

# Teaching and learning 1

## Objectives

By the end of this session teachers will:

- understand some of the implications of the standards for teaching and learning;
- be able to identify some features of effective teaching and learning;
- be familiar with the purposes of the sample lesson plans for mathematics.

## Resources

### For the trainer

- Computer with data projector, Microsoft PowerPoint and Presentation 2.ppt
- Whiteboard or flipchart
- Video recorder linked to large screen
- Video clip 1: A whole mathematics lesson
- *Sample lesson plans for mathematics: Grades 1 to 12*

### For each teacher

- *Teacher's pack*  
Handouts 2.1 and 2.2
- *Sample lesson plans for mathematics: Grades 1 to 12*

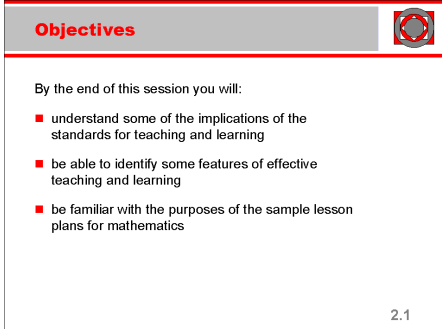
## Session outline

<b>Features of effective teaching and learning</b> Slides 2.1–2.4	Task 1: Identifying features of effective teaching and learning Groups of four	15 minutes
<b>Looking at a lesson</b> Video clip 1 Handout 2.1 Slide 2.5	Video clip 1 and Task 2: A whole mathematics lesson Whole group discussion	30 minutes
<b>Structuring mathematics lessons</b> Slide 2.6	Whole group presentation	10 minutes
<b>Introduction to the sample lesson plans</b> Slide 2.7	Whole group presentation Micro-teaching of a lesson plan Whole group discussion	25 minutes
<b>Conclusion</b> Handout 2.2	Summary of key points Task 3: Strengthening the quality of teaching	10 minutes

# Features of effective teaching and learning

15 minutes

Use **slide 2.1** to introduce the objectives for the session.



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2.1

Before the session starts, brief any interpreter about the key points of the session.

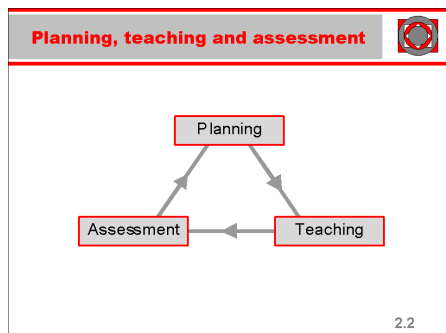
Make sure that each teacher has a copy of the *Sample lesson plans*.

Set up the video recorder in readiness.

Load **Presentation 2.ppt**.

Say that other sessions will also focus on the implications of the standards for teaching and learning. Stress that each school can develop its own policies for lesson planning, teaching and learning and assessment, so that as many of its students as possible achieve the standards expected for their grade. Similarly, there are no prescribed textbooks or other teaching and learning resources. Each school can select from the very best that exist to suit the needs of its students.

Show **slide 2.2** to discuss briefly the planning → teaching → assessment cycle: that effective teaching results from careful planning and use of assessment information.



## Task 1: Identifying features of effective teaching

Explain that many of the characteristics of effective teaching are the same for all subjects. Ask teachers to work in groups of four and to think of a good lesson that they have taught recently or that they have seen someone else teach. Ask the groups to suggest verbs to illustrate what effective teachers do when they are teaching a lesson. Give the groups a few examples to get them going, such as: *teachers tell, direct, explain, clarify, ...* Write the words quickly on a flipchart as teachers call them out. Stress that the verbs apply to any part of the lesson: the beginnings and ends of lessons as well as to the main part.

If possible, the groups should include teachers from different schools.

Show **slide 2.3**, referring back to what is on the flipchart to summarise it.

Repeat, but this time ask what it is that effective teachers enable students to do so that students are learning actively: *students explore, investigate, ...* List suggestions on the flipchart. Show **slide 2.4**, again referring back to what is on the flipchart to summarise it.

**Effective teachers:**

- instruct, direct and tell
- demonstrate, model and 'show how'
- explain, clarify and illustrate
- interact, question and lead discussion
- summarise key teaching points
- review progress, assess and give feedback

2.3

**Students of effective teachers:**

- explore, investigate and experiment
- create, invent and use imagination
- enquire and research
- analyse and process information
- explain and reason
- recount and recall
- practise and consolidate
- reflect, criticise and evaluate

2.4

## Looking at a lesson

**30 minutes**

### Video clip 1 and Task 2: A whole mathematics lesson

Explain that the video clip shows a whole mathematics lesson edited down to about 15 minutes. Explain the context of the lesson (the location and type of the school, the relevant grade, and the number of students in the class when they are all present).

Ask everyone, while they are watching, to note how the teacher begins and ends her lesson. They should also use the prompts on **Handout 2.1** in their *Teacher's pack*, picking out the active teaching strategies that the teacher uses and the kinds of activities she asks students to do.

Show **Video clip 1**, A whole mathematics lesson. Give teachers an extra 5 minutes to discuss the handout in pairs, and add a few more examples.

Take feedback by asking the whole group some questions.

- What teaching strategies did the teacher use?
- What learning activities did the students do?
- Did the teacher engage the students' attention at the beginning of the lesson? How?
- Did she round off the lesson effectively? How?
- If you had been teaching this lesson, what would you do differently?

Use **slide 2.5** to summarise features of the lesson. Adapt the slide to fit the lesson that you are showing.

