

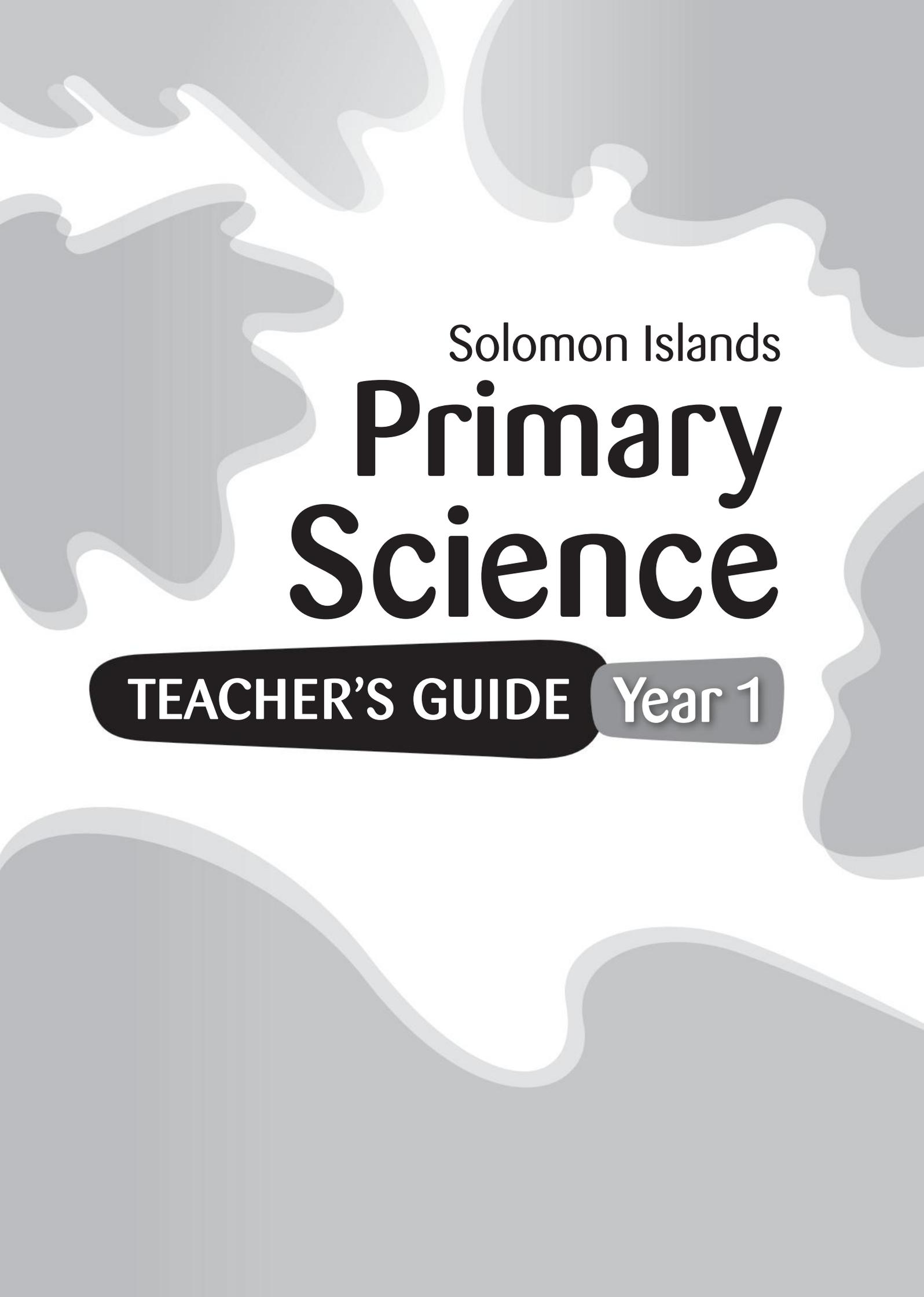
Solomon Islands

# Primary Science

**TEACHER'S GUIDE**

**Year 1**





Solomon Islands  
**Primary  
Science**

**TEACHER'S GUIDE**

**Year 1**



**Solomon Islands Curriculum Development Division**

This Teacher's Guide provides support material for the Solomon Islands Primary Science Learner's Resource Book Year 1. The Learner's Resource Book and Teacher's Guide address the learning outcomes of the Primary Science syllabus, developed during 2006 and 2007. The Ministry of Education and Human Resources Development would like to thank the following people whose work led to the development of the Year 1 science materials.

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# Introduction to this Teacher's Guide

## Teaching young children

Young children are very curious and want to find out about the world around them so they love to do science. However, at this stage they cannot read. The Year 1 Learner's Resource Book has some writing, but the children will not be able to read much of this. The writing is there to guide the teacher, who can read it to the learners and add more explanation when that is needed. When you are giving instructions to the learners it is important to keep them as simple as possible and repeat them a number of times. You can read and give instructions in English or Pijin or their own vernacular. Use the language that the learners find easiest to understand.

Science is meant to be active with learners carrying out activities and the Year 1 Learner's Resource Book has plenty of activities. The activities are simple, fun and do not require special equipment, and this Teacher's Guide gives you some extra information to help you do all of the activities.

We hope you enjoy teaching science to your Year 1 learners.

## Using this Teacher's Guide

This Teacher's Guide supports the *Solomon Islands Primary Science Year 1 Learner's Resource Book*. It is meant to give you ideas, not to tell you exactly how to teach. The exact methods and timing you use will vary according to your own circumstances.

The chapters of this Teacher's Guide correspond to the chapters in the Learner's Resource Book. Each chapter is presented in three sections. The first section contains the sub-strand statement and the learning outcomes and indicators for the Learner's Resource Book chapter. The bracketed letters after the outcomes indicate the type of domain covered by the general learning outcomes. There are four domains: understanding (U), knowledge (K), values (V) and skills (S). The information in this section is taken from the Primary Science syllabus.

The second section of each chapter provides support information for the teacher about each of the activities in the Learner's Resource Book. It is presented in table format.

- Column 1 lists important Science processes and skills being developed by each activity.
- Column 2 lists any resources that are needed for the activity and also refers to *Explore Science* (Pearson).
- Column 3 provides information for teachers about conducting the activity.
- Column 4 gives a reference to the relevant pages in the Learner's Resource Book.

The third section of each chapter lists the answers to the activities and assessment activities in the Learner's Resource Book.

At the beginning of this Teacher's Guide you will find information on:

- outcomes-based education and the learner-centred approach
- the approach of the Learner's Resource Book
- the Learner's Resource Book and the syllabus
- teaching methods
- assessment—recording, monitoring and reporting
- resources required for Science
- the links between Primary Science and other subjects.

At the end of the Teacher's Guide are copies of forms to be used for recording, monitoring and reporting individual and class achievement.

# Outcomes-based education and the learner-centred approach

This Teacher's Guide is written for a Learner's Resource Book and syllabus that follow the outcomes-based approach to learning. This approach has been adopted by the Ministry of Education and Human Resources Development and the Curriculum Development Division as part of the new curriculum for Basic Education from Years 1 to 9.

The basis of this approach is that learners should acquire knowledge, understanding, skills, values and attitudes that will be useful to them later in life. The approach is based on the needs of the learners rather than the needs of the subject. The emphasis is not on the traditional content of the subject, but on choosing those elements of the subject that will be useful and valuable to learners. The curriculum is learner-centred rather than subject-centred.

This learner-centred approach contrasts with the teacher-centred approach that has been common in the past. The emphasis is on learners learning for themselves with the guidance of the teacher rather than being taught by the teacher. This means active learning in which learners do things that help them to find out for themselves, think about and draw on their own knowledge and experience, make observations, do experiments and carry out practical tasks. This can be called "learning by doing".

Syllabuses, textbooks and teacher's guides refer to "learners", which suggests active participation in the process, rather than "students", which suggests passive reception of knowledge. One way to understand the learner-centred approach is to think of the more traditional approach of our schools as "banking education". In banking education, the teacher regards the learners as empty vessels that need to be filled with knowledge. The learners are then tested by being asked to reproduce the knowledge the teacher has given them. This method relies a lot on the learner listening to the teacher, copying notes from the board, learning the notes and reproducing them later. Learners can often do this successfully without understanding fully what they are writing and reading.

The present outcomes-based and learner-centred approach can be called “problem-posing education”. This assumes that the learners already have their own ideas, knowledge and skills based on previous experience in school or elsewhere. The job of the teacher is to build on this by posing problems to the learners that make them think about their own ideas and experiences, as well as adding new knowledge and skills. Learners are also exposed to experiences by being asked to observe reality outside the classroom, look at pictures or diagrams, examine statistics and read passages, and so gain knowledge and develop ideas for themselves. They are then expected to express these in their own words, not those of the teacher, to prove that they have really understood what they have learnt. Learners are encouraged to be responsible for their own learning, to think for themselves and to form their own ideas and opinions. They are encouraged to become critical thinkers and to be able to face new challenges and situations for themselves. Learning becomes a cooperative effort between the learner and the teacher. This approach also emphasises the use of multiple intelligences. In addition, education is seen not just as a way of passing on knowledge and skills, but a way of forming the kinds of values and attitudes that will make children good and responsible citizens in the future.

## **The approach of the Learner’s Resource Book**

The Learner’s Resource Book, therefore, is based on these principles. It is not just a summary of the factual knowledge and concepts of the subject. In addition to the content, there are activities for the learners to do and these activities form an essential part of the learning process. It is no longer good enough to simply read the book. Learners must also do the activities in the book.

In the past, activities were often included only at the end of chapters, and learners and teachers often ignored these and moved on to the next “content” section. In these books, the activities are part of the text and must be completed in order to fully learn from the book. Some sections or chapters start with an activity to encourage learners to find out information, think about their own experiences and knowledge, or practise skills for themselves.

