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INTRODUCTION

The Primary mathematics toolkits are intended to assist teachers with instructional planning using the Belize National Curriculum for Primary Schools. They include advisory content examples and teaching points for every lower division mathematics learning outcome. These are presented in the order they should be taught. Material from the toolkits can be copied directly into instructional plans. Teachers can edit the material in any way and can add their own examples and teaching points.

The advice in the toolkits is based on the belief that knowledge in mathematics is best developed as students solve problems, explore and record results, analyze observations, make and test generalizations and reach new conclusions. The suggestions aim to provide practical, adaptable and real life content with a focus on helping students explore mathematics for themselves.

The toolkits present activities that should challenge students to complete active learning tasks, both independently and collaboratively. Instruction in new concepts proceeds from simple ideas that are familiar to the students to more complex, abstract ideas. Whenever possible, these concepts are initially presented with concrete and picture-based examples. They encourage the use of manipulatives as tools for allowing students to explore mathematical ideas for themselves. Furthermore, the content examples and teaching points encourage teachers to link mathematical concepts to the students’ experiences outside the classroom so that they see mathematics as useful and worthwhile. Instruction should also promote a positive attitude, encourage students to take intellectual risks, involve frequent word-based problem solving and allow students to learn from each other.

Long term success in mathematics depends on the ability to mentally perform routine calculations with fluency and accuracy. These skills, and the accompanying understanding of number concepts and quantities, can be developed through the frequent playing of games that require mental calculations. Fluency and accuracy in the performance of mental calculations should be consolidated through short, individualized, repetition and practice activities such as drills conducted on a daily basis. Whole class chanting and choral response of memorized procedures and tables is less effective and its use should be minimized.
1.25 Apply the concept of thousands to real life situations.

The aim of this learning outcome is to help students understand how big “thousands” are and how this relates to smaller numbers. It can be useful to contrast items typically counted in ones with those counted in tens, hundreds and thousands.

For example:

I have 10 fingers, 32 teeth, 206 bones and thousands of hairs on my head.

At night, we can see thousands of stars.

There are hundreds of students in my school but there are thousands of students in the whole city.

Belize has thousands of square miles of land.

My toy car cost a few dollars but a real car costs thousands.

It is thousands of miles from Belize to China.

Students’ understanding can be assessed by asking them to discuss which of the following might be true.

(i) My friends and I played softball for thousands of hours last weekend.

(ii) A man won fifteen thousand dollars in the scratch game.

(iii) My journal has thousands of pages.

(iv) There are thousands of grains of sand in this jar.

(v) Thousands of people watched Belize play Mexico at football.

(vi) It is thousands of miles from Belmopan to Punta Gorda.

1.26 Read, write and match numbers up to 1,000 using numerical symbols and words.

In Infant two, students mostly used numbers up to 99. As they enter standard one, it is important they understand that a three digit number is in the hundreds.

The hundreds column for the place value chart therefore needs introducing.

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
<th>Number in Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
<td>7</td>
<td>Two hundred forty-seven</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>Four hundred thirty-two</td>
</tr>
</tbody>
</table>

Students should write sentences and short paragraphs that require them to write numbers in words. For example, “The woman lived to be one hundred eight years old.” “Juana paid three hundred sixteen dollars for her new sofa.”

There are some conventions for using commas, hyphens and the word and.

To make it easier to read long numbers, commas are often added. A comma can be used in writing 1,000.

Compound numbers between twenty-one & ninety-nine are hyphenated. Fractions are also hyphenated, for example two-thirds.

The use of and between the hundreds and tens is optional. It is used more in British English than North American. For example both two hundred twelve (U.S) & two hundred and twelve (British) are considered correct. The word and is not used between thousands and hundreds.
NUMBERS

There are multiple skills involved in learning outcome 1.24. Student’s understanding can be evaluated in the following ways:
1. The teacher calls out a number in words and the students select the correct numerals from a set of options.
2. The teacher calls out a number in words and the students write down the numerals.
3. The teacher shows a number written in words and a student reads it out loud.
4. The teacher shows a number written in numerals and a student reads it out loud.
5. The teacher shows a number written in words and a student writes down the numerals.
6. The teacher shows a number written in numerals and a student writes down the words.

1.27 Draw a segment of a number line to show a selection of positive numbers up to 1,000.

A number line does not have to start at zero. A segment of a number line can start and end with any number. Students may be asked to create number lines with missing numbers that they share with classmates who fill in the gaps.

This activity encourages peer teaching, gets students to test their own knowledge and assist each other in the learning process.

Games can be used to reinforce this concept. For example, musical chairs can be played with a number placed on each chair in sequence. Number lines can be drawn on the floor with chalk.

1.28 Explain that each column of a place value chart is ten times more or less than the neighbouring column for numbers between 0 and 999.

The place value of a digit increases by ten times as we move left on the place value chart and decreases by ten times as we move right.

In 555

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

The 5 in the hundreds column is worth 10 times more than the 5 in the tens column – 500 is 10x50.
The 5 in the tens column is worth 10 times more than the 5 in the ones column – 50 is 10x5.
The 5 in the tens column is worth 10 times less than the 5 in the hundreds column.
1.29 Compare numbers up to 1,000 using the symbols for equals (=), less than (<) and greater than (>).

This builds on knowledge of the place value chart. It is important that students realise that the number in the hundreds column is the one they look at first. Base ten blocks can be used to help students visualize the concepts.

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

If the number in the hundreds column is the same, then they need to compare the numbers in the tens column, and so on.

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>7</td>
<td>5</td>
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</tbody>
</table>

An additional rule is that a number with more digits is larger. 100 is larger than 99.

<table>
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<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td></td>
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<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
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</tr>
</tbody>
</table>
If two numbers have the same number of digits, the number with the bigger digit on the left hand side is greater.

