

Inservice Units to Support the Implementation of the
Primary Reform Curriculum

Unit 4:
Learning Areas: Mathematics
and Science

Module 3: Teaching and Learning,
Assessing and Reporting

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Name: File N°:.....

Date commenced: Date completed:.....

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

.....(insert name)

Assessor: Date:

Module 3: Teaching and Learning, Assessing and Reporting

Module Introduction

Welcome to *Module 3: Teaching and Learning, Assessing and Reporting*.

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

Mathematics, Lower Primary Syllabus

Mathematics, Upper Primary Syllabus, 2003

Environmental Studies, Lower Primary Syllabus

Science, Upper Primary Syllabus, 2003

Mathematics Teacher Guide, Lower Primary 2004

Mathematics Teacher Guide, Upper Primary 2004

Environmental Studies Teacher Guide, Lower Primary 2004

Science Teacher Guide, Upper Primary 2005

We look at the way the information in the subject syllabuses is expanded in the teacher guides to provide teachers with examples of strategies and approaches to assist with their planning, teaching and assessment needs.

To do this module you will need access to all documents listed above. These are shown on pages 4-7 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. explain the characteristics of and the approaches to student-centred learning
2. explain to a colleague the key features of the bilingual education approach and their implications for schools
3. describe and apply the different teaching and learning strategies and approaches recommended for Mathematics and Science learning areas
4. explain the meaning of words used to describe aspects of assessment and reporting
5. describe and apply the assessment, recording and reporting methods recommended for Mathematics and Science learning areas.

Section 1: Teaching and Learning

Part 1: Teaching and Learning in Lower Primary



Re-visit the section on *Teaching and learning* in both **Mathematics and Environmental Studies lower primary syllabuses**.

In both syllabuses *Teaching and learning* is part of the *Curriculum Principles* section. Teaching and learning principles can be found on the following pages.

Mathematics Lower Primary Syllabus: pages 5-8

Environmental Studies, Lower Primary Syllabus: pages 6-7

The focus in this part of the module is *Teaching and Learning*. However, it should not be considered apart from the other components of *Curriculum Principles—Our way of life and Integral human development*.

In the lower primary sector, bi-lingual education and bridging to English and integrated approaches across subjects underpin all learning and teaching.



Now read pages 5-8, *Mathematics, Lower Primary Syllabus* and pages 6-7, *Environmental Studies, Lower Primary Syllabus* more closely.

On page 5, the Mathematics syllabus says that it is based on three learning principles.



Do you support these principles in your current practices?

If yes, you are doing well.

If not, think about how you could make a commitment to these principles.



Make a list of all the key ideas discussed on pages 5-8 in the Mathematics syllabus. A table is provided.

Mathematics	Environmental Studies

- Now read pages 6-7 of the Environmental Studies syllabus, identify the key areas discussed and list them also in the above table.
- Write a comparative statement about the scope of the two syllabuses here.

Both syllabuses provide details of the requirements of *inclusive curriculum*.

- Read these requirements in both syllabuses carefully and then write down a definition of inclusive curriculum in the box below.

Inclusive curriculum:



Do you meet these requirements in your current practices?

If yes, you are doing well. If not, reflect on how you could make a commitment to these requirements.

Part 2: Teaching and Learning in Upper Primary



Re-visit the section on ‘Teaching and learning’ in both upper primary Mathematics and Science syllabuses.

In some syllabuses ‘Teaching and learning’ is part of the ‘Curriculum Principles’ section and in other syllabuses it is a separate section. The section can be found on the following pages.

Mathematics, Upper Primary Syllabus: pages 5-6

Science, Upper Primary Syllabus: pages 5-6

The focus in this part of the module is again *Teaching and Learning*. However, it should not be considered apart from the other components of *Curriculum Principles—Our way of life and Integral human development*.

In the upper primary sector, first language maintenance is promoted over bi-lingual education and bridging to English. Integrated approaches across subjects and a generalist outlook on the part of the teacher underpin all learning and teaching in the upper primary.



Now read page 5, *Mathematics, Upper Primary Syllabus* and page 5, *Science, Upper Primary Syllabus* more closely.

