

Inservice Units to Support the Implementation of the  
Primary Reform Curriculum

**Unit 4:**  
**Learning Areas: Mathematics**  
**and Science**

**Module 4: Applying your learning -  
developing units of work**

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Name: ..... File N<sup>o</sup>:.....

Date commenced: ..... Date completed:.....

I have sighted this study guide as evidence of completion of agreed tasks by

.....(insert name)

Assessor: ..... Date: .....

## Module 4: Applying your learning - developing units of work

### Module Introduction

Welcome to *Module 4: Applying your learning - developing units of work*.

This module focuses on the Mathematics and Science/Environmental Studies syllabuses and teachers guides.

*Mathematics, Lower Primary Syllabus, 2004*  
*Mathematics Teacher Guide, Lower Primary, 2004*  
*Mathematics, Upper Primary Syllabus, 2003*  
*Mathematics Teacher Guide, Upper Primary, 2003*  
*Environmental Studies, Lower Primary Syllabus, 2004*  
*Environmental Studies Teacher Guide, Lower Primary, 2004*  
*Science, Upper Primary Syllabus, 2003*  
*Science Teacher Guide, Upper Primary, 2003*

The implications for us is that we use syllabuses and teacher guides together to understand the way the learning outcomes, the indicators and elaborations of outcomes (in terms of knowledge, skills, attitudes, suggested activities) can be organised into integrated or subject-specific units of work.

To do this module you will need access to all documents listed above. These are shown on pages 4-6 of the *Unit Introduction*. All activities in this module are based on these documents.

If you are seeking academic credit, make sure you do the *self-assessment* in the *Accreditation and Certification* section before you start this module. As you do this module, keep a running record of sections, parts and pages of the module where you can identify evidence for particular unit outcomes. You may wish to record such information in your *Learning Contract*.

### Module learning outcomes

When you have worked through this module, you, the learner, can (are able to):

1. develop a unit of work based on one outcome from a subject
2. develop an integrated unit of work based on two or more learning outcomes from more than one subject
3. develop an assessment plan for a unit of work
4. explain to others how to develop a unit of work

## Section 1: What is a unit of work?

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**A unit of work is a series of sequenced teaching, learning and assessment activities that students do to achieve one or more learning outcomes within a specified period of time.**

A unit of work is a medium-term plan. In an outcomes-based approach, the starting point for developing a unit of work is the learning outcomes.

A unit of work can be developed from

- a single learning outcome from a subject (subject-based)
- a number of learning outcomes from one strand of a subject (subject-based)
- a number of learning outcomes from two or more strands in a subject (subject-based)
- a number of learning outcomes from two or more subjects for one grade (integrated)
- a number of learning outcomes from two or more subjects across a number of grade (integrated and multi-grade)

Units of work can be developed by individual teachers or a team of teachers. If there is more than one teacher in your school teaching the same grade then it is a good idea to collaborate on the development of units of work, brainstorming possible student activities and assessment tasks. The idea that links the selected outcomes provides focus for the unit of work. This idea may be called an organiser or a theme



**Browse through the following pages of your Mathematics and Science/ Environmental Studies teacher guides to see how units of work are developed and structured.**

*Mathematics Teacher Guide, Lower Primary* – pages 35-41

*Mathematics Teacher Guide, Upper Primary* – pages 26-40

*Environmental Studies Teacher Guide, Lower Primary* – pages 35-49

*Science Teacher Guide, Upper Primary* – pages 48-56

### Considerations when planning a unit of work

The Lower Primary Mathematics Teacher Guide provides some advice in this regard on page 36.

- Read this section carefully and answer the following question.
- What does it say about:
  - the number of outcomes to be used in any unit of work and why?
  - how to choose the outcomes for a unit of work?

- planning for assessment?
- references and resources?
- issues of culture and equity?
- student learning needs?

### Components of a unit of work

The teacher guides provide some advice in this regard.

