
Environmental Studies

Lower Primary
Teacher Guide



Department of Education

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Teachers, inspectors, tertiary educators, community members, representatives from non-government organisations and the Environmental Studies Subject Advisory Committee have developed this Teacher Guide through meeting, workshops and consultations.

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Inservice units

A set of inservice units has been written to support the implementation of the primary reform curriculum. These units should be used in conjunction with the Lower Primary Environmental Studies Syllabus and this Teacher Guide. For further information contact your head teacher or district inspector.

The inservice units are:

- self-instructional, so you can access them according to your needs
- self-paced, so you can study at your own pace
- outcomes-based, so you can experience outcomes-based approaches to education
- based on adult principles of learning such as, doing, sharing and reflecting
- practical and related to your daily work as a teacher or supervisor
- collegial, so you can learn together in small groups, whole school or cluster settings
- accredited with the PNG Education Institute, so you can improve your qualifications
- designed to promote best practice, so you can effectively implement the curriculum
- applicable across both Lower and Upper Primary syllabuses.

These units integrate principles contained in the National Curriculum Statement (2002) and the National Assessment and Reporting Policy (2003).

Secretary's message

The Environmental Studies Syllabus and this Teacher Guide build upon the skills and knowledge that children bring from their own cultural and family experiences and the learning outcomes from the Elementary curriculum. This learning occurs in the child's first language.

A bilingual approach, used at Lower Primary, incorporates bridging to English processes in Grades 3, 4 and 5. This approach helps students to know who they are by building on their knowledge about their culture and first language.

The student's first language used in Elementary will continue to be the language of instruction while bridging to English takes place in Grades 3, 4 and 5.

Students will continue to develop their thinking and decision-making skills as well as skills in speaking and listening and writing in the language they speak, while also learning in English.

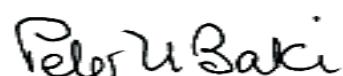
Lower Primary teachers are generalist teachers and this Teacher Guide is for all teachers in Lower Primary schools. It is one of a set of seven guides written for teachers of Grades 3, 4 and 5.

Environmental Studies helps students to understand what is in their environment, including living and non-living things and the interdependence and the impacts that humans have on environments. If we use and manage our resources and the environment wisely some of the natural disasters such as landslides, floods, bush fires and spread of diseases can be minimised. A harmonious relationship between the natural environment and humans is essential for healthy living. This relationship needs to be managed and maintained in order to keep our environment healthy for future generations.

As Lower Primary teachers you are responsible for ensuring that our children, who are the future generation of this resource rich country, recognise and understand, at an early age, that we need to care for all the resources we need for our daily living.

Teachers are encouraged to read this guide carefully and then become familiar with the content of each of the other Lower Primary teacher guides. In this way, teachers can feel confident to try out the ideas and strategies that they believe will be effective with their students. Teachers may choose to modify and amend these ideas to suit local circumstances.

Teachers should work closely with members of their school communities to ensure that local community needs are met within the framework of the learning outcomes published in the Lower Primary Syllabuses.



Peter M. Baki CBE
Secretary for Education

Introduction

Purpose

This Teacher Guide must be used in conjunction with the Lower Primary Environmental Studies Syllabus. Its main purpose is to help you to implement the syllabus in your classroom.

The guide provides you with guidelines and directions to help you plan and develop teaching and learning activities for the achievement of the learning outcomes. It also provides you with information and processes to:

- plan a program suitable to your school
- develop units of work based on clusters of learning outcomes relevant to your students' needs and interests
- use the elaborations to identify relevant content (knowledge, skills and attitudes) and contexts
- select appropriate teaching and learning strategies
- plan and conduct assessment to monitor students' learning, and achievement of learning outcomes.

Using this teacher guide

When you receive your Lower Primary syllabuses and teacher guides, you need to do the following:

- read each teacher guide carefully
- become familiar with each syllabus, its strands and substrands
- select one subject, then read the outcomes and indicators for that subject
- read each section of that subject's teacher guide again and take note of those ideas, strategies and processes that you think will be useful to you
- repeat these steps for the other subjects
- meet with other teachers, share your ideas and plan how you will work together to write programs and units of work
- try out some of the units of work in the teacher guides
- write your own programs and units of work using the information in one or more of the teacher guides and subject syllabuses.

Bilingual education

Bilingual education is the regular use of two languages for instruction. With over 800 different languages spoken across Papua New Guinea, most students do not speak English as their first language. In Lower Primary Environmental Studies, teachers will use a bilingual approach to teaching and learning, using both vernacular and English to develop students' understanding of the learning outcomes.

Lower Primary uses a bilingual approach as there are academic benefits for students being bilingual. Students continue to learn in their first language because learning only in English as a second language can limit their learning and social development. As students become confident in thinking, reasoning, problem solving and decision making in their vernacular, they are more able to learn another language such as English. Both inside and outside the classroom, it is important to continue to develop, expand and enhance vernacular language to that used by adults.

Bridging to English

Bridging to English is the gradual change from vernacular to English instruction during Grades 3 to 5. Bridging, while maintaining vernacular language, helps students retain their identity, culture, self-confidence and self-esteem.

Bridging to English approaches are explained in the section titled Teaching and Learning Strategies. Examples of how to apply these approaches appear in the section titled Units of Work.

Using vernacular language for continued learning and development while English is being learned, is an effective way for Papua New Guinean students to develop to their full potential.

Integration

When teachers use integrated and bilingual education approaches in their classrooms, they are encouraged to create a relaxed, enjoyable environment. They use a variety of teaching and learning strategies to help students acquire relevant skills, knowledge and understanding.

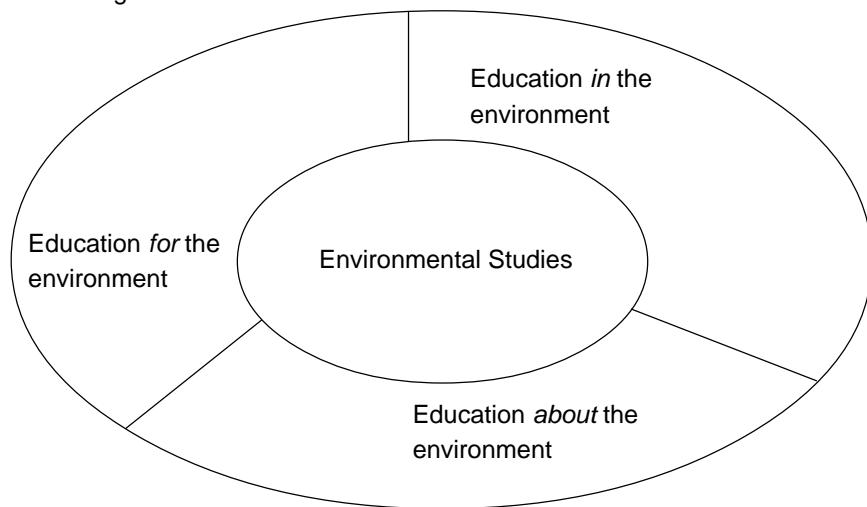
Integrating learning of subjects and learning outcomes is more likely to provide a meaningful and natural learning environment for students, and subsequently improve the quality of their learning.

Some learning outcomes from different subjects naturally collect or cluster together, allowing a thematic approach to programming. The integration is often determined by annual calendars of events, community activities, problems and issues to make the learning more meaningful to students. Learning outcomes that do not integrate easily, will of course need to be programmed separately.

Nature of Environmental Studies

We are becoming increasingly aware of the need to sustain the health of the planet and the integral web of connections that link together all life on Earth. Environmental Studies has emerged as a significant element within the school curriculum. It must be accepted as an important part of the curriculum and can assist students to develop a greater understanding of their ever-changing world.

Through Environmental Studies students gain the knowledge, skills and values needed to make decisions and take action in order to sustain and minimise harm to the planet. Environmental Studies recognises the importance of the following approach to teaching and learning, which focuses on the concepts of *in*, *about* and *for* the environment. These concepts are recognised and accepted internationally. The process is shown in the diagram below.



Education *in* the environment emphasises the importance of providing experiences for students out in the environment, whether it be the bush, rainforest, mangroves or beach. It is these types of experiences that assist students to develop and enhance their awareness and appreciation of environments.

Education *about* the environment enables students to make informed decisions to act in environmentally responsible ways. They develop sound knowledge and understanding of the environment through an integrated approach that emphasises the importance of natural, built and social environments.

Education *for* the environment encourages students to take action to initiate positive changes in attitudes and personal lifestyles. It builds upon the experiences and knowledge developed in education *in* and *about* the environment, and assists students to promote a sustainable use of their environment.

Source: Ryan, F. and Ray, S. (1991)

Links with other levels

This table shows how Environmental Studies at Lower Primary level links with the learning areas of Science and Culture and Community. It also shows the links between subjects from Elementary to Upper Primary.

School Level	Elementary	Lower Primary	Upper Primary
Learning Area	Culture and Community	Science	Science
Subject	Culture and Community	Environmental Studies	Science

Links to other subjects

The nature of Environmental Studies enables it to link easily with other subjects that deal with aspects of the environment such as Community Living, Arts and Health. It is important that these links are identified before any teaching or learning takes place and identifying these links should be used as a planning strategy at the start of the year or term.

More information on integration is given in the sample units of work where learning outcomes are clustered or linked together, and also in the Programming section.

Links across grades and strands

Integration can also be done across grades in multigrade classes and across strands of a subject in normal classes. Teachers of multigrade classes can link learning outcomes from the same strand but across the relevant grades to cater for individual learning needs. Teachers of one grade can make links across the strands in order to plan their teaching and learning.

Key features

This section highlights important aspects of Environmental Studies.

Strands and substrands

Environmental Studies is organised into strands and substrands. This is to help teachers organise teaching and learning activities and assessment tasks for the subject. Strands and substrands identify particular concepts which can be used as themes to develop units of work.

The content of the Environmental Studies Syllabus is organised into two strands and five substrands as shown below.

Strands and substrands for Environmental Studies

Strands	Substrands
1. What's in my environment?	<ul style="list-style-type: none"> • Plants and animals • Changes in my environment • Links in the environment
2. Caring for my environment	<ul style="list-style-type: none"> • Managing resources • Managing waste

Strand 1: What's in my environment?

Substrand: Plants and animals

In this substrand, students recognise and appreciate different species of useful plants and animals found in different environments. Students develop an appreciation of how plants and animals are used and undertake practical activities to care for plants and animals in the environment. Some useful plants and animals are threatened by human activities. Students develop a sense of pride in the species of plants and animals around them. They develop a sense of responsibility, care and respect and understand the need to conserve plants and animals in their environment.

Substrand: Changes in my environment

In this substrand, students recognise different changes and the impact of these on the environment. Some of these changes are caused by nature and some by people. Changes on the environment can be helpful or harmful. The environment never stays the same. Non-living things in the environment, such as weather, can change the environment gradually over seasons or a longer time. These changes can in turn cause changes in living things. Some changes are for the better, others are for the worse. Some changes can be reversed while others are permanent. Students must learn about these changes so they can make informed decisions about certain changes that may have an impact on their lives.

Substrand: Links in the environment

In this substrand, students develop knowledge and understanding of the interdependence and relationships between living and non-living things in the environment. There are many different relationships between animals and plants and other living and non-living things. Students study simple relationships between living and non-living things. For example, plants need water and sunlight and people need plants. Students observe how living things are related to nature's cycles such as weather and other natural changes. Students will appreciate that they are part of the environment and that they must actively participate in protecting environments now and in the future.

Strand 2: Caring for my environment

Substrand: Managing resources

In this substrand, students understand that Papua New Guinea has a diverse environment, rich in natural resources found in tropical forests, mangroves, fresh water, wetlands and coral reefs. In some cases these resources have been permanently damaged for short-term benefits. Students investigate consequences of mismanagement of resources from the land, sea, water and air and undertake good practices to manage resources in a sustainable way for the benefit of everybody, now and in the future. Students develop problem-solving skills associated with environmental issues and develop a sense of responsibility towards the environment.

Substrand: Managing waste

In this substrand, students develop understanding and awareness of the types of waste produced by living and non-living things in the environment. They consider types of waste produced by individuals and industries and the consequences of waste on the environment. Students work individually and in groups to develop and implement strategies to manage waste in the school, home and community environments. They participate in activities such as recycling and reducing waste materials to minimise waste.

Environmental problems and issues

Important issues and problems that affect conservation in Papua New Guinea must be identified so that students can address them and provide solutions for sustainable use of resources. There are several pressing environmental problems, all of which give cause for concern. They include:

- water and land pollution
- hazardous waste dumping and chemical waste pollution
- domestic, industrial and solid waste disposal
- deforestation and soil erosion
- plant and animal extinction
- destruction of marine resources

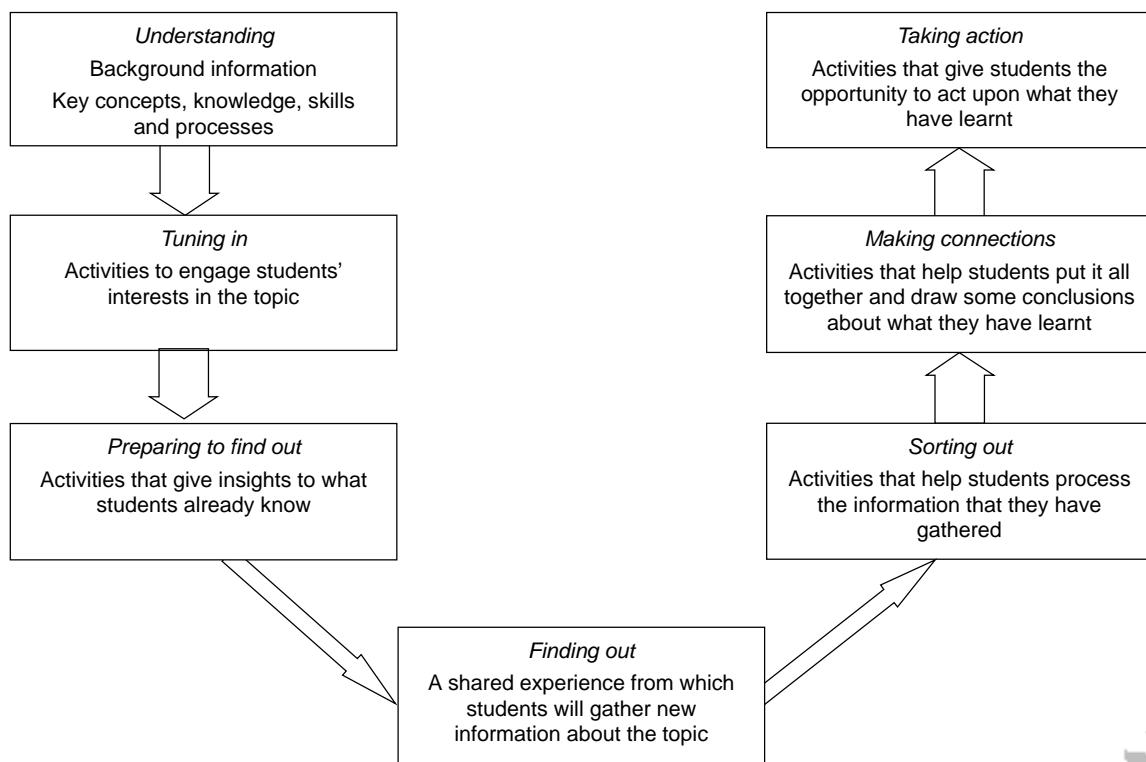
- urbanisation and increasing population pressures
- destruction caused by mining and logging
- decreasing quality of agriculture and food products
- loss of traditional environmental knowledge.

It is essential that students develop skills that will enable them to be active and informed citizens who can contribute to the care and sustainability of their environment. Within Environmental Studies there are a range of skills that are essential for students to develop in order to become effective environmental citizens and stewards. These skills allow students to:

- appreciate and understand the importance of the environment
- collect and analyse data about the environment
- solve problems and issues relating to the environment
- create awareness of a healthy environment
- evaluate their findings.

The Environmental Studies process

Environmental education is the process through which students come to understand and appreciate the environment. It aims to develop the knowledge, skills and willingness to make decisions and take action to sustain the planet. The flow chart below shows the Environmental Studies process. Teachers are encouraged to use this process in their planning and teaching and must provide opportunities for students to use this process as part of their learning.



