track to stop a trolley that would otherwise kill five. There is a loop track that reconnects to the main track before the place where there are five people. The trolley will hit five people even if diverted. However, there is a fat man on the track whose body will stop the trolley. Is there a meaningful ethical distinction among these three? Is there a moral distinction between push and loop? Is there a moral distinction between divert and loop?

3. Is there a moral difference between throwing trolleys on a fat man versus throwing a fat man under the trolley?

4. Is it possible to take the position that it's always all right to push a person under a trolley provided that n + 1 persons are saved?

5. Why do laws in most countries refuse to allow people to intentionally kill innocent bystanders in order to rescue people (even a large number of people) in grave danger?

Now discuss some different scenarios. What are the important ethical distinctions, if any, in these various scenarios?

1. A fat man is walking along a trolley track. He trips and falls on the track, stopping a trolley that would otherwise kill five people.

2. Smith and a fat man are walking along the track. Smith points out that a trolley is coming and will kill five people ahead. The fat man, sizing up the situation, decides to throw himself in front of the trolley to stop it.

3. Consider the same scenario as (2). However, the fat man does not size up the situation. Smith has to point out that he can stop the train. The fat man then decides to throw himself in front of the trolley to stop it.

4. This time, Smith tricks the fat man. He knows that the fat man loves strawberries. He says, "Hey, there is a strawberry patch right across the track!" The fat man dashes across the track and is hit by the trolley, saving the five. There is no strawberry patch across the track.

5. A fat man and his wife are walking along the track. Smith grabs the wife and threatens to kill her if the fat man does not jump in front of the trolley. The fat man does.

In a large group setting, one spokesperson from each small group reports the group's sentiments. A general discussion may ensue.

Note to Teachers

The corresponding unit in the book for which this collection of activities serves as a supplement describes many situations that can easily be converted into active learning discussions. Teachers may wish to use the "lifeboat case" and the discussion of Huck's dilemma in Mark Twain's novel Huckleberry Finn as a starting point.

The creative teacher can convert many of the presentations in the main volume into active learning tasks, but the unit on ethics is particularly easy to translate into learner-centered classroom activities.

In general, reading and discussing thoughtful, provocative fiction and non-fiction can be an excellent way to start meaningful ethical discussions. Every teacher will have a ready list of examples. Here are just a few of the countless excellent possibilities teachers may wish to consider.

October (Richard Wright)

Sophie's Choice (William Styron)

Antigone (Sophocles)

The Scarlet Letter (Nathaniel Hawthorne)

Great Expectations (Charles Dickens)

Fahrenheit 451 (Ray Bradbury)

The Cider House Rules (John Irving)

My Sister's Keeper (Jodi Picoult)

The Book of Dead Birds (Gayle Brandeis)

The Stranger (Albert Camus)

Mudbound (Hillary Jordan)

The Handmaid's Tale (Margaret Atwood)

The Death of Vishnu (Manil Suri)

The God of Small Things (Arundhati Roy)

Sleep Towards Heaven (Amanda Eyre Ward)

First, Do no Harm (Lisa Belkin)

The Lottery and Other Stories (Shirley Jackson)

The Things They Carried (Tim O'Brien)

Bel Canto (Ann Patchett)

The Sunset Limited (Cormac McCarthy)

The Jungle (Upton Sinclair)

The Cellist of Sarajevo (Steven Galloway)

For Further Discussion

1. Suppose that a historian is writing a narrative about an event or a series of events (like the French Revolution) whose outcome is well known to many readers. How can he or she maintain any suspense that can be carried through the narrative until the last page?

2. "History is a race between education and catastrophe" (H.G. Wells).

3. Think of movies you have seen (*Gone with the Wind*, *Titanic* or *Pearl Harbor*, for instance) that are based on actual events in the past. How accurate do you suppose these depictions are or can be? Is it worrisome that many people know history primarily through a medium meant to entertain rather than to educate?

4. The British historian G.M. Trevelyan claimed that the best historian was one who had deep knowledge of the evidence and "the largest intellect, the warmest human sympathy and the highest imaginative powers". Do you agree with this assessment? Are there any other qualities that you would propose instead of or in addition to those Trevelyan mentioned?

5. "History is philosophy teaching by example" (Thucydides). What do you think this statement means?

6. Lord Tennyson, the poet, wrote the famous "Charge of the Light Brigade" about an actual event during the Crimean War. Homer, of course, chronicled the Trojan War in *The Iliad.* Can poets, even when they do not stick to the evidence in the way that historians must, still have something to teach us about history?

7. We know that a map drawn to a scale of 1:1 would be exceptionally accurate but useless to us. If the historian must, by necessity, select facts to relate using his judgment, does this make the final product something that might be useful but not "true"?

8. Do you think that someone who has a passionate interest in certain material can write a history involving that material that is fair and impartial?

9. "The belief in a hard core of historical facts existing independently of the interpretation of the historian is a preposterous fallacy but one that is very hard to eradicate" (E.H. Carr).

10. How do you think that an authorized version of a biography of a famous person might differ from one that is not authorized? How might both differ from an autobiography?

11. How did people do the equivalent of Google searches before the arrival of the Internet and search engines?

12. "The human record is illogical…and history is a series of happenings with no inevitability about it" (Sir. Charles Oman).

13. "The past is never dead. It is not even past" (William Faulkner). Faulkner was born, raised and lived most of his life in the rural southern state of Mississippi in the American south in the second generation following the Civil War. Might the circumstances of his life have persuaded him to make this statement? Do you think that someone who spent his or her life traveling from one big city to another could arrive at this same conclusion?

14. Admiral Mahan has claimed that he suddenly had an inspiration, when studying how Hannibal failed to control communication by sea with Carthage, that sea power had exerted an unappreciated influence on history throughout the ages. What role, if any, do you think that intuition has in the writing of history?

15. "A reporter with no bias at all would be a vegetable" (John Gunther). Might we say the same thing about a historian?

16. In ancient Greek and Hindu thought, history was conceived as a cycle leading from dark ages to golden ages and then declining again. Do you think that this is a valid way to view the broad history of human beings?

17. People who write history were generally not there when the events they describe happened. They can never be certain that they have recovered what really happened. What is the method that they should follow for assuring that they are as close to the "truth" as possible?

18. "If history is to share its insights with a public in need of them, it must practice communication as an art, as Gibbon did, or Parkman" (Barbara Tuchman). Are the best histories those that are written for other historians or those written for an audience of educated general readers?

19. Bias in primary sources is the rule. How can a historian compensate for this fact?

20. Most Americans are astonished when they learn that their country has been involved in over sixty military interventions in Latin America since 1890. Many educated people in Latin America, however, know this fact quite well. How dangerous is historical amnesia? What purposes does it serve?

21. Is history linear and upward in progress? Are we moving to a better place as we move forward in time?

22. What if Nazi Germany had achieved victory in World War II? What if the Russians had anticipated the surprise attack on Port Arthur and defeated Japan in the Russo-Japanese War of 1905? What if President John F. Kennedy had not been assassinated? Some historians ask and then explore counterfactual questions of this sort. Do you think that virtual history is a potentially useful intellectual exercise?

23. "Who controls the past controls the future. Who controls the present controls the past" (George Orwell).

24. Is it fair to hold people in the past accountable for the future to which their actions led, even if this future was inconceivable to them at the time? Can one affirm that this is possible and still be doing history?

25. Is there a sense in which history is the story of great persons who have influenced its overall course and who for this reason merit special study?

26. If you had a choice of voting between two equally appealing candidates for high office, but one clearly had a superior understanding of history, would that factor influence you to cast your vote for that candidate?

27. According to the historian Barbara Tuchman, "whatever the subject, it must be written in terms of what was known and believed at the time, not from the perspective of hindsight, for otherwise the result will be invalid". Do you agree or disagree?

28. "Those who don't study the past are condemned to repeat it" (George Santayana). This is perhaps the most famous argument in favor of the study of history. However, some historians regard this statement as "fatuous". Why might they come to this conclusion?

29. Mary Chestnut was the wife of a Confederate general serving in the Civil War in the United States. She kept a famous diary that has become a rich primary source of observations and thoughts about life in Southern society during the upheaval of that war. What do you suppose were the sources of knowledge (emotion, perception, reason, imagination and so forth) that informed the entries in this famous diary? What claim to "truth" might such a diary have?

30. "Poetry is closer to vital truth than history is" (Plato).

31. Do you think that a historian must be passionate about her subject in order to write useful history?

32. Can history ever be utilitarian and teach us lessons that we can use in the future?

33. Because historians are usually remote from the subjects they explore, they are "doomed to be forever hailing someone who has just gone around the corner and out of earshot" (Simon Schama). Do you agree with this assessment? Is the historian tilting at windmills?

34. Should historians focus on social groups with conflicting interests and differential power instead of focusing on noteworthy individuals?

35. How important are eyewitness accounts to our understanding of what happened in the past?

36. Historians strive to reveal the **motivations** of those who have helped to create the past in order to arouse the empathy of the reader. Is this a scientific task or a literary task? Is it both? Is it possible at all?

37. "Though God cannot alter the past, historians can" (Samuel Butler). What do you make of this claim?

38. Is it possible to live better and more thoughtfully in the present by studying the past carefully and reflectively?

39. Your history classmates and teacher have decided to bury a "time capsule" for some unknown archaeologist of the future to find. The capsule is one meter long and one half meter wide. What items would you place in this capsule to give someone in the future a sense of what it is like to be alive here and now?

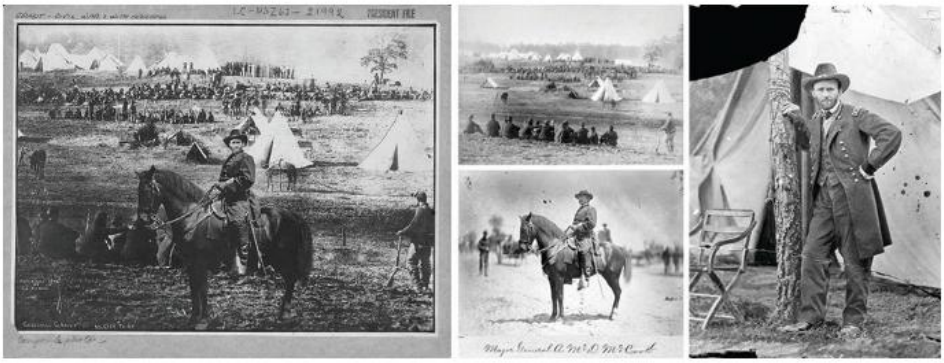
40. Historians of ancient civilizations have had a very limited body of surviving texts to work with, along with carvings, pottery, stones, the ruins of some buildings, coins, tombs and other artifacts. Historians of our age will have to contend with massive documentation across all media. How will the overabundance of evidence influence the kind of history that can and will be written by historians in the future?

Activity I

Doctored Photos

Well before the invention and widespread use of digital photo manipulation software, important archival photos have been convincingly doctored. How have these deceptions possibly altered our perception of historical events? What lessons can we draw? Is such manipulation limited to the photographic record?

The top photo, from 1937, shows Stalin with Water Commisar Nikolai Yezhov, who fell out of favor, was arrested and was removed from the photograph.



The photograph on the left shows General Grant's head, the body and horse of Major General Alexander McCook and, in the background, Confederate prisoners at Fisher's Hill, Virginia (USA) during the Civil War around 1864. It is a pastiche photo.

Vladimir Lenin address troops in 1920. In the lower photo, you can see Leon Trotsky and Lev Kamenev to the left of Lenin. They fell out of favor with Joseph Stalin, who had them erased before sending out the edited version to all and sundry.

Other Manipulated Historical Photos

http://www.fourandsix.com/photo-tampering-history/

http://twistedsifter.com/2012/02/famously-doctored-photographs/

http://www.nydailynews.com/news/historic-photos-altered-gallery-1.1092420?pmSlide=1.1092412

ACTIVITY II

GOOD KNOWLEDGE QUESTIONS?

Which of the following are good knowledge questions? Why? Which of the following are not good knowledge questions? Why? What areas of knowledge are implicated in the following questions?

Remember that knowledge questions ask how we construct and evaluate knowledge. These questions do not lend themselves to a single correct answer. They are open-ended questions that are, as we will see when we analyze real-life situations, the sources of many of the most impassioned debates and controversies that confront us. We express knowledge questions in general terms.

Although we might generate different but equally plausible answers to the knowledge questions that we confront, we must always arrive at answers that are reasonable. In doing so, we must respond adequately to reasonable counterclaims that others may make while at the same time understanding that our personal perspectives may influence both our analysis and the answers that we ultimately give.

In formulating these knowledge questions, it's important that we use general terms and not the specialized language or the methods of the areas of knowledge from which these questions arise.

1. To what extent can human beings compensate for cognitive biases?

2. Is history that is rational and consistent necessarily true?

3. In what language do deaf people think?

4. To what extent should historians follow the methods of the natural and human sciences in reconstructing the past?

5. If you cut off a cat's whiskers, will the cat get dizzy and tend to fall down?

6. To what extent do we romanticize the past?

7. Why is it easier to balance on a bicycle in motion than on one that is not?

8. What exactly happened during the great Cultural Revolution (1966-1976) in China?

9. Can emotion be entirely divorced from the scientific method? Should it be?

10. Is Buddhism an ethical system or a religion?

11. How does the historian combine objectivity and subjectivity in the process of identifying and selecting evidence and arriving at an interpretation of the past?

12. Does the death penalty reduce the rate of violent crimes?

13. To what extent can we draw on the arts to help us in our pursuit of scientific knowledge?

14. Is there room for creative imagination in the writing of history?

15. What's the longest word in the English language?

16. Who owns the garbage that you place on the curb for collection?

17. Is misrepresentation of the past unethical?

18. Why is Greenland not considered a continent?

19. Can more than one version of the past, even versions that contradict one another, be true in its own way?

20. How does stress affect our ability to feel empathy and therefore to connect to other human beings?

ACTIVITY III

THE MOST IMPORTANT EVENTS IN AMERICAN HISTORY

This is a list, generated by one American who has been a long-term resident of Japan, of what might qualify as the most "important" events in American history. The word "important" here is defined not as "dramatic" but as "having profound and far-reaching consequences that have contributed to the formation of the American identity". Other Americans might generate a different list. Non-Americans familiar with American history might generate yet another list. Please form small groups or work individually to come up with a similar list of the "ten most important events" in the history of your country. Be prepared to explain briefly why you have chosen each event.

1. The American Revolution

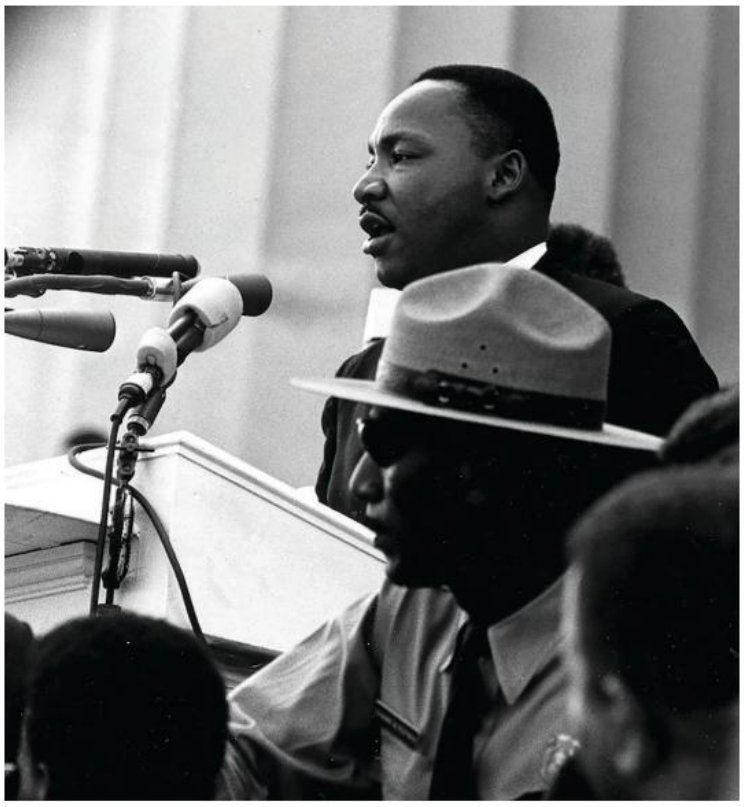
The American Revolution was a series of political and military events occurring between 1765 and 1783 during which colonists in the thirteen original American colonies declared their independence from Great Britain, fought a series of battles with the British on American soil, emerged victorious and founded a republic they called the United States of America based on a Constitution that was ratified in 1787 and is still the fundamental "law of the land".

2. The Civil War

The Ruins of Fredericksburg, Virginia (1862) Photographer Unknown

Some have called the American Civil War of 1861-1865 a revolutionary Constitutional Convention. The war resulted in 700,000 deaths, the survival of the union, the abolition of slavery, the naturalization of all former slaves and the guarantee of equal protection of the laws to all citizens.

3. The Civil Rights Movement



Martin Luther King, Jr. "I Have a Dream" Speech (August 28, 1963)

Washington, D.C.

The Civil Rights Movement is an omnibus term describing a number of social struggles in the United States in the years 1954-1968 that sought to ensure protection of the citizenship rights of African-Americans already enumerated in the Constitution and in federal law. These rights were insufficiently defined and enforced and were sometimes blatantly undermined and ignored. Civil rights activists engaged in bus boycotts, massive marches, sit-ins and a variety of other nonviolent activities designed to achieve desegregation of American society and to end voter suppression.

4. The Louisiana Purchase

For a paltry sum of money, the United States government under the leadership of President Thomas Jefferson purchased 828,000 square miles of land belonging to France. The purchase doubled the territory of the United States, made possible Western expansion and, eventually, led to the doctrine of Manifest Destiny—the belief that Americans were destined to expand their territory throughout the continent and to remake the West in the image of agrarian America.

5. The Great Depression

Poor Woman and Children, Oklahoma (1936) by Dorothea Lange

The Great Depression, lasting from 1929 until 1939, was the longest and most severe economic depression in the history of the industrialized world. One third of workers could not find jobs, banks failed, economic output decreased by over 50 percent and the number of people who fell into extreme poverty and did not have enough to eat was higher than it had ever been. President Roosevelt's New Deal social programs focused on relief, recovery and reform. The national government assumed unprecedented powers to regulate the economy and to promote public works. The federal government became increasingly centralized and powerful at the expense of the governments of the several states. Rural electrification, the Social Security Administration and the Fair Labor Standards Act were all legacies of this New Deal.

6. Indian Treaties, the Indian Removal Act and the Trail of Tears (1830-1838)

After passage of the federal Indian Removal Act (1830), the government of President Andrew Jackson negotiated over seventy treaties that resulted in the relocation of Indian tribes to areas west of the Mississippi River, particularly to territories in Oklahoma. Perhaps 100,000 Indians were relocated in this fashion. Some tribes resisted relocation. Over 15,000 Cherokee Indians were forcibly marched to Oklahoma by various routes now called "The Trail of Tears" since about 4,000 of them died along the way from starvation and exposure to the elements. Many consider this one of the darkest chapters in American history.

7. The Manhattan Project

Preparing for the Trinity Test in New Mexico (1945)

The Manhattan Project was a secret government-sponsored research and development project that, in the period from 1942-1945 produced the atomic bombs that were dropped on Hiroshima and Nagasaki to bring World War II to a close. The project involved 130,000 people and cost the equivalent of $26 billion dollars. It ushered in the nuclear age and the Cold War.

8. The Assassination of John F. Kennedy

The assassination of Kennedy sent shock waves through the nation. Virtually every American of a certain age remembers exactly what he or she was doing at the moment the news arrived. To this day, over half of Americans believe that the assassination was a conspiracy and not the act of a lone gunman. Coming just after the Cuban Missile Crisis, it caused many Americans to feel insecure and unsure of their government.

9. September 11, 2001

For younger Americans, the terrorist attack on the Twin Towers in New York City has had the same sort of effect that the Kennedy assassination did on Americans of an earlier generation. A massive attack on American soil by a foreign enemy had not occurred since Pearl Harbor in 1941.

