

Solomon Islands

Primary Science

TEACHER'S GUIDE Year 3



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Introduction to this Teacher's Guide

This Teacher's Guide supports the *Solomon Islands Primary Science Year 3 Learner's 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 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 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 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 the reference to the relevant pages in the Learner's Book.

The third section of each chapter lists the answers to the activities and assessment activities in the Learner's 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 Book
- the Learner's 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 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 outcome-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 people good and responsible citizens in the future.

The approach of the Learner’s Book

The Learner’s 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 Book or the teacher.

The Learner's Book and the syllabus

The Learner's 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 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 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 Book contains many illustrations: photos, pictures, maps, diagrams and statistics. 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 3 Science is five 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 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 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 above, 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 Book rather than the syllabus, and use the syllabus as a guide to what the learners should finally achieve.

Yearly program planner

The yearly program planner shows the Year 3 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 3	Life and living LL, 32 periods, 8 weeks										Energy sources EC, 16 periods, 4 weeks					Changing materials NPM, 16 periods, 4 weeks					
	<ul style="list-style-type: none"> Plants and animals Observing similarities and differences Grouping living things Identifying living things 										<ul style="list-style-type: none"> Energy Energy from sun Energy and changes Energy and machines Storing and releasing energy Energy in our bodies Electrical energy 					<ul style="list-style-type: none"> Materials Changing solid to liquid Changing liquid to gas Changing gas to liquid 					
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 3	Changing materials NMP, 8 periods, 2 weeks			Electricity EC, 16 periods, 4 weeks				Growing plants in a nursery F, 8 periods, 2 weeks			Growing plants in a nursery F, 12 periods, 3 weeks					Day and night EB, 20 periods, 5 weeks					R E V I S I O N
	<ul style="list-style-type: none"> The water cycle Looking after water 			<ul style="list-style-type: none"> Electricity Where does electricity come from? Saving electricity Batteries Mains electricity Making a bulb light up Conductors and insulators 				<ul style="list-style-type: none"> Sowing and germinating seeds Growing seedlings in nurseries What is nursery? 			<ul style="list-style-type: none"> Caring for seedlings Transplanting Keeping records 					<ul style="list-style-type: none"> What are day and night? Why day and night occur Tracking the Sun’s movement Sunrise and sunset Daytime and night-time activities Light from the Sun, the Moon and the Earth Animals and plants at night 					

- 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 classrooms. 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. The best way is often to provide a questionnaire to the learners before they go. A lot of the work can then be done by learners working in groups to answer the questions, without too much help from you. The activities in the Learner's 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 above. For instance, learners can be encouraged to go out at weekends and look at a river or stream, the sea and coastline, 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.

Report writing

The report-writing process involves researching an issue thoroughly, often through fieldwork, collecting the information through one or more of the techniques explained in this section, and organising the information in a logical and clear manner. In Year 3 you should not place too much emphasis on the formal writing of reports. It is usually enough for learners to answer a series of questions in a questionnaire.

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 listening passively to the teacher, as is often the case in 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 their learning in small groups and 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 volcanoes 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 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 3, 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 back their ideas at the end in English, 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 learning. Learners are able to conduct and collect information through research 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 3 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, emotions 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 other people and how they 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.

Graphs and statistics

Representing information through graphs and statistics is an important and effective way of teaching and learning about a particular topic.

Learners may find some information easier to understand when it is represented in graphical or statistical form. In the Learner's Book, learners are introduced to some simple statistics. You should not use complicated statistics in your teaching, or expect learners to remember statistics. They are there to illustrate a point, not to be learnt.

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 in the Learner's Book. 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 are at and the progress they make 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 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' achievement, 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 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 textbooks 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 3 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 3 Science. The statements in the table are assessment criteria for the specific learning outcome 3.1.1.1. Each of the six levels describes the achievement of the learner.

Level	Assessment criterion	Judgement criterion	Achievement award
L5	List and describe five or more similarities and differences between living things found in the environment correctly	Able to list and describe five or more similarities and differences between living things found in the environment	Achieved (A) Full mastery of learning outcome
L4	List and describe four similarities and differences between living things found in the environment correctly	Able to list and describe four similarities and differences between living things found in the environment	Partially Achieved (PA4) Substantial mastery of learning outcome
L3	List and describe three similarities and differences between living things found in the environment correctly	Able to list and describe three similarities and differences between living things found in the environment	Partially Achieved (PA3) Moderate mastery of learning outcome
L2	List and describe two similarities and differences between living things found in the environment correctly	Able to list and describe two similarities and differences between living things found in the environment	Partially Achieved (PA2) Minor mastery of learning outcome
L1	List one similarity and difference between living things found in the environment but unable to describe	Able to list and describe one similarity and difference between living things found in the environment	Partially Achieved (PA1) Minimal mastery of learning outcome
L0	Unable to list and describe the similarities and differences between living things found in the environment	Unable to list and describe any similarities and differences between living things found in the environment	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 records of 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 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 classrooms, 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 individual learners' achievement

With accurate records and effective monitoring systems, teachers are able to compile and make a balanced, accurate and fair report on the learners' 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 learners' performance. This means

that the report must also provide a descriptive account of the learners' 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 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 certification in recognition of the learner's achievement.

The table below shows achievement levels, awards and certifications.

Overall achievement level	Performance descriptor	Achievement awards	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

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 in the shops. They are all available.

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

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	Year 4 Looking after our water	Year 4 Solubility
	Year 5 Clean safe water for living Making healthy food choices	Year 5 Clean drinking water Crops and animals for food
Social Studies	Year 3 Weather and seasons	Year 5 The Earth's revolution, rotation and seasons
	Year 4 Transport	Year 5 Energy sources and energy changes
	Year 6 Using and managing resources	Year 5 Gardening skills

Chapter 1 Life and living

Strand: Life and Living

Suggested periods: 32 (8 weeks)

Sub-strand statement:

There are similarities and differences within and between groups of plants and animals. Scientists use these similarities and differences to classify living things into groups of plants, animals, bacteria and fungi.

General learning outcomes

Learners should:

- 3.1.1 recognise basic similarities and differences among living things (K)
- 3.1.2 sort living things into broad groups based upon these similarities and differences (S)
- 3.1.3 use simple classification keys to group animals and plants, for example the vertebrate animal groups of birds, mammals, amphibians, reptiles and fishes. (S)

Specific learning outcomes

Learners should be able to:

- 3.1.1.1 describe the similarities and differences between living things found in the school grounds
- 3.1.2.1 classify animals and plants according to simple sorting rules
- 3.1.3.1 record in a personal science book a list of animals and plants identified in the environment and the group to which they belong.

