Mathematics Curriculum Guide: Grade 4

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Exemplary Lesson Plan Term 1
Exemplary Lesson Plan Term 2
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References

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Introduction: Specific to Mathematics

Definition

The question as to what is mathematics arises when we seek to understand the bases/roots of our human activities. Mathematics can well be regarded as the foundation stone of many of our human activities. Mathematics deals with a collection of objects which includes points, lines, numbers and events all of which are basic notions in our thinking. The concern is not so much with the objects themselves as with the relationships and patterns they show.

The study of mathematics involves observing, discovering and investigating patterns and relationships especially as illustrated and modelled in the real world.

Purpose of Mathematics for life in our world

It provides the capacity to

- Think in precise terms
- Develop (process/problem solving) skills, that are needed for:
  - Making connections
  - Reasoning
  - Communicating
  - Problem solving

- Have confidence in building or interpreting quantitative descriptions

Contribution of Mathematics to the Curriculum

Mathematics provides a foundation for productive discourse especially in the sciences and to some extent in the humanities.

It offers fuel for:

- Creativity
- Originality
- Imagination

The Subject Strands:

- Number
- Geometry
- Measurement
- Statistics and data handling
- Patterns, functions and algebra

Integration

Across subjects

Mathematics concepts can be integrated into almost all other subjects of the national Curriculum and conversely mathematics can integrate concepts, skills and attitudes of other subjects. For example:

- Social Studies and HFLE: Social issues and trends that form the basis of life can provide the raw data needed for Statistics/Data Handling.
- In mathematics, students learn to estimate and make accurate measurements which are skills required to engage in learning experiences in Science. Measuring time is a life skill integrated into all subjects.
- Mathematics has its own vocabulary and mathematical literacy needs to be acquired in the early grades. This reinforces and consolidates the learning in Language Arts.
- Mathematics is about problem solving, mathematics contributes to the development of life skills and the holistic development of the learner.

Thematic Integration

It is possible to use a thematic approach to integrate across and within subject areas. For example, Nature provides opportunities for thematic integration not only across strands in mathematics but across other subjects.

TERM 1 SUMMARY	
UNITS	**No. of SESSIONS**
UNIT 1: ON THE BEACH – Number *AT 1:* *AT 1: LO 1* *Success Criteria*: 1 – 5	20
UNIT 2: Out of the Box – Geometry (3-D shapes) AT 2: LO 1 Success criteria: 1 – 2	16
UNIT 3: Helping Mummy – Measurement (length) AT 3: LO 1 AT 3: LO 1 Success criteria: 1 – 4	16
UNIT 4 : On the Beach - Number AT 1: LO 2 Success criteria: 1 – 4	20
Unit 5: My Favourite Things - Patterns AT 5: LO 1 Success criteria 1 – 3	16
Unit 6: Helping Mummy – Measurement (area) AT 3: LO 2 Success criteria 1 – 2	8

UNIT PLAN WITH SUGGESTED TEACHING, LEARNING & ASSESSMENT ACTIVITIES

TERM 1 STRAND 1 Number UNIT 1: ON THE BEACH (2 – 3 weeks – 20 sessions)

AT 1	**LO 1: Demonstrate an understanding of number up to 10 000** ***Success Criteria***

1. Count in a variety of ways: counting forward, counting backwards, skip counting, counting on/back
2. Identify, use and write numbers up to 10 000 and represent them in a variety of ways
3. Compare and order sets of numbers up to 10 000 in a variety of ways
4. Use a calculator, pen and pencil procedure or mental strategies to investigate number concepts
5. Create and solve problems involving whole number concepts

ACTIVITIES

Count in a variety of ways: counting forward, counting backwards, skip counting, counting on/back

1.1 Students are asked to imagine we enter a room or place or garden in which are some items that catch our attention. We want to find their number. How can we do this? Students are observed as they count some objects. Observing that they proceed one by one, students are asked to suggest other ways in which the objects can be counted. They are involved in counting by 2's, then in 4's, then in 6's.

1.2 Students observe as teacher goes around the class starting with a number, 83, say. Students count back 82, 81, 80,, 79, etc. This is repeated for counting back in 2's. e.g., 81, 79, 77, etc.

1.3 Students are allowed to play "fizz game" where for each multiple of 3 (say) student says fizz: e.g. 1, 2, fizz, 7, etc. This is repeated using fizz for other multiples.

1.4 Students observe as, on the chalkboard, the teacher draws following table, a daily planner for a school camp in July.

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
		1	2	3	4	B-BQ
Festival of praise	7	8	9	10	11	12
13	14	15	Hiking	17	18	19
20	21	Sports day	23	24	Meet the parents	26
27	28	29	30	Concert		

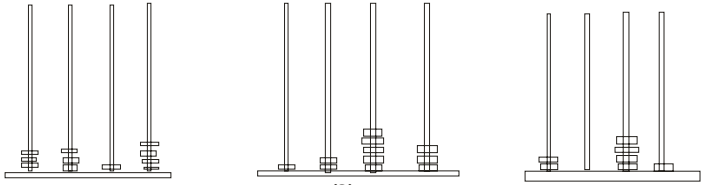
Through questioning, students are taught counting forward, counting backwards, skip counting, counting on/back. Students answer orally.

i. The students starting planning on the 15th for the sports day. How many days did they have to plan?
ii. How many days are there between the B-BQ and the parents' meeting?
iii. The camp needs at least 8 days to prepare for concert. On which day should they start preparing?
iv. Junelle was absent from school from the 9th to the 18th. For how long was she absent?
v. Miss Jacob returned to the camp on the 19th after spending 6 days in village. On what day did she leave the camp?
vi. Another festival of praise took place 3 weeks after the first one. On what day did the festival take place?
vii. How many days are there from the 3rd to the 27th?
viii. The camp organised a night duty with campers taking turns to guard. (i) Mike started on the 3rd and worked every other night. How many days did Mike work in all? Judy worked every three nights and started on the 4th. For how long did she work? (Give your answer in days.)

1.5 Students are involved in playing the game buzz counting backwards from a hundred by 2, 3, 5.

Identify, use and write numbers up to 10 000 and represent them in a variety of ways

2.1 Students observe as teacher makes an abacus using beads and coconut pointers. Students are grouped and given an abacus. They observe as teacher demonstrates the use of the abacus. A number is called; students build that number on the abacus and then write (record) that number name on paper.

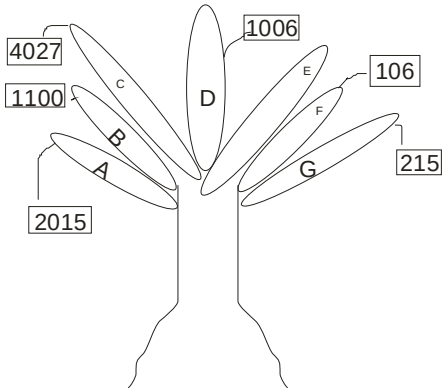


2.2 Students observe as teacher makes number cards. Students are grouped and each group is given a set of number cards. Students build number and write what number they have made. Students hear a number called. They build the number and write the name. Students are given number names and asked to show the number with their cards.

10	200	5	9	30	500	600	50	1 000	500

Number cards

2.3 Students are presented with the following picture along with a story in which farmer Brown has planted a tree of numbers. [NB: Instead of the letters A, B, C, D, F, G on the leaves, write two hundred fifteen, four thousand twenty seven, one thousand one hundred, one hundred six, one thousand six, two thousand one hundred five, respectively.] Each leaf represents a number which is incorrectly matched. Students help farmer Brown match the numbers to the words by completing the table below.



Tree of Numbers

Number	1	2	3	4	5	6
Words						

2.4 Students use the game 'go fish' to identify numbers. Example: numbers are written on cards both in words and figures. One student reads out the number in words; another student finds the number in figures.

Compare and order sets of numbers up to 10 000 in a variety of ways

3.1 Students are presented with a table showing points scored by 4 teams in a competition.

Teams	Points
Team A	843
Team B	1001
Team C	834
Team D	1010

Students use the table to answer questions, such as the following: (i) Which team scored the highest? (ii) Which team came third? (iii) Which team got the least points?

3.2 Students are allowed to play game 'war'. They are given cards with numbers up to 10 000 placed face down in a pile. Players take turns to take a card which is put face up on the desk. The player who turns up the largest numbers takes all the cards on desk. They repeat until pile is finished. The winner is player with most cards at the end. Variation: Player with smallest number wins.

3.3 Students observe as number cards are prepared with numbers on them. They are engaged as the terms ascending order and descending order are introduced. They observe as teacher demonstrates arranging numbers in order. Students in small groups are given a set of cards. They shuffle the cards then arrange them in the correct order.

2601	871	501	1612	106	722

3.4 Students revise number patterns done in Grade 3 that involve 2 digit numbers. They are guided to see the direction of the number sequence – whether increasing or decreasing. They are guided to look at how the digit in a given number changes to the digit in the next number. Example: What are the next two terms in each sequence?

1	2	4	8	16	?	?

30	25	20	15	?	?

3.5 Students are introduced to the signs < ('less than') and > ('more than'). They use the signs <, >, = to complete statements such as the following. (1) 7 tens ___ 100 (2) 6158 ____ 6148 (3) 8 hundreds ____ 800 (4) four hundred and seventeen ___ 470 (5) 5 000 + 600 + 7 ____ 567

Use a calculator, pen and pencil procedure or mental strategies to investigate number concepts

4.1 Students are put in small groups. Each group is given a calculator. Students tell what they know about the calculator and how it works. Students observe as teacher demonstrates its use. Students are given a few sums to calculate first without and then with use of calculator – e.g. 28 + 6, 136×2

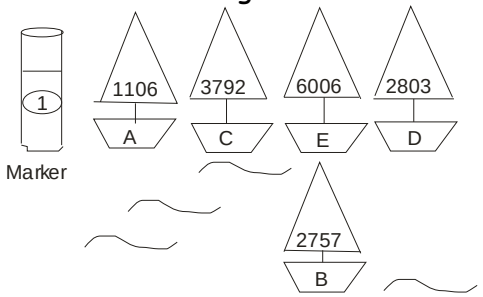
4.2 Students are grouped and given speed test. They are timed and given calculators to work. The group which gets the correct answers within the given time is awarded a point. Example of test: (i) 24×3 (ii) 81 ÷ 9 (iii) 86 – 29 (iv) 1 more than 86 (v) 101 – 6

4.3 Students are put in two groups. Each group is given 4 questions. One group works with their calculator and the other without. The group that finishes first gets a point. The group change position and the game continues.

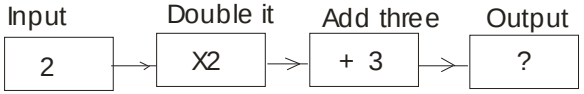
4.4 Students play game 'space invaders'. Students share a calculator and put a 3 digit number. Students take turns in subtracting a number between 1 to 9 or multiple of 10 or a multiple of 100 from the number. The student who finally reduces the number to 0 wins. Repeat for 4 digit numbers subtracting multiples of 1 000 as well.

Create and solve problems involving whole number concepts

5.1 Students are shown a drawing of a situation. They use drawing to answer questions, such as the following. (i) Which boat has the largest number? (ii) Which boats have the same digits in the thousands place?



5.2 Students are provided with a flowchart. They use the flowchart to answer questions.



5.3 In small groups, students are given puzzles such as: (i) I have 8 hundreds 13 tens and 3 ones. Who am I? I have 16 hundreds 8 tens and 8 ones. Who am I?

RESOURCES

Worksheets, abacus, charts and pictures

ASSESSMENT

1. Show students number patterns with missing numbers. Ask them to find the missing numbers: e.g. (a) 8, 12, 16, 20, ____, ____, 32 (b) ____, ____, ____, 15, 18, 21

2. Shown some numbers, students write the numbers in order of size: e.g. (a) 48, 179, 27, 208, 154 (b) 1920, 1092, 1290, 1902

TERM 1 STRAND 2 Geometry UNIT 2: OUT OF THE BOX (2 weeks – 16 sessions)

AT 2	**LO 1: Describe the differences/similarities between 3-D shapes in relation to their properties** ***Success Criteria***

1. Identify and discuss the differences and similarities between the cube and cuboid etc.
2. Identify and discuss the faces, edges and vertices of regular 3-D shapes

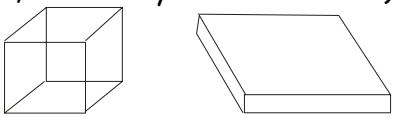
ACTIVITIES

Identify and discuss the differences and similarities between the cube and cuboid etc.

1.1 Students are placed in small groups and given a variety of 3-D shapes (e.g. boxes, cubes, cylinders). Students are instructed to place the objects in groups. They are questioned to say (i) how they group the objects and (ii) why. The exercise is repeated but this time the objects are placed in three groups. Students are allowed to say how they grouped the objects and why.

1.2 Students are given a variety of 3-D shapes and instructed to divide these objects according to (a) those which roll (or do not roll) (b) those which have flat faces (or do not have flat faces) and (c) those which have square faces (or do not have square faces). (d) Those which are boxlike (or not boxlike). The activity is repeated for other attributes.

1.3 Students are placed into groups. Each group is given (a) a die (as a model of a cube), (b) a matchbox (as a model of a cuboid) and (c) a ruler. (Use could be made of other shapes, such as cylinder and cone.) Students complete sentences on a worksheet.

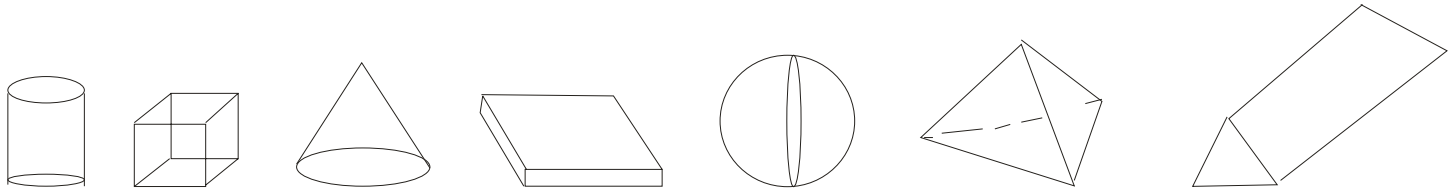


(i) The die has _____ faces.
(ii) The die has _____ edges (where two faces come together)
(iii) The die has ____ vertices (sharp points).
(iv) The shape of each face is a _____.
(v) All the edges of the die are of _____ length. (Use your ruler)

(vi) The matchbox has _____ faces.
(vii) The matchbox has _____ edges.
(viii) The matchbox has _____ vertices.
(ix) The shape of each face is a _____.
(x) The edges of the matchbox are of _____ length.
(xi) The die is an example of a _____.
(xii) The matchbox is an example of a _____.