The event led to the declaration of a War on Terror and a concentrated effort to pursue the goal of security even at the expense of liberties guaranteed by the Constitution. It also ultimately led to Abu Ghraib, "renditions" and "enhanced interrogations"—all of which have seriously diminished America's moral authority in the world.

10. Apollo 11

Neil Armstrong Becomes the First Human Being to Walk on the Moon

July 20, 1969

The country was embroiled in an unpopular war in Vietnam. Riots were erupting in large cities throughout the country. Robert Kennedy and Martin Luther King, Jr. had been assassinated. In the midst of all of the soul-searching occasioned by these events, America sent three astronauts to the moon and brought them home safely. Neil Armstrong declared that he was taking "one small step for man, one giant leap for mankind". It was perhaps the day when all Americans felt most proud of what their country could accomplish.

ACTIVITY IV

WAS THE WORLD MADE FOR MAN?

Please read the following quotation from an essay by the American writer Mark Twain. Share with the your classmates your reaction to the speculations of Twain's character who is, like his most endearing characters, a curious boy who lacks a formal education but tries to make sense of the world.

> "That it took a hundred million years to prepare the world for man is proof that that is what it was done for. I suppose it is. I dunno. If the Eiffel Tower were now representing the world's age, the skin of paint on the pinnacle knob at its summit would represent man's share of that age; and anybody would perceive that the skin was what the tower was built for. I reckon they would, I dunno. "

Activity V

History and Invention

Take time to read this short passage from Jane Austen's novel Northanger Abbey (1817). In it, the protagonist, a young lady named Catherine, is speaking with her friend Emily Tilney. Catherine tells Emily that she enjoys reading novels and poetry and plays. However, she cannot be interested in "history, real solemn history". Read what Catherine has to say about reading history books and Emily's response.

> "I read it a little as a duty, but it tells me nothing that does not either vex or weary me. The quarrels of popes and kings, with wars or pestilences, in every page; the men all so good for nothing, and hardly any women at all—it is very tiresome; and yet I often think it odd that it should be so dull, for a great deal of it must be invention. The speeches that are put into the heroes' mouths, their thoughts and designs—the chief of all of this must be invention, and invention is what delights me in other books.
>
> "Historians, you think," said Miss Tilney, "are not happy in their flights of fancy. They display imagination without raising interest. I am fond of history—and am very well contented to take the false with the true. In the principal facts they have sources of intelligence in former histories and records, which may be as much depended on, I conclude, as anything that does not actually pass under one's own observation; and as for the little embellishments you speak of, they are embellishments, and I like them as such. If a speech be well drawn up, I read it with pleasure, by whomsoever it may be made—and probably with much greater, if the production of Mr. Hume or Mr. Robertson, than if the genuine words of Caractacus, Agricola, or Alfred the Great."

In pairs, small groups or with the whole class discuss this conversation. Do you agree with these opinions? Would you modify them? Would you reject them out of hand? What role, if any, do you think that invention has in the writing of history? How does one draw a line between history and fiction?

ACTIVITY VI

HISTORY-RELATED ESSAY TITLES

The following history-related topics have been issued as prescribed essay topics in recent years for the IB Theory of Knowledge essay requirement. Please share with your classmates how you might approach these topics.

1. "Our knowledge is only a collection of scraps and fragments that we put together into a pleasing design, and often the discovery of one new fragment would cause us to alter utterly the whole design" (Morris Bishop). To what extent is this true in history and one other area of knowledge? (November 2013)

2. Using history and at least one other area of knowledge, examine the claim that it is possible to attain knowledge despite problems of bias and selection. (May 2012)

UNIT TEN
THE HUMAN SCIENCES

For Further Discussion

1. Why is there a Nobel Prize given for "Economic Sciences", while the prizes for Chemistry and Physics are not called prizes for "Chemical Sciences" and "Physical Sciences"?

2. "A tacit theory of human nature—that behavior is caused by thoughts and feelings—is embedded in the very way we think about people" (Steven Pinker).

3. "If the goal of science is to make us feel awkward and ignorant in the presence of things we once understood perfectly well, then psychology has succeeded above all others" (Dan Gilbert).

4. Name one instance where the fact that someone told you not to do something made you want to do it.

5. "The purpose of anthropology is to make the world safe for human differences" (Ruth Benedict).

6. "The love of complexity without reductionism makes art; the love of complexity with reductionism makes science" (E.O. Wilson).

7. "I am an anthropologist who lost faith in her own method, who stopped believing that observable activity defined anthropos" (Joan Didion).

8. "Cultural analysis is intrinsically incomplete. And, worse than that, the more deeply it goes the less complete it is" (Clifford Geertz).

9. Do you think that past behavior is the best predictor of future behavior?

10. "I claim that, unless the contrary can be proved, we must assume that all complex activities are socially determined, not hereditary" (Franz Boas).

11. "Man has no nature; what he has is history" (José Ortega y Gasset).

12. "Man will become better when you show him what he is like" (Anton Chekhov).

13. "The curious thing about individuals is that their singularity always goes beyond any category or generalization in the book" (Haruki Murakami).

14. Some people assert that little boys like to fight with one another physically because they are socialized to do so, not because they are genetically predisposed to do so. What do you think about this claim?

15. Behaviorists claim that, since we cannot measure consciousness with any sort of accuracy or confidence, it should have no role in the science of psychology. Scientists should simply ignore it and focus on what we can measure with confidence. What do you think about this idea?

16. "My belief is that economics is somewhat more vulnerable than the physical sciences to models whose validity will never be clear, because the necessity for approximation is much stronger than in the physical sciences, especially given that the models describe people rather than magnetic resonances or fundamental particles" (Robert Schiller).

17. Do you think that the human sciences will, in the future, make progress toward the articulation of "laws of human behavior", making them more like the natural sciences?

18. A trait may be 90 percent heritable, yet entirely malleable" (Stephen Jay Gould).

19. "Economics is uncertain because its fundamental subject matter is not money but human actions. That's why economics is

not the dismal science, it's no science at all" (Julian Baggini).

20. "I can calculate the motions of heavenly bodies, but not the madness of crowds" (Isaac Newton).

21. "One can't love humanity. One can only love people" (Graham Greene).

22. "We are social creatures to the inmost centre of our being. The notion that one can begin anything at all from scratch, free from the past, or free of debt to others, could not conceivably be more wrong" (Karl Popper).

23. "The single most important human insight to be gained from this way of comparing societies is perhaps the realization that everything could have been different in our own society – that the way we live is only one among innumerable ways of life which humans have adopted" (Thomas Hylland Eriksen).

24. "And no description of a people can be complete without reference to the character of their homeland, the ecological and geographical matrix in which they have determined to live out their destiny. Just as a landscape defines character, culture springs from a spirit of place" (Wade Davis).

25. Scientists have a discovered that when rats have access to a lever that sends electrical impulses to an electrode implanted in the pleasure center of their brains, they press the lever over and over, refuse to eat and drink or have sex and finally collapse in exhaustion. If a human were to volunteer to have such an electrode implanted in the pleasure center of his or her brain for research purposes, should we allow scientists to conduct this same experiment?

26. "A wonderful fact to reflect upon, that every human creature is constituted to be that profound secret and mystery to every other" (Charles Dickens).

ACTIVITY I

MEASUREMENT

The scientific method assumes the ability to make precise measurements. However, human scientists frequently find themselves attempting to measure phenomena that are not easily measured. There are in many cases simply no clear criteria or units of measure. This makes it difficult to achieve the precision that is a hallmark of the natural sciences.

Consider the following phenomena. How hard or easy are these to measure?

1. Happiness
2. Wealth
3. Consciousness
4. Commitment
5. Height
6. Gross National Product
7. Maturity
8. Intelligence
9. Passion
10. Absence from the Workplace
11. Hours Spent Online per Day
12. Correlation between Highest Educational Level and Salary
13. Employee Morale
14. Number of Cigarettes Consumed Per Day
15. Relative Percentages of Ethnic Groups in the National Population

ACTIVITY II

ALIEN ANTHROPOLOGIST

Suppose that you are an alien anthropologist who has come to Earth to study peculiar customs. You have been trained as a scientist to give purely objective explanations of what you observe. You are unfamiliar with the Verstehen position and do not attempt to inquire of the subjects of your observations what meaning they attribute to their actions. How would you interpret the following activities?

1. In the city of Burgos, Spain, young men dressed in bright orange outfits jump over babies lying on pillows and mattresses in front of a church.

2. Watching an Octopus

An octopus in Germany is given two boxes of food, each decorated with different symbols. He eats from one of them. Many people watch and record the octopus with cameras.

3. Turkey Ritual

In late November, the leader of the most powerful country on Earth stands in a garden outside of the building where he lives and works and then says some words to a turkey.

4. Groundhog Ritual

Early in the morning of February 2nd, thousands of people gather in a rural location in Pennsylvania to watch a groundhog emerge from its burrow.

5. People in Costumes Dance in front of Big Stones

In a place in rural England where there are a bunch of upright stones arranged in circles, people gather in late June and celebrate.

ACTIVITY III

ROBBER'S CAVE

In this classic 1954 experiment of how conflict and prejudice arise, experimenters took twenty-two 11-year-old boys to a camp in a state park. The boys were divided into two groups. The boys were placed in cabins in two distinct areas, separate from one another. For the first week, neither group knew of the existence of the other. They spent their days swimming and exploring the woods. They became friends with the other boys that they were with. Encouraged by their adult counselors, one group of boys chose the name "Rattlers" for themselves. The other chose the name "Eagles". They made special shirts and flags with their group name.

In the second week, the groups learned about one another. The boys in the different groups called each other derogatory names. The "counselors" created competitive activities. The Rattlers won a trophy for the most points after the activities. Name-calling increased. The boys in the two groups refused to eat in the same room with one another.

The experimenters then told the boys in both groups that someone had blocked the water supply. They invited the boys to work together to solve the problem. Later, they told the boys that they could all watch a movie if they could agree on what to see. The boys did. They began to eat in the same room again. Later the experimenters arranged for them to "stumble upon" other problems that they had to solve.

The experimenters concluded that if groups with different identities could work together to solve problems, they could resolve their conflicts and live together in peace.

This is the "official" version of the experiment that has been reported widely in social science literature for over sixty years. In fact, the experimenters conducted three of these experiments. Each had a different result. This official version was the third of the three experiments. The first two experiments had very different outcomes, but these were never widely reported. In the first experiment, an outside softball team was invited to play against an all-star team of boys from the two groups. The boys in the groups were predictably hostile to the outside team. However, experimenters were dissatisfied with the outcome of the experiment because tensions between the two groups of boys did not disappear. After the game, they reverted to in-group behavior, name-calling and so forth.

In the second experiment, the conditions were the same as in the third experiment. However, the outcome was different. What do you suppose happened? Share your guess along with your reasons for making it.

1. The boys refused to cooperate in solving the drinking supply problem.

2. Tensions between the two groups escalated to the point where the "counselors" had to terminate the experiment for the safety of the subjects.

3. The boys in the two groups staged a mutiny against the "counselors" because they felt that they were being manipulated.

[See Appendix II for the answer and a short discussion.]

ACTIVITY IV

DATA MINING

One of the great controversies to emerge in the age of the Internet concerns what some have referred to as an "unholy alliance" between researchers in universities and private enterprise. This has led to comprehensive data mining in order both to make huge samples of real-life data available at little cost to academic researchers and to provide businesses with information about how to sell their products and services more efficiently and profitably.

Please discuss in small groups what you think about the utility and/or dangers of the following trends and situations. Take notes and share your most important observations with the entire class at the end of the discussion.

1. Researchers at the University of Pittsburgh are analyzing 50 million Tweets a day in order to identify "happiness patterns" of those making the Tweets. The data is all treated anonymously.

2. Some employers are using algorithms to analyze the email traffic of employers to determine how efficiently the employees are doing their jobs.

3. Whenever you sign a petition on social networks, you are contributing data that will likely end up in the hands of academic researchers and businesses, the one looking to learn more about you, the other to persuade you to buy their products and services.

4. Some observers are worried that the danger is not in collecting data per se, but in using data to influence or (to use a term from behavioral psychology) to condition the providers of this data. Those seeking to condition providers of data (you) may be representatives of the State or Big Business.

5. For many years, businesses have understood that playing "elevator" or "mood music" in shops can encourage consumers to linger and ultimately make more purchases. Is data mining really any different or more dangerous than playing soothing and unchallenging music while we buy things?

6. Using data for "predictive buying" purposes is the norm on online business sites. If you visit an online music or bookstore, do you appreciate being titillated with advertisements personalized based on your buying habits? Do you regard this as a convenience or an invasion?

7. Have you ever been tempted to give false information when answering questions online as a way of protecting your privacy? Do you think that this is an effective response?

8. Do you think it's more acceptable to be "screened" for data if the subject is aware of the screening and can opt not to participate in the activity contemplated as a result of this knowledge?

9. According to a survey by a data privacy management company, 1 in 3 Internet users have stopped using websites of companies because of concerns about privacy issues. Are you one of these users? If so, explain your concerns.

10. A famous episode involved the chain store Target. It used data mining of customer purchases to figure out which customers were pregnant, based on a "pregnancy score" derived from data of purchases of twenty-five products, including extra-large bags of cotton balls, supplements, unscented lotions, blue and pink throw rugs and so forth. They were able to predict delivery dates and even gender of the forthcoming child with astonishing accuracy. They sent coupons for maternity products to the identified customers. One father of a high school student discovered that his daughter was pregnant as a result of the coupon campaign. Afterwards, Target started sending different sorts of coupon books in which the maternity products were placed randomly with items such as lawn mowers and so forth. What is your reaction to this anecdote? How would you feel if a retailer knew about the pregnancy of a loved one (daughter, wife, sister) before you did?

ACTIVITY V

NEW AGE ECONOMICS/SOCIAL NETWORKING

Research in university psychology and economics departments has inspired some businesses to adopt "alternative" pricing and marketing schemes designed to make customers feel better about themselves and their choices and to give them a sense that they are behaving altruistically and not just selfishly when they are in the marketplace. Much of this is inspired by careful study of "social analytics". This is an emerging field of research based on methodical study of social network activity and online consumer patterns.

In pairs or small groups, discuss what you think about the following schemes and observations. Have you experienced anything of this sort? Have you come across analogous schemes? At the end of the pair or small group discussion, select a spokesperson to report your most interesting observations and thoughts.

1. At a coffee shop called Karma Kitchen in Berkeley, California, customers can "pay it forward". When they walk into the shop, they may order a cappuccino or a café latte and then be told that a previous and anonymous customer has bought it for them. If they accept the gift, though, they must buy another for a subsequent customer whom they probably do not know. Would this make you feel better than making a purchase completely on your own? Would it surprise you to learn that people tend to spend a little more money when they "pay it forward" because they don't want to seem "cheap"? Is this karma or good business?

2. One of the insights that behavioral economists have put forth is that consumers sometimes respond more to appeals to morality and social identity than to their self-interest. But, as one critic has commented: "Where once the term ["social"] implied something concerning society or the common good, increasingly it refers to a technique of psychological intervention on the individual" (William Davies).

3. In 2007, the band Radiohead released a highly acclaimed album called In Rainbows. It originally went for sale online as an MP3 file. Customers could pay any price for the file that they felt was fair, including paying nothing at all. The band later released a physical CD and LP for customers who did not use the Internet. The band sold the album under this novel pricing scheme for exactly two months before withdrawing the "pay what you wish" offer. The band eventually sold over 3 million copies of the album in all formats and through both the innovative plus the traditional pricing schemes.

4. Many companies are exploring providing up-front services (like airline tickets) for free and then making up costs by charging extra for luggage, using the bathroom, going to the front of lines and so forth.

5. Some large companies have appointed "chief happiness officers". Google is famous for having done this. What do these executives do? One role is to come up with ideas to improve the work environment. They arrange for martial classes for employees and give them "computer and desk décor allowances", for example. But if defining happiness is so hard (psychologists concede that it is notoriously difficult to measure), how do you write a job description for a chief happiness officer? What if you are a company that cannot afford expensive worker benefits? What can the happiness executive do on a budget?

6. After the nuclear meltdown at its facilities in Fukushima, TEPCO engaged in a controversial advertising campaign in which they did nothing but thank people for driving safely, cooking Christmas dinners and such. They even thanked other companies for providing their services and products. Does that make you think better of TEPCO?

7. Coca-Cola has recently sold bottles of its products with first names of persons ("Bobby", "Gail") written on the bottles in the hopes that people will buy them for their friends who have that name. Do you think that people take more pleasure in buying things if the experience is combined with the experience of friendship and giving of gifts?

8. Do you think that marketers are right to identify payment as a "pain source" that must be glossed over or eliminated in order to enhance the experience of economic exchanges?

9. Many companies seek to influence friends to pass along their images and advertising to their digital friends on their social networks. "Friendvertisements" that "go viral" are a windfall for companies that don't to have to pay loads of money for the advertising. Why do you think users of social networks are so quick to help out businesses in this way?

10. One key insight of Adam Smith's The Invisible Hand is that free economic exchanges, while entirely selfish on the level of individual exchange, are ultimately beneficial for society as a whole. Do you think it's possible that people interacting with "friends" on their social networks are more interested in their own pleasure and happiness than in that of their "friends"? What do they contribute to the Gross National Happiness? Is the person who "pays it forward" and pays a little extra to avoid seeming "cheap" simply buying another commodity on top of the coffee, a "feeling" of altruism that is a substitute for the real thing? Can you count on your Facebook friends in a pinch? Are we experiencing the simulacrum of social connection with none of the obligations and frustrations? Are we less lonely for being more social in virtual space? Are we making ourselves more than ever vulnerable to psychological manipulations by businesses and even the State? Is there any reason to worry about any of this?

Activity VI

Silent Debate

On large pieces of white construction paper passed out by the teacher, write the following sentence and suggest as many possibilities as come to mind to fill in the blank. You will have only seven minutes to do this initial task.

"Human beings are the only animals that _____."

After the teacher calls time, wander around the room silently, observe the answers that other students gave and write down any comments (in a different color pen if possible) on the other students' construction paper. Do not write your name beside your comments. Take time to read the comments that other students have written.

UNIT ELEVEN
THE NATURAL SCIENCES

For Further Discussion

1. "Science is really anti-intellectual. It always distrusts pure reason and demands the production of objective fact" (H.L. Mencken).

2. "Science without religion is lame, religion without science is blind" (Albert Einstein).

3. "The most exciting phrase to hear in science, the one that heralds the most discoveries is not 'Eureka!' but 'That's funny'…" (Isaac Asimov).

4. "Even for the physicist the description in plain language will be a criterion of the degree of understanding that has been reached" (Werner Heisenberg).

5. Describe one activity that in your mind qualifies as a pseudoscience, one that purports to use the methods of science but is not faithful to its nature because it makes claims based on insufficient evidence and because its main beliefs are framed in ways that are not open to experiment and thus disproof.

6. "The first principle is you must not fool yourself and you are the easiest person to fool" (Richard Feynman).

7. Advertisers often claim that their products are "scientifically" proven to be effective. What does such a claim really mean? Why does this claim succeed in persuading people to buy the products?

8. Why are people still so unsettled by the image of Dr. Frankenstein, a character created two hundred years ago by Mary Shelley and immortalized in countless movies? What does this say about the public's relationship with science?

9. "Sit down before fact as a little child, be prepared to give up every preconceived notion, follow humbly wherever and to whatever abysses nature leads, or you shall learn nothing. I have only begun to learn content and peace of mind since I have resolved at all risks to do this" (Thomas Henry Huxley).

10. Some have claimed that the method of science is more important than the findings of science. Do you agree or disagree?

11. "If you try and take a cat apart to see how it works, the first thing you have on your hands is a non-working cat" (Douglas Adams).

12. "Science itself is irrational or mystical. It's just another faith or belief system or myth, with no more justification than any other. It doesn't matter whether beliefs are true or not, as long as they're meaningful to you" (Theodore Schick, Jr. and Lewis Vaughan).

13. Do you think that the consequences of scientific illiteracy are more dangerous in our time of global warming, toxic and radioactive wastes, soil erosion, deforestation and environmental pollution than at any other time in human history?

14. "Science promised man power…. But, as so often happens when people are seduced by promises of power, the price is servitude and impotence. Power is nothing if it is not the power to choose" (Joseph Weizenbaum).