(Source: Murdock, 1992: pg 6-8)

Teaching and learning strategies

The learning outcomes provide the planning framework for teachers. In their planning, teachers in Lower Primary schools use the learning outcomes from the syllabuses, and the elaborations in this Teacher Guide, to identify specific knowledge, skills and attitudes that can be developed at each grade.

Continuous assessment of student learning against the outcomes will ensure a supportive classroom environment that will meet the students' individual learning needs. Here is a discovery-learning motto to keep in mind when planning activities for students who are learning in two languages.

Discovery learning

We remember:

20% of what we hear

40% of what we see

80% of what we discover for ourselves.

Bridging to English approaches

Children begin school using their first language for learning and development while the English language is being acquired. As students move into the Lower Primary, a bridging process to learning in English is developed. The Curriculum Development Division has recommended five approaches to bridging to English for teaching in bilingual classes in Papua New Guinea. Each of these five approaches has been modelled in the units of work in this Teacher Guide. You have to use these processes when you are programming units of work. The approaches to bridging are explained below.

1. Integrated programming and thematic approach

Teachers are encouraged to use an integrated programming and thematic approach in Lower Primary.

First, you identify clusters of outcomes from within a subject or across several subjects that link naturally together. Then, you identify a theme that links the outcomes. This helps to make learning activities interesting, relevant and appropriate for the students. Themes may be used for programming a unit of work to be taught for one to two weeks or longer.

2. Whole language approach

Within the integrated, thematic approach, the whole language approach will guide planning and teaching of the vernacular and English programs.

Teachers must create a rich environment with models of a variety of oral and written text types in the classroom. This helps students learn how whole texts are constructed. Many student-centred activities can also be created from whole texts for students to learn about the parts of language, such as letter–sound relationships, pronunciation, spelling, grammar and vocabulary.

3. Program separately for vernacular and English

Language development in vernacular and English needs to be planned separately for each subject. Students use vernacular for example, when they are learning difficult new content and content that is related to their own community lives, or for small group discussions. Students are introduced to English words and language features while they are learning the concepts in vernacular. Gradually, as students vocabulary and understanding of English grows, they will learn more and more in English. In Grade 5 seventy percent of teaching, learning and assessment will be in English.

4. Use big books for both languages

Big books should be used as a main resource for both vernacular and English language development. Big books are usually used to introduce a new topic, new ideas, a new text type, new grammar and new vocabulary. Big books can be either fiction or information texts. You or the students can make bilingual big books showing the same information or telling the same story in both vernacular and English.

5. Variety of genres

There will be a focus on different text types, or genres, associated with different language functions or purposes. These genres help students to understand how language can be used in powerful and interesting ways for different purposes. For example we tell, read and write narratives to share experiences for enjoyment. We use procedures to explain how to make something or do something. We use reports to present factual information and explanations to explain why certain things happen. Arguments are used to present different points of view in powerful, persuasive ways. The following genres will be taught and practised in different subjects in Lower Primary:

- narrative
- recount
- procedure
- report
- explanation
- exposition.

You will be planning for students to learn these different genres when you plan your units of work. Read the *Lower Primary Language Teacher Guide* for more information.

Gender

The Environmental Studies Teacher Guide describes the content for Environmental Studies in Lower Primary. The content is designed to cater for the educational needs and interests of both girls and boys.

The interests and preferred learning styles of girls and boys need to be considered. For example, greater female participation in activities related to environmental education at this level can be promoted through:

- cooperative and collaborative teaching and learning approaches, which consider the needs of both single and mixed sex groupings, inside and outside of the classroom
- the use of inclusive language
- equal participation of boys and girls in all learning activities.

Student-centred approaches within Environmental Studies

Environmental Studies promotes a student-centred approach. The table below shows examples of how to use student-centred activities within the Environmental Studies process.

A detailed description of the Environmental Studies process

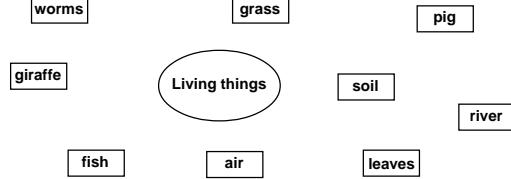
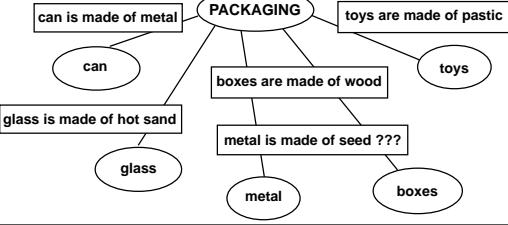
Stages	Descriptions	Examples			
1. Tuning in	The type of questions and activities suggested here are simply to get the students engaged in thinking about the topic. They are designed to raise interest, curiosity and motivate students to make a good start on the topic itself.	Bring a shopping bag filled with a range of food and household items such as a tin of fruit, a box of matches, a packet of soap, a packet of chicken pieces, a bottle of tomato sauce, a cotton 'T' shirt, a plastic bottle of mineral water, a ball of wool, a packet of rice and a packet of sugar. Ask questions such as:	<ul style="list-style-type: none"> • Where do you think these items come from? (shop) • But before that, where do you think they came from? (natural products) • What is written on the outside of the container? How are the goods packaged? Where were they made? • Do a brainstorm activity. 		
2. Preparing to find out	Students are given some insights into what they already know about the topic and where their initial interests lie. This stage also helps students to clearly focus on what they already know and what they will try to find out. Some activities may require students to make decisions about the ways they will go about gathering information. At this stage students prepare themselves for the experiences that will follow and focus their investigations.		<ul style="list-style-type: none"> • Write the name of each household item. • Say how it is prepared, served or used in the home. • Find out and explain some safe ways to dispose of wastes from these products. • Write up some questions to use during a visit to a dumping site. 		
3. Finding out	In each unit of work a list of teaching and learning activities is given. Teachers and students are given opportunities to choose one or two activities from this list. Students are then given the opportunity to gather new information about the topic.	Item	Made from living or non-living things	Name of things used to make this	How it is used
	a box of matches				
	a cotton 'T' shirt				
	a plastic bottle of mineral water				
	a bottle of tomato sauce				

Stages	Descriptions	Examples
4. Sorting out and presentation	<p>At this stage a variety of integrated activities are suggested from other subjects such as Arts, Language and Physical Education. Students will process the information gathered in stage 3 and present it in a number of different ways. They may also begin to draw some conclusions about what they have learnt so far.</p> <p>The variety of activities carried out here may challenge and extend students' understanding about the topic. New information, content or skills may be discovered and included in this stage of the process.</p>	<p>Steps:</p> <ol style="list-style-type: none"> 1. List all the materials that are made of living things. 2. Divide these into two groups and name them as plants and animals. 3. The third group will be the non-living things which students will further group as metals and non-metals. 4. Can any of these items be reduced, reused or recycled? 5. What are some ways that they can be reduced, reused or recycled ?
5. Making connections	<p>At this stage students will use all the information collected to draw conclusions about what they have learnt. This is an important time for the teacher to assess and evaluate the students' achievement of the knowledge, skills and attitudes in the unit of work.</p>	<p>Complete the sentences below:</p> <p>A matchbox and match sticks are made from _____.</p> <p>Plants are very important to us because _____.</p> <p>We must help to protect our plants from being destroyed by _____.</p>
6. Taking action	<p>This is an important stage in which students demonstrate both their inquiry process and their understanding of Environmental Studies. It is important that students are given the opportunity to act upon what they have learnt. A variety of actions are suggested, most of which are centred on the individual student's life and home. They may wish to go further by expressing their findings outside of school and in their local community.</p>	<p>Design a plan to look after the waste from the food items that are consumed every day at school and at home.</p> <p>Present as brochures and posters.</p> <p>Distribute brochures to all students and place posters around the school grounds.</p>

Teaching and learning strategies

Teaching and learning strategies identified in the table below are useful for Environmental Studies. Teachers are encouraged to select and use these where appropriate in planning units of work.

Sample teaching and learning strategies

Teaching and learning strategy	Explanation	Examples
Brainstorming	Brainstorming is used to generate ideas about a topic. All ideas are accepted. Discussions then take place, usually in groups or as a whole class. Points are evaluated and organised. Any incorrect ideas, such as listing soil and air as living things, are amended.	
Concept mapping	Concept mapping helps teachers to evaluate students' understanding of a concept. Key words about the topic, theme or concept are generated. These are linked using connecting phrases or words. In this example, the student does not understand how metals are formed.	
Problem solving	Problem solving encourages students to investigate an area of interest and establish strategies and actions to solve or minimise the problem. This helps students to develop critical and analytical thinking skills and to apply decision-making and problem-solving skills in real life situations.	<p>How to use problem solving</p> <ol style="list-style-type: none"> 1. Identify problems for discussion. 2. Discuss ways to solve the problem. 3. Consider the consequences of applying a particular strategy in trying to solve the problem. 4. Consult experts and other resource personnel for assistance. 5. Decide and apply corrective measures to correct the problem and take actions for planning and implementation.
Investigation	This is a scientific process where questions are structured with clear steps to solve a problem. Scientific knowledge and skills are applied to reach a solution.	<p>Soil Investigation</p> <p>Members _____ Class _____ Date _____</p> <ol style="list-style-type: none"> 1. Describe where the soil is from <ul style="list-style-type: none"> • Where was your soil site? • What was growing on this site? • Was it level or on a slope? • What other things did you notice? 2. Describe the soil <ul style="list-style-type: none"> • What colour is it? • How does it feel? Roll some in your fingers. • What do the largest and smallest soil particles look like? • How does your sample compare to the other soil samples? 3. Describe what is in the soil <ul style="list-style-type: none"> • What are some of the things that make up your soil? Add water to the soil and allow it to settle for at least a day before doing this activity. • Draw what the layers look like. • How do they compare to the other samples? 4. Write a summary of your findings and report to your class.

Teaching and learning strategy	Explanation	Examples
Observation and collecting information	<p>Students are actively involved or engaged in using all their senses; seeing, touching, smelling, tasting and hearing.</p> <p>They use skills of observing and recording.</p>	<p>You will need a simple map of the area you will be visiting and multiple copies of the nature observation sheet.</p> <p>Nature Observation Sheet</p> <p>Name _____ Date _____</p> <p>Exact place _____</p> <p>What I saw _____</p>
Projects	<p>These are short or long term activities which individuals or groups of students do over a number of lessons or in their own time.</p> <p>Examples of projects are:</p> <ul style="list-style-type: none"> • studying marine life • looking at pollution and its effects • looking at wastes and ways of managing them • studying the life cycle of a particular plant or animal • making an aquarium or terrestrial model • collecting pictures of different plant or animal species (sample given) • monitoring climate in relation to seasonal plants such as mango, yam and peanuts 	<p>Research Project</p> <p>Name _____ Class _____ Date due _____</p> <p>Topic: Birds of Papua New Guinea</p> <ol style="list-style-type: none"> 1. Find a picture of a bird found in Papua New Guinea. 2. Draw the bird and name some of its parts. 3. Write its name in your vernacular, Tok Pisin, Motu or English. 4. Does your bird have short, medium or long legs? 5. Does your bird swim in the sea or freshwater? 6. Does your bird stay awake at night or sleep at night and stay awake during the day? 7. Will your bird make a good pet? How will you make it become a good pet? 8. Is the bird better left in its natural habitat? Why? <p>Summary</p> <p>Birds are living things that have f_____ over their bodies. Instead of front legs they have a pair of w_____. Most birds use these to f____ with. Some birds cannot fly. Birds lay e_____ in n_____.</p>
Performances	<p>At Lower Primary students are still at the stage where they like to move and talk or play a lot.</p> <p>Activities such as performing mimes, role plays or reciting poems make learning fun and meaningful as students become involved in sharing their opinions and creativity about their environment.</p>	<p>Topic: Rainforests</p> <p>Introduction</p> <ol style="list-style-type: none"> 1. Distribute a variety of rainforest pictures. Students could collect these as homework. 2. Brainstorm what students know about rainforests. 3. Display colourful letter blocks on front table. <p>Body of lesson</p> <ol style="list-style-type: none"> 4. Teacher models acrostic poems. 5. Class discussion to stimulate ideas for poems about rainforests. 6. Students use letter blocks to create acrostic poems. <p>Conclusion</p> <ol style="list-style-type: none"> 7. Choral or group recitals of poems. 8. Add pictures, publish and display poems. 9. Create short role plays from poems. <p>Example of acrostic poem</p> <p>Completely Original and Natural Sustainable and Enriched Rainforests that are Very Attractive and of Top Importance Of course to Nature</p>

Teaching and learning strategy	Explanation	Examples																																																																				
Presenting information	<p>This normally happens after an observation or finding out activity.</p> <p>Students put their ideas together and then identify ways of presenting their findings.</p> <p>Presentations may be in the form of charts, posters, big books, tables or in oral form.</p>	<p><i>Presenting information using a table</i></p> <p>Things I found in my school garden</p> <table border="1"> <thead> <tr> <th>Insects</th><th>Worms</th><th>Plants for eating</th><th>Other plants</th><th>Birds</th></tr> </thead> <tbody> <tr> <td>grass-hopper</td><td>red worm</td><td>tomato</td><td>grass</td><td>crow</td></tr> <tr> <td>spider</td><td></td><td></td><td></td><td></td></tr> <tr> <td>beetle</td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <p>Students can also draw diagrams of these things on a chart or make a big book.</p>					Insects	Worms	Plants for eating	Other plants	Birds	grass-hopper	red worm	tomato	grass	crow	spider					beetle																																																
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beetle																																																																						
Writing activities	<p>Students can write short stories, poems, reports or diary entries about daily activities, explanations about an event, points to report in class, findings in an activity done outside the class and articles for their notice board.</p>	<p>Things I did during World Environment Day</p> <p>From 8:00am to 10.00am I</p> <p>.....</p> <p>.....</p> <p>From 11.00am to 12.00noon I</p> <p>.....</p> <p>.....</p> <p>From 1.00pm to 3.00pm I</p> <p>.....</p> <p>.....</p>																																																																				
Games about the environment	<p>You can create many environmental education games for students or they can make up their own.</p> <p>Examples:</p> <ul style="list-style-type: none"> make a model of a rubbish monster compose animal songs make puppets to show how animals move make up riddles about things in the environment (who am I?) build a food web by students joining hands and acting as living things in the food web create word games (sample given) search for sounds 	<p><i>Find the words hidden in the puzzle</i></p> <table border="1"> <tbody> <tr><td>p</td><td>g</td><td>l</td><td>a</td><td>s</td><td>s</td><td>p</td><td>y</td></tr> <tr><td>a</td><td>c</td><td>t</td><td>l</td><td>o</td><td>n</td><td>l</td><td>m</td></tr> <tr><td>p</td><td>m</td><td>e</td><td>t</td><td>a</td><td>l</td><td>a</td><td>c</td></tr> <tr><td>e</td><td>r</td><td>u</td><td>b</td><td>b</td><td>l</td><td>s</td><td>h</td></tr> <tr><td>r</td><td>e</td><td>f</td><td>d</td><td>g</td><td>p</td><td>t</td><td>a</td></tr> <tr><td>o</td><td>u</td><td>c</td><td>a</td><td>r</td><td>e</td><td>i</td><td>n</td></tr> <tr><td>k</td><td>s</td><td>t</td><td>v</td><td>l</td><td>w</td><td>c</td><td>g</td></tr> <tr><td>r</td><td>e</td><td>s</td><td>p</td><td>e</td><td>c</td><td>t</td><td>e</td></tr> </tbody> </table> <p>1. Copy the word puzzle on a piece of paper or on the chalkboard for everyone to see.</p> <p>2. Brainstorm some of the things in the environment.</p> <p>3. Students try to find some of these words to make them stand out.</p> <p>Answers: rubbish, glass, reuse, paper, change, metal, action, care, plastic, respect</p>					p	g	l	a	s	s	p	y	a	c	t	l	o	n	l	m	p	m	e	t	a	l	a	c	e	r	u	b	b	l	s	h	r	e	f	d	g	p	t	a	o	u	c	a	r	e	i	n	k	s	t	v	l	w	c	g	r	e	s	p	e	c	t	e
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Teaching and learning strategy	Explanation	Examples
Excursions and field trips	<p>Excursions and field trips really are <i>schools without walls</i>. They are useful and positive environmental activities. They help students and teachers to understand the relationships between humans and other living and non-living things in their environment.</p> <p>In any trip outside the classroom, it is important that safety precautions are taken and all students are well-informed.</p> <p>Some examples of sites for field trips are:</p> <ul style="list-style-type: none"> • road construction site • wildlife or rainforest habitat • botanical gardens • fish factory • local community water system • oil refinery or oil field • coastline or beachfront • mine site • logging site • school garden • city rubbish dump • National Museum. 	<p><i>Using the environmental studies process</i> is already explained in the Key Features section. Teachers can use this process as a guide to their teaching. An example appears below.</p> <p>Stages 1-3: Finding out</p> <p>Interview questionnaire to be used during an excursion to the community to investigate the local water supply.</p> <ol style="list-style-type: none"> 1. Where do you get your water from — bore, town supply, rainwater, river or well? 2. What do you use this water for — cooking, drinking and washing clothes? 3. Do you sometimes face water shortages? Why? 4. Do you think the water you are getting is safe to drink? Yes/No. Why? 5. Have your family fallen ill because of the water problem? What types of diseases have they caught? 6. Have your local elders or community members done anything about this problem? 7. What can we do to improve this problem? <p>Students and teachers can adapt this sample to suit their needs. The knowledge, skills and attitudes are also identified and applied in each of these stages.</p> <p>Remember, always be polite when interviewing your local community members because some people can misunderstand you and this may result in other problems within the community.</p> <p>Stage 4: Sorting out and presentation</p> <p>Write your findings and organise these using tables and graphs.</p> <p>Present your findings in an interesting way and identify possible solutions. Students can seek assistance from the teacher or health authorities. Prepare letters, posters and speeches.</p> <p>Stage 5-6: Taking Action</p> <p>This is where all your findings and possible solutions are presented to your target audience such as health authorities, community councillors, local Members of Parliament or the general public.</p>
Debates	<p>Students present their arguments in a formal debate setting. Groups can be those for, and those against the topic. Other students can form research teams to assist each side with their preparations and others can form the judging panel who will judge the debate.</p>	<p>After forming the groups, students can use their experiences from field trips and excursions to proceed with their preparations for the debate. Students should be encouraged to express themselves in the language with which they are most familiar.</p>