- What do you notice about the focus of teaching and learning in these two syllabuses?

You should have noticed that there are suggestions for teachers and for students.

- List some of these suggestions in the table below. An example has been done for you.

Teachers:	Students:
map out learning outcomes (both syllabuses)	are encouraged to use the resources readily available to them in their own surroundings (science)

- On page 6, what does the Mathematics syllabus say about the use of first language in teaching and learning Mathematics?
- On the same page, what does the syllabus say about integration?
- On page 5, what advice does the Science syllabus give about the language of science?
- On page 6, what advice does the Science syllabus give about the nature of science?



The teacher guides contain far more information on teaching and learning than the syllabuses.

They describe a range of learning and teaching strategies and approaches, as well as learning styles and learning situations.

- Go to pages 9-11 of the Mathematics Teacher Guide and skim read those pages.



List the four teaching and learning strategies discussed on pages 9-11. Make some summary notes.

Teaching and learning strategies	Summary notes

On page 9, the teachers guide states: You are required to use some of these strategies, along with other strategies you know will work well in the teaching and learning of Mathematics.



Reflect on what other strategies you may have been using in the teaching and learning of Mathematics. Record them here, if applicable.



Now go to pages 8-18 of the Science Teachers Guide and skim read those pages.

Pay special attention to how a science project is described on page 13. It states: *Upper primary science projects should focus on practical work carried out by one or more students over a number of lessons.*

Several examples of possible projects are listed here.

- Have you set projects of this nature for your students, in the past?
- What other ideas can you add to the list?

Now go to page 14 of the Environmental Studies Teacher Guide. Pay special attention to the description and the example provided.

- Are the descriptions here similar to those presented in the Science Syllabus?

Let us move on to comparing the teaching and learning activities presented in the Mathematics and Science teacher guides. Understanding the differences and similarities can assist with planning integrated units of work.

- Compare the learning and teaching strategies and approaches discussed in the Science and Mathematics teacher guides. List them in the table below.

	Science	Mathematics
Teaching and learning strategies		
Teaching and learning approaches		

- Can some of the strategies discussed in Science be used in Mathematics and vice versa?
- Can some of the approaches discussed in Science be used in Mathematics and vice versa?



Share, with a colleague, what you have found out about the teaching and learning strategies and approaches for Mathematics and Science in the upper primary.

- Together, identify all the strategies and approaches each is already applying.



Reflect on how you would make a commitment to applying those teaching and learning strategies and approaches you are not already using.

- Reflect on how you would assist your colleague to make a commitment to applying those teaching and learning strategies and approaches your colleague is not already using.



Share your thoughts with the colleague.



Work with a colleague or a group of teachers in your school to prepare a wall chart that lists and briefly describes as many teaching and learning strategies and approaches as possible, for Mathematics.

Your chart may look like this

Strategy	Description	Example	Cross-curriculum uses
Games	A strategy to deepen understanding and application of an idea or concept	Number games, eg. Fifteen word games	Environmental Studies, Science, Social Science, Personal Development

- Prepare another chart for Science.
- Place them side-by-side on the wall or another location and make links between them.

Consult these pages to prepare your chart.

Mathematics Teacher Guide, Lower Primary: pages 9-17

Mathematics Teachers Guide, Upper Primary: pages 9-11

Environmental Studies Teacher Guide, Lower Primary: pages 8-17

Science Teachers Guide, Upper Primary: pages 8-18

(For further information on these and other strategies refer to *Primary In-service Unit 6: Learning and Teaching for Outcomes.*)

The teacher guides contain far more information on teaching and learning than what we have explored. They describe a range of teaching strategies and methods, as well as learning styles and learning situations.

We can summarise the information provided under four main headings:

1. Student-centred learning
2. Bilingual education approaches
3. Integrated approaches
4. Inclusive approaches

- Do you agree? Explain.

1. Student-centred learning

This is a good time to revise your knowledge of the characteristics of student-centred learning.



Work with a colleague and identify at least five characteristics of student-centred learning.

(i)

(ii)

(iii)

(iv)

(v)

- Compare what you and your colleague have written with the information on page 12 of the *Mathematics Teacher Guide, Lower Primary* and the Environmental Studies processes described on pages 11-12 of the *Environmental Studies Teacher Guide, Lower Primary*.

