



2018 TRAINING WORKSHOP NO.1
MATHEMATICS



FOUNDATION PHASE



education

Department:
Education

PROVINCE OF KWAZULU-NATAL

**Foundation phase
Just-in-Time Training Workshop
2018: No. 1**

Facilitator's Guide

Maths

Endorsed by:



Jika iMfundo
what I do matters



Jika iMfundo
Foundation Phase JIT
Mathematics Workshop: 2018: No.1
Workshop guide for facilitators

In this workshop participants will find out more about

- Curriculum coverage using the Jika iMfundo teaching toolkit
- Teaching place value for deep conceptual understanding
- Reflecting on their teaching/ practice

Materials:

1. Extracts that are relevant to each grade are included in the participants' hand-out.
2. For the topic on place value, facilitators will need to bring some counters, a box of used matchsticks, small rubber bands, and a pair of scissors
3. Facilitators will need cut-outs of resources which are attached at the back of the facilitators hand-out.
 - Base ten blocks or cut-outs of base ten blocks (Flats, longs, units)
 - Place value mat
 - Flard cards
4. Participants need the following materials
 - Paper to work on
 - Pairs of scissors – one per participant – or to share
 - A box of matchstick/ straws/ sticks for each participant or pair/group
 - Small elastic rubber bands used for grouping into bundles (about 10 elastic bands for each participant)

SUGGESTED WORKSHOP PLAN			
Time	Duration	Session	Topic
8H00- 8H30	30 minutes	Arrival/ Registration	
8H30 – 8H40	10 minutes	Welcome, introduction and distribution of materials	Overview of purposes of workshop
8H40- 9H00	20 minutes	Topic 1	Discussion of the use of Jika Maths materials
9H00 – 10H15	75 minutes	Topic 2	Curriculum Coverage
10H15 – 10H45	30 minutes	Break	
10H45 - 12H 30	75 minutes	Topic 3	Place Value
12H30- 13H0	60 minutes	Topic 4	Reflecting on practice
Total working time	5 hours		

Introduction to workshop (10 mins)

Welcome the participants and distribute the materials

Explain that the purposes of the workshop are to:

- help teachers understand the importance of curriculum coverage using the Jika iMfundo teaching toolkit through discussions and case based studies
- empower teachers on how to teach place value using hands-on activities
- guide teachers on how to reflect on their practice

Topic 1: Discussion of the use of the Jika Maths materials (20 mins)

The purpose of this session is to give participants an opportunity to raise difficulties they have had with the use of the maths toolkit thus far, and to attempt to resolve these.

Topic 1: Discussion of the use of the Jika Maths materials (20 mins)

The purpose of this session is to allow participants to discuss the difficulties they experience with regard to the use of the maths toolkit thus far, and how to resolve these issues

Activity 1 (10 minutes):

Discuss with the person sitting next to you any questions, issues or concerns that you have with the Jika iMfundo lesson plans and trackers and planners.

Please don't raise issues about delivery of materials, number of activity books etc. but rather specific things to do with using the lesson plans and the planners and trackers

Discussion of Activity 1 (10 minutes):

Take feedback from as many pairs as possible and then address the concerns or questions. If possible address the issue after it has been raised. Do not let one pair give all their points – give each pair a turn to raise one till all the points are surfaced. Try not to spend too long on this; you might be able to pick up on some points (such as pace) in the context of later activities in the workshop.

Topic 2: Curriculum coverage

Background for facilitators

The information that follows is meant to serve as background information for the facilitators.

Recent studies have shown that vast majority of learners are performing well below the minimum expected competency levels for the respective grades. The lack of curriculum coverage in the foundation phase has been identified as one of the reasons for the poor mathematics performance of learners in South Africa (Scholar: 2015). Learners perform poorly because teachers tend to skip many concepts when teaching mathematics. It is against this background that Jika iMfundo intervention has provided teachers with a complete set of CAPS aligned materials (the Toolkit), which includes the lesson plans, assessment planner and the tracker.

In this session we are going to:

- Think about what curriculum coverage means,
- Consider some of the problems that teachers face in covering the curriculum and
- Share ideas for solving some of these problems.

Information for facilitator:

Curriculum coverage is what learners learn – not what teachers teach. Ticking the tracker boxes on the right day to show that work 'done' does not = curriculum coverage unless learners have understood and mastered the content skills to a reasonable level. When teachers say – the trackers are too fast – they show that they understand this meaning of curriculum coverage.

Activity 2 (10 minutes)

This is a group activity. Participants will Discuss what the concept “curriculum coverage” means to you. Think about your own practice; when do you feel you can tick to say you have covered the curriculum for a topic. Consider the following in answering, and also add your own ideas.

- I have taught all *concepts and skills for the topic in the time allocated for the topic*
- *All my learners have done all the classwork and all the homework in the lesson plans for the topic*
- *When I assessed my learners, all of them demonstrated that they had understood the concepts and had mastered the skills*
- *Most of my learners demonstrated that they had understood the concepts and mastered the skills*

Then have discussion on responses in which you:

(20 minutes)

- Unpack the idea that curriculum coverage is not just what has been taught, but is what has been learnt.
- Consider whether it is likely that everyone will have learnt everything in the set time – no – learning does not usually happen at one time – nor at the same time for everyone – ideas develop in each learner at a different pace; there are multiple opportunities for learning – and learners will develop over time. However, there are certain basic concepts and skills that must be mastered before the next set can be learnt as they provide a foundation for the next level – if this step is not in place, the next level will not be learnt and the gap in required knowledge and skills will increase.
- this leads to a need to know:
 - where different learners are at
 - what the most important things are that everyone should understand and be able to do before they can move on to the next level of concept and skill; this is why assessment is so important

Then ask teachers to do Activity 3

Activity 3 (10 minutes)

How does the Jika iMfundo Maths toolkit support curriculum coverage?

In your groups discuss how the lesson plans and planners and trackers help teachers manage curriculum coverage.

Ask for feedback from the groups, and facilitate a discussion in which the following main points are made clear:

Lesson plans:

- The daily lesson plans are designed to cover the CAPS content, day by day, term by term over the course of the year. They make clear what work must be done if all the concepts and skills are to be taught in the time allocated.
- The lesson plans make clear what is to be taught, and give structured activities that help teacher teach the material and the learners learn it;

- The pacing of the lesson plans might feel pressurised but the CAPS is demanding and teachers need to give their learners the best opportunity to learn their maths content over the year. The lesson plans show the necessary pace to get through all of the work in a meaningful way. However, because the pace is fast for many learners, and because curriculum coverage is about learning as well as teaching, the lesson plans show what is essential work that is fundamental and everyone should do, and what might be work that slower learners might not do, and yet still have a chance to learn the main concepts and skills. Enrichment activities are provided for faster learners
- The lesson plans provide ideas for informal assessment, so teachers can monitor and see how learners are managing daily; teachers can use information from this assessment to deal immediately with any difficulties learners are having, and so be sure that the curriculum is being meaningfully covered.
- The lesson plans provide extension activities and remedial ideas to support learners who are in different places in their understanding; those who are struggling can be helped immediately to catch up.
- The lesson plans provide homework for consolidation of class work; this also gives the teacher further opportunity to assess learners' and to remediate if necessary.
- One day of the week is left open for teachers to 'catch up' any work not completed. Teachers can plan how best to use this day at the start of each week.

