



2015 TRAINING WORKSHOP NO.2
MATHEMATICS



FOUNDATION PHASE



education

Department:

Education

PROVINCE OF KWAZULU-NATAL

Foundation Phase Training Workshop 2: February 2015

Facilitator's Guide

Maths

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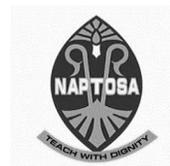
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Jika iMfundo
what I do matters



Facilitator Notes

In this workshop participants will find out more about the way in which assessment works when they use the Jika iMfundo FP Maths materials. They will also find out more about how to teach place value in the Foundation Phase.

Here are some notes that you could use when you facilitate this session. Key points for discussion relating to all of the questions are noted here. There are lots of things that could be said this is just a guideline.

- The participants should work in groups on all of the activity questions.
- You need to circulate and keep group discussion lively and then draw together comments from all of the groups in the last few minutes of each group discussion activity.
- At all times active engagement with the toolkit material is the goal – so that participants leave the session with a better understanding of what the toolkit comprises.
- Remember to watch the clock.
- Suggested times are given below. If you have more time and want to continue the discussions for longer you are free to do so.

Workshop plan

8.00 – 8.30 – Arrival and distribution of materials for the workshop

8.30 – 10.30 – Session 1: Assessment (2 hours = 120 min)

10.30-11.00 – Tea

11.00-13.30 – Session 2: Place value in FP (2 ½ hours = 150 min)

13.30-14.30 - Lunch

Activity 1: Lesson Plans and assessment – what’s in the package and how to use it?

Materials needed:

- *Tracker* and the *Lesson and Assessment Plans and Resources*. Participants should have brought their own copies to the session. If they do not all have copies make sure there is at least one set of documents per group.

This activity involves sets of questions to guide the discussion for about 120 minutes. Your facilitator will guide you as you break into groups and have large group discussions throughout this time.

1. Make a list of the planning for assessment that is included in the toolkit and where is it found (give page references where possible). (15 min)

- Assessment Term plan (Tracker at the back)
- Suggested Mark record sheet (Tracker, back)
- Baseline assessment (Tracker - week 1)
- Continuous assessment (Tracker pages, weekly except for the first week).
- Written assessments (Lesson Plans – printable resources section)

2. What is included in the *Assessment Term Plan*? (15 min)

- a. WHERE TO FIND IT: In the Tracker at the back.
- b. WHAT DOES IT INCLUDE?
 - i. the assessment programme for the term

- ii. CAPS aligned activities
- iii. oral, practical and written activities
- iv. content specification (CAPS topic and description of particular content for the activity)
- v. date outline, per week.

3. How will you use the *Suggested Mark Record Sheet*? (10 min)

- a. WHERE TO FIND IT: In the Tracker at the back.
- b. HOW TO USE IT:
 - i. Please point out to teachers this is to be photocopied or used as a guide for columns in a mark book.
 - ii. Teachers much use this format (or similar) to record their continuous assessment marks for activities throughout the term.
 - iii. SA SAMS info will be found and incorporated when possible.

4. How does the toolkit support teachers to do *continuous assessment (CASS)*? (30 min)

- a. Look back at question1 – which elements support CASS?
 - i. Baseline assessment (Tracker - week 1)
 - ii. Weekly assessment activities (Tracker pages, weekly except for the first week).
 - iii. Written assessments (Lesson Plans – Printable Resources section)
- b. Expand on the weekly assessment activities provided – what do they consist of and how do they offer support?
 - i. CAPS aligned
 - ii. Two tasks per grade (CAPS requirement)
 - iii. Number of activities per task (oral, practical and written)
 - iv. Criterion levels provided (7 levels)
 - v. Observation checklists provided (7 levels)
 - vi. Written activities – include marks and percentage conversions to levels.