Each group compares answers orally, through questioning by the teacher.

1.4 Students are shown various shapes. They identify and name the shapes.

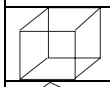
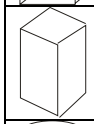
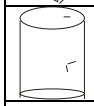
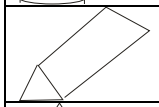
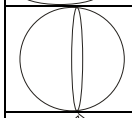
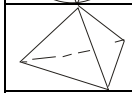


1.5 Students bring in objects or pictures of objects (e.g. orange, die, matchbox, rolled up mat, party hat, tent) from their homes or from the classroom. They discuss and identify objects which have the same attributes as the shapes.

Identify and discuss the faces, edges and vertices of regular 3-D shapes

2.1 Students are placed in small groups and given a variety of 3-D shapes. They are questioned to explain what is meant by a flat face. They are asked to find all the shapes that have (i) two flat faces (ii) six flat faces (iii) One flat face, etc. The activity is repeated for other attributes, example, curved faces, edges, corners.

2.2 Students are placed into groups and given examples of these solids: cubes, cuboids, cylinders, cones, triangle based pyramids, triangular prisms, spheres. Students observe the shapes and complete the table on worksheet provided.

	Name of solid	Number of flat faces	Number of curved faces	Shape of flat faces	Number of edges	Number of vertices
						
						
						
						
						
						
						

RESOURCES

3D shapes, objects, chart with pictures, worksheets

ASSESSMENT

Shown two 3D shapes, can answer relevant questions; for example, can

a. Indicate the name given to shape A and to shape B
b. List two (2) similarities and differences between the shapes
c. Complete a table as the one below

A B

	A	B
No. Of faces		
No. Of edges		
No. Of vertices		

TERM 1 STRAND 3 Measurement UNIT 3: HELPING MUMMY (2 weeks – 16 sessions)

AT 3	**LO 1: Estimate and accurately measure length and distances and calculate perimeter using standard units**
	Success Criteria

1. Compare estimates, measure and record lengths and distances of objects using the metre and centimetre
2. Explain why there is a need for a smaller unit of measure (the cm)
3. Calculate the perimeter of a 2-D shape
4. Solve simple real life problems related to length

ACTIVITIES

Compare estimates, measure and record lengths and distances of objects using the metre and centimetre

1.1 Students are placed in groups and allowed to estimate the lengths of various objects in the classroom. Then with measuring instruments (metre rule), they proceed to obtain measured values that are closer to the actual length.

1.2 Students are then allowed to compare the measurements, those obtained by estimation and those found using measuring instrument. The results are presented in a table, as illustrated below

Objects	Length (by estimating)	Length (by measuring)
book		
eraser		
pen		
pencil		

1.3 Students play a game in which they are allowed to toss windballs, to estimate the distances of the ball, record estimates, then find better measured values by using an instrument in the measuring. Measurements are recorded in tables and students compare their findings with each other.

1.4 Students observe lines drawn on the board. They are allowed to individually estimate the lengths and then proceed, using a ruler, to find measurements that are closer to the actual lengths. Students record the collected information in a table.

Explain why there is a need for a smaller unit of measure (the cm)

2.1 Students are asked "If we were to measure the length of the following things (or the distance between two points on them), what would we use and why?" (a) Book (b) eraser (c) road (d) bug "Do we use m, cm, km, mm?" Students are asked how they would measure the length of the named thing. Students are led to conclude for finding the length of a short thing, we use mm and cm; for long things we use m; and for longer things we use km.

2.2 Students are given a list of objects (e.g. pen, eraser, door, ruler, pencil, toy car, book). They must write the unit of measurement used to measure the given objects.

Calculate the perimeter of a 2-D shape

3.1 Students are introduced to the concept of perimeter by being asked to walk around the playground or schoolyard or classroom floor etc. and count the steps made as they do so. Students are then engaged in discussion through teacher-directed questioning. Example:

- What activity were you just engaged in?
- How many steps did it take for you to walk around the field?
- What do you call the distance around the 'field' or any area?

3.2 Students are given metre rule, tapeline and allowed to work in groups. Each group is assigned a different area to find its perimeter. Example: the classroom floor, the court, the school gate.

3.3 Students are given cut-outs of various 2D shapes. Students work in groups. They measure sides then calculate the perimeter.

Solve simple real life problems related to length

4.1 Students are given a problem, which the teacher helps them discuss to ensure understanding.

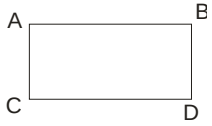
- The class is divided into groups of four. Each group comes to its own solution to the problem. Students are asked helpful questions to facilitate their progress.
- One member from some of the groups presents their solution on the board to the class.
- Students engage in teacher-led discussion on the merits of the different solutions.
- Students are challenged to find a faster method of solving the problem or set a new, but related problem.

RESOURCES

Rulers, tape measures, classroom environment, objects, games, windballs, worksheets, 2D shapes

ASSESSMENT

Shown a 2D shape, can indicate various lengths; for the figure below, for example, can



a. say what the length of AB is
b. find the length of BD
c. find the perimeter of the figure
d. say the length of one side of the square whose perimeter is the same as that of the rectangle.

TERM 1 STRAND 1 Number UNIT 4: ON THE BEACH 2 (2 – 3 weeks – 20 sessions)

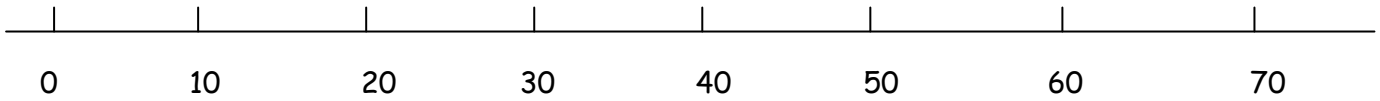
AT 1	**LO 2: Create and solve problems using place value and whole number concepts** **Success Criteria** 1. Use number line to round off 2-digit and 3-digit numbers to the nearest 10 2. Find the place value of any number up to 4-digits 3. Write 2, 3 and 4-digit numbers in expanded forms 4. Create and solve problems involving place value

ACTIVITIES

Use number line to round off 2-digit and 3-digit numbers to the nearest 10

1.1 Students are helped to recognise that when a number enters our sight, we may wish to *round it off*. For example, although 76 persons were at the show, we may wish to report that number as being 80. Or although 99 vehicles appeared at a gas station in a day, we may want to say that number was 100. Or although 497 bags entered the storehouse, we may prefer to say 500 did. Or although 698 visited the island, we may choose to report that number as being 700. Students are led to discuss the benefit of doing so, noting, for example, that compared to numbers such as 6, 17, 27, 31, numbers such as 10, 20, 30, 40 are easier to remember.

1.2 Draw the number line on the board



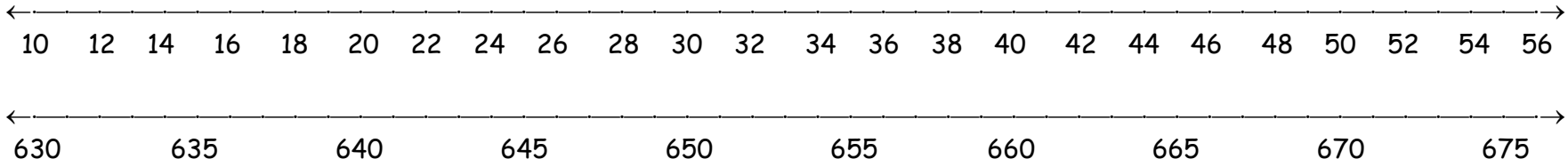
Ask a student to come up and indicate where the number 38 should be placed on the line.
Ask which multiples of ten does 38 lie between? To which multiple is it closest?
Say 38 when rounded to the nearest 10 is 40.
Repeat with other numbers.

1.3 Give students their own number lines marked in tens and tell them to show a variety of numbers e.g. 14, 76, 24 etc. Students use their number lines to round these numbers to the nearest 10.

1.4 Students are engaged in a story-relating exercise to appreciate that

a. rounding off a number to the nearest 10 involves finding a multiple of 10 that is nearest to the number
b. numbers that have the digits 1 through 4 in its ones place are rounded off to the lower multiple of 10. Example, 73 is nearer to 70 than 80. Thus, the answer we get when 73 is rounded off to the nearest 10 is 70.
c. Numbers that have the digits 5 through 9 in its ones place are rounded off to the higher multiple of 10. Example, 75 and 58 rounded off to the nearest 10 are 80 and 60 respectively.

1.5 Students use different number lines (see below) to show two and three digit numbers. They then use their number lines to help round these numbers to the nearest ten. [NB: When a number is not shown on the number line, we should remember the number is there. Thus, the following are not different number lines, but different ways of showing the number line.]



1.6 Students are placed in groups. Each group is given a number line on manila paper, as well as 20 cards with the following numbers.

11	16	23	28	34	37	62	67	74	79	179

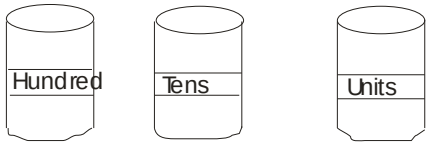
186	199	202	211	630	635	648	193	644

Students place each card at its place on the number line. They note the result the number gives when rounded off to the nearest ten. They then write the result on the back of the card. Students' cards are checked to assess their answers.

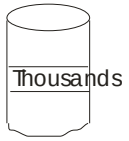
Find the place value of any number up to 4-digits

2.1 Students are placed into groups. Each group is given the following

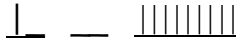
- three cups labelled as follows



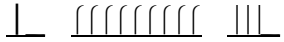
- 9 red straws each representing 1 unit; 9 blue straws each representing 1 ten; 9 yellow straws each representing 1 hundred
- By placing the straws into the labelled cups correctly, students use these straws to work out the place value of a digit in a 3-digit number (for example, the value of the 9 in 10<u>9</u> or 1<u>9</u>3 or <u>9</u>34)
- Students observe as a new cup is introduced, for 9 green straws, each representing 1 thousand.



- Students are led to conclude that after 999 comes 1 000, meaning that a new group of numbers has been formed.
- Students are shown how to use these "places" (the units place, the tens place, the hundreds place, the thousands place) to illustrate various numbers. As an illustration for 109, for example, students make the following picture.



As an illustration for 193, students give the following picture



With this illustration, students are led to see that the '9' in 193 means 90. Students make a picture for a number, such as 934, and with the picture are led to see that the '9' in 934 means 900. Students are led to make relevant observations, such as the following. (i) The blue straws can enter the 'tens' place; but they do not enter the 'units' place. (ii) The yellow straws can enter the 'hundreds' place; but they enter neither the 'tens' place nor the 'units' place.

2.2 Students are shown a number (such as 6724) and a place value chart or table as illustrated below. Students are asked whether the number can be written in the chart or table. Students are involved together with the teacher in writing the number in the chart. Through prompting by teacher, students then use the chart to answer questions. Example: According to the chart, the place value of the digit '7' in our number is what?

Thousand	Hundred	Tens	Units

or

Th	H	T	U

Th	H	T	U
6	7	2	4

2.3 Holding a card showing the number 10. Another is holding a card showing the number 5. Since we know what each digit in the number 15 means, can we say this number in another way? Is it the same as 10 + 5? What about the number 215? Is it the same as 200 + 10 + 5? Consider now the number 6724? Is it the same as 6 000 + 700 + 20 + 4?

Write 2, 3 and 4-digit numbers in expanded forms

3.1 Students are exposed to a set of cards as illustrated below. They are helped to make use of these cards to show e.g. 300 + 40 + 6 = 346, by using 300 and 40 and 6 and placing them as 346.

10 20 30 40 50 60 70 80 90

1 2 3 4 5 6 7 8 9

100 200 300 400 500 600 700 800 900

3.2 Students repeat the above activity adding cards 1 000 2 000 ... 9 000 etc.

Create and solve problems involving place value

4.1 Students are shown numbers written on cards, as illustrated. They are asked to put the numbers in order. (Students can use base ten materials to show these numbers if they present difficulty.) Variation: Use base ten materials to show which number is bigger or smaller.

1350 1530 1053 1305

4.2 Students are given a set of place value cards. They listen as numbers less than ten thousand are called and (in each case) they proceed to show that number.

4.3 Students are given a set of up to 6 cards with a mixture of digits. They are challenged

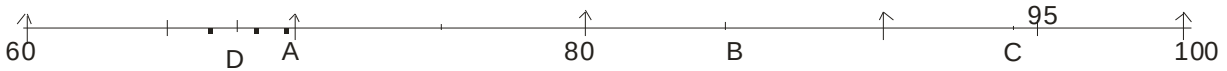
- to make the smallest/ largest number they can
- to see if they can make other numbers
- to order the numbers they have created
- to see how many different numbers they can make

RESOURCES

Number line, cards, cup, worksheets, boxes with compartments, charts, pictures

ASSESSMENT

1. Shown the number line as illustrated below, student can use it to say/ suggest:



   a. What number A represents
   b. What number B represents
   c. What number we get when the number that C represents is rounded to the nearest 10.
   d. Between which two tens D is
   e. What number arises/ falls halfway between 90 and 100
   f. Which numbers on the number line can be rounded off to (give) 80.