There are also many activities based on discussions that encourage learners to form their own ideas. This is to help in the development of desirable values and attitudes.

Many of the activities are to be done in groups. This is to encourage interaction among the learners, as they can often learn as much from each other as they can from the Learner's Resource Book or the teacher.

# The Learner's Resource Book and the syllabus

The Learner's Resource Book is structured according to the strands and sub-strands of the syllabus. Each chapter is based on one or more sub-strands, and the order of the chapters follows the order of the sub-strands of the syllabus.

Within the individual chapters, however, the order of the outcomes in the sub-strand of the syllabus is not necessarily followed. Each sub-strand of the syllabus outlines the knowledge, understanding, skills and attitudes—that is, the outcomes—we want learners to achieve. The Learner's Resource Book gives guidance about how the learners might best achieve these outcomes. The best way to do this is not always to follow the exact order of the outcomes in the syllabus. In teaching, therefore, you should usually follow the order of presentation in the Learner's Resource Book rather than the order of outcomes in the syllabus. As long as the outcomes are achieved, you have reached your goal.

The Learner's Resource Book contains many illustrations: photos, pictures and diagrams. These are not just included for decoration—they are often just as important as the words.

## Timing of the syllabus

The time available for Year 1 Science is four periods of 40 minutes per week. While some teachers may find they do not have time to complete all the activities in the Learner's Resource Book, others may complete them all with time to spare. If you do not have time, leave out some sections and move on to the next topic. Do not spend so long on one topic that you miss other topics altogether. Try to teach at least some of every strand of the syllabus. If you have very quick learners, make up extra exercises that challenge them to think about the topic in greater depth.

Some chapters of the Learner's Resource Book cover one sub-strand of the syllabus. Other chapters cover two or more sub-strands that are related to each other and are best taught together.

As explained earlier, the order of topics in the chapters does not always follow the order of the outcomes in the syllabus. As a teacher, therefore, you should follow the Learner’s Resource Book rather than the syllabus, and use the syllabus as a guide to what the learners should finally achieve.

## Yearly program planner

This yearly program planner shows the Year 1 learning program for the Primary Science course and the suggested teaching times based on eight teaching weeks per term and 32 teaching weeks per year.

Term 1											Term 2									
Week	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Year 1	<b>Living things and non-living things</b> LL, 32 periods, 8 weeks										<b>Energy all around us</b> EC, 32 periods, 8 weeks									
	<ul style="list-style-type: none"> <li>• Living things and non-living things</li> <li>• Living things can move and grow</li> <li>• Plants grow</li> <li>• Babies grow</li> </ul>										<ul style="list-style-type: none"> <li>• Types of energy</li> <li>• Light</li> <li>• Heat</li> <li>• Sound</li> <li>• Electricity</li> <li>• Moving a toy car</li> </ul>									
Term 3											Term 4									
Week	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Year 1	<b>Sorting materials</b> NPM, 24 periods, 6 weeks							<b>Food from the garden</b> F, 8 periods, 2 weeks			<b>Food from the garden</b> F, 12 periods, 3 weeks				<b>Sun and Moon</b> EB, 20 periods, 5 weeks					R E V I S I O N
	<ul style="list-style-type: none"> <li>• Different materials</li> <li>• Natural and man-made things</li> <li>• Describing things</li> <li>• Grouping colours and shapes</li> <li>• Changing shape</li> </ul>							<ul style="list-style-type: none"> <li>• Food from the garden</li> </ul>			<ul style="list-style-type: none"> <li>• What’s growing?</li> <li>• At the market</li> <li>• Vegetable person</li> </ul>				<ul style="list-style-type: none"> <li>• The Sun</li> <li>• Shadows</li> <li>• The dark</li> <li>• Day and night</li> <li>• Animals in the day and night</li> <li>• The Moon</li> </ul>					

- LL Life and Living
- EC Energy and Change
- NPM Natural and Processed Materials
- F Farming
- EB Earth and Beyond

# Teaching methods

The following are some teaching methods or approaches you can use to facilitate effective learning in your classroom. Planning and good preparation are important for effective application of these methods.

## Fieldwork and excursions

Fieldwork is any work outside the classroom. Fieldwork helps learners to link classroom learning to real-world experience outside the classroom. Here learners are instructed to apply the skills of observation, investigation, interviewing etc. as a means of collecting information about the topic of study for themselves, thus achieving the outcomes of the syllabus in more practical and realistic ways. This is very important in science for teaching learners about the real world around them.

Fieldwork is particularly important in the outcomes approach, which aims to link learning to the real needs of the learners. Fieldwork, therefore, is an essential part of teaching, not an optional extra.

To ensure an effective and successful outcome, you must consider important aspects of fieldwork, such as good classroom preparation and planning, an effective process of carrying out actual work in the field and follow-up work in the classroom.

This means you must go and look at the area you plan to do fieldwork in before you do it, and decide exactly what you want learners to observe and do when they go there. In preparation for the visit, make sure learners understand the purpose of the visit and know what to look for and what to find out. A lot of the work can then be done by learners working in groups to answer questions, without too much help from you. The activities in the Learner's Resource Book will often provide the basis for a questionnaire.

Fieldwork takes time and may have to be fitted in after the normal teaching time—in an afternoon or even a weekend. Learners can often fill in questionnaires during their own time by looking at their own area—either after school or, in boarding schools, during the holidays.

Fieldwork is difficult in town schools but should not be ignored. You may have to rely on questionnaires to help learners to do the fieldwork in their own time, as described earlier. For instance, learners can be encouraged to go out at weekends and look at a river or stream, a market, or a farming area. Assignments can also be given for learners to do in their home areas during holidays—this helps them to realise that what they are learning applies to their home area.

## Group work

Learners take a more active role and talk naturally when they are allowed to work in small groups. In this way they can express their ideas rather than listen passively to the teacher, as is often the case when working with the whole class. Group work encourages learners to talk or do things for themselves as part of the learning process. Learners discuss, share views and interact in small groups then present their collective work to the class. To ensure effective learning during group work, preparation and class management are important for teachers.

Group work must be properly organised and supervised. You must not use it as an excuse to sit back and let learners get on with it. However, learners will often not talk freely if they know the teacher is listening, so you must leave groups to talk on their own. Sometimes it is even effective to walk out of the classroom for a while to give groups a chance to get going without you listening.

The role of the teacher in group work is as follows.

- **Choose the topic.** Groups can only discuss topics that they know something about, and that allow a range of points of view or opinions. You cannot discuss a topic such as “How are volcanoes formed?” because there is only one answer to the question and answers are right or wrong. You can discuss “How can people who live near a volcano prepare for what to do if the volcano erupts?” There are many different answers and each learner can have different ideas.

- **Set the objective.** Make sure groups know exactly what to discuss and have a set of clear questions to answer. It is not enough just to say “discuss this topic”.
- **Organise the groups.** Groups should be small enough for everyone to be able to talk. They should usually be mixed—different island groups, not all wantoks. It is good to mix girls and boys but do not do this if it leads to girls being too shy to talk. All-girl and all-boy groups may sometimes be better.
- **Organise the seating.** Good discussion will take place only if learners face each other in a circle. You cannot have a discussion with someone’s back! If possible, classrooms may be arranged by grouping desks in circles facing each other so group work is easy and no movement is necessary. In crowded classrooms you may allow some groups to have their discussion outside.
- **Circulate and listen to progress.** It is best to do this only after giving time for discussion to start. Try to make sure that everyone is given a chance to speak. If you see certain people dominating groups, intervene and ask others their ideas. If groups are having difficulty, give guidance by explaining the topic, give some extra questions or ask individuals their ideas. If groups are doing well on their own, do not interfere.
- **Decide on the language to be used.** In Year 1, most learners will want to use Pijin. It is best to let them do so or they may say nothing. There is nothing wrong with a local language if all in the group speak it, but try to get each group to report their ideas in English at the end, either verbally or in writing.
- **Report back.** It is often a good idea to appoint a “chair”, who will report back to the whole class at the end, but this is not always necessary. Each member may write their own ideas, or groups may just learn from the process of discussion.

## Debate and discussion

Group work involves learners in debates and discussions, which are active ways of engaging learners in the topic. Learners are able to research and collect information to use in debates about a particular topic or share ideas with others in the classroom. They will learn a lot in this process. Discussion can take place in small groups or as a whole class.

Debates are good for encouraging learners to form their own opinions about a topic. Even in Year 1 we should encourage this, using simple topics. At this level debates should be informal, without trying to follow the strict parliamentary rules of debating.

## Presentations

Role-play is a type of group work in which learners are given a part to play, in either a discussion or a story. Acting out a role-play encourages learners to participate, interact and learn through talking. Learners imagine themselves in the place of other people and try to think, act and talk as those people would act. Role-play is often best used at the end of a teaching topic, when learners have learnt quite a lot about a topic or about people in a different area. This helps them to think about the ideas and feelings of those people.

Simulation is similar to role-play, but the emphasis is on a situation rather than the people. Learners are given a situation that is similar to a real-life situation and learners can either be themselves acting in that situation or can act a role-play. For instance, learners are given a story about a dispute leading up to a fight in a school hall. They are asked to play the parts of the people in the story and act it out. This helps them to understand how other people feel and also to think about what they themselves would do in a similar situation. For a role-play or simulation to be successful, learners need enough time and information about the person and the situation to enable them to act and talk realistically.

Other types of presentations are:

- drama performances
- dance performances
- talks and reports
- poster presentations
- collage presentations
- cartoon presentations.

The outcomes approach is intended to teach attitudes and values as well as knowledge, understanding and skills. Role-play and simulation are particularly important in teaching attitudes and values.