5. How will teachers use the toolkit assessment material on a daily basis? (40 min)

- a. Refer to the notes on assessment in the introduction to the Lesson Plans (p.3) and in the lesson plan outline (p.6). What guidance do they give?
 - i. P.3 refers to what is given in the toolkit and notes that the teacher needs to make his/her own plans for informal assessment.
 - ii. P.6 refers to the link in the teacher’s notes in the lesson plans. It mentions that grouping of learners should be used to manage the weekly tasks (apart from the written task). It also details more on the assessment support provided in the toolkit.
- b. How will you manage to assess all learners ever week? Discuss the use of grouping.
 - i. Assessment links in lesson plans – how to use these. This is just a daily reminder to do assessment. Reminds the teacher that the detail for assessment per week is given in the tracker.
 - ii. Most classes are big and so oral and practical tasks need to be managed by using grouping.
 - iii. Teachers should break their classes up into groups according to class size and number of days allocated to task.
 - iv. Different ways of grouping can be used – ability groups (mixed and same), interest groups.
 - v. While learners are all actively engaged in classwork activity – assess individuals/certain groups if necessary/possible, but without interfering with the normal schedule of teaching and classwork for the day.

Activity 2: Teaching place value in the Foundation Phase

Materials needed:

- *Lesson and Assessment Plans and Resources*. Participants should have brought their own copies to the session. If they do not all have copies make sure there is at least one set of documents per group.
- *Scissors*

In this discussion you will refer to the *Lesson Plans* but you will also do hands-on activities related to the teaching of place value in the FP. These will give you experience on how to work with the lesson plan activities relating to the teaching of place value.

You will make your own manipulatives using the cut-outs in the attached hand-out. These are two of the Term 1 printable resources that were included in the full lesson plan set.

This activity involves sets of questions to guide the discussion for about 150 minutes. Your facilitator will guide you as you break into groups and have large group discussions throughout this time.

Teaching place value in FP

FP number work gives teachers the opportunity to teach a thorough understanding of the way in which our numeration system works. This can be expanded to higher number ranges very easily, once the basics are in places.

To use place value properly learners need to know about grouping into tens (because we use a base 10 number system) and they need our ten symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. They need to know the names of the places for recording ever increasing numbers.

What knowledge needs to be established before children can move onto place value?

E.g. recognition of numbers/numerosity, grouping (all groups up to 9/10).

Establishing basic number concept – place value in the number range 0-30

Once basic counting from one to nine is established, we move on to the need for an understanding of place value to write the numerals for the numbers we are talking about. We will now discuss the use of various apparatus to aid the teaching of an understanding of base ten numeration.



Activity
10 min

Activity 1

1. Why might a learner think that 12 sweets are less than 8 sweets?

The face value of the digits in the number 12 might confuse them – they are “smaller” than the face value of 8.

2. What could we do to rectify the error in his/her understanding?

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.

The idea of grouping according to a base of ten needs to be explained. Sucker sticks (or toothpicks), elastic bands and base ten Dienes' blocks (base ten blocks) can be used as an aid.

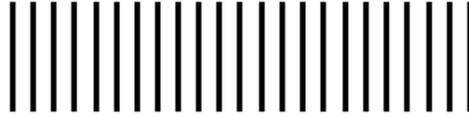
You need to make yourself the flard cards and base ten blocks using the hand-outs for the activities that follow.



Activity
30 min

Activity 2

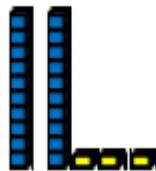
1. Cut out the base ten blocks and flard cards.
2. How would you expect a learner to group the sucker sticks below, to reveal the number of sucker sticks as a base ten numeral?



Group them in to groups of ten. They will get 2 tens and 3 loose units will remain. The number of sticks is 23.



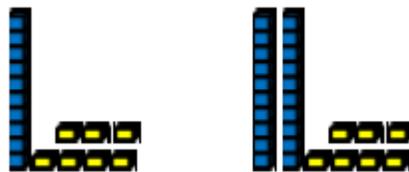
3. How could they represent the same number using base ten Dienes' blocks?



