



2019 TRAINING WORKSHOP NO.2
MATHEMATICS



FOUNDATION PHASE



education

Department:
Education

PROVINCE OF KWAZULU-NATAL

**Foundation phase
Just-in-Time Training Workshop
2019: No. 2**

Facilitator's Guide

MATHEMATICS



Jika iMfundo
what I do matters

Endorsed by:



Jika iMfundo: Foundation Phase JIT Workshop 2 of 2019
 Mathematics
 Workshop guide for facilitators

In this workshop participants will look more closely at the structure of the Jika iMfundo lesson plans and mental maths activities in the lesson plans. They will also find out more about how to teach position and direction in the Foundation Phase.

Participants should work in groups on all of the activity questions. Time guidelines are given and you should facilitate the group discussions. If you have more time and want to continue the discussions for longer you are free to do so.

Time	Activity	Resources
8.00 – 8.30	Session 1: Arrival and distribution of materials for the workshop <i>Pre-workshop activity (30 min)</i>	Facilitator’s guide (leader) Participants guides (participants) <i>Pre-workshop activity</i>
8.30 – 9.30	Session 2: Jika iMfundo lesson plan structure (1 hour = 60 min)	Participants’ handout. Extracts from the Jika iMfundo lesson plans (see <i>Resources Handout</i>)
9.30 – 10.30	Session 3: Mental Maths in the Jika iMfundo lesson plans (1 hour = 60 min)	Participants’ handout. Extracts from the Jika iMfundo lesson plans (see <i>Resources Handout</i>)
10.30 – 12.00	Session 4: Position and Direction (1 hour = 60 min)	Participants’ handout. Material for activities. <ul style="list-style-type: none"> • Scrap paper (several pieces), • Balloons (1 per group), • Paper/plastic disposable cups (1 per group), • String (approx. 1 m per group to make ‘hot air balloon’.) • Extracts from Jika iMfundo lesson plans and Learner Activity Book (see <i>Resources Handout</i>)
12.00-13.00	Session 5: Discussion and dry run – preparation for training (60 min)	Facilitator’s guide and participants’ handouts (participants)
13.00-13.30	Session 6: <i>Post-workshop activity (30 min)</i>	<i>Post-workshop activity</i>
13.30-14.30	END - Lunch	

NOTE:

There is an hour dedicated on the programme to allow for discussion of the activities and trialling them for yourselves as facilitators of the sessions when you go back to the district.

Session 1: Materials distribution and pre-workshop activity.

Distribute the pre-workshop activities and allow the participants to start writing. They have 30 min. for this activity.

Hand out all of the workshop materials quietly to the participants while they do the pre-workshop activity.

Take in the completed activity sheets when the writing time is up.

Session 2: Jika iMfundo lesson plan structure

When you work through all of the activities below you need to refer to the **Lesson Plan Outline** (see *Resources Handout*). In this discussion you will refer to extracts from the *Lesson Plans* in order to familiarise yourself more deeply with the design of the lesson plans and how to use the lesson plans to best effect when you teach mathematics in the FP.

This activity involves sets of questions to guide the discussion for about 60 minutes. Your facilitator will guide you as you break into groups and have large group discussions throughout this time.

The excerpts in this session are all taken from *Grade 2, Term 2, Lesson 21, Position and direction*. Please note that *Mental Maths* will be dealt with in detail in the next session.

Activity 1: Teachers Notes, Remediation and Enrichment

Teacher's notes

CAPS topics: 1.1 Count objects, 1.2 Count forwards and backwards, 1.16 Mental mathematics, 3.1 Position, orientation and views.

Lesson vocabulary: Position, on top of, in front of, behind, left, right, next to, down, up, between.

Prior knowledge:

Learners should have been taught how to:

- Describe the position of one objects in relation to another e.g. on top of, in front of, behind, left, right, up, down, next to.
- Follow directions to move around the classroom and to place one object in relation to another.