## Research interviews and questions

There are a number of ways of conducting research interviews with people to collect information about a topic, such as:

- organising informal chats
- preparing questions to ask particular people
- preparing standardised questionnaires that learners can use with small groups, asking the same questions to a large number of people and later converting the answers into statistical form.

Prepared questions are also useful for fieldwork and they can be used alone or with any of the above techniques to collect information.

## Guest speakers

Asking people from outside the school with specialised knowledge and skills in particular topics to speak to the learners is one way of varying the normal classroom teaching and learning. Through this process, learners will appreciate the importance of specialised knowledge that other people in the community have.

## Visits

If possible, try to visit areas that are relevant to the topic being studied. When you visit, make sure learners go with a questionnaire as they would for fieldwork, so they know what to look for and what to find out.

## Case studies

A case study is a detailed study of a particular area or topic. A case study helps learners to translate the abstract topic in the syllabus into concrete reality, and so understand it better.

# Assessment

Assessment is a process in which teachers gather, analyse and interpret assessment information and data. You should use such information and data to develop and implement enrichment support and intervention strategies to improve the teaching and learning processes in the classroom. It is important to assess the learners to know what stage they have reached and the progress they are making in the classroom. Assessment is an important ongoing process in teaching and learning and it should be used continuously, not only at the end of a topic.

Assessment should include *formative assessment*, which takes place throughout every teaching topic and every unit of the Learner's Resource Book. Formative assessment emphasises continuous assessment as part of the teaching and learning process. "Assessment for learning" focuses on using assessment information to improve teaching and learning as an ongoing process. This helps you to monitor learners' progress on a continuous basis. The teacher should constantly observe and evaluate learners' achievements, collecting data on areas of improvement and new skills that they acquire. In doing this, teachers should focus on the general and specific learning outcomes stated in the syllabus. Learners should also be aware of what is being assessed, the assessment techniques being used and the criteria used. Learners can then judge for themselves whether they are achieving the general and specific learning outcomes.

*Summative assessment*, for example a unit or chapter test, tells you what learners have learnt or can do after a whole section of teaching. This type of assessment focuses on "assessment of learning" and is directed at ranking learners from their performance on the learning outcomes. This will also help teachers to devise ways of improving the learners' performance in the classroom. These tests are important, but assessment should not be done only by test. Assessment must cover skills as well as knowledge. You should test whether learners can read a map or interpret a photograph as well as test the factual knowledge they have learnt.

*Diagnostic assessment* is the type of assessment that teachers are encouraged to do in order to identify the learner's ability or achievement level of a specific learning outcome. This helps you to identify the learner's ability and devise remedial tasks as an intervention strategy. Learners who have achieved the specific learning outcomes should be given enrichment support to encourage them to maintain their achievement level.

## Assessment techniques

Some of the assessment techniques that can be used include the following.

### Verbal assessment

- Answering questions
- Making a verbal report
- Interviewing

### Written assessment

- Doing an activity (from a textbook or self-prepared)
- Doing an assignment
- Writing a report
- Sitting for a test or an examination

### Practical assessment

- Participating in a field trip/excursion and collecting information
- Demonstrating a particular task
- Drawing, interpreting and using a map
- Analysing a photograph
- Basic library research and collecting information

### Group-work assessment

- Participating in a group task and discussion
- Participating in a role-play and drama (Learners can be assessed on how they contribute to the discussion or role-play, possibly using a list of criteria for judgement.)

### Other

Other assessment techniques include:

- observation of what individual learners do
- consultation with individual learners by asking them questions

- focused analyses of learners’ work such as portfolios, or a collection of work they have done, to determine how each individual learner is performing in their learning process.

## Assessment of specific learning outcomes using achievement levels

Learners’ achievements in Primary Science will be reported in levels instead of marks. These levels of achievement are derived from curriculum outcomes in the Year 1 Science syllabus. Six levels are used to describe learners’ achievement of the learning outcomes, ranging from L5, the highest, through L4, L3, L2 and L1 to L0, the lowest. These levels will be used for assessment of individual learning outcomes.

Learners achieving at L0, L1 and L2 are considered to be at a critical level (Lc) and need urgent assistance. Learners in this category must be given remedial work in order to reach the curriculum benchmark. Learners achieving at L3+, which is a combination of L3 and L4, require assistance and must be given remedial work in order to reach the curriculum benchmark. Learners achieving at L5 are considered to have reached the curriculum benchmark and should be given enrichment support in order to maintain their high standard.

Level	Assessment criterion	Judgement criterion	Achievement award
L5	Statement to identify the fifth and highest level of achievement	Criteria for judging learner’s achievement	Achieved (A) Full mastery of learning outcome
L4	Statement to identify the fourth level of achievement	Criteria for judging learner’s achievement	Partially Achieved (PA4) Substantial mastery of learning outcome
L3	Statement to identify the third level of achievement	Criteria for judging learner’s achievement	Partially Achieved (PA3) Moderate mastery of learning outcome
L2	Statement to identify the second level of achievement	Criteria for judging learner’s achievement	Partially Achieved (PA2) Minor mastery of learning outcome
L1	Statement to identify the first level of achievement	Criteria for judging learner’s achievement	Partially Achieved (PA1) Minimal mastery of learning outcome
L0	Statement to identify the lowest and last level of achievement	Criteria for judging learner’s achievement	Not Achieved (NA) No mastery of learning outcome

### Assessment criteria as achievement levels

Following is an example of an assessment criteria framework for a specific learning outcome in Year 1 Science. The statements in the table are assessment criteria for the specific learning outcome 1.1.1.1. Each of the six levels describes the achievement of the learner.

Level	Assessment criterion	Judgement criterion	Achievement award
L5	Give examples of five or more living things from the surroundings	Able to provide five or more examples of living things from the surroundings	Achieved (A) Full mastery of learning outcome
L4	Give examples of four living things from the surroundings	Able to provide four examples of living things from the surroundings	Partially Achieved (PA4) Substantial mastery of learning outcome
L3	Give examples of three living things from the surroundings	Able to provide three examples of living things from the surroundings	Partially Achieved (PA3) Moderate mastery of learning outcome
L2	Give examples of two living things from the surroundings	Able to provide two examples of living things from the surroundings	Partially Achieved (PA2) Minor mastery of learning outcome
L1	Give example of one living thing from the surroundings	Able to provide one example of living things from the surroundings	Partially Achieved (PA1) Minimal mastery of learning outcome
L0	Unable to give an example of a living thing from the surroundings	Unable to provide any examples of living things from the surroundings	Not Achieved (NA) No mastery of learning outcome

Note: For outcomes involving understanding we need to assess both factual knowledge (the ability to state or list something without explaining it) and understanding (the ability also to explain the topic). We are not usually assessing only factual knowledge.

## Recording learners' achievements

Teachers are encouraged to keep accurate records of both individual learners and the whole class. At the end of each assessment event, individual achievements must be recorded using the approved recording template. The recommended recording template is shown in Appendix 3.

Keeping up-to-date and accurate records is very important for monitoring and reporting learners' performance, progress and achievements. It is also useful for teachers to use and show the records during meetings with parents, the learner and other key stakeholders.

## Monitoring individual learner and class achievements

With accurate records, teachers are able to monitor the learning performance, progress and achievement of individual learners and the whole class. You should monitor individual learners' performance, progress and achievements at the end of each assessment event. As you continue to assess more outcomes, the learning pathway of each learner can be mapped and tracked during a term or semester in any one year. This information is useful for providing advice to parents, the learner and other key stakeholders.

In order to identify strengths and weaknesses of individual learners in the classroom, you need to keep accurate records of the performance of all learners in the class against the performance of an assessed outcome at the end of an assessment event. In this way you can identify whether individual learners have achieved, partially achieved or not achieved the outcome for a particular assessment event. Using this simple monitoring technique, you can identify learners who need enrichment support and those who need remedial work to help them achieve the standards required by the national curriculum. The recommended monitoring template is shown in Appendix 4.

## Reporting an individual learner's achievement

With accurate records and effective monitoring systems, teachers are able to compile and make a balanced, accurate and fair report on each learner's performance, progress and achievements in a given assessment period.

The type of reporting system recommended by the Ministry of Education requires more description of the learner's performance. This means that the report must also provide a descriptive account of each learner's achievement.

The reporting system no longer uses marks or grades; instead you need to specify whether a learner has achieved, partially achieved or not achieved the assessed outcome. You should indicate this with an A, a PA (1–4) or an NA on the approved reporting form. At the end of each assessment period, you need to give an overall achievement level for the learner. This is essential for the calculation of the overall award. The overall achievement level is calculated as a gross points average, whereby the values of the outcomes assessed are added and the total is divided by the number of outcomes assessed. The value of each overall achievement level is equivalent to an award of attainment for the learner. The recommended reporting template is shown in Appendix 8.

### **Calculating progressive achievement levels for formative and summative assessment**

To calculate the progressive achievement level for formative assessment, add the values of achievement levels for all outcomes assessed during the formative component of the assessment and divide by the number of outcomes assessed. The number you get is the progressive achievement level for the learner for formative assessment. Similarly, to calculate the progressive level for summative assessment, add the value of achievement level for all outcomes assessed in the summative component of the assessment and divide by the number of outcomes assessed. The number you get is the progressive achievement level for the learner for summative assessment.

## Calculation of overall achievement levels using formative and summative assessments

To calculate the overall achievement for each individual learner, add progressive achievement levels for formative and summative assessment and divide by two. The number you get is the overall achievement level for the learner for that specific assessment period. The overall achievement level attained corresponds to an overall award for the learner (you should round off the calculated values to the nearest whole number). The award will be issued to the learner in the form of a coloured certificate in recognition of the learner's achievement.

The table below shows achievement levels, awards and certifications.