- Read the following pages and synthesise the essential components of a unit of work.
  - Upper primary Science Teacher Guide – page 50
  - Lower Primary Environmental Studies Teacher Guide – page 36

The lower and upper primary Mathematics teacher guides do not provide this information.

- Here is a comprehensive list. Identify the essential components.

Components	Place a tick (✓) in this column to identify the essential components	Place an ✗ in this column to indicate if you do it now
Grade		
Subject(s), strand(s) and sub strand(s)		
Title of unit or organiser or theme		
Learning outcomes		
Number of weeks or lessons		
Purpose of the unit		
Assessment methods, tasks and criteria		
Learning and teaching strategies Knowledge, skills and attitudes		
Resources		

The next steps in the development of a unit of work include weekly plans and daily programs (short-term).

- Make a list of steps you currently use to plan a unit of work and the list of steps suggested in a teacher guide.

My current steps	Steps suggested in teacher guides

*Hints: Make a list of you steps in planning a unit of work. Then compare it with the steps suggested in the teacher guides.*

- Identify any differences between how you plan now and what the teacher guides suggest.

## Section 2: How to develop a unit of work

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All four teacher guides you are dealing with provide a series of steps for developing a unit of work.

- Browse through the following pages to glean the steps to developing a unit of work.

*Science Teachers Guide, Upper primary: pages 51-53*

*Mathematics Teachers Guide, Upper primary: pages 34-36*

*Environmental Studies Teacher Guide, Lower primary: pages 35-36*

*Mathematics Teacher Guide, Lower primary: page 35*

Pages 37-41 provides an example of a unit of work based on the process for developing a unit of work (lower primary Mathematics).

- In this example four subjects are integrated by clustering four outcomes (page 37).
- The organiser or theme for the unit is: Making graphs of living things in my community
- Purpose of this unit is identified as: students use graphing skills and information relating to animal and plant species and people and they construct and interpret graphs in vernacular and English
- Then the knowledge, skills and attitudes relevant for the outcomes are identified from the elaborations of outcomes sections of the relevant teacher guides (page 37)
- The next step shown here is the identification of teaching and learning activities and assessment tasks (page 38)
- This is followed by a detailed assessment plan (page 39) and a sample weekly program (page 40)
- Resources needed are identified last (page 41).

The above steps may be presented in a table as follows.

Unit of work: Making graphs of living things in the community	
<b>Grade</b>	3
<b>Strands</b>	Mathematics – Chance and Data Environmental Studies – What is in my environment? Community living – Community Language – writing
<b>Learning outcome</b>	3.4.2: Draw and interpret simple graphs 3.1.1: identify different species of plants and animals found in the environment 3.1.1: Explain changes in the community and family life and the effects on people 3.3.1: Plan and develop a range of text types to develop familiar ideas and information
<b>Purpose</b>	Students will use graphing skills and information relating to animals and plants species and people. They will construct and onterpret graphs in vernacular and English.
<b>Content – knowledge, skills and attitudes</b>	<i>Knowledge – Environmental Studies</i> Different types of plants and animals Where animals and plants are found <i>Skills – Environmental Studies</i> Collect, display and sort plants and animals into groups <i>Attitudes - Environmental Studies</i> Value their environment Self-confidence Cooperation Sharing etc. for the other outcomes  These are drawn from the elaborations of outcomes from the relevant syllabuses
<b>Teaching and learning activities and assessment tasks</b> Both of the tables suggest how an	<i>Mathematics:</i> Draw and interpret .. Collect and show ... Draw simple graphs ... Present graphs and ask and answer questions etc. for other subjects

