



English

Grade R Mathematics Improvement Programme



Workshop 2 Facilitator's Guide

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The **Schools Development Unit** (SDU) at the **University of Cape Town** (UCT) is the mathematics technical partner to the Grade R Mathematics and Language Improvement Project. The SDU is a unit within UCT's School of Education that focuses on teachers' professional development in Mathematics, Science, Literacy/Language and Life Skills from Grade R to Grade 12. The SDU offers teacher qualifications and approved UCT short courses, school-based work, materials development and research to support teaching and learning in all South African contexts.

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Overview

Purpose

This is the second of twelve Grade R Mathematics Improvement Programme workshops, which form part of the Gauteng Department of Education (GDE) Grade R Mathematics and Language Improvement Project.

The purpose of this workshop is to assist teachers to implement the Maths Programme in their classrooms. The focus of this workshop is Space and Shape (Geometry). Participants will strengthen their knowledge and understanding of teaching and learning in this Content Area, prepare for teaching Space and Shape (Geometry) activities in their classrooms and reflect on the guiding principles that inform teaching.

Learning outcomes

- To reflect on the implementation of Term 1 Weeks 1–2
- To explore strategies to support teaching maths in Grade R (e.g. problem solving, investigation, exploration, questioning, critical thinking, active listening, observation)
- To engage with the Maths Programme content of Term 1 Weeks 3–5 (Space and Shape (Geometry))
- To apply the Maths Programme principles in weekly planning

Workshop content

٠	Opening and reflection	(1 hour)
٠	Session 1: Content overview	(1 hour)
ΤE	A	
٠	Session 2: Space and Shape (Geometry)	(2 hours)
LU	NCH	
٠	Session 3: Planning for teaching	(2 hours)

Preparation

- PPT welcome and outcomes
- Copy and cut out the Appendix B strips and place them into one envelope per group.
- Set up a simple obstacle course in an open space.
- Prepare the tables with materials before each session.

Materials

- Flipchart paper, kokis
- Props for obstacle course
- Concept Guide

- Poster Book
- Activity Guide: Term 1
- Boxes, balls and ramps for each table
- Large sheet of newsprint (for tracing around a person)
- Newsprint and crayons for each table
- Attribute blocks for each table

Opening and reflection

Facilitator's notes

- PPT: Open the session, welcome participants and read through the outcomes for the workshop.
- Remind participants of the *Take back to school* task from the end of Workshop 1. Ask participants to work in groups to reflect on this task and to complete **Activity 1**.
- Groups share key points with the large group.
- List examples of good practice on newsprint and encourage participants to write these down or take a photograph of the newsprint as a record.
- On the ground, place a piece of string the length of the classroom. Mark one end of the string: 1 = the Maths Programme has made a big difference to my teaching. Mark the other end of the string: 10 = the Maths Programme has made no difference to my teaching.
- Invite a few participants at a time to stand on the string indicating where they fit on the scale and to explain why they chose to stand there.

In your Workshop 1 *Take back to school* task you were asked to complete several activities. We would like you to spend a few minutes reflecting on your progress so far.

In your groups, think about your maths teaching over the past two weeks and how successfully you have implemented Term 1 Weeks 1–2.

م الله Activity 1

In your group, discuss your successes and challenges with implementing Term 1 Weeks 1–2 of the Maths Programme. Allow each person to have a turn to present their reflections.

- 1. Briefly describe how you organised your classroom and how you prepared for teaching these two weeks.
- 2. Discuss what worked well and what you found difficult to implement. Does anyone have any helpful suggestions?
- 3. Share how and when you applied the guiding principles of teaching in your daily programme Mathematics focus time?

Facilitator's notes

- Wrap us this session with feedback from each group. Refer to specific activities in *Activity Guide: Term 1* to support what participants share.
- Discuss the video with a focus on how participants managed the teacher-guided activity in Week 2.



Activity Guide: Term 1, Week 2, Teacher-guided activity #3 (page 24) Watch the video of the teacher-guided activity which involves a small group of learners.

What do you think the intention of the activity is? Pay special attention to how the teacher prompts the learners with questions and how she observes each learner.

In Workshop 1 we discussed the eight guiding principles of teaching maths in Grade R. Activity 2 requires that you to match each of the eight principles with two statements that best describe it.

Facilitator's notes

- Hand out one envelope containing the eight guiding principles of teaching and matching statements to each group.
- Explain that the participants need to match the principles with the statements to complete Activity
 2.



Activity 2

- 1. Each group has been given an envelope containing a number of strips. Find the eight guiding principles of teaching and place them in a row on your table.
- 2. Discuss each of the statements and decide with which principle it fits best. Place the statement under this principle.