Overall achievement level	Performance descriptor	Achievement award	Certificate position	Colour code	Objective grading system
Level 5	Learner is competent with 95–100% of the outcomes	Achieved with excellence	Gold	Yellow	A
Level 4	Learner is competent with 80–94% of the outcomes	Achieved with merit	Silver	Green	B
Level 3	Learner is competent with 50–79% of the outcomes	Achieved with minimum standards	Bronze	Blue	C
Level 2	Learner is competent with 20–49% of the outcomes	Achieved below minimum standards	Critical level	No award	D
Level 1	Learner is competent with less than 20% of the outcomes	Achieved far below minimum standards	Critical level	No award	E
Level 0	Learner is not competent. Did not achieve outcomes	Not achieved	Critical level	No award	F

## Translation of the National Achievement Standards within individual subjects

The National Achievement Standards can be translated and adapted within individual subjects and is determined by the knowledge content, processes and skills taught, learnt and assessed during an assessment period for each academic year. For example, specific Science knowledge content, processes and skills taught, learnt, assessed and achieved by each learner should be reported clearly with an appropriate achievement award, grade and percentage attained using the National Achievement Standards framework. The report should provide specific Science knowledge content, processes and skills attained by each learner for a specific assessment period. Such attainments can be measured against the curriculum standards and benchmarks prescribed in the Primary Science Syllabus and the Science prescription handbook.

## Meetings with parents, learners and other stakeholders

Teachers and the school administration are encouraged to consult parents, learners and other stakeholders to discuss the performance, progress and achievements of learners and suggest ways that learners can improve. This is a very important process because it involves giving proper feedback to both the learner and the teacher. The school administration can organise consultative meetings between teacher and parent, as well as teacher, parent and learner. If you have kept accurate records of the learner's performance, progress and achievements you will be able to identify the learning progress and pathway of the learner, and therefore determine appropriate remedial work for each learner. You will also then need to provide results after each remedial work has been carried out with the learner. Conducting such very important meetings will give parents and key stakeholders confidence for their children to be educated in our schools. These meetings are important links with parents and other key stakeholders.

# Resources for Primary Science

Following is a list of materials and equipment required for Primary Science. Learners can collect many of these items. The school should use some of its grant money to buy the other items. They are all available in shops.

Note that not all of the items in this list will be needed for Year 1 Science. See the teacher's support notes in each chapter for a list of resources needed in each activity.

Aluminium foil	Globe of the Earth or	Plastic sheet
Balloons	football	Plasticine or Blu Tack
Balls	Ice cube trays	Rubber bands
Basins	Ice-cream cartons	Rulers
Batteries	Jars	Scissors
Bean seeds	Jugs	Screws
Bowls	Kerosene	Seeds of various types
Buckets	Kettle	Small stones
Bulbs	Large plate	Soil mixture
Candles	Matches	Sticky tape
Chalk	Metal bottle tops	String
Coins	Mirrors	Thin sticks (e.g.
Corks	Nails	toothpicks)
Cotton thread	Nursery boxes	Tins
Crayons	Paper clips	Torches
Cups	Pencils	Wires
Drinking glasses	Pens	Wood
Erasers	Pins	
Feathers	Plastic bags	
Fishing line	Plastic basins	
Glass jars	Plastic cups	

# Links between Primary Science and other subjects

Many other subjects cover topics or skills that are similar to or related to the topics and skills we teach in science. It is important that you are aware of these and, when you teach a topic or use a skill, you point out to learners that they have also learnt about this or will learn about this in another subject.

Below is a list of some of the topics or skills in other subjects that you should be aware of.

Other subjects: sub-strand and level		Science sub-strand and level
Health Studies	<b>Year 1</b> My body Eating for health Understanding germs	<b>Year 1</b> Living things and non-living things. Types of food in garden
	<b>Year 2</b> Growing up Safety in community and public places Healthy food for healthy growth Healthy school, home, community and public places	<b>Year 2</b> Using our senses Gardening
Social Studies	<b>Year 1</b> The Important features of where I live Natural and built resources	<b>Year 1</b> Living things and non-living things
	<b>Year 2</b> Resources and economic activities Goods and services	<b>Year 2</b> Things that make farming successful
	<b>Year 3</b> Weather and seasons	

# Chapter 1 Living things and non-living things

**Strand: Life and Living**

**Suggested periods: 32 (8 weeks)**

## Sub-strand statement:

There are living things and non-living things all around us. Some examples of living things are plants and animals. Examples of non-living things are soil and water. Living things have characteristics that non-living things do not have. Living things can breathe, and they need food and water. Human beings are living things. They need water, food and air to live.

## General learning outcomes

Learners should:

- 1.1.1 appreciate that there are living things and non-living things in our surroundings (V)
- 1.1.2 know that living things need air, water and food (K)
- 1.1.3 understand that living things can move and grow. (U)

## Specific learning outcomes

Learners should be able to:

- 1.1.1.1 give examples of three living things from the surroundings
- 1.1.2.1 identify and sort living things and non-living things according to their groups
- 1.1.2.2 name three basic needs of living things (water, food and air)
- 1.1.3.1 explain that living things can move and grow.

Processes and skills		Resources	Teacher's support notes	Leamer's Resource Book
Make observations and apply knowledge.	<i>Explore Science</i> pages 4–10	<p><b>Activity 1</b> Explain to the class that all of the things around them are either living or non-living. Living things are different from non-living things because they grow and have young, move by themselves, and need food, water and air. Once this has been discussed, the learners can look at the pictures of the puppy and discuss with a partner if the puppy is living. Because the puppy moves by itself, eats and drinks and grows – it must be living.</p>	Page 2	
Make observations and apply knowledge.	<i>Explore Science</i> pages 4–10	<p><b>Activity 2</b> This activity is similar to Activity 1. The learners should look at the photograph and decide if chickens are alive. The chicken grows from a chick so it is alive. Most learners will have seen chickens so ask them if they know other things about chickens that make them living things. They should know that chickens move, and eat food. At the end of this activity, tell the learners that all animals are alive and that humans are animals and so we must be alive as well.</p>	Page 3	
Make observations and apply knowledge.	<i>Explore Science</i> page 4	<p><b>Activity 3</b> The learners should look at the pictures of the seedling and the tree and discuss with a partner if the tree is alive. Ask them to think about other things they know about trees that might help them to decide. Trees are alive because they grow and the picture shows this. But many children find it difficult to think of plants as living because they do not see them move. Plants move to follow the Sun, and flowers open and close. The focus of this lesson is to simplify the process, so you can remind the learners that plants need water and without water they die.</p>	Page 4	

Processes and skills	Resources	Teacher's support notes	Learner's Resource Book
<p>Make observations and apply knowledge.</p>	<p><i>Explore Science</i> page 10 A collection of stones from outside</p>	<p><b>Activity 4</b> Give each learner a stone. Ask them to discuss in pairs if the stone is living or non-living. You can help them by asking some questions:</p> <ul style="list-style-type: none"> <li>• Does a stone need food or water?</li> <li>• Does a stone grow?</li> <li>• Can a stone move by itself?</li> <li>• Does a stone need air to breathe?</li> </ul> <p>You may have to explain 'breathing' to the learners, which is taking air into our lungs. The stone does none of the above things so it is not alive.</p>	<p>Page 5</p>
<p>Make observations and apply knowledge.</p>	<p><i>Explore Science</i> page 10</p>	<p><b>Activity 5</b> This activity is similar to Activity 4. The learners can observe a book and discuss with a partner if it is alive or not. They should now be able to do this without help from the teacher, but if help is needed, the teacher can ask them to think about the list of questions from Activity 4, but applied to a book.</p>	<p>Page 6</p>
<p>Make observations and apply knowledge.</p>	<p><i>Explore Science</i> pages 4–10</p>	<p><b>Activity 6</b> Ask the learners to look carefully at each picture and discuss with a partner if the thing in the picture is living or non-living, using the information they have gained from the previous activities. Draw a table on the board with two columns: 'Living' and 'Non-living'. As you get answers from the different learners, draw and write the objects in the correct column. Make sure the learners explain why they have decided that an object is living or non-living to make sure they are not guessing.</p>	<p>Page 7</p>

Processes and skills		Resources		Teacher's support notes		Learner's Resource Book	
Make observations and classify objects.	<i>Explore Science</i> pages 4–10	<b>Activity 7</b> Take the learners into the schoolyard and ask them to look around. Ask individual learners to point to things that are living or non-living and explain to the class why they think this. Back in the classroom, draw a table similar to the one in Activity 6, but for objects in the schoolyard.	Page 8				
Make observations and classify objects.	<i>Explore Science</i> pages 4–10 Pictures of living and non-living things cut from newspapers and magazines, glue or tape, large pieces of card	<b>Activity 8</b> Cut pictures from the local newspaper or magazines that show living and non-living things. Prepare charts with the headings 'Living things' and 'Non-living things'. This activity can be done in groups. Give each group their chart and a mix of pictures, and have them first classify the pictures into groups for you to check. Ask learners to glue or tape the pictures of the objects into the correct column. When they have finished, their charts can be displayed on the classroom wall.	Page 9				
Make observations and classify objects.	<i>Explore Science</i> pages 4–10	<b>Activity 9</b> Have the learners discuss this activity in pairs and then tell you and the rest of the class which objects can move and grow.	Page 9				
Make observations and classify objects.	<i>Explore Science</i> pages 4–10	<b>Activity 10</b> The learners can discuss this activity in pairs and then tell you and the rest of the class which of the objects are living. NOTE: Children often think that cars are living because they move and use fuel. But they cannot move by themselves and they do not grow or produce offspring.	Page 10				

Processes and skills		Resources	Teacher's support notes	Learner's Resource Book
Manipulate equipment and make observations.	<i>Explore Science</i> pages 4–7 Plastic cups, soil, bean seeds or other seeds	<b>Activity 11</b> Demonstrate to the class how to put soil into a plastic cup, plant a seed in it, and water it. Then give each group of learners a plastic cup, a seed and some soil and let them plant the seed for themselves. Let them water the seed each day but ensure that they don't use too much water. They can observe the seedling growing over a number of weeks and then it can be transplanted to the school garden. The learners should know that a plant is a living thing and this activity shows that plants grow and need water.	Page 11	
Make observations and draw conclusions.	<i>Explore Science</i> pages 4–7	<b>Activity 12</b> The learners should look at the pictures in the activity and discuss what the babies need to help them grow. The focus here is on food helping babies to grow, so help the learners to identify the food.	Page 12	
Summarise what has been learnt in the chapter.		<b>Chapter review</b> Go through the chapter review to revise the work covered in each section. Refer to the appropriate pages in the Learner's Resource Book if any review statements are not understood.	Page 13	
		<b>Concept map</b> Review the concept map with learners to ensure they understand the key concepts covered in the chapter.	Page 13	
		<b>Revision (assessment)</b> Give the learners time to complete the questions in the revision section of this chapter.	Page 14	

## Activity answers and assessment answers

### Activity 1

The puppy is alive because it moves, needs food, water and air, and it grows.