2. Using a place value chart, students can tell or write the place value of each of the underlined digits in examples such as the following: (i) 3586 (ii) 3076 (iii) 2347 (iv) 3010 (v) 8208 (vi) 4149 (vii) 1368 (viii) 1196 (ix) 7336 (x) 1005

TERM 1 STRAND 5 Patterns, Functions & Algebra UNIT 4: MY FAVOURITE THINGS

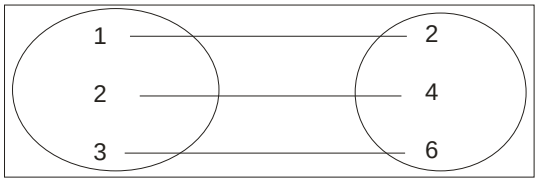
AT 5	**LO 1: Use graphs to show number relationships and solve simple real life problems** ***Success Criteria***

1. Draw arrow diagrams and bar graphs to show 2, 3, 4, 5 and 10 times tables
2. Extend and explain patterns using arrow diagrams and bar graphs
3. Create and solve problems by looking for patterns

ACTIVITIES

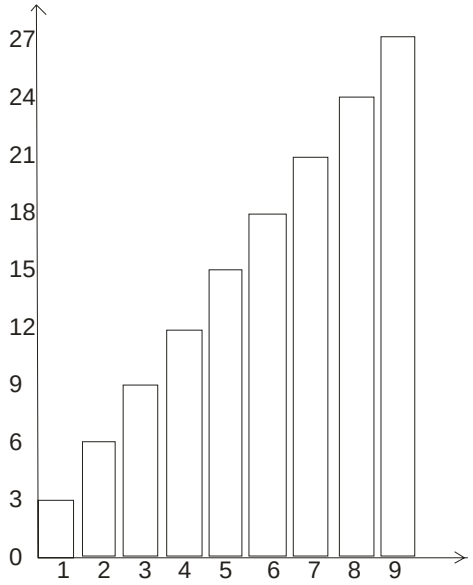
Draw arrow diagrams and bar graphs to show 2, 3, 4, 5 and 10 times tables

1.1 Students are shown a diagram such as the one below. They are asked to suggest the connection of the numbers on the left to those on the right. They are led to see that when each on the left is multiplied by 2, it gives the one on the right. The picture shows that 1×2 is 2; 2×2 is 4; and 3×2 is 6. Students extend the drawing to include the case in which 12 is multiplied by 2.



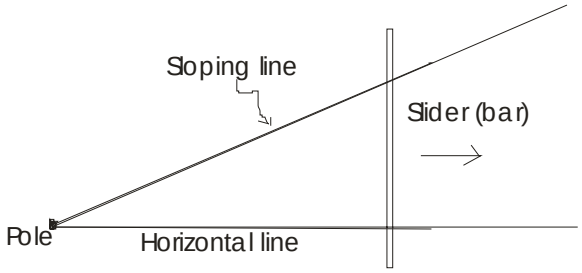
1.2 Students are engaged in drawing pictures as the one above, but for (i) multiplication by 3, (ii) multiplication by 4 and (iii) multiplication by 5.

1.3 Students are walked through the following example to see how a connection shown as an arrow diagram can also be shown in a bar graph. They are led to suggest that the first bar is 1×3, the second is 2×3, the third is 3×3, the fourth is 4×3, the fifth is 5×3, the sixth is 6×3, the seventh is 7×3, the eighth is 8×3, the ninth is 9×3, and so on.



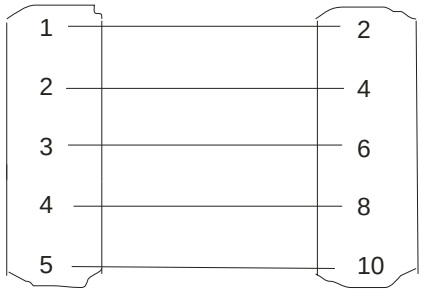
1.4 Guided by the above example, students use graph paper to show the 2-times table, the 4-times table, the 5-times table and the 10-times table.

1.5 Students are engaged in an exercise in which a large "triangle" is drawn on the classroom floor, as the diagram below illustrates. With the help of their teacher, students take a measurement of the distance from the pole to the bar. They do the same for the distance from where the bar touches the horizontal line to where it meets the sloping line. Now they observe as the triangle increases in size so that the bar is "raised". They proceed to take measurements of the new distances. The activity is used to get a table of values, as the example below.



How many metres across?	1	2	3	4	5
How many metres up?	2	4	6	8	10

What happens in this case (activity)? "1 matches with 2; 2 matches with 4; 3 matches with 6; 4 matches with 8; 5 matches with 10; 6 matches with 12." This relationship is (can be) illustrated (shown, pictured) using an arrow diagram (consisting of two loops, the one to the left showing numbers 1, 2, 3, 4, 5 and the one to the right, numbers 2, 4, 6, 8, 10)



(A possible illustration for this: A teacher enters the classroom and meets a group of students, each of whom has a number. Students are affected by the entrance. Each is left with twice the number he had. So the person who had 1 now has 2; the person who had 2 now has 4; the person who had 3 now has 6, and so on. What number did Tom have if he is now left with 12?)

It reminds one of our picture of the 2 times table.

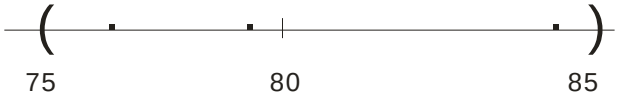
It is not always the case. Another possibility: "1 matches with 3; 2 matches with 6; 3 matches with 9; 4 matches 12; 5 matches with 15; 6 matches with 18."

1.6 Students are told a story in which some things are on a trip in a truck. The trip is such that the truck must enter a box. Before the truck enters the box, students count the number of objects in it. The truck enters the box. The arrangement is such that while the truck is passing through the box, some items (say, 2) are dropped from the top so that it receives two aditional objects. Once the truck is out on the other side, a count is again taken.

How many before?	1	2	3	4	5
How many after?	3	4	5	7	8

Extend and explain patterns using arrow diagrams and bar graphs

2.1 Students are shown a diagram such as the one below called figure A. They are allowed to suggest the connection of the numbers on the left to the one on the right. (A possible connection is the relation 'is close to'. Example: 76 is close to 80; 79 is close to 80; and 84 is close to 84.)



They are led to see that when those on the left are rounded off, they give the one on the right. This can happen, for example, in thinking of the numbers on the left as points in a neighbourhood of the number line, as illustrated.

They are challenged to suggest other numbers that may be placed in the set on the left.

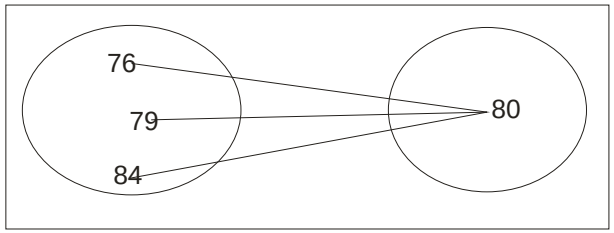
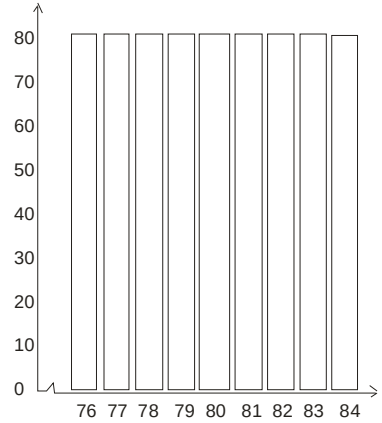


Figure A

2.2 Students are given other examples for which they are to figure out the connection and suggest how to extend the pattern.

2.3 Students discuss the following bar graph and are led to see it is another way to represent what happens when each number on the horizontal line is rounded off to the nearest ten.



2.4 Students draw bar graphs similar to the one above to show a connection, such as the number we get when certain numbers are rounded off to the nearest ten.

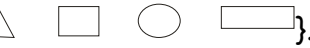
Create and solve problems by looking for patterns

3.1 Students observe as teacher draws a ring on the classroom floor. A student volunteer is asked to enter the ring. Students are questioned to say the number of shoes for that 1 student. With that student still in the ring, another student is asked to enter the ring. Again, students are questioned to say the number of shoes for the 2 students. The process continues until as many as,

say, 8 students are in the ring. Students proceed to complete a table such as the one below. Students look for the pattern. They are led to see that once we have the number of students in the ring, that number is doubled (or multiplied by 2) to get the shoes' number. Students work out the shoes' number when the students' number is (i) 10, (ii) 15, (iii) 20

Number of students	1	2	3	4	5	6	7	8
number of shoes	2							

3.2 Students engage in a similar exercise but this time using cars instead of students and tyres instead of shoes.

3.3 Students are placed in groups. Each group is given a bag containing cards of different shapes e.g. {  }. Students use the cards to make patterns. They explain their patterns. Groups exchange their created patterns and add to them.

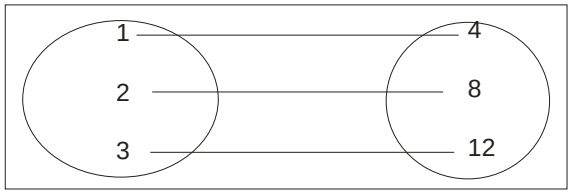
3.4 Students observe as different fruits are drawn on the chalkboard. Students are asked to use these different fruits to draw (make) patterns on their books.

RESOURCES

Cards, arrow diagrams, bar graphs, tables, sequences

ASSESSMENT

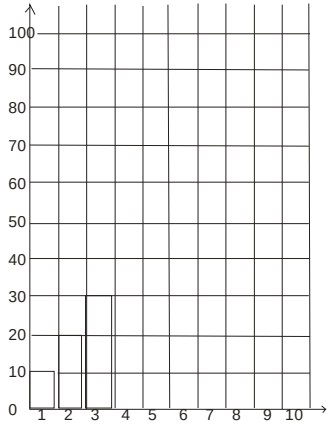
1. Shown a picture like the one below, identify the connection between the two sets of numbers. For example, students say, "We get the number on the right when the number on the left is multiplied by 4."



2. Shown a table like the one below, complete the table

	X4	x5
5		
9		
1		
6		

3. Shown a bar graph as the one below (for the 10-times table), continue the graph.



4. Shown a pattern involving △ ▭ ⬭ ▭, students explain and extend the pattern.

TERM 1 STRAND 3 Measurement UNIT 6: HELPING MUMMY 2 (1 week – 8 sessions)

AT 3	**LO 2: Develop the concept of area** **Success Criteria** 1. Explain the term area 2. Compare the area of two shapes by counting the number of squares or rectangles that just cover it

ACTIVITIES

Explain the term area

1.1 Students observe as on the classroom floor the teacher draws two rectangles, one big and one small. Students are invited to tile the spaces within each rectangle using tiles made out of paper, or some other unit. Students are asked to say which surface required more tiles to cover and why. They are led to say that it takes more tiles to cover the large section than the small section because the large surface has a bigger *area*.

NB: Students should use a variety of units and should be asked which are easier to use and which seem to give a better, more accurate answer. The students should be able to say that counters and coins are <u>not as good as squares and triangles</u>. Units which fit together without spaces are better for finding how much surface.

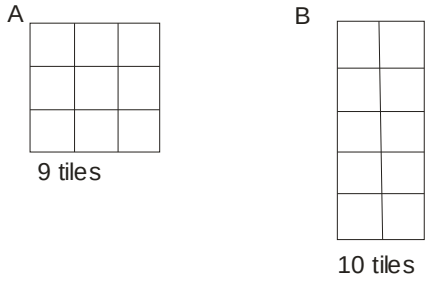
1.2 Students are placed in groups. Each group is given a piece of rubber in the shape of a square as well as paper. They use the paper to cover the surface of the rubber. Then they give the rubber a stretch and again use paper to cover its surface. They are led to make observation that the rubber's surface now requires more paper to be covered. They are challenged to explain this observation, that is, to say why the rubber's surface now requires more paper to be covered. They are led to suggest that the reason is that its area has increased. Does the rubber's surface cover more space after it is stretched? If it covers more space, its area is greater. Does a balloon's surface cover more space when the balloon is blown? Is the area of the balloon's surface greater when the balloon is blown? Does your skin cover more space when you enter adulthood? In other words, is the area of your skin greater when you become an adult?

1.3 Students discuss the advantage of using squares rather than, say, two-cent pieces as the unit to cover the surface of, say, an envelope. They are led to see that when the two-cent piece is used as the unit, tiny bits of the surface are left uncovered. And this means more error. With the square as the unit, we get a better result, because the tiny bits we could not cover are now covered.

Compare the area of two shapes by counting the number of squares or rectangles that just cover it

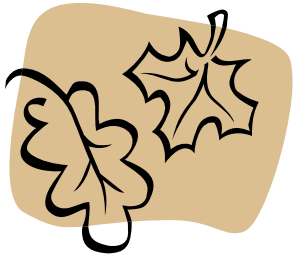
2.1 Students are placed in groups. Each group is given two objects (a large-sized book and a smaller one, a large envelope and a smaller one, a desk top and a floor, etc.). Using tiles made out of firm paper, or some other units such as playing cards or newspaper, students cover the surface of each object. They are questioned to direct them to say which object has more surface. Students are led to make statements such as the large envelope has a bigger area, or the floor of their classroom has a greater area than the floor of a nearby classroom.

2.2 Students are given shapes whose areas are to be compared first by covering using some arbitrary unit such as squares, tickets, cards, etc., depending on their size. Students are led to conclude that shape B has the greater area.

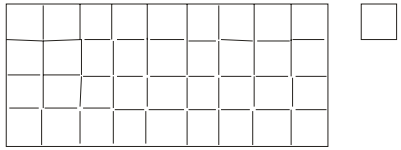


2.3 Students are given shapes drawn on squared paper. They are asked to count the number of squares or triangles to find the areas of the shapes.

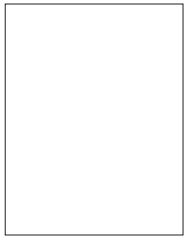
2.4 Students are placed in groups. Each group is given two leaves of different sizes. Students trace each on squared paper and find the area of the surface of each by counting squares.



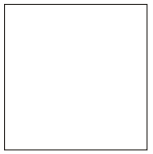
2.5 Students are given cut-out squares. They use the squares to cover the shapes to find their area. Example:



A.



B.



C.