Field trips or excursions

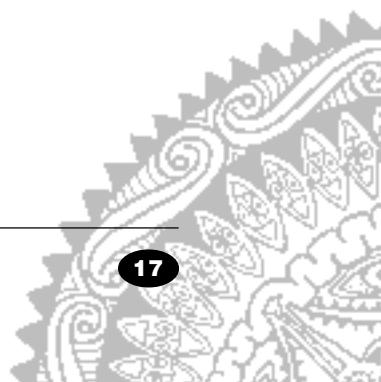
There may be many reasons why teachers are reluctant to take their classes outdoors. One is the feeling that they lack scientific knowledge. Another is a question of whether or not the teacher will lose control of the students outdoors and the third could be for cultural or social reasons.

To answer the first concern, primary teachers should accept that they don't need to be a science-trained teacher to take their class on a field trip. It is being honest to say 'I don't know' to some questions and advise the students that they will learn about this later, or challenge them to research the topic. Another way is to get into it yourself, and by experiencing it, you will slowly become confident in conducting outdoor activities.

Every field trip must be organised and the teacher needs to be clear about both the learning aspects and how to manage the students outside the classroom. The teacher has to decide on an activity appropriate for the age and learning level of the students.

Here are some tips teachers are encouraged to consider when planning a field trip. They are in no particular order.

- Is the field trip in the school yard or nearby?
- Do the students know from the start, the purpose of the field trip?
- Do they know the types of dangers they are likely to face and how to avoid them?
- What first aid equipment is required for this field trip?
- Does the field trip involve walking on roads which vehicles use?
- Is transportation needed?
- Is funding needed for the field trip?
- Is safety clothing required, for example closed-in shoes?
- How will the students carry lunch, water, equipment, and note-taking materials?
- What will the students need in the way of protection, for example, umbrellas or hats for shade?
- Will parents or community members be asked to help?
- What effective teaching and learning strategies will be used, for example, observation sheets or questionnaires?
- Will the students work in groups, pairs or as individuals?
- What methods of control will the teacher use? For example, blow the whistle twice for danger and once for coming together for discussion.



Assessment and reporting

Assessment

Assessment is the ongoing process of identifying, gathering and interpreting information about students' achievement of learning outcomes. In Lower Primary, assessment also needs to take account of the bilingual nature of teaching and learning. All assessment must link to the learning outcomes.

Teachers need to apply processes for assessment, recording and reporting that enable them to determine which learning outcomes students have achieved, and to report these achievements to parents in ways that make sense to them. The processes teachers use to assess, record and report students' achievements need to be manageable. Schools may decide to plan together on a whole school basis to share good assessment practice and to develop manageable assessment and reporting systems.

Students need to receive meaningful feedback about their achievement of learning outcomes. This can best be done using continuous assessment. The student's knowledge and skills are continually developing in a healthy classroom environment. It is important for teachers to be aware of, and record what the students know, can do, and understand. When this information is known about the students in the class, programming can be made more purposeful. It can be directed at learning weaknesses and made appropriate to the student's needs.

Criterion-referenced assessment

The approach to assessment that best aligns with an outcomes-based approach is criterion-referenced assessment.

Criterion-referenced assessment uses specific assessment criteria derived from the learning outcomes to judge a student's individual performance. It does not compare the performance of one student with that of another. This means that all students can demonstrate learning against individual criteria and all can find success against one or more criteria.

Unlike norm-referenced assessment, it is not used to rank students. It is used to determine what each student has learnt from the learning outcomes in terms of knowledge, skills and attitudes. All of the assessment methods described below use this approach.

Teachers will need to be able to:

- identify valid and reliable assessment tasks from the learning activities
- develop specific assessment criteria that describe exactly what a student must do to be successful in the assessment task
- make sure the students are aware of and understand the assessment criteria
- give students feedback on their performance in each assessment task against the assessment criteria.

In this way students are very clear about what they must know, do and understand. They are given constructive feedback from the teacher on what they are doing well and what they need to do to improve. Teachers are very clear about what they are assessing and are able to apply fair, consistent assessment to all students' work.

Assessment and recording methods

The syllabuses outline the main assessment methods. This section will expand on these methods by providing:

- examples of the kinds of activities where that assessment method may be appropriate
- examples of how to record students' demonstration of the knowledge, skills and attitudes in the learning outcomes.

Observation

Teachers can gather much information about students' learning by observing them in both formal and informal situations inside and outside the classroom. Observation is used largely for assessing skills and so is best suited to assessing skills-based activities. It can also be used to assess students' knowledge and attitudes when they are expressed orally.

Examples of when to use observation to assess students' learning

Formal assessment tasks that use observation as the assessment method might include:

- oral presentations
- role plays, dramatisations, dance or musical performances
- group work
- practical activities.

Informal observations can occur while students are working on normal learning activities both inside and outside the classroom. It is useful to inform students that you are assessing them and to make sure they know the assessment criteria that you want them to demonstrate. In this way more students are likely to be successful.

Students can also observe and give constructive feedback on each other's performances using the same assessment criteria. This is called peer assessment.

Ways of recording observations

There are a number of manageable ways to record observations of students' achievements. These include:

- checklists with comments
- class grids that allow the teacher to date their observations and focus on a few students at a time until they have recorded information about all students. These grids can be used to repeat the observations a number of times to build a fuller picture of each students' learning

- having a page for each student in an exercise book to keep dated, anecdotal records of significant learning
- having students complete peer assessments that show the performance of other students, either as individuals or in groups, against the assessment criteria.

Sometimes it may be necessary for the teacher to talk to the student about what they are observing as it is possible to misinterpret information. For example, a student staring out the window during a writing activity may be seen to be wasting time. When questioned, the student may well respond with a comment such as, 'I was thinking what to write next,' or, 'I was translating my sentence from vernacular to English in my head first.'

Conferencing or talking to students

In similar ways, teachers can gather information about students' understanding of what they are learning by sitting and talking with students while they are working.

Examples of when to use conferencing to assess students' learning

This is most useful in:

- practical lessons where students are applying skills
- language activities like shared or individual reading or when assessing students' writing
- small group work
- learning activities that are happening out in the community.

Teachers can ask relevant questions such as:

- What do you think is happening here?
- Why did you do it that way?
- Is there another way you could do this?

The purpose of conferencing is to gather information about students' knowledge and understanding of what they are learning. It can also give a good insight into students' attitudes to learning.

Ways of recording conference notes

The type of information gathered in conferences can be recorded on class grids or in exercise books with a page for each student.

Analysing students' products

This is probably one of the most common forms of assessment. The teacher sets an assessment task for students, explains the assessment criteria to them and then collects the students' products to see how well they have met the criteria.

Examples of when to analyse products to assess students' learning

Examples of products students make might include:

- written work such as stories, big books and posters
- models
- drawings, maps and diagrams
- art and craft samples
- community surveys and projects.

Teachers will need to make sure that the assessment criteria match the knowledge, skills and attitudes outlined in the learning outcomes being assessed. They will then have to decide how well the students have met these criteria. Teachers can use different scales to show various levels of achievement. For example, you could use scales like those below.

Examples of scales to show how well students performed on assessment tasks

Example 1	Example 2	Example 3
F. Student fully demonstrated the criteria	3 Student met the criteria most of the time	3 Student met the criteria independently
P. Student partly demonstrated the criteria	2 Student met the criteria some of the time	2 Student met the criteria with some assistance
NMP Student needs more practice	1 Student did not meet the criteria	1 Student needs more practice

In Example 1, teachers would record an F for those students who fully demonstrated the criteria, a P for those who partly demonstrated the criteria and NMP for those students who need more practice.

Examples 2 and 3 use numbers as codes to show how well the students met the assessment criteria. Teachers can choose which codes are the easiest for them to understand and use. Examples of how these codes can be used for recording, appear in the section Units of Work.

Ways of recording information gained from analysing students' products

Teachers may keep written products, or records of students' achievements on particular assessment tasks, in student portfolios.

Tests*Examples of when to use tests to assess students' learning*

Tests are used mainly to assess students' knowledge and understanding of subject content. Tests should be used for both formative and summative assessment, so that results can be used to help students improve in areas where they are having difficulty. At Lower Primary, tests are just one form of assessment and should be used in conjunction with the other assessment methods. This balanced approach to assessment gives students a greater chance of being successful as they are able to demonstrate their learning in different ways.

Ways of recording test results

Teachers normally record results of tests in record books. That can be done if the marks mean something and relate to the outcomes. For example, if a test was out of 10, then those students who received marks:

- between 8 and 10 have demonstrated a good understanding of the outcome being assessed
- between 5 and 7 have demonstrated partial understanding of the outcome being assessed
- of 4 or less, need more practice or further instruction.

Teachers can also store students' tests with teacher comments in students' portfolios.

What to do with assessment information

Once teachers have gathered information from a number of assessment tasks they should be in a position to make decisions about which outcomes students have achieved.

Teachers need to look at all the evidence they have gathered about each student and decide if they have enough evidence to say that the student has achieved the outcome. Normally to make this decision, teachers must be sure that the student has demonstrated the outcome independently and on a number of occasions; sometimes informally and sometimes in assessment tasks. Teachers can then record which students have achieved which outcomes.

One way of recording this would be to have a chart showing all of the outcomes by subject for the relevant grade. A sample of what this might look like appears on the next page.

Teachers could have one copy of the table for each student and colour the grid as each outcome is achieved. Teachers could lightly or partly colour the outcome box for students who are still working towards achieving the outcome. Whilst this is mainly for teacher records, a chart such as this could be incorporated into a formal report. However it would need further explanation for parents and guardians to make sense of it and to understand what learning has taken place.

Achievement of the learning outcomes

School:	Year:	Term:
Student:		Grade:

■ A fully shaded box indicates the student has achieved that outcome for that subject.

■ A lightly or partly shaded box indicates the student is working towards that outcome.

Subject	Learning outcomes														
	3.1.1	3.1.2	3.1.3	3.2.1	3.2.2	3.2.3	3.3.1	3.3.2	3.3.3	3.4.1	3.4.2	3.4.3	3.5.1	3.5.2	3.5.3
Arts															
Community Living	3.1.1	3.1.2	3.1.3	3.1.4	3.2.1	3.3.1									
Environmental Studies	3.1.1	3.1.2	3.1.3	3.2.1	3.2.2										
Health	3.1.1	3.1.2	3.1.3	3.1.4	3.1.5	3.2.1	3.2.2								
Language	3.1.1	3.1.2	3.1.3	3.1.4	3.2.1	3.2.2	3.2.3	3.2.4	3.3.1	3.3.2	3.3.3	3.3.4			
	V	V	V	V	V	V	V	V	V	V	V	V			
	3.1.1	3.1.2	3.1.3	3.1.4	3.2.1	3.2.2	3.2.3	3.2.4	3.3.1	3.3.2	3.3.3	3.3.4			
Mathematics	3.1.1	3.1.2	3.1.3	3.1.4	3.2.1	3.2.2	3.2.3	3.2.4	3.2.5	3.3.1	3.3.2	3.4.1	3.4.2	3.5.1	
Physical Education	3.1.1	3.2.1	3.3.1	3.3.2	3.3.3										

Assessment in vernacular and English

Bilingual education is used in Lower Primary where students learn in both their vernacular and English. They gradually 'bridge' from vernacular to English over the three years from Grade 3 to Grade 5. Teachers use both vernacular and English as the languages of instruction and so it follows that assessment should be conducted in both languages.

Teachers will need to make informed decisions about which language should be used to assess the students. In some cases it may be appropriate to give the students a choice about the language in which they would like to be assessed. The exception to this is where you are actually teaching English to students. This of course will need to be assessed in English.

The table on the next page provides a guide as to the percentage of assessment that should be conducted in each language.

Suggested percentage of assessment in vernacular and/or English

Grade	Vernacular	English
3	60%	40%
4	50%	50%
5	30%	70%

Assessment in Environmental Studies

The most effective way of assessing learning is to interact with students when the teacher can listen, observe, question and challenge. The teacher should also provide evidence of students' learning and involve them in the assessment process. Assessment tasks used by the classroom teacher should provide a clear picture of each child's learning development and their strengths and weakness in achieving the outcomes. Information collected by the teacher should help to develop a clear learning profile for each child.

Teachers should involve students at the start of an assessment task by letting them know what they are looking for. This is made obvious through the assessment criteria which list what students must do to be successful. The teacher should discuss the assessment criteria with students well before they complete the assessment task so they have time to develop the knowledge and practise the skills. This kind of interactive assessment enables a teacher to get maximum information about each child and enables students to be successful.

Planning for assessment

Teachers are encouraged to use the process, as well as ideas from other subjects, to develop assessment plans within units of work that are manageable. You can refer to the assessment sections within the sample units of work for more information about how to plan assessment tasks and develop assessment criteria. When planning assessment tasks teachers need to:

- identify the learning outcomes that are being assessed
- identify the knowledge, skills and attitudes that students will demonstrate
- select appropriate assessment tasks that students will perform to demonstrate achievement of the learning outcomes
- identify the language, vernacular (V) or English (E), in which students will be assessed
- develop assessment criteria and inform the students of these criteria
- develop a manageable way of recording and storing assessment information
- allow time for students to carry out an assessment task
- draw evidence from ongoing observation of performance or from specific assessment tasks
- use assessment information to make judgements about students' achievement of the learning outcomes.

Assessment criteria:

- describe what students will do if they are completing an activity at the required standard, which might mean that they are working towards achieving the outcome or have achieved it
- are explicit and are designed to help students to be successful
- provide a focus for teaching
- help students to assess each other consistently and fairly.

Points to consider when assessing

There is a relationship between the learning activities and assessment. Environmental Studies highlights this relationship in the following stages of planning. Assessment plans should be developed while developing units of work. Teachers need to think about the following in relation to assessment:

- planning for learning and assessment
- selecting suitable assessment methods
- designing assessment tasks and developing assessment criteria
- collecting and recording evidence
- making judgments about students' achievement of the outcomes
- reporting.