Tracker

- The tracker allows the teacher to record her progress through the curriculum as organised in the lesson plans. She can monitor her progress and see if she is on track or not.
- Provides a space and prompts for reflecting on the lesson – why reflect on curriculum coverage – to think about why she is/is not able to stay on track, and what she can do about it
- The HoD signs the tracker to show that she is monitoring how the teachers in her department are managing with regard to curriculum coverage. She needs to work collaboratively with teachers in her department to help to solve curriculum coverage problems. All teachers try to cover the curriculum – but as we all know, it is not an easy task! Keeping on track is a real challenge – and one that is best met collaboratively.

Ask participants to do Activity 4.

Activity 4: This is a group activity**Planner and Tracker****Week 1**

Day	CAPS content, concepts, skills	LP no. & p.	DBE workbook	Resources	Date completed
1	Place value: Numbers 100-300	1	Worksheet 41 (pp. 96, 97)	Base 10 blocks, flard cards, number cards, (see <i>Printable Resources</i>)	
2	Place value: Numbers 301-400	2	Worksheet 43 (pp. 100, 101)	Base 10 blocks, flard cards, number cards, (see <i>Printable Resources</i>)	
3	Place value: Numbers 401-500	3	Worksheet 45 (pp. 104, 105)	Base 10 blocks, flard cards, number cards, (see <i>Printable Resources</i>)	
4	Ordinal numbers 200-300	4	Worksheet 35a (pp. 80, 81)	201-300 Number board (see <i>Printable Resources</i>), counters	
5	Complete and consolidate the week's assessment and work	n/a			
Week 1 Assessment Activity: PRACTICAL INFORMAL					
CAPS: Number, operations and relationships: Place value					Mark: /7
Activity: Concrete representation of numbers up to 500- recognition of hundreds, tens and units					

Complete the case study activity (25 minutes)

Below is an extract of week 1 planning taken from the Grade 3, Term 2 planner and tracker. Look at how the concepts and the number range for the concept was planned for the week. Then study the case study that follows and answer the questions that follow:

Ms Mdluli is an experienced Grade 1 teacher but was inexperienced in teaching Grade 3 as this was her first time. She constantly complained that her learners were very weak and that she could not move forward with her teaching. In her first lesson she complained that her learners could not identify 3 digit numbers. So on the first day, she taught place value up to 100 only, the second day she taught place value up to 200 and the third day she taught place value up to 300. However, she continued with her assessment activity from the first day of the week because she had to show evidence to her HoD that her assessment was up to date. She was worried that she was going so slowly – but felt there was nothing else she could do – she really did not want to move on when some learners did not understand the basics they needed to build on. And – to make matters worse, there was a public holiday on day 4, and so the week had one day less than it should have had!

Questions on the case study – with suggested responses

- Based on the planning indicated on the tracker, comment on Ms Mdluli's progress with regard to keeping on track with the curriculum coverage.**

By the end of the week, Ms Mdluli will be behind with the curriculum coverage as she is not adhering to the allocated time as per the planner and tracker. She is 2 days behind and will have to find ways to catch up. By day 3, Ms Mdluli was still busy with number up to 300 instead of teaching up to 500. She has only done the work for day one.

2. Have you struggled to keep up with the required pace of curriculum coverage?

3. What could be the possible reasons for Ms Mdluli struggling to keep on track with the pacing of the curriculum? Do any of these reasons apply to difficulties you might have experienced/? Add any reasons that you feel apply to you but are not highlighted in Mrs Mdluli's case study.

- *Mrs Mdluli has no experience teaching grade 3 and so was not able to anticipate where learners would struggle most – experienced teachers are able to focus on the areas of work they know learners find difficult – they do not have to wait to find they have taught but work has not been understood; also, they have developed strategies for helping learners with difficult concepts.*
- *Ms Mdluli seems to lack curriculum knowledge of the previous grade.*
- *Some learners had not covered the curriculum adequately in previous year – their foundation was weak and they could not build on it to move forward.*
- *The CAPS is very full, and it is difficult to do all the work prescribed. If you go at the required pace, you might leave learners behind or just skim over the top of the work. Mrs Mdluli felt she had to go slowly to help her weak learners, - but in doing so she got very far behind with the whole class*
- *There might be a day missed because of a public holiday or a school vent or a teacher's absence. Work that should be done on that day will not be done – and you will fall behind for this reason.*

4. Suggest ways in which Ms Mdluli could catch up with the backlog as per the tracker.

- *Identify struggling learners and teach them separately in a group while providing enrichment task for the achieving learners*
- *She needs to inform her HOD so that she can be supported being a first time grade 3 teacher*
- *She can collaborate with her peers in her department to seek help on the strategies they used to ensure that children understand.*
- *She could use the Friday of the week to teach the concepts that were not covered.*
- *She should identify the struggling learners and give them extra support, while going ahead according to the tracker pacing with the stronger learners.*
- *She could identify which parts of the classwork activities are essential – and ask everyone to do these – supporting weakest learners- and ask only others to go on – i.e. they do not all need to do everything – make sure all cover the basics and do not worry if not everyone does all the questions in the classwork.*
- *It is important that the all teachers look at the calendar for the term, and see how it fits with the tracker. Sometimes there are 11 weeks in the term – so the 10 weeks of the tracker can be spread out a bit; if there are public holidays, plans must be made to accommodate them. If there are more weeks in the term than the tracker this is quite easy – but this is not always the case; then perhaps the department as a whole must agree on which parts of the work to pay less attention to so that they can cover all of it, but give the most important lessons the time they need.*

Further info for the facilitator:

The following challenges related to curriculum coverage may be addressed

- *The curriculum coverage may not be achieved to the appropriate “cognitive depth” (Reeves & Muller 2005, among others). Even though teachers may have covered the curriculum, the important question is whether learners have engaged with the underlying*

mathematics concepts in such a way that they build the foundations for more advanced concepts.

- The quality of outcomes may vary from school to school as the completeness and the complexity of content to which learners are exposed depends on individual teachers
- A large majority of classrooms have become multigrade classrooms in which teachers are faced with learners with differing abilities from innumerate to genuine competent.
- Because teachers emphasise the curriculum completion, they tend to lose focus on ensuring that they teach for understanding.

Note to facilitator about linking assessment to curriculum coverage

Point out to participants that assessment is an integral part of teaching and learning and has an important role in ensuring curriculum coverage. Assessment must be conducted continuously to ensure that learners are learning while teachers teach. They will now look at how the JICA resources make provision for continuous assessment.