15. "If the bee disappeared off the face of the Earth, man would have only four years left to live" (Maurice Maeterlinck).

16. Science and democracy both emerged from Ancient Greece in the sixth century BC. Some say that the values of science and democracy are mutually supporting and that science could not thrive without the free exchange of ideas and freedom from political manipulation that democracy makes possible. Do you agree or disagree?

17. "I reject the notion that science is by its nature secretive. Its culture and ethos are, and for very good reason, collective, collaborative, and communicative" (Carl Sagan).

18. "Men think epilepsy divine, merely because they do not understand it. But if they called everything divine which they do not understand, why, there would be no end of divine things" (Hippocrates).

19. Do scientists have a special moral responsibility to alert the public to the possible dangers emanating from science or from the foreseeable uses of scientific discoveries?

20. Some have estimated that approximately half of the professional scientists currently living work or have worked at least part-time for the military of their respective countries. Should this make people nervous about science and technology?

21. "The day science begins to study non-physical phenomena, it will make more progress in one decade than in all the previous centuries of its existence" (Nikola Tesla).

22. Do you think that science is compatible with spirituality and religious faith?

23. "I like the scientific spirit—the holding off, the being sure but not too sure, the willingness to surrender ideas when the evidence is against them: this is ultimately fine—it always keeps the way beyond open—always gives life, thought, affection, the whole man, a chance to try over again after a mistake—after a wrong guess" (Walt Whitman).

24. "The beginning scientist, unlike the beginning humanist, does not have an immediate contact with genius. Indeed, school courses can attract quite the wrong sort of person into science—unimaginative boys and girls who like routine" (John Passmore).

25. "The scientist is not the person who gives the right answers but the one who asks the right questions (Claude Lévi-Strauss).

26. "You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete" (Buckminster Fuller).

27. "Science is the great antidote to the poison of enthusiasm and superstition" (Adam Smith).

28. "To know the history of science is to recognize the mortality of any claim to universal truth" (Evelyn Fox Keller).

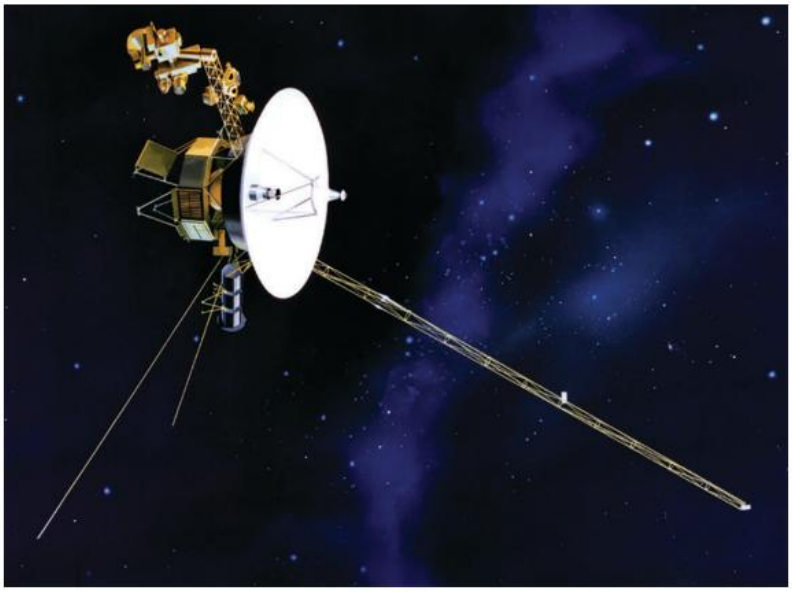
29. "Science is not about control. It is about cultivating a perpetual condition of wonder in the face of something that forever grows one step richer and subtler than the latest theory about it. It is about reverence, not mastery" (Richard Powers).

30. Some scientists claim that by safely altering embryo genes they can prevent some inherited diseases. Many have called for a ban on such research—even if the embryos are not viable—because it is unethical and because we can never know enough about long-term unforeseen harms. Should there be any limits on the research that scientists conduct? Who should set these limits?

ACTIVITY I

WHAT WOULD YOU PUT ON THE GOLDEN RECORD?

In 1977, astronomers Carl Sagan and Frank Drake, along with a small team of archivists, created two copies of a "Golden Record". These were mounted on Voyager I and Voyager II, twin space probes launched into deep space in that same year. Illustrated with a drawing of a nude man and a pregnant woman along with an indication of the date and the location of Earth, the Golden Record served as a time capsule transmitting information about human civilization to any intelligent life forms in the universe that might come across it.



Items included in the Golden Record included photographer Wayne Miller's photograph of his son's birth; a map of the human genome as it was then understood; demonstrations of humans licking, eating and drinking; a photograph of Olympic Sprinters of different races; images of mathematical equations; photographs of the Taj Mahal, the Golden Gate Bridge and several planets; and many recordings.

The recordings included greetings in fifty-five human languages; the hum of an automobile; whale songs; jazz, blues and rock and roll music; a Georgian chant; classical compositions by Beethoven, Mozart, Bach and Stravinsky; and the sound of a human kiss. It also included one hour of brainwave recordings of one member of the Golden Record archive team who was meditating on the history of mankind on Earth and on the experience of falling in love.

If you could send a similar time capsule into deep space in an effort to share with extraterrestrial life forms what it means to be a human being, what would you include that the Voyager Golden Record archivists overlooked or chose not to include?

ACTIVITY II

SOME DEBUNKED SCIENTIFIC THEORIES

In this activity, we consider a few notable scientific theories that once were believed to be true by most scientists until new evidence emerged and forced them to discard their original theories in favor of new models.

1. The Geocentric Model of the Universe

The geocentric model of the universe is perhaps the discredited scientific theory that most readily comes to mind to the casual student of the history of science. This model described the Earth as the center of the universe around which orbited the sun, the moon, the stars and the planets visible to the naked eye. Ancient Greeks from the sixth century BC advanced this theory, Aristotle developed it fully in the fourth century BC, and the Greco-Egyptian astronomer Ptolemy standardized it in the second century AD. This model was the predominant view of the Earth's position in the universe for well over fifteen hundred years until the models of Copernicus (1473-1543), Galileo (1564-1642) and Kepler (1571-1630) decisively displaced it.

2. The Four Humors Model of the Human Body

From the time of the Ancient Greeks until the arrival of systematic medical research in the nineteenth century, physicians believed that the balance of four "humors" or "vital fluids"—black bile, yellow bile, phlegm and blood—was responsible for the temperament and health of human beings. The practices of bloodletting and the application of blood-sucking leeches were consistent with this theory. Advances in chemistry and cellular biology in the nineteenth century at last discredited this theory after a reign of nearly two thousand years.

3. Miasma Theory of Disease

Until the end of the nineteenth century, most scientists believed that **miasmas**—toxic vapors or gases that emanated from swamps and stagnant water—gave rise to infectious diseases such as cholera and the plague. The English term "malaria" (which comes from the words for "bad air" in Latin) reflects the belief that foul odors cause these contagious diseases. The work of Robert Koch and Louis Pasteur, in particular, led to the discrediting of the miasma theory in favor of the germ theory of disease.

4. Theory of Stable Continents

The theory of stable continents persisted well into the twentieth century. In 1912, Alfred Wegener proposed the theory of continental drift. Since the 1950s, careful scientific studies of the movements of the Earth's geological plates have given substantial support to Wegener's theory.

5. The Age of the Earth

In the early nineteenth century, many scientists who rejected the Judeo-Christian biblical account of the Earth's age conjectured that it was about twenty or thirty million years old. So-called "Young Earth Creationists" had held that the Earth was created within the last 10,000 years. The work of geologists, notably the work of Charles Lyell (1797-1875), supported a theory that the Earth was actually much older than either earlier scientists or the creationists had supposed. This conclusion was, incidentally, essential to acceptance of Darwin's theory of evolution, which needed a very long timescale in order to be persuasively explanatory. Currently, the scientific consensus is that the Earth is about 4.5 billion years old.

6. The Universe is Static

Cosmologists for thousands of years believed that the universe is static and thus is neither expanding nor contracting. Careful observations by Edwin Hubbell and other astronomers in the early twentieth century convinced most scientists that objects further away from Earth were moving away from it faster than objects nearer to Earth and that the universe was thus expanding. More recent data shows that the expansion of the universe is far more rapid than had been previously supposed.

7. The Great Chain of Being

This false view of the universe (still in evidence in some quarters) holds that humans stand at the apex of the chain of being (just below God) and that all other forms of life can be situated below humans according to their various imperfections. The great insight of evolutionary theory is that each species is perfect in its own way and must be evaluated by its success in adapting to its own niche.

8. All Objects in Motion Must Come to a Rest

The belief that all objects in motion must come to a rest was a fundamental but incorrect assumption of Aristotle's physics and mechanics and was the dominant theory of motion until Isaac Newton made allowance for friction and other extraneous factors and demonstrated that in the absence of these factors the velocity and direction of the motion of an object will remain stable until other "forces" intervene.

9. Ulcers are Due to Stress

Doctors throughout the twentieth century blamed ulcers on the stress associated with modern life and recommended that patients take antacids and change their lifestyles to address the symptoms. An Australian scientist named Barry Marshall won a Nobel Prize in 2005 by showing decisively that the bacterium H. pylori causes the disease.

10. Classical Rationality

We are in the midst of a revolution in our thinking about the way that the human brain works. In the last twenty to thirty years, neuroscientists have demonstrated that the vast majority of thought is not conscious, that rationality is embodied and not an independent faculty, that emotion is vital to rational decision-making and that reason and language do not fit the world directly or even logically but are constrained by the brain and body and operate through metaphor and "frames".

Note to Students:

You may well have an opportunity to talk about paradigm shifts in formal presentations and essays—dramatic or fundamental changes in approach or in underlying assumptions. Please avoid using either the "geocentric theory of the universe" or the "flat earth theory" as examples of such shifts. The first is a cliché. The second is really not a good example of a scientific paradigm shift. Even in ancient times, most scientists agreed that the Earth was not flat and was probably spherical. Try using one of the less frequently mentioned examples of paradigm shift outlined above if you have the occasion to discuss the dramatic replacement of one scientific theory by another.

ACTIVITY III

SERENDIPITIES

In this activity, we consider a few notable scientific discoveries stemming from unexpected results to which scientists paid proper attention instead of writing them off as mistakes or "anomalies".

1. The Big Bang

In the 1960s, Arno Penzias and Robert Wilson, scientists working for Bell Labs, were using the most sophisticated sensing technology available in order to detect signals from deep within the Milky Way galaxy. The radio telescope that they used was designed to communicate with satellites. However, Penzias and Wilson wanted to look for radio waves in deep space. Instead of signals, they detected a constant hum and then realized that this was coming from areas where there were no stars and where the ambient heat was four degrees greater than expected. They speculated that this humming noise, the radio waves from non-star sources and the heat were residual energy from the Big Bang at the beginning of the universe. Their lucky discovery earned them the Nobel Prize.

2. X-rays

In 1895, Wilhelm Roentgen systematically observed strange and unexpected effects when he introduced high electrical charges into vacuum tubes in order to free electrons. These electrons formed into high velocity rays. Roentgen and others noticed that photographic plates near the tubes with these rays darkened for some reason. He recognized the medical possibilities when he photographed his wife's hand using x-rays that passed through her hand. When his wife saw the photograph, she said: "I have seen my death."

3. Penicillin

In 1928, Alexander Fleming was trying to find a means for killing or controlling infectious bacteria. He grew bacteria in special dishes called agar plates. He didn't sterilize his plates very well, and he left the windows to his lab open. Some of his plates became moldy as a result. He noticed clear rings around the mold—**penicillium notatum**—and realized that something was killing the bacteria there. He took notes and saved the plates. Other scientists followed up and, by the end of the 1940s, penicillin was being manufactured on a large-scale. This drug has saved countless lives and has changed the history of infectious diseases.

4. Teflon

In 1938, a scientist working for a large chemical company was working with a gas known as TFE. His company used it in making industrial refrigerators. He found that some of the gas, compressed in a cylinder under the right circumstances, turned into a waxy plastic called PTFE. He was curious about this new substance and investigated it. It turns out that it was one of the slipperiest substances ever created by man. DuPont called it Teflon, and it made an important contribution to advances in aerospace, communications and architecture. Its non-stick properties made it extremely popular as a coating for pots and pans. It is still used in the manufacture of clothes to make them stain-resistant.

5. The Coelacanth

In 1938, a museum curator named Marjorie Courtnay-Lattimer, was looking for unusual fish specimens known to the fishermen who worked the ocean waters off of the coast of South Africa. One captain showed her his haul, and she was startled to find a fish that she could not identify. She knew that it must be important, though. The fisherman and his buddies had never seen such a specimen. She sent the fish to a taxidermist to skin it and gut it. A friend of hers at a local university later identified the specimen as a Coelacanth, a species thought to have disappeared over 66 million years ago.

6. The Microwave Oven

In the late 1940s, a scientist named Percy Spencer noticed that microwaves from a radar apparatus that he was using melted a chocolate bar that was in his pocket. Percy immediately came upon the idea of using microwaves to cook food and got a patent for his invention in 1950. The first thing that he cooked with his new microwave oven was popcorn. The first models were enormous and did not sell well. However, by 1967, a smaller, cheaper device called the Radarange took the consumer world by storm.

7. Gravity

Some of the great "accidental" discoveries in science have become the stuff of myth and legend. The story goes that Isaac Newton was walking through his family's orchard when he noticed an apple fall from a tree to the ground. He wondered why it fell to the ground and didn't, for example, float up to the sky. This reverie led him to think about a kind of motion—gravity---that was a force of attraction between two objects. The Earth and the apple were in a kind of tug-of-war, but because the mass of the Earth was so much greater, the apple lost and fell to the ground.

8. The Smallpox Vaccine

In the eighteenth century, British scientist named Edward Jenner heard a story from a milkmaid. She told him that people who got cowpox infection never got smallpox. Cowpox is relatively harmless to human beings, but smallpox is usually lethal. He took pus from the milkmaid's cowpox sores and injected them into an eight-year-old boy. The boy developed cowpox symptoms, of course. Later, Jenner injected the boy with smallpox. The boy did not develop smallpox symptoms. This is the story of the first "vaccine". In Latin, the word means "made from cows". Do you suppose that Jenner's experiment on his eight-year-old subject would be considered "ethical" in today's environment?

9. Velcro

A Swiss engineer named George de Mestral had wanted for many years to devise a fastener that worked like the tiny burrs that attached themselves to his clothes during his regular hikes in the Alps. For years he tried many different approaches but without success. Then, by chance, he discovered that nylon sewn while bathed in infrared light formed tiny hooks that perfectly attached itself to softer velvet-like nylon. The name of the new product combines the French words for "velvet" and "hook".

10. Safety Glass

In 1903, a French scientist knocked a flask off his desk. The glass did not shatter, as he expected. Rather, it broke while maintaining its form. Curious, the scientist investigated and discovered that the glass had contained plastic cellulose nitrate. It created a type of film on the glass that kept it from shattering in the normal fashion. The scientist patented a process of putting plastic lamination between sheets of glass. This safety glass save countless lives and became standard in automobiles and the windows of tall buildings. Multi-layered safety glass became the bulletproof glass still widely used.

ACTIVITY IV

POPULAR NOTIONS ABOUT SCIENCE

Many popular notions about science and scientists are either false or only partly true. Discuss in small groups or as a class the following propositions.

1. The natural sciences are more rigorous and trustworthy than the human sciences.

2. Scientists are engaged in pure research and care little about the practical applications of their ideas.

3. When scientists solve problems, they must use either inductive or deductive reasoning.

4. Scientists can prove or disprove hypotheses once and for all.

5. Science requires technical skills rather than creativity.

6. Scientific experiments and research that do not lead to firm conclusions are of little use.

7. Scientists are always objective in their evaluation of scientific ideas.

8. There is a single scientific method and all scientists follow it without exception.

9. Without experiments, studies cannot be scientific or rigorous.

10. Scientists readily let go of pet theories once they are shown to be false.

ACTIVITY V

METAPHORS AND SIMILES IN SCIENCE

In attempting to explain scientific concepts, scientists frequently resort to metaphors and analogies. A metaphor is a word or phrase that designates one thing when used to explain another. "Love is a journey," is a metaphor. A simile is a comparison as well, but uses the words "like" or "as".

In pairs or small groups, discuss and if necessary do some quick research to discover the following about each of the following metaphors or analogies. Then explain the metaphors or similes to your classmates using the following guidelines.

- Briefly describe the target concept.
- Describe the metaphor or simile.
- With which particular branch of the sciences is it associated?
- Note the points of similarity.
- Suggest ways in which the metaphor or simile is misleading or unhelpful.
- Draw conclusions about the metaphor or simile.

1. Greenhouse effect
2. Trojan horse
3. The universe is like a string orchestra.
4. The immune system is like a police force.
5. The selfish gene
6. Rutherford's model of the atom is like a solar system.
7. Lock and key model
8. DNA blueprint
9. Ecological footprint
10. Natural selection
11. Firewall
12. Nature's building blocks
13. The fabric of the universe
14. Magnetic fields
15. The blind watchmaker

Discuss the following questions as a class.

1. What is the role of metaphor in science?

2. Is it possible or desirable to rid science of metaphor?

Finally, each student should come up with one metaphor or simile from the sciences and describe it along the lines that we followed in discussing the other metaphors and similes in this activity.

ACTIVITY VI

QUESTIONS THAT KIDS ASK

Children are insatiably curious about how the world works and are usually not shy about asking for help understanding what puzzles them. Unfortunately, what puzzles them often puzzles many of us. Work in pairs or small groups to brainstorm or, if necessary, to do some quick research to answer these commonly heard questions.

1. Why don't people fall off the bottom of the earth?

2. Why is the sky blue?

3. Why can you sometimes see the moon during the day?

4. What makes magnets work?

5. Why don't airplanes fall out of the sky?

6. When you open a package of assorted nuts, why are the biggest nuts—Brazil nuts—usually on top?

7. If you travel at the speed of light and turn on a flashlight, what will happen?

8. What would happen if I fell into a black hole?

9. Why don't birds get electrocuted on electrical wires?

10. What makes a rainbow?

Activity VII

Silent Debate

Draw a map on a piece of white construction paper. You should draw an "x" axis and a "y" axis. Let the "x" axis = time from 500 BC until the present. Let the "y" axis = scientific progress. Now plot a line that you think accurately describes scientific progress over time. Take about five minutes.

Next, students should wander around the room, looking at other students' maps and write comments or questions in English (preferably using a pen with ink of a different color). Students should do this in absolute silence and should not write down their names with their comments. Students should take the time to read and, if they wish, comment on the comments that other students have offered.

ACTIVITY VIII

THE SCIENTIFIC METHOD AS DETECTIVE WORK

In his book Outliers, Malcolm Gladwell describes a small town called Roseto, located near Bangor, Pennsylvania. Italian immigrants from a poor town called Roseto Valfortore in Foggia, Italy had settled in Roseto, Pennsylvania in large numbers. Many of the men who immigrated had worked in marble quarries in their hometown in Italy. In Pennsylvania, many of the men worked in a slate quarry.

In 1959, a medical doctor learned that almost no males under the age of sixty-five in Roseto, Pennsylvania had had heart attacks. The doctor discovered that the death rate from heart disease in that town was half of that of the United States as a whole. The death rate from all causes was 30 to 35 percent lower. The doctor was fascinated and decided to gather data. Here are some of the things he learned.

In small groups, discuss which factors you think are relevant to the doctor's investigation and guess what conclusion the doctor came to in the end. Afterwards, a spokesperson for each group should report their group's conclusions with the whole class.

1. There was no suicide, alcoholism, drug addition and very little crime in Roseto.

2. Most churchgoers attended mass at a single Catholic church.

3. The Rosetans generally cooked with lard rather than olive oil.

4. Rosetans ate traditional Italian sweets all year round.

5. Many homes had three generations under one roof.

6. Roseto pizzas typically had sausage, pepperoni, salami, ham and eggs as toppings.

7. Relatives of Rosetans in other parts of the country did not share the same good health.

8. Death rates from heart attacks in men in towns near Roseto were close to the U.S. average.

9. Rosetans liked to stroll in the streets in the evening and talk with one another in Italian.

10. There were twenty-two civic organizations in town and a population of 2,000.

[See Appendix II for the doctor's conclusion].