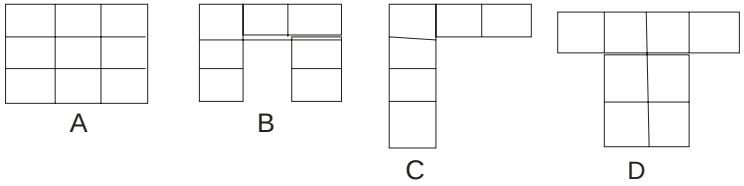
RESOURCES

Cut-out squares, objects in the classroom, paper

ASSESSMENT

Shown some figures, can indicate

a. What the area of each is.
b. Which has the greatest area
c. Which has the same area
d. Which has the smallest area



TERM 2 SUMMARY	
UNITS	**No. of SESSIONS**
UNIT 1: ON THE BEACH – Number (+ & -) *AT 1: LO 3* *Success Criteria*: 1 – 5	24
UNIT 2: OUT OF THE BOX – Geometry (2-D shapes) AT 2: LO 2 Success criteria: 1 – 4	12
UNIT 3: HELPING MUMMY – Measurement (capacity) AT 3: LO 3 Success criteria: 1 – 3	8
UNIT 4 : GOING SHOPPING - Statistics AT 4: LO 1 Success criteria: 1 – 3	12
UNIT 5: ON THE BEACH – Number (X, ÷) AT 1: LO 3 Success criteria 6 – 7	12
UNIT 6: HELPING MUMMY – Measurement (mass) AT 3: LO 4 Success criteria 1 – 5	8

UNIT PLAN WITH SUGGESTED TEACHING, LEARNING & ASSESSMENT ACTIVITIES

TERM 2 STRAND 1 Number UNIT 1: ON THE BEACH (3 weeks – 24 sessions)

AT 1	**LO 3: Create and solve real life problems involving addition and subtraction with numbers up to 10 000 and involving multiplication and division of numbers up to two digit numbers.** ***Success Criteria***

1. Explain and use several strategies to recall the basic facts for addition and subtraction.
2. Discuss and use several strategies to add a 1, 2, 3 or 4-digit number to a 1, 2 or 3-digit number, without and with regrouping, totals up to 10 000 in real life settings.
3. Discuss and use several strategies to subtract a 1, 2, 3 or 4-digit number from a 4-digit number, without and with regrouping in real life settings.
4. Create and solve problems involving addition and subtraction of whole numbers with totals up to 10 000.
5. Discuss and use several strategies (e.g., concrete objects, skip counting, properties of multiplication, bingo and card games) to develop the multiplication basic facts for the 2 to 10 times tables.

ACTIVITIES

Explain and use several strategies to recall the basic facts for addition and subtraction.

1.1 Students are related a story. Let's think of ourselves as dollars. On a particular day, someone counting us finds that our number is 20, which is the same as 4 fives. Now the person may wish to remove (or take away) 5 from our number. Is there another way to say this? The person wants to work out the answer for the expression 20 – 5. Once the subtraction work is done, the person has the following fact: 20 – 5 = 15. Students are asked to write more subtraction facts involving 20.

20 - 0 = ____	20 - 11 = _____
20 - 1 = ____	20 - 12 = _____
20 - 2 = ____	20 - 13 = _____
20 - 3 = ____	20 - 14 = _____
20 - 4 = ____	20 - 15 = _____
.	.
.	.
.	.

1.2 Students are led through a similar exercise using the expression 200 - 20 instead of the expression 20 - 5.

1.3 Students are questioned to notice relationship, to see the way addition and subtraction are related. They are led to write families of facts for groups of numbers, such as (i) 13, 12, 25 and (ii) 6, 18, 24

1.4 Let us think of ourselves as members of a family. Our number is 5. What number results if someone takes away 2 from our number? In other words, what is the answer to the expression 5 – 2? The answer is 3. So we have the fact 5 - 2 = 3, which says we are left with our number being 3. What should someone now do to us to let our number be 5 again? Add 2 to 3. So 5 - 2 = 3 means 5 = 2 + 3. Students are asked to complete the following.

5 - 0 = 5	means	5 = 0 + __
5 - 1 = 4	means	5 = __ + 4
5 - 2 = 3	means	5 = 2 + ___
.	.	.
.	.	.
.	.	.

1.5 Let us think of ourselves as stars. Our number is searched for and found to be 57. Now someone wishes to take 23 away from our number. This means someone wants to work out the answer to the expression 57 – 23. This is worked out to find the fact: 57 - 23 = 34 We are left with our number being 34. What should someone now do to us to let our number be 57 again? Add 23 to 34. So 57 - 23 = 34 means 57 = 23 + 34

1.6 [NB: Students can be shown a 50 dollar note and a 20 dollar note in the following activity.] Students are told a story to orient them to the fact that subtraction is the reverse of addition. On the number line, we get to 70 when we start with 50. We do so by adding 20 to 50. But if we have 70 as the result, we can get back to what we had in the beginning. We can do so by

reversing the addition. We can do so by removing from the 70 what we added to get it. Another way to say remove is to say subtract. So we can get back to 50 by subtracting 20 from 70.

To say 20 is subtracted from 70, one writes the expression 70 – 20. This is often read as "70 minus 20." Once the 20 is removed, we are left with 50. So this is just another way of saying 70 – 20 is 50, or saying the sentence "70 – 20 = 50".

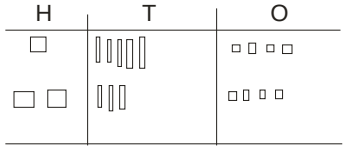
We must remove a number if we make a purchase. For example, look at a girl as she enters the bread shop with 50 dollars. Once inside, she makes a purchase. To the shopkeeper, she says, "May I have 20 dollars bread please."

"Twenty dollars bread is bread worth 20 dollars." Once she accepts this much bread from the shopkeeper, she is expected to give the shopkeeper what the bread is worth. She is expected to give the shopkeeper 20 dollars. She may give the shopkeeper 50 dollars from which to take 20 dollars. This is said if we write the expression 50 – 20. The result is the "change" she must receive. So she must receive 30 dollars.

Discuss and use several strategies to add a 1, 2, 3 or 4-digit number to a 1, 2 or 3-digit number, without and with regrouping

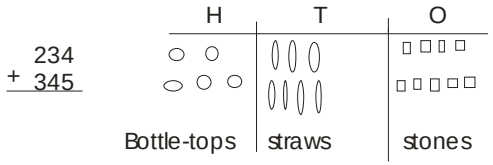
2.1 Students are exposed to base ten materials both in concrete and pictorial forms. They are allowed to use materials to add 3 or 4-digit numbers without regrouping. Example:

154
+235



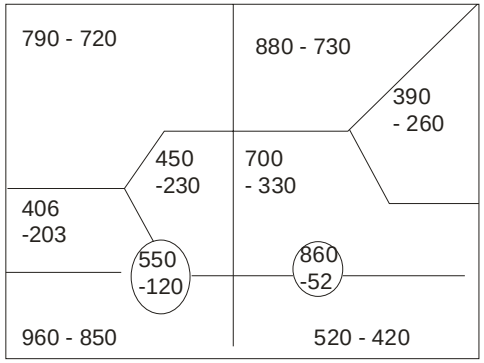
2.2 Students are shown 3 or 4-digit numbers on flash cards, examples: 4853 379 546. They are asked to select any 2 or 3-digit numbers that can be added to get the numbers shown on the cards.

2.3 Students are allowed to manipulate concrete materials to add using different materials to represent each place value. They are presented with worksheet with columns, as illustrated.



Discuss and use several strategies to subtract a 1, 2, 3 or 4-digit number from a 4-digit number, without and with regrouping in real life settings.

3.1 Students are presented with a number puzzle as shown and allowed to colour the shapes that have answers higher than 200. What picture do you see?



Create and solve problems involving addition and subtraction of whole numbers with totals up to 10 000.

4.1 Students are engaged in discussing and analysing the following problem with the teacher, stating what they think is needed to solve problems. The Parent Teacher Association planned a barbeque.

a. The printers delivered 357 adult tickets and 298 children's tickets to the school. What was the total number of tickets delivered?

b. The sale of tickets was going well. Class 2B had already sold 164 tickets and class 4C had sold 145 tickets. How many more tickets had 2B sold than 4C?

c. The PTA had to work out how to seat everyone. They could seat 124 people in the school hall, 234 under a tent on the field and 188 more under another tent in the parking lot. How many more people would be seated under tents than in the school?

4.2 Students are told a story which leads them to create/ write problems of their own involving either addition or subtraction.

4.3 Students write a series of five subtraction problems and provide answers to them.

4.4 Students go on a "subtraction outing" to find as many subtraction questions/ problems that have 247 as the answer. This is repeated for addition, using other answers.

Discuss and use several strategies (e.g., concrete objects, skip counting, properties of multiplication, bingo and card games) to develop the multiplication basic facts for the 2 to 10 times tables.

5.1 Students are allowed to memorise the multiplication table (the 2 to 10 times). Pairs are made using a playing card. Students play card games. The student who picks up two cards (9, 2) has to answer 18. They complete the following tables.

X	1	2	3	4	5	6	7	8	9
1									
2									
3									
4									
5									
6									
7									
8									
9									

RESOURCES

Concrete objects, bingo games, number cards, crayons, puzzles, worksheets

ASSESSMENT

(a) Mr. John has a bag of 20 mangoes. He wants to put them into bags of 2. Show 10 different ways he could bag the mangoes using basic addition facts. The first one is done for you. E.g. 1 and 9

(b) Tom has 3 500 dollars in his account at the bank. He made a withdrawal of 952 dollars to pay for a DVD and deposited half the amount a little while later. How much money does he now have on his account?

TERM 2 STRAND 2 Geometry UNIT 2: OUT OF THE BOX (1 – 2 weeks – 12 sessions)

AT 2	**LO 2: Investigate properties of 2-D shapes in terms of lines and angles** ***Success Criteria***

1. Sort 2-D shapes in terms of lines and angles.
2. Explain what is a right angle.
3. Classify angles according to size as equal to, greater than or less than a right angle.
4. Explore and find right angles in the environment.

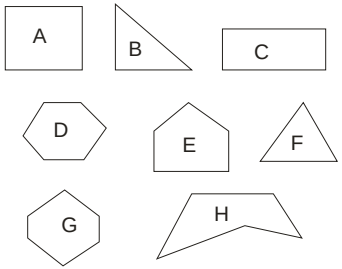
ACTIVITIES

Sort 2-D shapes in terms of lines and angles.

1.1 Students, in small groups, are given a variety of 2-D shapes and instructed to place the shapes in two groups. Students are questioned to say how they grouped the shapes and why. The activity is repeated, but this time placing the shapes in three groups.

1.2 Students, in small groups, are given a variety of 2-D shapes and instructed to sort the shapes into those with (i) 3 sides (ii) 4 sides (iii) 5 sides (iv) 3 angles (v) 4 angles, etc.

1.3 Students observe as the shapes below are drawn on the board. Students are questioned on the shapes. Example:
(a) What is the name for each polygon?
(b) How many sides does each have?
(c) How many angles? (d) How many angles would a six-sided polygon have?



1.4 Students are given a worksheet to complete

Polygon	No. Of sides	No. Of angles
A		
B		
C		
D		
E		
F		
G		

Students use the information from the table to group polygons according to sides and angles.

3 sides	4 sides	5 sides	6 sides

Explain what is a right angle.

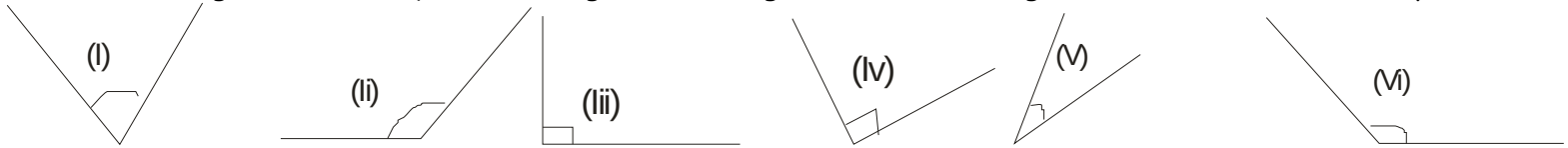
2.1 Students are told a story of a world in which a piece of paper could not be folded, a world different from ours. Students engage in paper folding to make observations or illustrations of the following: A plane is a flat surface. [NB: Flat in the geometric sense means perfectly flat. A sheet of paper is not perfectly flat; but we can use it as a model.] In it are lines. (This is why a line appears to us if we fold the paper.) The lines in a plane can meet. (Students can be allowed to suggest how to illustrate this.) An angle results (is made) when any two lines meet. (Before the word "angle" is introduced, students can be allowed to suggest what happens when the lines meet.) The angle that appears may be a right angle. (When do we get a right angle? When the lines are perpendicular to each other.)

2.2 Students observe as teacher demonstrates how to make a right angle (how to ensure that the angle that appears is a right angle). For example, they watch as the teacher (a) folds a piece of paper (e.g. a page from an exercise book) in half and (b) folds it in half again to make a corner. Students are asked (allowed) to name the lines that meet to form the right angle. In their own words, students explain what a right angle is.

2.3 [Page 29 from 'Geometry']

Classify angles according to size as equal to, greater than or less than a right angle.

3.1 Students are told a story in which an angle appears in Tom's sight and he begins to think of its size. He asks questions, such as: Is it less than 90 degrees? Is it equal to 90 degrees? Is it greater than 90 degrees? Students are shown pictures of angles



They are allowed to use their right angle to sort the angles into those which are less than 90 degrees, those which are equal to 90 degrees and those which are greater than 90 degrees. They are then asked to complete a worksheet as suggested below.

Less than	Equal to	More than

Explore and find right angles in the environment.

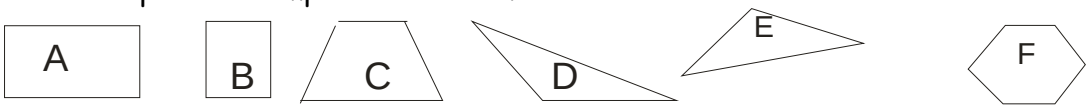
4.1 Students are placed into groups. Each group explores the school yard and buildings. They are to identify places where right angles can be found.