	These are drawn from the elaborations of outcomes from the relevant syllabuses and professional knowledge of the teacher. Some of the learning activities are also seen as possible assessment tasks for ongoing assessment
<b>Assessment methods, tasks and criteria</b>	<p><i>Environment Studies</i>  <i>Method:</i> analysing students' bar graphs  <i>Task:</i> draw a bar graph showing ....  <i>Criteria:</i>  draw bar graph with ...  names of animals at the bottom  shade in the number of animals found in the village</p> <p>Three different methods and one task for each method are identified here for the unit. For each task assessment criteria are set and the language of assessment is identified. Recording strategies are also identified.</p>
<b>Time</b>	2 weeks
<b>Weekly program</b>	Includes timetable and analysis of time allocation
<b>Resources</b>	Resources supplied, to be collected and to be borrowed for integration are listed

Now let us look at another sample unit of work for a single outcome from the Science area for upper primary (pages 50-53, teachers guide).

Let us summarise this into a table:

Unit of work: Earth formation and structure	
<b>Grade</b>	6
<b>Strand</b>	Earth and Beyond
<b>Sub-strand</b>	Our Earth and its origin
<b>Learning outcome</b>	6.4.1: Investigate the earth's structure and describe the formation, composition and the cycling of rocks
<b>Purpose</b>	Students describe and make a model of the earth's structure, collect rock and soil samples and make a model showing how soil erosion occurs.
<b>Content – knowledge, skills and attitudes</b>	<p><i>Knowledge</i>  Formation of earth  Structure and composition of the earth</p>

	Soil formation Rock formation <i>Skills</i> Investigating Comprehending Communicating  Knowledge is drawn from the <i>elaborations of outcomes</i> (page 46), the skills and attitudes are drawn from the <i>key features</i> section (pages 5 and 6) of the teacher guide. Attitudes are to be deduced from the <i>key features</i> in the teacher guide.
<b>Learning and teaching strategies and/or activities</b>	Invite guest speakers Research and present evidence for .... Make a model of the earth Describe .... Identify variations ...
	These are drawn from the elaborations of outcomes (page 46) and professional knowledge of the teacher. Some of the learning activities are also seen as possible assessment tasks for ongoing assessment.
<b>Assessment methods, tasks and criteria</b>	One assessment task is suggested: make a model of the earth's structure and label it. Assessment criteria are not provided.
<b>Resources</b>	Local elders World map Samples of soil
<b>Time</b>	1 week
<b>Weekly program</b>	To be done by reader

overview of a unit of work can be done and you may wish to do overviews of units before plunging into developing them fully. The steps are similar whether the unit you are planning is for a single outcome or a cluster of outcomes, but the sequence of steps could vary.

Now it is your turn to do a table yourself.

Go to page 44 of Environmental Studies teacher guide (Sample 2: Grade 4) and extract information to fill in the blank table provided.

<b>Unit of work:</b>	<b>Grade:</b>
<b>Purpose</b>	
<b>Subjects</b>	
<b>Strands</b>	
<b>Sub-strands</b>	
<b>Learning Outcomes</b>	
<b>Content – knowledge, skills and attitudes</b>	
<b>Teaching strategies and/or activities</b>	
<b>Assessment methods, tasks and criteria</b>	
<b>Programming in two languages</b>	

<b>Time</b>	
<b>Resources</b>	
<b>Weekly program</b>	

Having read the appropriate sections of the teacher guides and having done unit overviews, you are in a position to identify a logical sequence of steps that is likely to make sense to you.

Here is a series of steps. These steps are a guide and may look jumbled up. Some teachers will complete the steps in the process in a different order, but eventually all steps will be covered.

- Re-number these steps in the most logical sequence for you.