It is very important that teachers collect sufficient evidence of students' achievement of the learning outcomes. This evidence must be gathered through continuous assessment using a variety of assessment methods. Teachers are in a better position to make fair judgements when they are confident that they have sufficient evidence of students' achievement of the outcomes.

At each grade teachers must use a range of assessment methods. The four main assessment methods are described in more detail on the next page.

Assessment and recording methods

In Environmental Studies, teachers are encouraged to use these methods, as well as others that are supplied for the subject, to assess and record students' achievement of the learning outcomes.

Assessment and recording methods

Assessment method	Examples	Sample recording methods
Observations	<ul style="list-style-type: none"> watching work in progress informal observations self and peer assessment role-plays demonstrations performances debates case studies 	<ul style="list-style-type: none"> checklists running record sheets focused analysis sheet note taking anecdotal records  <p>Teacher or student notebook</p>
Conferencing or talking to students	<ul style="list-style-type: none"> asking questions pre and post interviews structured and informal conferences with students, parents, peers and community peer and group discussions 	 <p>Notes recorded at parent, teacher interviews</p>
Analysing students' products	<ul style="list-style-type: none"> concept map word wall diaries and journals best work collection first and final drafts of writing exhibitions explanations assignments research and field study reports posters and displays 	<ul style="list-style-type: none"> student profile running record sheets evaluation sheets  <p>Student portfolios show a collection of students' work gathered over time.</p>
Tests	<ul style="list-style-type: none"> essays multiple choice short answer selected response cloze paragraphs 	Tests can be stored in students' portfolios.

Reporting

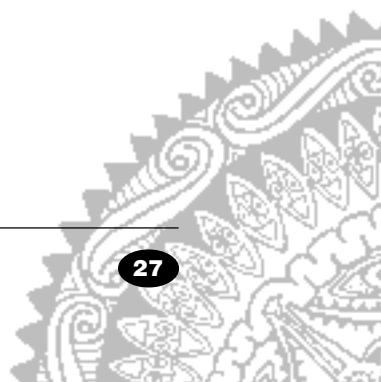
When the time comes for formal reporting through written reports or interviews, teachers can look at all the evidence of students' learning in student portfolios and in their own records. They can then decide which outcomes individual students have achieved and report this information clearly to parents. Teachers should highlight what students have done well and how they can further improve. The *National Assessment and Reporting Policy* outlines what is required in formal school reports.

Evaluation

Assessment information can also be used by teachers to evaluate the effectiveness of their teaching. By analysing class results as a whole, teachers can identify subjects, strands, substrands and outcomes where the students have done well and those that require further or improved teaching.

Similarly, a whole school can analyse results by subjects, strands and substrands, or by grades, and identify areas of strength and areas which need further attention. For example if a whole school is not performing well in Mathematics, then Mathematics could become the focus for inservice and resource development for the next year. In this way assessment information serves two purposes:

- to improve students' learning
- to improve the quality of teaching.



Programming

A program is a detailed plan developed by teachers to manage teaching and learning activities for their students throughout the year. The main purpose of programming is to help teachers arrange the content of the course by developing a year plan and weekly programs.

A year plan, broken into terms, should show when all of the learning outcomes for each subject will be taught. Because an integrated approach to programming is recommended, learning outcomes that link naturally together should be put into clusters and described through themes that show the linking concept.

The year plan should also sequence individual subject learning outcomes that need to be taught on their own. The themes and individual outcomes for each term are broken down on a week-by-week basis for the four school terms.

Weekly programs in the units of work detail teaching, learning and assessment activities for each week.

Samples of both types of programs appear below and in the Units of Work section of this teacher guide.

Developing a program

Programs are developed using common learning concepts. The concepts are identified in the learning outcomes from the seven syllabuses. It is also possible to develop a unit of work from one outcome. However, due to the nature of the learning approach at the Lower Primary level, we will focus on integrated units of work. Integrated units of work should use more than one outcome.

Using an integrated approach:

- learning is planned using common concepts within or across subjects
- students' learning should relate to the community activities
- new learning experiences are built from past experiences
- learning is focused around a familiar environmental context
- provides opportunities for a wide variety of student-centred activities
- encourages the use of local resources to support learning.

Characteristics of a good program

An effective outcomes-based program:

- maintains a focus on learning outcomes, showing what students must know and do to achieve the outcomes
- uses time flexibly, so that students with different needs can develop understanding and demonstrate specific outcomes over a period of time
- uses a variety of teaching and learning strategies. Teachers act as facilitators of learning and cater for different learning styles and individual needs of students

- emphasises the development of knowledge, skills and attitudes that promote lifelong learning
- provides opportunities for students to become effective, self-directed learners
- enables students to learn in a range of contexts
- supports learning through the use of a variety of texts, media and real-life materials and resources
- shows the links between the outcomes, teaching and learning activities and assessment tasks.

When programming, teachers should also take into consideration the following:

- providing a balance of activities including projects, practical work and assignments
- students' needs and interests
- the community calendar
- unplanned events
- holidays
- major school activities.

Programming for Environmental Studies

Environmental Studies contains two strands, which should be covered during the three year period from Grade 3 to Grade 5. Each grade will cover these strands, the five substrands and the outcomes listed for the year. In the Elaborations section of this Teacher Guide each outcome is further elaborated into specific knowledge, skills and attitudes which teachers can use to program their teaching, learning and assessment.

Papua New Guinea has a diverse environment and this should be reflected in the programs and learning in schools. Programs and lessons should depend on the available resources and facilities to teach the course. Teachers are expected to be selective and creative.

You are encouraged to do your year plan at the beginning of the year. A village calendar can be used to support your programming. It will provide you with valuable information about different environmental activities that occur in the community. The National Department of Education calendar will give you the dates for special days like World Environment Day.

World Environment Day

This day is observed by all nations annually in the move to conserve and protect the natural environment and resources.

All schools must respect this day and activities must be organised according to the theme. Activities such as drama, public speeches, debates, treasure hunts, poems, environmental games, paintings, planting of trees and flowers can all be part of this day.

Other days of environmental significance to be observed are:

- World Water Day
- World Health Day
- World Population Day
- World Day to combat Desertification and Drought
- International Day for the Preservation of the Ozone Layer
- World Maritime Day
- International Day for Natural Disaster Reduction
- World Food Day.

The dates for most of these days vary from year to year so you should consult the National Department of Education Calendar at the start of each year.

Learning becomes more meaningful when you teach about things that children can see or experience in their environment. When situations such as logging or natural disasters occur in your environment, you are encouraged to adjust your programs so that your Environmental Studies lessons are based on these real life situations.

Environmental education committee

This committee should be made up of representatives from all the Lower Primary grades. The committee must be recognised and funded by the School Board of Management.

Some of their roles would be to:

- design rules and guidelines for all students to follow at school, home and in the community
- coordinate National Environment Day
- organise competitions relating to environmental issues
- organise environmental awareness activities at school, in the community, and through the media
- design strategies to maintain the cleanliness of the school grounds
- set up displays on the school noticeboard or in the local community
- devise personal action contracts to be carried out at home based on changing habits or forming new ones.

Integration

Organising learning outcomes in an integrated way is an effective and economical way to program and teach Environmental Studies. Units of work based around environmental understanding and experiences provide teachers and students with:

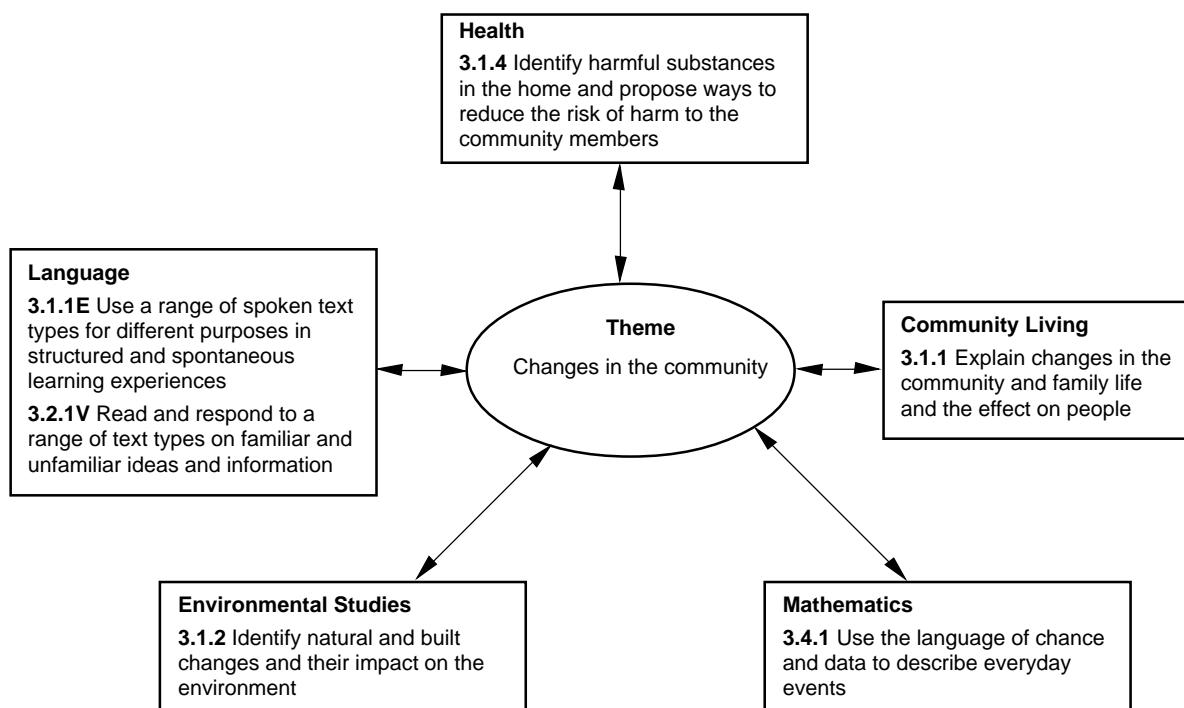
- a sustainable and sequenced learning experience, not a stop-start fragmented approach
- opportunities to explore topics or content in depth
- logical links between subjects
- a chance to be flexible, basing the learning on students' interests.

It is very important that clusters of learning outcomes and links between subjects are identified before any teaching or learning takes place. Teachers should look for these links at the start of every school year or term to formulate clusters of outcomes that have strong links that can later be used to form themes for units of work. Teachers within a grade can use outcomes charts to develop their year programs..

Below is an example of integration taken from the unit of work sample for Grade 3 in the Units of Work section. Identifying clusters of outcomes makes programming all seven subjects more manageable for teachers. The clusters are then used to form themes for developing units of work.

Sample cluster of learning outcomes

Theme: Changes in the community



You can also create integrated units of work using the following methods:

1. Links across grades

For example, a teacher of a multigrade class may prepare an integrated unit of work for Grades 3 and 4, from the first strand of Environmental Studies, What's in my Environment?

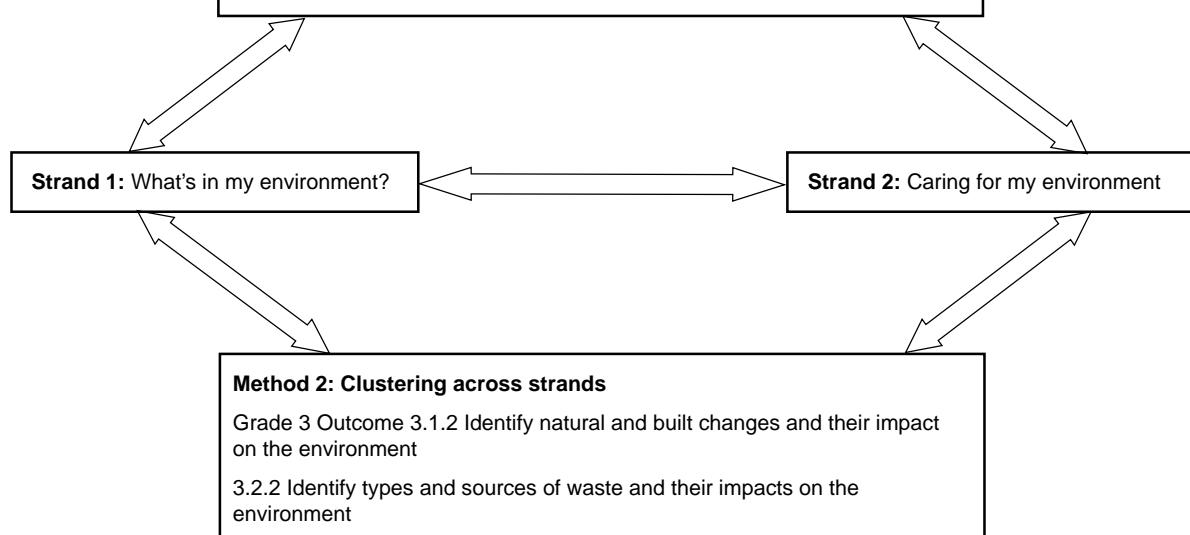
2. Links across strands within a grade

For example, a Grade 3 teacher may plan an integrated unit of work across both strands of Environmental Studies, where several outcomes are clustered together under a theme.

Method 1: Clustering across grades

Grade 3 Outcome 3.1.2 Identify natural and built changes and their impact on the environment

Grade 4 Outcome 4.1.2 Describe the impact of changes to the environment and identify solutions to potentially harmful substances



Stand-alone outcomes

When outcomes can not be linked, they are called *stand-alone* outcomes and short units of work must be programmed for these together with their sets of knowledge, skills and attitudes. Stand-alone outcomes are usually identified after clustering all of the outcomes from the seven subjects into integrated units of work.

Developing year and term programs

Below is a process or set of steps to help you develop a year plan. You may modify it according to your needs.

Process for developing a year plan

Study all seven Lower Primary syllabuses and teacher guides. Become familiar with the strands, substrands, learning outcomes and elaborations. (Step 1 in the unit of work process).

With a group of teachers at the same grade level:

- cluster or group about 4 learning outcomes from 2-3 subjects that link naturally. Refer to step 2 in the unit of work process for more information
- record these clusters on paper
- cross check which outcomes you have used. You will need to repeat most of the Language outcomes in other units of work to allow students to develop these skills to sufficiently high levels
- identify a theme for each cluster and record it next to the cluster. Refer to step 3 in the units of work process.
- some outcomes will not form clusters easily and these can be taught on their own. We are referring to these as *stand-alone* outcomes
- decide on an appropriate time of the year and the week to teach each theme or stand-alone outcomes. You may decide to teach these stand-alone outcomes at the same time as a unit of work by setting blocks of time aside
- now you can fill in the year plan with the information collected.

Sample format for a year plan

Week	Term 1	Term 2	Term 3	Term 4
1	Allocate themes and stand-alone outcomes to each week of the year plan.			
2				

Sample format for a term program

Week	Theme	Subject learning outcomes	Stand-alone outcomes	Assessment Tasks	Comments
1					
2					
10					

Time allocation for Environmental Studies

The time allocations for all the subjects are given in Appendix 2. Below is the time allocation for Environmental Studies.

Grade 3	180 minutes per week
Grade 4	210 minutes per week
Grade 5	210 minutes per week

The school and teachers will decide on the distribution of time allocations for the Environmental Studies lessons. It is suggested that at least one hour from the total number of minutes per week be used for students to carry out practical activities.

Suggestions for lesson allocations

Grade 3 180 minutes per week

Option 1	Option 2
1 x 60 minute lesson	2 x 60 minute lessons
4 x 30 minute lessons	2 x 30 minute lessons

Grade 4 and 5 210 minutes per week

Option 1	Option 2	Option 3
2 x 60 minute lessons	3 x 60 minute lessons	3 x 70 minute lessons
3 x 30 minute lessons	1 x 30 minute lesson	

Units of work

A unit of work is a set of sequenced teaching and learning activities with assessment tasks, designed to help students achieve selected learning outcomes within a specific time frame.

Process for developing units of work

The following ten step process will guide teachers in their planning and developing of units of work. Some teachers may start at different steps in the process (or, for example, reverse the order of Steps 2 and 3) but eventually all steps will be covered. When the unit is completed, you should reflect on its success and make improvements if you plan to use it with another group of students in a following year.