Session 1: Content overview

Facilitator's notes

- Refer participants to pages 63–65 of the *Concept Guide*. Remind participants that this table provides the framework for all maths planning and will be used and referenced throughout the training.
- Ask participants to work in groups to complete **Activity 3**. Ask one person from each group to share their ideas.

Term 1 Content overview: Space and Shape (Geometry)

The content for teaching and learning in Weeks 3–5 focuses mainly on the CAPS Content Area, Space and Shape (Geometry). This content involves more than teaching learners to identify geometric shapes. Their understanding of space and shape depends to a large extent on whether they understand and can use position vocabulary to describe the location of an object (e.g. on, in, next to, behind, in front of). Learners also need to be able to see objects from different positions or views (e.g. from the top, from the bottom, turned sideways, flipped upside down).

Facilitator's notes

- Ask the participants: If I say 'space and shape' what words come to mind?
- List the words that they share on flipchart paper.

Read the content overview for Space and Shape (Geometry) on pages 63–65 of the *Concept Guide*. It provides an overview of the Maths Programme content to be taught in each term of Grade R.

- The text in blue is the content from the Grade R CAPS for Mathematics.
- The text descriptions and content in black have been added to extend and build on CAPS.
- The topics are sequenced to show a developmental progression from one topic to another.

م Activity 3

Look at 3.1–3.4 of the content overview for Space and Shape (Geometry) on pages 63–65 of the *Concept Guide*. In your group, do the following:

1. Look at each topic and discuss the content and developmental progression across the four terms.

2. Look at the text in black and discuss what the Maths Programme adds to the content from CAPS.

Refer to the black text. Main additions to CAPS are:

- position of child in relation to their surroundings

- exploring 3-D objects: flat, round, square or rectangular shape

- rectangle (referred to incidentally in Term 1 and taught in Term 3)
- recognise, identify and name 2-D shapes
- comparing rectangles and squares
- curved and straight lines.
- 3. Why do you think that the weighting of Space and Shape (Geometry) is the second highest of the Content Areas in Grade R?

Understanding more about their world – everything around us has a shape. Learning the correct language enables learners to talk about and describe shapes.

Many of the terms also apply to understanding the position of number in the counting sequence or the sequence of items in a pattern. Many life skills depend on spatial awareness and skills, e.g. following directions or reading a map, packing things into a container, etc.

4. How have you approached teaching Space and Shape (Geometry) in your classroom? Give examples of lessons and activities that you have used in the past.

Session 2: Space and Shape (Geometry)

Spatial concepts

(30 minutes)

2 hours

Learners start to learn about spatial concepts such as position, direction, orientation (different views) and perspective as they use their own bodies to explore the relationship between themselves, other people and objects.

Facilitator's notes

- Set up an obstacle course using chairs, hula hoops, planks, tables and a box.
- Examples of instructions to use:
 - Take two steps forward.
 - Jump into the hula hoop.
 - Jump out of the hula hoop.
 - Stand with one leg in the hula hoop.
 - Crawl forwards through the legs of the table.
 - Stand up and turn around.
 - Take three steps backwards.
 - Put one leg inside the hula hoop.
 - Jump over the box.
 - Walk between the chairs.
 - Stand in the box.



The facilitator has set up a simple obstacle course. With a partner take turns to guide each other through the obstacle course. Use positional and directional language to give clear instructions.

Using the Poster Book to talk about position and direction

Facilitator's notes
PPT: Poster 9: Ask questions that require answers that use position and direction words.

The Maths Programme's *Poster Book* provides opportunities to use real-life contexts to explore concepts. On Poster 9 of the *Poster Book* you can see where Malusi lives in relation to other people and places in his neighbourhood. This poster can be used to stimulate discussion about the position of people and objects in relation to one another and to encourage learners to use and become familiar with the language that describes space, position and direction. Learners link maths to their everyday lives as they discuss and solve problems.

Facilitator's notes

- Ask participants to complete **Activity 5** in their small groups. Have each group report back on the activity.
- Remind participants that position and direction questions and vocabulary are introduced not only during Mathematics focus times, but are also woven into the daily programme throughout the school day. Also remind them that the teacher plays an important role in modelling appropriate vocabulary.



In your group, look at Poster 9 and discuss the following:

1. What position and direction words could you introduce to learners and encourage them to use?

Position: on top of, behind, in front of, in, on, under, next to.

Direction: turn, straight, forwards, towards, away from, left, right, to, from, around, along, through.

2. What other questions could you ask learners that would help them to learn about position, direction, orientation (views) and perspective?