Teacher's support notes		Learner's Book	
Processes and skills	Resources	Teacher's support notes	Learner's Book
Make and record observations. Identify some plants and animals.	<i>Explore Science</i> (Pearson) pages 11–39	<p>Activity 1 Preparation for this activity is important. It is a good idea to look around the school grounds before the activity starts to find out what plants and animals are there (remember, insects are animals). Learners can explore for themselves but you can also direct them at times to places where there are lots of insects, spiders or worms to look at. Learners record information about the plants and animals they observe. They then present their findings to the whole class. Ensure that all key ideas are covered by learners in their presentations.</p>	Pages 2–3
Observe and identify common characteristics in different animals.	<i>Explore Science</i> (Pearson) pages 11–39	<p>Activity 2 Review the previous activity, making links with the current activity. Learners should examine the pictures of the animals on page 4 of the Learner's Book. It is likely that they will identify size as the main difference between the animals, but encourage them to look more closely and identify as many other differences and similarities as possible. Sum up the key ideas.</p>	Page 4
Make, compare and group observations.	<i>Explore Science</i> (Pearson) pages 11–39 Different types of leaves	<p>Activity 3 Preparation for this activity is important. You should gather lots of different types of leaves before the class. Some leaves should be the same type and colour. Encourage learners to group the leaves themselves. Guide them by asking what features they are using to group their leaves. Help any learners having difficulty by pointing out features they can use, such as shape and colour. Sum up the key ideas of the lesson.</p>	Page 5

Processes and skills	Resources	Teacher's support notes	Learner's Book
<p>Make observations and use these to make simple drawings and descriptions.</p>	<p><i>Explore Science</i> (Pearson) pages 11–39</p> <p>Some small animals such as woodlice, moths, beetles and worms</p> <p>Plastic cups</p>	<p>Activity 4</p> <p>Preparation for this activity is important. You should collect a number of small animals before the lesson, and give each group an animal in a plastic cup. Ask learners to treat the animals they have been given very carefully. Help each group to measure their animal if it is large enough. Learners should carefully draw their animal and write a sentence or two to describe it. Sum up the lesson and display the pictures on the science corner in the classroom.</p>	<p>Page 6</p>
<p>Make observations of plants and use these to write brief descriptions.</p>	<p><i>Explore Science</i> (Pearson) pages 11–39</p>	<p>Activity 5</p> <p>Preparation for this activity is important. Check the school grounds to make sure there are some suitable plants for learners to observe and describe. Although the Learner's Book suggests learners work in pairs, it might be easier if they work in groups of 4 or 5. If learners have trouble writing then they can simply describe their plant in words to the rest of the group. When one learner has described a plant the others can try to find the plant they have described.</p>	<p>Page 7</p>
<p>Group living things into plants and animals.</p>	<p><i>Explore Science</i> (Pearson) pages 11–39</p>	<p>Activity 6</p> <p>Learners copy the table into their exercise books, and then write the names of the plants and animals shown in the correct columns. Sum up by doing corrections together as a whole class.</p>	<p>Pages 8–9</p>
<p>Make observations and group animals.</p>	<p><i>Explore Science</i> (Pearson) pages 11–39</p>	<p>Activity 7</p> <p>Learners copy the table into their exercise books. They then examine the pictures of the animals carefully and write the names of the animals shown in the correct columns. They can discuss in their pairs which animals belong to which group: birds, fish or reptiles.</p>	<p>Page 11</p>

Processes and skills	Resources	Teacher's support notes	Learner's Book
Work with others to explore the school compound and list different types of insects.	<i>Explore Science</i> (Pearson) pages 11–39	<p>Activity 8 Learners explore the school compound and look for animals that are the same or similar. They can simply point these out to their friends and explain why the animals are similar. Observe how they carry out this activity and assist them when needed. Summarise the key points of this lesson.</p>	Pages 12–13
Write a summary of what has been learnt in the chapter.		<p>Chapter review Go through the chapter review to revise the work covered in each of the sections. Refer to the appropriate pages in the Learner's Book if any review statements are not understood.</p>	Page 14
		<p>Concept map Review the concept map with learners to ensure they understand the key concepts covered in the chapter.</p>	Page 15
		<p>Revision (assessment) Give learners time to complete questions 1 to 3 in the revision section of this chapter.</p>	Page 15

Activities and assessment answers

Activity 1

Learners' answers will depend on the living things they collect from the school compound.

Activity 2

- 1 (clockwise) elephant, mouse, boy, blue whale
- 2 The main common differences are their shape and sizes, but there are others, such as trunks (elephant), fins (whale) etc.
- 3 Common things include:
 - eyes
 - ears
 - head
 - nose
 - tail.

Activity 3

At this stage learners can use colour, size and shape to group the leaves, although some may use other thing like spikes, hairs or whether the leaves are smooth-edged or jagged.

Activity 4

Learners' answers will depend on the animal they observe.

Activity 5

Learners' answers will depend on the plants they observe.

Activity 6

Plants	Animals
corn	dog
coconut tree	fish
lettuce	bird
tomato	fly

Activity 7

Birds	Fish	Reptiles
hawk	tuna	crocodile
heron	barracuda	snake
myna	shark	lizard

Activity 8

Learners' answers will depend on the animals they find in the school compound.

Revision questions

- Possible answers are:
 - animals eat their food; plants make their food
 - plants do not move from place to place
 - plants are generally green while only some animals are green
 - plants have leaves, roots and a stem; animals do not.
- Fly, wasp, butterfly and mosquito are all insects.
- Birds are the only animals with feathers.

Chapter 2 Energy sources

Strand: Energy and Change

Suggested periods: 16 (4 weeks)

Sub-strand statement:

Energy is essential for human life and activity. Machines also need energy in order to work. Learners observe and experience how various simple machines operate.

General learning outcomes

Learners should:

- 3.2.1 know a range of sources of energy (e.g. sun, food, fuel, waves and batteries) (K)
- 3.2.2 know that machines (toys that move, vehicles, outboard motors) need a source of energy in order to work (K)
- 3.2.3 apply simple power sources (e.g. in stretched elastic bands) to devices for changing energy (e.g. the fishing spear gun) (S)
- 3.2.4 appreciate that energy is essential for all aspects of human life and activity (V)
- 3.2.5 know a range of fuels that are sources of energy. (K)

Specific learning outcomes

Learners should be able to:

- 3.2.1.1 list three types of energy sources used every day, at home or school
- 3.2.2.1 identify the source of energy used to make vehicles and a homemade fishing gun work effectively
- 3.2.3.1 demonstrate how energy is stored and released, by stretching elastic bands around fingers or pencils
- 3.2.4.1 give one reason why energy is essential for all animals and plants
- 3.2.5.1 identify two types of fuel that are sources of energy.

Processes and skills		Resources		Teacher's support notes		Learner's Book	
Identify different types of energy.	<i>Explore Science</i> (Pearson) pages 224–39	Before starting these activities you will find it very useful to read pages 224–39 of <i>Explore Science</i> . Activity 1 Read the section on energy on page 17 of the Learner's Book with the class and discuss this before beginning the activity.	Pages 17–18				
Assemble a food chain.	<i>Explore Science</i> (Pearson) pages 192–96 Scissors, fishing line, crayons, sellotape	Activity 2 Plants are able to use the energy from the Sun through the process of photosynthesis to produce their own food. Certain animals eat plants, and the energy from the plants is passed along a food chain. The section on pages 192–96 of <i>Explore Science</i> explains this very well. When learners have completed the activity, extend it by getting them to make the food chain they have drawn. This can be done in groups. Learners draw the animals and cut them out. They make a food chain by hanging the cut-outs together with fishing line. The food chains can be hung from the ceiling of the classroom.	Page 19				
Change energy from one form to another.	<i>Explore Science</i> (Pearson) pages 224–39	Activity 3 When learners rub their hands together there is some friction between them. If they rub hard this produces heat. So the energy change in this activity is from energy of movement (also called kinetic energy) to heat energy.	Page 20				
Draw conclusions from observations.	<i>Explore Science</i> (Pearson) pages 224–39	Activity 4 Both energy changes in this activity are the same. Candle wax and kerosene are both fuels with stored energy. They can both be burned to produce heat and light energy. Make sure learners do not get too close to the flame. When the activity is complete learners should draw what they observed and write a sentence to describe the energy change from stored energy to heat and light.	Page 20				