4. Set out 19 sucker sticks. Group them in base ten. Add 1 sucker stick. Regroup. What property of our number system is illustrated by working with sucker sticks in this way?
5. Use base ten blocks to show the same exchange, from 19 to 20, in a concrete display. How are the base ten blocks more effective in showing the displays?



6. Draw displays of 17 and 27 using base ten blocks. Which represents the biggest number? How do you know?



27 represents the biggest number. There are more blocks in the display (2 longs and 7 tinies). The number has two tens and 7 units which is more than 1 ten and 7 units.

Consolidating basic number concept and moving on – place value in the number range 0-999

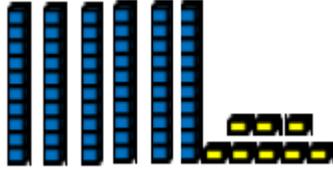
Once grouping into tens is established, we need to extend learners' understanding of place value into the hundreds.



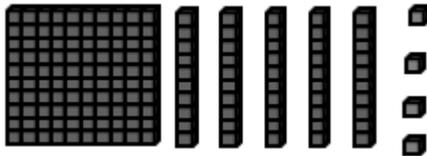
Activity
25 min

Activity 3

1. Is it still reasonable to expect learners to use unit counting to work with numbers in the range 0-99 or 0-999?
NO. They need to start working with the groups (tens and hundreds) using place value.
2. How could learners represent the number 68 using base ten Dienes' blocks? How does this compare to doing the same display using sucker sticks?

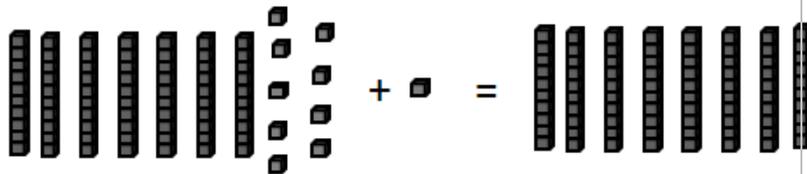


3. How could learners represent the number 154 using base ten Dienes' blocks? How does this compare to doing the same display using sucker sticks?

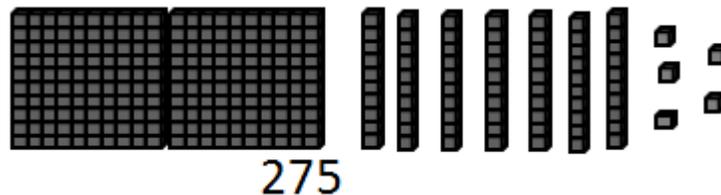
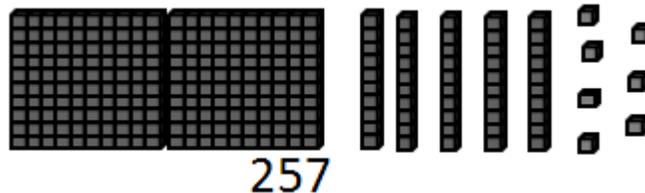


This display embodies the place values of the digits in the number. To display this number using sucker sticks would be less effective and less efficient.

4. 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 biggest 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.)

You could work with Dienes' blocks as you work through the following type of activity, to demonstrate the relationship between units in different places.



Activity
20 min

Activity 4

Complete the following:

1. 60 tinies can be exchanged for 6 longs, so 60 units = 6 tens.
2. 480 tinies can be exchanged for 48 longs, so 480 units = 48 tens.
3. 40 longs can be exchanged for 4 flats, so 40 tens = 4 hundreds.
4. 50 longs can be exchanged for 5 flats, so 50 tens = 5 hundreds.
5. 33 longs can be exchanged for 330__ tinies, so 33 tens = 330 units.
6. 42 longs can be exchanged for 420 tinies, so 42 tens = 420 units.
7. 8 flats can be exchanged for 800 tinies, so 8 hundreds = 800 units.
8. 7 flats can be exchanged for 70 longs, so 7 hundreds = 70 tens.
9. 9 flats can be exchanged for 90 longs, so 9 hundreds = 90 tens.
10. 760 tinies can be exchanged for 0 tinies, 6 longs, and 7 flats, so 760 units = 0 units, 6 tens, and 7 hundreds.
11. 299 tinies can be exchanged for tinies, longs, and flats, so 299 units = 9 units, 9 tens, and 2 hundreds.
12. In what way do the Dienes' blocks clarify the ideas of face value, place value and total value?