Step 1	Study the content overview from the syllabus/es that shows the strands, sub-strands and learning outcomes. (if you are planning an integrated unit you need to look at most or all the syllabuses)
Step 2	Estimate how many lessons or weeks will be needed to complete the unit of work
Step 3	Identify the outcomes with similar concepts or processes (the links between subjects). It may be easier if you make links between sub-strands first. For both LP and UP you can cluster the outcomes – about 4 – from across the subjects that link naturally together and identify a theme that describes these links
Step 4	State the purpose of the unit, summarising in two or three sentences what students will learn/achieve during this unit. Refer to the learning outcomes.
Step 5	Identify the knowledge, skills and attitudes that underpin the outcomes that you want the students to demonstrate in the unit of work. (use outcomes and indicators from the syllabus/es and the elaborations from the teacher guides)

Step 6	Develop and sequence teaching and learning activities that help students to learn and demonstrate the knowledge, skills and attitudes (read the elaborations in the teacher guides for some ideas on activities and/or use activities you have developed yourself)
Step 7 (mainly for lower primary)	State the language of instruction for teaching and learning activities and assessment tasks (and develop activities for language learning outcomes in the unit of work that incorporate bridging approaches)
Step 8	Develop an assessment plan which includes a schedule, tasks that allow students to demonstrate the knowledge, skills and attitudes in the outcomes, criteria with descriptors, and recording and reporting details
Step 9	Develop teaching programs for the unit of work by lessons, weeks or terms, (using your own programming format)
Step 10	List relevant resources and materials, particularly local resources
Step 11	Think about how you will find evidence of student achievement of outcomes

Now do an overview of a unit for outcome 4.1.3 (lower primary Mathematics) using the sequence you have identified above. Add more rows, if needed.

<b>Unit of work:</b>	




**So far we have been exploring the model for planning a unit of work provided in the Mathematics and Science teacher guides. Let us call this the teacher guide model.**

There is an alternative way to develop a unit of work. Let us call this the designing down approach. This approach is based on four questions. These questions help you to think about and focus on the outcomes.

This approach shows you that you can use the steps in a different order.

Questions:	Steps: from pages 11 and 12
Question 1: What is it that my students need to know and be able to do?  (this question directs us to the learning outcomes in the syllabuses)	Steps 1 and 3 in the table on page 10
Question 2: What is the best way to find out if my students are achieving the outcomes?  (this question directs us to assessment plans as the second important decision to make)	Steps 8 and 11
Question 3: What are the most appropriate learning and teaching strategies and activities to help my students achieve the outcomes?  (this question directs us to the learning strategies most suitable for assisting students to achieve the outcomes)	Steps 6, 7 and 10
Question 4: What is the most appropriate content – knowledge, skills and attitudes – to help my students achieve the outcomes?  (this question finally directs us to the most appropriate knowledge, skills, understandings and attitudes)	Step 5

The sequence above is called designing down (or working backwards) from the outcomes to the content – an essential characteristic of outcomes-based education.

What is important in the OBE environment is the achievement of outcomes. The outcomes do not exist in a vacuum. Each outcome has embedded in it knowledge, skills and attitudes in the contexts of – Science, Mathematics, Environmental studies, Language and so on.

The following scenario illustrates this alternative approach.

### ***Scenario***

Here is Mrs Kenehe's rough draft of a unit of work for a single outcome.

Mrs Kenehe considered Question 1 of the 'Alternative approach'. She selected an outcome from the Environmental Studies syllabus: *4.1.1 Students describe features of plants and animals that live in the environment.*

Next Mrs Kenehe thought about the second question which is about developing an assessment plan. So she decided to read the indicators for this outcome (Environmental Studies syllabus, page 13) to get an idea about the standard at which the outcome is to be understood, taught and assessed.

On thinking about the outcome further, Mrs Kenehe focussed on the verb of the outcome: 'describe'. Students can 'describe' in different ways – through a written piece of work, a talk, through a series of pictures or diagrams. Students are to describe the features of plants and animals that are found in the environment. So Mrs Kenehe decided to set a written/pictorial assignment and an oral presentation for assessment. She then discussed and negotiated with her students what she expects to find (assessment criteria) in the assignment and the oral presentation.

Next she went to the elaborations section of the *Environmental Studies Teacher Guide, Lower Primary*. Here she decided to focus on the following suggested activities 1, 2, 3, 5 and 6 (page 61) and selected the content.