Activity 5: Consider an assessment plan taken from the tracker document. (10 minutes)

Look at the extract from the Assessment Term Plan for Grade 2 Term 2 and answer the questions which follow.

Week	Informal Assessment Activities	Formal Assessment Activities
1	Oral: Activity 1 Number, operations and relationships: Place value	Written: Item bank questions 1, 2, 3 and 4. Number, operations and relationships
2		Practical: Activity 2 Measurement: Mass Written: Item bank questions 5, 6, and 7. Number, operations and relationships
3		Oral and Practical: Activity 3 Number operations and relationships: Addition Written: Item bank questions 8, 9 and 10. Number, operations and relationships
4		Oral and Practical: Activity 4 Number operations and relationships Money Written: Item bank questions 11, 12 and 13. Number, operations and relationships
5	Oral: Activity 5 Number, operations and relationships: Counting (and patterns)	Written: Item bank questions 14, 15, 16, 18 and 19. Number, operations and relationships and Patterns.
6		Oral and practical: Activity 6 Space and shape: Position and direction Written: Item bank question 22. Space and Shape.
7		Oral: Activity 7 Patterns and algebra: Number patterns
8		Practical: Activity 8 Data Handling Written: Item bank questions 20, 23 and 25. Space and Shape, Patterns and Data Handling
9	Oral and Practical: Activity 9 Space and shape: Symmetry	Written: Item bank question 21. Space and Shape.
10	Oral and Practical: Activity 10 Measurement: Time	Written: Item bank question 17 and 24. Measurement.

1. What do you understand by the “continuous” nature of assessment? What is the purpose of continuous assessment in the foundation phase?
2. Identify the two types of assessment indicated on the assessment plan and discuss how they differ from each other.

Informal and formal

Informal – Mainly oral, recorded in observation book, formative use, not for progression and promotion purpose, daily monitoring of learners work. Done through observations, discussions, practical demonstration, informal interactions

Formal- Formally recorded, summative, different forms (written, oral, practical)

3. Identify the different forms of assessment and explain the importance of using different assessment forms

(Oral, written, practical)

To accommodate different learning modalities

Some skills and competencies can be demonstrated best in practical ways with particular forms of assessment

Certain knowledge and skills are best assessed using specific forms of assessment

SESSION 2 (Duration 120 minutes)

Topic: Place Value

Materials: Resources from the resource pack. Participants will make their own manipulative using the cut-outs in the attached hand-out.

In this session, participants will

- develop their understanding of place value within the decimal number system.
- develop their understanding of progression of place value across grades 1 to 3
- use appropriate resources to teach place value
- do hands on activities related to the teaching of place value

This topic involves a set of activities to guide the discussion for about 120 minutes. You will guide the participants as they break into groups and have larger group discussions throughout this time

Input for the participants: Teaching place value in the foundation phase (10 minutes)

Place value refers to the value of the digit based on its position and is a difficult concept for young learners to grasp. A thorough understanding of place value is essential for basic mathematics computations. The reason place value can be difficult to grasp is that learners often begin with rote counting — 1, 2, 3, 4 — before learning two-digit and three-digit numbers and to a child, the 1 in the numbers 1, 10, and 100 often mean the same thing, though place value dictates that these numbers are vastly different — the place value of 1 in the number 1 is one while the place value for 1 in 10 is a group of one group of ten while the place value for 1 in the number 100 is a group of ten tens or one group of one hundred. Learners need opportunities to experiment with these values. That way, learners can gain a hands-on understanding of how place values function in the larger mathematical world. Sadly, too many learners have a rote understanding of place value without truly understanding what different place values actually mean. They are not able to go back and forth between equivalent representations of the same number (i.e. 31 could be three groups of 10 and one 1 or it could be 2 groups of 10 and 11 ones). Place value forms the basis of the methods that learners are taught to use for calculations with larger numbers. The concept of place value is very abstract. To help learners develop an authentic understanding of place value, it is important that they construct meaning for themselves through applicable hands-on activities.

Note to facilitator

Explain to the participants that numbers fall within a decimal system. A brief discussion of the decimal system will broaden participants' understanding of how numbers are written and how numbers get their value. The decimal number system is used in most countries in the modern

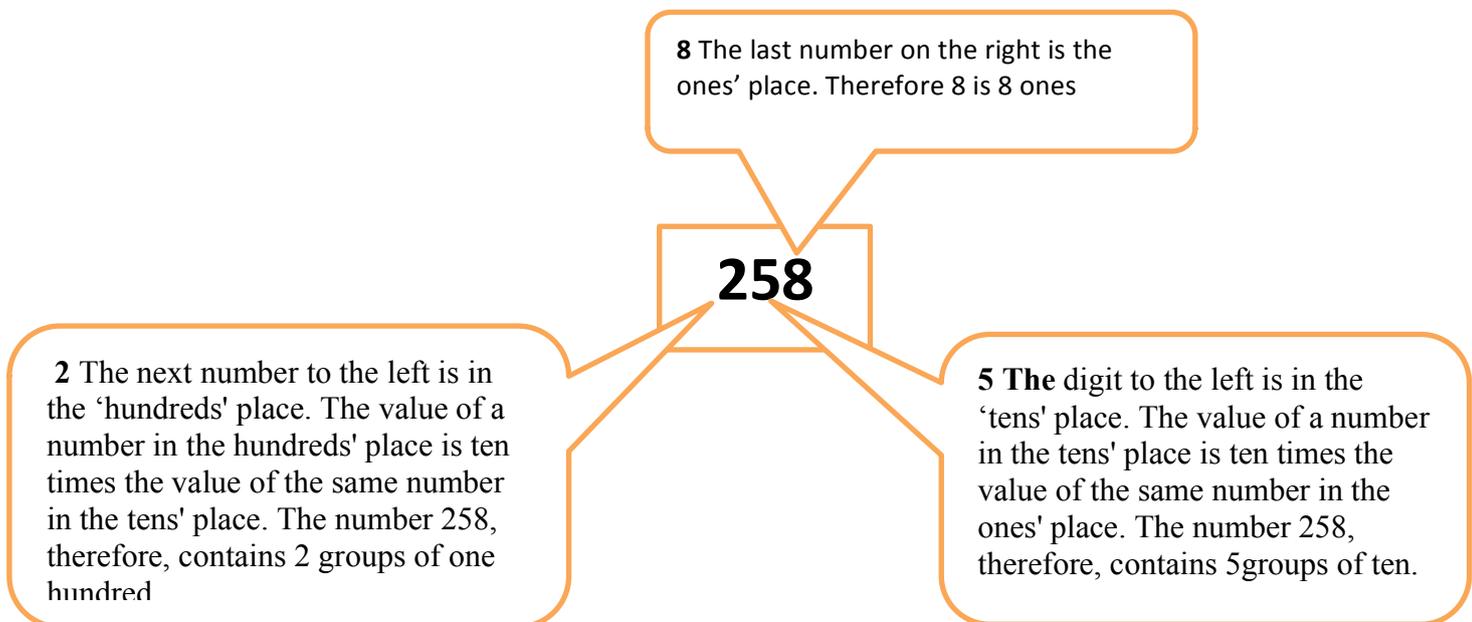
world today for counting, calculating and reading and writing numbers. This system is referred to the “Decimal” system because it is based on the number 10. (decem is 10 in Latin)

