2015 TRAINING WORKSHOP NO.4
MATHEMATICS

FOUNDATION PHASE

PILO
IMPROVING LEARNER PERFORMANCE

Numeric patterns: counting forwards and backwards

ANA 2013 Grade 3 Mathematics Item 10.1 and 10.2

10. Complete the table:

10.1	Count forwards in 100s	584				
10.2	Count backwards in 20s	320				240

What should a learner know to answer these questions correctly?

Learners should be able to:

Item 10.1

- Understand the mathematical vocabulary of counting forward in 100s;

Item 10.2

- Understand mathematical vocabulary of counting backwards in 20s;
- Complete a specific number sequence by counting forwards or backwards.

Where is this topic located in the curriculum? Grade 3 Term 1 - 3

Content area: Numbers, Operations and Relationships.

Topic: Count forwards and backwards.

Concepts and skills:

- Count forwards and backwards in 20s, 25s, 50s and 100s to at least 1000.

What would show evidence of full understanding?

Item 10.1

- If the learner completed the number sequence correctly this shows a full understanding of counting forwards in 100s.

Item 10.2

- If the learners completed the number sequence correctly this shows a full understanding of counting backwards in 20s.

10. Complete the table:

10.1	Count forwards in 100s	584	684	784	884	984
10.2	Count backwards in 20s	320	300	280	260	240

What would show evidence of partial understanding?

Item 10.1

- If the learner counted forwards in 1s instead of 100s, the learner shows an understanding of counting forwards, but no understanding of the place value of digits in numbers.

Item 10.2

- If the learner counted forwards in 100s in both questions it shows that the learner did not read the instructions with understanding.
- If the learner counted forwards or backwards incorrectly, the learner showed some understanding of counting forwards and backwards but could not count in the correct multiple of 100 or 20.

10. Complete the table:

10.1	Count forwards in 100s	584	684	784	884	984
10.2	Count backwards in 20s	320	420	520	620	240

10. Complete the table:

10.1	Count forwards in 100s	584	585	586	587	588
10.2	Count backwards in 20s	320	310	320	330	240

10. Complete the table:

10.1	Count forwards in 100s	584	585	586	587	588
10.2	Count backwards in 20s	320	321	322	323	240

What would show evidence of no understanding?

- No response to the question; or
- If the learner wrote a random number that makes no sense.

10. Complete the table:

10.1	Count forwards in 100s	584	4	5	8	100	✗
10.2	Count backwards in 20s	320	3	2	0	240	✗

What do the item statistics tell us?

Item 10.1

37 % of learners answered the question correctly.

Item 10.2

30% of learners answered the question correctly.

Factors contributing to the difficulty of the items

Item 10.1

- The concept and skills tested in this item, such as counting forwards in 100s have not been mastered by majority of learners.
- Learners find it difficult to understand which digit in a 3-digit number must increase when counting in 100s.

Item 10.2

- The concept and skills tested in this item, such as counting backwards in 20s have not been

mastered by majority of learners.

- Although learners are familiar with numbers in tables, the two questions posed together in one table could have been confusing to learners in Grade 3 due to poor reading skills.

Teaching strategies

Counting forward and backwards in 20s and 100s using number cards

- Help the learners to realise that counting in intervals is a quick way of counting and that this strategy can help them in all number operations.

Concrete Level

- If learners struggle with counting in multiples, go back to Grade 2 activities and reinforce on all the different levels if necessary.

Abstract Level

- Give learners cards with numbers in multiples and place them according to number in ascending or descending order.
- Colour the multiples on the number chart and count in 100s or 20s forwards and backwards.
- Encourage learners to move towards counting in multiples using the number chart without colours, counting forwards and backwards in 100s and 20s.