Processes and skills	Resources	Teacher's support notes	Learner's Book
Draw conclusions from observations.	<i>Explore Science</i> (Pearson) pages 224–39	<p>Activity 5 In this activity the change in energy is from stored energy to movement energy. When the elastic band is pulled back it has stored energy. When it is released it has movement and propels the paper pellet against the wall. The same principle is used with a fishing or spear gun to propel the spear at fish.</p> <p>Safety: The activity should only be done by the teacher. Tell learners that it is dangerous to fire paper pellets at people as they could possibly injure them and even blind them.</p>	Page 22
Write a summary of what has been learnt in the chapter.		<p>Chapter review Go through the chapter review to revise the work covered in each of the sections. Refer to the appropriate pages in the Learner's Book if any review statements are not understood.</p>	Page 23
		<p>Concept map Review the concept map with learners to ensure they understand the key concepts covered in the chapter.</p>	Page 24
		<p>Revision (assessment) Give learners time to complete questions 1 to 4 in the revision section of this chapter.</p>	Page 24

Activities and assessment answers

Activity 1

Activity	Types of energy
Car driving	Movement energy and stored energy (from fuel)
Playing soccer	Movement energy and stored energy (from food)
Playing volleyball	Movement energy and stored energy (from food)
Lighting a bulb	Electrical energy, light and heat energy
Eating a salad	Stored energy (in the food)
Sun shining	Light and heat energy
Radio playing	Electrical energy and sound energy
Playing pan pipes	Movement energy (from blowing air) and sound energy

Activity 2

The food chain should look like this:

plant → caterpillar → myna → hawk

Activity 3

When learners rub their hands together they produce heat energy, which they will feel. The heat energy comes from the energy of movement as they rub their hands.

Activity 4

Both wax and kerosene are fuels that are forms of stored energy. They can be burned to give heat and light.

Revision questions

- 1 Green plants use light energy from the Sun to make their food.
- 2 The food chain will look like this: grass → grasshopper → bird → snake
- 3 When we light a candle the stored energy in the wax changes into heat and light energy.
- 4 Humans get their energy from the food they eat.

Chapter 3 Changing materials

Strand: Natural and Processed Materials

Suggested periods: 24 (6 weeks)

Sub-strand statement:

Matter occurs in three states: solid, liquid and gas. Matter can change from one state to another through heating or cooling. A good example of how matter can change state is when we boil water and liquid water changes into gas.

General learning outcomes

Learners should:

- 3.4.2 identify the three states of matter: solid, liquid and gas (K)
- 3.4.3 group common household materials as solids, liquids and gases (S)
- 3.4.4 understand that applying or removing heat (cooling) can change the state of matter from solid to liquid, liquid to gas, gas to liquid and liquid to solid. (U, V, S)

Specific learning outcomes

Learners should be able to:

- 3.4.2.1 differentiate between the three states of matter
- 3.4.3.1 classify common household materials as solid, liquid or gas
- 3.4.4.1 give one example of a change from solid to liquid (melting), liquid to gas (evaporation), gas to liquid (condensation) and liquid to solid (freezing).

Processes and skills		Resources	Teacher's support notes	Learner's Book
Classify materials.	<i>Explore Science</i> (Pearson) pages 84–89	<p>Before starting these activities you will find it very useful to read pages 84–89 of <i>Explore Science</i>.</p> <p>Activity 1 Read through the information about materials (page 26 of the Learner's Book) with the class. Make sure learners can identify solids, liquids and gases. Solids have a definite shape. Liquids do not have a shape but take the shape of any container they are put in to. Liquids can also be poured, while solids cannot. Gases are very difficult for learners to visualise, but some of the later activities will help with this.</p>	Pages 26–27	
Make observations, record and draw conclusions.	<i>Explore Science</i> (Pearson) pages 84–89 Paper clips, small stones, erasers, plastic cups, plastic basins and some water	<p>Activity 2 Review the previous activity and make links to this activity. Learners experiment with the materials they have been given to determine which of the materials are solids and which are liquid. When they try to pick up the stone or paper clip, it is quite easy. If they try to pick up the water they cannot. When they pour water from the cup to the bench it changes shape but when they drop the stone or the paper clip on the bench these objects do not change shape. Solids such as the stone and the paper clip keep their shape when they are dropped and they cannot be poured. Liquids such as water can be poured because they flow. Sum up the key concepts at the end of the activity.</p>	Pages 28–29	
Make and record observations, and draw conclusions.	<i>Explore Science</i> (Pearson) pages 84–89 Different containers such as ice-cream cartons, plastic bags, cups, jugs or jars	<p>Activity 3 Learners should pour water from one type of container to the next and observe what happens to the shape of the water. They should notice that the water takes up the shape of the container that it is poured into. This is because water can flow, as it is a liquid. As well as writing a few sentences in their exercise books about this activity, learners can also draw the different containers with water in them. Sum up the key concepts at the end of the activity.</p>	Page 29	

Processes and skills		Resources	Teacher's support notes	Learner's Book
Make predictions and draw conclusions.	<i>Explore Science</i> (Pearson) pages 84–89 Basins, bowls or buckets, some water, corks or any other small floating objects, drinking glasses or glass jars, paper	Activity 4 Learners find gases very difficult to imagine and often do not believe they are real substances or materials as, unlike solids and liquids, they are invisible and difficult to feel. This activity and activities 5, 6 and 7 are designed to help students gain a better understanding of gases. It is a good idea to try this activity before doing it with the class. Also ask learners to predict what will happen in each case and get them to write or draw their prediction before you do the demonstration.	Page 31	
Make predictions and draw conclusions.	<i>Explore Science</i> (Pearson) pages 84–89 Balloons, tins containing soil, string or fishing line, scissors, thin sticks, pencils and pins	Activity 5 The main difficulty with this experiment is getting the balloons to balance. Learners should look at the diagram on page 32 of the Learner's Book to help them set up the experiment. You may have to move the beam around to get it to balance properly. Once it is balanced ask learners to predict what would happen if one of the balloons burst. Learners can write or draw their predictions. At the end of the activity, sum up the key ideas.	Page 32	
Make predictions and draw conclusions. Use equipment and record and compare findings.	<i>Explore Science</i> (Pearson) pages 84–89 Feathers, paper clips, square pieces of plastic sheet, cotton thread or fishing line	Activity 6 In this activity, learners drop a feather and watch how it falls. Does it fall more quickly than a stone? Ask learners if they know what a parachute is—some of them may have seen parachutes in books or films. Explain that parachutes allow people to jump from planes and float down through the air slowly because the air fills the parachute and holds them up. Learners should work in groups to make their parachutes (see page 33 of the Learner's Book). When they have made their parachutes they should drop them and count how long they take to fall to the ground. They should compare this with the time the paper clip on its own took to fall. When learners have completed the activity they should draw it and write about it in their exercise books. Sum up the key ideas and go through their exercise books to check learners' understanding of what they have done.	Page 33	