- Content – types and features, habitat and features, physical features that aid survival and protection
- Processes and skills – gather information, summarise, record, discuss

Mrs Kenehe realised that the processes and skills she had selected were basically the Environmental Studies processes identified on pages 7 and elaborated upon on pages 11 and 12 of the Environmental Studies Teacher Guide.

Mrs Kenehe jotted down her ideas in a table, including learning/teaching strategies and assessment methods that would help students achieve the learning outcome.

<i>Unit title: Features of plants and animals</i>		<i>Grade: 4</i>		
<i>Purpose: Students explore the features of plants and animals that enable them to survive in particular habitats</i>				
	<i>Outcome</i>	<i>Assessment methods and tasks in two languages</i>	<i>Learning /teaching Strategies in two languages</i>	<i>Content – knowledge, skills and attitudes in two languages</i>
<i>Strand – What's in my environment?</i>	<i>Describe features of plants and animals that live in the environment</i>	<i>Methods: Written/pictorial response Observation Tasks: Student to do a written assignment (E) and an oral presentation (V) on features of plants, found in a selected habitat, that promote survival in that habitat and offer them some protection, Criteria: as negotiated with students</i>	<i>1. observe and record features of plants and animals found in a habitat (E) 2. explore this further with a guest speaker (V) 3. read a simple text on features of animals and plants (E) 4. write poems or quizzes using information gathered (V) 5. Collect and display plants highlighting their special features (E)</i>	<i>Different types of features  Relationship between habitat and features of plants and animals  Physical features that provide protection from predators or adverse conditions  Physical features and ability to survive</i>
<i>Sub-strand – Plants and animals students</i>				

Mrs Kenehe then checked each part of her plan for consistency with the selected learning outcome before she elaborated her plan into weekly programs and daily lessons.

Since the action word (verb) in the outcomes is ‘describe’, the questions she asked herself for checking consistency were: Are the selected assessment methods, tasks and criteria consistent with being able to ‘describe’? Will the learning activities and selected content allow my students to ‘describe’ ....?



**Reflect on the steps for developing a unit of work provided in the teachers guides and Mrs Kenehe’s draft unit.**

- Which model did she use?
- Which steps from the first model did she leave out?
- Are the steps she left out important at the overview stage?
- Are the steps she left out important when doing the weekly program and daily lessons?



**Now it is your turn to develop an outline of a draft unit of work for one learning outcome using the alternative approach.**

- You may work with a colleague for this activity.
- Use outcome 4.1.3 (lower primary mathematics) – *Compare and represent common fractions* - for your example.
- Use the alternative approach to develop a plan for a unit of work. Do not do detailed weekly and daily programs at this stage.
- Use the table below to guide your overview. The four questions have been filled in for you to prompt your thinking.

Questions:	Ideas:
Question 1: What is it that the students need to know and be able to do?	
Question 2: What is the best way to find out whether the students are achieving the outcomes?	

Question 3: What are the most appropriate learning and teaching strategies and activities to help students achieve the outcomes?	
Question 4: What is the most appropriate content – knowledge, skills and attitudes – to help student achieve the outcomes?	

Both models of planning an overview are examples of planning holistically. Here the teacher thinks the whole unit through and checks for consistency between the components of the unit.



**Reflect on what you have learned from this section.**

- What would be the new sequence for you? List the steps here.