Concepts:

- Compare numbers up to 50.
- Describe the position of one objects in relation to another, e.g. on top of, in front of, behind, left, right, up, down, next to.
- Follow directions to move around the classroom.

Resources: Directional arrow cards (see *Printable Resources*), objects in the classroom.

DBE workbook activities relevant to this lesson:

- N/A

Assessment: Refer to the tracker for today's formal/informal oral, practical or written assessment activity.

Remediation: Play *Simon says* with your learners. Remember that learners should only move when Simon gives the instruction. Example: Simon says: *Move one step to the left*. Simon says: *Move two steps to the right*. *Move three steps to the left*. (Note that learners should not move as Simon did not give the last instruction). Simon says: *Stand behind the desk*. Simon says: *Stand in front of the desk*. Simon says: *Stand next to the desk*.

Problem solving: Ask the learners if *next to the desk* could be left or right of the desk.

Enrichment: See enrichment activity cards.

1. Analyse the components of the teacher's notes box – list its contents and discuss what each of these items gives to the teacher to assist her with planning for the lesson.

2. Refer to the lesson plan outline (see *Resources Handout*) – read it carefully to see what guidance is given there on how to use the teacher’s notes.
3. How do YOU use the teacher’s notes when you plan to teach a lesson?
4. How are remediation and enrichment addressed by the lesson plans? How are these aspects covered in the teacher’s notes?

Activity 2: Correction/reflection on homework

2. Correction/reflection on homework (15 minutes)

Reflection/remediation based on previous day’s work/homework.

1. Discuss:
 - a. How much time do you spend correcting homework every day?
 - b. Do you involve learners actively when you correct/reflect on homework from the previous lesson? If so, how?
2. Refer to the lesson plan outline (see *Resources Handout*) – read it carefully to see what guidance is given there on the second part of the active lesson – correction/reflection on homework.
3. Do you think you need to plan more carefully in terms of time spent on going over homework?

Activity 3: Concept development

3. Lesson content – concept development (30 minutes)

1. Refer to the lesson plan outline (see *Resources Handout*) – read it carefully to see what guidance is given there on the third part of the active lesson – concept development.
2. Do you think you need to change the way in which you prepare to teach for conceptual development in your lessons?
3. Do you need to spend more time in preparation for teaching? If so why/why not?

Activity 4: Classwork

4. Classwork activity (25 minutes) (See next page)

1. Discuss:
 - a. How much time do you allow your learners to spend doing classwork every day?

- b. Do you involve learners actively when you facilitate their working through the classwork activities. If so, how?
2. Refer to the lesson plan outline (see *Resources Handout*) – read it carefully to see what guidance is given there for ‘classwork’ in the active lesson.
3. Do you think you need to change the way in which you manage classwork in your lessons?
4. Do you need to spend more or less time on classwork? If so why/why not?

Activity 5: Homework and Reflection

5. Homework activity (5 minutes) (See next page)

6. Reflection on lesson

1. Discuss:
 - a. Do you remember to give the learners the homework activity every day?
 - b. How long does it take you to give the learners instructions about the homework every day?
 - c. Do you take some time to reflect on how the lesson went each day?
2. Refer to the lesson plan outline (see *Resources Handout*) – read it carefully to see what guidance is given there about homework and reflection on the lesson.
3. Do you think you need to change the way in which you give learners instructions about homework? If so, how?
4. Do you think it would be useful to spend more time reflecting on how the lesson go? If so why/why not?

Session 3: Mental Maths in the Jika IMfundo lesson plans

In this discussion you will do hands-on activities related to the teaching of mental maths in the FP. You will also refer to some extracts (of mental maths activities) from the Jika IMfundo *Lesson Plans* (see *Resources Handout*).

The purpose of this session is to talk about the value of mental mathematics and also to give teachers some ideas for participatory mental mathematics activities that can be used in conjunction with the Jika iMfundo Lesson Plans.