Processes and skills		Resources	Teacher's support notes	Learner's Book
Make predictions and draw conclusions.	<i>Explore Science</i> (Pearson) pages 84–89 Ice cubes of the same size	Activity 7 For this activity, learners will have to work quickly, so it is best to explain the activity before they begin. Give each group two ice cubes. The ice cubes should be the same size. Learners should write their predictions in their exercise books with an explanation. Sum up the key ideas.	Page 34	
Make predictions and draw conclusions.	<i>Explore Science</i> (Pearson) pages 84–89 Butter in small cubes, straight from the fridge	Activity 8 This activity is a repeat of Activity 7, using small cubes of butter straight from the fridge rather than ice cubes.	Page 35	
Make predictions and draw conclusions.	<i>Explore Science</i> (Pearson) pages 84–89 Candles, matches, paper	Activity 9 In this activity you need to light a candle. When you have finished the demonstration, ask learners to explain the changes that took place and get them to record their observations and explanations in their exercise books.	Page 35	
Draw conclusions and write explanations based on observations.	<i>Explore Science</i> (Pearson) pages 84–89 Buckets of water, chalk	Activity 10 Find an area of flat concrete on which to make a puddle. You need a flat concrete surface so that the water does not run off or soak into the ground. Use a bucket of water to make a large puddle on the concrete. Once there is a puddle, ask one of the learners to draw around it with chalk. Leave the puddle for about 30 minutes and then visit it again with the class. The puddle should be smaller and another learner can chalk around the smaller puddle. Keep visiting the puddle every hour and chalking around it until the puddle disappears. Now ask learners to explain where they think the puddle has gone. Often learners think that the water has disappeared because it sinks into the ground.	Page 37	

Processes and skills		Resources	Teacher's support notes	Learner's Book
Make and record observations.	Kettle, large plate	<p>Activity 11</p> <p>This is a teacher demonstration. It is designed to show condensation: when a gas (steam) turns into a liquid (water).</p> <p>Boil the kettle and, as it is boiling, carefully hold the large plate over the spout with the steam. When the steam hits the cold plate it will turn into water and drip off the bottom of the plate.</p> <p>This activity works very well if you can put ice on the plate as this makes it cooler.</p> <p>Safety: Make sure your hand does not come into contact with the steam, as it will give a severe burn. Hold the plate on one edge and let the steam hit the other edge of the plate.</p> <p>Asking learners to breathe onto a cold mirror can extend this activity. Condensation also occurs very readily in the Solomon Islands when a bottle is taken from the fridge, as the air is humid and when it touches a cold object the water in the air condenses on the cold surface into drops of liquid water. All of these activities show condensation.</p> <p>Learners should write about one of these activities in their exercise books.</p>	Page 39	
Create a song or poem.	<i>Explore Science</i> (Pearson) page 93 Paper and crayons	<p>Activity 12</p> <p>Learners read about the water cycle from their Learner's Books. Explain this process to them and emphasise its importance.</p> <p>Learners then work in groups to write their song or poem about the water cycle. They can perform their song or poem to the rest of the class and draw the water cycle in their exercise books.</p>	Pages 40–42	
Make a poster.	Paper and crayons	<p>Activity 13</p> <p>Before learners make their posters, discuss the importance of water and particularly of keeping it clean and not wasting it. The posters can be displayed in the classroom or around the school.</p>	Pages 42–43	

Processes and skills	Resources	Teacher's support notes	Learner's Book
Write a summary of what has been learnt in the chapter.		<p>Chapter review Go through the chapter review to revise the work covered in each of the sections. Refer to the appropriate pages in the Learner's Book if any review statements are not understood.</p>	Page 43
		<p>Concept map Review the concept map with learners to ensure they understand the key concepts covered in the chapter.</p>	Page 44
		<p>Revision (assessment) Give learners time to complete questions 1 to 3 in the revision section of this chapter.</p>	Pages 45–46

Activities and assessment answers

Activity 1

Tick the correct column in the table for each object or material

Object	Solid	Liquid	Gas
flame on stove			✓
air inside a balloon			✓
beans			
cooking oil		✓	
bubbles			✓
crayons	✓		
water		✓	
shampoo		✓	
butter	✓		
wood	✓		
books	✓		
kerosene		✓	

Activity 2

- 1 You can't pick up the water.
- 2 No, they don't change their shape.
- 3 Yes, the water does change its shape.
- 4 Solids will keep their shape when moved but liquids take up the shape of any container they are put in to. Furthermore, liquids can be poured but solids cannot.

Activity 3

Liquids will take up the shape of any container they are poured into.

Activity 4

The air in the glass or jar will stop the water from entering it and making the paper wet or forcing the cork to the top of the glass.

Activity 5

- 3 When the balloon bursts, it loses its air. The other balloon with air is now heavier the burst balloon fragments, so the balance goes down on that side.
- 4 When the balloon is pricked, it goes *bang* and loses its *air*. The other balloon still has its air so it is now *heavier*. So air must have *weight*.

Activity 6

- 1 Slowly.
- 2 More quickly than the feather, because it is heavier.
- 4 Slower, because the plastic sheet traps the air and slows the paper clip's descent—in the same way as a proper parachute allows a person to drop slowly through the air.

Activity 7

Ice will melt more quickly where there is more heat.

Activity 8

Like ice, butter melts faster in a warmer place.

Activity 9

- 1 When the liquid wax is poured onto the paper it forms a solid again.
- 2 The wax becomes solid again because the heat is removed and the wax cools.

Wax will only melt if it is heated in a flame, but unlike ice or butter it will turn solid or solidify quite quickly once it drips away from the flame. So this activity shows that cooling can reverse the change from solid to liquid.

Activity 10

The water disappeared because the heat from the Sun turned it into vapour.

Activity 11

- 2 After a while drops of water form and drip off the plate like rain.

Activity 12

Learners' answers will vary. However, the poem or song can show that the water cycle goes "around and around" and can include terms like "evaporation" and "condensation" and "precipitation", which rhyme.

Activity 13

Learners' answers will vary. However, the posters might explain that it is important to make sure that taps are switched off when they are not being used and that any leaking taps should be reported to the school office and fixed.

Revision questions

1

Solid	Liquid	Gas
stones sticks pencil ball books ice cubes	paint water kerosene milk shampoo oil	water vapour air in balloon steam car exhaust

- 2 a *Freezing* is when liquid water turns into ice.
b *Melting* is when ice turn into liquid water.
c *Condensation* is when water vapour turns into liquid water.
d *Evaporation* is when a puddle slowly dries up and turns into water vapour.
e *Boiling* is when liquid water is heated to a high temperature and bubbles give off steam.
- 3 a See the diagram on pages 40–41 of the Learner's Book. The labels *clouds*, *rivers*, *sea* and *Sun* need to be added to it.
b See the diagram on pages 40–41 of the Learner's Book.

Chapter 4 Electricity

Strand: Energy and Change

Suggested periods: 16 (4 weeks)

Sub-strand statement:

Electricity is a form of energy and is used in many ways. Electricity travels in electric circuits. Materials like iron can conduct electricity but wood and stones do not conduct electricity. Materials that allow electricity to travel through them are called conductors. These materials can be used in electrical circuits. Materials that do not allow electrical current to pass through are called insulators. Insulators have very important uses in electrical safety. Precaution must always be taken when using electricity. Misuse of electrical appliances is dangerous.