Facilitator will explain to participants about the decimal number system

The decimal system of numbering enables any number, big or small to be written using only the ten digits from 0 to 9. It is based on the following principles:

- Only the following ten digits are used in the decimal system: 0,1, 2, 3, 4, 5, 6, 7, 8, 9
- The position of the digits within the system determines its value.
- Zero is used as a place value to represent that, for example in the number 304, there are no tens in the ten place
- Numbers between zero and nine are represented by 1-digit numbers -- 8, for example. Numbers between ten and ninety-nine are represented by 2-digit numbers -- 58, for example. Numbers between one hundred and nine-hundred-ninety-nine are represented by 3-digit numbers -- 258, for example.

IMPORTANT: The system uses 10 as a “base” – a digit one place to the left of another number is worth ten times its value. Let us look at what this means for number 258 for example



Learners do not need to know these principles explicitly, but it is essential that they develop sound understanding of these principles as they underpin so much of what follows in their mathematics learning.

One of the reasons why learners struggle with place value is that they do not understand the difference between the concepts place, face and total value. They do not need to know these terms – but they do need to understand the concepts – let us confirm what they mean for ourselves

Face Value	– is what you see – the value of the digit no matter where it is. E.g. the number 541 is a 3-digit number, the digits that make up the number are 5, 4 and 1.
Place Value	- is the position of the digit – e.g. the number 452 has 3 places - units, tens or hundreds.
Total value	– is the value of the digit according to its position – e.g. a 5 in the tens place has a total value of 50.

Let us look at the difference between place value and face value with an example.

In the number 235, the face value of 3 is 3. 3 is at ten's place so the place value is 3 tens, and the total value is $3 \times 10 = 30$

In the same number, the face value of 2 is 2, and the place value is **hundred**; the total value is $2 \times 100 = 200$. You will notice that the face value remains the same though it is used at the different places but place value changes according to the place of the digit.

Activity 6 (10 minute) Participants discuss with their partners the place value; face value, and total value of digits in the following numbers

E.g. In 146,

4 is at **place** ten

4 is **face** value

4 is **total value** 40

In 437

4 are at place

4 is value

4 is total value

In 1425

1 is at place

1 is Value

1 is total value.....

In 864

6 is at place.....

6 is value

6 is total value.....

In 706

0 is at place

0 is place value.....

In 716

1 is at place

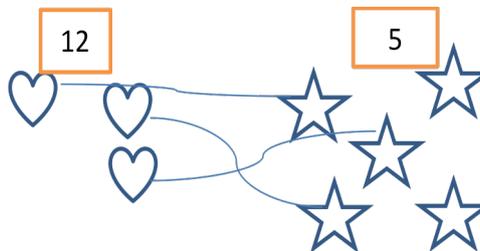
1 is value

1 is total value.....

In the previous section, the participants learnt about how the positions of the digits in the numbers determine the value of the numbers. Next participants they will look at two examples of learners' work that show how a lack of understanding of place and face value can lead to errors.

Activity 7 Discuss in pairs (10 minutes)

1. Ms Khumalo asked the learners to compare two numbers (12 and 5). Learners had to make drawings to show the value of the numbers and then match the items they had drawn for each number (one to one correspondence) to find out which number was more and by how many. Thabo drew 3 hearts for number 12, and 5 stars for number 5 and then matched as follows



- a) Why do you think Thabo drew 3 hearts instead of 12?
 b) How can we help Thabo to rectify this error?

2. Learners were asked to write down in columns how many tens and units there are in the number 84. Ms Khumalo noticed that some learners wrote 80 under the tens column and 4 under the units column. She then said “I see some wrote 80 tens and some wrote 8 tens. I wonder which one is correct?”

Identify the error/ misconception learners made. How can the teacher help the learners to correct this error/ misconception?

a) Why do you think Thabo drew 3 hearts instead of 12?

Thabo had a misunderstanding that 12 is 1 and 2, therefore drew 3. He saw 12 as 1 and 2 therefore drew 3.

b) How can we help Thabo to rectify this error?

Use concrete apparatus to demonstrate the amounts and count out how many there are. Show how the grouping works using place value to make the number 12. Learners can draw on flip chart

2. Learners were asked to write down in columns how many tens and units there are in the number 84. Ms Khumalo noticed that some learners wrote 80 under the tens column and 4 under the units column. She then said “I see some wrote 80 tens and some wrote 8 tens. I wonder which one is correct?”

Identify the error/ misconception learners made. How can the teacher help the learners to correct this error/ misconception?

The learner seems to have confused total value with place value. The total value is 80 but place value is 8tens.

The teacher needs to provide practical hands-on experiences to help learner show 8 tens and 4 units.

Next participants will learn about different strategies for teaching place value using appropriate resources. Using different strategies will help learners overcome the misconceptions of face and place value

Strategies for teaching place value

It is really important to give learners an opportunity to work practically with place value. Let's review some of the strategies. Can anyone suggest what these are? (List the key contributions on the board/flipchart making sure that the following are given:

- Grouping to base ten using concrete material
- Using a base ten blocks
- Using number line
- Using Flard cards

Note to facilitator: The facilitator will discuss/ explain how the different strategies are used to teach place value. Participants will practise these strategies

a) Using Physical objects: Matchsticks/ toothpicks/ beans/ counters

Through this strategy, participants will become accustomed to organising the items they are counting into 'tens' as an efficient means of finding the total of the count. A collection such as this is organised into tens for easy counting. Participants will use manipulatives such as match sticks and counters with numbers that are large enough for them to see the need to make and use 'tens'. Participants group matchsticks/ toothpicks by making bundles; seeds, buttons, beans

So, a collection such as this



is organised in tens for easy counting



They will count the groups of tens first -eg ten, twenty, thirty; thirty one, thirty two, thirty three, thirty four. This is counting on from groups of ten. Participants can practice by grouping matchsticks, toothpicks, making bundles, etc

b) Using base ten blocks to teach place value

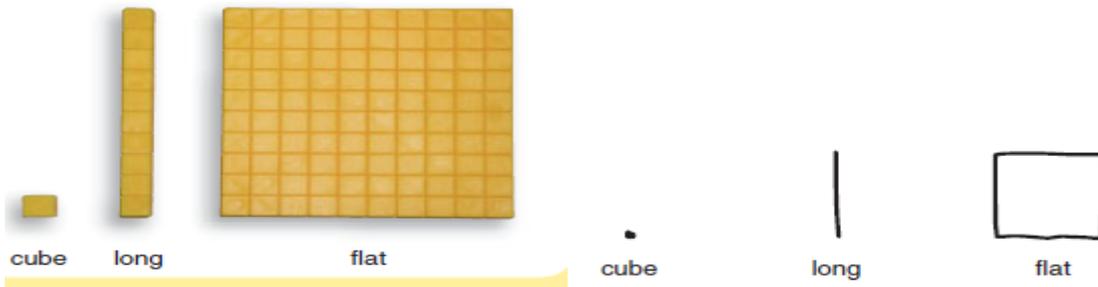
Materials: Base ten cut-outs from resource pack

Information for facilitator: This activity will help participants see the value of using base ten blocks (also known as Dienes' blocks). Base ten blocks are very useful for developing this sense of number size, because there is a direct and accurate relationship between the size of each block and its value.