This activity involves sets of questions to guide the discussion for about 60 minutes. Your facilitator will guide you as you break into groups and have large group discussions throughout this time.

Warm up activity: Bean bag bounce...

Take a ball (or something else that you can throw around from learner to learner).

- Ask a question. The person who catches the ball must answer the question. The person then makes up a question and throws the ball to another person who has to answer.
- Give an instruction for counting in a particular way. e.g. 5s, starting at 5. Throw the ball. The learner who catches the ball starts the counting, and then throws the ball to another learner who says the next number in the sequence.
- Counting can start at any number. You can choose the starting number or the learner who starts chooses the starting number. Teachers should check the number range to be sure that learners will manage the given counting.

Do this activity – discuss what is learnt and what is valuable about the activity. What other variations can you think of?

There is some theory presented in the participants' handout – allow participants to read it before going in to the discussion questions that follow.

Activity 1

1. Why is mental mathematics useful?

It enables learners to do calculations without necessarily having to write things down. It enables learners to apply their knowledge of the basic facts (number bonds and tables) to calculations involving bigger numbers. It teaches learners to think strategically and work out calculations using their brains.

2. Design a chain of questions appropriate for Grade 1 and Grade 2 learners:

- a. Write out the chain.

Answers may vary. Discussion and recording of specific chains to stimulate mental maths calculations and strategic thinking about mental calculations.

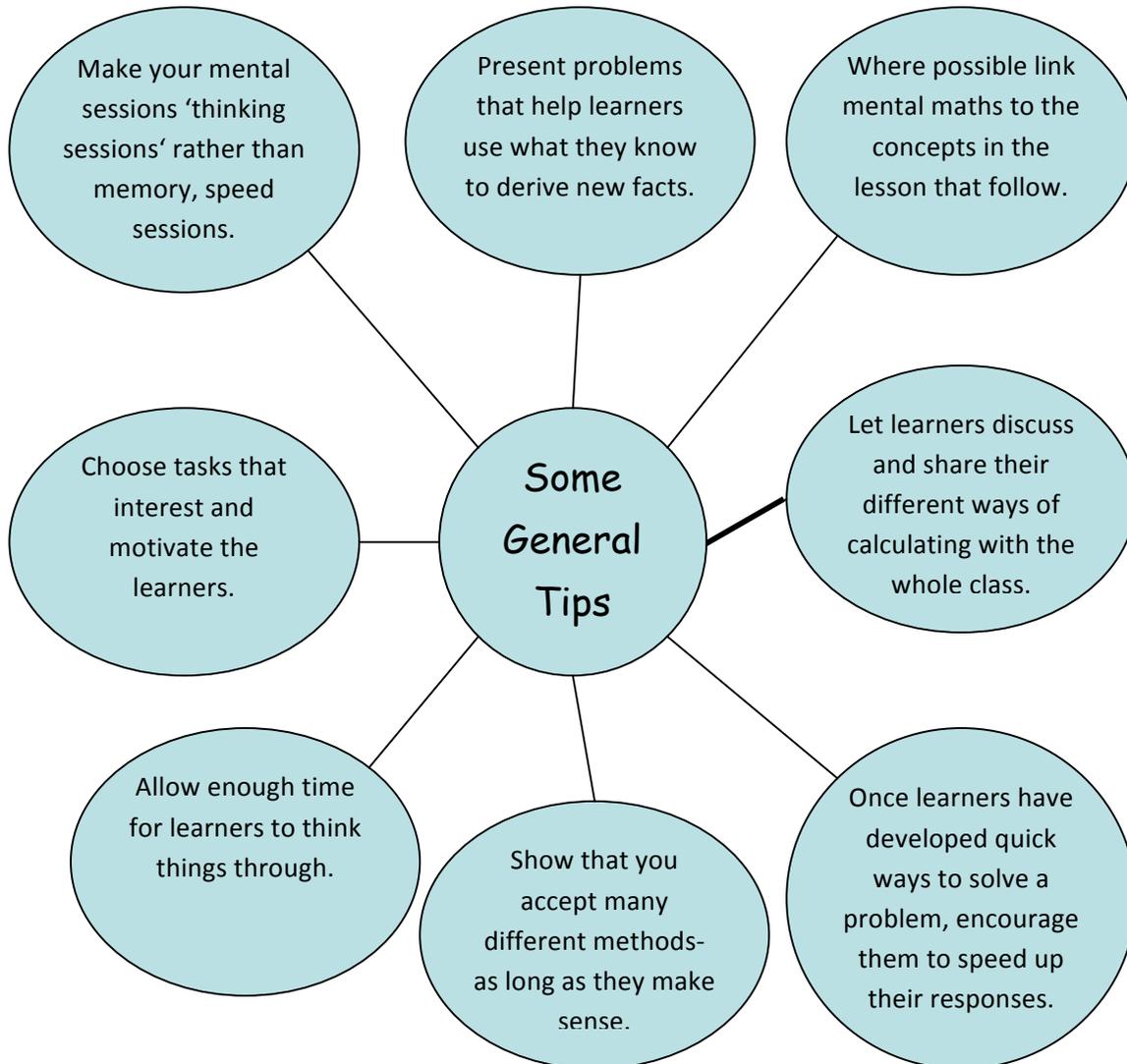
For example: Grade 1: Think of a number between 0 and 5, add 3, subtract 2, add 1, subtract your number, add 2 ... what have you got? (The answer should be 4.)