Counting using a 100 chart/number chart

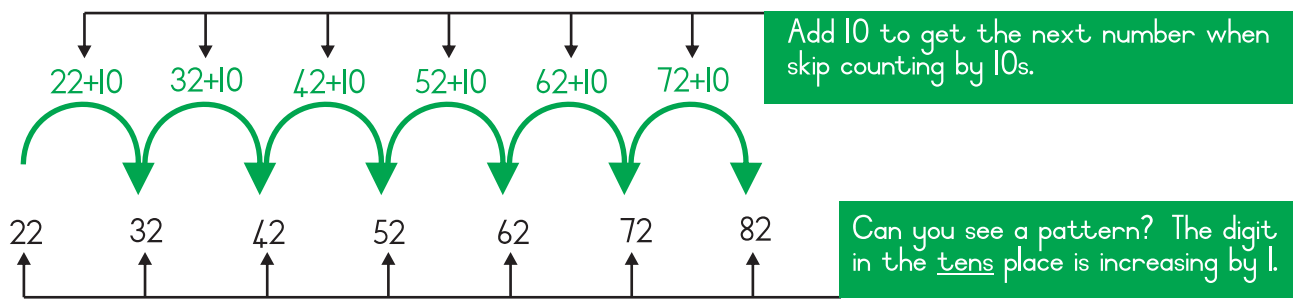| 1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

- Ask learners to complete a variety of activities to reinforce their counting skills, such as:
  - Connect the dots to complete pictures by counting in multiples;
  - Use counting forwards and backwards as a strategy for solving word problems involving equal sharing and grouping, addition and subtraction, money and time;

- Ask learners to explain their solutions.
- Let learners check their peers' solutions to problems.

- Discover, describe and copy a pattern of counting in multiples.
- Ask questions about the position of multiples, e.g. "Which multiple of 10 comes after 37? (40) or before 45? (40) or between 67 and 73?" (70).
- Fill in the missing numbers on the number line or blank number chart.
- Gradually encourage learners to work towards counting without a number chart or number line (counting mentally only).

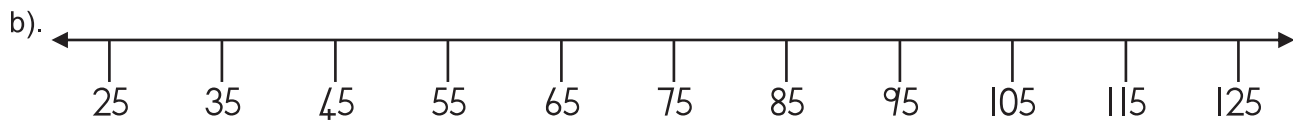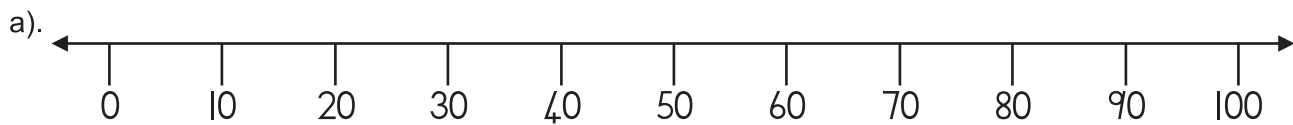- Remember to also work in a higher number range (for example: 500-600)

501	502	503	504	505	506	507	508	509	510
511	512	513	514	515	516	517	518	519	520
521	522	523	524	525	526	527	528	529	530
531	532	533	534	535	536	537	538	539	540
541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560
561	562	563	564	565	566	567	568	569	570
571	572	573	574	575	576	577	578	579	580
581	582	583	584	585	586	587	588	589	590
591	592	593	594	595	596	597	598	599	600

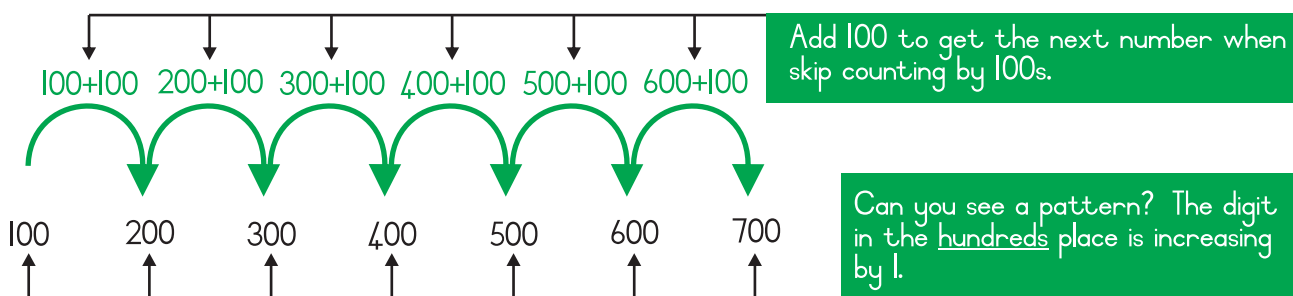**Counting forward and backwards in 20s and 100s using number lines**
- Number lines should be used to teach counting forwards and backwards in 10s and 100s.
- Learners must understand that counting in 10s and 100s is not the same. If they count in tens the tens' digit increases and if they count in hundreds the hundreds' digit increases.