1. Study the learning outcomes

Look at the learning outcomes for the seven Lower Primary subjects if planning an integrated unit of work.

Look at the learning outcomes from one subject only if planning a unit of work for one subject.

2. Cluster learning outcomes

Cluster a small group of learning outcomes (about four) from across the subjects that link naturally together.

3. Identify a theme

Identify a theme to describe the natural links within the cluster of learning outcomes.

4. State the purpose of the unit of work

Summarise in two or three sentences what students will learn during this unit of work. Refer back to the learning outcomes.

5. Identify the knowledge, skills and attitudes

Use the indicators from the syllabuses and the elaborations from the teacher guide, to identify the knowledge, skills and attitudes for the cluster of learning outcomes.

6. Develop teaching and learning activities and assessment tasks

Develop relevant teaching and learning activities and assessment tasks that help students to learn and demonstrate the knowledge, skills and attitudes.

Develop teaching and learning activities for the Language learning outcomes in the unit of work which incorporate bridging approaches.

7. State the language of instruction for teaching and learning activities and assessment tasks

Identify which language will be used for all of the teaching and learning activities and assessment tasks.

8. Estimate the time

Identify how many weeks it will take to teach the unit of work (probably no more than three weeks for Lower Primary students).

9. Develop a weekly teaching program

Use your own programming format to develop a weekly program.

10. Identify relevant resources and materials

List the resources and materials needed to teach the unit of work.

Sample unit of work

A unit of work will consist of the following features:

- cluster of learning outcomes selected from the syllabuses
- theme
- purpose
- knowledge, skills and attitudes
- teaching and learning activities, including the language of instruction
- assessment plan, including assessment tasks and criteria, the language of assessment and how to record students' achievements of learning outcomes
- estimated time frame for the unit of work
- weekly teaching program
- resources required to teach the unit of work.

There are three sample units of work provided: one for Grade 3, one for Grade 4 and one for Grade 5. Each unit of work is integrated across several subjects and is based on a broad theme.

Teachers are advised to read and understand these units of work as individuals or in groups before attempting to use or adapt them.

Sample 1: Grade 3**Theme**

Changes in the community

Purpose

Students will learn to:

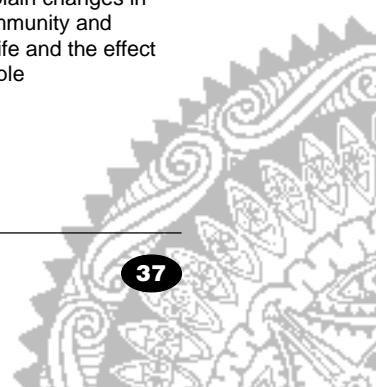
- identify the advantages and disadvantages of change in the home and community
- assess the impact of changes on the environment
- develop a caring attitude toward the environment and apply this in everyday life.

Learning outcomes

The learning outcomes listed in the table below were identified during the clustering process. Language will always be programmed in all units of work. Other related outcomes, if identified during planning, should be taught but not necessarily assessed. This is because it becomes unmanageable to try and assess too many outcomes in one unit of work.



Subject	Strand	Substrands	Learning outcomes
Health	Healthy individuals	Harmful substances	3.1.4 Identify harmful substances in the home and propose ways to reduce the risk of harm to the family members
Environmental Studies	What's in my environment?	Changes in my environment	3.1.2 Identify natural and built changes and their impact on the environment
Language	Speaking and listening	Context and texts	3.1.1E Use a range of spoken text types for different purposes in structured and spontaneous learning experiences 3.2.1V Read and respond to a range of text types on familiar and unfamiliar ideas and information
Mathematics	Chance and data	Probability and sets	3.4.1 Use the language of chance and data to describe everyday events
Community Living	Community	People	3.1.1 Explain changes in the community and family life and the effect on people



Knowledge, skills and attitudes

The table below shows the knowledge, skills and attitudes, most of which are taken from the elaborations of outcomes from the selected subjects.

Subjects and Outcomes	Knowledge	Skills	Attitudes
Maths: 3.4.1	<ul style="list-style-type: none">harmful substances	<ul style="list-style-type: none">explain	<ul style="list-style-type: none">caring
Community Living: 3.1.1	<ul style="list-style-type: none">ways to reduce risk of harm	<ul style="list-style-type: none">dramatise	<ul style="list-style-type: none">appreciating
Environmental Studies: 3.1.2	<ul style="list-style-type: none">natural and built changes	<ul style="list-style-type: none">draw tables and graphs	<ul style="list-style-type: none">accepting
Health: 3.1.4	<ul style="list-style-type: none">impact on the environment	<ul style="list-style-type: none">identify, discuss, compare, list, collect, record, role-play, report, describe, evaluate, classify	<ul style="list-style-type: none">protecting
Language: 3.1.1E, 3.2.1V	<ul style="list-style-type: none">changes in the community, family and their effects on peoplerate of changes		<ul style="list-style-type: none">respectingconserving

Teaching and learning activities

The list of teaching and learning activities identified here, are developed from the knowledge, skills and attitudes outlined above. They are integrated activities, which address the needs of all subjects used to create the unit of work. The letters V, E and V/E after each activity identify which language is to be used.

V = vernacular E = English V/E = vernacular and English

1. Discuss and share different points of view about changes in the community. (V/E)
2. Collect pictures of natural changes.
3. Collect pictures of built changes.
4. Find out and report past and present changes to the community and school. (V)
5. Invite a guest speaker to talk about ways in which life has changed in the community. (V/E)
6. Investigate how these changes have impacted on the environment and the community. (V/E)
7. *Assessment Task 1*
Write a report summarising natural and built changes, and how they have impacted on the environment and the community. (V)
8. Fill out a questionnaire and write a report after visiting a site that has been through environmental changes, such as logging or gardening. (V/E)
9. Write a short summary to evaluate findings after the field trip. (V/E)
10. Identify changes that are certain, and changes that are impossible in the community. (V)
11. Use disjoint sets to classify advantages and disadvantages of natural changes. (V/E)
12. Use disjoint sets to classify advantages and disadvantages of built changes. (V/E)

13. Record certain and impossible events. (E)
14. *Assessment Task 2*
Identify and sort harmless and harmful substances at home. (V/E)
15. Describe how harmful substances affect our lives. (V/E)
16. Role-play how to say *no* to bad habits and changes. (V/E)

Language activities

These are the activities that will be covered in Language using the knowledge, skills and attitudes from the other subjects as the context for language learning.

1. Research the term *change*, and identify the different types of changes that are built or natural through group discussion, field trips and questionnaires.
2. Shared reading of a relevant big book.
3. Silent reading about changes.
4. Describe the terms natural and built changes.
5. Explain and describe the consequences of changes.
6. Listen to a guest speaker and fill in questionnaires.
7. Identify words from the big book that describe changes in the community.
8. Add words to the word wall that describe changes in the community.
9. Write neatly, in cursive, one paragraph of the big book story.
10. Write a poem on changes.



Deciding which language to use

Select the language of instruction, either vernacular, English or both languages, that will give the students the best opportunity to learn. Sixty percent of teaching and learning in Grade 3 is in vernacular and forty percent is in English.

Identify where bridging to English approaches can be incorporated in your teaching and learning activities.



Programming in two languages

Because Grade 3 is a bridging class, it is very important that teaching and learning is addressed both in English and vernacular. The format below helps you to monitor your use of both languages to see if you are using approximately the right proportions of each. You just need to sort your teaching, learning and assessment activities under the headings in the format below.

Vernacular		English	
Oral	Print	Oral	Print
<ul style="list-style-type: none"> Research changes to the community through group discussion Listen to a guest speaker talk about changes in the built and natural community 			

Assessment plan

The assessment tasks identified here assess the knowledge, skills and attitudes identified from the selected learning outcomes.

Outcomes	Assessment tasks	Language V/E	Assessment criteria	Assessment and recording methods
Environmental Studies 3.1.2 Community Living 3.1.1 Mathematics 3.4.1	Write a report summarising natural and built changes and explain their impact on the environment and the community	V	<ul style="list-style-type: none"> provide examples of at least 3 good changes provide examples of at least 3 bad changes give reasons why you think these changes are good or bad use words such as certain, possible and impossible to assess whether these changes will impact on the environment 	Written report Teacher comments on students' reports
Health 3.1.4 Language 3.1.1E	Sort and analyse different harmful substances	V	<ul style="list-style-type: none"> list 3 harmful substances found at home state 3 safety rules concerning harmful substances in the home 	Written assignment Sample of student's writing

Recording methods

Whenever an assessment task is given, there should be some kind of evidence of students' work kept or recorded for the purpose of reporting to parents and guardians or following up on an individual's performance. Below are some examples of these methods.

Observation class list

Name of student	Classroom checklist
Kaleb	Recognises the English language used to describe changes
Siwa	Needs further explanation on the definition of terms – chance, certain, uncertain, possible and impossible
Liwen	Has difficulty in sorting sets on Venn diagrams



The outcomes used to create this unit of work are shaded by the teacher as students achieve them. A blank space means that the student has not yet achieved the outcome. A lightly shaded box means they are working towards achievement of the outcome, and a fully shaded box means they have achieved the outcome.

Achievement checklist

Name of student	Grade 3 outcomes from the unit of work					
	Community Living 3.1.1	Environmental Studies 3.1.2	Language 3.1.1E	Language 3.2.1V	Health 3.1.4	Mathematics 3.4.1
Moa						
Loke						
Tatah						

Assessment Criteria

Assessment criteria explain what the students must do to be successful. In the first assessment task for this unit of work, students must:

1. provide examples of at least 3 good changes
2. provide examples of at least 3 bad changes
3. give reasons why they think these changes are good or bad
4. use words such as certain, possible and impossible to assess whether these changes will impact on the environment.

Marking Code

A – met the criteria to a high standard

B – satisfactory

C – needs further assistance

Students' names	Assessment criteria				Comments
	1	2	3	4	
Nanu	A	A	A	B	Had some trouble predicting certain impacts on the environment
Poi	B	A	A	B	Understands Mathematical terms but had some difficulty applying them
Nau	A	A	C	C	Needs more practice applying Mathematical terms Unable to give sound reasons for sorting the changes

Estimated time frame

2 weeks

Resources

Pictures of natural and built changes

Guest speaker – elder or community member

Local site where environmental change has occurred

Weekly program

Grade: 3 Term: 1 Week: 2

The activities shaded in the program below are from the unit of work. The non-shaded activities are related or stand-alone outcomes from the other subjects that must be programmed in order to have a complete program for all 7 subjects. The total time allocation should be 1650 minutes. This sample weekly program is for the first week of this unit of work. Programs for the following weeks need to be developed if you intend to teach this unit of work.

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8.00 to 8.15	A S S E M B L Y				
8.15 to 10.00	Environmental Studies and Community Living Group discussion on changes 60 mins Language Add words to word wall Shared reading of big book 45 mins	Language Teacher models report writing and discusses the structures and features of a report Practise writing reports in pairs 105 mins	Language Shared reading Add new vocabulary to word wall Assessment Task 1 Write individual reports summarising <i>natural</i> and <i>built</i> changes in the local community 105 mins	Language Silent reading Explain the good and bad consequences of changes 105 mins	Language Write cursive paragraph from big book Add new words to word wall Write poems on changes 105 mins
10.00 to 10.30	R E C E S S				
10.30 to 12.00	Language Research the terms <i>natural</i> and <i>built</i> changes 30 min Brainstorm, list and draw natural and built changes in the community 60 mins	Health Identify harmful and harmless substances at home and in the community 60 mins Mathematics Discuss the terms <i>certain</i> and <i>impossible</i> and brainstorm events under each heading 30 mins	Language Silent reading of texts on changes 30 mins Physical Education Volleyball skills 60 mins	Mathematics Use Venn diagrams to show <i>certain</i> and <i>impossible</i> events 60 mins Arts Traditional design 30 mins	Mathematics Use Venn diagrams to show <i>certain</i> and <i>impossible</i> events 30 mins Health and Community Living In small groups role-play how to say <i>no</i> to bad habits 60 mins
12.00 to 1.00	L U N C H				
1.00 to 3.00	Environmental Studies Visit a site where environmental change has occurred Fill out questionnaires 90 mins Physical education Volleyball skills 30 mins	Community Living Listen to a guest speaker discussing changes in the community and summarise the main ideas 60 mins Block time 60 mins	Arts Traditional designs 60 mins Religious education 60 mins	Health Discuss ways to minimise injury from harmful substances at home 60 mins Sports 60 mins	Language Edit, publish and illustrate poems 60 mins Arts Painting and printing 60 mins



Sample 2: Grade 4

Theme

Healthy and safe environments

Purpose

Students will learn to:

- demonstrate responsible ways of caring for, and managing resources
- develop a healthy, balanced attitude to life
- read and share ideas on safe and healthy environments.

Learning outcomes

The learning outcomes listed in the table below were identified during the clustering process. Language will always be programmed in all units of work. Other related outcomes, if identified during planning, should be taught but not necessarily assessed. This is because it becomes unmanageable to try and assess too many outcomes in one unit of work.

Subject	Strand	Substrands	Learning Outcomes
Health	Healthy community	Healthy environment	4.2.2 Survey unsafe situations at school, make plans and take action to reduce harm and promote health
Environmental Studies	Caring for my environment	Managing waste	4.2.2 Investigate the consequences of waste and apply ways to minimise environmental damage
Language	Speaking and listening	Skills and strategies	4.1.2E Use oral skills and strategies to share ideas and information
	Reading	Production	4.2.1E Read simple text types and interact with the ideas and information from the texts

Knowledge, skills and attitudes

The table below shows the knowledge, skills and attitudes, most of which are taken from the elaborations of learning outcomes from the selected subjects.

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> types of waste ways of minimising or controlling environmental damage consequences of waste – impact on the environment effects of chemical waste traditional ways of managing waste unsafe situations at school such as dirty water, dirty toilets and sanitation, smoking and chewing (unsafe habits), security personal hygiene practices benefits of managing resources follow big book patterns 	<ul style="list-style-type: none"> write questions ask questions gather information explain and identify list types of waste design a model plan analyse classify group survey to observe, collect data, ask questions, discuss ideas and report make plans to take actions: list, explain, apply, organise explain environmental impact apply rules to use resources wisely reading skills 	<ul style="list-style-type: none"> responsible behaviour positive attitudes



Teaching and learning activities

The list of teaching and learning activities identified here, are developed from the knowledge, skills and attitudes outlined above. They are integrated activities, which address the needs of all the subjects used to create the unit of work. The letters V, E and V/E after each activity identify which language is to be used.

V = vernacular E = English V/E = vernacular and English

1. Complete a *Know, Want to know, Learnt* (KWL) chart on the theme of healthy and safe environments. (V)
2. Research the term *waste* and identify the different types of waste such as household waste, human waste, industrial waste and chemical waste, through group discussion, using dictionaries, researching in the library, listening to guest speakers (chemist or industrialist) and administering questionnaires. (V)
3. Shared reading experiences about waste – big book on wastes (talk, read, talk, read, do, talk). (E)
4. Silent reading about waste. (E)
5. Define the terms *household waste*, *human waste*, *industrial waste* and *chemical waste*. (E)
6. Visit the community, take notes about different types of wastes and identify unsafe waste disposal methods being used in the community. (V)
7. Sort and analyse different types of waste at home and school, and plan how to control or manage these – for example, write rules for waste disposal, draw pictures and make big books. (V)

8. Discuss how wastes can be harmful to people or other living things. (V)

9. **Assessment Task 1**
Explain and describe the consequences of waste that is dangerous to people's health. (V)

10. Listen to a guest speaker from the community and ask questions about how waste was managed traditionally. (V)

11. Writers' workshop – students participate in negotiated writing (writing together in pairs or groups) on waste disposal at home. Publish as a class big book. (E)

12. Long-term project: Design a process to control waste at home and school (rubbish pit project). (V/E)

13. Share their experiences of accidents they have had because of unsafe situations at school. (E)

14. Make a big book called *Accidents at school*. (E)

15. Shared reading of big book, *Accidents at school*. (E)

16. Role-play main parts of the big book story. (E)

17. Identify words from big book story that describe unsafe situations at school and add to word wall (see, hear, say, write). (E)

18. **Assessment Task 2**
Read part of a favourite English story to others. (E)

19. Write a text (poem) about safety at school. (V/E)

20. Write neatly in cursive one paragraph of the big book story. (E)

21. Take part in clean-up programs to make the school a safer place. (V/E)

22. **Assessment Task 3**
Make posters to encourage safe behaviour and to keep the environment safe at school. (E)

Assessment plan

The assessment tasks identified here assess the knowledge, skills and attitudes identified from the selected learning outcomes.