- b. Explain what mental mathematics skill the chain you have designed is developing or testing.

The example given here is for Grade 1 learners to consolidate adding and subtracting numbers from 0 to 5. Other examples created by groups should be explained. The example given also could stimulate thinking about "how did the teacher know my answer would be 4?" (the original number was subtracted – so the teacher now controls the answer.)

3. How do compensations help learners do mental calculations?
When learners think about making compensations they are using their knowledge of rounding numbers using basic bonds to simplify a calculation. This draws on and develops their knowledge of numbers. The value of doing this mentally is that it stimulates the brain to think mathematically.
4. How does pattern identification help learners do mental calculations?
It gives them a rule to use when doing the progressive calculations. In the two examples shown above, once the learner has identified the pattern (which involves mathematical thinking), the calculations that follow are made easier to do.

Here are some tips to bear in mind when you plan mental maths activities:



Mental mathematics in Jika iMfundo

Discuss the provision of Mental Maths in the Jika iMfundo lesson plans.

Activity 2

Look at the activities (provided in the workshop *Resources handout*) to see how the planned mental mathematics cater for counting as well as other mental mathematics strategic operations in accordance with CAPS requirements for Term 2.

Discussion. Answers will vary. Make sure participants notice the variety of the activities and realise the importance of doing daily mental mathematics activities.

Look at the activities to see:

1. How do the activities vary across the three grades?
Look at how the Grade 1 MM activities are a bit different from the Grade 2 and 3 activities. Some Grade 1 MM activities still allow learners to work with counters. Participants should review the full set of activities in the lesson plans to see how there is a spread of calculation types (the excerpts show this in a limited way). e.g. There is addition, subtraction, doubling, halving, more than, less than and so on.
2. How do the planned mental mathematics cater for counting?
*Every day there is a suggestion for a counting sequence, in a given number range, with suggestions for starting points given at **1.1 Counting (5 minutes)**. These are just suggestions and could be varied by teachers.*
3. What other mental mathematics opportunities are provided?
*Every day there is a suggested set of mental calculations given at **1.2 Recall and strategies (10 minutes)**. These are just suggestions and could be varied by teachers.*
4. How do these pairs of activities (provided daily in the lesson plans) cater for the CAPS requirements for mental mathematics?
The suggestions are according to the number range specified by CAPS per grade for the term. The also allow for variation of operations.