General learning outcomes

Learners should:

- 3.3.1 understand that a complete circuit is needed for an electrical device such as a bulb to light up (U)
- 3.3.2 know that some materials let electricity pass through them (conduct) while others do not (K)
- 3.3.3 know that some household appliances can use electricity (K)
- 3.3.4 know about safety measures associated with the use of electricity. (K)

Specific learning outcomes

Learners should be able to:

- 3.3.1.1 construct simple electrical circuits
- 3.3.2.1 name some materials that conduct electricity and some that do not
- 3.3.3.1 list some of the uses of electricity at home and school
- 3.3.4.1 identify safety issues associated with the use of electricity.

Processes and skills		Resources	Teacher's support notes	Learner's Book
Make and record observations and make comparisons.	<i>Explore Science</i> (Pearson) page 244	Activity 1 Learners should draw a table in their exercise books with two columns, one for school appliances and one for home appliances, so that they can easily make comparisons between home and school.	Page 48	
Identifying objects and their uses.	<i>Explore Science</i> (Pearson) page 244	Activity 2 Learners can complete this activity individually in their exercise books. If they are not familiar with all of the appliances shown, explain what each appliance does.	Page 48	
Communicate in words and pictures.	<i>Explore Science</i> (Pearson) page 244	Activity 3 Electricity is expensive, so it is important not to waste it. We can save electricity by switching off all lights in schools when they are not being used. Learners could elect a monitor to switch off all lights. Learners should discuss their ideas before they start their posters. They could present their posters at the school assembly.	Page 50	
Communicate in words and pictures.	<i>Explore Science</i> (Pearson) page 244	Activity 4 This activity links science and literacy. Before learners begin, ask them to close their eyes and imagine that they are in a thunderstorm with lots of lightning. Then they should write a poem about how they feel during the storm and draw some pictures of the storm. This activity can be done in pairs or individually.	Page 51	
Communicate in words and pictures.	<i>Explore Science</i> (Pearson) page 244	Activity 5 This activity can be done in groups. Learners should read through page 52 of the Learner's Book and get some ideas for their poster. When each group has finished making their poster they can present it to the rest of the class. The posters could include a set of safety rules for using electricity, such as never push anything into an electric socket.	Page 52	

Processes and skills	Resources	Teacher's support notes	Learner's Book
<p>Make and record observations. Use equipment.</p>	<p><i>Explore Science</i> (Pearson) page 244 Wires, batteries and bulbs</p>	<p>Activity 6 This activity can be done as a teacher demonstration if there is there is not enough equipment. However, it is good to let learners take turns doing it after the demonstration so that they get the hands-on experience of making a complete circuit. Check that the wires are connected to the bulb and battery to make a complete circuit like the one shown on page 53 of the Learner's Book.</p>	<p>Page 53</p>
<p>Make predictions. Make and record observations.</p>	<p>Wires, batteries and bulbs, coins, chalk, eraser, nail, screw, paper, aluminium foil, paper clip, wood and plastic pen</p>	<p>Activity 7 Build a test circuit like the one shown on page 55 of the Learner's Book. This has a bulb, four wires and a battery. Learners can take turns at placing different objects in the circuit to see if they conduct electricity. They can predict what will happen before they try each object.</p>	<p>Page 55</p>
<p>Classify objects as conductors or insulators.</p>		<p>Activity 8 Learners use the knowledge gained in the previous activity to help them complete their table. Sum up the key ideas.</p>	<p>Page 56</p>
<p>Write a summary of what has been learnt in the chapter.</p>		<p>Chapter review Go through the chapter review to revise the work covered in each of the sections. Refer to the appropriate pages in the Learner's Book if any review statements are not understood.</p>	<p>Page 57</p>
		<p>Concept map Review the concept map with learners to ensure they understand the key concepts covered in the chapter.</p>	<p>Page 58</p>
		<p>Revision (assessment) Give learners time to complete questions 1 to 5 in the revision section of this chapter.</p>	<p>Page 58</p>

Activities and assessment answers

Activity 1

Below is a list of possible appliances at home and school that use electricity either from a battery or the mains.

School	Home
computer	clock
heater	torch
projector	watch
fan	radio
lights	remote control
calculator	calculator
clock	lights
	electrical frying pan
	television
	iron
	fan
	microwave
	computer

These are only some examples—there may be others.

Activity 2

The appliances in the pictures are: (clockwise from middle) radio, fan, television, rice cooker, torch.

Activity 3

Learners' posters will vary. However, they could focus on how money is wasted when we leave lights on, as the school has to pay for the electricity. Groups could list some of the things the school could buy if it saved money from switching off lights.

Activity 4

Learners' stories or poems will vary.

Activity 5

Learners' posters will vary. However, they could explain that it is very dangerous to climb up poles carrying electric cables or to put metal objects into electrical sockets.

Activity 6

It is important to ensure that the circuit has no breaks otherwise the electricity will not flow and the bulb will not light.

Activity 7

1 Coins, nail, screw, aluminium foil and paper clips allow the bulb to light up. Chalk, eraser, paper, wood and the plastic pen do not allow the bulb to light up.

2

Object	Bulb lights (conductor)	Bulb does not light (insulator)
coin	✓	
eraser		✓
chalk		✓
nail	✓	
screw	✓	
paper		✓
aluminium foil	✓	
paper clip		
wood		✓
plastic pen		✓

3 All the conductors are metals. All the insulators are non-metals.

Activity 8

Conductors	Insulators
paper clips	comb
scissors	rubber bands
metal spoon	plastic cup
coin	plastic straw
gold ring	crayon

Revision questions

- 1 We can get electricity from oil-burning generators, solar panels or flowing water (hydroelectricity).
- 2 Mains electricity is extremely dangerous; electricity from a battery is safe.
- 3 No.
- 4 Aluminium, iron or any other metal.
- 5 Rubber and plastic and any other non-metal.

Chapter 5 Growing plants in a nursery

Strand: Farming

Suggested periods: 20 (5 weeks)

Sub-strand statement:

Many plants in our gardens started growing (germinated) in a special place called a nursery. This is important as it can increase their chances of survival. After germinating in the nursery the seedlings are transplanted to the field. The skill of transplanting involves giving the seedlings enough time in the nursery, handling them correctly during transplanting, providing enough shade and watching the seedlings carefully.

General learning outcomes

Learners should:

- 3.5.1 know the terms *nursery*, *germination* and *transplanting* (K)
- 3.5.2 understand the importance of the nursery for germination and early growth of plants (U)
- 3.5.3 be able to demonstrate how to handle plants during transplanting (S)
- 3.5.4 understand why it is necessary to keep a nursery record of nursery seedlings. (U)

Specific learning outcomes

Learners should be able to:

- 3.5.1.1 briefly explain the terms *nursery*, *germination* and *transplanting*
- 3.5.2.1 give three reasons why the nursery is important
- 3.5.3.1 construct a simple nursery box and sow seeds for germination
- 3.5.4.1 keep a record of the time from sowing to germination to transplanting.