If the leftmost digits are the same, we compare the next digit to the right and keep doing this until the digits are different.

### 1.30 State, read and write numbers in expanded form, up to 1,000.

A good understanding of place value is essential previous knowledge for this learning outcome. Expanded form is a numeric form of writing a number to stretch out the different values into a number sentence.

For example:

123 = 100 + 20 + 3

Place value charts with a blank row can be used as follows:

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

200 + 70 + 5

This concept should be introduced using base ten blocks or other real objects.

Writing numbers in expanded form allows students to look at a number and identify the value of each digit. Students write the expanded form of a number from hearing the word name of a number. Remind students that value means how much a number is worth.

**Most standard one students will not have done enough multiplication to understand an alternative way of expanding numbers, that is:**

123 = (1 × 100) + (2 × 10) + (3 × 1).

This form is introduced at a later grade level.
2.9 Sequence non-consecutive positive numbers between 0 and 1,000 in ascending and descending order, using the number line.

This learning outcome builds on the skill of using a segment of a number line covered in learning outcome 1.25. For example, circle the following on the number line below and then write them from smallest to largest: 868, 860, 863, 867, 870.

Students should also be introduced to number lines that have intervals other than 1, such as 5 and 10. This will help with reading rulers and measuring scales.

Use the number line below to help you write these numbers in descending order, that is from largest to smallest.

560, 585, 570, 605, 595.

Students used the concept of ascending and descending order in both infant one and infant two. However, at the beginning of this learning outcome, it should be reviewed using single digit numbers. This can be done in a game, for example shake a dice three times and write the numbers in descending order.

Even after students have mastered arranging small numbers in order, they might get confused with ordering numbers such as 500, 290 and 179 if they do not have a strong understanding of place value.

2.10 Identify the next or a missing, object, action, shape, colour, sound, or number in a series.

This learning outcome builds on pattern work done in infant two. Teachers can start by reviewing this using simple world patterns.

What colour is the next ball in the series?

Progressively, more complex patterns can be introduced.

Students can be taught to ask a series of questions to help them find the next number in a series.

For example:

Are the numbers all ascending or descending?
51, 52, 53, 54 . . .

Is the gap between the numbers the same?
20, 24, 28, 32 (the gap is 4 in each case)

Does the gap between the numbers change in a regular way?
2, 4, 8, 16, 32 (the gap doubles in each case).
**2.11 Create increasing, decreasing and alternating patterns using objects, actions, shapes, colours, sounds or numbers.**

Students will understand patterns better if they have the opportunity to make their own. The teacher’s role is to provide appropriate tools and some guidance. The most important instruction is that items relate to each other in a special way to make the pattern.

For example make a decreasing pattern using the following blocks.

![Decreasing pattern blocks](image)

Students enjoy making patterns out of real objects such as beans.

![Beans pattern](image)

Or

![Alternating pattern with beans](image)

Students can:

- Make an alternating pattern by shading in this shape using two different colours.
- Create an alternating pattern using three actions, for example, clap, stamp, jump, clap, stamp, jump.
- Students should apply the rules from learning outcome 2.11 when creating number patterns.
- For example, starting with 1, create a pattern that has a gap of 3 between each number (1, 4, 7, 10, 13 . . .).
**2.12 Describe increasing, decreasing and alternating number patterns and patterns of real objects, actions, sounds, colours, and shapes.**

This learning outcome assumes that students have a good grasp of the skills required for the two previous ones. It requires the students to work out what connects each item in the pattern and describe the relationship in words.

For example, “in this pattern, each square is smaller than the one to the left.”

![Pattern of squares](image)

In this pattern, each number is 2 less than the one to its right. It is a decreasing pattern.

12, 10, 8, 6, 4

“The white beans and red beans alternate.”

![Pattern of beans](image)

The type of bean changes every second one.

**2.13 Count forward and backward by 2’s, 5’s, 10’s and 100’s from any given starting number between 0 and 1000.**

Counting by a number other than one is called skip counting. To skip count you add the same number over and over, for example 5, 10, 15, 20, 25 involves adding 5 each time.

Skip counting can start at any number.

Students can be taught this skill by counting coins, bottle tops, counters or similar small objects.

![Pattern of coins](image)

Skip counting helps students see patterns in numbers as well as lays a great foundation for number sense and learning multiplication facts. The more patterns they see in numbers, the more generalizations they can make about how numbers work.

A lot of time is to be spent on skip counting using number lines and charts so that the students can visualize what’s happening to the numbers.
Skip counting can be linked to real life by using play money. For example, students can count out a pile of $100 notes. The use of games, such as jumping on a number line drawn on the floor, may also be very effective in helping students to visualize counting forwards and backwards.

### 7.15 Describe horizontal, vertical, diagonal, intersecting, parallel and perpendicular lines.

The different lines required for this learning outcome are:

- **Horizontal**: A line that goes from side to side and not up and down. The horizon is the line that runs from side to side and divides the land from the sky. The red lines at the top and bottom of the flag of Belize are horizontal.

- **Vertical**: A line that goes straight up and down. A flag pole is vertical.

- **Diagonal**: A line that has a slope. The flag of Jamaica has diagonal lines.

- **Intersecting**: Two lines that cross each other. The multiplication sign is made of two intersecting lines (x).

- **Parallel**: Two lines that run next to each other but never meet. Railway tracks make parallel lines. The red lines on the flag of Belize are also parallel lines. The equals sign (=) uses parallel lines.

- **Perpendicular**: Two lines that meet like a T. A flag pole is perpendicular to the ground.

**Activity:** Identify the lines in these flags. Which countries do they belong to?

As well as practicing drawing each type of line, students need to explain what gives each line its name. This can be done using familiar, everyday language supported by real-world examples.