UNIT TWELVE
THE ARTS

For Further Discussion

1. "We all know that Art is not truth. Art is a lie that makes us realize truth, at least the truth that is given us to understand. The artist must know the manner whereby to convince others of the truthfulness of his lies" (Pablo Picasso).

2. "Art is never finished, only abandoned" (Leonardo da Vinci).

3. "The essential function of art is moral" (D.H. Lawrence).

4. Recently, a collective digital art project called "The Johnny Cash Project" was exhibited at several famous museums in London. Tens of thousands of participants have visited an online site and have collectively contributed computer drawings to a frame-by-frame animation of Cash's song "Ain't No Grave". Can this qualify as art?

5. In one or two sentences, describe the difference between a man-made object that qualifies as a work of art and one that does not.

6. Do you think that sophisticated robots in the future will create and appreciate art?

7. "Art is not what you see but what you make others see" (Edgar Degas).

8. Should the judgment of the public, however informed, about the merit of a so-called "work of art" have as much weight as the judgment of members of the art establishment?

9. Do you think that the Internet and the increasing homogenization of world culture will have an adverse effect on the quality of art in the future?

10. "A camera is a save button for the mind's eye" (Robert Kingston).

11. To what degree does familiarity with arts confer social status? Might this be one reason that some people become "culture vultures"?

12. "The value of art is largely unrelated to aesthetics: a priceless masterpiece becomes worthless if it is found to be a forgery; soup cans and comic strips become high art when the art world says they are, and then command conspicuously wasteful prices" (Steven Pinker).

13. Some critics, notably Arthur Danto, have noted that beauty should not be the goal of modern art. Do you agree?

14. Do you think that there are some aesthetic judgments that are universal? Or do you think that all such judgments vary from person-to-person or from culture-to-culture?

15. When you take the time to read a novel, watch a play, listen to a piece of music or contemplate a painting or work of sculpture, are you more interested in being disturbed or comforted? If neither of these words is appropriate, which are?

16. Although many consider James Joyce's novel Ulysses to have been one of the greatest novels ever written, he never won a Nobel Prize for Literature or a general readership. Can you think of other artists who have not won fame or applause while they were living and creating?

17. "You don't make a photograph just with a camera. You bring to the act of photography all the pictures you have seen, the books you have read, the music you have heard, the people you have loved" (Ansel Adams).

18. If the public schools in your community were facing a budget crisis and you had to reduce class offerings in order to save money, would you reduce courses in the sciences, physical education, mathematics or the arts? Why?

19. "Perpetual work is the law of art, as it is the law of life, for art is idealized creation. Hence great artists and perfect poets wait neither for commission nor for purchasers. They are constantly creating—today, tomorrow and always. The result is a habit of work, the unfailing apprehension of the difficulties which keep them in close intercourse with the Muse and her productive forces" (Honoré de Balzac).

20. In the 17th century, the French royal family published a famous series of sixty-six texts of classical Greek and Latin poets and dramatists for the use of the son of King Louis XIV. Since the texts were for the education of the young heir, many of the "naughty" parts were censored. Do you think that this is appropriate?

21. "It is quite possible—overwhelmingly probable, one might guess—that we will always learn more about human life and human personality from novels than from scientific psychology" (Noam Chomsky).

22. "The enemy of art is the absence of limitations" (Orson Welles).

23. Can you think of a work of literature that has either helped you to refine your moral values or to see the world from the perspective of another?

24. "Life imitates art more than art imitates life" (Oscar Wilde).

25. In *How the Mind Works*, Steven Pinker suggests that the arts are "concocted for the express purpose of pressing our pleasure buttons", and these have no evolutionary value in the sense of helping us to reproduce successfully in the environment in which we evolved. In other words, our capacity for making and enjoying art is a **byproduc**t of evolution, akin to our ability to ask metaphysical questions that we cannot possibly answer. This is a controversial claim. Can you think of any sense in which the capacity to make and appreciate art can help us be healthy, win mates and have babies who survive into adulthood and spread our genes?

ACTIVITY I

CENSORSHIP AND ART

In small groups, discuss the pros and cons of censorship in view of the following scenarios. Would you come up with a rule that censorship is never all right? If you can't do that and feel that there are circumstances that warrant censorship, articulate some of these circumstances. Make some provisional rules.

Then in a large group, spokespersons from each group should share these rules (or their reason for choosing no rules) and allow for all members to share their opinions.

1. Lady Chatterley's Lover

Perhaps the most famous modern attempt to suppress a work of literature arose in the U.K. in 1960 when Penguin for the first time published an unabridged version of D.H. Lawrence's novel *Lady Chatterley's Lover* (1928). Until that time, the novel could not be published openly because of its sexually explicit scenes, "unprintable words" and (some claimed) its depiction of a sexual relationship between a working-class man and an aristocratic married woman. A British obscenity law from 1959 allowed publishers to escape prosecution only if a work had "artistic merit". At the trial, the prosecutor claimed that it was not "a book you would wish your wife or servants to read". The jury was not persuaded. It found the publisher not guilty, a major victory for artistic freedom.

2. Robert Mapplethorpe

One of the most controversial attempts to censor art in recent years came during a museum tour of an exhibition of Robert Mapplethorpe's photographs in 1989. Entitled "The Perfect Moment", the show featured portraits and figure studies as well as a series of black-and-white photos from the underground gay sadomasochism (S & M) scene in New York City. These latter photographs were exceptionally graphic and were shown only in an age-restricted area during the early exhibitions. The early shows were critically well received. However, controversy from conservative groups in the United States forced the cancellation of the show at other museums. In addition, because public money from an endowment for the arts had been used to support the traveling show, the U.S. Congress passed a law requiring artists who receive public funding to take an oath that they would not promote "obscenity".

3. The Hays Code

In response to protests against the "immoral lifestyles" of Hollywood actors during the 1920s, the Motion Picture Producers and Distributors of America adopted a voluntary censorship code that sought to enforce a set of moral guidelines governing films released and distributed in the United States. The so-called Hays Code was in effect from 1930 until 1968 and was succeeded by a ratings system. The Code enumerated subjects that were absolutely forbidden in films, of whatever artistic merit. These included, for instance, sexual relationships between people of different races, suggestive nudity, vulgar language and ridicule of the clergy. It also listed areas of caution. For example, excessive kissing was an object of scrutiny. There was a famous "rule of thumb" that actors could not kiss on screen for more three seconds at a time. Alfred Hitchcock, in the film *Notorious* (1946), famously got around this rule by having his leading actor and actress kiss for several minutes but cutting back and forth every three seconds.

4. Ai Wei Wei

The Chinese artist Ai Wei Wei has long been active in his denunciation of censorship and propaganda in his own country. He has been a vocal critic of the government handling of the Sichuan earthquake of 2008 and posted anti-Olympic comments on the Internet when Beijing hosted the games that same year. His art has gained an international audience. The Chinese government considers his art subversive. Perhaps his most famous exhibit was an installation at the Tate Modern in 2010. It consisted of 100 million tiny sunflower seeds made of porcelain. It took 1,600 artisans several years to produce these. The sunflower was a powerful symbol of Chairman Mao as the sun, with his followers turning to him as the sunflower does. Ai's use of artisans was a pointed reminder that most modern Chinese factories now turn out cheap products made by relatively unskilled laborers for the export market. Ai was arrested by the police in 2009 and suffered serious injury. In 2011, he was arrested at the airport when trying to leave the country.

5. The Satanic Verses

The author Salman Rushdie wrote the novel The Satanic Verses in 1988. It was written in a dream-like style called "magic realism" and dealt with certain Quranic verses allowing prayers for pagan goddesses at Mecca. The novel was well received internationally and won a Whitbread Award (U.K.) for best novel of the year. However, Ayatollah Khomeini, Supreme Leader of Iran, issued a **fatwa** in 1989 calling on faithful Muslims to kill Rushdie for blaspheming their faith. Rushdie survived several assassination attempts and went into hiding, recently expressing doubt that his novel could even be published in the current atmosphere of "nervousness". His Japanese translator was stabbed to death in 1991.

ACTIVITY II

DRAMATIC SITUATIONS

In the 19th century, Georges Polti, a French scholar, analyzed classical Greek dramatic texts and some French texts and derived a list of "thirty-six dramatic situations" that most often occur. He claimed to be continuing the work of other scholars.

Consider the following dramatic situations. Identify an example of a novel, drama or film that exemplifies each of these situations.

1. Deliverance from Peril

In this situation, a rescuer saves a person whose life or vital interests have been threatened.

2. Self-Sacrifice

A character sacrifices himself or herself for an ideal or another person.

3. Crime and Vengeance

A criminal commits a crime and the authorities cannot or do not punish him. An avenger steps in to deliver justice.

4. Madness

A person becomes insane and injures innocent people.

5. Supplicant

A hero or heroine, pursued by a persecutor, seeks help from an authority figure to be saved.

6. Revolt

A hero or a group of "good" rebels rises against a corrupt and evil power.

7. Obstacles to Love

Two lovers encounter obstacles and attempt to overcome them in order to fulfill their love.

8. Vengeance of a Kinsman

A family member takes revenge for something that was done to another family member.

9. Mistaken Jealousy

Unfounded jealousy leads to tragic consequences.

ACTIVITY III

CONNECTIONS

The following adjectives are frequently associated with the arts. Can you suggest other areas of knowledge to which these same words apply with similar force?

1. Pleasurable
2. Creative
3. Emotional
4. Original
5. Beautiful
6. Sublime
7. Provocative
8. Subjective
9. Imaginative
10. Engaging

ACTIVITY IV

LANDSCAPE PAINTINGS AND CULTURAL INFLUENCES

Landscape paintings depict trees, mountains, rivers, meadows, valleys and other natural features from a point of view that imparts to the whole composition a sense of coherence and satisfying form. Throughout history, artists from many different cultural traditions have contributed to this important genre.

Examine the paintings below and discuss what these paintings may tell us about the artists who produced them and the culture and tradition within which they created them. Do human or animal figures appear in the landscape? Do the sky or elements of weather figure? Are there religious symbols? Are there man-made objects?

Are the works more dream-like and imaginative or representational? Are they comforting or frightening? Is the emphasis on the foreground or the background? What do the works say about the relationship of the artist and his culture towards nature? Is the composition "full" or are there empty spaces? Do elements of writing appear? Why? Do you suppose that the artists had particularly high status? For whom do you suppose the landscapes were intended?

What can we learn about different cultural and historical perspectives just from examining these paintings?

1. Wall Scroll by Ma Lin (China, c. 1246)

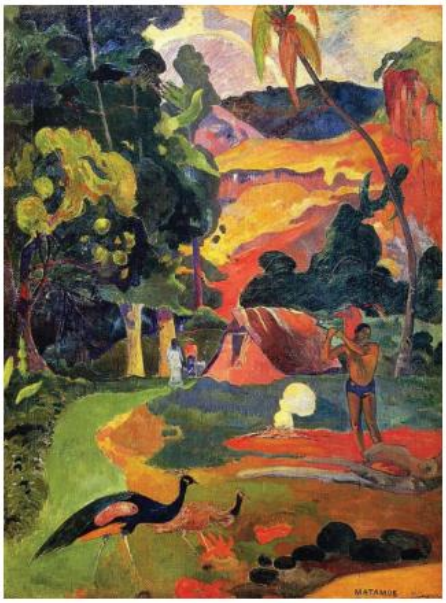
2. Titian, Madonna of the Rabbit (1576)

3. Hanging Ink Scroll by Kano Chikanobu (c. 1680)

4. Aeneas at Delos by Claude Lorraine (1678)

5. Wanderer Above the Sea of Fog by Caspar David Friedrich (1818)

6. Entrance Gate at Enoshima by Utagawa Hiroshige (1836)



7. Landscape with Peacocks by Paul Gauguin (1892)

8. Big Trees at Estaque by Georges Braque (1908)

ACTIVITY V

"SUITORS FOR AGREEMENT?"

In her novel Emma (1815), Jane Austen offers an interesting account of a meeting between one of her characters, Frank Churchill, and Jane Fairfax, the woman with whom he enters into a secret marriage engagement. He is telling Emma, the protagonist, about Jane's skill as a musician. Frank and Jane were, at the time, at a seaside resort along with Jane's "very particular friend" Miss Campbell and her fiancée, Mr. Dixon. Emma has often heard Jane play the piano. She claims that Jane "plays charmingly".

Please break into pairs or small groups. One student should read aloud the passage and then all students should discuss the questions that follow. At the end, students should report to the whole class some of their answers to these questions.

"You think so, do you?—I wanted the opinion of someone who could really judge. She appeared to me to play well, that is, with considerable taste, but I know nothing of the matter myself.—I am excessively fond of music, but without the smallest skill or right of judging of anybody's performance. I have been used to hear hers admired; and I remember one proof of her being thought to play well. A man, a very musical man, and in love with another woman—engaged to her—on the point of marriage—would yet never ask that other woman to sit down to the instrument, if the lady in question could not sit down instead—never seemed to like to hear one if he could hear the other. That, I thought, in a man of known musical talent, was some proof."

1. How important is it to you, when you like a work of art—a painting, a musical performance, a film, a dance performance—that others agree with your judgment that it is excellent or otherwise?

2. Would you agree that we have a tendency to present our choices to others and invite dialogues and a measure of agreement from those who have an interest in the choices we have made? Are we, as Kant has suggested, "suitors for agreement" in our aesthetic judgments?

3. Is the possibility of agreement about a work of art being excellent or otherwise an argument for an objective dimension of the concept of beauty? Or do you believe that the experience of art is overwhelmingly subjective, personal and incommunicable?

4. Have you ever allowed someone to change your mind about appreciating a work of art? Relate an instance when you read a review or engaged in a conversation that changed your mind about a work of art that you have experienced?

ACTIVITY VI

JAPANESE WOODBLOCK KITSCH

Kuniyoshi Utagawa (1797-1841) is considered one of the masters of the Japanese woodblock (ukiyo-e) tradition. However, he was eccentric. He adored cats, and they regularly swarmed in large numbers around his studio. He made hundreds of woodblock prints featuring these cats that remain popular in Japan, particularly with children. Some have described these as kitsch rather than "high" art. Would you agree? Please discuss these paintings in terms of how they may constitute "low-brow" as opposed to "high brow" art and what the difference between these two designations really means.

Cat-Populated Version of Satire of Ando's 53 Stages of the Tokaido

Cats Forming the Characters for the Japanese Word "Catfish"

ACTIVITY VII

HIDING VALUABLE ART

Many students and patrons of museums generally do not realize this, but large museums typically display only about **five** percent of their art collection at any given point.

In early 2016, the online news provider Quartz (qz.com) surveyed the holdings of 20 museums in 7 countries, focusing on the work of 13 major artists. In total, its reporters collected data for 2,087 pieces of art. The results surprised a lot of people. The survey revealed, for instance, that well over half of the work of Georgia O'Keeffe, Wassily Kandinsky, Alexander Calder and Mark Rothko are unavailable at any given time for public display, as are almost all of the oil paintings and half of the general artwork of Pablo Picasso.

Museums in the survey hold 862 important photographs by Henri Cartier-Bresson. However, at the time of the survey, only one was on display.

These simple facts raise a host of provocative questions that students can and should discuss and about which they should have debates when they think about the arts as an area of knowledge.

In small groups or as a large group, pose and discuss these sorts of questions. Here are a few to start with. Encourage students to pose their own questions or to point out related topics.

1. What is the purpose of museums, after all? Is it to conserve works of art first and foremost, with display and education and amusement of the pubic merely secondary goals?

2. What if the goal (even if not stated directly) is to provide artists, foundations and collectors with a valuable tax write-off? Does this make the hiding away of masterpieces of art a moral issue?

3. It is very expensive to store great works of art safely. If large museums sell some of the art that they would otherwise keep for long periods of time in storage to smaller museums that could display the works right away, doesn't everyone win? The large museums get rid of a large fixed cost. Smaller museums starving for credibility could acquire a **deaccessioned** Picasso, display it, earn money to buy other art and display that artwork and so forth. The public would, in the end, see more valuable art. Why does this not happen more often?

4. In what way are debates about the utility and desirability of fine art museums like debates about the utility and desirability of zoos? How are they different?

5. Some museums are selling items that they store for long periods of time. However, some art trade associations will **blacklist** museums that sell items and do not use the funds to buy other works of art. Is this sort of market manipulation not immoral? By selling some items in this way, museums could—to take just one idea—make admission free to all visitors or free on certain days of the week. They could use the money to create free art classes for lifelong learners. Wouldn't hindering such efforts require a very special explanation and justification?

6. In response to criticisms about storing great works of art and keeping them from the public, many large museums have responded by creating **virtual online galleries** of **all** of their holdings. The quality of these displays improves every year along with the technology that makes it possible. Is this a way for the public to get access to all of the art? It's not the original art, of course, but is this not a promising development?

7. Is it possible, through regular exposure to high-quality **virtual representations of masterpieces**, for open-minded, curious and creative students to acquire the **knowledge** that the arts promise to deliver generally?

UNIT THIRTEEN
MATHEMATICS

For Further Discussion

1. The German poet Goethe once compared mathematicians to Frenchmen. "Whatever you tell them, they translate into their own language and all of a sudden it is something completely different".

2. Why do we tend to think of odd numbers as male and even numbers as female?

3. What is harder for you imagine, throwing a ball into the air and watching it fly away without ever falling down, or putting two apples into a bowl with two other apples and finding five apples in the bowl when you take your hands away? Do you think a world without our law of physics is less or more strange than a world without our laws of math?

4. Think of a number. Double it. Add six. Divide it by half. Subtract the number you originally started with. Your answer is 3. Why?

5. Kids love to try to outdo one another in coming up with the highest number that they can name. They even make up words. "Gazillions". "Bazillions". Why do you suppose that they do this?

6. If you add one pile of leaves to another pile of leaves, you get one big pile, not three piles. Why is this? Is arithmetic sometimes wrong?

7. Can "nothing" do "something"? If you put a zero between two other numbers (301, for instance), does it really mean "nothing"? Or does it change what the numerals around it mean? Should we think of zero as something that is mysterious, the "nothing that is"?

8. "Four people are in a room. Seven people leave it. How many need to come into the room before it is empty?" The answer is three. Why do you think that kids from many different cultures smirk when they tell each other this riddle?

9. "Through the judicious employment of symbols, diagrams, and calculations, mathematics enables us to acquire significant facts about extremely significant things (universal laws, even), not by first forging out into the cosmos with teams of scientists, but rather from the comforts and confines of coffee tables in our living rooms" (G. Arnell Williams).

10. When you think of having math ability, do you suspect that there is a "math gene" that you either inherit or don't?

11. "Numbers are the highest degree of knowledge. It is knowledge itself" (Plato).

12. Do you think that you have to be able to perceive something with your own senses for it to count as something "real"?

13. "Mathematics is the queen of the sciences" (Carl Friedrich Gauss).

14. Do our calculators understand mathematics? If we use these devices to get answers that we could not obtain on our own without using them, can we say that we understand mathematics?

15. "The difference between the poet and the mathematician is that the poet tries to get his head into the heavens while the mathematician tries to get the heavens into his head" (G.K. Chesterton).

16. "No mathematician in the world would bother making these senseless distinctions: 2 1/2 is a 'mixed number' while 5/2 is an 'improper fraction'. They're EQUAL for crying out loud. They are the exact same numbers and have the exact same properties. Who uses such words outside of fourth grade?" (Paul Lockhardt).

17. Do you think that God is a mathematician?

18. Why is it that you will not generally hear an adult confess to a stranger that he or she can't read or write but will often hear

adults tell other people with no sense of shame that they never "got" math when they were in school?

19. Why do you think that mathematical thinking and the development of mathematical tools didn't really develop until hunter-gatherers settled into an agricultural lifestyle?

20. A "googolplex" is a number defined as 10 to the power of 10 to the power of 100. If you were to write it on paper, there would not be enough space in the known universe to contain it. Does it really exist?