- Count in 10s on a number line:
  ◦ The patterns in all three examples are the same: the number in **the tens place goes up by one each time.**
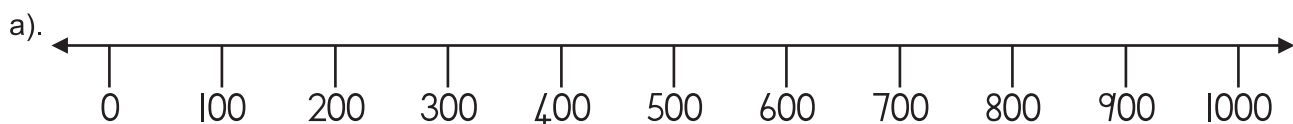
| 22+10 | 32+10 | 42+10 | 52+10 | 62+10 | 72+10 | Add 10 to get the next number when skip counting by 10s. |

| 22 | 32 | 42 | 52 | 62 | 72 | 82 | Can you see a pattern? The digit in the <u>tens</u> place is increasing by 1. |

- Ask the learners to complete a variety of examples, such as the following:
  - Draw these number lines on the board.
  - Use them to count in tens.

a).

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

b).

| 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 | 105 | 115 | 125 |

c).

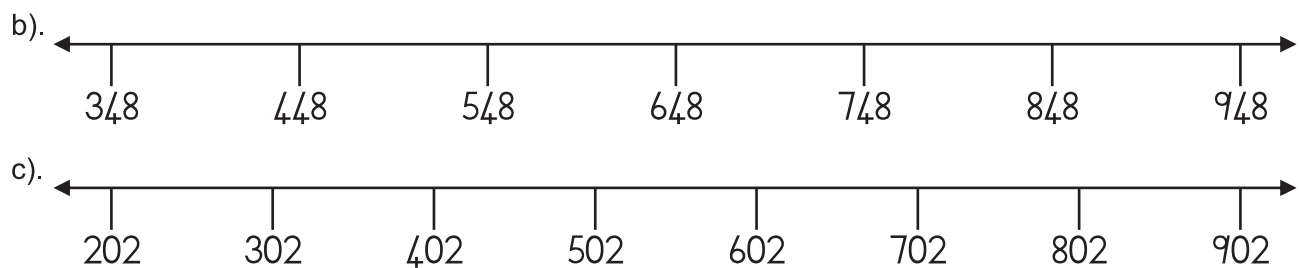| 512 | 522 | 532 | 542 | 552 | 562 | 572 | 582 | 592 |

- Count in 100s on a number line:
  - The three examples below show counting in hundreds.
  - The patterns in all three are the same: the number in the hundreds place goes up by one each time.

| 100+100 | 200+100 | 300+100 | 400+100 | 500+100 | 600+100 | Add 100 to get the next number when skip counting by 100s. |

| 100 | 200 | 300 | 400 | 500 | 600 | 700 | Can you see a pattern? The digit in the <u>hundreds</u> place is increasing by 1. |

- Ask the learners to complete a variety of examples, as indicated below:
  - Draw these number lines on the board.
  - Use them to count in hundreds.

a).

| 0 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 |

b).

348   448   548   648   748   848   948

c).

202   302   402   502   602   702   802   902

Other examples of how counting forwards and backwards can be tested

ANA 2014 Grade 3 Mathematics Item 3

2. Count backwards in 100s from 521 to 121.

521; _____; _____; _____; 121

ANA 2014 Grade 3 Mathematics Item 7.2

7.2 Count forwards in 20s.

220; 240; _____; _____; _____

Notes:

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