**Key features of the video lesson**

- High expectations
- Making clear what has to be learned
- Collaborative group work
- Activities that involve students and require them to think
- Interactive questioning and discussion, with encouragement for students to respond and use intuition
- Immediate feedback and support for students at a point of difficulty
- Extra challenge for the most able
- Prompts to support students' independent work


2.5

Choose a suitable video. You will need to explain the context of the lesson, e.g. the film was made in a large comprehensive school for all abilities in a city in the north-west of England. The school is a mixed school with 900 students from Grade 6 to Grade 12. There are 28 students in the class when all are present.

## Structuring mathematics lessons

10 minutes

Remind everyone that most teachers structure their lessons to provide a series of ‘episodes’ that flow from one to the other. When lessons are planned, it is useful to think about the beginning of the lesson, the middle of the lesson and the end of the lesson. Show **slide 2.6**.

**A typical mathematics lesson** 

**A starter activity** (5 to 10 minutes)

- Whole class work to develop oral and mental skills: recall, calculation, visualisation, thinking skills

**The main teaching activity** (35 to 45 minutes)

- Combinations of teaching input and student activities
- Whole class work, groups or pairs, or individual work
- Interventions to identify and remedy misconceptions, clarify points and give immediate feedback

**A consolidation phase** (5 to 15 minutes)

- Whole class work to summarise key points, assess extent of learning, make links to other work, set homework

2.6

Refer back to the video lesson that they have seen and explain how it featured a starter, a main part of the lesson with a series of activities for groups of students, interspersed with mini-plenaries where the teacher addressed the whole class, and a consolidation phase.

Say that a three-part beginning–middle–end structure is not a mechanistic model that has to be followed. It is intended to be flexible. It should allow teachers to use their professional judgement to determine the activities, timing and organisation of the ‘beginning’, ‘middle’ and ‘end’ of the lesson to suit the lesson’s objectives and to meet students’ needs over a series of lessons.

Emphasise these points.

- Lengths of lessons are determined by schools and will therefore vary. Primary schools tend to have shorter lessons. The structure outlined above can work for lessons lasting from 35 to 70 minutes but probably works best with lessons of 45 to 60 minutes. 70-minute lessons can be too long for students to maintain concentration, while 35- to 40-minute lessons offer too little time for ideas to be developed.
- The time spent on each part of the lesson can vary according to what is being taught and the position of the lesson in a series of lessons.
- Teachers need to consider the balance of lesson activities over time, both in lesson content and in the range of teaching and learning styles.

## Introduction to the sample lesson plans

25 minutes

Refer teachers to their *Sample lesson plans for mathematics: Grades 1 to 12*. Stress that the plans are samples only and are illustrative. Show **slide 2.7** to explain their purpose.

### The sample plans show ways of:



- structuring lessons
- giving students opportunities to work as a whole class, in small groups, as pairs or individually
- demonstrating, explaining and questioning
- motivating learning through:
  - providing stimulating active tasks
  - balancing speaking, listening, reading, writing
  - varying ways to practise a skill
  - differentiating to provide extra support or challenge
  - using varied learning resources, including ICT

2.7

Ask teachers to look at some of the lesson plans for their grade. Stress these points.

- The structure corresponds to the structure described on slide 2.6.
- The lessons don't refer to specific texts or textbooks, since these will vary from school to school.
- Each lesson plan will support about 45 minutes of teaching. Teachers may need to supplement activities, choosing from textbooks or other resources. If there is too much material in the lesson plan, they could designate one of the activities as homework, or carry it forward to the next lesson.

Choose a lesson for one particular grade. Talk through it, asking teachers to act as 'the class' and teaching one or more of the activities. You may want to explain that demonstrating teaching techniques in this way is known as *micro-teaching*.

At the end of the lesson, discuss with the whole group one or more of these sets of questions.

- What activities are offered to students in the lesson? Are any of these activities collaborative, in which students are expected to do things together? Do any of the activities require them to discuss with a partner?
- What kinds of questions do teachers ask in the lesson? Are they open questions, for which a range of answers is possible, or closed questions, for which only one answer is possible? Are students expected to give one-word answers, or to explain and justify their answers?

For an audience of primary teachers, choose from Grade 3 or 4; for preparatory and secondary teachers, use Grade 9 or 10; for a mixed audience, use Grade 6.

Choose the lesson in advance and think through how you will teach it. For example, you may need to make an overhead projector transparency or to prepare a resource sheet for 'the class' to use.

## Conclusion

**10 minutes**

### Task 3: Strengthening the quality of teaching

Refer to **Handout 2.2** in the *Teacher's pack*.

Ask teachers to work in school groups to reflect on how they encourage all teachers of mathematics in their school to:

- plan lessons that ensure that students take part actively and do more than listen, give short answers to oral questions and write;
- plan a variety of teaching and learning activities over time (e.g. over the course of a unit of work).

Allow groups a few minutes for discussion, then take feedback in order to share ideas among the whole group. Ensure that these possibilities are included:

- studying and discussing the sample lesson plans for the relevant grades;

- watching and discussing a video of a lesson;
- teaching a short lesson (a ‘mini-lesson’) to a group of colleagues and then discussing it;
- planning lessons jointly with colleagues;
- team teaching (one teacher leads and the other supports a lesson);
- observing teaching and giving feedback.

Explain that if teachers are working with colleagues to strengthen the quality of teaching it may be best to pick out just one or two features of effective teaching and to concentrate on those aspects for a while, e.g. to focus on improving the beginnings of lessons, or on extending interactive questioning techniques.

Conclude by saying that discussion of effective teaching will continue on Day 2. The next session will focus on planning.