A line that goes from side to side and not up and down is horizontal. The horizon is the line that runs from side to side and divides the land from the sky. The red lines at the top and bottom of the flag of Belize are horizontal.

A line that goes straight up and down is vertical. A flag pole is vertical.

A line that has a slope is diagonal. The flag of Jamaica has diagonal lines.

Intersecting lines are two lines that cross each other. The multiplication sign is made of two intersecting lines (x).

Two lines that run next to each other but never meet are parallel. Railway tracks make parallel lines. The red lines on the flag of Belize are also parallel lines. The equals sign (=) uses parallel lines.

Two lines that meet like a T are perpendicular. A flag pole is perpendicular to the ground.

### 7.16 Draw common shapes with specified lengths of sides using a ruler.

The focus of this learning outcome is on practicing drawing accurately using a ruler. Learning how to draw using a ruler is an important step in developing measurement skills.

Students should learn the following:

- Rulers have numbers and markings. Each number represents one inch. The smaller lines represent parts of an inch. Note that the zero is often not printed on the ruler. This can be called “the invisible zero”.

- When drawing, the pencil should first be placed at the zero point on the ruler.

- It is important to have a strong grip on the ruler to make sure it does not move as the line is being drawn and that fingers are behind the drawing edge.

- Some rulers have inches on one side and centimetres on the other. However, in this curriculum, the metric system is not used in lower division.

- The act of drawing should end at the correct point, for example, at the 1 inch mark.

Teachers can use an observational checklist to evaluate this learning outcome.
7.17 Investigate how the perimeter of common shapes such as triangles, squares and rectangles is calculated.

The perimeter of a shape is the distance around it.

To consolidate the concept of perimeter, students can measure the sides of many different shapes before they investigate how calculations can be used.

One way of finding the perimeter is to measure the length of every side and add them all together. In this case, the perimeter of the triangle is 6ft+5ft+3ft = 14ft.

To find the perimeter of a rectangle or square students can add the lengths of all four sides.

The next step is to give students examples with information missing. They can measure all the sides. However, they can also be asked if they can think of another way of getting the answer.

In a rectangle, opposite sides are equal. This means that Side A must be 4 inches and Side B must be 7 inches. The total distance around the rectangle can be worked out in two ways:

- Adding the lengths of all the sides together – 7+7+4+4=22
- Or, in the case of rectangles, using a simple formula (two times the length added to two times the width)

$$2 \times 7 + 2 \times 4 = 22$$

This can be represented as $$2 \times W + 2 \times L$$

If a shape is completely regular, then the perimeter can be calculated by multiplying the length of one side by the total number of sides.

The perimeter of this triangle is 5+5+5=15. Since all sides are equal, students can both measure all three sides and add them together (5in+5in+5in=15in ) and multiply the length of one side by the total number of sides (5inx3in=15in).

Note that the only way to find the perimeter of an irregular shape is to measure all the sides and add them together.

$$\text{Perimeter} = 2ft+2ft+5ft+1ft + 3ft = 13ft.$$
7.18 Create compound shapes using manipulatives such as pattern blocks, sticks, straws, string or other materials.

Provided with pattern blocks, construction paper cut into different shapes or any other manipulatives, students can create compound shapes or a design or piece of art using the shapes, as shown in the example below.

Encourage students to mention the names of the different shapes that they will use when constructing compound shapes.

Students may also work on square paper to create rough sketches of their compound shapes, before creating them.

7.19 Describe 3-D figures such as cones, cylinders, cubes, cuboids and pyramids.

This learning outcome requires students to use sentences to describe shapes. They can also give real life examples.

What am I?

A cuboid has 6 faces, 8 vertices and 12 edges. A cube is a cuboid that has all sides of the same length. Dice are cubes.

A toilet paper roll is a cylinder. It has a circle at each end.

A cone has a circle at one end an apex at the other.

A square pyramid has faces. The one at the bottom is a square. The ancient Egyptians built square pyramids.

Teachers should introduce this topic by bringing in real world objects of different shapes such as:

- cornflakes box, dominoes
- dice, rubik’s cube
- tin of food, oats container, Pringles can
- ice cream cone, traffic cone.

Students can then hunt for similar shapes in the classroom, such as board erasers, glue stick and chalk.

Students will use their knowledge of 2D shapes to identify the shapes of faces on 3D shapes. To avoid over counting the faces, students can mark each face in some way.

Students should increasingly use geometry vocabulary such as “face”, “edge”, “vertex”, “curve” and “apex”. A vertex is where two edges meet. The tip of a cone is an apex because it is formed by one curved surface.
### 3.15 Add 2-digit numbers without regrouping using a range of mental and written strategies.

This learning outcome was introduced in infant two. The emphasis in standard one can be on writing the sums correctly.

Students should already be able to add single digit numbers fluently and accurately. If they cannot, it is important to spend time building this skill before proceeding to double digit addition.

Adding a single digit to a 2-digit number without regrouping should be reviewed and practiced, for example, 24+5=29.

For this learning outcome, students should practice using only sums that do not require changes in the tens column such as:

```
  3 5
+ 2 3
_____
  5 8
```

Students should make sure that:

- the top number in the ones column is exactly above the number below it;
- the top number in the tens column is exactly above the number below it;
- the ones column is added first, followed by the tens column.

### 3.16 Subtract 2-digit numbers without regrouping using a range of mental and written strategies.

For this learning outcome, for each column, the digit in the first number should be higher than in the second. If the digit in the second number is higher, then regrouping or borrowing becomes necessary.