Examples:

- Where is ...?

- What is in front/behind/under/next to the ...?
- How will Malusi get to ...?

Facilitator's notes

- Draw attention to Malusi waving goodbye to Granny. Ask the participants:
 - What do you see in the picture?
 - Where do you think Malusi is going?
 - How do you think he will get there?
- List the direction words as they are called out, e.g. turn, straight, forwards, towards, away from, left, right, to, from, around, along, through.
- Ask the participants: Where in the playground could Malusi hide from the other learners?
- List the position words, e.g. top of, behind, in, on, under, bottom, next to, upside down.
- PPT: Briefly define the spatial concepts of position, direction, orientation (views) and perspective. Discuss how learners first use their own bodies to explore spatial concepts.
- Ask participants what kinds of activities in their daily programmes will help learners develop the understanding of these spatial concepts.

Refer to pages 86–88 of the *Concept Guide* to read more about space.

Introducing shapes

Facilitator's notes

- In Grade R learners recognise, identify and name three-dimensional (3-D) objects and twodimensional (2-D) shapes.
- Refer to pages 89–94 of the *Concept Guide*.
- Discuss the terms '2-D shapes' and '3-D objects'.
- Use real objects to demonstrate as you explain the difference between these terms.

In Grade R learners focus on recognising, identifying and naming three-dimensional (3-D) objects and two-dimensional (2-D) shapes.

- 3-D means that an object has three dimensions: length, breadth (width) and height.
- 2-D means that a shape has two dimensions: length and breadth (width).

Recognising, identifying and comparing three-dimensional objects

Facilitator's notes

- Discuss how learners engage with the properties of 3-D objects as they explore everyday materials such as boxes, cans, toilet roll inners, balls and so on.
- Ask participants what they provide in their classrooms that helps learners to discuss, compare and sort objects. Explain that the next activity will demonstrate how to help learners recognise the properties of objects.
- Show the video and ask participants to complete the activity in their groups.

In Grade R learners explore the properties of everyday objects. They build constructions using recycled household materials such as boxes, cans, tubs, toilet roll inners, balls and so on. They investigate and describe box- and ball-shaped objects. They compare and sort objects and talk about similarities and differences.

Video 2

Activity Guide: Term 1, Week 3, Day 1 #4 (page 28)

Watch the video of a teacher talking to learners who are sorting a collection of objects. Listen to how she prompts the learners to explain how they are sorting the objects and how to use the correct terms to describe each object. Refer to pages 89–90 of the *Concept Guide* to read more about 3-D objects.

Moving from 3-D objects to 2-D shapes

Facilitator's notes		
•	Ask a volunteer to join you. Ask participants to look at this person from the front, the top and the	
	side, and to describe what they see. Explain that we can view this person from many different	
	positions if we move or if we turn them.	
•	Ask the volunteer to lie flat on his /her back on a large sheet of paper and trace around him /her wi	

- Ask the volunteer to lie flat on his/her back on a large sheet of paper and trace around him/her with a koki. Once the outline has been drawn, have the participant stand up.
- Ask participants what they see on the paper.
- Ask questions that focus on the person and on the shape or outline of the person, for example: Can you look at the drawing from different positions?
- Place a number of boxes, a large piece of paper and crayons on each group's table. Explain that the participants will explore the boxes in **Activity 6**.
- After the activity discuss what participants observed. Point out that this activity helps learners create shapes by tracing around the base of objects.

In Grade R, the focus is on the properties of objects and shapes. Learners learn to identify and describe the properties of both objects and shapes.



Explore and describe the properties of a box.

- Place a box on a piece of paper.
- Trace around the base of the box.
- Describe the lines of your drawing.
 Straight, four, two long and two short/all the same
- Name the shape you have drawn.
- How do you know it's a square/rectangle?
- How many sides does it have?
- How many corners does it have?
- What is the difference between the box and the square/rectangle?

Recognising, describing and comparing two-dimensional shapes

Facilitator's notes

- Explain that learners also need opportunities to explore a variety of shapes to find out what the common properties of a particular shape are. Refer participants to **Activity 7** and ask them to use their attribute blocks and to follow the instructions.
- Point out that the attribute block is an object. (It has length, width and height.) If you focus on the surface of the attribute block by running your finger along the edges, you will follow the lines and trace the length and width of the shape, e.g. a square, rectangle, triangle or circle (the edge of the circle is curved).
- Ensure that participants understand the difference between 3-D and 2-D and can explain this to learners.
- Emphasise that in Grade R learners do not learn the terms 3-D and 2-D. They only talk about 'objects' and 'shapes', but they should use the correct vocabulary to describe the properties.
- Link **Activity 7** to Poster 8 and briefly discuss the shapes.
- Explain the term 'orientation'.