Session 4: Position and direction

In this discussion you will do hands-on activities related to the teaching of position and direction in the FP. You will also refer to some extracts from the *Jika IMfundo Lesson Plans* and *Learner Activity Book* (see *Resources Handout*). This will give you experience on how to work with the lesson plan activities relating to the teaching of fractions.

Materials: Balloons, string and scrap paper.

This activity involves sets of questions to guide the activities and discussion for about 60 minutes.

Some theory is presented in the participants' handout – allow them to read it before starting the discussion of the questions that follow.

Activity 1

1. Write as many different mathematical words you can think of that are used in the following contexts:
 - a. Position
List all possible terms. E.g. Under, inside, outside, beside, in between, next to, left, right, near, far away from, on top, above, below, etc.
 - b. Views
List all possible terms. E.g. front, side, back, top, bottom, etc.
 - c. Direction
List all possible terms. E.g. through, towards, forwards, backwards, sideways, across, turn, half a turn, a quarter turn, left, right, etc.
2. Brainstorm some ideas for activities that you could do in lessons on position, views and direction. *Activities in which learners move artefacts from one point to the next and draw representations of the resultant image will enable them to develop concepts of position (including observing features from different positions), direction and distance.*

Possible activities:

- *By providing resources – anti-waste material for example – that learners can manipulate to create roads, enclosures, pathways, bridges, tunnels, rivers, parking spaces, etc. you will give learners opportunities to extend their understanding of concepts of shape and space to create small worlds that fit their purpose. Teaching and learning using 'small worlds' can be developed by:*
 - *Introducing characters or vehicles that can be moved around the scene in order to give learners a purpose for developing a narrative in which positional language is used.*
 - *Involving learners in the setting up of a small world, either by following a simple plan or in the retelling of a story or route.*
 - *Encouraging different learners to describe what they see and compare them with those of their peers. A feature near to one child will be far away from the child sitting opposite, for example, thus enabling them to compare their perspectives and to discuss why their views differ.*
 - *Varying the place in which small worlds are set up, sometimes on table-tops (perhaps an interest table in a corner of the classroom). This allows learners to get a good view down onto the scene. And sometimes on the floor (allowing learners both to sit around it and to 'get into' the scene).*
- *The Jika iMfundo home language listening and speaking posters provide a wonderful resource for discussions on position and, as a result, the enhancement of positional language central to Mathematics.*

- *The following example illustrates how pre Grade R learners typically view different perspectives. The internalisation of logic relating to different viewpoints is a gradual process of cognitive development and hands-on, experiential learning is central to this process. **The Three Mountain Problem.***
- *Discuss this example with the group explaining how the ability to view objects changes as young learners develop cognitively and gain experience of the world around them.*

According to Piaget, thought in the pre-operation period is egocentric: learners tend to be captured by their immediate concrete perceptions and find it difficult to adopt alternative viewpoints. The three mountain problem illustrates this tendency. Learners are asked to draw how the mountains would look from the doll's point of view. Typically, 3- and 4-year-olds simply draw how the mountains look from their own viewpoint (to show what the doll sees).

The problem is not that young learners don't know that the mountains ought to look different from the other side, they don't always think about it until they have developed their cognitive understanding of different viewpoints.

In experiments where the mountains were surreptitiously shifted while learners were led around the display, learners were surprised to see that the mountains looked just the same from the opposite side.

Giving learners the opportunity to think about how views are different from different viewpoints will enable them to develop cognitively.



To consolidate the theory presented in the first activity and to show an example of an activity that can be used in many ways in FP teaching of position, views and direction, work through the next activity.