This does not require regrouping because 5>3 and 3>2.

```
  3 5
- 2 3
_____
  1 2
```

However, the following problem requires regrouping because the ones digit in the bottom number is higher than the ones digit in the top number. This should not be introduced at this stage.

```
  4 3
- 2 5
_____
  1 8
```

When introducing this learning outcome, ensure that students can already mentally subtract single digit numbers, for example 7-4=3. If not, then spend time practicing and reinforcing this skill.

Whenever students subtract using unit columns, they start with the numbers in the ones column, followed by the tens and then the hundreds.

Problems related to real life examples should be used. For example:

Miguel has 25 cents. He spends 13 cents, how much will he have left?

Juanita began the day with 63 marbles. At break, she lost 11 marbles while playing a game with Teresita. How many marbles did Juanita have left?

Marta finished a game with 53 points. Tony finished it with 85 points. How many more points did Tony have than Marta?
3.17 Add 2-digit numbers with regrouping using manipulatives such as base ten blocks or lego.

Regrouping is changing a group of more than ten ones into separate groups of tens and ones.

For example, 11 ones is the same as 1 ten and 1 one.

Before introducing the concept of regrouping in addition, play games that require students to regroup objects such as beans. This could be a race. For example, give each group a pile of beans. The first group to correctly divide the beans into piles of tens and ones is the winner.

This can also be done in a PE lesson. Ask the whole class to make one big group. Instruct them to get into groups of exactly ten students. The groups are the “tens” and students left over are the “ones”.

Base ten blocks and lego blocks can also be used to reinforce the concept of regrouping before it is applied to addition.

- When using base ten blocks, students have to exchange ten unit blocks for one ten block.

The following requires regrouping because the sum of the digits in the ones column is more than 10.

<table>
<thead>
<tr>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>+</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>

8+5=13. This is regrouped as 10+3. The 10 is carried over to the tens column.

<table>
<thead>
<tr>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>+</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>

This can be done with base ten blocks.

Now add the ones together.

This is more than ten, so we have to regroup by exchanging ten ones blocks for one ten block.

This is put with the other tens.

Now adding everything together we get the final answer.

25+48=73
3.18 Subtract 2-digit numbers with regrouping using manipulatives such as base ten blocks or lego.

A key concept in subtraction is regrouping by borrowing ten from the next column in the place value chart.

Regrouping is necessary when the top number in the ones column is smaller than the bottom number in the same column. This concept should first be introduced by subtracting a large single digit number from a 2 digit number.

In 21 – 8, 8 cannot be subtracted from 1, so regrouping is used.

\[
\begin{array}{c|c}
\text{tens} & \text{ones} \\
\hline
2 & 1 \\
- & 8 \\
\end{array}
\]

This can be demonstrated using base ten blocks placed in a large place value chart.

First try to subtract 8 ones blocks from the ones column. Since this is impossible, we have to exchange one of the ten block for ten ones blocks.

In the written sum, the 2 in the tens column is changed to a 1 and the 10 is added to the ones column to get 11.

\[
\begin{array}{c|c}
\text{tens} & \text{ones} \\
\hline
1 & 11 \\
\end{array}
\]

In the written sum, the 2 in the tens column is changed to a 1 and the 10 is added to the ones column to get 11.

Once students have grasped the concept by subtracting single digit numbers, they can be introduced to subtracting one 2-digit number from another.

In the following example, 8 cannot be subtracted from 5, so regrouping is necessary.

\[
\begin{array}{c|c}
\text{tens} & \text{ones} \\
\hline
3 & 5 \\
- & 1 \\
\end{array}
\]

Look at the ones column. 8 cannot be taken from 5 so we need to borrow.

Take one of the ten blocks and exchange it for ten ones.

In the written sum, the three in the tens column is changed to a 2 and the 5 in the ones column becomes 15. Since we are taking ten from the tens column, the 3 is changed to 2. (The 3 represents 30. After taking 10 from 30, there are 20 left.)

\[
\begin{array}{c|c}
\text{tens} & \text{ones} \\
\hline
2 & 15 \\
- & 8 \\
\end{array}
\]

Now it is possible to take 8 from 15 in the ones column and 1 from 2 in the tens column to complete the calculation.

\[
\begin{array}{c|c}
\text{tens} & \text{ones} \\
\hline
2 & 3 \\
- & 1 \\
\end{array}
\]

\[
\begin{array}{c|c}
\text{tens} & \text{ones} \\
\hline
1 & 7 \\
\end{array}
\]

Cross out the 2 and write 1.
3.19 Add three 2-digit numbers with and without regrouping in unit columns.

This is the first learning outcome that requires students to add three numbers together instead of only two. This requires holding something in working memory, which is a new technique that may need practicing mentally with single digit numbers first.

2+4+3=9 because 2+4=6 and 6+3=9.

Students can use a variety of techniques, including using real objects and counting on.

When introducing adding 3 numbers together in unit columns, start with calculations that do not require regrouping.

\[
\begin{array}{c}
  2 & 1 \\
  1 & 2 \\
+ & 1 & 5 \\
\hline
  4 & 8 \\
\end{array}
\]

Before introducing calculations that require regrouping, review the skills developed in learning outcome 3.17.

\[
\begin{array}{c}
  1 \\
  2 & 9 \\
  1 & 2 \\
+ & 1 & 5 \\
\hline
  5 & 6 \\
\end{array}
\]

A 1 is added at the top of the tens column because 9+2+5=16, which is more than 9.
### 8.19 Measure, compare and record the length of lines, distances and the size of objects using the customary units of inches, feet and yards.

Use a ruler or a yard stick to measure different objects in and outside the classroom. For example, measure a pencil, an eraser, a notebook, a calendar or someone’s foot using a ruler. Outside the classroom use either a yard stick or a measuring tape to measure the school verandah, steps, length of a door or the length of a slide on the playground.