Outcomes	Assessment tasks	Language V/E	Assessment criteria	Assessment and recording methods
Language 4.1.2V Environmental Studies 4.2.1 and 4.2.2	Explain and describe the consequences of dangerous waste	V	<ul style="list-style-type: none"> identify and name harmful waste give at least 3 reasons to explain why waste can be dangerous explain the effects of waste on living things 	Observation and conferencing of students in groups Record sheets showing criteria
Language 4.2.1E	Read a simple English text	E	<ul style="list-style-type: none"> pronounce words correctly pause in the right places answer simple questions about the text 	Conferencing Conference notes
Health 4.2.2	Make posters to encourage safe behaviour and to keep the environment safe at school	E	<ul style="list-style-type: none"> identify at least 3 unsafe situations at school show ways to minimise the danger 	Analysis of posters Samples of students' work to be stored in portfolios

Programming in two languages

Because Grade 4 is a bridging class, it is very important that teaching and learning is addressed both in English and vernacular. The format below helps you to monitor your use of both languages to see if you are using approximately the right proportions of each. See the completed sample below.

Vernacular		English	
Oral	Print	Oral	Print
<ul style="list-style-type: none"> research the term <i>waste</i> and identify the different types of waste such as household waste, human waste, industrial waste and chemical waste, through: <ul style="list-style-type: none"> – group discussion, – guest speaker (chemist or industrialist) and – questionnaires discuss how wastes impact on people and other living things explain the consequences of waste that is dangerous to people's health listen to a guest speaker from the community and ask questions about how waste was managed traditionally 	<ul style="list-style-type: none"> complete KWL chart on the theme healthy and safe environment visit the community and take notes about wastes sort and analyse different types of waste at home and school and plan how to manage these. For example, write rules for waste disposal, draw pictures or make posters 	<ul style="list-style-type: none"> define the terms <i>household waste</i>, <i>human waste</i>, <i>industrial waste</i> and <i>chemical waste</i> contribute ideas for negotiated writing at a writers' workshop share experiences of an accident they have had because of unsafe situations at school 	<ul style="list-style-type: none"> shared reading from big book discuss experiences about waste silent reading about waste write and publish class big book on waste disposal at home make a big book called <i>Accidents at school</i> shared reading of big book add new words to word wall role-play main parts of the story read favourite parts of book to others write poems about safety at school write a paragraph from the big book in cursive make posters to promote a safe environment at school

Estimated time frame

2 weeks

Resources

Texts about wastes

Dictionaries

Paper and pencils to make big books and posters

Guest speaker – elder or community member

Weekly program

Grade: 4

Term: 1

Week: 2

The activities shaded in the program below are from the unit of work. The non-shaded activities are related or stand-alone outcomes from the other subjects that must be programmed in order to have a complete program for all 7 subjects. The total time allocation should be 1650 minutes. This sample weekly program is for the first week of this unit of work. Programs for the following weeks need to be developed if you intend to teach this unit of work.

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8.00 to 8.15	A S S E M B L Y				
8.15 to 10.00	Environmental Studies and Health KWL on the theme of healthy and safe environments 60 mins Language Shared reading of big book on wastes Role-play favourite parts of the big book in small groups 105 mins	Language Shared reading of big book on wastes Role-play favourite parts of the big book in small groups 105 mins	Environmental Studies, Health and Language Identify dangerous waste and discuss in groups Select one dangerous waste and write an explanation as to why it is dangerous 105 mins	Language Edit and publish rules for safe disposal of rubbish at home Make into a class big book – illustrate 105 mins	Language Silent reading Shared reading of new class big book on safe disposal of rubbish Practise cursive writing 105 mins
10.00 to 10.30	RECESS				
10.30 to 12.00	Environmental Studies Visit the community Take notes on different types of wastes Identify wastes that have been disposed of in unsafe ways Collect samples of waste 90 mins	Environmental Studies Sort and analyse wastes from community visit using headings; human, household, chemical and industrial wastes 60 mins Physical Education Skills development 30 mins	Language Negotiated writing on waste disposal at home Write rules for safe disposal of wastes at home 60 mins Physical Education Skills development 30 mins	Environmental Studies Listen to a guest speaker discussing traditional methods of waste disposal Reflect upon and summarise main points from guest speaker 90 mins	Language and Health Brainstorm unsafe situations at school 60 mins Arts 30 mins
12.00 to 1.00	LUNCH				
1.00 to 3.00	Language Group discussion on different types of wastes Silent reading to find definitions for terms: household, human, chemical and industrial waste 90 mins Arts 30 mins	Environmental Studies, Health and Mathematics Assessment Task 1 Explain and describe effects of waste Discuss and begin planning the project – rubbish pit 120 mins	Religious education 60 mins Environmental Studies, Health and Mathematics Present plans for the rubbish pit project 60 mins	Environmental Studies Debate ways of disposing of wastes to minimise environmental damage 60 mins Mathematics 60 mins	Physical Education Modified Sports 60 mins Mathematics 60 mins

Sample 3: Grade 5

Theme

Safe environment

Purpose

The students will learn to:

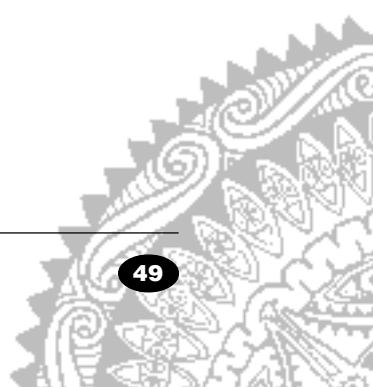
- develop and implement strategies to promote safety and to deal with emergency situations in the community
- identify how different types of waste are produced and how they can be disposed of safely
- demonstrate responsible, caring attitudes towards the environment and towards each other in the community.

Learning outcomes

The learning outcomes listed in the table below were identified during the clustering process. Language will always be programmed in all units of work. Other related outcomes, if identified during planning, should be taught but not necessarily assessed. This is because it becomes unmanageable to try and assess too many outcomes in one unit of work.



Subject	Strand	Substrands	Learning Outcomes
Health	Healthy individuals	Safety and first aid	5.1.5 Demonstrate and evaluate strategies to deal with unsafe and emergency situations in the community
Environmental Studies	Caring for my environment	Managing waste	5.2.2 Develop and implement action plans to manage waste production and disposal
Language	Speaking and listening	Production	5.3.1V/E Plan and produce a range of text types in all genre categories to present ideas and information
Physical Education	Safety	Keeping safe	5.1.1 Develop and apply simple action plans to promote safety and deal with emergency situations in games and sports



Knowledge, skills and attitudes

The table below shows the knowledge, skills and attitudes, most of which are taken from the elaborations of learning outcomes from the selected subjects.

Knowledge	Skills	Attitudes
<p>Safety</p> <ul style="list-style-type: none">unsafe situations in the communityunsafe situations in games and sportsways to deal with emergency situations in the communityways to deal with emergency situations in games and sportssafety rules and practices to prevent injury and illnessbasic first aid <p>Waste</p> <ul style="list-style-type: none">different types of waste and how they are producedways of minimising wastesafe ways to dispose of waste	<ul style="list-style-type: none">identify local issues about safety and wastedevelop action plans and take actionpropose and apply safety rules and practicesdemonstrate basic first aidconduct surveys and make recommendationssummarise main ideaswrite reports	<ul style="list-style-type: none">demonstrate responsible, caring attitudes towards each other and the environment

Teaching and learning activities

The list of teaching and learning activities identified here are from the elaborations of learning outcomes. They are integrated activities which address the needs of all the subjects used to create the unit of work. The letters V, E and V/E after each activity identify which language is to be used.

V = vernacular E = English V/E = vernacular and English

Safety

1. Students start to show what they Know, Want to know and Learn (KWL) about a safe environment. (E)
2. Express own and other's point of views on a safe environment in an open-air lesson. (V)
3. Interview community members to research and identify unsafe situations such as contaminated water sources, playing fields with holes, playing with fire or poor sanitation practices in the community. Present findings as a written report. (V/E)
4. Identify and list words and phrases on the vocabulary list indicating unsafe situations. (E)
5. Listen to and observe a community health worker talk about and demonstrate safety and first aid procedures for common emergency situations. (V/E)
6. Practise first aid procedures. (V/E)
7. *Assessment Task1*
Role-play the appropriate safety and first aid procedures for emergency situations as demonstrated by the community health worker. Examples may include helping an injured or sick person, treating snake bites, assisting a person at risk of drowning, providing basic first aid for sports injuries or attending to injured people in car accidents and natural disasters. (V/E)
8. Design and make simple first aid equipment such as a stretcher using local resources. (E)
9. Identify and demonstrate appropriate and safe behaviour when playing games and modified sports. Identify and take actions such as explaining the rules of the game, demonstrating how to use equipment safely and pointing out hazardous spots in the playground to avoid dangerous situations before starting the game. (V/E)
10. Make simple action plans to promote community awareness to avoid unsafe situations and to deal with emergencies in sport and in the community generally. Examples of actions might include making and displaying posters, speaking to community groups and performing plays about safety. (E)
11. Implement action plans. (V/E)



12. Assessment Task 2

Write a report outlining ways to improve safety in sport and in the community. (E)

Waste

13. Read big book to find out about types of local waste products. (E)
14. Write any new words onto the vocabulary list that relate to waste products. (E)
15. Visit different sites in the community and gather information about the types of waste, how they are produced and how they are currently disposed of. Present findings in a class discussion and students record main ideas. (V/E)
16. Evaluate current methods of waste disposal and their impact on the environment. (E)
17. Gather and present information through interviews with community experts on how to minimise waste and how to dispose of it in ways that are safe to the environment. Examples may include recycling and reusing waste. (V/E)
18. Write any new words onto the vocabulary list that relate to waste products. (E)
19. Prepare speeches on how to dispose of waste. (E)
20. Design and apply simple processes to recycle and reuse waste at home, school and in the community. (E)
21. Suggest ways to improve current waste disposal practices. (E)
22. Take action to restore parts of the environment damaged by waste such as having clean-a-thons to remove litter and building hygienic sanitation pits. (E)
23. **Assessment Task 3**
Develop action plans to raise community awareness to minimise waste and to promote safe methods of waste disposal. Examples of actions might include designing and displaying posters and sign boards to control waste, setting up small recycling centres in the community for plastics and cans and setting up compost heaps near the local market. (E)
24. Implement action plans. (V/E)
25. Students complete their KWL charts on safe environment. (E)

Assessment plan

The assessment tasks identified here assess the knowledge, skills and attitudes identified from the selected learning outcomes.

Outcomes	Assessment tasks	Language (V/E)	Assessment criteria	Assessment methods	Assessment and recording methods
Health 5.1.5	Role-play the appropriate safety and first aid procedures for emergency situations	E	<p>Students demonstrate basic first aid procedures:</p> <ul style="list-style-type: none"> • stop bleeding without coming into contact with the wound • stabilise sprained or broken bones until help arrives • apply Cardio-Pulmonary Resuscitation (CPR) <ul style="list-style-type: none"> – mouth to mouth resuscitation and heart massage • seek help in an emergency 	Observation	Checklist with comments
Physical Education 5.1.1	Write a report outlining ways to improve safety in sport and in the community	E	<p>Students:</p> <ul style="list-style-type: none"> • use the correct language structures and features for a report • identify at least 3 unsafe situations at home, school and in the community • describe ways to resolve the unsafe situations • describe appropriate and safe behaviours when playing games and modified sports 	Teacher analyses written reports	Sample of work with teacher comments
Environmental Studies 5.2.2 Language 5.3.1V/E	Develop action plans to raise community awareness about minimising waste and promoting safe methods of waste disposal	V/E (Students choose)	<p>Students:</p> <ul style="list-style-type: none"> • use suitable headings such as issue or problem for their action plans • describe strategies or ways to address the problem • determine who is responsible • plan when it will be implemented • describe at least 3 ways to minimise waste production • explain safe ways of disposing of at least 3 different types of waste 	Teacher analyses action plan	Sample of work with teacher comments

Sample assessment task

Role-play the appropriate safety and first aid procedures for emergency situations.

Teacher observes students and records their achievements on a checklist similar to the one shown below.

Assessment criteria

Students demonstrate basic first aid procedures:

1. stop bleeding without coming into contact with the wound
2. stabilise sprained or broken bones until help arrives
3. apply Cardio-Pulmonary Resuscitation (CPR) – mouth to mouth resuscitation and heart massage
4. seek help in an emergency

Recording methods

When an assessment task is given there should be some kind of evidence of students' work kept or recorded for the purpose of reporting to parents and guardians or following up on individual's performance. Below is an example of a recording method.

Name	Assessment criteria				Comment
	1	2	3	4	
Peter	3	2	2	3	Needs to improve timing of CPR
Jim	2	1	1	3	Needs more practice to perform first aid independently
Helen					
Nancy					
William					

Code: (this is for the overall performance)

3 – Performed the first aid procedure correctly on their own

2 – Performed the first aid procedure correctly with supervision

1 – Needs more practice

Programming in two languages

Because Grade 5 is a bridging class, it is very important that teaching and learning is addressed both in English and vernacular. The format below helps you to monitor your use of both languages to see if you are using approximately the right proportions of each. See the completed sample below.

Vernacular		English	
Oral	Print	Oral	Print
<ul style="list-style-type: none"> express points of view on safe environments express own points of view about safe environments interview community members about unsafe situations listen to and observe community health worker talk about first aid role-play first aid procedures identify and demonstrate safe sporting behaviours visit sites to gather information on waste present findings in class discussion gather information about safe ways to dispose of waste through interviews with experts take action to restore damaged environment implement action plans 	<ul style="list-style-type: none"> gather information about safe ways to dispose of waste through research at the library make action plans to raise community awareness about unsafe situations 	<ul style="list-style-type: none"> interview community members about unsafe situations listen to and observe community health worker talk about first aid and demonstrate procedures role-play first aid procedures design and make simple first aid equipment identify and demonstrate safe sporting behaviours implement action plans visit sites to gather information on waste present findings in class discussion evaluate current methods of waste disposal gather information about safe ways to dispose of waste through interviews with experts prepare speeches on waste disposal design and apply simple processes to recycle and reuse waste suggest ways to improve current waste disposal practices take action to restore damaged environment implement action plans 	<ul style="list-style-type: none"> complete KWL chart identify and list words and phrases about unsafe situations make action plans to raise community awareness about unsafe situations write a report to improve safety in sport and in the community read big books on types of waste write new waste words on vocabulary list develop action plans to raise community awareness about waste disposal



Weekly program

Grade: 5 **Term: 1** **Week: 2**

The activities shaded in the program below are from the unit of work. The non-shaded activities are related or stand-alone outcomes from the other subjects that must be programmed in order to have a complete program for all 7 subjects. The total time allocation should be 1650 minutes. This sample weekly program is for the first week of this unit of work. Programs for the following weeks need to be developed if you intend to teach this unit of work.

