



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**

Participants' Handout

Mathematics



Jika iMfundo
what I do matters

Endorsed by:



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

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

Work in groups on all of the activity questions. Time guidelines are given and your facilitator will interact with you while you work. You will have many group discussions in which you can share what you have found. Suggested times are given below. If you have more time and want to continue the discussions for longer you are free to do so.

Time (Length of session)	Activity	Resources
30 min	Session 1: Arrival and distribution of materials for the workshop <i>Pre-workshop activity</i>	Facilitator's guide (leader) Participants guides (participants) <i>Pre-workshop activity</i>
60 min	Session 2: Jika iMfundo lesson plan	Participants' handout. Extracts from the Jika iMfundo lesson plans (see <i>Resources Handout</i>)
60 min	Session 3: Mental Maths in the Jika iMfundo lesson	Participants' handout. Extracts from the Jika iMfundo lesson plans (see <i>Resources Handout</i>)
60 min	Session 4: Position and Direction	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>)
60 min	Session 5: Dry run – preparation for training	Facilitator's guide and participants' handouts (participants)
30 min	Session 6: <i>Post-workshop activity</i>	<i>Post-workshop activity</i>
	END - Lunch	

Session 1: Materials distribution and pre-workshop activity.

You have 30 min. to complete this activity.

Your facilitator will hand out the workshop materials quietly while you are busy on the activity.

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 them 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...

Mental mathematics is the ability to calculate, estimate and check solutions quickly without the need for any tool other than one's own mind. Learners will do many written calculations but while doing these, they will also exercise their mental mathematics abilities.

Mental mathematics plays a very important role in the curriculum. The number bonds and multiplication table facts that learners are expected to know or recall fairly quickly are listed for each grade. Knowing these off by heart will help learners do calculations with bigger numbers more easily and efficiently. You need to gradually extend your learners mental mathematics skills – by giving them ample practice and also by trying to make it fun. Showing them where mental mathematics comes in useful in bigger calculations should also motivate them to learn the basics by heart.

Mental mathematics is used extensively to explore the higher number ranges through skip counting and by doing activities such as up and down the number ladder, e.g. the Grade 3 teacher might ask a series of chained questions. For example:

Start with 796. Make that 7 more. Yes, it is 803. Make that 5 less. Yes, it is 798. Make that 10 more... 2 more... 90 more... 5 less...etc. These activities help learners to construct a mental number line which reinforces number concept.

Learners can use mental strategies to calculate sums and differences by thinking about strategic compensations to make when they do these calculations. For example:

Explain how to find the following sums/differences:

$$302 + 99 =$$

$$189 + 582 =$$

$$473 - 98 =$$

$$105 - 57 =$$

Mental mathematics also helps learners develop skills of looking for patterns using linked questions and a series of sums that follow a pattern: For example:

Can you find a quick way to find answers for these?

$$31 - 10 =$$

$$31 - 11 =$$

$$31 - 12 =$$

$$31 - 13 =$$

$$31 - 14 =$$

$$18 + 8 = \dots\dots$$

$$28 + 8 = \dots\dots$$

$$48 + 8 = \dots\dots$$

$$78 + 8 = \dots\dots$$

$$98 + 8 = \dots\dots$$

$$108 + 8 = \dots\dots$$

Mental mathematics thus features strongly in both the counting and the number concept development sections relating to the topics of number and number patterns. Mental mathematics skills can be used in any mathematics topics, where basic calculations are needed or where basic bonds and tables assist with bigger calculations.

Activity 1

1. Why is mental mathematics useful?
2. Design a chain of questions appropriate for Grade 1 and Grade 2 learners:
 - a. Write out the chain.
 - b. Explain what mental mathematics skill the chain you have designed is developing or testing.
3. How do compensations help learners do mental calculations?
4. How does pattern identification help learners do mental calculations?

Mental work was previously seen primarily as a means of testing a learners' memorisation of number facts on a regular basis. Memorisation is very important, but mental mathematics activities can also be about mental calculations involving strategic thinking (a mental activity) that draws on memorised knowledge. You should not overemphasise speed.

Overemphasizing speed causes learners to:

- get the idea that “right answer finding” and speed are the most important aspects of mental activity;
- children, who can give quick answers, “beat” those who are still trying to figure the answers out for themselves;

Allow thinking time, because this:

- encourages learners to grow their bank of mental problem solving strategies,
- creates many opportunities to expose learners to different ways of dealing with tasks by sharing their different ideas
- builds respect for “thinking time”.

Reading and writing in mental mathematics:

Learners can write down the final answer, but not all the steps: these must be done mentally. If learners are hesitating and struggling, you could write the question on the board, let learners look at it for a minute or so (read) and then cover it up again. All the time you are trying to encourage mental activity.

Mental mathematics activities: There are many ways to allow learners to do mental mathematics activities that strengthen the calculation skills of learners. For example:

- Number boards can allow for fun activities. For example, give a series of instructions that lead learners to shade blocks that create a picture. (e.g. Shade the block with the answer to $1 + 1 =$.) The shaded blocks could be chosen to represent a picture of some sort. (e.g. if the shaded blocks are the numbers 2, 4, 22 and 44, these four blocks form the corners of a square.) Many other number board activities can be designed. Remember that they should require mental activity not just recognition.
- Create worksheets that have a series of activities that develop different calculation skills, especially the ability to compensate. Compensation is the manipulation of numbers in order to simplify a calculation – essentially, to make it easy to do the calculation mentally.
- Bingo games – design a series of questions (related to one/several operations/number concept/etc.) and play BINGO! (You could Google for the rules and for examples of maths BINGO.)