Some notes for the facilitator: Ensure that the participants know the correct names of each component of the base ten blocks. This will help them to be able to explain their reasoning.

Participants will cut out the base ten blocks (flats, longs and cube from the resource pack). They will touch the cube and say "this is a base ten cube". Touch the long and say "This is a long, it

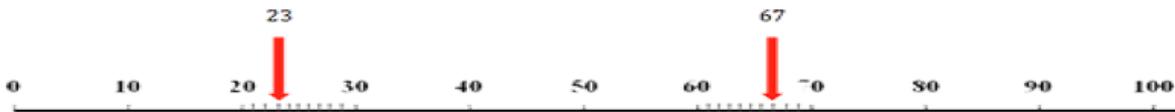
represents a ten” Touch the flat and say “This is a flat. It is made up of 10 longs. It is also made up of 100 cubes”



Show the participants a quick and easy way to draw base-10 blocks. Drawing pictures may be more convenient than using the actual blocks, and pictures are often useful for explaining and recording solutions

c) Using a number line to teach place value

Note to facilitator: Discuss the use and importance of using a number line. A number line provides a strong visual image to help develop learners’ understanding of where any given number is positioned in relation to other number of place values. For example the diagram below shows the position of the number 23 on the number line and also its relative size in relation to other numbers. The number line also shows that the number 23 is made up of 20 plus 3 (or 2 lots of ten plus three)



A number line showing the position of 23 in relation to 67.

The facilitator can point to various points on the number line and ask teachers to estimate which numbers are pointed to.

Additional information: Using a string of beans alongside a number line.

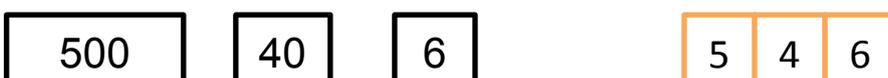
The number line below illustrates how the number line can be used to support the understanding of larger numbers.



Number line section showing the positions of 250 and 276.

d) Using flard cards to teach place value

Flard cards are useful for modelling how numbers are written and represented, but do not in themselves help learners to develop a sense of the size, or magnitude of numbers. We may think of the number 546 as written on three separate cards, which could be placed one behind the other to look like this (these are known as place value cards or Flard cards).



Using these cards we can say that 500 is the total value of the first digit in the numeral that has a face value of 5 in the 100s place.

Participants work in groups of four. Each participant will have their own sets of flard cards (resource) and lay the cards neatly down in front of them. As the facilitator calls out a number, the participants show these numbers using the appropriate flard cards.

Show me the number 453

Show me the number 237

Show me the number 207

Show me the number that is 3 tens, 4 hundred and 2 units

NB: Take a few minutes for this as it is a valuable experience for participants to handle the cards and to look at the numbers on the cards. Start by drawing attention to the number of digits in each card. Demonstrate using 2 or 3 numbers. It is important to allow the group adequate time so that everyone in the group agrees on a correct response. This helps to involve all participants and encourages collaborative working and mathematical discussion. In each case talk about the face value, place value and total value of the digits that make up the number.

Activity 8 (10 minutes) Work in groups of four

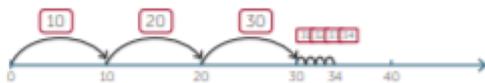
Using an example of a 2 digit or 3 digit numbers, discuss how you would use the following resources to teach the concept place value:

- matchsticks/ beans/ counters
- Using base ten blocks
- Using flard cards
- using a numberline

b) For each example, draw a simple numberline similar to the one below, and show how you will illustrate the following numbers

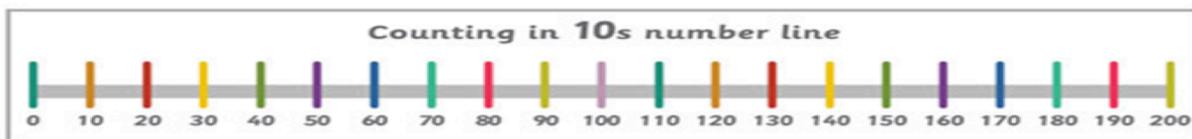
37, 45, 63, 204,

The numberline below is an example.



c) Work with the person next to you and point to the position of the following numbers in relation to each other using the numberline.

- **13 and 31** **26 and 62** **18 and 81**
29 and 92 **25 and 52** **31 and 130**



How do think the numberline can help learners to correct misconceptions about place value?

- A common problem is that learners tend to confuse reading numbers when the digits are reversed. such as 13 and 31. The numberline can be a useful tool to help learners makes the distinction

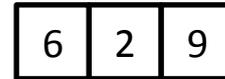
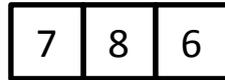
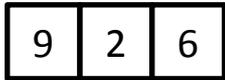
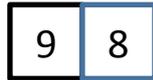
Recap information for facilitator

Face value – is what you see – the value of the digit no matter where it is. E.g. the number 451 is a 3-digit number, the digits that make up the number are 4, 5 and 1.

Place value – is the position of the digit – e.g. the number 452 has 3 places - units, tens or hundreds.

Total value – is the value of the digit according to its position – e.g. a 5 in the tens place has a total value of 50.

Participants identify the face value, place value and total value of the following numbers



Note to facilitator

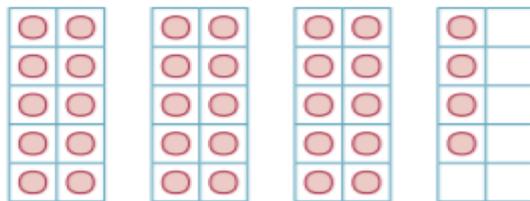
The participants were introduced to different strategies to teach place value. Next they will practice a combination of these strategies using their own sets of resources / manipulatives.

Activity 9 (10 minutes) Work in groups of four

Materials: packet of beans/ matchsticks, rubber bands, base ten longs and units (cut-outs)

Participants work in groups of four. Each participant takes turns to count out counters. Counters must be large enough for learners to see the need to make groups of tens. The following strategies can be practised.