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8.00 to 8.15	ASSEMBLY				
8.15 to 10.00	Language Start the KWL chart on the theme safe environment 30 mins Teacher models interview techniques – students practise in pairs 30 mins Community Living Prepare questions for community interviews 45 mins	Health Community health worker demonstrating and coaching students on first aid procedures 90 mins Language Play word games to learn new vocabulary on safety and first aid 15 mins	Language Teacher models report writing 45 mins Students practise writing reports together through negotiated writing 60 mins	Health Students practise safety and first aid procedures 45 mins Language Students practise writing individual reports on topics related to the theme 60 mins	Language <i>Assessment Task</i> Write a report on safety in sport and in the community 60 mins Health <i>Assessment Task</i> Role-play safety and first aid procedures 45 mins
10.00 to 10.30	RECESS				
10.30 to 12.00	Mathematics 60 mins Environmental Studies Express points of view on what makes up a safe environment Summarise main ideas 30 mins	Mathematics 30 mins Language Collate the information gathered from interviews with community members 60 mins	Mathematics 60 mins Language Individual reading of books related to the theme 30 mins	Community Living 60 mins Physical Education Skills practice for modified sports emphasising safe use of equipment 30 mins	Mathematics 30 mins Arts 60 mins

Time	Monday	Tuesday	Wednesday	Thursday	Friday
12.00 to 1.00	LUNCH				
1.00 to 3.00	Health/ Language Interview community members about unsafe situations in the community 60 mins Language 60 mins	Physical Education Design and make simple first aid equipment from local resources 60 mins Community Living 60 mins	Religious Education 60 mins Physical Education Play one modified sport and demonstrate safe use of equipment and fair play by the rules 60 mins	Environmental Studies Brainstorm and list unsafe situations in the local environment 30 mins Arts 90 mins	Community Living 60 mins Block Time 60 mins



Summary:

- Language (Lang) 480 minutes
- Environmental Studies (ES) 60 minutes
- Health 210 minutes
- Arts 150 minutes
- Mathematics (Maths) 180 minutes
- Physical Education (PE) 150 minutes
- Community Living (CL) 225 minutes
- Religious Education (RE) 60 minutes
- Assembly 75 minutes
- Block time 60 minutes

Total: 1650 minutes

Note: The time allocations for subjects do not match the time allocations specified in Appendix 2. This is because teachers can program flexibly and adjust the time allocations in following weeks to compensate.

Estimated time frame

3 weeks

Resources

Community members, including a health worker and expert on waste disposal

Simple first aid equipment such as bandages and splints

Modified sports equipment

Sites in the community that can be improved environmentally

Self evaluation sheets for a unit of work

Sample 1

Name: _____

Theme for unit of work: _____

My favourite part of the unit of work was:

because _____

I didn't enjoy _____

because _____

Three things I have learnt are:

I would still like to know more about:

Other comments about the unit of work _____

Signed: _____

Date: _____

Sample 2

Thinking about my work

Name: _____

Theme for unit of work: _____

During this unit I have:

not worked very well _____ *worked very well* _____

(Mark the spot on the line)



As a group member, I have been:

uncooperative _____ *cooperative* _____

(Mark the spot on the line)

Looking back over my work, I am most proud of:

I have improved at:

I still need to work on:

Signed: _____

Date: _____

Elaboration of learning outcomes

Elaborations describe the knowledge and skills included in each of the learning outcomes. They identify the content to be taught to students. Elaborations are designed to help teachers understand the context of the outcomes so that they can develop teaching and learning activities that meet the needs of their students. For each learning outcome the elaborations describe:

- recommended knowledge
- recommended processes and skills
- in some subjects, attitudes and suggested activities.

Recommended knowledge

Knowledge is what students are expected to know and understand. The knowledge and concepts identified from the outcomes for Lower Primary Environmental Studies are listed as short statements under the heading Recommended Knowledge. The knowledge listed in the elaborations can be used by teachers to create units of work that are relevant to students' needs and the local context.

Recommended processes and skills

Skills are what students can do and, so the Recommended Processes and Skills section of the elaborations describes the skills that students need to demonstrate to achieve the outcomes.

Attitudes

Attitudes are assumptions and can only be observed in real classroom teaching.

Suggested activities

Some subjects provide a list of suggested teaching and learning activities for each outcome. Teachers can select those from the list that are relevant to the needs of their students. This list is not exhaustive so teachers can also develop their own teaching and learning activities relevant to the local context.

Strand: What's in my environment?

Substrand	Grade 3	Grade 4	Grade 5
Plants and animals	3.1.1 identify different species of plants and animals found in the environment	4.1.1 Describe features of plants and animals that live in the environment	5.1.1 Investigate and apply ways of using, protecting and conserving certain plants and animals
Recommended knowledge	<ul style="list-style-type: none"> examples of plants and animals in the local environment different species of plants and animals similarities and differences between species of plants and animals endangered plants and animals useful plants and animals in the environment 	<ul style="list-style-type: none"> types and features of plants and animals found in selected environments physical features of plants and animals that enable them to survive in the environment reasons why certain plants and animals live in specific environments habitats and physical features of different animals endangered and endemic plants and animals protection and conservation 	<ul style="list-style-type: none"> of endemic and endangered plants and animals local ways of using plants and animals for medicinal purposes traditional rules for conserving plants and animals setting restrictions on fishing and hunting grounds advantages and disadvantages of cutting down forests knowledge of how to grow plants and raise animals
Recommended processes and skills	<ul style="list-style-type: none"> draw and label name, sort and classify different animals identify different species of animals explain similarities and differences record different species of plants and animals draw, list or make models 	<ul style="list-style-type: none"> record types and features of plants and animals write stories, poems and reports discuss physical features summarise main ideas sort out plants and animals into groups gather information 	<ul style="list-style-type: none"> draw posters discuss local ways of using plants and animals write reports explain how certain plants and animals are conserved discuss traditional rules and taboos role-play advantages and disadvantages
Suggested activities	<ul style="list-style-type: none"> draw and label pictures of useful plants and animals name and group animals found in the local environment according to what they eat, where they live and their physical features discuss how to identify different species of animals by colour, shape and body covering talk about the similarities and differences between species of plants and animals draw, list or make models of examples of plants and animals classify different species of animals by colour, shape and body covering sort different animals according to what they eat, where they live and their physical features 	<ul style="list-style-type: none"> record types and features of plants and animals found in selected environments; example, shallow roots, hard beaks, fibrous roots listen to a guest speaker and find out why certain plants and animals live in specific environments sort out groups of plants and animals according to their habitat and physical features write a report about endangered and endemic plants and animals and how to protect them write stories or poems about animals and plants collect and display common plants and animals from the area and their special features 	<ul style="list-style-type: none"> gather information about certain plants and animals from a range of sources like natural environment, library or from people organise a group discussion on local ways of using plants and animals investigate the benefits and uses of certain plants and animals explain how to look after plants and animals carry out research to identify endangered and endemic species of plants and animals in Papua New Guinea organise a class debate on the importance of developing, protecting and preserving resources carry out research on local taboos and laws on traditional hunting grounds role-play advantages and disadvantages of logging



Strand: What's in my environment?

Substrand	Grade 3	Grade 4	Grade 5
Changes in my environment	3.1.2 Identify natural and built changes and their impact on the environment	4.1.2 Describe the impact of changes to the environment and identify solutions to potentially harmful changes	5.1.2 Investigate consequences of major changes and make informed decisions to conserve the environment
Recommended knowledge	<ul style="list-style-type: none"> • how people change the natural environment • built changes • reasons for building things • natural changes • how nature changes the environment • how changes in the environment affect living things • weather and its effect on the lives of people • large scale environmental changes • natural changes 	<ul style="list-style-type: none"> • effects of natural disasters on the environment • areas of common natural disasters and descriptions • examples of development and possible solutions • impact of development on living and non-living things • effect of major changes to the environment 	<ul style="list-style-type: none"> • changes occurring on a selected site in their community • solutions to changes in the community • developments such as tuna fish factory, abattoir, recycling factory or community market • effects of development in their community • effects of future development in their area • impact of increased population on the natural environment • traditional conservation methods
Recommended processes and skills	<ul style="list-style-type: none"> • draw or collect pictures • give examples and reasons • list natural changes • describe natural changes to the environment • role-play changes • keep records of weather • explain the effects of weather • discuss changes to the environment • compare natural and built changes 	<ul style="list-style-type: none"> • discuss natural changes • illustrate • describe disasters • list examples • describe advantages and disadvantages • gather and present information • suggest possible solutions 	<ul style="list-style-type: none"> • write about the effect of major changes • gather information • suggest ways to deal with changes • carry out research • suggest actions to conserve the environment • listen to guest speakers • write reports • predict the effects of development • discuss the impact of increased population • plan and role-play
Suggested activities	<ul style="list-style-type: none"> • draw and compare the natural and built environments • discuss in groups the good and bad things about natural and built environments • create and role-play how living things feel when the natural environment is destroyed • explain the effects of weather on the lives of people in the community • invite a guest speaker to talk about their current and past experiences in certain areas of the community 	<ul style="list-style-type: none"> • discuss and report on natural disasters such as volcanoes and landslides that occur in their community to the class • draw the Papua New Guinea map and label common areas where natural disasters occur • collect information about damaged environment and identify possible solutions • draw a map of their local community and show the areas where natural disasters can occur • dramatise what happens to living things when the environment is changed • dramatise ways of taking precautions when natural disasters occur 	<ul style="list-style-type: none"> • listen to a guest speaker talk about major changes in the community and write a summary • gather information about the effects of major changes in the community and present findings on a chart • plan and carry out research on the effects of development and increased population in future in their area • plan and role-play traditional conservation methods • take actions to conserve the environment

Strand: What's in my environment?

Substrand	Grade 3	Grade 4	Grade 5
Links in the environment	3.1.3 Identify and describe links between living and non-living things in the environment	4.1.3 Explain how living things interact with the environment to meet basic needs	5.1.3 Investigate the relationships between living and non-living things
Recommended knowledge	<ul style="list-style-type: none"> plants that depend on other plants for survival animals that depend on another animals or plants for survival living things that grow or live on trees links between living things how plants depend on soil and sunlight how soil depends on plants for nutrients parts and functions of plants parts and functions of animals how people use certain plants and animals how living things depend on non-living things for survival 	<ul style="list-style-type: none"> how living things depend on the environment how people used the environment in the past how people use the environment in the present what might happen in how they use it in the future rules for people on the use of resources food chains showing dependency and interrelationships food webs food pyramids 	<ul style="list-style-type: none"> what might happen when an element of the food chain is removed knowledge of what animals eat and where they live the water cycle how plants and animals protect themselves from danger how living things respond to stimuli movement of energy good practices in caring for plants
Recommended skills and processes	<ul style="list-style-type: none"> draw, label and explain pictures and charts list names observe and record explain links make posters write stories role-play 	<ul style="list-style-type: none"> write stories observe and explain compare predict what might happen in the future build models draw pictures interpret the weather observe and report investigate responses to stimuli 	<ul style="list-style-type: none"> predict what might happen classify animals explain how plants and animals protect themselves perform and report on experiments draw diagrams apply good practices write rules
Suggested activities	<ul style="list-style-type: none"> discuss plants that depend on other plants or animals for food and water discuss and draw pictures of animals that depend on other animals for food, shelter and protection draw pictures to show how a particular plant or animal gets its food, water, air and sunlight role-play the relationship between plants, animals and their surroundings write a short story about a favourite plant or animal in their life or community 	<ul style="list-style-type: none"> write a story to show how living things are linked to each other, after a visit to an area around the school as a class, discuss the importance of the relationships between living and non-living things and what will happen in future if some of these living things are destroyed in groups, build food chains and webs using different ideas role-play food chains, food webs and food pyramids collect information from elders in the community about how people base their daily activities on the weather 	<ul style="list-style-type: none"> carry out a project based on the study of the behaviour of a particular plant or animal in their community investigate and write a report on the types of things that plants and animals need in order to live demonstrate how living things respond to stimuli by using the five senses discuss different laws and taboos about the use of the land and the things on it observe and report to the class how behaviour of particular living things changes in relation to a changes in weather design simple rules for their school or home to apply good practices in caring for living things around their home



Strand: Caring for my environment

Substrand	Grade 3	Grade 4	Grade 5
Managing resources	3.2.1 Identify useful resources in the environment and describe ways to use them wisely	4.2.1 Describe effects of mismanaging land, sea, water and air resources and apply ways to care for them	5.2.1 Design and apply good practices to sustain the environment
Recommended knowledge	<ul style="list-style-type: none"> renewable and non-renewable resources differences between renewable and non-renewable resources rules for protecting and conserving resources traditional ways of protecting endangered species useful resources in the local environment 	<ul style="list-style-type: none"> misuse of resources impacts of misuse of resources on the environment wise use of land and sea resources appropriate fishing and hunting techniques benefits of managing renewable and non-renewable resources simple environmental rules for the wise use of resources 	<ul style="list-style-type: none"> advantages and disadvantages of using resources conserving, protecting or sustaining local resources what are healthy and productive environments local environmental issues ways to address local environmental issues consequences of using resources excessively how introduced species harm the environment ways of controlling the population of introduced species
Recommended skills and processes	<ul style="list-style-type: none"> discuss and list examples explain differences write rules describe traditional ways sketch explain 	<ul style="list-style-type: none"> gather information explain the impact on the environment plan and participate in projects use appropriate fishing and hunting techniques explain the benefits of managing renewable and non-renewable resources make and apply simple environmental rules 	<ul style="list-style-type: none"> identify and describe good practices debate advantages and disadvantages set up and maintain small projects promote healthy environments investigate local environmental issues write letters suggest ideas explain consequences
Suggested activities	<ul style="list-style-type: none"> explain the differences and give examples of renewable and non-renewable resources in their local community investigate local resources that are useful for food or medicines and describe traditional ways of using them explain some ways in which local resources can be used wisely draw charts and posters to show different types of traditional resources and explain how they are used 	<ul style="list-style-type: none"> gather and present findings on the impacts of misuse of resources on the environment find out and report to the class on different methods of fishing and hunting in the community discuss and identify good and bad fishing and hunting techniques construct simple environmental rules for the wise use of resources ask a local expert to explain the benefits of managing renewable and non-renewable resources make and apply simple environmental rules to conserve, sustain and protect the environment 	<ul style="list-style-type: none"> identify and carry out small projects to conserve, protect or sustain local resources describe some examples that show what healthy and productive environments are through community awareness activities investigate ways to control the population of introduced species that harm the natural environment debate the advantages and disadvantages of conserving, protecting and sustaining the environment discuss and suggest ways to address issues such as the effects of logging in the community investigate and explain the consequences of using resources excessively

Strand: Caring for my environment

Substrand	Grade 3	Grade 4	Grade 5
Managing wastes	3.2.2 Identify types and sources of waste and their impacts on the environment	4.2.2 Investigate the consequences of waste and apply ways to minimise environmental damage	5.2.2 Develop and implement action plans to manage waste production and disposal
Recommended knowledge	<ul style="list-style-type: none"> different types of waste and where they come from waste produced in the home, at school and by industries impact of different types of waste on the environment health risks associated with waste disposal practices that may cause sicknesses grouping waste products and their impact on the environment advantages and disadvantages of burning rubbish, and how it affects the environment 	<ul style="list-style-type: none"> effects of chemical waste on the environment rules on how to dispose of different types of waste appropriate ways to minimise waste rules and plans to control waste at home and school traditional ways of managing waste products the environmental impact of waste 	<ul style="list-style-type: none"> waste disposal problems in the community strategies to control waste safe disposal of different types of waste simple processes for recycling different types of waste ways to prevent damage to the environment local problems caused by waste how to restore the environment to a healthy state
Recommended skills and processes	<ul style="list-style-type: none"> make posters list and describe discuss the impact of different types of waste discuss health risks associated with waste sort waste from products into groups discuss advantages and disadvantages 	<ul style="list-style-type: none"> discuss the effects list or write rules identify appropriate ways of disposing of different types of waste explain appropriate ways to minimise waste develop and apply rules and plans list traditional ways of managing waste products summarise effects investigate consequences discuss the environmental impact 	<ul style="list-style-type: none"> identify waste disposal problems in the community gather and present information from various sources apply knowledge and skills design and display posters and sign boards take actions to restore the environment
Suggested activities	<ul style="list-style-type: none"> make posters to show different types of waste and where they come from collect and describe different types of waste in their school area discuss how different types of waste affect their lives in the community discuss health risks associated with waste around their school and homes group different types of rubbish and discuss advantages and disadvantages of burning these sort waste from products such as Ox & Palm, ice block, betel nut, soft drink and food scraps into groups and suggest the best ways of disposing of them 	<ul style="list-style-type: none"> identify reasons for disposing of waste correctly discuss and summarise on chart the effects on the environment identify appropriate ways of disposing of different types of waste list traditional ways of managing waste products and apply these in everyday life investigate how waste affects our lives and present this information to the class 	<ul style="list-style-type: none"> discuss environmental impact of waste in the community and the country and present findings to the class draw a map of Papua New Guinea and identify causes of waste production in different regions identify waste disposal problems and suggest solutions design simple processes for recycling, re-using and reducing waste design and display posters and sign boards showing how to dispose of waste design action plans such as public speeches, dramas, role-plays, posters and clean-a-thons to restore the environment

Resources

Resources recommended in this teacher guide are listed in three parts:

- documents issued by the National Department of Education (NDOE),
- community resources
- materials published by other organisations and commercial companies.