Mental mathematics in Jika iMfundo

If you go through the full lesson plan set, just looking at the mental mathematics activities, you will see how they develop and offer a full range of mental mathematics activities each term.

You could use other resources or simply adapt these activities if you want to vary the mental mathematics programme even more.

The important thing is that you do some mental mathematics every day, to build up the strategic calculation abilities of learners in your class. This should take about **15 minutes** before main section of the mathematics lesson. It comprises of counting and mental calculations.

Activity 2

Two mental mathematics extracts from each of the lesson plan sets for Grades 1, 2 and 3 for Term 2 are given in the *Resources Handout*.

Look at the activities to see:

1. How do the activities vary across the three grades?
2. How do the planned mental mathematics cater for counting?
3. What other mental mathematics opportunities are provided?
4. How do these pairs of activities (provided daily in the lesson plans) cater for the CAPS requirements for mental mathematics?

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. Your facilitator will guide you as you break into groups and have large group discussions throughout this time.

Optimal learning for a Foundation Phase learner is facilitated by movement through three distinct phases or stages:

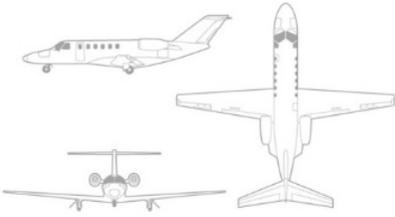
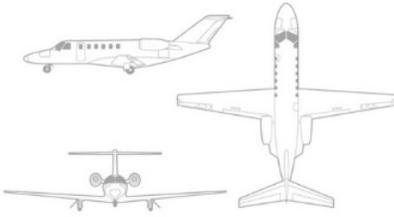
1. Kinaesthetic (body movement)
2. Three dimensional (objects)
3. Two dimensional (paper and pen, worksheets).

The integrated nature of the Foundation Phase curriculum – Mathematics, Language and Life Skills – can be used to advantage in the teaching of position, views and direction – since this will give opportunities for activities across the three phases mentioned above.

Outdoor physical education activities give an opportunity for you to help learners develop a sense of space, movement and position. When learners use large apparatus, they will be moving over, under, through, inside or in-between objects. They could also move along pathways that might be straight, curved or zigzagged. Dance also offers many opportunities for learners to hear, interpret instructions and use movement and positional language. Inviting learners to move with a variety of props (such as balloons, balls or ribbons) can be used to stimulate their own movement and descriptive language.

Introducing descriptive vocabulary (including mathematical vocabulary), commenting positively on a learner's movement, and encouraging learners to describe the movement of others, all facilitate the use of this mathematical vocabulary in a creative and meaningful way. Here are some definitions of important words in this topic (taken from the English/IsiZulu dictionary) in this topic to get you started:

Position	The place where something is, compared to other things that are around it.	E.g. the position of the ball is on top of the box. 	indawo	Indawo lapho okuthile kuqhathanisw a khona nokunye okukanye nakho.	Isb. Indawo lapho kukhona ibhola khona yiphezulu kwebhokisi.
views (top view, side view, front view)	What you see when you look at a shape from different positions. E.g. This is the top, front and side view of an aeroplane.		ukuvelela (ukuvelela ngaphezulu, ukuvela ohlangothini)	Lokho okubona uma ubuka isimo usivelele ezinhlangothini. Isb. Yiphezulu leli, yingaphambili leli kanti yicala lendizamshini elinye.	

			
Direction	The path along which anything moves, points or lies. E.g. When you write in your book, the direction in which you write is from left to right.	inkomba	Umugqa ongalandelwa yinoma yini ehambayo. Isb. Uma ubhala encwadini yakho usuka kwesokunxele uye kwesokudla.

Each of the topics has lots of different mathematical words used to talk about them. For example:

- Positional words are: on top, above, next to, etc.
- Different views we can talk about are the top, front and side views.
- Direction is given using words such as left and right.

Activity 1

1. Write as many different mathematical words you can think of that are used in the following contexts:
 - a. position
 - b. views
 - c. direction
2. Brainstorm some ideas for activities that you could do in lessons on position, views and direction.

Activity 2

Using balloons to teach position, views and direction.

1. Make the balloon landing kit.
2. Discuss:
 - a. the directions in which the balloon flies
 - b. where it is at certain points on its flight and where it lands
 - c. what views could be seen from it as it flies and when it has landed.

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 balloon activity you have just worked through is not included, but you could decide to use it in the place of some of the set activities should you prefer. It is important for you the teacher to decide what will be the most meaningful way to teach the prescribed content and you can always change or add to the lesson plans in ways that you think will benefit your learners.

In the next activity you can go through some more of the Jika iMfundo lesson plan activities.

Activity 3

Refer to the resources handout for the extracts from the Term 2 lessons on position, views and direction in the Jika iMfundo FP Mathematics materials:

- *Grade 2 Term 2 lessons 21 and 22.*
- *Grade 3 Term 2 lessons 28 and 29.*

Analyse the activities and think about ways in which you would use these activities.

For each of the activities, 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?

Session 5: Discussion and dry run – preparation for training

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?

The next set of questions you think about the work going forwards based on the training at this workshop.

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?

Remember that you should work together and support each other in your schools and districts.

Please make notes of things that work well and difficulties you have over the next term and bring them to the next training session for discussion.

Session 6: Post-workshop activity.

You have 30 min. to complete this activity.