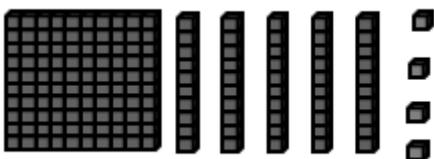
- Make groups of tens by bundling the sticks. The tens are counted first
- Represent the same number using base ten blocks (draw to illustrate)
- Demonstrate using the numberline
- Show the number using flard cards
- Demonstrate using the tens frame. See the example below of a tens frame



Once grouping into tens is established, we need to extend learners' understanding of place value into the hundreds. The next activity will allow participants the opportunity to explore working with hundreds

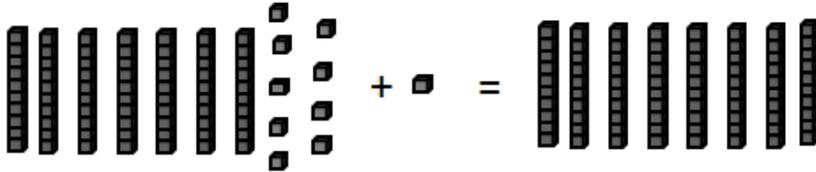
Activity 10 (10 minutes)

1. How could learners represent the number 154 using base ten Dienes' blocks? How does this compare to doing the same display using sucker sticks?

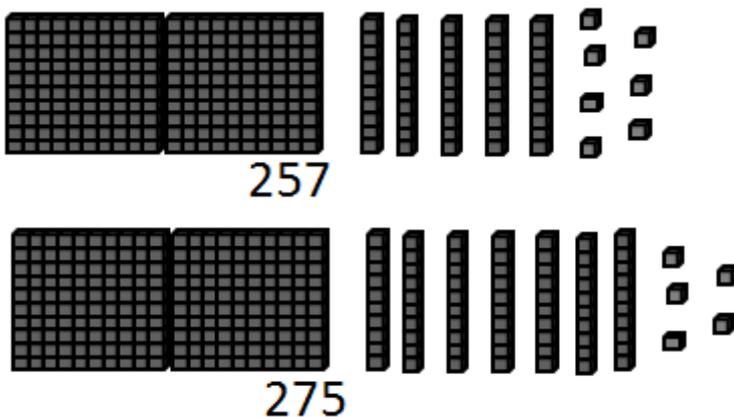


- *This display embodies the place values of the digits in the number. To display this number using sucker sticks would be less effective and less efficient. as it would require learners to count out individual sticks, make groups of tens and then bundle tens to make hundreds*

2. Set out 79 using base ten blocks. Add 1. Regroup. What property of our number system is illustrated by working with sucker sticks in this way?



Draw displays of 257 and 275 using base ten blocks. Which represents the biggest number? How do you know?



Both numbers have the same number of hundreds. 275 is the bigger number. It has more tens. (The units are not needed to compare these two numbers, because the tens have already determined the difference in size.)

How to write numbers in expanded notation form (10 minutes)

Information for facilitators: Expanded notation is a notation that reveals what is hidden behind the numerals that we see. So expanded notation is about writing a number to show the value of each digit. It is shown as a sum of each digit multiplied by its matching place value (ones, tens, hundreds, etc. For example $127 = 1 \times 100 + 2 \times 10 + 7 \times 1$) It is thus a useful exercise for learners to write out numbers in expanded notation to show their understanding of the total values of the digits that make up a number.

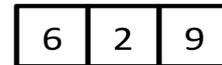
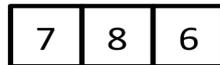
In activity 11, participants will show the numbers in an expanded form in three different ways

Activity 11

1. Write out the following numbers in expanded notation in three different ways:
 - a. 34
 - = $3 \times 10 + 4 \times 1$
 - = 3 tens plus 4 units
 - = $30 + 4$

Activity 11 Work with a partner. You will need cut-outs of your flard cards

1. Work with a partner and show these numbers using your flard cards. Then talk about the face value, place value and total value of the following numbers
2. Write the expanded notation for each number as in the example provided above



Importance of zero in place value

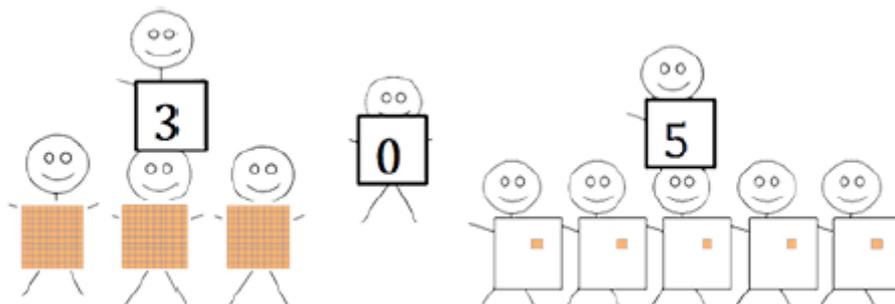
Background information to facilitator

In our place value number system, zero is used to represent an empty column. So the '0' in the number 503 means we have no 'tens'. Children often have difficulty with the use of the symbol zero in place value activities. Misunderstanding the role of zero is a common misconception and usually results in errors such as writing 'three hundred and four' as '3004' or reading '407' as 'forty-seven'. Essentially, children do not understand that the position of a digit determines its value (or non-value, where the digit is a zero).

Not understanding the role of zero also frequently causes problems when place value is being used in the context of number calculations.

Practical demonstration to show the importance of zero in place value (5 minutes)

This is a practical demonstration. The facilitator asks three participants to each hold up a large base ten “hundred” and another 5 participants to each hold up a “one”. Then ask the group “How many hundreds do we have?” Call another participant to hold up the card with number 3 behind the three participants (using base ten flat). Do the same for the ones. Then write 3 and 5 on the chalkboard. “Read this number. Does it look right? Can we say that these cards are equal to 35?” Use question prompts to get participants to think how the number can be explained using a zero.



Explain to the participants why zero is a very important part of the decimal number system. For 305 the number zero was needed to show that there are no tens. Represent the number on the chalkboard to highlight this.

Hundreds	Tens	Ones
3	0	5

Repeat the same process to make more numbers with participants (380, 308, 230, and 200). Record them on the place value board. Each time stress that “We need the zero to show that there is no”

Activity 12 Group Activity

In groups, demonstrate the value of zero following the example of the demonstrated activity (use number 380, 308, 230, and 200). Record each number on the place value board. Each time stress that “We need the zero to show that there is no”

In the next section, we will learn about how the foundations of place value are taught to young children and outline the progression of significant steps in learning place value.

Progression of place value in the Foundation phase according to CAPS (10 minutes)

Place value development in the foundation phase occurs by increasing the numbers (i.e. in grade one up to 20, grade 2 up to 99 and grade 3 up to 999) in a sequenced and progressive manner. In the Jika iMfundo lesson plans, this teaching unfolds according to the CAPS pacing so that learners are exposed to content in the appropriate order and at the right time.

