



education

Department:

Education

PROVINCE OF KWAZULU-NATAL

Just-in-Time Training Workshop Term 2, 2017

Facilitator's Guide

Grade 4 – 7

Subject: Mathematics



A re Tokafatseng
Seemo sa Thuto

what I do matters



Endorsed by:



Programme

Session 1:	3-D objects, volume and capacity	page 2	40 mins
Session 2:	Looking at CAPS and assessment for Term 2	page 4	60 mins
Session 3:	Mark analysis to understand what learners need	page 10	90 mins
Session 4:	Learning from analysis of learner performance	page 13	50 mins
Extra notes:	Geometric patterns	page 16	
	Participants summary of key learnings from workshop		10 mins
	PILO Evaluation of workshop		10 mins

Notes about training:

Planning for training for Term 2, 2017:

In discussion with district subject advisors, we identified key areas of Term 2 Maths learning and teaching that present difficulties for both teachers and learners. Together we agreed to focus on 3-D objects, volume and capacity, with a special focus on assessment and learning from learner errors. If there is time, we also look at decimal fractions, introduced for the first time in Term 2 of Grade 6 and geometric patterns.

The Tracker Term 2 also provides useful suggestions about lesson preparation, the content and the assessment for this term and there are resources at the back of the tracker

Progression: Throughout the workshop, we look at the progression of concepts from Grade 4 to Grade 7. Look out for evidence of the following important ideas from CAPS:

Session 1: 3-D objects, Volume and Capacity

40 minutes

Review your understanding and knowledge

Start this activity without too much introduction. Teachers who arrive early can start completing the review of knowledge on their own. As each teacher arrives, get them to start.

When teachers have completed the Volume and Capacity questions, and are still waiting for the other participants, they can continue working on the 3-D object questions.

Do not spend too much time on this activity. Spend the time on the discussion of the concepts that follows. Encourage participants to be honest about their difficulties. We all have different difficulties and no one needs to feel embarrassed. We can learn from each other.

The questions are intended to help participants reflect on their own thinking about maths content, not to begin applying their ideas to learners and assessment yet.

Help participants to identify what it is about a question that makes it difficult. As they think through the question, when do they “hit a blank”? what thinking helps them to get past that block and successfully answer the question?

Participants should be familiar with the term “social knowledge” as we use in Mathematics. If not, give them a quick reminder.

Then help them identify questions which require social knowledge and questions which need a person to understand a concept.

Memo: Volume and capacity

1. D; B; C; A
2. Volume is the amount of space taken up by an object. However, when measuring volume, the container’s capacity is the whole amount of space, whereas its volume is the space taken up what is inside the container – liquids, blocks etc.
3. Capacity is the amount of a solid, liquid or gas that would fill a container to the top. Informally, we talk about a hall being “filled to its capacity” by protesters, students etc.
4. Volume = 18 cm^3
- 5.

Memo: 3-D objects

6. a) An object takes up space; you can pick it and hold it
A shape is flat. It cannot be picked up because it is just the description of the form of something concrete.
- b) A cube is a block with six faces that are square shaped. A square is the shape of one face of a cube.

c) A prism has two end faces of the same shape that are parallel to each other and joined by a number of rectangular shapes. A pyramid has one base shape with triangular faces on each edge of the base and joined together at the apex.

7. Learners are not expected to get their drawings accurate, but teachers should be encouraged to improve their drawing of prisms and pyramids so that they can easily demonstrate them.

Session 2: Looking at CAPS and assessment for Term 2

60 minutes

Give participants a few minutes to look through the grades and topics for Term Two. Then go through the notes made in the Participants' manual (page 6). Ask if there are any questions.

Ask them to identify the measurement topics in each grade:

Grade 4: length

Grade 5: length

Grade 6: capacity and volume

Grade 7: area and perimeter, surface area and volume.

Explain that, although our focus is on volume and capacity, there are many common characteristics between different kinds of measurement and what is required in CAPS.

- One obvious similarity is the conversion of units.
- Another is that learners move from understanding measurement by comparing mass, volume, length and area of different real objects and pictures, by measuring in squares and blocks and then using measurement tools.
- CAPS guides teachers to establish the concepts first before letting learners “discover” and use formulas only in Grade 7. This is an important focus on conceptual understanding before introducing formulae.

The space and shape topics in each grade:

Grade 4: 3-D objects

Grade 5: 3-D objects and symmetry

Grade 6: 3-D objects and symmetry

Grade 7: using 2-D shapes and 3-D objects for measurement.