The get bigger in size in the way in which the number groupings of the base ten numeration system grow. We say they embody the place values.

We may think of the number 439 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).

400

30

9

439

Using these cards we can say that 400 is the total value of the first digit in the numeral that has a face value of 4 in the 100s place.



Activity
20 min

Activity 5

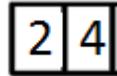
Use Flard cards to display the following numbers. In each case talk about the face value, place value and total value of the digits that make up the number.

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.

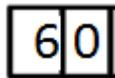
Place value – is the position of the digit – e.g. the number 452 has 3 places - units, tens or hundreds.

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.

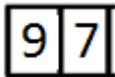
1. 24



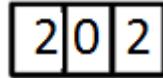
2. 60



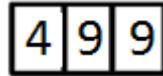
3. 97



4. 202



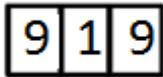
5. 499



6. 870



7. 919



Our apparatus is limited, and our time and patience would also be limited in the working with large numbers using concrete material. However, learners need to be able to read and work with large numbers and so it is worth every minute spent working with the apparatus if good place value concept is established through this activity. Learners need to learn how to read and write number names, and how our number system is used to do this.

Your learners ultimately need to be able to answer questions relating to the understanding of the relative positioning of numerals, involving whole numbers up to 999 (in term 4 Grade 3). Expanded notation is a notation that reveals what is hidden behind the numerals that we see. 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.

Remember the use of Flard cards to assist learners to write numbers in expanded notation.



Activity
15 min

Activity 6

1. Write out both of the following numbers in expanded notation in three different ways:
 - a. 27
$$= 2 \times 10 + 7 \times 1$$
$$= 2 \text{ tens plus } 7 \text{ units}$$
$$= 20 + 7$$
 - b. 90
$$= 9 \times 10 + 0 \times 1$$
$$= 9 \text{ tens plus } 0 \text{ units}$$
$$= 90 + 0$$
 - c. 456
$$= 4 \times 100 + 2 \times 10 + 7 \times 1$$
$$= 4 \text{ hundreds} + 2 \text{ tens plus } 7 \text{ units}$$
$$= 400 + 50 + 6$$
 - d. 305
$$= 3 \times 100 + 2 \times 10 + 7 \times 1$$
$$= 3 \text{ hundreds} + 0 \text{ tens plus } 5 \text{ units}$$
$$= 300 + 0 + 5$$
2. In the number 566 the 6 on the left is 10 times the 6 on the right.
3. In the number 202 the 2 on the left is 100 times the 2 on the right.
4. In the number 111 the 1 in the middle is 10 times the 1 on the far right.
5. In the number 733 the 3 on the right is $\frac{1}{10}$ times the 3 on the left.
6. In the number 424 the 2 on the right is $\frac{1}{100}$ times the 4 on the left.
7. In the number 111 the 1 in the middle is $\frac{1}{10}$ times the 1 on the far right.
8. In the number 387, the face values of the digits are 3 , 8 and 7; the place value of the digits (from left to right) are hundreds , tens and units; and the total values represented by the digits (from left to right) are 300 , 80 and 7.

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 7

Activity
20 min

1. Look through the Grade 1, 2 and 3 lesson plans to find out which lessons in the first 4 weeks deal with place value.
 - a. *Grade 1: Numbers up to 5 are taught. Not place value component yet.*
 - b. *Grade 2: Numbers up to 25 are taught. Covered in lessons 1-5. Place value up to two places (units and tens).*
 - c. *Grade 3: Numbers up to 500 are taught. Covered in lessons 1-7. Place value up to three places (units, tens and hundreds).*
 - d. *See below for two examples that you could discuss.*
2. How are the concrete apparatus we have used today used in the lesson plans?