Activity 2

1. Make the balloon landing kit. – *Do this and allow time for active participation. Facilitate as needed. In this activity you will use balloons to teach about position, views and direction. Learners need to be able to use the language of position, views and direction – allow them to describe where the balloon is, what would be seen from the balloon when it flies along and the path the balloon follows, to use the vocabulary in relation to a real context. Use the balloon actively to allow this kind of discussion to take place in your class.*
2. Discuss:
 - a. the directions in which the balloon flies,
Answers may vary. Discussion: e.g. describe the path of flight of the balloons and where they land using mathematical vocabulary of direction. For example the balloon flew up, then it turned to the left, flew straight and then flew down and landed on the floor.

- b. where it is at certain points on its flight and where it lands
Answers may vary. Discussion: e.g. describe the positions of the balloon along its flight and when it lands using mathematical vocabulary of position. For example the balloon was above the ground, it flew over my desk and landed on the floor under the teacher's desk.
- c. what views could be seen from it as it flies and when it has landed.
Discussion: e.g. describe the views that might have been seen from the balloons (things below them, on either side and in front of them) using mathematical vocabulary of position. You need to encourage teachers to use their imaginations – to think about what they will see when they fly above certain objects. Use the balloon to demonstrate this flight. For example, from above, my desk looks like a rectangle so the top view of a desk is a rectangle.

The Jika iMfundo lesson plans include lessons on position, views and direction for Grades 2 and 3 in Term 2 (as per CAPS). There are no Grade 1 lesson plans on position, views and direction in Term 2. The next activity gives the participants an opportunity to focus these lessons.

You should contextualise these lessons – show/talk about them in relation to the full lesson plan context (using the full LP document) if possible.

Activity 3

For each of the activities from the Term 2 lessons about position, views and direction in the Jika iMfundo FP Mathematics materials, discuss:

1. What content is covered and how it is presented?
2. How does it relate to the CAPS content specifications?
3. How would you use the activity?
4. Would you add to/change the activity in any way and if so, how and why?

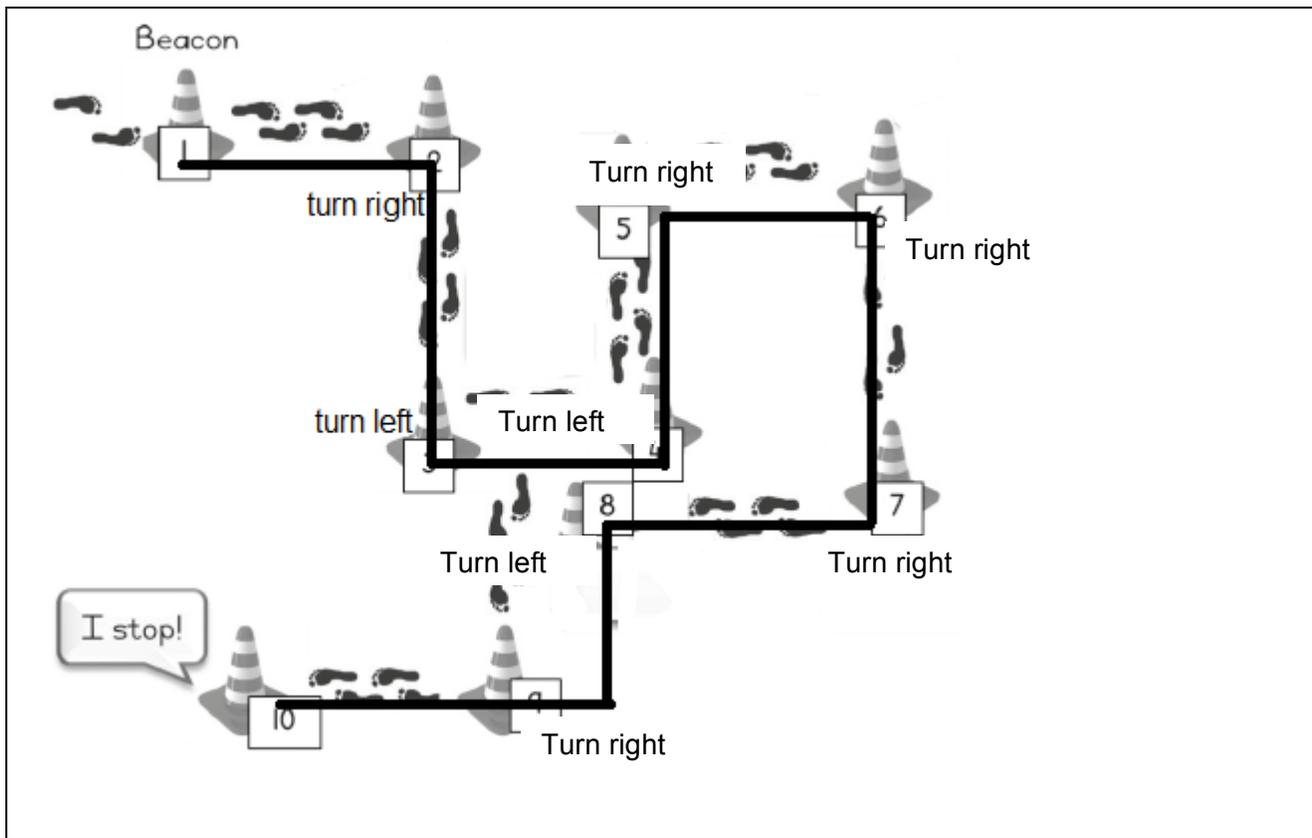
Discussion – facilitate group discussions and share good ideas from individual groups with the whole group. Facilitate the discussion and ensure all participants are actively involved. Allow report back to the bigger groups where good ideas can be shared more widely.