Learners need to observe and discuss a variety of 2-D shapes to find out what the common properties of a particular shape are, e.g. even though all triangles may not look exactly the same, they all have three sides and three corners; all rectangles have four sides regardless of the orientation.

Use the attribute blocks on your table to explore 2-D shapes.



In your group, talk about the shape of the surface of each attribute block.

- Look for a shape that has four corners.
- Use your finger to trace around the shape. What is the shape called?
- Look for a shape that has no straight sides.
- Use your finger to trace around the shape. What is the shape called?
- Think of a question that would encourage learners to think and reason.

Refer to pages 91–94 of the *Concept Guide* to read more about 2-D shapes.

Symmetry

Facilitator's notes

- PPT: Symmetrical and non-symmetrical shapes and objects. Refer to pages 94–95 of the *Concept Guide*.
- Remind participants about the **practice principle** and that learners need many opportunities to practise new skills and apply them in different contexts.

An object or shape has symmetry when it can be divided into two equal halves along a central line. Symmetrical patterns can be found on our bodies, in nature, in the built environment and in pictures. Line symmetry divides the shape into two identical parts. The line can be horizontal or vertical.

Refer to pages 94–95 of the *Concept Guide* to read more about symmetry.

The **practice principle:** Learners should have plenty of time to practise new skills and knowledge. When learners have regular practice in what they have already learnt, they become more competent and more confident. Learners enjoy repetition and practice. The Grade R teacher should provide repeated opportunities for learners to practise and improve new skills.

Session 3: Planning for teaching

Facilitator's notes

- Refer participants to Appendix A: Term 1 Weekly Content Summary (Weeks 3–5).
- Read the whole class, teacher-guided and workstation activities sections.
- Have participants work in groups to complete **Activity 8**.

Term 1 Content Summary (Weeks 3-5)(40 minutes)

Appendix A: Term 1 Weekly Content Summary (Weeks 3–5) outlines the main Content Area Focus for each week, the topics to be covered, the new knowledge and practise focus for each week, and suggested activities for whole class, teacher-guided and independent group work for the week.

Read the whole class, teacher-guided and workstation activities sections and complete Activity 8.

م Activity 8

Look at Appendix A: Term 1 Weekly Content Summary (Weeks 3–5). Answer the questions.

Questions	Week 3	Week 4	Week 5
What is the Content	Space and Shape	Space and Shape	Space and Shape
Area Focus for the	(Geometry)	(Geometry)	(Geometry)
week?			
What are the key concepts that learners	Properties of 3-D objects Spatial concepts: in	Properties of 2-D shapes (circle) Symmetry	Properties of 2-D shapes (square) Backwards, forwards
will be learning?	and out Big and small	Symmetry	inside, outside
What new knowledge	Counting objects 1–5	Circle	2-D shape: square
is introduced?	Properties of boxes and balls Objects that roll or slide Position: in and out Big and small Biggest and smallest	Symmetry Number 2	Direction: forwards and backwards Position: inside and outside
What skills are being practised?	Oral counting 1–5 Reinforce number 1 Sorting	Oral counting 1–5 Number 1 Counting objects 1–5	Circle Number concept 1 and 2 Oral counting 1–5
			Counting objects 1–5

2 hours

Video 3

Activity Guide: Term 1, Week 5, Day 3 #4 (page 46) Watch the video of learners discussing a poster.

- 1. Make a note of the questions and maths problems that the teacher presents to the learners during the poster discussion.
- 2. Write down other questions that the teacher could have asked.

Refer to Weeks 3, 4 and 5 in *Activity Guide: Term 1*. Complete Activity 9 in your group.

م Activity 9

1. Find Weeks 3, 4 and 5 in *Activity Guide: Term 1*. Answer the questions.

- What is the Content Area Focus for each week?
- What topics and new knowledge are taught in each week?
- How does the 'Practise' content link to the previous week?
- What do you need to get ready before teaching each week?
- Read the whole class activities and small group activities.
- Discuss in your small group how you will plan and organise your class for these three weeks of teaching.
- 2. Refer to Appendix A: Term 1 Weekly Content Summary (Weeks 3–5). Match the whole class and small group activities in Weeks 3, 4 and 5 of the *Activity Guide: Term 1* to the Content Summary for each week.

Remember that in Grade R assessment is informal and continuous. We need to observe learners throughout the day, inside and outside the classroom. The eye icon reminds us that we need to observe the learners while they are busy, and we need to listen carefully while they are talking to us and to their peers.