Students should practice using a variety of measuring instruments such as a 12 inch ruler, a yard stick or a measuring tape and give them enough practice with these instruments. Students can discuss which instrument to use in which circumstance. For example a 12-inch ruler is not as good as a yard stick for measuring the outside of a building. However, a measuring tape is even better.

### 8.20 Measure, compare and record the mass of various objects in the customary units of pounds and ounces.

This learning outcome requires students to compare weights of objects using the same units, that is objects weighed in ounces are compared to each other, not to ones weighed in pounds. Comparing ounces and pounds is covered in Measurement B, learning outcome 8.23.

Achieving this learning outcome requires students to carry out practical tasks using kitchen and bathroom scales. They need to learn how to read these scales properly and how to make accurate records.

![Scales Illustration]

Each short line indicates one ounce.

Students can find out that ounces are used to weigh very light objects but that pounds can be used for heavier objects.

Comparing weights can also be done by reading the labels of food packages.

Students should use comparative adjectives when comparing, such as heavier than and lighter than.

They can also make relative comparisons: this object is much heavier than that one. This is only a little bit lighter.
**8.21 Measure, compare and record the capacity of a container using the customary units of cups, pints, quarts and gallons.**

In infant two, students were introduced to cups and pints but not quarts and gallons. Students can explore the units of cups, pints, quarts and gallons by playing with different containers to determine their capacity. Students should experiment pouring liquid into a variety of differently sized and shaped containers. Students will find out that the attributes of certain containers determines the capacity of the liquid they can hold. For example, they can experiment to see if a tall, thin container holds more or less liquid than a short, fat one. For this learning outcome, comparing means using words such as larger than, smaller than and twice as large as. Conversion between units is covered in learning outcome 8.23 in Measurement B.

**8.22 Estimate the length, mass and capacity of objects before accurately measuring them.**

The key skill in this learning outcome is estimation that is guessing a number that is close to the right answer based on previous experience. How long do you think this pencil is?

Now measure it using a ruler.

Estimate the amount of orange juice by comparing it to the amount of lime juice. There is about twice as much orange juice as lime juice. There is about one cup of lime juice and two cups of orange juice.
3.20 Show the relationship between addition and subtraction.

Addition and subtraction are related because addition can be undone by subtraction. If 2 is added to 1, the answer is 3, and if 2 is subtracted from 3, the answer is 1. 1+2=3 is undone by 3-2, which equals 1.

When one operation is undone by another, they have an inverse relationship. This can be demonstrated with a simple activity. Start with one block. Add two more. How many do we have?

\[
\begin{array}{ccc}
\text{Blocks} & \text{Blocks} & = \text{Blocks}
\end{array}
\]

Now take away two blocks from the three that you have. 1 block is left.

\[
\begin{array}{ccc}
\text{Blocks} & \text{Blocks} & \text{Blocks}
\end{array} - \begin{array}{ccc}
\text{Blocks}
\end{array} = \begin{array}{ccc}
\text{Block}
\end{array}
\]

For each set of three different numbers, you can create two addition and two subtraction calculations that are related.

\[
\begin{array}{ccc}
1 + 2 = 3 & 3 - 2 = 1 \\
2 + 1 = 3 & 3 - 1 = 2
\end{array}
\]

This can be demonstrated using numbers and symbols on cards.
3.21 Add two 3-digit numbers without regrouping using unit columns.

This is the first time students are asked to add 3-digit numbers. It may be useful to review the three column place value chart first.

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
<th>Number in Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
<td>7</td>
<td>Two hundred forty-seven</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>Four hundred thirty-two</td>
</tr>
</tbody>
</table>

Since regrouping is not involved, then the process for adding 3-digit numbers is the same as adding 2-digit numbers.

\[
\begin{array}{ccc}
1 & 2 & 3 \\
+ & 1 & 5 \\
\hline
2 & 7 & 7 \\
\end{array}
\]

\[
\begin{array}{ccc}
6 & 4 & 1 \\
+ & 2 & 4 \\
\hline
8 & 8 & 1 \\
\end{array}
\]

3.22 Subtract two 3-digit numbers without regrouping using unit columns.

Subtracting two 3-digit numbers without regrouping is essentially the same as subtracting two 2-digit numbers. Students should be required to complete real world word problems. They need to recognize phrases that indicate they need to subtract such as:

"Find the difference" / "What is the difference"
“How many were left"
“How much more than"
“How much less than”

Real world problems can be used to review measurement.

Ivan walked three hundred and twenty-eight yards. Debbie walked two hundred and eight yards. How many more yards did Ivan walk than Debbie?

\[
\begin{array}{ccc}
3 & 2 & 8 \\
- & 2 & 0 \\
\hline
1 & 2 & 0 \\
\end{array}
\]
3.23 Add two 3-digit numbers with regrouping using manipulatives such as base ten blocks.

Adding 3-digit numbers with regrouping uses the same techniques as adding 2-digit numbers with regrouping, so 2-digit addition should be reviewed and practiced first.

Sometimes, regrouping may have to be done more than once in the same problem.

\[
\begin{array}{c}
255 \\
+178 \\
\hline
\end{array}
\]

Use base ten blocks to demonstrate this.

Create the two numbers to be added, 255 and 178.

When the ones are added, it is more than ten so regrouping is needed. The 13 ones become 1 ten and 3 ones.

\[
\text{1 ten + 5 tens + 7 tens = 13 tens.}
\]

This requires regrouping into 1 hundred and 3 tens.

After all the regrouping, the students should have.

\[
255 + 178 = 433
\]

In writing, the regrouping is indicated by adding a one to the appropriate column.

\[
\begin{array}{c}
1 \\
255 \\
178 \\
\hline
433
\end{array}
\]
### 3.24 Subtract two 3-digit numbers with regrouping using manipulatives such as base ten blocks.