### Activity 2

The chicken is alive because it moves, needs food, water and air, and it grows.

### Activity 3

The tree is alive because it grows from a seedling and it needs water.

### Activity 4

The stone is not alive because it does not move, does not need food, water or air and does not grow.

### Activity 5

The book is not alive because it does not move, does not need food, water or air and does not grow.

### Activity 6

The table will look like this. Be sure to use drawings for each thing.

Living	Non-living
butterfly	house
dog	table
tree	chair
pig	toy car
fish	plastic bag
child	

### Activity 7

The table might look like this, but it will depend on the living and non-living things in the schoolyard.

Living	Non-living
dog	building
plant	wall
insect	rocks
bird	glass

### Activity 8

Check that the learners have grouped their pictures correctly before they stick them into the correct column of the chart.

### Activity 9

The answers are as follows:

Living	Non-living
cows kitten or cat boy fish chicken	books roof chair, desk and computer T-shirt bottles of drink torch ship

### Activity 10

The answers are as follows:

Living	Non-living
ladybug or insect trees or forest	car mobile phone

### Activity 11

Make sure you demonstrate how to plant a seed in a small cup and water it each day. Then let the learners do this for themselves. Once the seedling has grown, they should be able to tell you that the plant is living because it grows.

### Activity 12

The babies will need food and water to help them grow and so they are living. Because the focus here is on food, the only thing the babies need is milk.

### **Revision questions**

- 1 Living things are in pictures a, c, d, f showing trees, a person, corn and a bird.
- 2 The boy and girl are living because they can move by themselves, they need food, water and air, and they grow into adults.

# Chapter 2 Energy all around us

## Strand: Energy

**Suggested periods: 32 (8 weeks)**

### Sub-strand statement:

Learners experience some sources of energy and learn to identify these. They investigate sound, light and movement energy.

### General learning outcomes

Learners should:

- 1.2.1 know that light comes from different things (K)
- 1.2.2 know the colours of the rainbow (K)
- 1.2.3 understand that there are various sources of heat (U)
- 1.2.4 appreciate that sounds can be made in a variety of ways (V)
- 1.2.5 know that electricity is the energy in many everyday appliances (K)
- 1.2.6 understand that a push is needed to make a car move. (U)

### Specific learning outcomes

Learners should be able to:

- 1.2.1.1 give examples of things that give out light at home
- 1.2.2.2 name the colours of the rainbow
- 1.2.3.1 give two examples of sources of heat we experience each day
- 1.2.4.1 make a simple musical instrument using local materials
- 1.2.5.1 name some home appliances which use electricity
- 1.2.6.1 demonstrate that a push can make a toy car move.

### Note

Energy is a very difficult idea for children and many adults. So at this level it is better not to talk about energy in general but only about particular types of energy. This is why you will not see the word ‘energy’ appearing very often in the Learner’s resource Book. Instead, we talk about light, heat, sound and electricity. The chapter will help learners to become familiar with certain types of energy so that it is easier for them to understand the idea of energy in general and different types of energy later on.

Processes and skills		Resources	Teacher's support notes	Learner's Resource Book
Make observations.	<i>Explore Science</i> pages 246–249	<p><b>Activity 1</b> This first activity introduces the learners to light (one form of energy) from the Sun and from some other sources, such as lamps and candles. Ask the learners: What lets you see things? Discuss that light from the Sun does this. Ask: How do you see when the Sun goes down at night? Look at the pictures in Activity 1 and ask the learners to identify these different sources of light.</p>	Page 16	
Make observations and communicate in pictures.		<p><b>Activity 2</b> Light a candle and let the learners watch it and draw it in their exercise books. Tell them that candles give us light to see. Ask: Do candles give out anything else?</p>	Page 16	
Make observations and communicate in pictures.	<i>Explore Science</i> page 249	<p><b>Activity 3</b> Ask the learners if they have seen a rainbow. Ask: When do you usually see rainbows? If there is a rainbow during school time, take the class outside to observe it. The picture of the rainbow in the Learner's Resource Book shows all the colours of a rainbow and the learners should draw this in their exercise books. Explain that in a real rainbow, the colours are not separated as in the drawn rainbow.</p>	Page 17	
Make observations and communicate in pictures.	<i>Explore Science</i> page 93	<p><b>Activity 4</b> Ask the learners: What does the Sun give us? They should know that it gives us light but also heat. Take them outside to feel the heat from the Sun on their skin. Make a puddle in the school playground so the learners can check it every 30 minutes and see it gradually disappear. Explain to the learners that the puddle has disappeared because the heat from the Sun dries it. Ask the learners what else gives us heat. Discuss the picture of the flame on page 19 and explain that flames give us light and heat just like the Sun. What things do we use flames for? The picture in the book will give the learners some ideas.</p>	Page 18	

Processes and skills		Resources		Teacher's support notes		Learner's Resource Book	
Make observations.	<i>Explore Science</i> pages 252–255	<b>Activity 5</b> This activity is simply to let the learners identify some musical instruments from illustrations and introduce the topic of sound.	Page 20				
Make an instrument.	<i>Explore Science</i> pages 252–255 Materials to make some simple musical instruments	<b>Activity 6</b> This activity allows the learners to have some fun making simple musical instruments. The easiest instruments to make are shakers. These can be made by putting small stones into plastic bottles or tins. They can also make drums and simple guitars as shown in the Learner's Resource Book. When they have done this, they can play a simple tune and then draw their instrument in their exercise book.	Page 21				
Make observations.	<i>Explore Science</i> pages 244–245	<b>Activity 7</b> This activity introduces electricity to the learners without going into too much detail. They simply have to identify some appliances that need electricity to work. If possible, bring in an appliance like a kettle and demonstrate to the learners that it needs electricity to work.	Page 22				
Make observations.		<b>Activity 8</b> This activity can be done as homework and builds on Activity 7. The learners identify electrical appliances at home.	Page 23				
Make observations.	<i>Explore Science</i> page 154 A toy car for each group	<b>Activity 9</b> This activity introduces the learners to the idea of movement (another type of energy). The learners can do this activity in groups. Give each group a toy car. (The children may be able to bring their own cars in.) Learners set the car on a flat surface—the floor or a table—and the car should be sitting still. Ask: How can you make the car move? Let the learners push the car to make it move. They can make a drawing of the car when they have completed the activity.	Page 24				

Processes and skills	Resources	Teacher's support notes	Learner's Resource Book
Summarise what has been learnt in the chapter.		<p><b>Chapter review</b> Go through the chapter review to revise the work covered in each section. Refer to the appropriate pages in the Learner's Resource Book if any review statements are not understood.</p>	Page 25
		<p><b>Concept map</b> Review the concept map with learners to ensure they understand the key concepts covered in the chapter.</p>	Page 25
		<p><b>Revision (assessment)</b> Give the learners time to complete the revision activity in this chapter.</p>	Page 26

## Activity answers and assessment answers

It is important to keep language very simple in all these activities. Avoid using the term 'energy' too much as it is much too difficult for very young learners.

### Activity 1

- 1 We get light from kerosene lamps.
- 2 We get light from electric lamps and bulbs.
- 3 We get light from candles.

### Activity 2

The candle gives out both light and heat. The Sun gives out light and heat also. (At this stage, do not explain that light and heat are two types of energy: just say that they are different forms of energy.)

### Activity 3

Light from the Sun is actually a mixture of colours. In a rainbow we can see all the colours. This activity makes the learners familiar with a range of different colours.

### Activity 4

It is important for the learners to understand that the Sun gives us light and heat. They should understand that the heat from the Sun dries up water after it rains. We can get heat from other things like fires, and we use this to cook.

### Activity 5

By the end of this activity the learners should be able to identify a number of musical instruments including a guitar, drum, panpipes and ukulele.

### Activity 6

Help the learners to make simple musical instruments. Let the learners play with the instruments and try to make tunes. Don't worry if there is a lot of noise for a short time.

### **Activities 7 & 8**

These activities introduce the learners to electricity. Electricity is a type of energy but it is a very difficult idea for young children to understand. At this stage they just need to understand that we need electricity to make many appliances work.

### **Activity 9**

By the end of this activity they should understand that to make something move you need to push it (a push is a force).

### **Revision questions**

- 1 A bird singing—sound
- 2 A flame—light and heat
- 3 The Sun—light and heat
- 4 A person playing a guitar—sound
- 5 A television—electricity
- 6 Lightning—light and electricity
- 7 An electric fan—electricity

# Chapter 3 Sorting materials

## Strand: Natural and Processed Materials

**Suggested periods: 24 (6 weeks)**

### Sub-strand statement:

We use many different materials every day. Some of these are natural materials, e.g. wood, rocks or clay. Others are man-made or processed materials, e.g. plastics and nylon. Materials can be sorted using their physical properties such as shape, colour, size and texture. Some of the physical properties of materials can change when they are heated, squashed or squeezed, e.g. shape or size.