The Mathematics CAPS provides **an overview of the progression** of place value in the foundation phase. This overview is presented as a **phase overview** which shows progression across the phase; and as a **grade overview** which shows how the concept is developed across the terms within a grade. The overview is important to ensure that the concept is taught developmentally to ensure deep conceptual understanding.

Place value is taught over the 3 year Foundation Phase in a sequenced and progressive manner. In the Jika iMfundo lesson plans, this teaching unfolds according to the CAPS pacing so that learners are exposed to content in the appropriate order and at the right time.

Activity 13 Phase Overview

Look at the phase overview. Discuss with your partner some of the important information provided in the phase overview

PHASE OVERVIEW: PLACE VALUE (An extract from the Mathematics CAPS)

Place Value	Grade R	Grade 1	Grade 2	Grade 3
		<p>Begin to recognise the place value of at least two-digit numbers to 20.</p> <ul style="list-style-type: none"> Decompose two-digit numbers into multiples of 10 and ones/ units 	<p>Recognise the place value of at least two-digit numbers to 99</p> <p>Decompose two-digit numbers up to 99 into multiples of 10 and Ones/ units</p> <p>Identify and state the value of each digit</p>	<p>Recognise the place value of at least three-digit numbers to 100</p> <p>Decompose three-digit numbers up to 999 into multiples of 100, multiples of 10 and Ones/ units</p> <p>Identify and state the value of each digit</p>

Expected answers for activity 13

- It shows how the concept is developed across the grades
- Number range increases Grade 1 (up to 20); Grade 2 (up to 99), Grade 3 (up to 999)
- Different kinds of numbers are introduced
- Calculation strategies change
- Grade 1 – Begin to recognize value and decompose numbers up to 20
- Grade 2- Recognise and decompose numbers up to 99. Identify and state value of each digit up to 99
- Grade 3: Recognise, decompose, identify and state value up to 999

Activity 14. Consider the Grade overview and answer these questions (10 minutes)

Study the Grade overviews from Grade 1 to Grade 3 and answer the questions below

1. How can teachers use the information in the grade overview in their teaching?
2. When is place value introduced in grade 1? Why do you think this is the case?
3. How does the grade overview illustrate the concept of progression within a grade?
4. How can the grade overview help teachers in their planning and teaching?
5. How can this information assist teachers in planning support interventions for learners?

Grade 1 overview			
Term 1	Term 2	Term 3	Term 4
		Recognise place value of numbers 11 to 15 Decompose two digit numbers into ten and ones e.g. 12 is 10 and 2	Recognise place value of numbers 11 to 19 Decompose two digit numbers into ten and ones e.g. 18 is 10 and 8

Grade 2 overview			
Term 1	Term 2	Term 3	Term 4
Recognise place value of numbers 11 to 25 Decompose two digit numbers into multiples of tens and units. Identify and state the value of each digit	Recognise place value of numbers 11 to 50 Decompose two digit numbers into multiples of tens and units. Identify and state the value of each digit	Recognise place value of numbers 11 to 75 Decompose two digit numbers into multiples of tens and units. Identify and state the value of each digit	Recognise place value of numbers 11 to 99 Decompose two digit numbers into multiples of tens and units. Identify and state the value of each digit

Grade 3 overview			
Term 1	Term 2	Term 3	Term 4
Recognise place value of numbers to 99 Know what each digit represents Decompose two digit numbers up to 99 into multiples of tens and units. Identify and state the value of each digit	Recognise place value of numbers to 500 Know what each digit represents Decompose two digit numbers up to 99 into multiples of tens and units. Identify and state the value of each digit	Recognise place value of numbers to 700 Know what each digit represents Decompose two digit numbers up to 99 into multiples of tens and units. Identify and state the value of each digit	Recognise place value of numbers to 999 Know what each digit represents Decompose two digit numbers up to 99 into multiples of tens and units. Identify and state the value of each digit

Suggested responses to questions in Actiivty 14.

- 1. How can teachers use the information in the grade overview in their teaching?**
- 2. When is place value introduced in grade 1? Why do you think this is the case?**
- 3. How does the grade overview illustrate the concept of progression within a grade?**
- 4. How can the grade overview help teachers in their planning and teaching?**
 - *It provides information on what number range must be covered for each term. This helps teachers to pace their teaching across the terms*
 - *It ensures that teachers teach the foundational concepts upon which other concepts develop.*
 - *It provides information on the number range to be covered*
 - *Teachers will also know what learners have learnt in the previous grades.*
 - *Prior knowledge is important as a starting point for teachers*
- 5. How can this information assist teachers in planning support interventions for learners?**

- *If learners struggle with the concept for the current grade, then the teacher can backtrack and teach the concepts using smaller number range from the previous grade*

In activity 15, participants will refer to lessons taken from the Jika lesson plans and discuss how base ten blocks and flard cards are used in teaching place value.

Activity 15

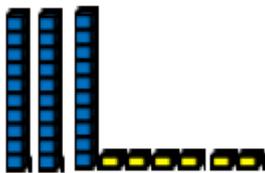
Refer to examples of lessons where Dienes blocks (base ten blocks) are used in Grade 2 and flard cards are used in Grade 3.

1. When you discuss these (or other place value lessons) reflect on how Flard cards and Dienes blocks are used in the lessons.
2. Think about ways you might add examples to the lesson or adapt it in other ways to include more use of the apparatus, if you think it is necessary.

Grade 2 Term 2 Lesson 3

Activity 1: Learners work in groups (15 minutes)

- Write the numbers 31 to 40 on the board.
- Give each group of learners their own base ten blocks and flard cards to use at their desks.
- Each group member chooses 3 numbers between 31 and 40 and shows them to their fellow group members using base ten blocks and then flard cards.
- The group discusses how the number is made up of tens and ones, e.g. 36 is three tens and six ones.
- Using Unifix cubes show the number 36.



(3 tens and 6 units = 36)

- Using flard cards, show 36
- Show this using the cards separately (which shows the breakdown into tens and units) *and* overlaid, (which makes it look like the number 36).



- Allow some report back discussion from each group (one group member) for a whole class discussion.

Activity 2: Whole class activity.

- Ask the learners the following questions about the numbers written on the board:
 - *Show me the biggest number.* (40)
 - *Show me the smallest number.* (31)
 - *Which number is between 34 and 36?* (35)
 - *Which number is one less than 37?* (36)
 - *Which number is one more than 33?* (34)
 - *Which number is two less than 37?* (35)
 - *Which number is two more than 33?* (35)
 - Etc.

Grade 3 Term 1 Lesson 2: Place value up to 99

Activity 1: Small-group work

- Place flard cards (see *Printable Resources*) up to **99** on the learners' desks. Ask the learners to show you **43**. Ask the learners to show you **53**. Ask the learners what they did to change the **43** into **53** and why. (Possible answer: **I swopped the 40 card for a 50 card because I know that 40 is ten less than 50.**)
- Do the same with **75** and **55/63** and **66/40** and **30**.