21. Some have speculated that certain species of cicadas that spend 13 or 17 years (both prime numbers) incubating underground do so because they come into contact with predators less often in those years than in other years. What do you think about this theory?

22. Seven is the only number from 1 to 10 that you cannot multiple or divide and keep it within that group. Do you think that people sense that it's a unique number? If you ask a large group of people to name their favorite number from 1 to 10, most will choose 7. Do you think that this has anything to do with the seven "wonders" of the world, the seven deadly sins, the seven days of the week, the seven colors of the rainbow or the seven seas? Is there something special about the number 7?

23. Some have suggested that mathematics is neither a science nor an art but a little of both. What do you think about this claim?

24. Art and music have in some ways been influenced by mathematics at certain points. Can you think of some examples of this?

25. Can you think of a time when you were trying to solve a math problem by brute force or calculation and then figured out an easy trick to get the answer you were looking for? Share this story.

ACTIVITY I

MYSTERIES OF MATHEMATICS

In his recent book, *Millennium Problems* (2015), the mathematician Keith Devlin discusses some seemingly simple problems that no one has adequately explained.

In small groups, let's think about two of these problems. In pairs or small groups of three or four, discuss each problem and your intuitions about how one might go about solving them. Then share your thoughts with your other classmates in a large group setting.

1. Pick any whole number you wish. If the number is even, cut it in half. If it is odd, multiply it by 3 and add 1. Whatever number results from this, apply the rule to it as well. If you do this over and over again, you'll notice something rather odd about the numbers that you get. What is it? How can you explain this?

2. Suppose you are attending a conference. What is the smallest number of people who need to be present so that it is certain that there will be at least 3 who are mutual acquaintances or at least 3 who are mutual strangers?

[See Appendix II for discussions of these problems.]

ACTIVITY II

THE MU GAME

Douglas Hofstadter first described this game in a book called Gödel, Escher, Bach that appeared in 1979. This is a variation on the game and rules that he presented.

We have three symbols—"M", "I" and "U". We begin with one "given" (axiom). "MI" is a word. You have four rules that are going to be the "logic" or rules of inference that apply in this game.

1. You can add a U to the end of any string ending in I.
2. You can double any string after the M.
3. You can replace any III with a U.
4. You can remove any UU.

As an example, let's start with a goal. We want to derive, using our axiom and rules of inference, the goal word "MIIU".

Here is a simple solution. Other solutions are possible.

1. MI to MII (rule 1)
2. MII to MIIU (rule 2)

Notice a few points here. The axiom and rules of this simple game make up a formal system—just like Euclid's geometry, but on a much more modest scale. It starts with axioms. We take these as "givens". It's the same as when we start playing checkers or chess or backgammon with the pieces in a given position. It's the set-up. It's not right or wrong. It's just what we have to work with when we start. Then we apply the rules.

When we apply the rules, we suggest theorems. Some theorems are OK. Some are wrong since you cannot generate them with recognized rules. The key to solving the problem is to choose the rules to apply and to apply them in the right order. In this game, some goal words are not possible because the rules won't get you there no matter how clever you are.

Now, try these three tasks.

1. Break into pairs. Using the rules of the MU game, derive the word "MUIU". Write down the rules that you applied in order to arrive at your goal.

2. In the same pair and using the same rules, derive the word "UIU".

3. With your partner, write a short paragraph in which you address these questions. How is this game similar to math problems that we encounter in our math classes? What role do reason, intuition and sheer guesswork play in helping us arrive at a solution? Do we rely more on knowing facts or knowing how to apply rules when we solve these problems?

4. In a large group, discuss the answers to 1 and 2. Then, one person from each pair reads aloud the reflective paragraph and the other partner in the pair makes one comment about how he or she found this activity illuminating or not.

[See Appendix II for possible solutions to these problems.]

ACTIVITY III

MAKE A LOGIC PUZZLE "ON YOUR OWN"

Hitori" is yet another popular logic puzzle pastime that Japan has exported successfully to the rest of the world. This follows on the heels of the remarkably successful "Sudoku" and "Kakuro" logic puzzles. This variant works as an elimination game, unlike its predecessors. You start with all of the numbers on the board and eliminate them. These are the rules.

1. No number can appear in a row or column more than once.

2. Shaded squares cannot touch one another vertically or horizontally.

3. The squares that are not shaded (white) must form a single area and cannot be isolated.

You have two tasks to complete. Using the graph paper cut into grids given to you by your teacher, create a challenging logic puzzle.

1. Use a grid of eight rows and eight columns.

2. Create a puzzle that another person can solve.

3. Start with rule three and form a continuous area of white squares along with shaded areas that do not touch another vertically or horizontally.

4. Put numbers in the white squares that do not violate rule 1 above.

5. Now create a new grid filling in duplicate numbers where the shaded rows will have to go when the real player takes the challenge.

6. Choose a classmate who has not watched you make your puzzle.

7. Give it to that partner to solve.

8. At the end of the activity, each student must reflect on the exercise. Was it harder to make or solve the puzzle? Was the puzzle easy, sort of hard or very hard? Do you like these kinds of games? Do you think that you are good at logic puzzles? If so, why? If not, why not?

ACTIVITY IV

MATH AND CITIZENSHIP DISCUSSION STARTERS

An inquiry-based mathematics curriculum can serve as a basis for the development of informed and active citizens capable of and strongly encouraged to think critically about a society whose structures are increasingly technological and mathematical in nature.

It might be useful just to start with a discussion with students about how we feel about the role of math in our daily lives. Some people, for instance, see math problems as a kind of mental stimulation or amusement. Others view it as crucial to understanding the very nature of our humanity.

Encourage students in small groups to discuss the following ideas/propositions/scenarios. Then, if desirable, have discussions about the most promising topics as a class.

1. Our world has become increasingly quantitative, according to some. Is this true? If so, what are the implications?

2. Achievements in mathematics are part of our cultural heritage and can serve as a foundation for the sharing of our culture's products and practices with those of people from other cultures.

3. Mathematics increasingly has a **formatting** influence in our society. When we make decisions in the workplace, for example, we often look together at graphs and projections and crunch numbers in order to arrive at important decisions about how to spend resources and manage time.

4. One way that teachers and students can change the focus in the mathematics classroom is to discourage the idea that math education is all about finding the **right answer.**

5. Instead, teachers and students can focus on the **process** of learning math, emphasizing the fact that all students must make contributions to the math discussion. Students have a **responsibility** to make sure that other students understand the lessons. Those students, once they understand lessons through the efforts to foster general understanding, acquire the same responsibility. Students begin, in such a culture, to demand **explanations** rather than **answers**. The distinction between these two terms is vital to an understanding of the value of and need for citizenship education in the mathematics classroom.

6. In discussions about "literacy" and "numeracy", students and teachers sometimes forget to make connections rather than seeing matters in terms of familiar but unhelpful categories. Instead of declaring a right answer (**monologue**) or having a verbal tousle about what the right answer is (**debate/argument**), students should focus on the **conversational** nature of mathematics in the first place.

7. By doing so, students can engage in replenishing talks with one another, talks that are designed to make sure that they are all thinking about the **process** of mathematical reasoning.

8. Students must be sure that they are not simply competing to get the right answer faster and more efficiently and with a greater rate of accuracy than their peers. Instead, they must encourage one another to give explanations, pose open-ended questions and suggest conjectures.

9 In mathematics, perhaps students ought to focus on the need to build a community of people who understand mathematics and who question how they are using mathematical tools, models and ways of thinking to format vital information as they make their way through their daily tasks and make daily decisions.

10. In this way, all of us can begin to see mathematics as a kind of citizenship training, not just as the collection of skills that will give some of us the tools we need to survive in a highly competitive marketplace for good jobs and material advancement.

11. In other words, such training can help all of us to to keep our eyes on the need to become intelligent consumers of information, trusting that if we can all understand clearly the terms and ways of thinking underlying the debates about "quantities" that require our attention as citizens, we will make decisions that advance our common (and not just our parochial) interests.

As a final challenge, encourage students in each small group to come up with one to three suggestions that can help teachers and students change the focus in mathematics to citizenship education.

UNIT FOURTEEN
INDIGENOUS KNOWLEDGE SYSTEMS

For Further Discussion

1. "We, the indigenous people, have not forgotten that man is part of nature. If we hurt nature, we also hurt ourselves. We know how to protect the forests. Give them back to us before they die" (Davi Kopenawa).

2. "Everywhere is the center of the world. Everything is sacred" (Black Elk).

3. "Bolivia is a majority indigenous nation, but that majority has always been excluded" (Evo Morales).

4. "Thousands of years ago, civilizations flourished in Africa which suffered not at all by comparison with those of other continents. In those centuries, Africans were politically free and economically independent. Their social patterns were their own and their cultures truly indigenous" (Haile Selassie).

5. "And I thanked mi papa who'd always said to me that we, los Indios, the Indians, were like the weeds. That roses you had to water and giver fertilizer or they'd die. But weeds, indigenous plants, you gave them nada-nothing; hell you even poisoned them and put concrete over them, and those weeds would still break the concrete" (Victor Villaseñor).

6. "I was taught that there is a natural law of nature which we must live by; that we are only one component in the web of life; that we are not dominant over the environment but, in fact, related; that we take only what we need and utilize all that we take; that everything is inter-connected, and when one component in the environment or ecosystem is over-exploited and not protected, the balance is lost" (Mexsis Happynook).

7. "Change itself does note destroy a culture. All societies are constantly evolving. Indeed a culture survives when it has enough confidence in its past and enough say in its future to maintain its spirit and essence through all the changes it will inevitably undergo" (Wade Davis).

8. "The world's most primitive people have few possessions, but they are not poor. Poverty is not a certain small amount of goods, nor is it just a relation between means and ends; above all it is a relation between people. Poverty is a social status. As such it is the invention of civilization" (Marshall Sahlins).

9. Why do you think that so many people in the West are interested in natural foods, natural health remedies and natural childbirth?

10. "I believe very firmly that indigenous populations had a really good, intuitive understanding of why we're here, and we're trying to gain that same understanding through psychology and intellect in modern civilization" (Serj Tankian).

11. "The world in which you were born is just one model of reality. Other cultures are not failed attempts at being you; they are unique manifestations of the human spirit" (Wade Davis).

12. In the 1970s, researchers from a US drug company manufactured a successful medicine for heart congestion and high blood pressure from the venom of a viper indigenous to Brazil. Some tribes used this venom to make poison for arrowheads but were unaware of its medicinal properties. Do you think that the drug company should compensate the tribes for using this "indigenous genetic material"?

13. "English is so hierarchical. In Cree, we don't have animate-inanimate comparisons between things. Animals have souls that are equal to ours. Rocks have souls. Trees have souls. Trees are 'who,' not 'what.'" (Thomson Highway).

14. "And no description of a people can be complete without reference to the character of their homeland, the ecological and geographical matrix in which they have determined to live out their destiny. Just as a landscape defines character, culture springs from a spirit of place" (Wade Davis).

15. "At one extreme you have indigenous tribal societies trying to stem the race to disaster. At the other extreme, the richest, most powerful societies in world history, like the United States and Canada, are racing full-speed ahead to destroy the environment as quickly as possible" (Noam Chomsky).

UNIT FIFTEEN
RELIGIOUS KNOWLEDGE SYSTEMS

For Further Discussion

1. "Religion was humanity's original cosmology, biology and anthropology. It provided explanations for the origin of the world, life and humans. Science now gives us increasingly complete explanations for those big three" (J. Anderson Thomson).

2. "Men never do evil so completely and cheerfully as when they do it from religious conviction" (Blaise Pascal).

3. "Is God willing to prevent evil, but not able? Then he is not omnipotent. Is he able, but not willing? Then he is malevolent. Is he both able and willing? Then what is the source of evil? Is he neither able nor willing? Then why call him God?" (Epicurus).

4. "Each of those churches shows certain books, which they call revelation, or the Word of God. The Jews say that their Word of God was given by God to Moses face to face; the Christians say that their Word of God came by divine inspiration; and the Turks say that their Word of God (the Koran) was brought by an angel from heaven. Each of those churches accuses the other of unbelief; and, for my own part, I disbelieve them all." (Thomas Paine).

5. "There can be no doubt whatever that the peoples of the world, of whatever race or religion, derive their inspiration from one heavenly Source, and are the subjects of one God" (Baha'u'llah).

6. "From a scientific view, we can make no distinction between the man who eats little and sees heaven and the man who drinks much and sees snakes" (Bertrand Russell).

7. "There is no one alive today who knows enough to say with confidence whether one religion has been greater than all others" (Arnold Toynbee).

8. "I want you to just let a wave of intolerance wash over you. I want you to let a wave of hatred wash over you. Yes, hate is good. Our goal is a Christian nation. We have a Biblical duty. We are called by God to conquer this country. We don't want equal time. We don't want pluralism" (Randall Terry).

9. "What a strange fellowship this is, the God-seekers in every land, lifting their voices in the most disparate ways imaginable to the God of all life. How does it sound from above? Like bedlam, or do the strains blend in strange, ethereal harmony" (Huston Smith)?

10. Does a commitment to religious tolerance require a commitment to relativism and a conviction that objective truth does not exist?

ACTIVITY I

RELIGIOUS SYMBOLS

The illustration below contains symbols of a number of religious traditions. Can you identify the tradition that each symbol represents? In small groups, discuss these symbols. If you do not know what they mean, do some quick research. Then share your insights with the class at the end of the activity.

ACTIVITY II

LET'S TALK ABOUT RELIGIOUS OPPRESSION

It is possible to find, in the history of almost any country or people—ancient and medieval, modern and contemporary—conspicuous examples of religious oppression. Let students start with a discussion of Situation One.

Then have discussions briefly in small groups. Each small group should discuss one example of religious oppression (thinking in terms of suppressing a system of knowledge) and perhaps do some "quick" research about the topic if students have Internet and computers or other resources in the classroom or space where they are having this discussion. Consider the topics and questions listed for possible discussion starters.

After discussing the various situations in small groups, answering questions posed and then posing and answering a few more along similar lines, students should have a fifteen-minute discussion in a larger group, sharing what they have talked about in small groups.

At this time, students should suggest some tentative conclusions they have reached after thinking of religious oppression terms of suppression of knowledge systems, not jut of suppression of belief systems.

Situation One

In 1637-1638, in the so-called Shimbara Rebellion, Catholic peasants rose up after facing horrific oppression of their faith by the Japanese authorities. Many were branded with hot irons and crucified. Believers were required to deny their faith or were covered with grass mats that were set on fire. This was taking place as a backdrop to a general effort by the Japanese government to isolate itself from the rest of the world. Christianity was seen as a form of "globalization" that threatened the integrity of local traditions and practices.

1. In the long run, has any government been able to hold forces of "global progress" at bay?

2. Is it possible to view Christianity as something inherently destructive and not progressive at all?

3. In his recent book, Christ's Samurai, Jonathan Clements spoke of the suppression of the Shimbara Rebellion" as "a genocide against fellow Japanese, all to create a Japan that could claim unity of belief and purpose". Is it ever possible to accomplish this? Is it desirable under any conceivable circumstances to even try?

Other Possible Topics for Brief ("Quick") Discussions

a. Persecution of Sikhs

b. Persecution of Atheists

c. Muslim Persecution of Fellow Muslims

d. Persecution of Serer People (Senegal, the Gambia and Mauritania)

e. Persecution of Buddhists in Imperial China (5th to 10th Century)

f. Persecution of Falun Gong

Possible Discussion Starters

a. "Christian Privilege"

b. Is the Doctrine of Separation of Church and State a Knowledge Issue

c. Ecclesiastical Intolerance

Possible Questions

a. Is it possible to discuss religious oppression without discussing political differences?

b. Is religious oppression, in some instances, a form of ethnic cleansing that has little to do with suppression of "knowledge" from non-sanctioned sources?

APPENDICES

Appendix One

For Further Discussion Unit One

Sample Teacher and Student Responses

One

Douglas Hofstadter suggests that we can take open-mindedness to an undesirable extreme. Being open-minded is generally considered a virtue. In the absence of clear evidence, we should reserve judgment and be prepared to evaluate new discoveries and insights as fairly as possible. If necessary, we should be willing to change our minds if the evidence compels us to do so.

However, holding views in defiance of overwhelming evidence is not a virtue. On the contrary, it is indefensible. For this reason, we should not be open-minded about claims that the world is flat, that Hitler is alive, that the Nazis did not kill six million Jews during World War II and so forth. There is a difference between being open-minded and being gullible.

Note that this question did not ask whether it was all right for the Nazis to kill six million Jews. That is another question entirely. Some students misunderstand this. Here the question is whether we should be open-minded with respect to those who say that the Holocaust never **happened.**

In our discussion of "relativism" in the main volume of *Theory of Knowledge: A New Synthesis* (the claim that there is no truth and therefore no basis for judging what people in other contexts choose to do), we suggested that if you are a relativist, you might find it difficult to condemn the practice of stoning women to death for alleged infidelity, the practice of mutilating women's sexual organs, the practice of forbidding certain children access to schools and so forth. The relativist believes that these practices might be right for one person or culture and may be wrong for the rest of us.

Some people think that you have to be a relativist in order to promote tolerance, sensitivity and freedom. However, you can reject relativism and still embrace these values. In fact, only non-relativists can claim that tolerance, sensitivity and freedom are **universal** values.

Two

The argument from ignorance takes two basic forms. (1) "X is true since you cannot prove that it is not true." (2) "X is not true since you cannot prove that it is true." Either form of the argument is an error in reasoning.

Some students give good examples of the argument from ignorance. They might say: "Rabbits can talk. You can't prove they can't talk, so they can." "You can't prove that the center of the moon is not made of green cheese. Therefore, it must be made of green cheese." "You can't prove that there is a part of the brain that allows kids to learn languages easily. Therefore it must not exist."

Consider the theory of evolution. It is widely believed to be true but there is no definitive proof that it is. Just because you can't prove it's true, however, does not mean that it's false. In fact, it would be easy to falsify the theory. Someone once asked a famous biologist what it would take to prove that evolution is wrong. He said, "Rabbit fossils in the pre-Cambrian."

Three

It would be very difficult to prove beyond all doubt that a species has gone extinct. Scientists have, for example, found thousands of dinosaur fossils, all of which date to a period at least 60 million years before the arrival of human beings. No human has ever seen a dinosaur. We cannot be 100% sure, but the likelihood that dinosaurs are extinct is **extremely** high. Given the sheer amount of evidence that dinosaurs are no longer with us, someone would have to provide overwhelming evidence to prove to us that they are not extinct.

Four

Various people have at various times made claims that the Loch Ness monster exists and that people can train themselves to defy gravity and levitate. Both of these claims are extraordinary and would require extraordinary evidence to make them credible to most people.

Many students believe that the Loch Ness monster claim is perhaps more credible than the levitation claim. The consensus seems to be that optical illusions are not uncommon, especially when the light is just right or the mist is heavy on a Scottish lake. Many students conclude that the levitation claim is less believable because the laws of gravity are thoroughly confirmed by their experience on this planet.

Five

Christopher Hitchens has said, "That which can be asserted without evidence can be dismissed without evidence." In other words, if you make an extraordinary claim, the burden is on you to prove it. It's not our responsibility to disprove it.

Most people probably would agree with this statement on first hearing it. However, some might have second thoughts.

Hitchens made this claim in a book called *God is Not Great*. He argues that people who believe in God have an obligation to prove that God exists. Those who do not make this claim can, he suggests, can dismiss the argument without having to prove that God doesn't exist.

But this is not such an easy question after all. Consider a profound non-religious claim, for instance. Abraham Lincoln said that the United States was "dedicated to the proposition that all men are created equal". Does someone have to prove this proposition to us? If they cannot, is it OK to dismiss the claim?

Even in some less profound circumstances, Hitchens' claim is not useful. What happens if I call the police and tell them that there is a bomb hidden in my school and that it will explode in one hour? The police are going to do their best to prove that I am wrong about this.

Six

In his book *Chariots of the Gods* (1968), Erich von Daniken argued that ancient alien visitors brought advanced technology and religious teachings to ancient civilizations on Earth. The author focuses on artifacts such as the Egyptian pyramids, the statues of Easter Island, Stonehenge and even a medieval map that seems to show the Earth as seen from space. While the author makes claims that are provocative and remain popular, most scientists dismiss them as pseudoscience—claims that do not follow a valid scientific method and cannot be tested in a reliable way.