What is important here is to examine CAPS clarification pages to see the increasing progression of difficulty across Grade 4, 5 and 6 in the examples used for 3-D objects and symmetry.

There is not time in this workshop to examine these.

Working with a partner, participants work through the questions asked in **Section 4** and **Section 5**. After completing the questions, they answer the discussion questions from their own understanding of what is required at a Grade 6 level.

Only after this, they should compare their answers and their discussion with the memo provided on page 9 of the Participant's Guide.

Session 3: Mark analysis to understand what learners need

Introduce the session with a summary of the important aspects of learner assessment. You can do this by listing suggestions from participants on a flip chart.

Then take participants through the weighting of topics in the term 2 test and the cognitive levels addressed.

Spend some time checking that participants understand how to work out the averages of topics in the mark sheet. You can do this by using one of the topics and working through finding the average for the topic using the number of learners as well as the total possible marks for the topic.

Some suggestions for discussion of questions 2 – 8 follow. If participants overlook any points in their discussion, it is your role as facilitator to bring them into the discussion.

Possible Answers to consider: this section needs to be replaced with answers according to the new marksheet, but it gives you an idea of what kinds of answers there are.

- The majority of learners performed well in Question 5.2. The mark sheet and averages per question help you identify areas where most learners performed well and where they performed poorly too. The mark sheet helps you see trends in learner performance too e.g. performance decreases in Questions 6.1 and 6.2
- The learners answered the volume of rectangular prism question very well.
- The question was easy to understand and relied on knowledge, substitution and simplification.
- The learners performed poorly in finding the number of litres of paint needed.
- The learners had to rely on the answer to Question 6.1 to answer Question 6.2. Also learners had to think about what to do.
- No. Learners B and D performed poorly in all questions.. Learner F achieved full marks and learners A, G, I and J achieved 1 less than the total for the questions.
- Allow learners to work with actual 3-D objects and feel the faces as they describe the object. Allow learners to make nets of 3-D objects. Further advice can be found in the memo to Question 6.1. Make sure I understand the work before I teach it.

Some suggested teaching strategies:

- Revise 2-D shapes before starting 3-D objects.
- Allow learners to put together shapes to form all the 3-D objects the curriculum requires for that grade.
- Use actual 3-D objects and allow them to feel and describe the faces so that they can name the object correctly.
- Compare prisms and pyramids. Use the same objects to teach vertices and edges. Note: If learners can feel the faces of 3-D objects in their heads they should cope better with the section on surface area and volume of 3-D objects.

Important social knowledge

- **Capacity** is the amount of a gas, liquid or solid that an object can hold or the amount of space inside the object. In CAPS, capacity is usually measured in *ml*, litres and *kl*.
- **Volume** is the amount of space that an object occupies.
A bottle can have a 1 litre capacity, but it may not be filled to its full capacity. It could for example, only contain a volume of *250ml*.
- In CAPS Intermediate Phase, we measure **volume** in number of cubes or boxes filling a space, or building constructions of cubes. We use blocks of 1 cubic centimeter.
- Grade 7 learners need to be able to use equivalent units in problem solving:
 $1 \text{ cm}^3 \leftrightarrow 1 \text{ ml}$ $1 \text{ m}^3 \leftrightarrow 1 \text{ kl}$

Session 4: Learning from analysis of learner performance

Grade 5 question from the *Tracker: Mathematics June/Mid-year Examination Exemplar Term 2*.

Use this question to consolidate the teachers own knowledge, to check that teachers know when an mistake is a slip or an error, to encourage teachers to think about what learners were thinking, to discuss how to give feedback to learners and how to remediate.

Possible answers to consider:

The correct answer is: A. Triangular prism

Answer given	Slip/ error/ both. Cause of slip.	Error a) Learner thought	Error b) Feedback to learner	Error c) Remediation
A Triangular prism	N/A	A triangle has 3 sides. Each rectangle would go on a side. The two opposite faces that are exactly the same are triangles.	Well done!	N/A
B Rectangular prism	Both Slip: Saw prism, chose wrong prism	Saw more rectangles than triangles.	What are the two opposite faces that are exactly the same?	Allow learner to feel the faces of a triangular prism.
C Triangular pyramid	Both Slip: Saw triangular, chose wrong answer	Saw triangular faces...thought must be a pyramid	You would need 4 triangles for it to be a triangular pyramid	Pyramids have triangular faces on the sides
D Cube	Error	Thought 3-D object and wrote the most common one.	A cube has 6 faces you were given 5 faces.	Count the number of faces and think how they will fit together. A cube has 6 faces, all are squares.