Before introducing subtraction using 3-digit numbers, students should review and practice subtraction with regrouping using 1 and 2-digit numbers (learning outcome 3.18 in Addition and Subtraction A). Students should then practice using 3-digit numbers in cases where regrouping is only required once.

![Base ten blocks](image)

363

- 171

______

Start by creating 363 using base ten blocks.

Now subtract 171 from 363 starting with the ones column, 3-1 is 2. However, in the tens column, 7 cannot be taken from 6 (60-70) so regrouping is necessary.

Change one of the hundreds into 10 tens. There are now 16 ten blocks so 7 can be taken away.

In writing:

363

- 171

______

Subtracting 3 digit numbers has an additional step in cases such as:

\[
\begin{array}{c}
100 \\
-2
\end{array}
\]

Give students a hundred block and ask them to work out the procedure for subtracting two ones blocks.

First they will need to exchange the hundred block for ten tens blocks.

Next, exchange a tens block for ones. Note there are 9 tens blocks left.

Now there are 9 tens and ten ones, so there are still one hundred blocks. Now the 2 ones can be subtracted leaving 98.

In writing this can be demonstrated in steps

Step 1: Regroup the hundred as ten tens.

Step 2: Regroup the tens as 9 tens and 10 ones.
8.23 Convert among units within the customary system of length, mass and capacity.

This learning outcome focuses on understanding the relationship between customary units. It does not involve the metric system.

One introductory idea is to relate customary units of length to parts of the body. Ask students to measure objects using their thumbs, the length of their foot and the length of their stride. Ask them how many thumb lengths equal one foot and how many feet placed end to end equal one stride.

In some languages, the words for measurements are related to parts of the body. In Spanish, the word for thumb is *el pulgar* and an inch is *la pulgada*.

| Conversion Chart |
|------------------|-----------------|
| **Length**       | **Weight**      |
| 12 inches = 1 foot | 16 ounces = 1 pound |
| 36 inches = 1 yard |                 |
| 3 feet = 1 yard   |                 |
| **Capacity**     |                 |
| 2 cups = 1 pint   |                 |
| 4 cups = 1 quart  |                 |
| 2 pints = 1 quart |                 |

Real world word problems can be used. Since the focus is on the measurements, ensure the calculations are not too complex.

Tina bought five pints of milk. How many cups did she have altogether?

Miguel’s height is thirty-six inches. How tall is he in feet?

David bought one and a half pounds of flour. How many ounces did he get?

A goal in football is eight yards wide. How many feet is this?

A tailor needs six feet of cloth to make a shirt. How many yards is this?

8.24 Convert a length of time between minutes and seconds.

This learning outcome requires students to calculate the total number of seconds in a length of time such as one minute and ten seconds. However, they may not yet have the multiplication skills required to do this with larger numbers.

Provide students with a simple chart to use:

<table>
<thead>
<tr>
<th>Number of Minutes</th>
<th>Number of Seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>2</td>
<td>120</td>
</tr>
<tr>
<td>3</td>
<td>180</td>
</tr>
<tr>
<td>4</td>
<td>240</td>
</tr>
<tr>
<td>5</td>
<td>300</td>
</tr>
<tr>
<td>10</td>
<td>600</td>
</tr>
</tbody>
</table>

Using the chart, the conversion can be done as an addition problem as follows.

2 minutes and 12 seconds = 120 seconds + 12 seconds.

5 minutes and 38 seconds = 300 seconds + 38 seconds.

Real world word problems should be used.

It takes Lisa five minutes and twenty seconds to walk from her home to school. How many seconds is this in total?
8.25 Identify the temperature of the environment, in either degrees Celsius or Fahrenheit, by using a thermometer with a scale.

This is the first learning outcome that refers to temperature, although students may be familiar with the concept from previous knowledge and social studies.

Students need to use temperature vocabulary. Temperature is measured in degrees. In Belize, the Fahrenheit temperature scale is used for the daily weather forecast. 100 degrees Fahrenheit is a hot day. It feels cold at night if the temperature is lower than 70 degrees Fahrenheit.

As digital thermometers become more common, traditional mercury or alcohol thermometers are increasingly rare. It may be necessary to make a model of a thermometer out of card to teach this learning outcome. The main skill required for this learning outcome is reading a scale. Students should already be familiar with reading the scale on a ruler and on scales used for weighing food in the kitchen.

Some scales require counting by 2’s, 5’s or 10’s. In this thermometer, each short line is 2 more than the line below it.

When reading a thermometer, it is important to look carefully at the top of the line made by the mercury or alcohol.
### 4.5 Multiply, mentally, 1-digit numbers by 2, 3, 4, 5, and 10 with automaticity.

The focus of this learning outcome is “automaticity” which means being able to give the answer immediately and without having to work it out. Automaticity helps students do math quickly and accurately.

Students achieve automaticity through repetitive practice using games, flashcards and drills. This is not the same as chanting times tables. However, arrays can be used.

### 4.6 Explore the multiplicative identity of a number, that is if you multiply a number by 1, the product is that original number.

When you multiply any number by 1, the answer is the same number.

\[ 2 \times 1 = 2 \quad 54 \times 1 = 54 \quad 987 \times 1 = 987. \]

This also works for fractions. \( \frac{1}{2} \times 1 = \frac{1}{2} \)

For example, if we give 10 apples to one child, the number of apples given away will be \( 10 \times 1 = 10 \). That is, the number of apples remains the same.

The number 1 is called the multiplication identity or the identity element for multiplication of numbers because it does not change the identity (value) of the numbers during the operation of multiplication.