## Section 3: Assessing units of work

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**Each of the teacher guides describes a process for developing an assessment plan. This is summarised below.**

- Decide on the best assessment method to gather information you would like about the student's learning for this unit of work: observation, analysing samples of work, etc. (refer to the assessment, recording and reporting section in the lower primary syllabuses). The selection of the methods would depend on the learning outcomes of the unit. The action words such as describe, discuss, investigate etc. provide ideas for assessment methods.
- Identify the assessment tasks consistent with the selected assessment methods. Ideally these could come from teaching and learning activities for the unit of work or specially constructed for a specific purpose.
- Identify the most appropriate person to conduct the assessment task – such as yourself, the student, student peers, a community resource person.
- Decide on the number of assessment tasks necessary to gather all the information you need.
- Design criteria for each assessment task. This may be negotiated with the students or jointly designed with the students. The criteria need to be known to the student well in advance of assessment. Criteria enable teachers to make consistent judgements about student achievement.
- Decide if you are going to conduct ongoing assessment.
- Keep the number and nature of the tasks manageable for yourself because you have to manage seven subjects and be fair to the students.
- Sequence the tasks to line up with your teaching and learning activities. Decide on the best time to assess students, remembering you have to give them time to learn and practise the knowledge and skills formatively.
- Include your assessment tasks within your unit plan.



**Before you commence any of the following activities, go back to Module 3, pages 13-14 and re-read the definitions of terms relating to assessment.**

You have found examples of units of work in

*Mathematics Teachers Guide, Upper Primary: pages 27-40*

*Mathematics Teachers Guide, Lower Primary: pages 37-41*

*Science Teachers Guide, Upper Primary: pages 50-56*

*Environmental Studies Teachers Guide, Upper Primary: pages 35-59*

Most of these units of work have included an assessment plan including assessment methods, tasks, criteria and recording methods.



**Study the assessment plans and assessment tasks described in any two units of work with one or more colleagues.**

Discuss how they are different from or similar to your current practice.



**With the help of your colleague(s), prepare a presentation to explain to a group of teachers how to do an assessment plan.**

Use an example from the upper or lower primary Science/Environmental Studies syllabuses to help with your explanation.

For the outcomes you selected on pages 9-10 of this module, elaborate on the assessment plan. Think of other ways of assessing. Use the table below to identify assessment methods, tasks, criteria and recording methods. Use this plan for your explanation.

<b>Possible assessment methods</b>	
<b>Possible assessment tasks</b>	
<b>Possible criteria for a task</b>	
<b>Possible recording method(s)</b>	

## Module Summary

Congratulations! You have come to the end of this module! In doing so you have worked your way through the Mathematics and Science/Environmental Studies syllabuses and teacher guides and done the many tasks and activities designed to make it easy for you to learn and apply your learning.

This module focused on exploring a subject-based unit of work based on one outcome and an integrated unit of work based on outcomes from two or more subjects. Two models for developing a unit of work were illustrated with examples and steps to planning assessment were identified.

You should have by now developed certain knowledge, understandings, insights and skills as they relate to reform curriculum in the context of your work. All this should help you to perform well in your work.

At this point let us review your progress by assessing the extent to which you can now demonstrate each outcome.

The outcomes for the module are copied here. For each of the outcomes how do you assess yourself - Yes, No or Not sure?

Can you:	Yes/No/ Not sure
1. develop a unit of work based on one outcome from a subject?	
2. develop an integrated unit of work based on one or more learning outcomes from more than one subject?	
3. develop an assessment plan for a unit of work?	
4. explain to others how to develop a unit of work?	

If you answered 'Yes' to all of them, then you have done very well. Think about the kinds of evidence that will support the achievement of each of the outcomes. If you have said 'No' or 'Not sure' to some, then it may be worth your while to go over the appropriate sections of the module again and have another go at repeating the tasks, and/or reflecting on your difficulties and seeking help.

Remember these *module outcomes* help you achieve the outcomes of the unit. Refer back to the outcomes of the unit in the *Unit Introduction* and reflect on where you are in relation to those outcomes.

If you are seeking academic credit, you were advised to keep a running record of any evidence you may have for particular unit outcomes. If you have not been doing this go back over the module and jot down, in your *Learning Contract*, what you might consider to be evidence for the unit outcomes for which you have agreed to provide evidence.

**Additional space for your notes**

**Additional space for your notes**