RESOURCES

Right angle testers, papers, 2D shapes, worksheets

ASSESSMENT

1. Sort the shapes and complete the table.



	A	B	C	D	E	F
Number of sides						
Number of angles						
No. Of angles < than right angle						
No. Of angles > than right angle						
No. Of angles = to right angle						

TERM 2 STRAND 3 Measurement UNIT 3: HELPING MUMMY (1 week – 8 sessions)

AT 3	**LO 3: Compare capacities of different objects using basic standard units** ***Success Criteria***

1. Justify the need for the litre as a unit of measure of capacity.
2. Compare estimates, measure and record the capacity of containers using the litre as a base for identifying $\frac{1}{2}$, 1/4 and $\frac{3}{4}$ litre.
3. Solve simple real life problems involving capacity.

ACTIVITIES

Justify the need for the litre as a unit of measure of capacity

1.1 Students are told a story in which someone enters a lab and sees some containers that she wants to fill. Students proceed to fill containers with water or sand using three different sized cups. Students are questioned to compare the answers. They discuss reasons for this. Not all cups have the same size, so there is a need for a standard unit.

1.2 They consider whether a tin container, for example, would receive less water after it is flattened a bit. (This is done by students first guessing or 'hypothesizing' what will happen and then proceeding to check by some experiment or demonstration suggested by some class member.)

1.3 From the containers in a pile, students take one at random and let a class member pour one cup of water (or sand) after another into it until it can receive no more water. Students note the number of cups it received and complete the statement: 'the tin's capacity is _____ cups.' Then a different student repeats the exercise using a cup of a different size. One cup of water (or sand) after another is poured until the container is filled to the brim. Again the number is noted and the result is used to complete the statement: 'the tin's capacity is ____ cups.' Students compare the answers and discuss why in this case we get different answers for the same capacity. Students are led to realise that not all cups have the same size, so in measuring capacity there is a need for a 'standard cup' or a standard unit (so that when different persons report the results of their measurement we know the size of the unit or 'cup' they are using). Students are informed that the standard unit we bring into use to measure capacity is from the metric system. It is called the litre.

1.4 Students are shown a litre bottle or can. They are involved in discussing how to produce half a litre. They are led to conclude that the can/bottle is first filled with water (or sand) to the brim. The material is then transferred to two similar containers in such a way that the water (or sand) level in both is the same. (That level can be marked, say, by elastic bands or by pen.)

1.5 Students are told a story that illustrates that an object's capacity (for, say, water) can change. Some friends consider a tin. Its capacity is measured. Then it is put in an environment in which it is flattened a bit by the pressure on it. Then its capacity is measured. So the object's capacity is measured before the operation and then after the operation. Possible results:

Capacity before (in litres)	1
Capacity after (in litres)	$\frac{1}{2}$

Compare estimates, measure and record the capacity of containers using the litre as a base for identifying $\frac{1}{2}$, 1/4 and $\frac{3}{4}$ litre

2.1 Students are given opportunities to estimate the capacity of each container in a given pile to the nearest $\frac{1}{2}$ litre. Each object's capacity is measured using litre and half litre bottles. Then the results are presented in a table.

Container	Estimated capacity (in litres)	Measured capacity (in litres)

The results are compared.

2.2 Students are asked to mark a plastic cooking oil bottle or Carib Spring bottle in quarter litres. They do this using a cup holding a quarter of a litre marked by the teacher. (To produce the result, students with help by the teacher can produce as follows. The water from a one-litre container is transferred to two other containers so that each is filled to the same level.

The water from one of these is then transferred to two other containers so that each is filled to the same level. The water can now be poured into the bottle by first pouring a quarter litre and marking the level reached $\frac{1}{4}$. Another quarter litre is poured and the new level is marked $\frac{1}{2}$. Another quarter litre is poured and the new level marked $\frac{3}{4}$. The last quarter litre is poured and the level marked 1.) Students use the bottle graduated in $\frac{1}{4}$ litres to measure the capacities of other objects, such as jugs, bowls, jars, milk bottles. To find the capacity of the mug, for example, students fill the mug with water, pour the water into the measuring bottle and read off the capacity. In reading these values, students are led to observe that the capacities in litre are usually not exactly $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1. They are taught to approximate to the nearest of these levels, using phrases like 'about half a litre', 'nearly three-quarters of a litre', 'just under a quarter litre'.

Solve simple real life problems involving capacity

3.1 Students are told a story in which Tom started a journey with his 1 litre fuel tank filled to the brim. At the end of the exercise, the tank is $\frac{3}{4}$ litre filled. (They observe this illustrated using a container which has some holes so that sand falls off as a journey or a walk continues.) They calculate how much fuel Tom use on the journey.

3.2 Students are placed in groups. Each group given five containers of capacities (in litre) $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, 2. With help by the teacher, students study or discover the relation of these objects or containers in terms of capacity.

i. Students are asked to fill container D (with sand or water). They observe whether in pouring the contents, they can fill containers A, B and C. They give reason for the answer or observation. (True or false: What D receives is enough to fill A, B, C.)
ii. Students observe as the teacher (or another student) finds a way to fill container D. Students are challenged to find a different way to fill container D. [Possibilities include, (A, C), (B, B), (A, A, A, A)]
iii. Students observe as the teacher or a student finds a way to fill container E. Students are challenged to find two other ways to fill container E. [Possibilities include (A, A, A, A, A, A, A, A), (B, B, B, B), (D, D)]
iv. Students are reminded of the number of litres D holds (1 litre). They say how many the largest holds.
v. Students say what fraction of a litre the smallest holds.
vi. Students pour the contents of A into D and say the number of times they must do this to fill D.
vii. Students are asked 'How many times do the contents of container A have to be emptied into E to fill it?'
viii. Students say the number of times the contents of B have to be emptied into E to fill it.

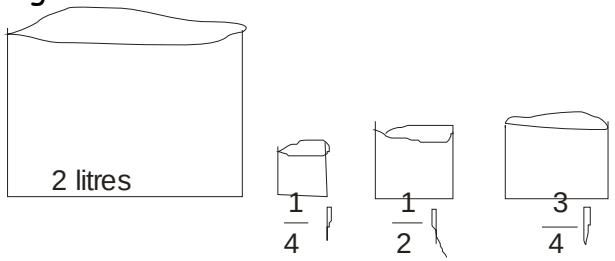
ix. Students predict whether E will be full after the contents of A and C have been poured into it and they carry out the exercise to confirm their prediction.
x. Students say what happens when the contents of container C are poured into E three times.

RESOURCES

One litre capacity containers, water, empty containers, bottles, pails

ASSESSMENT

1. Tom wishes to fill a 2 litre container using the bottles shown.



a) How many chubby bottles would he need to fill the container?
b) How many cola bottles would he need to fill the container?
c) How many bottles of wine would he need to fill the container?
d) What would Tom need to do to fill the container to its capacity using the wine bottle?

TERM 2 STRAND 4 Statistics and Data Handling UNIT 4: GOING SHOPPING

AT 4	**LO 1: Collect data to solve simple problems through observation and interview** ***Success Criteria***

1. Create simple real life problems that may be answered through observation and interview
2. Develop simple interview schedules
3. Collect data related to their interest using observation or interview schedule to solve simple real life problems

ACTIVITIES

Create simple real life problems that may be answered through observation and interview

1.1 Students are asked to reveal what their favourite show is. Their answers are recorded in a table.

Favourite TV shows from Grade 4

Show	number of students

Students are asked questions, such as:

i. How many TV shows are shown in the table?
ii. Which is the most popular TV show?
iii. Which is the least popular TV show?
iv. What does the table tell us is the number of students watching TV shows? (Calculate the number of students who watch TV shows.)
v. Put the TV shows in order from most popular to least popular and least popular to most popular.
vi. Consider the students who watch sponge bob. Is their number greater than that of the students who watch sweet life? If so, how many more students watch sponge bob that sweet life? (This number is asked in case sponge bob and sweet life appear in the table.)

1.2 Students repeat the activity for other survey questions. Example, they are allowed to gather information by interviewing members of their community, about (i) how rubbish is disposed, (ii) places of worship, (iii) favourite dish. They represent the information in a table.

Develop simple interview schedules

2.1 Students are given certain topics (e.g. garbage disposal, occupations) or worksheets in groups and allowed to figure out how they would gather information based on topic given.

Collect data related to their interest using observation or interview schedule to solve simple real life problems

3.1 Student brainstorm with teacher questions they would like to find out about, e.g., student's favourite game, how many walk to school, etc. They are placed in groups. Each group chooses question to investigate and decides how to collect data, etc.

3.2 Students are allowed to observe each other over a period of days, as to what snacks are brought to school by students. Students must represent this information in a table and answer questions such as

i. Which are the most popular snacks?
ii. Which snacks are the least popular?

3.3 Students are allowed to interview each other to find out what their favourite sports are, to answer questions, such as (i) what are the most popular sports played? What are the least popular sports played (and why do you think this is the least popular sports played)?

RESOURCE

Questionnaires, tables, graphs, local environment

ASSESSMENT

1. Shown a questionnaire as illustrated below, can work in pairs to
   i. discuss how they would answer the questionnaire
   ii. reveal what they think the designer of the questionnaire wanted to find out
   iii. say whether or not the questionnaire is clear and simple and give reasons
   iv. design s questionnaire to find out what students in Grade 4 do on a Friday night
   v. Swap their questionnaire with another pair and assess each other's questionnaires and make suggestions for improvement
   vi. Use their questionnaire to collect data from another pair of students

Name: _____ Date: _____
Please circle the correct information.

Sex: male female
age 10-14 15-19 20-24

1. Do you travel by public transport? Yes No
2. If yes, what sort of public transport do you use?
   Bus Sedan Taxi Mini-bus taxi Tram Train
   Aeroplane Ferry Other: _____

3. How much does your transport cost per week to the nearest dollar?
   < $5 $6 - $15 $16 - $24
   $25 - $34 $35- $44 > $45

4. If you were offered free public transport, what three things would you like to be part of the service you receive
   i: _____
   ii: _____
   iii: _____

Thanks for your help with our survey.

2. Shown an expression as illustrated below, student can use observation to collect data to answer question or complete a table

All things bright and beautiful.
All creatures great and small
All things wise and wonderful
The Lord God made them all.

Vowel	tally	total
A		
E		
I		
O		
U		

TERM 2 STRAND 1 Number UNIT 5: ON THE BEACH (1 – 2 weeks – 12 sessions)

AT 1	**LO 3: Create and solve real life problems involving addition and subtraction with numbers up to 10 000 and involving multiplication and division of numbers up to two digit numbers** ***Success Criteria***

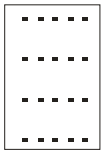
6. Choose and use a variety of appropriate strategies to solve problems involving multiplication and division of 2-digit numbers by 1 digit numbers in real life settings.
7. Plan and use mental computation strategies or the calculator to carry out calculations when necessary

ACTIVITIES

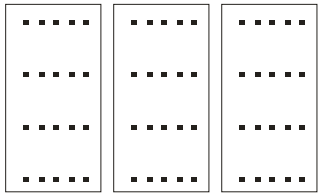
Choose and use a variety of appropriate strategies to solve problems involving multiplication and division of 2-digit numbers by 1 digit numbers in real life settings.

6.1 Students are told a story in which Cynthia is asked to count her oranges. She finds that their number is 20. She is asked to reveal how many oranges she now has if that number is multiplied by 3. Students are questioned to appreciate that

multiplication of 20 by 3 means the expression 3×20. They are challenged to recall that the multiplication sign '×' can be read as 'of', so that 3×20 means '3 of 20'. This means Cynthia must work out 3×20. … use of a suitable picture. If 20 is pictured as below

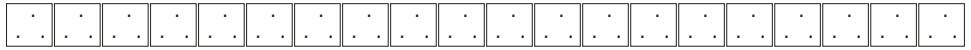


Then 3 times as many can be pictures as shown below



This suggests that we can think of multiplication as repeated addition. We can say 3×20 is the same as 20 + 20 + 20. (This idea allows us to turn a multiplication problem into an addition exercise.)
Students are led to realise that when Cynthia counted her oranges in the beginning, she could have found that their number was 3. Then she could have been asked to reveal how many she had once 3 is multiplied by 20. This multiplication of 3 by 20 is the expression 20×3, which means the change is now from

to



With this observation, students proceed to say why do 20×3 and 3×20 give the same answer.

6.2 Students are told a story in which Albert is asked to count the stars in his crown. He finds that their number is 90. Two friends appear, each with a crown having no star. Albert takes an interest in these friends. He wants to transfer stars to their crowns so that each crown has the same number of crowns. Students discuss ways to do this division.

Plan and use mental computation strategies or the calculator to carry out calculations when necessary

7.1 Students are placed in pairs according to their abilities (e.g. upper level and lower level). Each pair is given mental computation involving the four operations. Example: (i) 2 2 2 2 = 4 (ii) 2 2 2 2 = 2 Students are to use any of the four operations to make the given answers correct.

7.2 Students are given number grid and asked to find three (3) sets of numbers that add up to 20

1	3	6
5	7	10
7	9	12

7.3 Students play estimation game. They listen as two numbers are called out in addition, e.g. 464 + 372. Students work in pairs to guess the answers then use calculator to check answers. The student who is closer to the correct answer gets a point. First student to get ten points wins.

RESOURCES

ASSESSMENT

TERM 2 STRAND 3 Measurement UNIT 6: HELPING MUMMY (1 week – 8 sessions)

AT 3	**LO 4: Compare the relationships among the more commonly used units of mass** ***Success Criteria***

1. Justify the need for gram as a unit of mass
2. Describe situations in real life where the gram is used as a unit of measure
3. Compare estimates, measure and record the mass of everyday things in grams
4. State the relationships between the kg and g

5. Solve simple real life problems involving kg and g

ACTIVITIES

Justify the need for gram as a unit of mass

1.1 Students are allowed to bring in some grocery items. They are allowed to play shop using non-standard units, e.g. their hand, a glass, etc. They are allowed to weigh items using scale. They are then allowed to compare weights of non-standard units and standard units to see that there is a need for a standard unit of mass. They discuss the gram as a unit of mass.