### 4.7 Round-off to the nearest ten to estimate when multiplying.

There are two steps involved in this learning outcome: rounding off and multiplying. Since students may not be familiar with the concept of rounding off, this should be practiced first.

A number is rounded to the nearest ten. It can be rounded up or rounded down. A number line can be used to demonstrate this.

- The closest "tens number" to 23 is 20.
- The closest "tens number" to 28 is 30.

If a number ends in a 5, it is rounded up.

- 75 is rounded up to 80.

Multiplying by ten can be done by adding a zero after the number. This works for any whole number, however large.

\[ 5 \times 10 = 50, \quad 53 \times 10 = 530. \]

To help students understand this, review the learning outcome 1.26 *Explain that each column of a place value chart is ten times more or less than the neighbouring column for numbers between 0 and 999.*

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

20 is ten times more than 2, so \( 2 \times 10 = 20 \).

200 is ten times more than 20, so \( 20 \times 10 = 200 \).

Discuss with students why rounding off to the nearest ten before multiplying is useful.

For example, if you are in a store and you see that a toy boat costs $27, you can quickly estimate that ten boats will cost approximately $300. By first rounding 27 to 30 and then multiplying 30 by 10.
**4.8 Multiply a 2-digit number by a 1-digit number.**

Writing and working out multiplication calculations horizontally is introduced in Multiplication and Division B, learning outcome 4.9.

The aim of this learning outcome is to develop fluency and automaticity in mental multiplication of 2 digit numbers by single digit numbers. This should start with multiplying by 2 and 3.

For example

3x15=45, 13x3=39, 24x2=48, 50x2=100.

Students should practice multiplying using repeated addition and decomposing.

21x3 = 20x3 + 1x3 =63

This can be demonstrated using beans.

<table>
<thead>
<tr>
<th>21</th>
<th>+</th>
<th>21</th>
<th>+</th>
<th>21</th>
</tr>
</thead>
</table>

21x3 can be calculated using repeated addition:

\[ 21 + 21 + 21 = 63 \]

Decomposing can be used as follows:

21=20+1,

So 21x3 is 20+20+20 + 1+1+1 or 20x3 + 1x3

\[ 20+20+20 + 1+1+1 \]

or 3x20

\[ 20+20+20 \]

+ 3
5.7 Describe parts of a whole or of a set using fractions with numerators other than one, such as 2/3, 3/4, 2/5, 5/6, 4/10.

In infant two, students used fractions with a numerator of one, such as ½ and ¼. This is the first time they will have used fractions with higher numbers as numerators.

Begin by reviewing, 1/2, 1/3, 1/4 and 1/5 using shaded diagrams.

Review that the number at the bottom, or the denominator, tells us how many total parts there are.

This shape has been divided into a total of four parts and therefore the denominator, is 4.

Review that the top number, which is the numerator, tells us how many parts have been shaded. In this, one part has been shaded so the fraction is 1/4.

Practice this with a variety of shapes, keeping the numerator at 1.

Once students have clearly grasped the concept that 1/5 indicates one part out of a total of five, numerators other than one can be introduced.

This shape has 3 parts in total so the denominator is 3.

2 parts are shaded so the numerator is 2.

The fraction is 2/3

Practice with a variety of shapes. These have 3/4 shaded.
5.8 Compare and sequence fractions with like denominators with the aid of pictures, the number line, fraction strips or other manipulatives.

This learning outcome can be introduced as follows:

Compare these two shapes. Which has the larger part shaded?

\[
\begin{array}{cc}
\frac{1}{3} & \frac{2}{3} \\
\end{array}
\]

This shows that \(\frac{2}{3}\) is greater than \(\frac{1}{3}\).

Study these three fraction strips, insert the numerators.

\[
\begin{array}{cccccc}
\frac{1}{5} & \frac{1}{5} & \frac{1}{5} & \frac{1}{5} & \frac{1}{5} & \frac{2}{5} \\
\frac{1}{5} & \frac{1}{5} & \frac{1}{5} & \frac{1}{5} & \frac{1}{5} & \frac{2}{5} \\
\frac{1}{5} & \frac{1}{5} & \frac{1}{5} & \frac{1}{5} & \frac{1}{5} & \frac{2}{5} \\
\end{array}
\]

Now write the fractions in order from smallest to largest.

\[
\frac{1}{5} < \frac{2}{5} < \frac{3}{5}
\]

Students can now be introduced to fraction number lines.

\[
\begin{array}{cccccc}
0 & \frac{1}{4} & \frac{2}{4} & \frac{3}{4} & 1 \\
\end{array}
\]

Note in this example \(\frac{1}{2}\) is written as \(\frac{2}{4}\) because students are comparing fractions with like denominators. Equivalent fractions are introduced in standard two.

The number line can be used to help solve real world problems such as:

Corey cycled one quarter of a mile. Ashae cycled three quarters. Who cycled more?

\[
\begin{array}{cccccc}
\frac{1}{4} & \frac{2}{4} & \frac{3}{4} & 1 \\
\end{array}
\]
5.9 Add two or more proper fractions with like denominators.

This is the first time students have added fractions. The concept should be introduced using shaded diagrams, fraction strips, pictures and so on.

Adding fractions can make more sense if it is linked to real world situations.

If Dale has one quarter of a pizza and Delilah also has one quarter of a pizza. How many quarters do they have altogether?

\[ \frac{1}{4} + \frac{1}{4} = \frac{2}{4} \]

This fraction strip shows \( \frac{1}{5} \).

\[ \frac{1}{5} + \frac{1}{5} = \frac{2}{5} \]

5.10 Convert fractions with tenths to decimals for example 3/10 is the same as 0.3.

This is the first time students have been introduced to numbers with decimals. The intention of this learning outcome is to focus on tenths between zero and one. Numbers with decimals above one will be covered in standard two.