- Add any of the key points you had forgotten.
- (vi) ..
- (vii) ..
- (viii) ..
- Now re-visit the teaching and learning strategies—experience—based learning, problem-based learning, open-ended questions and cooperative learning—on pages 9-10, *Mathematics Teachers Guide, Upper Primary*. Are they examples of student-centred strategies?
 - Now re-visit the teaching and learning approaches and strategies listed and described with examples on pages 8-15, *Science Teachers Guide, Upper Primary*.
 - Look closely through the teaching and learning strategies listed and described on pages 13-15. Can these strategies and their processes and products be used for assessment purposes?

2. Bridging to English approaches

The lower primary teacher guides contain an additional section not detailed in the upper primary guides. Pages 8-9 of the *Environmental Studies Teacher Guide, Lower Primary* and pages 9-10 of the *Mathematics Teacher Guide, Lower Primary* contain identical information about Bridging to English.

On pages 11-12, the Mathematics teachers guide provides an example of how to bridge to English through Mathematics.

Bridging to English strategies are critical in the lower primary years of schooling to enable students to make the transition to English with confidence.

In the *Appendix* of all Lower Primary syllabuses you'll find the Ministerial Policy Statement "*Language Policy in All Schools*".

If you are not familiar with this circular, take a few moments to read it.



Prepare a short presentation for lower primary teachers in your school in which you highlight the key features of the bilingual education approach.

Hint: Your presentation should include information about bridging to English through the five approaches-integrated planning and programming, whole language approach, using big books, using the full range of genres and programming separately for vernacular and English..

- Now re-visit your Mathematics and Science syllabuses and other documents and find out what the requirements are for vernacular usage in the Upper Primary.
- List the requirements here.

3. Integrated approach



Prepare a mind map or another structure to summarise the important ideas presented in the syllabuses and teacher guides.

(Use space provided on page 25 to construct your mind map.)

4. Inclusive approaches



Read the appropriate sections of the syllabuses and teachers guide. Make a list of strategies you are already practising to make your lessons inclusive and a separate list of strategies you could introduce in your classroom.

If you are a non-school-based officer, make a list of indicators of inclusivity you would look for in a school you supervise. (Use space provided on page 26 to record you lists.)

Section 2: Assessing, recording, reporting and evaluating

Part 2.1: Assessing



As a starting point reflect on the following questions.

- How do you assess in the lower and/or upper primary Mathematics and Science learning areas?
- Why do you assess?
- How often do you assess?
- What is your basis for making judgements about students' achievement?

Hint: List the main strategies you use for each subject. Write down your current practices and thinking. It is important that you compare ways you do it now with the advice provided in the syllabuses.



Before you study this section in more detail it is important that you are clear about the meanings of terms.

- Study the following definitions and write an example from your own practice to illustrate each one. Some examples have been done for you.

Term	Definition	Example/s
Assessment method	how the teacher will assess in a broad sense, through, for example,	written responses, observation, student products, etc.
Assessment task	the activity the students actually do/complete to be assessed	
Assessment criteria	standard, condition – the standards or conditions set to demonstrate what has been is to be achieved	

Recording		
Reporting		
Evaluation		



The two examples below show the difference between assessment methods, assessment tasks and assessment criteria.

Example 1:

The **assessment method** a teacher is planning to assess the students' achievement is through a **'written report'**.

The **assessment task** is **'students write a report summarizing natural and built changes and explaining their impact on the environment'**.

The **criteria** set to judge or measure their achievement are that, in their report, they: **'provide examples of at least 3 good and 3 bad examples of change; give reasons why they 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'**.

The recording method is to **'annotate (write comments on) reports students present and file these reports up'**.

Example 2

The **assessment method** a teacher is thinking of is a **'written, graphical response'**. The **assessment task** is **'draw a bar graph showing different plants and animals in the community'**.

The **criteria** to be used to judge their achievement is **'what exactly the teacher wants to see in the graph such as labeled axes, scale, percentage of different varieties of plants and animals etc.'**

The recording method is to **'annotate (write comments on) graphs students present and file them up'**.