### General learning outcomes

Learners should:

- 1.3.1 identify some common materials, e.g. wood, metal, plastic, glass (S)
- 1.3.2 recognise different shapes and colours of materials (K)
- 1.3.3 know various materials, such as rubber and plastic, change shape when squashed or stretched. (K)

### Specific learning outcomes

Learners should be able to:

- 1.3.1.1 group things from the local environment according to the materials they are made from
- 1.3.1.2 name the shapes and colours of some of the things collected
- 1.3.2.1 name two objects that change shape when they are squashed or stretched.

Processes and skills		Resources	Teacher's support notes	Learner's Resource Book
Make classifications.	<i>Explore Science</i> pages 45–47 Wooden and plastic objects, such as: rulers, pencils, pens, carvings, cups, bags	<b>Activity 1</b> Show the learners some items in the classroom that are plastic and some that are wood. Explain that wood is a natural material that comes from trees but plastic has to be made by humans. The learners can work in groups. Give them a number of different wooden and plastic objects and ask them to put the objects into two groups. Let them try this themselves, but if they require some help, do the first example for them.	Page 29	
Make observations and identify objects made of metal.	<i>Explore Science</i> page 47	<b>Activity 2</b> Explain to the learners that metals are very strong and do not break easily. That is why we can use metals to make bridges, cars and trucks. Now look at the pictures in the Learner's Resource Book and ask the learners what each object is and why it is made of metal. Let the learners look around the classroom and identify things that are made of metal.	Page 29	
Make observations and identify what objects are made of. Communicate in words and pictures.	<i>Explore Science</i> pages 45, 47	<b>Activity 3</b> Before going out into the schoolyard, ask the learners to identify objects that are made from wood, metal and plastic in the classroom. Then take them into the schoolyard to see how many wood, plastic and metal objects they can find outside. When they go back inside they can report their findings to the rest of the class and draw some of the objects they identified in their exercise books.	Page 30	

Processes and skills	Resources	Teacher's support notes	Learner's Resource Book
Classify objects in groups.		<p><b>Activity 4</b> The learners should look at the pictures in this activity and discuss in pairs or groups which objects they think are natural and which are man-made. Ask each group to tell the rest of the class one natural object and one man-made object and why they think this. Then draw these in a table with two columns on the blackboard.</p>	Page 31
Describe objects.	<i>Explore Science</i> pages 40–49	<p><b>Activity 5</b> Explain what the terms <b>hard</b>, <b>soft</b>, <b>rough</b>, <b>smooth</b>, <b>dull</b> and <b>shiny</b> mean. It is good to use some examples to explain these words, like a 'shiny, smooth spoon' that is also hard, and a 'rough, hard rock' that is dull. Then give the learners some objects and ask them to describe these using the words above. They can do this in groups. Then each group describes one object to the rest of the class. The learners draw the objects in their exercise books and copy the words that describe them.</p>	Page 32
Make observations and describe shapes.	Cardboard shapes (triangles, squares and circles) in different colours—blue, red, green, yellow, brown, white, black	<p><b>Activity 6</b> Hold up the different shaped cards to show the class. Ask the learners what each shape is called. Then ask them the colour of the different shapes. Draw the three shapes on the blackboard and label them as <b>circle</b>, <b>square</b> and <b>triangle</b>. Ask the learners to copy these into their exercise books. The learners should then look at the pictures in the Learner's Resource Book and decide what colour and shape each object is. They can report their ideas to the rest of the class.</p>	Page 33

Processes and skills		Resources		Teacher's support notes		Learner's Resource Book	
Make observations and describe objects.				<b>Activity 7</b> Point to different objects in the classroom and ask the learners to tell you and the rest of the class what colour they are and what shape they are, e.g. The blackboard is black and square.	Page 34		
Make observations and describe objects.				<b>Activity 8</b> Take the class into the schoolyard and ask them to look around at all of the different things outside. Ask each learner to remember one object and its colour. When they go back inside, ask the learners to list the objects and their colours. Draw these on the blackboard and write the colour beside them.	Page 34		
Make observations and classify into groups.		Square cards of different colours		<b>Activity 9</b> The learners can do this activity in groups. Give each group a number of square cards of different colours and ask the learners to group the cards into colours. You may have to demonstrate this first by putting all the red cards together.	Page 35		
Make observations.		Cards of the same colour but different shapes		<b>Activity 10</b> This activity is the same as above but this time the learners should group the cards into shapes. You may have to demonstrate this by putting all the circles together.	Page 35		
Make observations and classify into groups.		Cards of different colours and different shapes		<b>Activity 11</b> This activity builds on the two activities before. This time the learners have to group the cards using two properties: colour and shape. Again, you may have to demonstrate this by grouping, for example, the red square cards together.	Page 36		

Processes and skills		Resources	Teacher's support notes	Learner's Resource Book
Make observations.	<i>Explore Science</i> page 157 A rubber ball and a rock	<b>Activity 12</b> Hold up a rock and ask the learners if they think it is possible to change the shape of a rock. Do the same with a rubber ball. Pass both objects around the class and ask the learners why it is possible to change the shape of the rubber ball but not the rock. Ask: How did you change the shape of the ball?	Page 36	
Make observations.	A number of erasers	<b>Activity 13</b> Give out an eraser to each group. Ask the group if they can change the shape of the eraser and how they can do this.	Page 37	
Make observations.	A number of rubber bands	<b>Activity 14</b> NOTE: Be careful with this activity—make sure learners do not stretch the rubber bands too far as they might break, and they can damage children's eyes. Give out a rubber band to each group. Ask the group if they can change the shape of the rubber band and how they can do this. By the end of Activities 12–14, the learners should understand that it is difficult to change the shape of a hard object but it is possible to change the shape of a soft object by <b>squeezing, bending, twisting or stretching</b> it.	Page 37	
Summarise what has been learnt in the chapter.		<b>Chapter review</b> Go through the chapter review to revise the work covered in each section. Refer to the appropriate pages in the Learner's Resource Book if learners do not understand any review statements.	Page 38	
		<b>Concept map</b> Review the concept map with learners to ensure they understand the key concepts covered in the chapter.	Page 38	
		<b>Revision (assessment)</b> Give the learners time to complete the revision activity in this chapter.	Page 39	

## Activity answers and assessment answers

### Activity 1

This activity helps to develop skills such as observing, and it can also be useful to develop language such as 'wood' and 'plastic'. These words can be given in English, Pijin or the vernacular.

### Activity 2

The learners should learn the word **metal** and some of the properties of metal.

### Activity 3

The learners should be able to identify the materials **wood**, **metal** and **plastic** and link these materials to their uses.

### Activity 4

The learners should be able to distinguish between man-made objects—made by humans—and natural objects from nature. It is good to make these very obvious. Use metal and plastic objects as examples of man-made things and plants and animals for the natural objects.

Man-made: plastic bags, metal tongs

Natural: apple, salad, flower, crocodile, bird, stones

### Activity 5

The learners should be able to use words like **rough** and **smooth** appropriately. Again, this is a good activity for improving language skills in English, Pijin or the vernacular.

### Activity 6

It is important the learners can identify different colours and shapes. Activities 6–11 will help them to do this. The activities should also help improve their vocabulary. This first activity should make them familiar with three shapes and a number of different colours and they can apply this knowledge to the pictures in the activity.

### Activity 7

Here the learners can apply their knowledge of shapes and colours to objects in the classroom.

**Activity 8**

Here the learners can apply their knowledge of shapes and colours to objects in the schoolyard. This can include grass, soil, the sea and sky.

**Activity 9**

The learners should be able to group the cards into colours.

**Activity 10**

The learners should be able to group the cards into shapes.

**Activity 11**

The learners should be able to combine the skills in Activities 9 and 10 and group the cards using both shape and colour.

**Activity 12**

The learners should understand that it is difficult to change the shape of a hard object like a rock, but a soft object, like a rubber ball, can be changed by squeezing it.

**Activity 13**

An eraser is quite soft and it is possible to change its shape by bending or twisting it.

**Activity 14**

A rubber band is also quite soft. We can change the shape of a rubber band by stretching it.

**Revision questions**

- 1 The window is made of glass.
- 2 The cup is made of plastic.
- 3 The ruler is made of wood.
- 4 The spoon is made of metal.

# Chapter 4 Food from the garden

## Strand: Farming

**Suggested periods: 20 (5 weeks)**

### Sub-strand statement:

Most meals contain root crops and other vegetables and fruits that are grown in gardens. Such vegetables, including root crops, and fruits include paw paws, bananas, peanuts, cucumber, potatoes, cassava, taro, yam and cabbage. Food that we grow and pick from our gardens is fresh and healthy.

### General learning outcomes

Learners should:

- 1.4.1 know some common fruits, vegetables and root crops planted in the garden (K)
- 1.4.2 understand the importance of growing food in the garden (U)
- 1.4.3 appreciate that their daily meals contain food from the garden. (A/V)

### Specific learning outcomes

Learners should be able to:

- 1.4.1.1 list three examples of common root crops normally eaten during meals at home
- 1.4.2.1 explain why food from the garden is fresh and healthy
- 1.4.3.1 list some garden crops which they eat at home.