Teacher's support notes		Learner's Book	
Processes and skills	Resources	Teacher's support notes	Learner's Book
Follow instructions and handle equipment. Make observations and take and record measurements.	Bean seeds, plastic cups, soil mixture, a pin, water	<p>Activity 1 Soak some bean seeds overnight before this activity. Read the instructions with the class then organise learners into groups of 4 or 5. Show them how to use the pin to put holes in the bottom of the plastic cup. Make sure each group puts enough soil into their plastic cup and does not add too much water. Ensure each group waters their seed every day. It is a good idea to give each learner in the group a particular task, such as watering the plant on a particular day.</p> <p>Once the shoot comes through the soil show learners how to measure it every few days without damaging it. As the bean grows it may need to be transplanted into a larger container and supported with a stick.</p>	Page 61
Measure seedlings. Draw a simple picture graph or pictograph.	The bean seedlings planted in Activity 1 and a ruler	<p>Activity 2 Show learners how to measure the bean seedlings very carefully without damaging them. It is best if you make the first few measurements, so learners understand what they have to do. After that a different member of each group should take the measurement each time, although teacher help may still be required.</p> <p>Check learners' work when they enter the measurements in their exercise books. When they have enough measurements, they should draw a pictograph of their results, like the one in the Learner's Book on page 62. If they need more help, you could draw another example on the blackboard.</p> <p>It is not necessary to measure the seedlings every day. Learners can measure them every 3–4 days.</p>	Page 62
Make observations and draw conclusions.	Bean seeds, plastic cups, soil mixture, a pin, water	<p>Activity 3 Soak some bean seeds overnight before this activity.</p> <p>Each group should set up two bean seeds in cups in the same way as Activity 1, except that only one seed will have been soaked overnight. That will be the seed that is watered each day. Make sure learners water the same seed each day and do not water the other seed at all. Ask learners to predict what they think will happen (only the seeds that are watered will germinate).</p>	Page 63

Processes and skills	Resources	Teacher's support notes	Learner's Book
<p>Following instructions, observing and drawing conclusions.</p>	<p>Bean seeds, plastic cups, soil mixture, a pin, water</p>	<p>Activity 4 Soak some bean seeds overnight before this activity. Each group should set up two bean seeds in cups in the same way as in Activity 1. However, in this activity both bean seeds should be soaked overnight before they are planted. This time, one cup should be placed on a window ledge and the other in a dark cupboard but each seed should be watered a little every day. Ask learners to predict what will happen. Both seeds should germinate because seeds do not need light to help them germinate or begin growing. This is because they contain a store of food that allows them to begin growing without light. However, once this store of food has been used up plants need sunlight to make their food using a process called photosynthesis.</p>	<p>Page 64</p>
<p>Prepare soil for planting seeds.</p>	<p>Nursery boxes or other containers, soil, seeds of various types</p>	<p>Activity 5 You may be able to borrow some boxes from a local nursery. However, if this is not possible use any boxes that are available—even ice-cream tubs. Make sure they have some holes punched in the bottom to allow water to drain out. Show learners how to fill the boxes almost to the top with good soil and how to use a stick to make some furrows in the soil. Demonstrate how to sprinkle or plant seeds along furrows so that there is enough space between the seeds to allow them to grow properly. If there are too many seeds they will not grow well, as they compete for water and light. Make sure learners water the seed boxes every day. You may need to show them how much water is needed each time. If learners have planted too many seedlings in any of the boxes, demonstrate how to remove some.</p>	<p>Page 67</p>

Processes and skills	Resources	Teacher's support notes	Learner's Book
Follow instructions.	Seedlings from Activity 5, school garden	<p>Activity 6 This activity follows on from Activity 5. Prepare a section of the school garden ready for transplanting the seedlings from the seed boxes. You will need to dig shallow furrows and add some fertiliser to the soil in the furrows. Demonstrate how to transplant some of the seedlings from the nursery boxes into the furrows without damaging them. Learners can then transplant the remainder of the seedlings and carefully water them. They will need to continue to water the seedlings each day and keep the area free from weeds. When the plants are fully grown, they should be harvested and sold.</p> <p>As an extension activity, learners could draw up tables like the one on page 70 of the Learner's Book and fill in the dates of particular events as the seedlings grow. They can also record how often the seeds and seedlings are watered.</p> <p>If any of the learners have worked in a garden at home, they can talk to the rest of the class about what they have done.</p>	Page 69
Write a summary of what has been learnt in the chapter.		<p>Chapter review Go through the chapter review to revise the work covered in each of the sections. Refer to the appropriate pages in the Learner's Book if any review statements are not understood.</p>	Page 71
		<p>Concept map Review the concept map with learners to ensure they understand the key concepts covered in the chapter.</p>	Page 72
		<p>Revision (assessment) Give learners time to complete questions 1 to 4 in the revision section of this chapter</p>	Page 73

Activities and assessment answers

Activity 1

Bean seeds may take a few days to germinate but will then grow quite quickly if watered every day and kept in the sunlight.

Activity 2

Refer to the pictograph in the Learner's Book for an example of how one should look.

Activity 3

Only the seeds that have been soaked and watered will germinate and continue to grow.

Activity 4

Seeds will germinate and begin to grow in both light and dark. This is because they have a store of food that allows them to grow without light. However, when that store is used up those in the dark will stop growing, as without light they cannot produce their own food.

Activity 5

The outcome of the activity will depend on the care with which the seeds are planted and looked after.

Activity 6

The outcome of the activity will depend on the care taken during transplanting.

Revision

- 1 b germination
- 2 a True
b False
c True
- 3 It is important to put nursery boxes in the shade because direct hot sunlight will dry out the soil very quickly and kill the seedlings.
- 4 b It is important to thin seedlings.

Chapter 6 Day and night

Strand: Earth and Beyond

Suggested periods: 20 (5 weeks)

Sub-strand statement:

The spinning of the Earth gives us day and night. At different times, some parts of the Earth receive sunlight while shadows fall on the other parts. The parts of the Earth that receive sunlight experience day and those parts in shadow experience night. This daily change influences the lives of plants and animals differently.

General learning outcomes

Learners should:

- 3.6.1 understand that daytime results from the presence of sunlight and night time results from the absence of sunlight (U)
- 3.6.2 understand that day and night occur because the Earth spins in space (U)
- 3.6.3 know that the Moon reflects light from the Sun to earth at night (K)
- 3.6.4 appreciate how day and night influence the lives of plants and animals. (V)

Specific learning outcomes

Learners should be able to:

- 3.6.1.1 explain why day and night occur in terms of the spinning of the Earth
- 3.6.2.1 model the spinning of the Earth to show how day and night occur
- 3.6.3.1 using a torch, ball and a mirror, demonstrate day, night and reflection depicting moonlight
- 3.6.3.1 observe behaviours of different plants and animals during the day and night and explain why these change.