Most students express a certain willingness to be open-minded about the possibility that the author is right but make it clear that you would need a lot of very good evidence before accepting his claims. Some students have even suggested that an advanced human species preceded the current humans on Earth and provided much of this mysterious technology. However, there is as little evidence for this lost human species as for the visiting alien astronauts.

Seven

When asked to list some things that we are certain of, most of us will point out concrete details of the world around us—our homes, trees, mountains, lakes, the ocean and other people. We would probably also state things about ourselves—our gender, our memories, the color of our hair and so forth.

However, there are some powerful philosophical arguments that seem to show that we cannot prove that everything we believe for sure is not simply an illusion. Perhaps we are—like the characters in the movie *The Matrix*—simply immersed in a sophisticated computer program generating all of our virtual reality. Most of us believe that the external world that we experience is real. But it's hard to say what, exactly, is wrong with the skeptic's argument that it is just an illusion.

Eight

This question invites us to name some beliefs that are wrong or even possibly dangerous. All of us have unprecedented access to information these days. However, false beliefs continue to flourish.

Some demonstrably false beliefs that students mention include the following. "Columbus sailed to the mainland of North America." "Eating less than an hour before swimming increases the risk of drowning." "Bats are blind." "Astronauts can see the Great Wall of China from deep space." Some students refer to current controversies. "Vaccines cause autism." "Global warming is a result of human activity."

Nine

Voltaire famously suggested that those who "can make you believe absurdities can make you commit atrocities". Most people have interpreted these words to warn of the power of dictators and demagogues to lead people to do evil things that they would not do under ordinary circumstances. The most common example raised is that of Hitler. He convinced many of the German people that Aryans were a superior race and that the Jews bore much responsibility for Germany's woes at the time. His power to make the German people believe these absurd claims led them to commit truly inhumane and unforgivable acts.

Several students have made a very interesting point. Sometimes powerful religious leaders can persuade us to believe things ("we must love all people", "we must turn the other cheek") that may seem absurd from a certain perspective but certainly do not lead us to commit atrocities. Other students point out that some people whose beliefs seem perfectly rational nonetheless commit atrocities.

Ten

This question invites us to consider words or phrases (in our Native language and in other languages that we know) that reveal cultural perspectives.

Many students have difficulty with this task. Here is a particularly good answer. "I am an American. When I first was learning Japanese, I constantly came across words or phrases that suggest interesting cultural differences between America and Japan. For instance, Americans do not eat vegetables from the ocean. We call these plants 'seaweed'. In English, 'weed' means a plant with no real virtues. However, the Japanese characters for the same thing mean 'sea grass'. Grass is a plant with a virtue. Japan is a fish culture. America is not. If you are doomed in Japan, you are a 'carp on a cutting board'.

Even similar expressions can mean different things in the two cultures. Consider this proverb. "A rolling stone gathers no moss." In many English-speaking countries, this has always meant that it's a good thing to keep on the move. We don't like moss. If moss grows on a stone, the stone has been stuck in one place for too long. But the Japanese like moss. It's a good thing. They want it to grow. In the old days, this same expression in Japanese meant: "Don't move around so much or the moss won't grow". These days, though, for many young Japanese this expression means what it means to their Western peers. "Keep on moving!" This, too, says something about how cultures are different and how they converge.

Eleven

The American Anthropological Association defines culture as "the learned patterns of behavior (i.e. traditions and customs) characteristic of a society". Other anthropologists define it as the "framework of beliefs, expressive symbols and values in terms of which individuals define their world".

Most students give good definitions of culture based on those given above. Some define it as the beliefs, arts, lifestyles and social organization of a particular country or group. Others define it as the "attitudes and traditions" of a particular group of people.

Twelve

This task invites students to name the persons whom they regard as the greatest writer and greatest scientist of all time. The task assumes that people from different cultures with different histories may offer different candidates.

Names such as Shakespeare, Edison, Pasteur, Galileo, Dante, Cervantes and so forth come up often, of course. Many students offer names less well known but important in their own cultures. Some students decline to name just one writer and scientist, concluding that such an exercise is "fruitless".

Thirteen

This task invites students to discuss how the same ideas, phrases or concepts can have different meanings in different cultures.

Many students have difficulty with this task and claim not to understand it or not to be able to complete it. Some students, however, offer very interesting examples. One, for instance, suggested that the Japanese concepts of "honne" and "tatemae" (the difference between your intentions and the way you say that things are) might be difficult to express in non-Japanese cultures.

One student suggested that for Americans "quality" means "it works". For Koreans, it means "brand new". For Japanese, it signifies "zero defects". For Chinese, it refers to something that "gives status". This student speculated that other common words such as "friends", "romantic" "fun" and "honorable" would mean different things for different people from different cultures.

Fourteen

A teacher in America asks a young Korean boy who has just moved to the U.S. how old he is. The boy says, "I used to be ten but now I am eight". This is confusing to the American because she does not know Korean culture. Koreans consider themselves to be one year old when they are born and two years old as soon as the New Year arrives. A person born the day before the lunar New Year would be two years old his or her second day of life. The child says "but now I am eight" because he is adjusting his Native culture's counting system to the host country's counting system.

Fifteen

A Japanese journalist once reported what was to him an interesting event. A train arrived on time at a railroad station in a city quite distant from Mexico City. There was a group of Japanese businessmen on that train. They were perplexed when most of the Mexican passengers around them stood up and started clapping spontaneously. In Mexico, trains to distant cities are only rarely on time, so it was a cause for a celebration of sorts. This was naturally surprising to the businessmen from Japan who regarded on-time trains as the norm.

Sixteen

Every culture seems to define intimate, personal and social space in somewhat different terms. For most cultures, intimate space between partners in a conversation is about twenty centimeters. Personal space averages about ninety centimeters. Social space averages about two meters. However, there are cultural variations. In Latin America and much of Europe, a kiss on the cheek is a perfectly acceptable way to greet someone socially, even a stranger. North Americans, however, prefer to shake hands. Japanese prefer to bow. All have a somewhat different sense of space.

Seventeen

This question asks whether your native culture emphasizes universal rules or case-by-case treatment; emphasizes the individual or the group; values direct or indirect expression of feelings; confers status based on achievement or on birth, age or position; values living in harmony with nature or seeking control over it.

Students will, of course, be most adept at describing the rules of their own culture. Most students who are Japanese, for instance, claim that Japanese culture emphasizes universal rules and the group; values indirect expression; confers status based on birth, age or position; and values living in harmony with nature. However, even these students note that Japanese culture is constantly changing—that conferring status based on individual achievement is more important than before and that controlling nature is a fact of life in modern urban Japan. Students from different cultures will likely give somewhat different answers to this question.

Eighteen

This task invites students to share examples of misunderstandings that are intercultural in nature.

Students might, for instance, point out that in some cultures it is polite to leave a bit of food on your dish when a host cooks a meal for you, while in other cultures this might send a message that you did not like the meal. In some cultures, the hand gesture that means "come here" and might in other cultures be a form of waving goodbye.

One student, while studying abroad in Japan, explained that he met a neighbor of his host family. The Japanese neighbor asked: "Are you going out?" This is a set expression in Japanese. But the student felt that this greeting demanded a detailed answer. He told the neighbor that he was going to the bank to change some money and then was going to buy some milk at the convenience store but should be back in thirty minutes or so. The neighbor was surprised by this answer. Later, this student learned how to give an appropriate answer. "Yes, just going over there for a bit."

Nineteen

This task invites students to show how an element from the folklore of their native culture can illustrate one or more of its beliefs or attitudes.

Students give some very good examples. Some have suggested that in the folklore of their culture people who are impatient usually are unsuccessful and unhappy. This is because their culture values patience. Other students have suggested that their folk religion is open to belief in many gods because they are open to many ideas. This is why they have no problem celebrating Western holidays such as Christmas and Valentine's Day in more recent times. Some students suggest that characters in old stories in their culture pray to ancestors for good crops—not to the gods—because they believe that ancestors have the power to bring a good harvest.

Twenty

UNESCO has claimed that cultural diversity is as important for mankind as biodiversity is for nature.

Almost all students agree with this statement. Most students seem to believe that cultural diversity and biodiversity increase the chances for mutual survival. Others emphasize that sharing cultural insights can increase the body of shared knowledge that all humans can access. Other students claim that biodiversity is more important than cultural diversity, though they usually do not offer reasons for making this claim.

Twenty-One

This task asks students to consider their own culture from the point of view of time orientation (past, present, future); relationship to nature; relationship among individuals; motivation for behavior; and fundamental attitudes toward human nature (good, bad, or mixed).

In considering their own cultures, students may find that their cultures tend to focus on the present and the future; tend to dominate nature (despite a history of reverence for nature); relate to other individuals in terms of hierarchy (though this is slowly changing); are oriented to achievement (usually defined materially); and view human nature as essentially good though not unmixed. Many variations are, of course, possible.

Twenty-Two

There has been a worrisome trend of decreasing turnout of eligible voters in elections in democratic nations around the world. It's not clear if people who are eligible to vote but do not are simply disgusted with politics or stay away from the polls for other reasons. In some countries, voting is mandatory, so it is difficult to know how apathetic voters are.

Most students addressing this question claim that young people are not really divided along liberal/conservative lines. In fact, they believe that their peers really don't care much about politics and elections, don't express opinions on controversial political issues and prefer to remain on the sidelines of the political process. Political perspectives (unless non-engagement counts as a perspective) do not color their perceptions of the world. A few students disagree and believe that young people are more committed and engaged than ever before. They cite Internet activism as the new way that young people express their politics.

Twenty-Three

This task invites students to discuss any map that has caused them to rethink their view of the world.

Students point to many interesting examples. However, many students claim that world population maps, with countries scaled not to size of territory but to size of population, most astonish them. In these maps, Australia and Canada more or less disappear. Russia dwindles to almost nothing. India and China dominate the map. Nigeria, Japan and a few other countries appear larger than they do on ordinary maps based on the size of the territory.

Twenty-Four

This task asks students to respond to Einstein's assertion that common sense is nothing more than the prejudices acquired by people before they are eighteen years old.

Most students agree that children tend to accept what they are taught and do not have as much ability to engage in critical thinking as adults. However, most students believe that common sense is still a credible source of knowledge. Not all things that are a matter of common sense are true, though. It does require a special effort and imagination to defy common sense when it is not really defensible.

Twenty-Five

This task presents students with an invalid deduction. Even if the two premises are true (some musicians are blind; no astronomers are blind), the conclusion (some astronomers are musicians) is not logically required. You cannot assert that the conclusion is absolutely certain. Valid and invalid syllogisms are explored in the unit on "reason". This item is just a preview and a check. Most students understand that there is something fishy about the conclusion to the syllogism presented, even if they have never formally studied logic.

Twenty-Six

If we are prone to accept every claim that we hear, does this save us from the trouble of thinking? If we are prone to doubt every claim that we hear, does this too save us from the trouble of thinking?

Students are generally divided in their response to these questions. Some agree that a posture of total acceptance or a posture of total doubt is lazy and requires no real thinking. Others, though, disagree. Any posture one arrives at—total acceptance or partial acceptance, total doubt or occasional doubt—requires one to think. Not thinking, these students believe, is simply not an option.

Twenty-Seven

Is there any real harm in believing something that is clearly false?

Some students point out that some false beliefs can harm you or others. For example, if you believe that a box of poison is edible, you will find yourself in big trouble if you act on this belief. On the other hand, some false beliefs (in tooth fairies or Santa Claus) for instance are harmless (at least for people of a certain age). The answer depends on the context.

Twenty-Eight

"I know that if I tease my little sister, she will squint her eyes and close her mouth tightly." If you know this from personal experience, this is personal knowledge. If someone tells you this but you did not know it before, it would be shared knowledge, though this is a much less likely of your knowledge. Whether your sister will react in the same way in the distant future is open to question. However, if you have had enough personal experience teasing your sister and this is always the reaction you get, you can be pretty sure that this will continue to happen at least into the near future.

Twenty-Nine

"Do you believe that the end of the search for knowledge in the natural sciences is now in sight?"

Almost all students believe that the search for knowledge has no end, even in the natural sciences. New discoveries topple old assumptions and convictions and will continue to do so for as long as humans are curious. A few students—often those who describe themselves as skeptics or cynics—believe that the search is over, the last frontier has been reached and found to be an illusion, and all effort to educate ourselves further is vanity and "a chasing of the wind".

Thirty

"Do you feel pity for our ancestors for knowing so little? Or do you believe that we are no better intellectually or morally than people who lived thousands of years ago?"

Students give an impressive variety of answers to this question. Some point out that they feel sorry that our ancestors did not enjoy many of the conveniences of modern life—airplanes, the Internet, high-quality medical care and so forth.

Some students, however, believe that our ancestors were more intellectually engaged and morally developed than we are, despite their relatively modest technological achievements. A few students, however, are confident that we are intellectually and morally superior to our ancestors. Other students disagree. One student even recommended to the teacher Steven Mithen's book The Prehistory of the Mind to support his claim that our ancestors were as fully evolved as we are.

Appendix Two

Solutions and Comments for Selected Activities

Unit I: Activity VII

1. "Smith obviously thinks that snail darters are more important than human beings."

2. "Does Smith really think that we need to resort to the threat of deadly force to cite people for parking violations?"

3. "You obviously think that it's more important to live for the moment with no thought at all about what we might need in the future."

4. "Why stop at safe sex? Why not teach teens how to shoplift without getting caught?"

5. "That's a great idea. Let's create a lane of traffic for people who can ignore red lights and stop signs while the rest of us must obey the laws."

6. "So I guess you don't care about protecting your children against the possibility of burglars or killers breaking into our house while we are sleeping."

7. "So, I guess that Mr. Singer thinks that we should eat grass and bamboo shoots and expect to be healthy."

8. "We need to save money, too. We should cut back on food. I shouldn't go to university. If I get sick, don't send me to the hospital. Let Nature take its course."

9. "Great. Let's go on a wild boar hunt. Let's live in caves and fight each other with stone-tipped spears."

10. "I guess that the lives of murderers must be more important than the lives of their victims.".

Unit III: Activity IX

1. Some journalists use the term "separation wall".

2. Both terms seem to be non-neutral, though IDF is an official title. Some journalists simply refer to "Israeli military forces".

3. Most journalists follow the advice of editors and use the word "civilian" without the adjective "innocent". A related question concerns the phrase "caught in the crossfire". This term implies that the victims were civilians and were innocent. Editors sometimes recommend using the term "killed" until the circumstances are clear.

4. Careful journalists use phrases such as "harsh criticism" or "escalating rhetoric".

5. Careful journalists use the place names—East Jerusalem, the Gaza Strip or the West Bank—and avoid other terms.

Unit V: For Further Discussion

In (8), the woman may have had triplets or even more babies in a single pregnancy.

Unit V: Activity I

1. Are there more words in English beginning with the letter "r" than with "r" as the third letter of the word?

There are many more words with "r" in the third position. When we think about words, we think of words that begin with the letter "r". This is because we are in the habit of alphabetizing words in dictionaries. This is an example of the availability error. It's easier to retrieve words like "rip", "rabies" and "riddle" than words like "fare", "street" and "barrel" and this seduces us into reaching a conclusion that is not true.

2. H stands for heads in a coin flip. T stands for tails. Consider the following three possible results: (TTTTTT), (TTTHHH) and (THHTTH). Which of these three sequences is most likely to occur?

The odds are all the same—one in sixty-four. The third choice looks more typical of a sequence, so most people choose this answer.

3. Suppose that you are at the roulette wheel in a casino. The ball can fall into either a red slot or a black slot. The ball has landed in a black slot twenty-six times in a row. Do you bet red or black?

It does not matter. The odds are the same as always (one in two). This is an example of the gambler's paradox.

4. Smoking increases the risk of lung cancer by a factor of ten and of fatal heart disease by a factor of two. Do more smokers die of lung cancer than heart disease?

The answer depends on numbers, of course, but in every country many more people die of heart disease than of lung cancer. So the simple answer to this question is "NO".

Suppose that in a given country, 300,000 per year die of heart disease. 55,000 per years die of lung cancer. These are typical proportions.

Since smoking doubles the risk of fatal heart disease, 200,000 smokers will die of heart disease and 100,000 non-smokers will also die of the same disease. In other words, 100,000 people who smoke will die of heart disease and would have even if they had not smoked. Another 100,000 die of heart disease because of smoking.

Similarly, suppose that 5,000 non-smokers die of lung cancer every year. This means that 50,000 who smoke will die of lung cancer. 45,000 will die of lung cancer because of smoking.

The probability of dying of heart disease or lung cancer because of smoking must be combined with the probability of dying of heart disease or lung cancer when no smoking is involved. This is called the base rate. Failure to account for the base rate is a very common error that leads to false conclusions.

5. You are a doctor. What percentage of patients testing positive on a test for a certain disease will actually have the disease if it is present in 1 person in 1,000 and if 5 percent of people who do not have the test falsely test positive?

The answer is 2%. This is another base rate problem. If you test 1,000 people, 1 will have the disease but 5% (50) will test positive but not have the disease. In other words, 1 out of 50 who test positive will have the disease. That's 2%. Most people answer 95%.

If administering this medical test involves or leads to expensive and/or risky procedures, you can clearly see how a miscalculation of probability here could not only be irrational but also extremely harmful.

6. Suppose that a woman (Driver A) parks her car on a steep road in downtown San Francisco. While she is gone, the car's emergency brake fails. The car rolls into a fire hydrant. Suppose that a different woman (Driver B) parks her car on the same road at another time. Again the car's emergency brake fails. This time, though, the car rolls into a pedestrian and kills him. Is Driver B more responsible than Driver A? Should we punish either Driver A or B? Should we punish Driver B more than Driver A?

Assuming that there is no negligence on the part of the driver, the penalty should be the same in either case. In fact, most people in experiments involving asking these questions will hold Driver B as more responsible and would be comfortable punishing that driver more severely than Driver A.

7. If terrorists hijacked four flights in your country within the last year, would you travel by car rather than by plane?

You shouldn't. The odds are still overwhelmingly in favor of your being killed in a car accident than in an airplane accident. In the twelve months after 9/11, US passenger air miles fell between 12 and 20 percent as people switched from planes to cars for

long-distance travel within the United States. Using road traffic deaths data and air figures, one researcher estimated that an extra 1,596 Americans died in road traffic accidents due to the switch.

8. Suppose that a patient has a .8 probability of having a disease. A positive reading on TEST Z will confirm the diagnosis, but if the result is negative, the probability will drop to .6. The treatment for the disease is unpleasant. If TEST Z is the only test available, should you administer it?

You should not give the test. Even if the results are negative, the patient is more likely to have the disease than not, so all patients should be treated for the disease regardless of the outcome of TEST Z.

9. You tell yourself that you \5,000 is a fair price for a movie ticket. You buy the ticket at that price. Then you lose the ticket. You don't buy another ticket since you think that it will actually cost you \10,000 to see the movie and this is too much. Is this a rational calculation?

No. Losing your ticket has nothing to do with the calculation. You have lost the money you paid for the ticket and nothing can get it back. If you were willing to pay \5,000 for the ticket in the first place, you should be willing to pay again after losing your ticket. Suppose that you had lost a \5,000 note a week ago in an unrelated incident. Would this keep you from buying a movie ticket for \5,000 if you estimate that this is a good price for the entertainment in question?

This is called the "sunk cost error" and arises because people fail to realize that all that matters are their future gains and losses. The past is irrelevant. If I will lose by continuing an activity, I should discontinue the activity at once, no matter how much I have invested. On the other hand, if I would benefit from undertaking an activity (like seeing a movie), I should not be put off by the fact that I have lost some investment in it. Look to the future and forget the past. All that can be learned from the past is to keep your ticket in a safe place.

10. You are trying to decide which courses to take during your first year at university. You get into a conversation with three seniors with whom you feel an instant connection. They are friendly and "your type". They tell you that you should steer away from Professor A and take any class offered by Professors B or C. You have a "confidential guide" to courses compiled as the result of an anonymous survey of hundreds of students. Should you take the advice of your friends even if it contradicts the advice in the confidential guide to courses?