The Maths Programme is designed around the rotation of small groups during a week and the teacher pays special attention to one group a day, watching and listening as the learners complete specific tasks. This time gives the teacher the opportunity to carefully observe each learner and gather information on their progress.

Look at the shaded block at the end of the teacher-guided activity: **'Check that learners are able to'**. The teacher makes a mental note of each learner and once the learners have left for the day she writes down her observations in a dedicated observation book that has space for each learner's notes.

Closing activities

(20 minutes)

Facilitator's notes

- **Lessons learnt:** Ask participants to think about what they have learnt during the workshop and to complete **Activity 10** individually.
- **Take back to school task:** Read through this task. Ask if there is anything that is not clear and that requires more explanation.
- **Evaluation:** Hand out copies of the Workshop Evaluation Form and have participants complete the form.
- **Next workshop:** Give dates for the next workshop and close the workshop.

Activity 10

Lessons learnt: Think about what you learnt during the workshop and complete the table.

Things I am already doing that work well	New ideas that I would like to try

D Take back to school task

- 1. Read the *Concept Guide* pages that were referred to during this workshop.
- 2. Prepare a Space and Shape (Geometry) maths area. Take a photograph of it and bring it to the next workshop.
- 3. Use *Activity Guide: Term 1* to plan and implement Weeks 3–5 of the Maths Programme. When planning, think about how the guiding principles will inform your planning and teaching:

- How will you find out what learners already know and understand? (level principle)

- How will you build on the prior knowledge that learners bring from home? (context principle)

- How will you ensure that the planned activities are meaningful for learners? (context principle)

- How will you build active listening and speaking into your planned activities? (interaction principle)

4. Write a reflection of what worked well and what did not work so well. Bring your reflection notes and some examples of work that the learners did to the next workshop.

Evaluation

Complete the Evaluation Form.

APPENDIX A: TERM 1 WEEKLY CONTENT SUMMARY (WEEKS 3-5) Term 1: Activity Plan

Week 3				
CONTENT AREA: SPACE AND SHAPE (GEOMETRY)				
TOPIC:	Recognise, identify and name 3-D objects	; describe, sort and compare 3-D objects (boxes and ba	lls); position, orientation and views: in and out
INTROE	DUCE NEW KNOWLEDGE: Counting objects	1–5, properties of boxes and balls, objects the	at roll or slide	, position: in and out, big/small, biggest/smallest
PRACTI	SE: Oral counting 1–5, reinforce number cor	cept (1), sorting		
Whole o	class activities	Teacher-guided activity	Workstatio	n activities
Day 1	Explore properties of boxes and balls.	Counting one-to-one correspondence 1–	Activity 1	Construct objects with boxes.
Day 2	Compare sizes of boxes and balls.	5.	Activity 2	Big and small playdough balls – sorting.
Day 3	Explore which can slide, which can roll;	Big and small game.	Activity 3	Paint prints with boxes or blocks.
	big/biggest and small/smallest.	Properties of boxes and balls.	Activity 4	Build animal shelters for the farm animals with
Day 4	Discuss why objects roll and slide.	Compare boxes and balls.		building blocks.
Day 5	Position: in and out.	Sort objects that slide and roll.		
	·	Week 4		
CONTEN	NT AREA: SPACE AND SHAPE (GEOMETRY)			
TOPIC:	Recognise, identify and name 2-D shapes	(circle); compare 3-D objects and 2-D sha	pes; symmet	ry
INTROE	DUCE NEW KNOWLEDGE: Circle, symmetry,	introduce number 2		
PRACTI	SE: Oral counting 1–5, counting objects 1–5,	number 1		
Whole class activities		Teacher-guided activity	Workstati	on activities
Day 1	Introduce 2; number frieze story.	Naming the shape and colour of counters	Activity 1	Playdough template – make 2.
Day 2	What is a shape? Introduce the circle.	from the <i>Resource Kit</i> .	Activity 2	Circle prints – paint and containers.
Day 3	Find circles in the classroom.	Circle activity – properties.	Activity 3	'Plate' template – cut and paste pictures of food.
Day 4	Count different body parts; explore	Number dot cards, pictures and symbols	Activity 4	Body puzzles.
	symmetry in their own body.	1 and 2.		
Day 5	Circle (use poster) and symmetry in a			
	picture.			

Workshop 2 Evaluation Form

1.	Did the workshop meet your expectations?
2.	What did you learn in this workshop that helped you the most?
3.	Was there anything that you did not like or had difficulty understanding?
4.	How will you apply what you have learnt in your Grade R classroom?
5.	Do you have any suggestions for improving further workshops?