As you can see above, an assessment method is very broad; an assessment task is quite specific but fits into the method identified.

Assessment criteria are the specifications and instructions relating to the task. Here the teacher makes clear to students what she or he expects from them. Rather than leaving it to the imagination of the students, the teacher specifies or negotiates and priorities with students the important aspects of the task.

The recording method must be appropriate to the task. It may be the task itself with teacher's comments written on it or specially devised by teacher or teacher and students for the purpose.



Skim the section on 'Assessment and Reporting' in each syllabus. The section can be found on the following pages.

Mathematics, Lower Primary Syllabus: pages 28-31

Mathematics, Upper Primary, Syllabus: pages 56-59

Environmental Studies, Lower Primary Syllabus: pages 18-20

Science, Upper Primary Syllabus: pages 24-26

In each document assessment is defined as the *'the ongoing process of identifying, gathering and interpreting information about students' progress towards achievement of the learning outcomes described in the subject syllabuses'*.

A number of assessment methods are suggested on these pages. These include observation of processes, products, skills and performances written responses, projects, practical work, tests, portfolios, self and peer-assessment.



Compare this list with the list you made earlier in response to the question:

How do you assess? on page 7.

If your list includes all of the above methods, you are doing well.

- Meet with two or three of your colleagues and find out how they assess and how often they assess.

A table is provided below for you to record the results. First record which of the methods you have been using over the past three months and how often. Use words such as 'never' (N), 'often' (O), 'sometimes' (S), 'rarely' (R), daily (D) to record the frequency. Find out how often your colleagues assess in the following ways. C1 is Colleague 1, C2 is Colleague 2 and C3 Colleague 3. You may wish to add to the list methods that you and your colleagues use, but are not suggested in the syllabus.

Assessment methods	Frequency (how often?) 'never' (N), 'often' (O), 'sometimes' (S), 'rarely' (R), daily (D)			
	Self	C1	C2	C3
Observation of processes and products				
Observation of skills and performance				
Listening to students explain (conferencing)				
Projects				
Practical work				
Tests and examinations				
Portfolios				
Self-assessment				
Peer assessment				
Other (add)				
Other (add)				



What conclusions can you draw from the data you have collected? Which of the methods is the most popular? Which is the least popular? Why do you think this is the case?

- Check your understanding of the important points made about *assessment and reporting* in the *Mathematics, Lower Primary Syllabus* by identifying whether the following statements are true or false. Explain your answer. If a statement is false, correct it.

Statements	True/False? Why?
The overall purpose of assessment is to improve student learning.	
When assessing students' achievements, teachers should be clear about which language best enables students to demonstrate their learning.	
Assessment is the end-of-unit process of finding out if students have achieved the learning outcomes.	

Assessment should first and foremost be used for ranking students in the lower primary.	
Student reports should be based on external examinations only.	
Students should not be allowed to assess their own learning and the learning of their peers.	



The Mathematics and Science/Environmental Studies teacher guides contain important information about ‘assessment and reporting’.

This information can be found on the following pages:

Mathematics Teacher Guide, Lower Primary: pages 18-29

Mathematics Teachers Guide, Upper Primary: pages 12-21

Environmental Studies Teacher Guide, Lower Primary: pages 18-27

Science Teachers Guide, Upper Primary: pages 19-29

- Skim read the above sections of the teacher guides.

All four teacher guides provide advice on assessment and examples and illustrations of assessment methods and tasks. There is a wealth of information here which you can easily understand and emulate.

Later on in the teacher guides there are examples of units of work which illustrate that developing an assessment plan at the same as planning learning and teaching strategies and content is an important step. Assessment should never be an after thought.

There is much you can learn from these examples.

In an overall sense, the defining questions when planning for assessing student achievement of learning outcomes are:

- What is the best way to find out what the students know and can do?
- Are these ways fair to all students?
- Are all aspects of the outcome(s) being assessed?
- Are the tasks big enough for the students to demonstrate what they know and can do

The steps to planning for assessment can be found in Science/ Environmental Studies teacher guides.

Environmental Studies Teacher Guide, Lower Primary: pages 24-25

Science Teachers Guide, Upper Primary: pages 24-28

Skim read the information provided in the two teacher guides.