Paying too much attention to small samples, which are likely to yield atypical results, is always a little risky. In addition, the three seniors who offered advice are likely friends who probably have similar tastes, interests and biases. In general, it's safer to rely on larger samples that are not biased.

11. There are three cards. One has two white faces. One has two red faces. One has white on one side and red on another. In front of you is one of these cards. There is a red face upwards. What is the probability that it is the card with red on both faces?

Most people say one out of two. They reason thus: It cannot be the white-white card, so it must be one of two cards, either the red-red or the red-white.

They are wrong. The visible red face could be one of three red faces. It could be the red face of the red-white card. Or it could be one or the other of the two red faces on the red-red card.

Out of these three possibilities, in two the hidden face is red. In one it is white. Therefore, the probability of the other face being red (the red-red card) is two out of three and not one out of two.

12. Could you be persuaded to give electric shocks that might hurt or even kill someone as part of a psychological experiment? Would you do so if you were being paid for participating and a professor at a famous university wearing a white lab coat was overseeing the experiment?

In the early sixties, Stanley Milgram advertised for subjects to take part in an experiment at Yale. Each subject chosen was introduced to a person disguised as another subject (a stooge working for Milgram). Milgram explained that they would have to teach one another a simple task. Each subject and stooge drew slips of paper to determine who would be a teacher and who would be a student. The word "teacher" was written on both slips of paper. The subject became the teacher. The stooge became the student and was strapped into a chair with four buttons at his command.

The student had to associate one word with another. The teacher would read out the word and four possible answers to associate with it. The learner had to press one of four buttons in response. The teacher was in another room but could see whether the student had made the right response from watching lights come on.

The teacher had access to an electric shock generator and could administer shocks of different intensities (15 to 450 volts) to the students. The options were labeled.

The teacher had to give a shock when the student made a mistake and had to increase the shock after each additional mistake. If the teacher hesitated, the experimenter urged him to go on, saying that the experiment required his cooperation and that he had no other choice but to continue. The experimenter was clearly an authority figure and used verbal prods frequently to persuade subjects to comply with the terms of the experiment.

No shocks were actually delivered. However, the "students" screamed when the 75-volt shock level was reached. They screamed in agony and begged to be released at higher levels. Beyond 330 volts, the students remained silent and no longer answered. The experimenter told the teacher to administer shocks when no answers were forthcoming.

In the first experiment, 26 of 40 subjects continued to deliver shocks until the highest level (450 volts, marked "Danger: Severe Shock"). None stopped at the "moderate shock" level. Some subjects were trembling, sweating and stuttering as they administered increasingly heavy shocks. Some asked to quit and even agreed not to take money. None quit the experiment and none went to check on the "victims".

Milgram has argued that persons "come to view themselves as the instrument for carrying out another's person's wishes, and they therefore no longer see themselves as responsible for their actions. Once this critical shift of viewpoint has occurred in the person, all of the essential features of obedience follow."

13. Suppose that you are in a room with eight other persons whom you have never met. You are all taking part in an experiment. The experimenter shows you two cards. On one is a line that is six inches long. On the second card there are three lines of four, six and eight inches. The experimenter asks which line on Card 2 is the same length as the line on card 1. You are the eighth person to give an answer. Everyone before you has identified the eight-inch line as the right answer. Do you give this answer, too?

In 1951, Solomon Asch performed conformity experiments in a lab at Swarthmore College. Each subject was placed in a room with seven stooges who knew the true aim of the experiment. The subjects were placed in such a way that they would have to answer last.

Subjects were shown a card with a line on it and a second card with three lines. The subjects had to say aloud which line on the second card matched the length of the line on the first card. During the first two trials, the stooges gave the obvious, correct answer. On the third trial and in subsequent trials, the stooges unanimously chose an incorrect answer. There were 18 trials in all, 12 involving stooges giving the incorrect answers.

In control experiments with no stooges present, the subjects answered correctly 99% of the time. In the 12 trials involving stooges giving unanimous incorrect answers, subjects answered incorrectly 33% of the time.

Analysis showed that some subjects were able to resist the majority, but often felt stress in being the lone voice of dissent. Some of those who yielded really believed the stooges incorrect answers to be true. Most, however, assumed that they must be wrong and that the majority must be correct. They experienced "distorted perceptual judgment". Still others yielded because, even though they knew what the correct answer was, they did not want to go against the group and seem inferior. Members of the last group often had to wrestle with themselves to do so and experienced sweating, stress and unusual loss of confidence.

14. Suppose that a famous magazine offers (a) an Internet-only subscription for $59, (b) a print-only subscription for $125 or (c) a print-and-Internet subscription for $125. Which would you choose? What if only (a) and (c) were offered?

Behavioral economist Dan Ariely made this hypothetical offer of (a), (b) and (c) to 100 MBA students. 16 chose (a), none chose (b) and 84 chose (c). When he eliminated option (b), the results were quite different. 68 chose the Internet-only option and 32 chose the combination print-and-Internet option.

What happened was not rational. It was the presence of a decoy (the print-only option) that had skewed the first results. As Ariely writes: "This is not only irrational but predictably irrational as well."

This decoy phenomenon is why many upscale restaurants offer an extremely expensive option on their menu. Very few, if any, customers order this item. However, customers will choose the second-most-expensive item, which can be priced to deliver high profits. The high-end item is just a decoy. It works.

15. You see a table in a large public building. A sign above the table reads: "One chocolate per customer." Those working at the table offer two kinds of chocolates—Lindt truffles and Hershey's Kisses. The former are much more expensive than the latter in most stores. The price for a truffle is 15 cents. The price for a Hershey's kiss is one cent. Which would you choose? What if the people at the table offer the truffle for 14 cents and the kiss for free? Which would you choose?

Again, Dan Ariely conducted this experiment. Given the first prices, 73% of customers chose the truffle and 27% chose the kiss. Given the second scheme, where the truffle was offered for 14 cents and the kiss was free, 69% chose the kiss and only 31% chose the truffle.

Nothing had changed in relative terms between the first and second pricing schemes. Humans are predictably irrational when it comes to the possibility of getting something for free. They did not, in the second scheme, choose truffles by the same "margin of preference" as rational economics would predict.

Unit V: Activity III

1. Question Mark Crimson.

2. He was standing on a block of ice and died as it melted.

3. He executed a ski jump.

4. His friend had blood all over him and was tied tightly to a chair with his arms behind him and gagged.

5. The poison was in the ice.

6. It was driven across the lake after the water froze.

7. It was a charity fund-raising gag.

8. She's playing hide and seek.

9. Miho is blind and is reading a Braille book.

10. They were playing golf.

11. The man had an operation on his eyes. He took off the bandages, thought he was blind and killed himself.

12. The test is a blood test. The true son was a hemophiliac.

13. Satoru is an albino. The challenge was who could get the best tan.

14. They were watching a baseball player.

15. The two suspects are Siamese twins still joined.

16. She dialed 119 by mistake.

17. He wanted to look at the stars.

18. Mom was asleep.

19. The passenger's dog died while she was on vacation. She was bringing the corpse home to bury it.

20. The man and the chicken cross the river. He leaves the chicken on the other side and goes back across. The man then takes the fox across the river and brings the chicken back. He leaves the chicken and takes the corn and leaves it with the fox. He then returns to pick up the chicken and heads across the river one last time.

21. He was watching a television show.

22. She is an elevator operator in a skyscraper.

23. The piece of paper has the numbers one to ninety-nine written on it.

24. The man is falling from an airplane and has not yet hit the ground.

25. "I wish that my mother could see her grandson playing on a golden swing."

Unit V: Activity IV

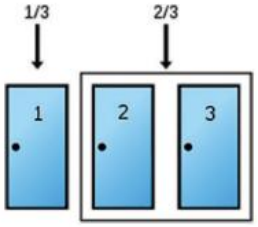
1. Special Pleading
2. Ad Hominem
3. Begging the Question
4. Invalid
5. Hasty Generalization
6. Valid
7. False Dilemma
8. Ad Hominem
9. Ad Hominem
10. Post Hoc
11. Slippery Slope
12. Gambler's Fallacy
13. Invalid (Two Negative Premises)
14. False Dilemma
15. Valid
16. Invalid (Undistributed Middle Term)
17. Begging the Question
18. Equivocation
19. Invalid
20. Post Hoc
21. Appeal to Authority
22. Affirming the Consequent
23. False Analogy
24. Equivocation
25. Slippery Slope
26. False Analogy
27. Hasty Generalization
28. Ad Hominem
29. Appeal to Authority
30. Fast-Food Thinking

Unit V: Activity VII

Most people feel that the odds are 50-50 at this point. However, the answer is extremely counter-intuitive. The right answer is that it is better for you to switch since this improves your odds from 1/2 to 2/3. How can this be? Consider the three possible outcomes if you pick door one, the host shows you a goat behind door two or door three and you either stay or switch. If you switch, your odds improve.

Door One	Door Two	Door Three	Stay	Switch to Unopened Door
Car	Goat	Goat	Win Car	Win Goat
Goat	Car	Goat	Win Goat	Win Car
Goat	Goat	Car	Win Goat	Win Car

Think of doors two and three as a pair that the host is offering to you. The pair has better odds of bringing you a card than a single door. You should go for the pair.



This advice continues to be valid even after one of the two doors has been opened.

Computer simulations have repeatedly demonstrated that this solution is correct.

Unit V: Activity VIII

1. The blackened figure should be on the bottom right of the diagram as it is in the two complete diagrams that precede it.

2. The correct answer is 5. Figuring out the rule in force here requires that you form **hypotheses** in your mind and test them out. A hypothesis is an explanation or prediction that needs to be tested. How can you explain the shapes (bars, dark curves and straight lines), their number and their orientation (vertical or horizontal)? In the end orientation (vertical or horizontal) and number form the basis of the rules needed to solve this problem. In each row there are always 1, 2 and 3 horizontal elements and 1, 2 and 3 vertical elements. In addition to this, 1, 2 and 3 elements (vertical and horizontal) of each shape are distributed across the three rows. Most people who solve this problem have an IQ that is above average. Note again that this is a test of **convergent** thinking. You have to consider different possibilities and narrow it down to the one right answer.

Unit V: Activity IX

(1) Here is the response from a British high school student for the prompt "a brick": "To break windows for robbery, to determine depth of wells, to use as ammunition, as pendulum, to practice carving, wall building, to demonstrate Archimedes' Principle, as part of abstract sculpture, ballast in a boat, weight for dropping things in river, etc., as a hammer, keep door open, foot wiper, use as rubble for path filling, chock, weight on scale, to prop up wobbly table, paperweight, as fire-hearth. To block up rabbit hole."

(2) Here is the response from another British high school student for the prompt "a blanket": "To use on a bed. As a cover for illicit sex in the woods. As a tent. To make smoke signals with. As a sail for a boat, cart or sled. As a substitute for a towel. As a target for shooting practice for short-sighted people. As a thing to catch people jumping out of burning skyscrapers." This student had an average IQ.

Unit VII: Activity V

See the following sites for lucid discussions of the birthday paradox and the shooting and dropping bullets problem.

https://en.wikipedia.org/wiki/Birthday_problem

https://van.physics.illinois.edu/qa/listing.php?id=187

Unit VIII: Activity IV

This thought experiment was meant to address the question whether the fetus has a right to life that the mother cannot violate. Most people who contemplate this scenario agree that you may be permitted to disconnect yourself from the famous violinist.

However, many claim that there are morally important differences between this scenario and abortion. They claim that Thomson's argument would justify abortion only in cases of rape. You did not cause the violinist to be plugged into you. In the same way, a woman who is raped and has become pregnant has done nothing to cause her pregnancy.

On the other hand, a woman engaging in consensual sex tacitly consents to the fetus' making demands on her body since, by having consensual sex, she could foresee the possibility of pregnancy.

Of course, those favoring "reproductive freedom" claim that the tacit consent lasts only so long as it takes for the woman to detect the pregnancy and get an abortion.

The thought experiment, while provocative, in no way resolves the debate in favor of one side or the other.

Unit X: Activity III

The subjects mutinied against the counselors because they felt that they were being manipulated. The man who directed the study, Muzafer Sherif, wrote at the time that he terminated the experiment because of "errors of judgment" and "difficulties". Researchers later obtained audio recordings and were able to discern that the real reason for termination was because subjects in both groups of boys felt that they were being deceived and manipulated. This raises great ethical questions, of course. In addition, many claim that the "counselors" (confederates of Sherif) constituted an unannounced "third group" and influenced the outcome of the experiment. Finally, some have criticized the experiment because the subjects were all white, middle-class boys. They claim that this constitutes sample bias.

Unit XI: Activity VIII

The doctor concluded that the people of Roseto enjoyed an unusually strong sense of community and of belonging and that this served to keep stress and feelings of alienation at bay and resulted in people being less at risk for heart disease than people in less well functioning communities are.

Unit XIII, Activity I

1. Suppose you pick 40. Since the number 13 is odd, you multiply it by 3 and add 1 to get 40. Since the number 40 is even, you cut it in half to get 20. Applying the rule now to 20 gives you the number 10. Continuing in this way, you get 5, 16, 8, 4, 2, 1, 4, 2, 1, 4, 2, 1 and so on. The last numbers repeat themselves infinitely. Sometimes it takes many applications of the rule to get there. The small number 27, for example, takes many steps before you reach the number 1. The mystery is that every number that has been tried does eventually return to 1. But why is this? No one has offered a proof.

2. To see that the number is at most 6 suppose that you're one of 6 attendees at a conference. Since you either know or don't know each of the other 5, there are at least 3 of them whom you know or at least 3 of them whom you don't know. Suppose that you know 3 of them. (The argument works whether you consider acquaintances or strangers). What relationships hold among your 3 acquaintances? If any 2 of them know each other, then these 2 and you constitute a group of 3 mutual acquaintances. On the other hand, if none of your 3 acquaintances know each other, they constitute a group of 3 mutual strangers. Thus 6 attendees are sufficient, and it can be shown that 5 are not. (Can you find an example showing that 5 people are not enough?) It has been shown that a group must contain 18 people in order for there always to be at least 4 people in it who are mutually acquainted or at least 4 who are mutual strangers. For larger numbers, even the most powerful computers cannot at this point generate the right answer.

Unit XIII: Activity II

Task One

1. MI to MII (rule 2)

2. MI to MIII (rule 2)

3. MIIII to MUI (rule 3)

4. MUI to MUIU (rule 1)

Task Two

1. MI to UIU is not possible given the rules of inference and the starting point.

2. In some games, certain positions are simply impossible to achieve by definition.

Appendix Three

The TOK Curriculum for First Assessment in 2015

What's New (In a Nutshell)

The new Theory of Knowledge curriculum was implemented in 2013. First assessment was given in May of 2015. Here, very briefly, is a description of the principal improvements.

1. Four Ways of Knowing have been added, bringing the total WOK to eight. The new sources of knowledge are intuition, memory, imagination and faith.

2. TOK teachers are encouraged to study the Ways of Knowing in context rather than in isolation. The focus should be on how they are woven into the knowledge frameworks underlying each of the AOK.

3. Two Areas if Knowledge have been added, bringing the total AOK to eight. The new AOK are Indigenous Knowledge Systems and Religious Knowledge Systems.

4. A new assessment instrument emphasizing "global impression marking" has been introduced.

5. Knowledge questions are at the heart of the new assessment scheme for both the presentation and the essay. For the global impression judgment of the TOK essay, for example, a single question guides examiners. "Does the student present an appropriate and cogent analysis of knowledge questions in discussing the title."

6. The distinction between personal and shared knowledge is emphasized in the new curriculum. Students are strongly encouraged to draw on personal knowledge when giving the required presentation and writing the required essay. TOK has been embedded across the curriculum in order to encourage students to draw on their personal experiences in other courses when discussing knowledge questions rather than relying on predictable "textbook" examples.

7. The emphasis has shifted from defining knowledge as justified true belief to viewing it in terms of the metaphor of a map. This change addresses a concern that students in the past have engaged in simplistic and somewhat narrow philosophical arguments.

8. Students must now submit a Presentation Planning Document. The idea is to avoid presentations that are not properly focused on good knowledge questions.

Appendix Four

Theory of Knowledge (TOK) Presentation Advice

Students have complete freedom in choosing a topic for the TOK Presentation for internal assessment. They must simply identify a real-life situation (RLS) that interests them sufficiently to warrant the effort that preparing a formal presentation will require. Having chosen an appropriate topic, they must then identify the knowledge question on which they will focus their attention.

The course teacher grades the presentation. External examiners do receive the planning document (TK/PPD) and can ask to see a video of the actual performance should they choose to moderate the internal assessment. In general, the teacher's grade is the final grade.

Students may make presentations alone, in pairs or in groups of three. Making a presentation as a pair is perhaps most common. The length of the presentation is limited to ten minutes per person presenting. A presentation by a single student will last a maximum of ten minutes. A presentation by a group of three will last a maximum of thirty minutes. If time remains at the end of the presentation, students may choose to engage in a question-and-answer session with members of the audience.

Students will submit the planning document directly to the teacher, but copies will generally not be distributed to students or guests in the audience.

The teacher may allow students to give more than one presentation and submit the best grade to the International Baccalaureate Organisation (IBO). If students choose to give two presentations, the presentations must address different topics. The grade teachers submit to the IBO for students' presentations will constitute 33% of their final course grade. The prescribed essay, which is externally assessed, will account for the remaining 67%.

The guidelines for the course limit and specify the assistance that the teacher may offer students during the presentation planning and preparation process. The teacher can meet three times with students to discuss the RLS, the KQ and the development of the presentation.

In the presentation, students must demonstrate how the ideas that they have learned in the TOK course relate to the real world. This is the main goal of the presentation. The knowledge question (KQ) must be clearly related to the RLS chosen. Students must use convincing arguments, must persuade the audience why the RLS is important and must relate the RLS to other real-life situations.

The best evidence in support of the points that students make in the presentation should come from real life. Students' personal experience is very important. They are encouraged to described knowledge that they have created or experiences that have led them to look at the world in a particular way. Students may also draw upon shared knowledge (books, magazines, the Internet, films or general cultural knowledge, for instance). Students' experiences fulfilling the Creativity, Action and Service (CAS) requirements and their experiences in other classes may also serve as sources of personal knowledge that students may include in the presentation.

Most students prepare a PowerPoint-style presentation. This is not required, however. Students may choose to do an elaborate role-play with props. They may wear costumes. They may pretend to be newscasters or talk show hosts having a conversation with guests. They may use music or visual aids. They can involve the audience if this works. Some students choose to combine a traditional PowerPoint-style presentation with another approach. So long as they communicate their arguments effectively to the audience, students may adopt any approach that suits their purposes.

Possible Structure for a Pair Presentation (PowerPoint-style)

Introduction

1. Students show an uncluttered slide with the name of the presentation and their names. They then speak briefly about the RLS they will address and share some initial thoughts about why they chose the topic and why it seems important or relevant to them. Students should aim for sincerity and avoid looking at slides or notes. They should maintain contact with the audience as much as possible.

2. Students show a new slide with some key concepts from the TOK course—ways of knowing, areas of knowledge, perspectives, bias, truth, reliability, justification, certainty, validity and so forth—that are suggested by the RLS. Students should share with the audience details of their journey from their first encounter with the RLS to their conceiving of it in terms of TOK categories and ideas. They can then explain how the limited RLS can lead to big, general questions.

3. Students show a slide featuring the KQ and the key ways of knowing, areas of knowledge or TOK concepts that they will explore in the discussion and analysis portion of the presentation.

4. This first part of the presentation should take three to four minutes.

Analysis and Discussion

5. Students now move into the analysis and discussion section. They should use a limited number of slides. Two to four should be adequate. The text on the slides should be simple and the slides should be visually appealing and uncluttered.

6. In the slides, students should outline two to four provisional answers to the KQ posed, each provisional answer calling on different ways of knowing, areas of knowledge and/or TOK concepts. For each provisional answer, students should consider a strong argument that someone disagreeing with their position might take.

7. Students should explore the possibility of reconciling their provisional answers with the counterclaims that they have identified.