NDOE documents

NDOE (2003), *Science Syllabus Upper Primary*, NDOE, Waigani

NDOE (2003), *Making A Living Syllabus Upper Primary*, NDOE, Waigani

NDOE (2003), *Social Science Syllabus Upper Primary*, NDOE, Waigani

NDOE (2003), *National Assessment and Reporting Policy, Papua New Guinea*, NDOE, Waigani

NDOE (2002), *National Curriculum Statement, Papua New Guinea*, NDOE, Waigani

NDOE (1999), *Environmental Studies Grades 3 - 5*, CDD – Waigani

NDOE (1998), *Environmental Studies Syllabus Edition I*, CDD – Waigani

Community resources

Below are lists of some things you will normally find around your home, school or community. Many of these resources are often overlooked when it comes to identifying resources in the local community in planning. Link these resources to the content of the course and identify activities where students can use them.

- domestic animals or pets such as pigs, cats, dogs, rabbits, chicken, birds
- fruit plants and nuts such as mangoes, peanuts, guava, coconuts, breadfruit, laulau, betel nut, oranges, lemons
- herbal plants such as aloe vera, noni, lemon grass, ginger, chilli, aupa, pawpaw seeds, guava fruits and leaves, lemon, hibiscus leaves, coconut oil, tangat, frangipani, garlic, carrot, ferns, nim tree, pine tree, mushroom
- household tools such as spade, hammer, tin opener, screw driver, saw, axe, bush knife, pliers, grass knife, kitchen knife
- household washing items such as soap powder, bleach, soap, disinfectant, cream and powder cleansers, dishwashing detergents
- reusable items such as tins, bottles, boxes, cartons, packets, plastic bags, aluminium foil, tubes from cars, old tyres, off cuts of wire and timber, nails, broken down electrical items, newspapers, magazines, batteries
- other substances such as kerosene, cordial, cooking oil, salt, sugar, coffee, baby oil, baby powder, hair cream
- household items such as mirror, toys, paintings, and crafts, medical kit containing scissors, cotton wool, antiseptic, tablets, plaster, bandage
- trade store items such as batteries, bulbs, rubber bands, seeds, toys

Other

McInnes, Dianne and Rice, Elizabeth (2003), *Environmental Studies Teacher's Book Grade 3*, Pearson Longman, Melbourne

Murdoch, K. (1992) *Integrating Naturally, Units of Work for Environmental Education*, Dellasta Pty Ltd, Victoria

Ryan, F. and Ray, S. (1991) *The Environment Book*, Macmillian, Melbourne

Taylor, N. and Keates, D. (1995) *Life in the Mangroves*, Longman Paul

Addresses of Government institutions, companies and other non-government organisations (NGOs)

The following addresses are supplied so that teachers and schools can have access to them when they need assistance in ordering materials or advice on certain topics or areas. The addresses you need most will be those that directly relate to your location and the type of projects or activities you are doing at your school.

Some of these resources are supplied for free, especially newsletters, charts, pamphlets and activity books that have bright ideas for teachers to use. Teachers could also ask these institutions to assist in organising their field trips and excursions because they are experts in this area.

The Curriculum Development Division Primary Section P.O.Box 446, Fincorp Haus Waigani Ph: 3246400 or 3246438 Fax: 3255902	Conservation International (CI) P.O.Box 804, Alotau Milnebay Province Ph: 6410349/6410359 Fax: 6410359 Web: www.conservation.org
Research & Conservation Foundation PNG P.O.Box 1261 Goroka, Eastern Highlands Province Ph: 7323821 or 7323221 Fax: 7321123 Email: rcf@rcf.org.pg	Coffee Industry Corporation LTD Grower Services Division P.O.Box 470 Ukarumpa Eastern Highlands Province 444 Ph: 7373511 Fax: 7373524 Email: coffee@datec.net.pg
The Papua New Guinea Eco- Forestry Forum P.O.Box 3217, Boroko, NCD Ph: 3239050 Fax: 3254610 Email: teff@global.net.pg	Highlands Institutional Food Security Project (DAL) P.O.Box 753, Kundiawa Simbu Province
Worldwide Fund for Nature (WWF) Pacific Ecoregion Centre Private Mail Bag, Madang Madang Province Ph: 8523720 Fax: 8523721 Web: http://www.wwfpacific.org.fg	National Department of Agriculture and Livestock P.O.Box 417 Konedobu. Port Moresby Fax/Ph: 3214725
WWF Papua New Guinea P.O.Box 8280, Boroko, NCD Ph: 3299855/3253334 Fax: 3253324 Web: www.wwfpacific.org.pg	The University of Papua New Guinea Department of Environmental Science P.O.Box 320, University Waigani Campus Ph: 3267225, Fax: 3267187 UNI PNG
PNG Forest Research Institute P.O.Box 314 Lae, Morobe Province Ph: 4724188 Fax: 4724357	The Rainforest Habitat Papua New Guinea University of Technology Private Mail Bag Unitedch, Lae Morobe Province Ph: 4757839 Or 4734651 Fax: 4757667
National Research Institute (NRI) P.O.Box 5854 Waigani, NCD Fax: 3260213	Small Business Development Corporation P.O.Box 286 Waigani, NCD Ph: 3235816

Glossary

Explanations of terms used in this Teacher Guide are provided for subject specific terms.

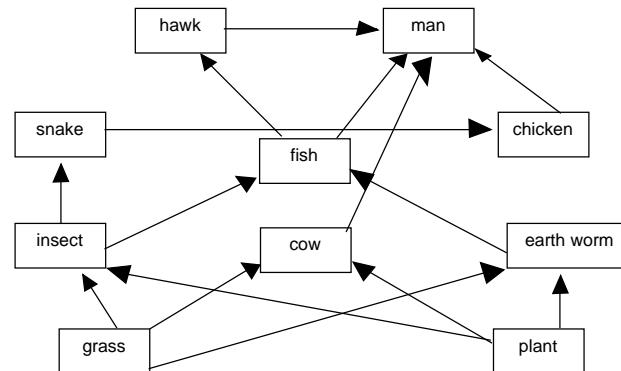
Subject specific terms

Some of these terms may not be found in this Teacher Guide but are very important to environmental education. As such they have been included, in case teachers come across them during their research.

abattoir	a place where animals are killed for meat
absorb	soaking or drawing up substances like liquids, gas, heat, light or forms of energy
abundant	present in very large numbers
adaptation	a change in an organism that makes it better suited to a particular environment
aquarium	a glass container of water in which a variety of plants and animals are kept
atmosphere	a layer of gas or air around the Earth. The kind of air that you breathe around you which could be fresh or polluted, especially in industrialised areas
biodiversity	the variety of life on earth. It includes everything from the smallest to the biggest or tallest living thing
built environment	where the natural environment has been removed and replaced by a new environment that is created by human beings
camouflage	the way in which animals and plants use their colour and shape to blend in with their natural surroundings
chemicals	substances such as liquids, gases or powders that are used in chemical processes
chlorophyll	green colouring matter of plants that enable green plants to make their own food
components	one of the parts or features from which something is created, made or produced
concept map	a teaching and learning method where students or teachers brainstorm and write related words or phrases that link to a main topic or theme. These words are normally joined by arrows or lines to show the links

conservation	preserving, protecting, improving and managing natural resources such as farmland, rainforest and water in such a way so that they are kept in good condition for the present and future generations
conservationist	someone who cares greatly about the conservation of the environment and who works and campaigns actively to try to protect it
conserve	if you conserve a supply of something, you are very careful in the way that you use it so that it lasts as long as possible
contaminate	to add dangerous substances to food or water making these impure or not safe to be taken
crop rotation	alternate growing of two or more types of crops on the same land; rotational cropping. It should involve growing legumes in order to enrich the soil and protect the land
deforestation	cutting down all of the trees
dominant	more powerful, important or noticeable than other things of its kind
drought	absence of rain over a long period of time, usually months or years
ecology	branch of science that deals with the study of the relationships between living things and their surrounding environment
ecosystem	all the plants and animals that live in a particular area and the relationship that exists with them and their environment
element	part or thing in the environment, living or non-living
elements	conditions of the environment such as weather as well as other built and natural environments such as buildings, trees, rivers, gold, copper and oil
empathising	understanding another person's feelings and experiences, especially if you have been through the same situation
endangered	a species that is being threatened or in danger of being destroyed or damaged
endemic	a species of plant or animal that is naturally found only in a particular place and nowhere else
environmentalist	a person who is concerned about the natural environment and wants to improve or protect it

epidemic	a sudden increase in the rate or occurrence of a disease to a state above normal, affecting large numbers of plants and animals
erosion	wearing away of the soil's surface by running water, wind or ice separation and movement of soil or rock particles by water, wind or ice
extinction	a species of living thing that disappears altogether from the earth
extracting	to draw or take something out of the earth's crust such as gold, copper, oil
fauna	animals in an area
fertilizer	any material added to the soil to improve its quality so that plants can grow well
fibrous	contains a lot of fibres
flood plain	a large area of flat land that can be subject to flooding
flora	plants in an area
food chain	series of living things with related eating habits. In a food chain one organism is eaten by another which is then eaten by another sweet potato → pig → crocodile → man
food web	a more complicated relationship of eating habits but similar to the food chain. It is made up of more than one food chain



grassland	large area of open land covered with wild grass
greenhouse effect	trapping of heat from the sun by the effect of the earth's atmosphere as a result of atmospheric pollution. This raises the temperature above normal in certain areas of the world

habitat	where an organism lives such as a pond, the seashore, the canopy of the rainforest
harmful	the ability to cause damage or injury to something, especially to a person's health or the environment
herb	low growing soft-stemmed plant whose leaves, stems, roots or seeds are used as medicines or for flavouring food
impact	the effect that something has on a situation, process or person
insecticide	a poison used to kill insects
interdependence	is the condition of a group of things or people all depending on each other
introduced	a plant or animal species that is brought in from somewhere else (usually another country). Some of these can cause problems for native species in terms of competing for food and shelter
manure	waste products that are passed out from animals, that is useful for improving the quality of the soil
marine life	all living things in the sea
misuse	using in an incorrect or careless manner or for a wrong or dishonest purpose not using something wisely, correctly or honestly
mulching	putting dried leaves or grass around plants to add nutrients to the soil and reduce water loss
non-renewable	something that is not capable of replacing itself after it has been used, destroyed or lost
nutrients	substances that are absorbed into plants or bodies of animals and humans to help them grow
organism	living plant or animal of any size
pesticides	chemicals which farmers put on their crops to kill harmful animals, especially insects
photosynthesis	the process in which green plants make their own food using carbon dioxide and water and the presence of sunlight
physical features	physical features or surroundings are objects, structures or natural surroundings such as mountains, valleys, rivers, forest

pollution	changes in the air, soil or water that spoils the environment and makes it less useful or dangerous to plants, animals and human beings
predict	if you predict an event, you say that will happen or it will happen in a particular way
purifying	making a substance pure by removing any foreign substance from it
rare	existing only in small numbers and therefore regarded as valuable and should be protected
recycle	a process by which a used resource is recovered and used again
reforestation	planting of trees in an area that no longer has any trees in order to make a forest, especially useful after logging or mining
renewable	something that is capable of replacing itself after it has been used, destroyed or lost
reuse	to use something again
sense organ	organs that contain receptors that are sensitive to external surroundings and send messages to the brain
soil profile	vertical section of the soil showing layers called a horizon
species	a class of plants or animals or a variety of the same class, whose members have the same main characteristics and are therefore able to breed with each other
stimulus	something that causes a part of a plant's, person's or animal's body to move or function, automatically by a natural reflex
sustainable	if you sustain something, you maintain it or keep it going for a period of time
terrestrial	this refers to the life on earth, which includes plant and animal life
tsunami	a large ocean wave caused by an undersea earthquake
waste product	a useless material or substance produced while making something else

water cycle	the movement of water between the atmosphere, the land and sea water
weathering	the slow breaking down of the surface of rocks into small particles caused by wind, chemical reactions, changes in temperature and waves
wetland	an area that has a lot of water and is normally wet
word wall	this is a teaching method where students or teachers prepare a wall by painting it or putting up a large sheet of paper or material. Students then pin up words that they identify during their learning about a theme or topic

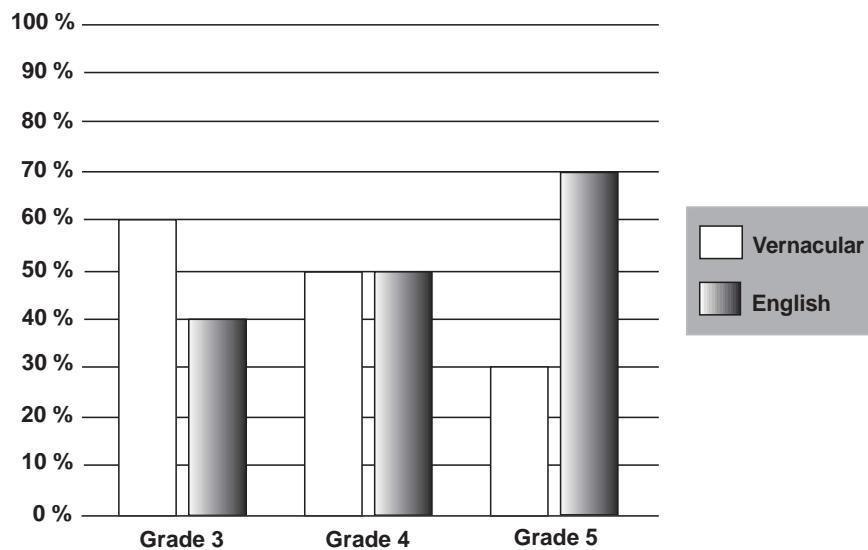
Appendices

Appendix 1

Suggested percentages of vernacular and English to be used at each grade

Papua New Guinea's Language Policy in All Schools (NDOE, 1999) requires a bilingual approach to education that incorporates bridging to English in Grades 3, 4 and 5. The graph below gives you an indication of approximately how much time you will spend teaching in vernacular and English at Grades 3, 4 and 5.

Percentage of teaching, learning and assessment in vernacular and English



In the classroom this means that in Lower Primary Environmental Studies, as well as in all the other Lower Primary subjects, you will be planning teaching, learning and assessment activities for students in both vernacular and English. As the classroom teacher, you will be the best person to decide when it is appropriate to use vernacular to support the students' learning, and when it is appropriate to introduce the English terms and language features to the students. Language is the vehicle for learning, so it is very important that you help students to learn and understand the knowledge and skills from each subject in vernacular, while at the same time introducing them to the English words, phrases and language structures required of that subject. Grade 3 teachers will be introducing a lot of new English vocabulary and language features to students, while teaching mostly in vernacular. Grade 5 teachers will be using English as the main language of instruction in all subjects and using vernacular as a way of enhancing students' understanding of the concepts. In this way language will be used and taught explicitly in all subjects at Lower Primary.

Appendix 2

Weekly time allocations for Lower Primary subjects

The curriculum reform allows teachers increased flexibility. Lower Primary teachers developing units of work must make sure that the following weekly time allocations for each grade and subject are met by the end of each term.

Subject	Grade 3	Grade 4	Grade 5
Arts	150 minutes	150 minutes	150 minutes
Community Living	150 minutes	180 minutes	210 minutes
Environmental Studies	180 minutes	210 minutes	210 minutes
Health	90 minutes	90 minutes	90 minutes
Language	570 minutes	450 minutes	405 minutes
Mathematics	210 minutes	210 minutes	210 minutes
Physical Education	105 minutes	135 minutes	150 minutes
Other			
Assembly	75 minutes	75 minutes	75 minutes
Religious Education	60 minutes	60 minutes	60 minutes
Block time	60 minutes	90 minutes	90 minutes
Total	1650 minutes	1650 minutes	1650 minutes