Processes and skills		Resources	Teacher's support activities	Learner's Book
Make and record observations.	Torch, white or light-coloured ball	Activity 1 Before learners begin the activity, draw a cross on each ball to represent Solomon Islands. One learner holds the ball while the other shines the torch on it so that one half of the ball is illuminated. The first learner rotates the ball to show how the world spins on its axis. Learners will be able to see how Solomon Islands moves in and out of shadow as the ball spins.	Page 75	
Make and record observations.	Torch	Activity 2 This activity should be carried out in pairs, away from bright sunshine. The spinning learner will experience the bright light of the torch as day and the shadow as night. Safety: If the torches are very bright the spinning learners should keep their eyes closed when the light is being shone on their faces.	Page 76	
Make and record observations.	Chalk	Activity 3 Learners need to start this activity at the very beginning of the school day when the Sun is low in the sky. Working in pairs, one learner stands very still in a concreted area that gives a good shadow. The second learner of each pair draws a chalk outline around the shadow of the first learner. The pairs do this every hour until the end of the school day. It is important that they make a note of the time at which each shadow is drawn. They answer question 3 using their knowledge of how the Earth spins.	Page 77	

Teacher's support activities		Learner's Book	
Processes and skills	Resources	Teacher's support activities	Learner's Book
Make and explain observations.	Globe of the Earth or football, torch, small piece of plasticine or Blu Tack, half a matchstick	<p>Activity 4 Recap on the previous activity on mapping shadows. Ask some of the learners to explain why their shadow changed during the day.</p> <p>This next activity will help them understand why their shadow changes. Again, you need to find an area that is in the shade. Use the plasticine or Blu Tack to stick the piece of matchstick to the globe or football at about where the Solomon Islands would be, as shown in the illustration on page 78. Ask a learner to shine a torch across the surface of the globe where the match is. As this happens slowly, spin the globe or ball. Learners should observe how the shadow from the match changes as the ball slowly spins. They should record their observations in their exercise books and explain how this activity is similar to the activity in which they mapped their shadow.</p>	Page 78
Make observations and draw conclusions.		<p>Activity 5 Learners may require some help to do this activity. Once they have completed the activity, explain that the Sun does not move even though it seems to—it is the Earth spinning that makes the sun appear to move.</p> <p>Safety: It is very important that learners are told never to look directly at the Sun as this can damage their eyes permanently.</p>	Page 79
Write a poem or song.		<p>Activity 6 This activity links science and literacy. Ask learners to close their eyes and imagine a sunset or sunrise before they begin their poem or song. You may have to start them off by writing the first line. Some learners may find it easier to draw a picture of sunset and write a simple description.</p>	Page 80
Brainstorm and organise results into a table.		<p>Activity 7 In this activity, learners work in groups in order to brainstorm things they do during the daytime and things they do at night.</p>	Page 81

Processes and skills		Resources	Teacher's support activities	Learner's Book
Identify activities and organise into a table.			<p>Activity 8 This activity builds on Activity 7.</p>	Page 82
Make and record observations.	Mirrors, torches, small white and blue balls		<p>Activity 9 Learners work in pairs in an area out of direct sunlight. If mirrors are not available it is possible to make them by sticking some aluminium foil onto card. One learner shines the torch onto the mirror while the other holds the mirror and moves the reflected light around. Explain to learners that this is called reflection and that shiny objects such as mirrors reflect best. Explain that the Earth and Moon do not produce their own light but reflect the light of the Sun. The Earth looks blue because of the oceans that cover its surface.</p>	Page 83
Make observations and draw conclusions.			<p>Activity 10 Learners should identify the possum, bat and owl as nocturnal animals because they have very large eyes to help them see in the dark. There is always some light available even on the darkest nights and these animals can use that light to help them see because of their very large eyes.</p>	Page 84
Make observations and draw conclusions.			<p>Activity 11 Explain that the dark part at the centre of the eye is called the pupil and its job is to let light into the eye. Each learner should observe their partner's pupil in bright sunshine and in a darker room and then write down their observations. Ask them to explain why this change in the pupil happens. Explain that in the bright light the pupil becomes much smaller to stop too much light getting in to the eye, as this would make it difficult to see and the eye could be damaged. The pupil opens up in the dark to let more light in so that we can see well. Safety: Again, explain to students the dangers of looking directly at the Sun.</p>	Page 85

Processes and skills	Resources	Teacher's support activities	Learner's Book
Make and record observations.	An adult to accompany learners on their night walk	<p>Activity 12 Ensure that learners have an adult to accompany them when they go out after dark to observe the plants.</p>	Page 86
Write a summary of what has been learnt in the chapter.		<p>Chapter review Go through the chapter review to revise the work covered in each of the sections. Refer to the appropriate pages in the Learner's Book if any review statements are not understood.</p>	Page 87
		<p>Concept map Review the concept map with learners to ensure they understand the key concepts covered in the chapter.</p>	Page 88
		<p>Revision (assessment) Give learners time to complete questions 1 to 3 in the revision section of this chapter.</p>	Page 89

Activities and assessment answers

Activity 1

When the Sun shines on the ball, one half will be lit and the other half will be in shadow. The lit half represents the part of the Earth experiencing day and the dark half is experiencing night

Activity 2

When the light is shining in the learner's face they experiencing "day" and when their face is in shadow they are experiencing "night".

Activity 3

The shadow is long in the morning when the Sun is low, short at midday when the Sun is high in the sky and long in the evening when the Sun is low again.

Activity 4

The shadow from the matchstick changes as the globe is turned in the light. This shows that shadows change in length because of the rotation or spinning of the Earth.

Activity 5

The drawings should show the Sun low in the sky at 7 a.m., high at noon and low again at 5 p.m. This is because of the rotation of the Earth, not the Sun, which does not move.

Activity 6

Learners' poems or songs will vary. However, the poem or song could describe the beautiful colours of the sunset or sunrise and how these change as the Sun is lower or higher.

Activity 7

Learners' lists of things they do during the day may include playing various games, doing schoolwork, eating meals. At night they may wash or shower, clean their teeth, do homework, read etc.

Activity 8

Daytime	Night-time
Waking up Feeding chickens Working in the garden Hanging out the washing	Reading with a lamp Driving with headlights on Going to bed Using a lamp

Activity 9

The Earth and Moon do not produce their own light. They reflect the light from the Sun.

Activity 10

The nocturnal animals in the pictures are the possum, fruit bat and owl.

Activity 11

The pupil increases in size in the dark to let more light in and decreases slightly in bright conditions to reduce the amount of light entering the eye.

Activity 12

At night most flowers close because this protects them and there are no insects visiting them at night.

Revision questions

- 1
 - a false
 - b true
 - c true
 - d true
 - e true
 - f true
- 2
 - a sleep
 - b night
 - c Earth
 - d day
 - e night
 - f light
 - g Sun
- 3 From left to right, the labels are Moon, Earth, Sun.

Appendix 1: Glossary of terms

The glossary in the Learner's Book lists important words and concepts for each chapter. Each of these words is printed in bold where it appears in the Learner's Book. You may need to explain other difficult words to learners, or encourage them to use a dictionary.

Learners should be encouraged to use the glossary whenever they come across a word in bold that they do not know or understand clearly, but they do not need to learn the definition. They should make sure they understand the word and then practise using it for themselves. The real test is being able to use the word correctly in a sentence, not being able to repeat the definition.

The glossary from the Learner's Book is repeated in the following pages.