Describe situations in real life where the gram is used as a unit of measure

2.1 Students are presented with picture. They view picture and pick out items that are measured in grams.

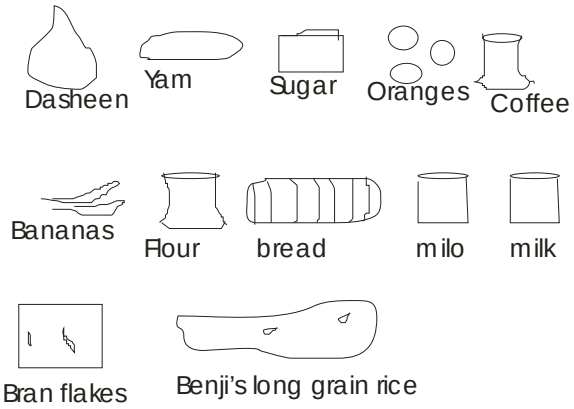
Compare estimates, measure and record the mass of everyday things in grams

3.1 Students are allowed to bring in fruits, vegetables. They are allowed to work in groups. They first estimate the mass of each item and then proceed to find the 'actual mass' (or the mass more accurately) by measuring. Results obtained are used to fill out a table.

Object	Estimated mass	Actual mass

State the relationships between the kg and g

4.1 Students are presented with shop items and market items, as suggested below.



a. Students are asked to estimate the mass of each.
b. Students then measure some of the grocery and market items using a kitchen scale.
c. Students compare estimates with actual mass and record their answers.
d. Students read out the mass of some items written on base of the items and compare it with their estimates.
e. Using these known actual masses, students then give a list of items with similar masses.

Solve simple real life problems involving kg and g

5.1 Students are presented with problems involving different measures of mass. They read problems together and decide how to solve it. Students also create problems of their own.

5.2 Students are told a story in which in her basket Devi carried $2\frac{1}{2}$ Kg of fish, $3\frac{1}{4}$ Kg of meat, 4 kg of potatoes and 250g of cheese. Students are asked to reveal how much her groceries weigh.

5.3 Students are told a story in which Ann wants to know how much heavier a bag of potatoes weighing 15 kg is than one weighing $12\frac{1}{2}$ Kg. They are asked to help Ann.

5.4 Students are told a story in which curry powder is said to be sold in packets of 100 g. They are asked to reveal the number of packets that can be made from 15 kg of curry powder.

RESOURCES

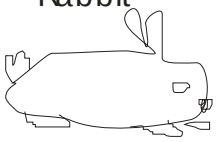
Scales (bathroom/ kitchen), grocery items, sand, stones

ASSESSMENT

1. Choose the best mass for the following items

Rabbit

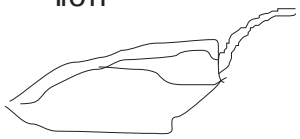
1)



200 g, 2 kg

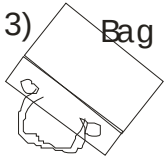
Iron

2)



1 kg, 3 kg

3)



400 g, 4 kg

4)

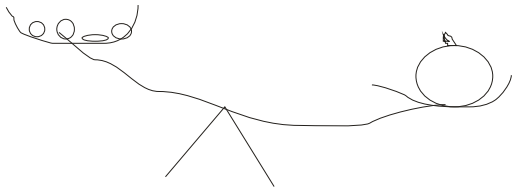
400 g, 40 kg

2. Solve

a) A woman has 3500 grams bag of rice. She used $1\frac{1}{2}$ Kg to make rice patties. How much rice was left in the bag?

b) Mr. Cutt bought $2\frac{1}{2}$ Kg of beef, 3 kg of pork and $4\frac{1}{4}$ Kg of lamb. What was the total mass of meat in kilograms?

c) A breadfruit and 4 potatoes are placed on the scales of a balance, as illustrated.



The breadfruit has a mass of 1 kg and the potatoes each has a mass of 125 kg. How many more potatoes must be added to the scale to achieve balance?

TERM 3 SUMMARY	No. of
UNITS	**SESSIONS**
UNIT 1: ON THE BEACH *AT 1: LO 4* *Success Criteria*: 1 – 4	22
UNIT 2: HELPING MUMMY AT 3: LO 5 Success criteria: 1 – 4	12
UNIT 3: GOING SHOPPING AT 4: LO 2 Success criteria: 1 – 4	8
UNIT 4: MY FAVOURITE THINGS AT 5: LO 2 Success criteria: 1 – 4	14
UNIT 5: HELPING MUMMY AT 3: LO 6 Success criteria 1 – 4	14

UNIT PLAN WITH SUGGESTED TEACHING, LEARNING & ASSESSMENT ACTIVITIES

TERM 3 STRAND 1 Number UNIT 1: ON THE BEACH (2 – 3 weeks 22 sessions)

AT 1	**LO 4: Solve simple problems involving elementary fractions** ***Success Criteria***

1. Identify unit and proper fraction of a whole or group of objects
2. Represent unit and proper fraction of a whole or group of objects
3. Compare halves, quarters, thirds, eighths and tenths using fraction pies in real life settings.
4. Find simple equivalences between wholes, halves, quarters, thirds, eighths and tenths using fraction pies

ACTIVITIES

Identify unit and proper fraction of a whole or group of objects

1.1 Students are arranged in groups. Each group is given a fraction chart. They are allowed to identify various fractions of a whole. Example, they colour $\frac{1}{4}$ green, $\frac{1}{2}$ red. They are questioned to reveal what fraction of the whole is coloured (i) green (ii) red.

1.2 Making a whole: Students are arranged in groups. Each group is given cut-out fractions of a whole. They are allowed to put the cut-out fraction pieces together to make a whole.

1.3 Students go on a fraction hunt. Before the lesson begins, fraction cut-outs are placed all around in their classroom. Students are allowed to hunt for the hidden pieces. Once students have found the pieces and put the fractions together, they must say which fraction they get. For example, the student who put $\frac{1}{4}$, $\frac{1}{4}$, $\frac{1}{4}$ together has $\frac{3}{4}$. (NB: $\frac{3}{4}$ is the same as $3x\frac{1}{4}$.)

1.4 Students are given group of objects (e.g. 4 fruits $\rightarrow$ 3 oranges and 1 banana). They are questioned to say what fraction of the fruits are oranges. A similar exercise is done for other fractions.

1.5 Students are shown some straws (a hundred of them). They observe as someone takes away 25 of these straws. Students are questioned to say the fraction that is taken. When the straws are all together again, students observe as someone takes away fifty (50) of them. Students are questioned to say the fraction taken. This is repeated for the case in which 75 straws are taken. [Possibly variation: Students are shown 600 "nice things." They observe as 150 of them are taken. Students are questioned to reveal the fraction taken.]

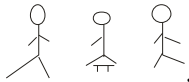
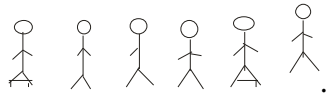
1.6 Some shaded shapes are drawn. Students write down the fraction of shape that is shaded.

Represent unit and proper fraction of a whole or group of objects

2.1 Students are given a number of objects, including possibly shapes. They are informed of a definite fraction (e.g. $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$) we want taken or shaded or marked or affected in some way. Students represent the fraction using the objects given.

2.2 Students are shown some shaded shapes. They write down fraction of shapes that is shaded.

2.3 Students stand at the front of the classroom. A fraction is called and they are allowed to use themselves to show the fraction:

$\frac{1}{4}$ =  , $\frac{1}{2}$ =  .

2.4 Students are given fraction to shade to show $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, when $\frac{1}{8}$ = 

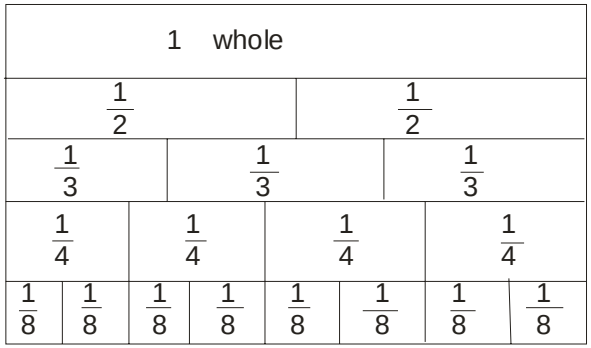
Compare halves, quarters, thirds, eighths and tenths using fraction pies in real life settings.

3.1 Students are related suitable story, example, story in which Leslie receives a third of an orange and Glen, a quarter of a similar orange. They are questioned to reveal how these parts compare, e.g, whether someone received more orange and if so, who.

They are given fraction pie cut outs -- $\frac{1\text{'s}}{2}$, $\frac{1\text{'s}}{3}$, $\frac{1\text{'s}}{4}$, $\frac{1\text{'s}}{8}$, $\frac{1\text{'s}}{10}$ They are led to put in correct sign (=, <, >) for various fraction pies, e.g. $\frac{1}{3} \square \frac{1}{4}$, $\frac{3}{4} \square \frac{2}{3}$

Find simple equivalences between wholes, halves, quarters, thirds, eighths and tenths using fraction pies

4.1 Students are shown a fraction chart drawn on the board.

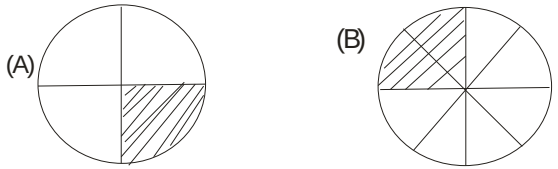


They are posed with questions based on the fraction chart and are involved in explaining proper fractions of a whole and in answering related questions.

a. How many $\frac{1}{2}$'s make a whole? 1 whole is 2 halves. $1 = 2x\frac{1}{2}$ or $1 = 2/2$
b. How many $\frac{1}{3}$'s make a whole? 1 whole is 3 thirds. $1 = 3x\frac{1}{3}$ Or $1 = \frac{3}{3}$
c. How 2 halves is related to 3 thirds: $\frac{2}{2}$ ☐ $\frac{3}{3}$
d. How many $\frac{1}{4}$'s make a half? 1 half is 2 quarters. $\frac{1}{2} = 2x\frac{1}{4}$ or $\frac{1}{2} = 2/4$
e. How many $\frac{1}{8}$'s make a quarter? 1 quarter is 2 eighths. $\frac{1}{4} = 2x\frac{1}{8}$ or $\frac{1}{4} = 2/8$

4.2 Students are questioned to say (i) which is larger $\frac{1}{2}$ or $\frac{1}{3}$ (ii) which is smaller $\frac{1}{3}$ or $\frac{1}{8}$.

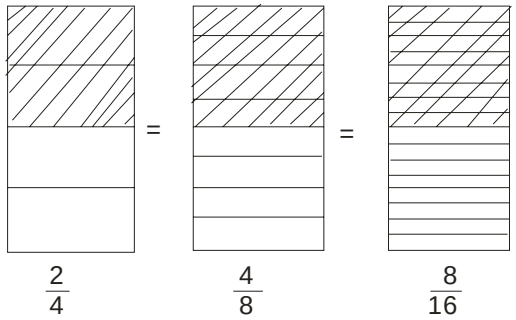
4.3 Students observe two fraction pies, as illustrated below. They discuss and answer related questions, e.g. "If I had two slices of cake B, would that be more or less or the same as one slice of cake A?"



4.4 Students told a story in which Jade takes 5 when the whole is divided into 20 equal pieces. And Akim takes 10 when the whole is divided into 40 equal pieces. Students are questioned to reveal how the fraction Akim takes compares with the fraction that Jade takes. (Taking 10 when the whole is 40 amounts to taking 5 when the whole is 20) This is used to make a statement such as

$$\frac{10}{40} = \frac{5}{20}$$

4.5 Students draw and shade to show three equivalent fractions for a certain fraction example. Example:



RESOURCES

Fraction pies/ walls, fruits, objects, cut-outs

ASSESSMENT

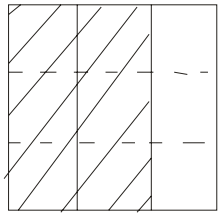
1. Shown a shape with part shaded, student can indicate the fraction shaded. Write down the fraction of the figure that is shaded.

2. Shown a fraction chart in which 1 whole is divided into thirds, sixths and twelfths, student can complete missing items to make statements as

A. $\frac{4}{12} = \frac{\square}{6}$ B. $\frac{2}{3} = \frac{4}{\square}$

3. Shown a fraction chart in which 1 whole is divided into halves, thirds, quarters and fifths, student can reveal results such as
   f. the number of fifths that make a whole
   g. which of two fractions (e.g. 1/5 and 1/4) is larger
   h. which of two fractions (e.g. $\frac{3}{4}$ and $\frac{1}{2}$) is smaller

4. Shown a shape with shading on it, student can use the observation to complete a statement equating one fraction to another. Example:



$\frac{2}{3} = \frac{\square}{\square}$

TERM 3 STRAND 3 Measurement UNIT 2: HELPING MUMMY (1 – 2 weeks 12 sessions)

AT 3	**LO 5: Find duration between events and develop an understanding of the relationship between different units of time**
	Success Criteria

1. Tell, read, write and represent time on the hour, half-hour, quarter and five minute interval in a variety of ways.
2. State and write dates in a variety of ways and calculate the duration between given dates.
3. Use time related vocabulary to describe real life situations e.g. anniversary, decades, century, millennium and leap year.
4. Create and solve problems involving time and duration.

ACTIVITIES

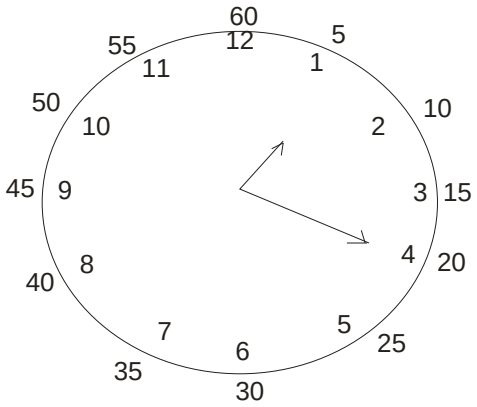
Tell, read, write and represent time on the hour, half-hour, quarter and five minute interval in a variety of ways.

1.1 Students are given material and engaged in making clock faces. They are guided to place the hour hand at 1 and the minute hand at 12. Students allowed to tell the position of the hour hand before teacher starts to move the minute hand. Students are led to conclude that when the hour hand is at 1 and the minute hand points at 12 it is one o'clock. (NB: This could be done for half and a quarter hour.)

1.2 Students make a digital clock by writing numbers on cards and arranging the cards in a suitable order. Ex: quarter past eleven would be represented by 10 : 15

1.3 Students work in pairs. One student says a time and the other has to move the hands on a clock face to show the time to 5 minute intervals. Alternatively, one student sets the time and the other has to say it.