Processes and skills		Resources	Teacher's support notes	Learner's Resource Book
Make observations.	A variety of root crops: yam, cassava, kumara, taro	<b>Activity 1</b> Ask the learners where they think their food comes from. Ask: What are your favourite foods and why do you like them? Show the learners the root vegetables and pass them around the class. They should discuss if these grow above the soil or under it. They should talk to a partner about the crop they like to eat most and why.	Page 41	
Make observations.	A variety of green vegetables	<b>Activity 2</b> Show the learners some green vegetables, such as lettuce, beans and cabbage, and pass them around the class. The learners should discuss if these grow above the soil or under it. They should talk to a partner about the crop they like to eat most and why.	Page 42	
Make observations.	Other vegetables, such as corn, eggplant, tomatoes, pumpkin	<b>Activity 3</b> Show the learners the vegetables and ask if they can name each one. Ask: Do you think these vegetables grow under the soil or above it? They should talk to a partner about the crop they like to eat most and why. Ask the learners to name the colours of the different vegetables.	Page 43	
Make observations and communicate in pictures.	The school garden	<b>Activity 4</b> Before this activity, check the school garden and find out what is growing there. Take the learners to the garden and ask them to identify the crops that are growing. Back in the classroom, discuss why it is good to have a garden to grow vegetables and fruit. The learners can draw a picture of the school garden they have visited.	Page 44	

Processes and skills		Resources	Teacher's support notes	Learner's Resource Book
Make observations and apply knowledge.			<p><b>Activity 5</b> The learners should examine the pictures in the Learner's Resource Book and discuss with a partner what all of the food types are. Then they should identify the vegetables and tell the class what they are.</p>	Page 45
Make observations and communicate in pictures.		Access to a local market	<p><b>Activity 6</b> Go to the local market and check what vegetables they are selling. Talk to some of the sellers there and explain that you will be bringing your class to the market and the children may want to ask them some questions. It is good to ask some parents to come with you when you take the class. When you take your class to the market, ask them to count how many different types of vegetables they can see. Encourage them to ask questions of the sellers. When they get back to the classroom they can draw a picture of the market.</p>	Page 46
Make and draw.		Matchsticks; a range of fruit and vegetables	<p><b>Activity 7</b> Show the learners how to make a vegetable person by using pieces of vegetable and fruit stuck together with matchsticks or other small sticks. The learners can work in groups to make their vegetable people. When they have finished, they can draw them in their exercise books. Encourage some groups to tell the class a story about their person. When they have finished, the children can take their people home and eat the vegetables.</p>	Page 47
Make and draw.		Fruit and vegetables, cardboard boxes, pots and plates	<p><b>Activity 8</b> For this role-play, the learners work in small groups. They can use a box as a cooking stove and pretend to cook some vegetables in pairs, and serve the vegetables to their friends on plates. This role-play can be done in front of the whole class.</p>	Page 48

Processes and skills		Resources	Teacher's support notes	Learner's Resource Book
Make and draw.	Fruit and vegetables, cardboard boxes and pretend money	<b>Activity 9</b> For this role-play the learners work in small groups. Help groups to set up a pretend market stall using a cardboard box. The learners should put some different fruits and vegetables on the box and their friends can 'buy' the fruit using pretend money.	Page 48	
Summarise what has been learnt in the chapter.		<b>Chapter review</b> Go through the chapter review to revise the work covered in each section. Refer to the appropriate pages in the Learner's Resource Book if learners do not understand any review statements.	Page 49	
		<b>Concept map</b> Review the concept map with learners to ensure they understand the key concepts covered in the chapter.	Page 49	
		<b>Revision (assessment)</b> Give the learners time to complete the revision activity in this chapter.	Page 50	

## Activity answers and assessment answers

### Activity 1

All of the vegetables are root vegetables and grow under the soil, e.g. kumara, yam, cassava.

### Activity 2

All of the vegetables are green vegetables and they grow above the soil, e.g. lettuce, cabbage, broccoli, green peppers, beans.

### Activity 3

These vegetables are not root vegetables or green vegetables but they all grow above the soil, e.g. chillies, tomatoes, eggplant, corn. Name the colours of the different vegetables to improve the learners' vocabulary.

### Activity 4

Visiting the school garden is fun for the learners and lets them see vegetables actually growing.

### Activity 5

Draw a table on the blackboard with two columns like the one below, and then draw the different food types in the correct column. Ask the learners where the other food comes from, and write the sentences into the second column of the table.

From the garden	Other food
Draw pictures here of vegetables and fruits from pictures 2 and 5.	Draw pictures here of fish, crabs and meat from pictures 1, 3, 4 and 6.  1 Fish come from the sea. 3 Shellfish come from the sea. 4 Meat comes from animals. 6 Crabs come from the sea.

## Activity 6

Encourage the learners to ask questions about the market and identify as many different vegetables and fruits as possible.

## Activity 7

The learners may be able to bring in some fruit and vegetables for this activity. Demonstrate how to make a vegetable person and then let each group make their own. Each group should draw their vegetable person and then tell a story about them.

Learners can take the fruit and vegetables home to eat so that none goes to waste.

## Activities 8 & 9

The learners may be able to bring in some materials such as boxes to help with these activities. They act out the activities in groups as role-plays.

## Revision questions

1

Type of food	Food from the garden	Food from the shops
Biscuit		✓
Kumara	✓	
Rice		✓
Banana	✓	
Bread		✓
Green pepper	✓	
Tinned fish		✓
Pineapple	✓	

2 The drawing will depend on which fruit or vegetable each learner chooses.

# Chapter 5 Sun and Moon

## Strand: Earth and Beyond

**Suggested periods: 20 (5 weeks)**

### Sub-strand statement:

The Sun gives us light on Earth during the day. The Moon gives us light during the night. The Sun plays a major role in our daily lives, giving us light, warmth and enabling plants to grow.

### General learning outcomes

Learners should:

- 1.5.1 know that the Sun and the Moon give out light at different times on Earth (K)
- 1.5.2 recognise that the Sun gives us light and heat but the Moon only gives us light (K)
- 1.5.3 understand the danger of looking directly at the Sun (U)
- 1.5.4 know that sunlight affects behaviour of some animals (K)
- 1.5.5 appreciate that people do different things at different times of the day and night. (V)

### Specific learning outcomes

Learners should be able to:

- 1.5.1.1 state that the Sun gives out light during the day and the Moon gives out light at night
- 1.5.2.1 explain the difference between the Sun and the Moon in terms light and heat
- 1.5.3.1 explain the danger of looking directly at the Sun
- 1.5.4.1 list examples of some animals that are active (come out) at night
- 1.5.5.1 explain two examples of activities that people do during the day and two they do at night.

Processes and skills		Resources	Teacher's support notes	Learner's Resource Book
Make observations.	<i>Explore Science</i> page 227	<p><b>Activity 1</b> Take the class out into the schoolyard—early morning or late afternoon is best as it is not too hot. Ask them to close their eyes and tell you what they feel on their skin. They should notice the warmth of the Sun. Tell them to open their eyes. Ask: What do you notice? What helps you to see things outside?</p>	Page 53	
Make observations through listening, and communicate through role-play and in pictures.		<p><b>Activity 2</b> Read the poem to the class and then ask some questions about it. Ask learners to tell you about playing on the beach or in the warm sea. Ask: Why do you like it? The learners can do simple role-plays of playing on the beach or in the sea and then they can draw a picture of one of these.</p>	Page 54	
Make observations.	<i>Explore Science</i> page 250	<p><b>Activity 3</b> The Learner's Resource Book shows a picture of a child and her shadow. Take the learners outside and ask them to identify their shadow. They can observe how it changes as they move their bodies. They will do much more work on shadow later.</p>	Page 55	
Make observations. Explain reasons.		<p><b>Activity 4</b> When you bring the class back to the classroom, try to make it as dark as possible by putting sheets or paper over the windows. Ask the learners why it is difficult to see. Take the sheets down and ask them why it is easier to see. They should be able to tell you that we need light to see.</p>	Page 56	

Processes and skills	Resources	Teacher's support notes	Learner's Resource Book
<p>Make observations through listening, and communicate through role-play and in pictures.</p>		<p><b>Activity 5</b> Read the story to the class and ask them some questions at the end, such as: When did the Sun have no light? The learners can role-play the story or draw a simple picture to show one part of it. If doing a role-play, discuss ideas with the learners on how they can represent parts of the story, such as holding up their arms and wiggling their fingers to show rain. Then read the story and have learners mime the actions.</p>	Page 57
<p>Predict, observe and draw conclusions.</p>	<p><i>Explore Science</i> page 93 Pieces of cloth and some water</p>	<p><b>Activity 6</b> Show the class a piece of wet cloth and tell the learners that you want to dry the cloth. Ask: What should I do? Where would be the best place for drying cloth? Tell the class that they will be doing a test to find the best place for drying. Explain that each group will get two pieces of wet cloth. They will put one in the Sun and one in the shade. Ask: Which one will dry first? Why? Once they have tested this, they can explain why the cloth in the Sun dried more quickly. The cloth in the Sun dries faster because the Sun gives out heat.</p>	Page 58
<p>Make observations and apply knowledge.</p>		<p><b>Activity 7</b> Ask the learners about things they do during the daytime when it is light, and things they do at night time when it is dark. Then ask them to look at the pictures in Activity 6 and tell you which things happen during the day and which happen at night.</p>	Page 60

Processes and skills	Resources	Teacher's support notes	Learner's Resource Book
Make observations and communicate in pictures.		<p><b>Activity 8</b> Take your class into the schoolyard and ask them to be very quiet and look around to see if there are any animals. The learners are most likely to see some insects, like grasshoppers in the grass or bushes, and perhaps some birds flying overhead. Ask them to observe the animals and what they are doing. When they return to the classroom, ask some of the learners to tell the class what they observed. The learners can then draw an animal they saw during the daytime.</p>	Page 61
Make observations.		<p><b>Activity 9</b> Some animals only come out at night. Ask the learners if they know of any animals that come out at night. Look at the pictures of the animals and ask which animals come out at night. Ask them to watch a gecko at night when they go home. The next day, have learners explain why the gecko likes the night time.</p>	Page 61
Make observations by listening and communicate in pictures.		<p><b>Activity 10</b> Read the poem of the Moon to the class. Ask learners to look at the Moon when they go home at night and draw a picture of it.</p>	Page 63
Summarise what has been learnt in the chapter.		<p><b>Chapter review</b> Go through the chapter review to revise the work covered in each section. Refer to the appropriate pages in the Learner's Resource Book if learners do not understand any review statements.</p>	Page 64
		<p><b>Concept map</b> Review the concept map with learners to ensure they understand the key concepts covered in the chapter.</p>	Page 64
		<p><b>Revision (assessment)</b> Give the learners time to complete the revision activity in this chapter.</p>	Page 65

## Activity answers and assessment answers

### Activity 1

The learners should realise that the Sun gives out heat and light.