A

- air** an invisible mixture of gases surrounding the Earth
- animal** one of a large group of living things that can move around by themselves to find food
- appliance** a machine used for a particular purpose; fans and refrigerators are appliances used in the home

B

- battery** a device that makes electricity using chemicals
- blackout** the loss of light when the electricity in a town or village goes off
- bulb** a ball made of thin, clear glass that produces light when an electric current passes through it

C

- circuit** the closed path followed by an electric current
- classify** to put similar things together in groups
- clockwise** the direction in which a clock's hands turn
- condensation** what happens when a gas cools and changes into a liquid
- conductor** material that allows heat or electricity to pass through it, usually a metal
- cyclone** a storm with very strong winds

D

- dam** a wall built across a river or stream to keep the water from flowing
- day** the twenty-four hours included in one day and night
- daytime** the period between sunrise and sunset
- diesel** a type of liquid fuel
- differences** ways in which things are not the same
- dry cell** a type of electric battery

E

- electric shock** a sudden and powerful pain from touching part of an electric circuit

evaporation what happens when a liquid is heated and changes into a gas

exhaust the smoke or gas given off by an engine

F

features parts of a person's face such as the eyes, nose or chin

flow to move in a smooth, steady stream

food chain series of living beings in which each serves as food for the next

fuel anything such as wood or petrol or diesel that is burned as a source of energy

fumes a gas or smoke that is not pleasant or healthy

G

gas state of matter that can change shape and volume; for example, air is a mixture of gases

generator a machine that produces electricity

germination what is happening when a plant starts to grow from a seed

greenhouse a building used to protect growing plants

H

hydroelectric power electricity that is produced by means of moving water

I

insulator material that does not allow electricity to pass through it, such as glass or plastic

K

kerosene a type of liquid fuel

key a way of classifying living things that is used to help us identify them

L

lightning electricity produced in thunderclouds; appears as a bright flash or streak in the sky

liquid state of matter that has a definite volume and flows to take the shape of the container it is in

M

machine	device with a system of parts that work together to perform a task; for example, a pulley is a machine that is used to lift an object
mains electricity	electricity that comes from sockets in buildings at home and at school
material	anything used for building or making something else
matter	something that materials are made from
melt	to change from a solid to a liquid due to heating; for example, when ice turns to water
metal	material that is usually shiny and easy to bend, and that conducts heat and electricity
moist	a little bit wet

N

night-time	the period between sunset and sunrise
nocturnal	active at night
nursery	a place where young plants or trees are grown

O

observation	looking carefully at something
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P

pictograph	a graph that uses pictures to show measurement
plant	one of a large group of living things that use sunlight to make their own food
plug	something with two or three prongs on the end of an electrical cord that fits into a socket
pour	to cause to flow
pupil	the small, dark opening in the centre of the eye; light passes through the pupil into the eye
pylons	tall towers for supporting electric cables

R

reflect	to throw back light from a shiny surface
reflection	an image that is thrown back from a shiny surface
rotate	to turn around on an axis
rotation	turning on or around an axis

S

seedling	a young tree or plant grown from a seed
shade	darker area out of the sunlight
shadow	the dark shape made on a surface by a person or thing blocking the light of the sun
shoot	new plant or part of a plant
similarities	ways in which things are alike
skill	ability to perform a task well
socket	something into which you push an electrical plug
solar panels	glass sheets that produce electricity from sunlight
solid	something with a firm shape or form that can be measured in length, width and height; not like a liquid or a gas
solidifying	when a liquid turns into a solid
sowing	to plant or scatter seeds in or over the ground
spin	to turn around
stored energy	energy in food or fuel
sunrise	the moment each day when the sun can first be seen above the eastern horizon
sunset	the moment when the sun goes below the western horizon

T

thinning	removing some seedlings from a seed box or garden where there are too many
transplanted	pulled up and planted again in another place

W

water cycle	a process in which water evaporates and rises, then condenses and falls back to earth as rain
water vapour	water in the form of a gas
wax	a white substance that burns and is used for making candles
wires	thin threads of metal

Appendix 2: Lesson plan format

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

Appendix 3: Sample individual record form

Learner name:		Year:		Class:	
Strand:		Sub-strand:			
Assessment event	Specific learning outcome (use appropriate code)	Achievement levels (ratings)			Specific learning outcomes: A = Achieved, PA = Partially Achieved, NA = Not Achieved Key: 0 = NA, 1-4 = PA, 5 = A
1	3.1.1.1 <i>Describe the similarities and differences between living things found in the school grounds.</i>			*	A
2			*		PA
3		*			NA
4				*	PA
Descriptive comments:					
Class teacher:		Signature:			Date:

Appendix 4: Sample class record form

Class:		Strand:	Sub-strand:										Year:			
Specific learning outcomes: A = Achieved, PA = Partially Achieved, NA = Not Achieved		Individual comments on the learning progress in the class														
Assessment event	1															
Learning outcome assessed (code)	3.1.1.1															
Denis	A															
Ian	A															
Jack	A															
James	A															
John	PA															
Joyce	PA															
Lionel	PA															Steady/satisfactory
Liza	NA															
Luke	NA															
Mary	A															Improved/excellent progress
Michael	PA															
Nancy	NA															
Peter	A															
Tom	NA															
Yates	NA															Not improved/slow progress
Overall comments:																
Class teacher:												Signature:			Date:	

Appendix 5: Sample individual monitoring form

Learner name:		Class:		Year:	
Strand:		Topic/unit:			
Sub-strand:		Remarks: comment on learning progress: improved, steady or not improved			
Assessment event	Specific learning outcomes: A = Achieved, PA = Partially Achieved, NA = Not Achieved	A	PA	NA	
Code	Outcome assessed				
1	3.1.1.1 Describe the similarities and differences between living things found in the school grounds.	*			Improved from previous assessment event
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
Class teacher:		Signature:			Date:

Appendix 8: Sample individual report form

Learner name:		Class:	Term:	Year:
Strand:	Sub-strand:		Specific learning outcomes: Achieved (A), Partially Achieved (PA) or Not Achieved (NA)	
Code	Specific learning outcome assessed (use appropriate code)		A	PA
3.1.1.1	<i>Describe the similarities and differences between living things found in the school grounds.</i>		*	*
Descriptive remarks:				
Strand:	Sub Strand:		Specific learning outcomes: Achieved (A), Partially Achieved (PA) or Not Achieved (NA)	
Code	Specific learning outcomes (use appropriate code)		A	PA
Descriptive remarks:				
Results for summative assessment: The progressive achievement level for summative assessment is:				

Appendix 8 (cont.)

Strand:	Combination of sub-strands:	Specific learning outcomes: Achieved (A), Partially Achieved (PA) or Not Achieved (NA)	
3.1.1.1		*	
3.1.3.1		*	
3.3.1.1			*
Descriptive remarks from summative assessment:			
Overall achievement level:		Overall achievement award:	
School administration report on learner's behaviour and character			
Class teacher:		Signature:	Date:
Class teacher comments:			
Head Teacher/Principal:		Signature:	Date:
Head Teacher/Principal comments:			

Solomon Islands Primary Science

TEACHER'S GUIDE Year 3

This *Solomon Islands Primary Science Year 3 Teacher's Guide* is the teacher support material for the *Solomon Islands Primary Science Year 3 Learner's Book*.

This Teacher's Guide supports the chapters of the Learner's Book—"life and living"; "energy sources"; "changing materials"; "electricity"; "growing plants in a nursery"; and "day and night". The support notes for each chapter are presented in a standard format. Each section has:

- processes and skills
- resources
- teacher's support notes
- learner's guide references
- answers to the activities and assessment items.

This *Solomon Islands Primary Science Year 3 Teacher's Guide* is part of a new series of materials for Solomon Islands Primary Science for Years 1 to 6. This series was developed as part of the Solomon Islands school curriculum reform during 2005 to 2012. This Teacher's Guide will help teachers to give learners the opportunity to learn from their environment. It supports teachers in the organisation of learners' hands-on investigations of the physical and living world.

Throughout this Teacher's Guide there are page references to a primary science encyclopedia, *Explore Science*, where teachers can find background information on each chapter of the Learner's Book. The encyclopedia accompanies this Teacher's Guide.