1.4 Students observe as teacher makes a demonstration clock as follows.



Students are led to write the 5 minute intervals (5, 10, 15, …, 60) on their clocks next to the hour numeral.

1.5 Students are taught time in 5 minute intervals. They are reminded that there are 60 minutes in an hour and reference is made to the number they write on their clock faces. They are allowed to show 20 minutes past the hour, 35 minutes past, etc.

State and write dates in a variety of ways and calculate the duration between given dates.

2.1 Students are asked to tell the different ways they know to write the date. Their responses are recorded on the board. A discussion follows. Students are given format (if not given by students): e.g.
07. 17. 02 02 17 07
Year day month month day year

2.2 Students are grouped and each group is given a calendar. The calendar is reviewed through questioning. Students are guided to identify a particular date, e.g., 4th March 2007. Students tell what date it will be 3 days later. What day will it be? Other dates where weeks and months have elapsed are done in the same way. Example: Calculate the duration of time between (i) 12th April 2007 to 3rd May 2007 (ii) June 15th 2007 to 15th July 2007

2.3 Students use a calendar to write dates in different ways. They write Monday 8th May 2006 or 08/05/06, for example. They are given statements to complete:

i. □ minutes = 1 hour
j. □ hours = 2 days
k. 14 days = □ weeks
l. □ months = 1 year

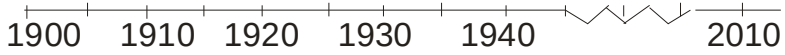
Use time related vocabulary to describe real life situations e.g. anniversary, decades, century, millennium and leap year.

3.1 Students are shown a calendar and questioned to reveal information given on the calendar. They tell what day on the calendar is (a) New Year's Day, (b) Christmas Day, (c) Student's birthday, (d) 3rd November
Students are posed with questions, such as:

i. How often does a leap year occur?
ii. How many days are there between January 6th and February 1st?

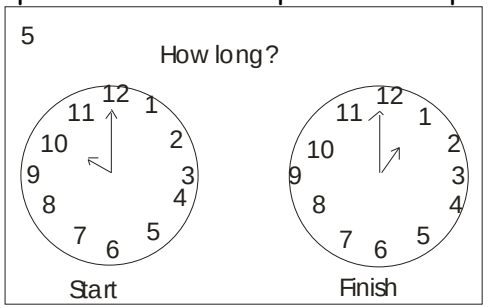
iii. How many years are there in 1 century?
iv. How many years of independence will Dominica be celebrating?

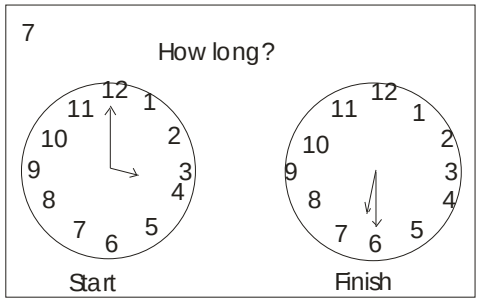
3.2 Students are shown a time line for Dominica, as illustrated below. They put in important events e.g. Hurricane David, Independence, World War 2, etc. They are posed with questions – e.g. in which century…? In which millennium…?



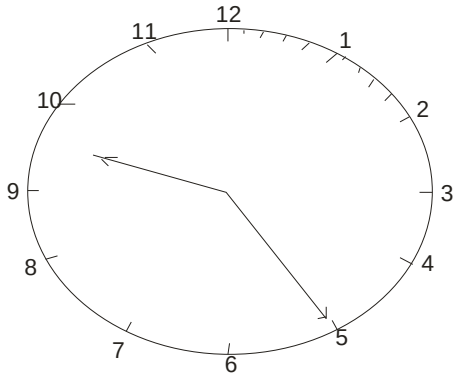
Create and solve problems involving time and duration.

4.1 Students are presented with simple duration problems to help them understand the concept of time.





4.2 Students are given examples that include clocks which are slow and fast. Example: This clock is 5 minutes fast. Put it to the correct time. What is the correct time?



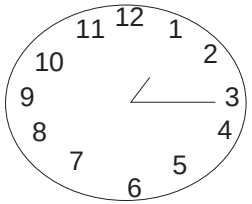
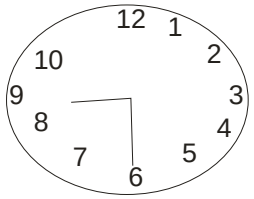
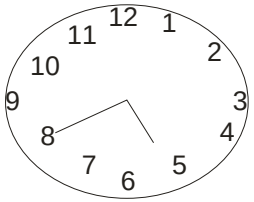
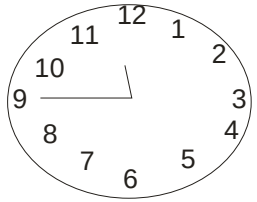
4.3 Students are shown a clock face and told a story in which Sabrina is leaving home to go to school now. They are asked to reveal what time it is. They are shown another clock face which shows the time at which Sabrina arrives at school. They are asked to say how long her journey to school was. They are asked to suggest what time assembly ended if it started at the time Sabrina arrived and lasted for 15 minutes.

RESOURCES

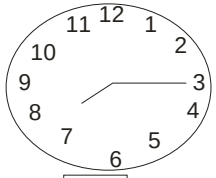
Model clocks, real clocks, worksheets, calendars, stamp clocks

ASSESSMENT

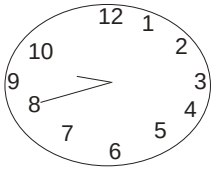
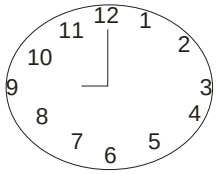
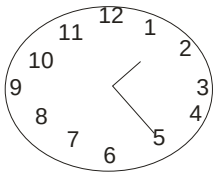
1.1 Shown clock faces (as in the examples below), students can give (write or utter) an expression that tells (indicates) the time shown.

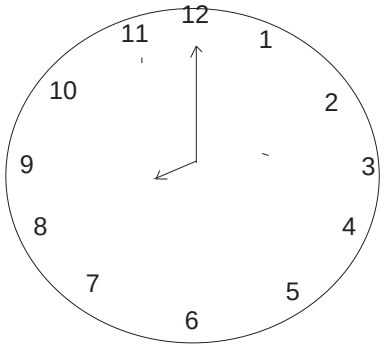
1.2 Fill in the missing time


7:15

A quarter past seven

1.3 Look at the clock. Use it to answer these questions.



i. What time is half an hour after the time shown?
ii. School starts at the time shown on the clock. Jane came 5 minutes before school started. At what time did she arrive at school?
iii. Tom was 15 minutes late. What time did he arrive?
iv. Mr Drigo came to school half an hour before the start of the school and left 45 minutes after. At what time did he leave the school?

1.4 Write answers to these questions

a. How far does the long hand travel in 1 hour?
b. How many minutes are there in $\frac{1}{4}$ hour?
c. How many minutes are there in $\frac{1}{2}$ hour?
d. How many minutes are there in $\frac{3}{4}$ hour?

TERM 3 STRAND 4: Statistics and Data Handling UNIT 3: GOING SHOPPING (1 week – 8 sessions)

AT 4	**LO 2: Use, construct and interpret pictographs and charts using simple scales** ***Success Criteria***

1. Explain why it may be necessary to use one picture or block to represent more than one unit of data.
2. Read data presented in pictographs and bar graphs that use a simple scale in real life problems.
3. Select an appropriate method and scale to represent a set of collected data in real life problems
4. Interpret data presented in pictographs and bar graphs that use a simple scale in real life problems.

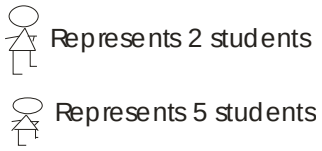
ACTIVITIES

Explain why it may be necessary to use one picture or block to represent more than one unit of data.

1.1 Students are presented with a table which shows the number of students in each house at school.

House	Tally	Total
Red	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	45
Blue		30
Green		40
Yellow		35

They are grouped. Each group is given two graphs representing the same information using different scales. Example:



Students compare the graphs and write their findings.

Read data presented in pictographs and bar graphs that use a simple scale in real life problems.

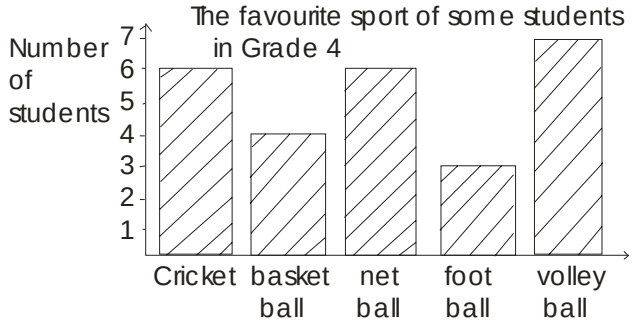
2.1 Students are presented with pictograph. They observe and discuss amongst themselves

Favourite fruit of Grade 4 students

Banana	
Pears	
Oranges	
Grapes	
Mangoes	

Students are posed with questions based on the pictograph. Example: They are questioned to reveal what each stickman represents and the number of students who preferred orange.

2.2 Students are presented with a bar graph as illustrated below.



Students observe the bar graph and discuss their observations. They are questioned to suggest

(a) why it is called a bar graph
(b) what the height of each bar shows
(c) what is noticed about the width of the bars

They such and such explains the height of the bars and the use of appropriate scales
They are guided to read and interpret the bar graph

Select an appropriate method and scale to represent a set of collected data in real life problems

3.1 Students are informed that they are going to find each other's favourite toy. They are allowed to interview each other. The information collected is tallied on the board and a table is drawn.

Favourite toy	number of students
Truck	4
Dolls	8
teddy bears	3
Game boy	10
Balls	2
Computer	6

Students select an appropriate method (pictograph or bar graph) to display their information. They are allowed to come up with their own scales.
After they complete their graphs, they discuss them and are questioned, e.g., to reveal (i) the type of graph they used and (ii) the scale they used.

Interpret data presented in pictographs and bar graphs that use a simple scale in real life problems.

4.1 Students are allowed to find out what months they are having their birthdays. They then complete a table, as shown below.

Month	tally	number of students
January		
February		
Etc.		

Students use the information collected to draw a bar graph.
They are questioned on the graph, e.g., to reveal

v. The number of students born in April
vi. The number born in October
vii. The month in which most students were born
viii. The month in which fewest students were born

4.2 Students are taken by the roadside. They are to tally the different vehicles that they see. Students complete a table, as the example below.

Vehicle	Tally	Number of vehicles
Cars		
Buses		
Trucks		
SUV's		
Vans		

Students use the information collected to draw a pictograph. For help in interpreting their graph, they are questioned to reveal

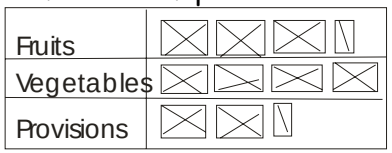
i. the number of cars seen
ii. the number of vans seen
iii. the type of vehicle that was most popular

RESOURCES

Pictures, worksheets, graphs

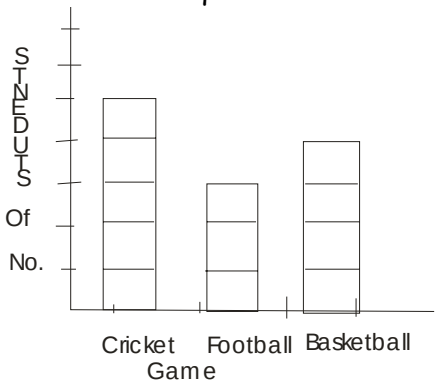
ASSESSMENT

1. The pictograph shows the number of boxes of produce that was shipped to the USA by AGRO Ltd. ☒ represents 100 boxes.



   i. How many fruits were shipped to the USA?
   ii. How many more vegetables than provisions were shipped to the USA?
   iii. How many boxes does ▯ represent?

2. Use the graph to answer these questions.



   i. If 20 students like cricket, how many students does ▯ represent?
   ii. How many students like football?
   iii. How many more students prefer cricket to football?

TERM 3 STRAND 5 Patterns, Functions and Algebra UNIT 4: My Favourite Things (1 – 2 weeks – 14 sessions)

AT 5	**LO 2: Solve simple problems based on number patterns** ***Success Criteria***

1. Identify the pattern in a sequence of numbers
2. Complete sequences of numbers
3. Generate number sequences
4. Conduct simple number investigations

ACTIVITIES

Identify the pattern in a sequence of numbers

1.1 Students are involved in making a 'function machine' as illustrated in the picture below. In the arrangement is a truck, on which a string is attached for pulling. The function machine is a large box designed in such a way that an operator can influence what happens in the truck once it enters the machine. The operator may be doing this from a hole on the top of the box, or (if the box is large enough) from within the box itself.

The class lets the truck enter the machine. Before it enters, the number of 'nice things' in it is recorded. After it passes through the machine, the number is again recorded.

Number before	1	2	3	4	5	6	7	8	9	10
Number after	4	5	6	7	8	9	10	11	12	13

The numbers generated are recorded in a table.
Students are led into a discussion which makes clear that the numbers that come out of this function machine together form a sequence. So one way in which the machine might be used is to generate a sequence.
Students are led to see that in the sequence 4, 5, 6, 7, …, the first term is 4, the second term is 5, the third term is 6, and so on.
Students discuss how to get the next term once we know the one just before it. They discover the pattern in the sequence.
Students are asked to suppose that the sequence that the machine makes or generates is 3, 6, 9, 12, 15, …
Students work out the pattern by revealing that to get any term when you know the one just before it, you simply add 3.

1.2 Students are shown various sequences, say, on charts. For each sequence, they are questioned to discover the pattern.

1.3 In groups, students are given tables showing other number sequences generated using the function machine. They are allowed to identify the pattern.

1.4 Groups are allowed to make their tables of number sequences that could be generated using the function machine. They exchange their tables with other groups to solve by finding the pattern.

Complete sequences of numbers

2.1 Students are given tables showing number sequences that are incomplete. Students work (i) in groups and (ii) independently to complete each sequence.