Dienes blocks (base ten blocks) and Flard cards are used in Grade 2 and Grade 3. Unifix cubes are also used. Grade 1 does not use these apparatus (Dienes blocks and Flard cards) since they do not have a place value component in the curriculum in Term 1.
3. What vocabulary is developed in the lessons that relate to place value? How does the dictionary help you to build the understanding of the maths terminology?
 - a. **Grade 1 lessons weeks 1-4: Number lessons:** *Number symbol and number name, one, two, three, four, five, many, few, most, least, more than, less than, the same as, just as many as, different, smaller than, greater than, smallest, greatest*
 - b. **Grade 2 lessons weeks 1-4: Number lessons:** *Number, number names, number symbols, whole numbers, forwards, backwards, greatest, smallest, smaller than and greater than, more than, greatest, less than and equal to, smallest, more, less, estimate, before, after, digit(s), unit(s), ten(s), units, biggest, add, subtract, equal to, place value, decompose, two-digit numbers, multiples, value*
 - c. **Grade 3 lessons weeks 1-4: Number lessons:** *Number symbols and number (word) names (0-99), place value, digit(s), ten(s), unit(s), smaller than, greater than, more than, less than, equal, comparing, ordering, biggest, largest, smallest, least, backwards, forwards, odd, even.*

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

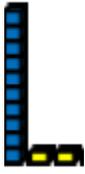
1. When you discuss these (or other place value lessons) reflect on how Flard cards and Dienes blocks are used in the lessons.
2. Think about ways you might add examples to the lesson or adapt it in other ways to include more use of the apparatus, if you think it is necessary.

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

Activity 1: Write the numbers 10 to 19 on the board.

- Ask the learners to show **10**, then 11 using a base 10 block and using ones/units. For example, 12 is one ten and 2 ones/units.

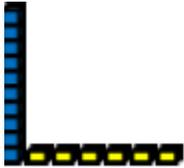
This is what the display of 12 looks like using base ten blocks:



(1 ten and 2 units – so we write the symbol 12)

- Ask the learners to show you each number up to 16 using a base 10 block and ones/units.

This is what the display of 16 looks like using base ten blocks:



(1 ten and 6 units – so we write the symbol 16)

- Ask the learners to show you which number is between **14** and **16** using a base 10 block and ones/units. Repeat using different numbers.
- Ask the learners to show you which number is one/two less than **17**. Repeat using different numbers.
- Ask learners to show you which number is one/two more than **13**. Repeat using different numbers.

Activity 2: Learners work in pairs using flard cards. Write the following numbers on the board: 11, 18, 20, 15, 13.

- Ask learners in their pairs to show you these numbers using flard cards. Ensure that the cards are being used correctly (tens and ones).

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 swapped 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, 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
10 min

Activity 8

A calculator game that can be used to consolidate place value is called "ZAP".

One player calls out a number for the other players to enter onto their calculator displays (e.g. 789). The player then says "ZAP the 8", which means that the other players must replace the 8 with the digit 0, using one operation (i.e. to change it into 709). The player who is the quickest to decide on how to ZAP the given digit is the "winner" of the first round and could call out the next number. The "winner" chooses a new number to call, for example calls 324 and says "Zap the hundreds". (The correct call is – 300). And so the game continues, with learners calling out numbers and indicating which digit should be eliminated.

1. Play the game for 10 minutes (or so).
2. What property of number does this calculator game exercise?

The property of number illustrated is place value – learners realize how to identify the place value of the digit to be zapped and how to decide what total value should be subtracted so that this digit will disappear.



Reflection
5 min

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?

Acknowledgement: The following resource was used in the preparation of this workshop. Sapire, I. (2010). *Mathematics for Primary School Teachers*. Saide and the Wits School of Education, University of the Witwatersrand, Johannesburg.