Also discuss the use of the bilingual materials and the Bilingual Dictionary and how teachers would use this to best support learning in their classes.

Spend some time drawing objects as they might look when viewed from different positions.

NOTE:

- **Grade 3 Term 2 Lesson 29** has a drawing of a route walked from beacon to beacon. There are four steps between each beacon.
- Learners need to decide what direction each turn on the route is.
- A solid black line has been drawn in (from beacon to beacon) to show the path walked, and the corners turned along the route.
- ***To decide the direction of the turn you need to imagine yourself walking along the line. When you get to the end of the line, what direction do you turn?***
- The turns are marked in on the copy of the route below. (Part of the original drawing has been erased to allow the labels to be inserted.)



Session 5: Discussion and dry run – preparation for training

Settle the group and allow them to discuss the following questions to recap on the workshop.

In this session you should wrap up the discussions you have had in this workshop. In your groups, discuss the following questions.

1. What is the most important idea you learnt about using the Jika iMfundo lesson plans in Session 2?
2. What is the most important idea you learnt about doing mental maths at the beginning of each lesson in Session 3?
3. What is the most important idea you learnt about the teaching of position and direction in Session 4?

Discussion – facilitate group discussions and share good ideas from individual groups with the whole group.

Facilitate the discussion and ensure all participants are actively involved. Allow report back to the bigger groups where good ideas can be shared more widely. Allow about 15 minutes for this discussion and then take feedback from the groups so that they can learn from each other. Take about another 15 minutes of general discussion.

The next set of questions moves the participants to think about the work they will do going forwards based on the training at this workshop and to raise questions they still have that they would like to have answered.

4. How will you manage Session 2 in your district? Do you have questions about the content of Session 2? If so, what are they?
5. How will you manage Session 3 in your district? Do you have questions about the content of Session 3? If so, what are they?
6. How will you manage Session 4 in your district? Do you have questions about the content of Session 4? If so, what are they?

Allow about 30 minutes for this discussion and report back. Discuss all important individual group questions with the large group.

Encourage participants from the same districts/schools to work together and support each other. Encourage them to make notes of things that work well and difficulties they have over the next term – these could be brought to the next training session for discussion.

Session 6: Post-workshop activity.

Distribute the post-workshop activity sheets and get participants writing. They have 30 min. to work on the activity.

Take in the activity sheets when the writing time is up.