8. Students should take care to present the strongest possible evidence both for their own claims and for the counterclaims that they consider.

9. Students may wish at this juncture to mention one or two additional RLS that seem related or help support one or another point made.

10. This portion of the presentation should take ten to twelve minutes.

Preliminary Conclusion

11. Students should show a new slide stating a provisional conclusion. They should explain that this is a tentative conclusion and indicate some of the strongest objections to the conclusion. They should avoid creating the impression that they are absolutely certain that their conclusion is the right one and that no other conclusion is possible. They may wish to suggest some of the perspectives (nationality, gender, religion, politics, age, socio-economic status and so forth) that might lead to different ways of answering the KQ.

12. Again, students should avoid reading the slide or consulting notes and should endeavor to maintain eye contact with the audience.

13. This part of the presentation should take about two minutes.

Linking the Conclusion to the RLS

14. Students should show a new slide that clearly and explicitly links their conclusion to the RLS. Students should keep in mind the large implications and questions raised but focus in the end on the practical link to the RLS. If possible, students should identify at least two links between the conclusion and the RLS.

15. Finally, students may wish to mention at least one personal experience if they have not done so previously. This will make explicit the link to real life and the students' personal knowledge.

16. This last element of the presentation should take about two minutes.

Final Advice

Students should write the KQ at the bottom of all slides, at least for the slides used in the analysis and discussion section. This will help the members of the audience to focus on the question as it attends to the presentation.

If time remains, students may invite questions from the audience, though this is by no means required. Teachers should give appropriate guidance to other students ahead of the presentation, encouraging those in the audience to ask only questions that are fair and relevant and that will give the presenters an opportunity to emphasize or flesh out points that they have made. The questions should never attempt to put presenters on the spot.

Appendix Five

Theory of Knowledge (TOK) Prescribed Essay Advice

Students must submit an essay on one of six prescribed topics. The topics are selected for each examination session and ask generic questions about knowledge. The topics are published in September before the May examination session and in March before the November examination session.

Students must engage in a sustained analysis of the knowledge questions implied by the topic chosen, explain claims and counterclaims with appropriate examples and make explicit links to ways of knowing and areas of knowledge.

The essay may be a maximum length of 1600 words. This word count does not include notes, footnotes or appendices. Maps, diagrams and other illustrations may be used but also are not included in the word count. The essay is externally examined. Examiners will stop reading after 1600 words and will apply a one-mark penalty to essays exceeding the maximum word count.

Global impression marking is used in evaluating the essay. Examiners may give a maximum of 10 marks for the essay, which contributes 67% to each student's final TOK grade.

Students must address the chosen topic exactly as worded. Altering or ignoring the topic the student has chosen to address will result in severe marking penalties. Essays bearing no resemblance to the topic ostensibly addressed will receive a score of zero.

Students and the TOK teacher should consult *Theory of knowledge guide: For first assessment 2015* for details about correct essay formatting and all submission requirements.

The TOK teacher is responsible for ensuring that the essay is the student's own work and that the student has acknowledged fully the thoughts and ideas of other people in the work submitted. The student must provide a bibliography of all sources serving as sources of ideas or quotations appearing in the content of the student essay.

The teacher may give only limited and specified assistance to the students when the latter are brainstorming, researching, writing and polishing their essays. Students should present to the teacher a very rough draft (an "exploration") or set of notes at the beginning of the process. The teacher and student may use this rough draft or this set of notes as the basis for a discussion about how to structure the essay.

After this, the student can and should submit a full draft of the essay to the teacher, who will provide **holistic** comments in written form but cannot assist the student by marking or editing the draft. Students may seek incidental advice subsequent to this—clarification about word choice or the appropriateness of examples cited, for instance—but students are responsible for finding and correcting mistakes and for strengthening their arguments and improving their prose.

The examiners will consult written descriptions of performance levels in the TOK essay assessment instrument when marking the essay. For this reason, it is very important for teachers and students to have frequent discussions about these descriptions so that the students become fluent in the vocabulary examiners will use in assessing the student work. Again, please remember that assessment is holistic. Examiners will view the written descriptions from a global perspective and not simply as a "checklist of necessary characteristics".

In general, examiners will assess students' understanding of the knowledge questions contained in or implied by the prescribed topics and the quality of their analysis of those questions. To achieve the highest possible marks, students should aim to produce essays that impress examiners as cogent, persuasive, lucid, accomplished, original and insightful.

TOK essay examiners do not explicitly assess mother tongue or second language literacy. Occasional infelicities of grammar, diction or style will not result in lower marks. According to *Theory of knowledge guide: First assessment 2015*: "It is only when these errors become major and impede the comprehension of the essay that they will be taken into account."

In these pages, we have included numerous activities designed to help students identify good knowledge claims and questions and to distinguish between claims/questions about the world and claims/questions explicitly about knowledge. We call the claims and questions about the world "first-order" claims and questions. These play an important role in the TOK essay. However, the **focus** of the essay should be on "second-order" claims and questions, which are claims and questions **about knowledge itself.**

For this reason, students must always engage in the same line of questioning to which we've introduced them in the "Good Knowledge Questions?" activities that have appeared throughout these pages. Students should ask themselves the following questions on a regular basis. "Are my questions good knowledge questions? Why? Which ways of knowing and which areas of

knowledge are implicated in the knowledge questions that I have identified for purposes of my essay?"

Students must keep in mind that knowledge questions ask how we construct and evaluate knowledge. These questions do not lend themselves to a single correct answer. They are open questions that are the sources of many of the most impassioned debates and controversies that confront us.

In addition, students should express knowledge questions in general terms. Good knowledge questions are worded in such a way as to encourage students to attend to multiple perspectives and to become skeptical of the "one right answer" or "convergent" style of analysis. This is why words such as "to what extent", "under what circumstances", "on what basis" or "at what point" often appear in good knowledge questions. Words such as these are often used in formulating more sophisticated knowledge questions since they point to the need for **rigorous evaluation**.

Teachers should encourage students to generate multiple but plausible answers to the knowledge questions that they have identified. However, students must always take care to offer answers, however tentative, that are reasonable and defensible, even if they are not definitive.

As in the TOK presentation, students must respond adequately to reasonable counterclaims that others may make while at the same time understanding that their personal perspectives may influence both their analysis and the answers that they ultimately give.

In formulating or identifying knowledge questions, students may use the specialized language or the methods of academic disciplines from which these questions arise. However, a successful TOK essay will build upon this first-order analysis in order to engage the second-order questions about knowledge itself.

In conceiving of their essay, students must move from specialized to general and trans-disciplinary language and methods. In other words, they must engage the questions from a holistic (TOK) perspective rather than from the discrete perspectives of specific areas of knowledge. Relating the knowledge question to specific ways of knowing and areas of knowledge is important; arriving at general (even if tentative) answers to knowledge questions is vital.

Many experienced TOK teachers recommend that students identify and discuss two, three or (at most) four of the ways of knowing or areas of knowledge as they relate to the knowledge question that the student has decided to address. To write an accomplished TOK essay, however, the student must then correlate insights from consideration of these ways of knowing and/or areas of knowledge into a global treatment of the knowledge question.

The Essentials: Questions Students Should Ask Themselves throughout the Essay Process

1. Have I thought clearly and comprehensively about the implications of the title I have selected?

2. Have I formulated a knowledge question that focuses on that topic?

3. Have I made every effort to relate the topic/KQ to my own experiences, including the lessons that I have learned in my other courses at school?

4. Have I searched for, identified and appropriately analyzed evidence to support my claims?

5. Have I arrived at a complex and comprehensive understanding of the issues I am addressing?

6. Have I reflected adequately on the conclusions that I am putting forth?

7. Have I made the most effective use possible of the 1600 words allowed to me to make my case? In other words, do I give appropriate weight and discussion to the various claims and counterclaims on which my analysis depends?

Making Consistent Claims and Avoiding Kettle Logic

As in the presentation, the analysis and discussion of the knowledge question is the heart of the TOK essay. The student who writes an effective essay will offer consistent claims that are mutually supporting and that are amply supported by evidence, some of which can and indeed should be drawn from the student's personal experience.

Consistency is vital. In *The Interpretation of Dreams* and *Jokes and their Relation to the Unconscious*, Sigmund Freud introduces a story about a man who was accused of damaging a kettle that he had borrowed. The man, pleading in the alternative as a

lawyer might, offers three defenses or claims.

1. When he returned the kettle to its owner, it was not damaged.

2. The kettle was already damaged when he borrowed it.

3. He never borrowed the kettle.

These arguments are contradictory and inconsistent. Freud suggests that such kettle logic is often present in dreams. In real-life, however, the man accused probably should have chosen to make claims that were mutually consistent and could be backed up with corroborating evidence.

A more convincing approach would be to make the following **consistent** and **mutually supporting** arguments, each supported by as much evidence as can be marshaled.

1. When he returned the kettle to its owner, it was not damaged.

2. The man who borrowed it has a widely acknowledged reputation as a person who is responsible and careful in all his actions.

3. The man who borrowed it has sworn that he did not damage the kettle, and no one can produce any evidence that the man has sworn falsely in the past.

The Four Stages

In the first stage, the student needs to select and interpret a title, formulate a sophisticated knowledge question and state a position. This position may evolve as the process unfolds, but an initial statement of the position is essential.

In the second stage, the student proceeds to the discussion and analysis of the knowledge question/topic, the "meat" of the essay task. We have earlier suggested that students identify at least two, preferably three and no more than four WOK and AOK that are implicated by the knowledge question that they have identified.

In the third stage, the student (within the framework established by the WOK and AOK that the student has chosen) identifies his or her claims and introduces and, to the extent possible, responds to the strongest possible counterclaims that can be adduced.

In the fourth stage, the student carefully edits the essay draft, seeks clarification from the teacher where permitted and desirable, seeks peer feedback if possible and produces a final draft for submission.

Studying Successful TOK Essays

In the Online Curriculum Centre, the IBO has posted a valuable document called *Theory of knowledge teacher support materials (TSM)*. This document explains significant changes in the TOK course for first assessment 2015. It contains four sample TOK essays along with examiner comments. Essay A was marked Level 2: Basic and received a grade of 3. Essay B was marked Level 3: Satisfactory and received a grade of 6. Essay C was marked Level 4: Very Good and received a grade of 7. Essay D was marked Level 5: Excellent and received a grade of 10.

A student may receive a maximum of ten marks for the TOK essay. Students and teachers should read the essays and examiner comments carefully and discuss them with the level descriptors at hand. Teachers must emphasize over and over that assessment is based on a global impression of level attained rather than on specific assessment criteria approached in the manner of a checklist.

The Structure of a Successful Essay

For our purposes here, we will concentrate on Essay D, the most successful of the four examples posted, and inquire why this essay was successful and what lessons students about to write their own essays can glean from this student essay and from the examiner comments that it inspired.

The IBO has kept the identity of the student of this essay anonymous. However, for ease of reference, we will use the pronoun "she" to refer to the student in order to avoid inelegant periphrasis.

It is well to keep in mind at the outset that there is no single "right" approach or "formula" or "method" for writing a successful TOK essay. The main point is that the student must adopt a clear approach that engages different perspectives revealed in real-life examples that are effectively linked to different ways of knowing, areas of knowledge and, of course, to the knowledge question itself.

If a student takes one side on an issue, then it is best to proceed by advancing claims (supporting the student's position) balanced by consideration of strong counterclaims.

In Essay D, the student has taken a middle road, suggesting that in some ways doubt is a "key to knowledge" and in other ways it is not. Taking this middle course inherently balances arguments confirming and contradicting the knowledge claim offered in the topic.

1. Paragraph One

In the first paragraph, the student introduces the topic/knowledge question immediately. " 'Doubt is the key to knowledge' (Persian Proverb). To what extent is this true in two areas of knowledge?"

She then gives a short answer in the form of a thesis. Doubt, while not a way of knowing, can motivate us to seek knowledge. This motivation "can manifest itself differently in contrasting areas of knowledge like Mathematics and Religion."

Note that this short answer serves as a signpost alerting the reader that the student will explore these two areas of knowledge when discussing and analyzing the knowledge question.

2. Paragraph Two

In the second paragraph, the student makes a knowledge claim. "Mathematics is an area of knowledge that is only concerned with reason." She then suggests the Pythagorean theorem as a proposition that is undoubtedly true.

However, she qualifies this claim by sharing a doubt that arose when she first learned about negative numbers. "How could a bigger number have a lower value than a smaller one?" The confusion this doubt engendered led her teacher to explain negative numbers to her using a number line with a central point at zero. "My doubt," she reports, "led to understanding and was the key to my knowledge."

Here the student has adduced two examples—one (the Pythagorean theorem) taken from shared knowledge and the other (being nonplussed on first encountering negative numbers) from personal experience. The second example suggests how doubt can lead to clarity and thus be key to acquiring knowledge.

3. Paragraph Three

In the third paragraph, the student engages a counterclaim. "On the other hand, doubt in mathematics can be detrimental to education."

She offers another example from personal experience—her tendency to become dependent upon immediately obtaining the right answers to math questions, since these are conveniently printed in the back of the textbook or are readily available from the math teacher at school.

She then clearly links this example to the knowledge question by explaining that doubt can lead students to avoid exploring on their own and developing their own methods for finding answers. It can also engender a loss of confidence that is detrimental to the development of mathematical knowledge.

4. Paragraph Four

In paragraph four, the student notes that mathematicians have advanced thousands of conjectures. By their nature, conjectures are not absolutely certain, because they are based on inductive reasoning and have not been proven. She adduces a well-known example—Goldbach's conjecture that every even number is the sum of two prime numbers—and suggests that the conjecture has not allowed mathematicians "any access to new knowledge about the validity of the conjecture". Again, the example is linked clearly to the knowledge question.

5. Paragraph Five

In paragraph five, the student proceeds to consider another area of knowledge—religion. She claims that religious knowledge is based on authoritative sources (such as sacred texts) that admit of no doubt. She adduces the example of the raising of Lazarus from the dead, as related in the Christian Bible. For the devout Christian, the Bible is "fully reliable" and "doubt is not the key to knowledge". Despite the evidence from their senses and experiences, devout Christians may believe the Lazarus story as a matter of faith.

6. Paragraph Six

In paragraph six, the student considers the example of English philosopher Anthony Flew. He was an atheist who combined doubt and reason to provide a logical "proof" for the existence of God. The student reiterates a point she made in the first paragraph. Doubt is not a way of knowing, but Flew used his doubts about the existence of God as a "tool" to motivate him to seek knowledge.

7. Paragraph Seven

The student then suggests how controversies about the meaning of key words in religious texts can lead to doubts that encourage exploration of "issues that are yet to be answered". She focuses on the example of a word in the Quran, idrib, that some believe means "to beat someone". According to some believers, this language authorizes Muslim men to beat wives or sisters who are disobedient. Some Muslim scholars have cast doubt on this interpretation, suggesting that the word means "leave" and only authorizes men to separate themselves from women in their lives if they are disobedient.

8 Paragraph Eight

In this paragraph, the student discusses the work of a scholar who has suggested that the contested words and, indeed, much of the language of the Quran have been misinterpreted. This scholar contends that the language in which the Quran was composed was not Classical Arabic but a mixed Arabic-Syriac language. This scholar's doubts have not led people to abandon their faith in Islam, but it has underscored the fact that we lack the sort of evidence required to settle upon a definitive reading of the text in question.

9. Paragraph Nine

The student finishes by reviewing her preliminary conclusions in the preceding paragraphs. Depending on answers printed or given by the teacher in the math context, doubt can be detrimental to the acquisition of knowledge. Also, conjectures do not generate new knowledge. In the religious context, doubt is a key to knowledge for people who are devout and rely on obedience to religious authority. On the other hand, Anthony Flew's attempts to prove the existence of God using logic suggest that doubt can motivate one to seek new knowledge. Furthermore, in the religious context, the linguistic debates about the meaning of key vocabulary in the Quran suggest that doubt can be positive since it "makes room for new knowledge".

Finally, she restates her thesis or short answer from paragraph one. Doubt does not produce new knowledge. However, it can open "doors to knowledge" by encouraging the doubter to explore the unknown.

Examiner Comments

The examiners praised the "clear approach using different perspectives", the use of a personal example as a stepping stone to a more sophisticated example (mathematical conjectures) and the examination of how religious doubt "might be a key to knowledge and how not". The examiners found that the arguments were well developed and that the student used them to explore a range of relevant TOK issues. The only reason that the essay did not receive the maximum score of 10 was because the examples, while effective, "were not fully evaluated".

Appendix Six

Time Management

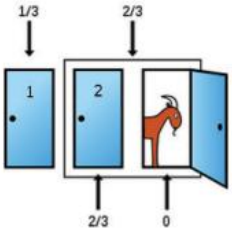
Learning to manage their time is one of the overarching skills that students must master in order to succeed in the rigorous Theory of Knowledge course. Students and parents must understand this clearly from the very beginning. One cannot make this point strenuously enough. If students do not plan and organize their time outside of the classroom in such a way as to give consistent attention to the achievement of the small but vital steps needed to complete demanding long-term assignments and preparation for examinations, they cannot earn a Diploma.

In order to succeed, students must make realistic daily and weekly goals and stick to them. This means that they must consistently give priority to their schoolwork. Of course, a healthy balance is vital. However, successful IB students know how to put aside video games, turn off their cell phones, preserve quality study time in a quiet and orderly environment and work regularly and with focus toward the achievement of the goals that alone can bring them success.

Many students have learned bad habits in their formative educational years. They have learned, for instance, that they can spend a few days before an exam and "pull it all together" at the last minute, cram facts and formulae into their short-term memories, stay up late to catch up with reading assignments, read their notes one time on the commute to school on the day of the exam and so forth. These strategies simply will not work in the TOK and IB context.

In the first place, the IBDP curriculum is focused on the development of critical thinking skills, a process that requires daily engagement with ideas and academic tasks, discussion with peers, construction of new knowledge and ample opportunities to make mistakes and find different pathways to knowledge.

Second, timed writing exams, presentations, inquiry-based laboratory work and so forth are common in IBDP subject courses. To succeed on timed writing tests, students must master not only a body of ideas that they have fleshed out by independently engaging them and interacting with their peers and teachers, they must also have had ample opportunities to practice writing,



which involves a different mode of consciousness than merely recalling answers or working out a problem involving a limited number of steps and choosing an answer on a multiple-choice test.

IBDP assessments focus on higher-level cognitive domains such as analyzing, evaluating and creating rather than on lower-level cognitive domains such as remembering, understanding and applying. Assessments at many schools target only these lower cognitive domains. The price of demanding higher order thinking is the need for students to become independent, to take charge of their learning, to demonstrate focus and discipline and to proceed in a methodical manner toward clear goals of which they never lose sight.

In addition, students must fit their TOK work where they can in the openings they can create among the substantial work that they must do in the six regular courses and the other two core components (EE and CAS).

In TOK, for instance, they must prepare and deliver a presentation on a real-life situation that generates an interesting knowledge question that they must analyze and discuss, keeping in mind alternative perspectives, counterclaims, other real-life situations and connections to their personal experiences. They can give these presentations alone, but most often they have to work with one or two partners. A successful presentation requires meticulous planning and teamwork. Furthermore, students must write a 1600 word essay on a prescribed knowledge topic.

Sound time management is one of the keys to success in the IBDP. Students must make clear goals, consistently attend to them, find a balance in their lifestyles that gives priority to their IB commitments, avoid procrastination and never lose sight of their goals.

The rewards are tremendous. Students build unusual self-confidence by setting and reaching difficult goals. In addition, success in the TOK and in the IBDP proves to anyone caring to look closely that the student in question has demonstrated intellectual depth and substance, maturity, focus, discipline and "the right stuff".

This is why elite universities around the world so readily endorse the IBDP and give special credit and scholarships to students who earn and score well on the Diploma exam. They know that the qualities that students must master in order to succeed in TOK and the IBDP are congruent with the qualities and skills that university success requires.

Teachers and Advisors will give the students the roadmaps and encouragement that they need. They will tell them when the many assessments fall due and will repeatedly advise them to develop strong time management skills. It's ultimately up to the students to use the map to find the treasure, however. The carrots and sticks they dangle must be of their own devising.

George R. Pruitt

1960-2016