### Activity 2

The learners' drawings will vary according to ability.

### Activity 3

The learners should become familiar with their shadow and associate it with their body blocking the light from the Sun.

### Activity 4

The learners should become aware that we need light to see. During the day, light comes from the Sun. In the dark it is difficult to see.

### Activity 5

The learners' drawings will vary according to ability.

### Activity 6

The cloth dries faster in the Sun because it is warmer there.

### Activity 7

The activities can be put into these groups:

Daytime activities	Night time activities
shopping swimming working in the garden playing ball	sleeping reading

### Activity 8

The learners should see insects, birds, and possibly dogs and cats in the schoolyard during the daytime.

### Activity 9

Fruit bats, geckos and mosquitoes come out at night. Geckos come out at night to catch and eat insects that fly near lights.

### Activity 10

The learners' drawings will vary according to ability.

## Revision activity

Activity	Day or Night
watching TV	night
praying	day
playing basketball	day
sleeping	night
working in the garden	day

# Appendix 1: Glossary

## A, B

air	a gas that surrounds the Earth
animal	a living creature (including humans) that is not a plant

## C

crops	plants grown for food or to produce clothing
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## D

dark	when there is no light
day	the period when it is light between sunrise and sunset

## E

electricity	a type of energy used to light, heat and move things
energy	something that allows us to do things

## F, G

food	something we eat to keep us alive
fresh	still good to eat
garden	an area of land used for growing plants
grow	to become larger

## H

heat	the form of energy that we feel as warmth
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## I, J, K

instrument (musical)	a special device for making musical notes
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## L

light	the form of energy that makes it possible for the eye to see
living	being alive and in an active state

## **M**

<b>man-made</b>	made by people, not by nature
<b>materials</b>	anything used for building or making new things
<b>move</b>	to change position or place

## **N**

<b>natural</b>	produced or made by nature
<b>night</b>	the period of darkness between sunset and sunrise
<b>non-living</b>	not alive or active

## **O**

<b>object</b>	anything that has shape and can be seen or touched
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## **P, Q**

<b>plants</b>	living things that use sunlight to make their own food
<b>pulling</b>	bringing closer by using force
<b>pushing</b>	moving away by using force

## **R**

<b>rainbow</b>	a curved arc of light of many colours across the sky
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## **S**

<b>shape</b>	the form of the outer edge or surface of an object
<b>squeezing</b>	pressing firmly together
<b>sound</b>	anything that people or animals hear with their ears

## **T, U, V**

<b>twisting</b>	to wind something around
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## **W, X, Y, Z**

<b>water</b>	the clear liquid that is in rain. People, plants and animals drink water and need it in order to live
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## Appendix 2: Lesson plan format

<b>Name of school:</b>		<b>Class teacher:</b>	
<b>Lesson title:</b>			<b>Date:</b>
<b>Learning outcomes:</b> <ul style="list-style-type: none"> <li>• What are the main things I want learners to learn and be able to do as a result of the lesson? How are lesson outcomes linked to syllabus outcomes?</li> <li>• What are other things I want learners to learn as well?</li> </ul>			
<b>Lesson content:</b> <ul style="list-style-type: none"> <li>• What are the key facts, concepts or procedures that I want learners to understand as a result of this lesson?</li> </ul>			
<b>Introduction:</b> <ul style="list-style-type: none"> <li>• How will I get learners motivated, curious and ready to learn?</li> <li>• This section should be allocated 3–5 minutes.</li> </ul>			
<b>Teacher activities:</b> <ul style="list-style-type: none"> <li>• What am I going to do during the lesson in order for learners to achieve the learning outcome?</li> <li>• This section should be allocated 8–10 minutes.</li> </ul>		<b>Learner activities:</b> <ul style="list-style-type: none"> <li>• What are the learners going to do during the lesson in order for them to achieve the learning outcome?</li> <li>• This section should be allocated 20–25 minutes.</li> </ul>	
<b>Conclusion:</b> <ul style="list-style-type: none"> <li>• How will I bring the lesson to a logical and meaningful conclusion?</li> <li>• This section should be allocated 5–7 minutes.</li> </ul>			
<b>Learner assessment:</b> <ul style="list-style-type: none"> <li>• How will I know that learners have achieved what I wanted them to achieve?</li> </ul>			
<b>Lesson evaluation:</b> <ul style="list-style-type: none"> <li>• How will I evaluate the success of the lesson?</li> </ul>			
<b>Lesson endorsement:</b> (to be signed by Head of Department/Head Teacher/Principal) Head of Department: Head Teacher/Principal:			



# Appendix 4: Sample class record form

Class:	Strand:	Sub-strand:	Year:
<b>Specific learning outcomes: A = Achieved, PA = Partially Achieved, NA = Not Achieved</b>			
Assessment event	1		
Learning outcome assessed (code)	1.1.1.1		
Denis	A		
Ian	A		
Jack	A		
James	A		
John	PA		
Joyce	PA		
Lionel	PA		Steady/satisfactory
Lisa	PA		
Luke	NA		
Mary	A		improved/excellent progress
Michael	NA		
Nancy	PA		
Peter	A		
Tom	PA		
Yates	NA		no improvement/slow progress
Overall comments:			
Class teacher:		Signature:	Date:

# Appendix 5: Sample individual monitoring form

<b>Learner name:</b>		<b>Class:</b>			<b>Year:</b>	
<b>Strand:</b>		<b>Topic/unit:</b>				
<b>Sub-strand:</b>		<b>Remarks: comment on learning progress: improved, steady or not improved</b>				
<b>Assessment event</b>	<b>Specific learning outcomes: A = Achieved, PA = Partially Achieved, NA = Not Achieved</b>	<b>Code</b>	<b>Outcome assessed</b>	<b>A</b>	<b>PA</b>	<b>NA</b>
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
<b>Class teacher:</b>		<b>Signature:</b>			<b>Date:</b>	



# Appendix 7: Sample individual remedial work form

Learner name:		Class:		Term/semester:	Year:	
Strand:		Sub-strand:			Remedial work required	Results after remedial work
Assessment event	Specific learning outcomes (use appropriate code)	A	PA	NA		
	Code	Outcome assessed				
/	1.1.1.1	Give three examples of living things from the surroundings				
Class teacher:		Signature:			Date:	

# Appendix 8: Sample individual report form

<b>Learner name:</b>		<b>Class:</b>	<b>Term:</b>	<b>Year:</b>	
<b>Strand:</b>	<b>Sub-strand:</b>		<b>Specific learning outcomes: Achieved (A), Partially Achieved (PA) or Not Achieved (NA)</b>		
<b>Code</b>	<b>Specific learning outcome assessed (use appropriate code)</b>		<b>A</b>	<b>PA</b>	<b>NA</b>
1.1.1.1	<i>Give examples of three living things from the surroundings</i>		*		
Descriptive remarks:					
<b>Strand:</b>	<b>Sub-strand:</b>		<b>Specific learning outcomes: Achieved (A), Partially Achieved (PA) or Not Achieved (NA)</b>		
<b>Code</b>	<b>Specific learning outcomes (use appropriate code)</b>		<b>A</b>	<b>PA</b>	<b>NA</b>
Descriptive remarks:					
<b>Results for summative assessment: The progressive achievement level for summative assessment is:</b>					

# Appendix 8 (cont.)

Strand:	Combination of sub-strands:	Specific learning outcomes: Achieved (A), Partially Achieved (PA) or Not Achieved (NA)	
I.I.I.1		*	
I.I.I.2		*	
I.I.I.3			*
Descriptive remarks from summative assessment:			
Overall achievement level:		Overall achievement award:	
<b>School administration report on learner's behaviour and character</b>			
Class teacher:		Signature:	Date:
Class teacher comments:			
Head Teacher/Principal:		Signature:	Date:
Head Teacher/Principal comments:			



# Solomon Islands Primary Science

## TEACHER'S GUIDE Year 1

The *Solomon Islands Primary Science Year 1 Teacher's Guide* provides teachers with comprehensive support material to support the implementation of the *Key Learning Outcomes of the Primary Science Syllabus (2008)*, and provides assistance in teaching a range of skills in science investigation and research.

Designed to be used alongside the accompanying *Solomon Islands Primary Science Year 1 Learner's Resource Book*, this Teacher's Guide provides teachers with detailed lesson plans, as well as advice on how to initiate the learners' hands-on investigations of the physical and living world and how to integrate the key skills and knowledge of each topic with the available resources in the Learner's Resource Book. In addition, the guide includes:

- support notes on processes and skills
- lists of required resources
- teacher support activities
- detailed Learner's Resource Book cross-references
- answers to the activities and assessment tasks.

This Teacher's Guide is a part of a series of materials for Solomon Islands Primary Science for Years 1–6. This series was developed as part of the Solomon Islands school curriculum reform between 2005 and 2013.

Throughout this guide there are page references to an excellent primary encyclopaedia, *Explore Science*, where teachers can find background information on each topic covered in the Learner's Resource Book. A copy of *Explore Science* accompanies this Teacher's Guide.