2.2 Students are presented with a sequence, examples (i) 8, 16, 24, 32, ___, 48 (ii) 73, 69, 65, ___, 57, 53 (iii) 81, 79, 77, ___, ___ (iv) 1, ___, ___, 31, 41 (v) 2 + 9, 3 + 8, ____, ____, 6 + 5, 7 + 4, 8 + 3. Students discuss how the sequence is generated (from the function machine) and they work out the pattern.

Generate number sequences

3.1 Students are asked to suppose that for every number that we feed into it, the machine first adds 4 and then divides by 2. They discuss what sequence it generates (makes) when we feed the counting numbers into it.

$$\begin{array}{cccccc} 1 & 2 & 3 & 4 & 5 & 6 \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ \frac{5}{2} & \frac{6}{2} & \frac{7}{2} & \frac{8}{2} & \frac{9}{2} & \frac{10}{2} \end{array}, \ldots$$

In discussing the pattern, students should be able to see that if the term just before the one we want is, say, $\frac{100}{2}$, then what we seek, the number that comes next, is $\frac{101}{2}$.

3.2 Students are grouped. Each group is given flash cards with different instructions: e.g. (i) [add 5], [÷ by 2], (ii) multiply by 3. Students build sequences based on their instructions.

3.3 Students are allowed to create their own sequences based on their initiatives.

Conduct simple number investigations

4.1 Students are given a statement and they proceed to investigate its truth. Examples: (i) The sum of two numbers is always smaller than their product. (ii) The sum of the digits of a multiple of 3 is always divisible by 3.

4.2 Give examples of (i) a number with 5 factors; (ii) a pair of numbers whose product is 69.

4.3 Start with an answer – e.g. 27 (i) How many different computations can you make that give 19 as an answer? (ii) Which three numbers can you add/multiply that give 68 as an answer?

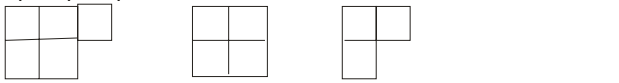
4.4 Investigate to find out whether the following statements are (a) always true (b) sometimes true (c) never true. (i) All numbers in the eighth times table are divisible by 4. (ii) A number that has only three factors is a square number.

RESOURCES

Number charts, sequences, patterns, flash cards

ASSESSMENT

1. Given a sequence, students can identify the pattern, by saying what happens to the number each time it enters the function machine. For example, they can say, 'Each time 2 is added to the number' or 'Each time 3 is subtracted from the number'.

2. Given a sequence, students can complete the sequence.
   Look carefully at each pattern below and fill in what is missing
   i. *Δ**Δ***Δ*Δ**Δ _____
   ii. □□□∩∩□□∩∩□ ____
   iii. $\frac{1}{4}, \frac{2}{4}, \frac{3}{4}$ _____
   iv.  _____
   v. $1\times1, 2\times2, 3\times3,$ ___

3. Given some instruction, students can generate the sequence. Example: You have a machine that adds 1 more each time. What sequence do you get if the number before are as in the table?

Number before	1	2	3	4	5	6	7	8	9	10
Number after										

4. k

TERM 3 STRAND 3 Measurement UNIT 5: HELPING MUMMY (1 – 2 weeks 14 sessions)

AT 3	**LO 6: Create and solve real life problems involving calculations for buying and selling items** ***Success Criteria***

1. Read and write amounts of money up to $10 000
2. Represent amounts of money up to $100 using various combinations of notes and coins
3. Calculate the cost of a set of items given cost of that item and vice versa
4. Create and solve simple real life problems involving cost price and selling price.

ACTIVITIES

Read and write amounts of money up to $10 000

1.1 Students are grouped. Each group is given a collection of coins and allowed to use various combinations of one dollar coin, twenty-five cent coins, ten-cent coins, five-cent coins, two-cent coins and one-cent coins to form specified amounts, such as (i) $2.50, (ii) $3.25, (iii) $4.08, (iv) $11.00. The amounts are then read and then revealed in written words. Example, for $2.50, this amount is first called out and then the student writes 'two dollars and fifty cents'

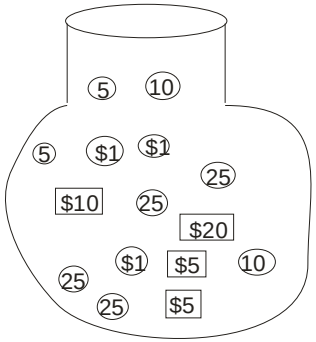
1.2 Students are told a story in which mention is made of an amount of money (e.g. $150.00) used to purchase a desired object. Students read the amount and then reveal it in written words.

1.3 Students are engaged in writing amounts of money in words when they are given in figures – e.g. (i) write $ 325.00 in words; (ii) write $520.25 in words.

1.4 Students are engaged in writing amounts in figures when given in words.

Represent amounts of money up to $100 using various combinations of notes and coins

2.1 Students are told a story in which, to buy items for their class, the pupils of Grade 4 Black have collected money, as shown in the bottle.



They are asked to suggest which notes/ coins they would use to buy

(i) a box of chalk for $8.30
(ii) a wall chart for $16.55
(iii) a standing far for $42.15

Calculate the cost of a set of items given cost of that item and vice versa

3.1 Students are shown a chart with a list of items with their cost attached to them. They are given different situations where a customer comes in and buys a number of items. Example, Harold buys 5 shirts at $25 each. How much does he pay for the shirts? Students work out the total cost.

3.2 Students are given the bill of a customer who bought a certain number of items:

3 shirts @ _____
total $ 60

They are to work out the cost of one shirt.

Create and solve simple real life problems involving cost price and selling price.

4.1 Students observe as teacher places different items on a table. They are questioned. Example: If I want to make a profit of $20, how much must I sell the necklace? Students are given items where cost price is given, there is a profit or a loss and they have to work out the selling price and vice versa.

4.2 Students use items from the shop corner to create their own cost price/ selling price. They are to work in pairs where the other student has to figure out the selling price/ cost price given the profit or loss.

4.3 Students create their own problems involving cost price and selling price and work them out.

4.4 Students are given word problems involving cost price and selling price to work out.

RESOURCES

Play money, items from class shop, real coins

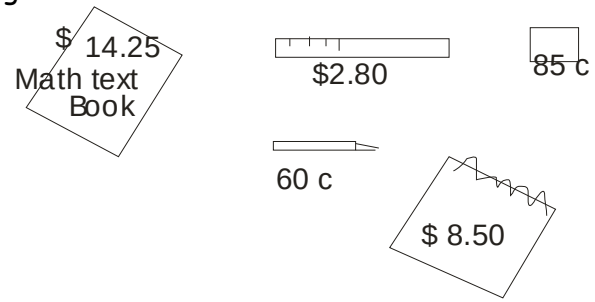
ASSESSMENT

5. How much money

I. $ 50 $ 20 $ 1 25 10 5

Ii. $ 50 $ 10 $ 5 5 5 5

6. Use the following:



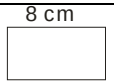
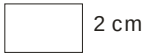
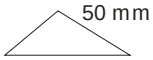
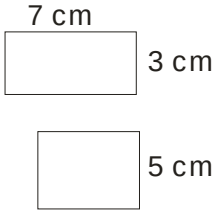
i. What is the cost of a textbook and a ruler?

ii. Fredie bought 5 pencils, 2 rulers and 3 erasers. How much did he pay for it?

iii. Serena has $ 30. She bought a textbook and a notebook. How much change did she get?

EXEMPLAR LESSON PLANS

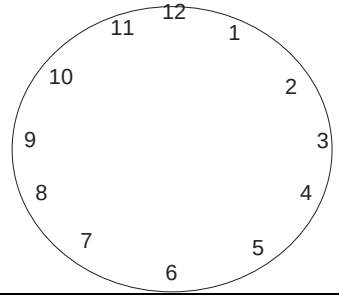
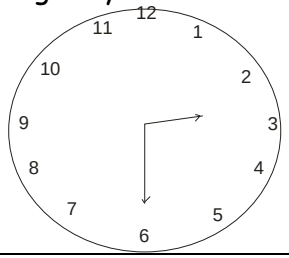
EXEMPLAR LESSON PLAN		**TERM 1**	
UNIT 3: Helping Mummy		**TOPIC: Perimeter**	
TIME: 30 minutes			
EXPECTED BACKGROUND KNOWLEDGE OF STUDENTS: Students are already familiar with units of measure for length			
LEARNING OUTCOME 1: Estimate and accurately measure length and distances and calculate perimeter using standard units			
SUCCESS CRITERIA 3: Calculate the perimeter of a 2D shape			
ORGANISATION & TIME	**TEACHER ACTIVITY**	**STUDENT ACTIVITY**	**RESOURCES**
WAY IN **5 min**	▪ Begin by asking how many steps are needed to walk around the classroom.	▪ Estimate answers ▪ Demonstrate by walking and counting steps.	▪ Classroom ▪ Feet
DEVELOPMENT **15 min**	▪ Presents tape measure or metre rulers and the assistance of 2 – 3 students find the distance around the class. ▪ Explains the term perimeter to class ▪ Have students find the perimeter of objects in the classroom	▪ Estimate the distance round the class, then use the tape/ ruler to measure ▪ State their understanding of term ▪ Work in groups to find perimeter of objects	▪ Tape measure ▪ Metre rulers ▪ Rulers ▪ Classroom - Desks - Chalkboard - charts
CONCLUSION **5 min**	▪ presents the 2D shapes with missing lengths	▪ Respond to questions by giving a unit of measure for missing lengths hence finding the perimeters	

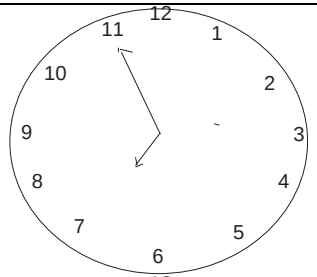
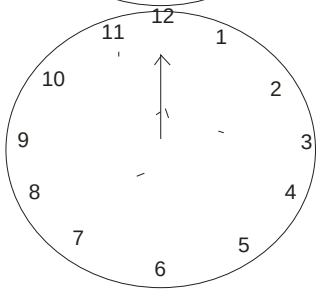
	1)  2)  3)  ▪ Questions students as to what is needed to find their perimeter		
WAY ACROSS **5 min**		▪ Students state different occasions where people would need to find perimeter	
ASSESSMENT	▪ Find the perimeter of these shapes  ▪ Construct (2) shapes with perimeters of 24 cm ▪ The length of a rectangle is 6 cm. If the width is 4 cm, what is its perimeter?		
EVALUATION OF LESSON			

EXEMPLAR LESSON PLAN TERM 2			
UNIT 1: ON THE BEACH **TOPIC: Addition**			
TIME: 30 minutes			
EXPECTED BACKGROUND KNOWLEDGE OF STUDENTS Students can ▪ count to 1 000 ▪ subtract using concrete materials			
LEARNING OUTCOME 3: Create and solve real life problems involving addition and subtraction with numbers up to 10 000 and involving multiplication and division of numbers up to 2 digit numbers			
SUCCESS CRITERIA 4 Students will create and solve problems involving subtraction			
ORGANISATION & TIME	**TEACHER ACTIVITY**	**STUDENT ACTIVITY**	**RESOURCES**
WAY IN **5 min**	▪ Teacher begins the lesson with the song "Ten Green Bottles."	▪ Students sing the song subtracting one bottle every time	
DEVELOPMENT **17 min**	▪ Teacher presents a problem. Tom had 443 marbles; he gave 155 to his brother. How many marbles does he now have? ▪ On the board, teacher then writes 625 - 247 462 - 189	▪ Students read the problem together and decide how they would solve it ▪ Students create problems involving these subtractions using their own method and then find solutions	

CONCLUSION **5 min**	▪ Teacher demonstrates how to subtract using base then materials	▪ Students use this method to check their answers to the problems.	
WAY ACROSS **5 min**		▪ Students explain which method was easier for them to use and why	
ASSESSMENT **3 minutes**	▪ Teacher presents the following o In a barrel there are 515 mangoes; 276 of them are ripe. How many green mangoes are there? o 382 boys attend a certain school. If there are 620 students in the school, how many girls are there in the school?	▪ Students use their preferred method to solve problems ▪ Students also create some problems of their own	
EVALUATION OF LESSON			

EXEMPLAR LESSON PLAN TERM 3			
UNIT: Helping Mummy **TOPIC:** Time			
TIME: 30 minutes			
EXPECTED BACKGROUND KNOWLEDGE OF PUPILS: ▪ Students have leant about the concept of time			
LEARNING OUTCOME 5: Find duration between events and develop an understanding of the relationship between different units of time			
SUCCESS CRITERIA 1: Tell, read, write and represent time on the hour, half-hour, quarter hour and five minute interval in a variety of ways			
ORGANISATION & TIME	**TEACHER ACTIVITY**	**STUDENT ACTIVITY**	**RESOURCES**
WAY IN **5 min**	▪ Teacher draws a clock face on the board and ask students to observe the numbers on the clock ▪ Teacher then draws a digit clock	▪ Students discuss numbers on the clock saying what each number represents; also the difference between the hands of the clock and what they represent. ▪ Students compare the digital and analogue clock telling their difference	Clocks
DEVELOPMENT **15 min**	▪ Teacher presents an activity e.g. she tells students that she is referring to the location of a particular pupil. Teacher stands	▪ Twelve students form a circle around the teacher ▪ Students guess the location of pupil indicated	Teacher Students

	somewhere in the centre of the classroom as on the centre of a clock facing the front. Teacher provides students with clues as to the location of the pupil as if she was calling out time. ▪ Teacher repeats the process three times before allowing students to identify the pupil.	by the teacher. ▪ Pupils record the time location of students and calculate the time elapsed between locations.	
CONCLUSION **5 min**	▪ Teacher presents clock faces to the class with instructions as to what to do. ▪ The group which gets the answer in the short time wins	▪ Students are divided in groups of threes or fours ▪ Students divide the clock faces into 3 parts by drawing 2 lines across so that so that each part adds up to 26	Analogue clocks without hands e.g. 
WAY ACROSS **5 min**		▪ Students state the importance of each stroke between the numbers on the clock	
ASSESSMENT	▪ Write the time shown on each clock digitally 	▪	

	  ▪ The time shown is 2:45 1) What is 5 minutes before that time? **2)** 1o minutes past that time. Draw clocks to show your answer ▪ n		
EVALUATION OF LESSON			

References