Now read the **Environmental Studies Teacher Guide pages 18-27 and 24-25** carefully.

- Identify two assessment methods and for each method identify and design an assessment task for Outcome 3.2.1 in Environmental Studies. Remember to take into consideration the requirements for vernacular literacy (pages 8-9) and the Environmental Studies processes when designing your assessment tasks.

Outcome 3.2.1: *identify useful resources in the environment and describe ways to use them wisely.*

Hint: Pay special attention to the action words and the knowledge, skills and attitudes embedded in the outcome. For this go to the elaborations of learning outcomes on page 64 for this outcome. Think about the teaching and learning activities students may be engaging with. Also ask yourself the four questions listed above. (page 17).



Both the lower primary Environment Studies and Mathematics teacher guides have provided advice on " what to do with assessment information"

Page 26 of the *Science Teachers Guide, Upper Primary*, contains an example of 'Focussed analysis' as an assessment method.

The task set within this method is 'a project'. The project involves 'making a model of the earth's structure and labelling it'.

On page 26 you also find the assessment criteria for this task.

Let us take a few moments to critique the criteria provided.

- Do you think the criteria relates directly to the expectations of the labelled model and through that to the outcome?
- Which part of the outcome does the model address?
- Which criterion relate to the model?
- Which part of the outcome do the other criteria relate to?
- Do you think another task should be set to assess the rest of Outcome 6.4.1?

You will find this information on pages 22-23 of both documents. The advice is identical in these documents.

The table on page 23 in both documents shows you how to track student progress for the whole year. It is a summary record. This kind of a record is sometimes called a student achievement profile.

If you wish to follow this suggestion, you will need to make enough copies of the table for every student in your class.

- In what other ways can you keep records of overall achievement of your students?

On collecting 'enough' evidence about student learning, you the teacher, interprets the information in relation to achievement of outcomes and records it appropriately.

If the purpose of assessment is to facilitate learning, feedback should be provided to students in the timely fashion and plans and programs adjusted accordingly.

If the purpose of assessment is summative, the next step would be to report this information to the stakeholders.

- Add a definition of recording to the table on pages 13-14 of this module. Cite one or two examples.
- Use the syllabuses and teacher guides to help.

Environmental Studies/Science	Mathematics

Part 2.2: Recording and Reporting



A number of recording/reporting methods are suggested in each syllabus. However, ways of reporting student achievement to the community is left to the school to negotiate with the community.



Collect examples of school reports from your own school and other schools close by, if possible.

- Compare the reports. How does your school report to parents and the community? Do other schools report the same way?
- Read page 30 of the Environmental Studies Syllabus. Add the definition of reporting to your table on pages 13-14 of this module. Cite one or two ways of reporting your school or a school you supervise practise.



According to the *National Assessment and Reporting Policy*, what should written reports include?

- Compare the reports you have collected with the list. Do they reflect the requirements of the policy? If not, why?

Part 2.3: Evaluating

Each syllabus has a statement on *evaluation* including what it is, the role that assessment plays in evaluation and the purposes of evaluation.



Read the two paragraphs on *evaluation* in *Arts, Lower Primary, Syllabus* then write a paragraph that will help you explain to others what you believe evaluation is and how it informs you about what is going on.

- See if you can come up with a definition and examples to include in the table on pages 13-14 of this module.



Go back to the wall chart of teaching strategies you designed with your colleague in Module 2.

- Select four strategies from the chart and match them with an appropriate assessment task and a recording method. For example ‘a focussed analysis’ could be assessed using a checklist with criteria.

Teaching strategy	Assessment task	Recording Method
Focussed analysis		checklist with criteria

Module Summary

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

The focuses in this module have been the pedagogical aspects of a teacher's craft.

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. explain the characteristics of and the approaches to student-centred learning?	
2. explain to a colleague, the key features of the bilingual education approach and their implications for schools?	
3. describe and apply the different teaching and learning strategies recommended for the Mathematics and Science learning areas?	
3. explain the meaning of words used to describe aspects of assessment and reporting?	
4. describe and apply the assessment and reporting methods recommended for the Mathematics and Science learning areas?	

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