Activity 2: Revise breaking down of numbers on the boards.

- **53 = 5 tens and 3 units.**
- **70 = 7 tens and 3 units.**
- **514 = 5 hundreds and 1 ten and 4 units.**

Activity 3: Write 72 on the board and ask:

- **What does the 7 represent? (7 tens or 70)**
- **What does the 2 represent? (2 units or 2)**
- Do the same with **60, 46,** and **78.**

Activity 4: Ask the learners what number the following will give you:

- **8 tens and 3 units (83)**
- **6 tens and 1 unit (61)**
- **9 tens and 3 units (93)**

Activity 16. Participants' reflections on place value activities

In the concluding activity on place value, participants will reflect on the activity by responding to the following prompts:

What went well?

What did not go well?

What was difficult or easy to understand/do?

What will you do to support or extend learners?

Did you cover all the work set for the workshop? If not, how will you get back on track?

What would you change for next time? Why?

TOPIC 4: Reflecting on practice (60 minutes)

The purpose of the discussion on “Reflecting on practice” is to equip teachers with skills and knowledge on how to become a reflective practitioner. In this topic, teachers will:

- Unpack what it means to them to be a reflective teacher,
- Know why it is important to reflect on their practice
- Understand how reflection can contribute to effective teaching.
- Distinguish between the two types of reflection , i.e. reflection in action and reflection on action
- understand how the Jika materials make provision for teacher to reflect on their practice

Background information for facilitator

The Jika toolkit encourages teachers to become reflective practitioners. Teachers are asked to reflect on their lessons and to record a weekly reflection note, following the prompts in the tracker based on their teaching practice.

What does teacher reflection involve?

Reflective practice is a process that facilitates teaching, learning and understanding, and it plays a central role in teachers' professional development. When teachers reflect on their teaching, they think over their teaching practices, analyze how something was taught and think about how the practice might be improved or changed for better learning outcomes.

Reflecting on teaching means reflecting on one's own practice as well as on learners' learning. Teachers reflect on their practice during teaching as well as after teaching. Schon, who is a prominent scholar on teacher reflection distinguished between two types of reflection as follows:

- **Reflection-on-action** – Reflecting on an experience that you have already had, or an action that you have already taken, and considering what could have been done differently, as well as looking at the positives from that interaction.
- **Reflection-in-action** - Reflecting on your actions as you are doing them, and considering issues like best practice throughout the process.

In activity 17 teachers will unpack what it means to them to be a reflective teacher. It is important for participants to know about aspects that constitutes a reflective teacher.

Activity 17 (15 minutes) In groups, participants brainstorm what it means to be a reflective practitioner

Expected response

Reflective teaching means looking at what you do in the classroom, thinking about why you do it, and thinking about if it works - a process of self-observation and self-evaluation.

The teacher thinks about how the teaching went. For example I planned this; it went like this, now I think this

Teacher realises that there is more than one way of doing things. Thinks about how things are and how they might be

When teachers identify problems in their teaching, or with their learners and when they are able to come up with solutions to the problems

When teachers act in an intentional or purposeful manner, when they think about whether they have achieved the learning goals.

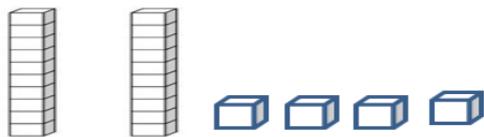
A reflective practitioner thinks critically. This means that they try to understand the practice from different perspectives, explain and justify the practice.

By collecting information about what goes on in our classroom, and by analysing and evaluating this information, we identify and explore our own practices and underlying beliefs. This may then lead to changes and improvements in our teaching.

In activity 17, participants will identify practices that refer to “reflect in action” and “reflect on action”. This is important as in conveying the idea that reflection happens during teaching as well as after teaching.

Activity 18: Read the case study below and answer the questions that follow (45 minutes minutes)

On the first day of term 2, Ms Johnson planned to teach the grade two learners how to recognise, read, write and compare numbers from 21 to 30. She wrote the numbers 21 to 30 on the board. She asked the learners to show the number using their flard cards as she called out each number: 21, 24, and 25. She noticed that some learners picked up a 2 and a 1 to show 21, 2 and 4 to show 24 and 2 and 5 to show 25. Mrs Johnson paused for a moment and then asked: “What is 2 and 1 equal to? Learner replied 3. Does it give you 21?” “What is 2 and 4 equal to. Is it 24?” The learners said “No “Mrs Johnson then asked the learners to use the base ten blocks to show 24. She asked learners the following questions: How many in each block. How many blocks will I need to make 20.



Most learners correctly showed 24 using base ten blocks. However when she asked the learners to use their flard cards again to show 24 and this is how some learners showed 24.



Teacher reflection: Mrs Johnson wrote as follows:

Some learners did not complete the written work. Some learners struggled.

Activity 18

1. Discuss how the teacher practised reflection “in action”

- *When Mrs Johnson realised that the learners could not break down 21 using the flard cards, she paused to think.*
- *She then came up with an alternate strategy by providing base ten blocks*
- *She asked learners questions to identify their problem areas.*

2. Discuss how the teacher practised reflection “on action”

- *Mrs Johnson’s reflection “on action” was very precise*
- *Her reflection statement was clearly aligned to her outcomes*

- *She was able to identify the errors/ misconceptions learners made*
- *She planned to teach differently next time by using additional resources*

3. Comment on Mrs Johnson's written reflection statement – does it convey what she actually reflected on? Suggest a suitable critical reflective statement based on this lesson to overcome the learners' errors/ misconceptions. Use the following prompts:

- *What did not go well?*
- *What did the learners find difficult or easy to understand or do?*
- *What will you do to support or extend learners?*
- *Did you complete all the work set for the week?*
- *If not, how will you get back on track?*
- *What will you change next time? Why?*

4. Identify the characteristics that teachers need to become a critically reflective teacher.

- *Observe and listen interpretively*
- *Problem solver*
- *Have content knowledge*
- *A thinking teacher*

5. How does the tracker enable you to reflect (look back) each week at how things went?

There are reflection questions and a space to write comments in response to these questions every week.

6. Think of a scenario where a lesson you taught went very badly. Through reflection, what did you learn from the situation and how did it help you improve your practice.

7. What are the benefits of critical reflection?

- *The main benefit of applying a reflective teaching practice is that a teacher gains a deeper understanding of his or her own teaching methods and style, ultimately becoming a more effective teacher. Past research has shown that effective teaching practice is related to inquiry, reflection, and professional growth.*
- *Teachers can improve their effectiveness in the classroom by understanding their own teaching style and building upon it, using the reflective practice. It encourages teachers to :*
 - ✓ *become aware of high quality interactions such as interventions and conversations to maximise learning*
 - ✓ *It gives a record of how things went. This can be used to think about making changes based on learners' and teachers' needs.*
 - ✓ *When **teachers** carry out systematic enquiry into themselves, they understand themselves, their **practices** and their learners*