The first step is to consolidate students’ understanding of tenths. This can be done using fraction strips and shaded shapes.

Next, students can practice sequencing fractions using a number line divided into tenths.

Once students have a strong grasp of tenths, decimals, that are numbers that represent fractions that have 10 as the denominator, can be introduced.

Note that only one decimal place is introduced in standard one.
5.11 Add and subtract numbers with one decimal place.

As with 5.10, this learning outcome focuses on adding decimals between 0 and 1, that is 0.1, 0.2 to 0.9.

Note that sums, such as 0.6+0.7, that have an answer that exceeds 1 should be avoided since this introduces a new concept.

This learning outcome builds on the knowledge acquired in learning outcomes 5.9 and 5.10. Students need to understand that $\frac{1}{10} + \frac{2}{10} = \frac{3}{10}$ is the same as 0.1+0.2=0.3.

This can be demonstrated using fraction strips or shaded diagrams.

One-tenth of this block is shaded pink

Now shade two-tenths in blue. How many tenths are shaded altogether?

Now do the same using the decimal strips.

At this stage, teacher may introduce the place value chart with decimals using a zero in the ones column.

<table>
<thead>
<tr>
<th>ones</th>
<th>tenths</th>
<th>Read as</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>zero point one or one tenth</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
<td>zero point two or two tenths</td>
</tr>
</tbody>
</table>

This allows students to write calculations vertically.

Avoid calculations that require regrouping.

5.12 State, read and write decimals to one decimal place.

This learning outcome should be taught at the same time as 5.11 and 5.12.

Students need to be comfortable with both ways of reading the numbers.

For example, 0.4 is zero point four as well as four tenths.
4.9 Represent multiplication problems both horizontally and vertically.

This learning outcome introduces several new concepts. Skills should be developed one step at a time and much careful explanation will be required.

Before introducing this learning outcome, practice mental multiplication using single digit numbers (see learning outcome 4.8).

When introducing the written calculations vertically, it is important to start with calculations that do not require regrouping – that is the product of the individual numbers being multiplied does not exceed 100. For example 24x2.

Write the larger number above the smaller number, making sure that the top ones number is exactly above the bottom one.

\[
\begin{array}{ccc}
2 & 4 \\
\times & 2 \\
\hline
4 & 8 \\
\end{array}
\]

The number at the bottom is the multiplier.

The next step is to multiply the ones in the top number by the multiplier (2x4) followed by the tens (2x2). The answers must be written in the appropriate column. Many students get this part wrong.

\[
\begin{array}{ccc}
2 & 4 \\
\times & 2 \\
\hline
4 & 8 \\
\end{array}
\]

This procedure, without the need to regroup, should be practiced until students are performing it fluently.

When students have mastered this technique, introduce problems that require carrying over to the next column.

\[
\begin{array}{ccc}
1 & 6 \\
\times & 3 \\
\hline
3 & 8 \\
\end{array}
\]

3x6=18, ten ones are moved to the next column, leaving 8 behind.

Students can use base ten blocks to check this.

First multiply the ones column by 3.

Next multiply the tens column by 3.

Regrouping is required because there are too many ones blocks.
**4.10 Read and write multiplication number sentences that include the symbols x and =.**

This learning outcome can be taught at the same time as the previous one – when students are writing calculations horizontally.

An example of a multiplication number sentence is $25 \times 4 = 100$

**4.11 Multiply numbers by using a 12 by 12 chart.**

Students can use a 12x12 chart to help them as they learn related multiplication skills. This enables them to focus on the skills being acquired rather than on calculating.

This learning outcome does not require memorization of the times table chart.

However, reading a 12x12 chart does require a skill that some students may not have acquired, that of finding a piece of data by looking at where a column meets a row.

In the example below, the answer to $12 \times 4$ is found by reading across from the 12 row until it meets the 4 column.

### The 12 Times Table

<table>
<thead>
<tr>
<th>X</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>18</td>
<td>20</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
<td>18</td>
<td>21</td>
<td>24</td>
<td>27</td>
<td>30</td>
<td>33</td>
<td>36</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
<td>24</td>
<td>28</td>
<td>32</td>
<td>36</td>
<td>40</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>55</td>
<td>60</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>24</td>
<td>30</td>
<td>36</td>
<td>42</td>
<td>48</td>
<td>54</td>
<td>60</td>
<td>66</td>
<td>72</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>14</td>
<td>21</td>
<td>28</td>
<td>35</td>
<td>42</td>
<td>49</td>
<td>56</td>
<td>63</td>
<td>70</td>
<td>77</td>
<td>84</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>16</td>
<td>24</td>
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<td>54</td>
<td>63</td>
<td>72</td>
<td>81</td>
<td>90</td>
<td>99</td>
<td>108</td>
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<td>44</td>
<td>55</td>
<td>66</td>
<td>77</td>
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<td>110</td>
<td>121</td>
<td>132</td>
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<tr>
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<td>60</td>
<td>72</td>
<td>84</td>
<td>96</td>
<td>108</td>
<td>120</td>
<td>132</td>
<td>144</td>
</tr>
</tbody>
</table>

This skill requires practice. Students can work in pairs. One setting the problem and the other finding the answer. This can also be done as a race.
### 4.12 Investigate that division is the same as repeated subtraction.

Students should be familiar with subtraction. They have also practiced dividing objects into groups. This unit deepens their understanding of division.

Start reviewing by dividing real objects into groups. Use small numbers of objects as follows:

Divide these 8 bottle tops into groups of 2.

If we divide 8 bottle tops into groups of 2, we get 4 groups. We say this as “8 divided by 2 equals 4.”

The division symbol can be introduced at this point (see learning outcome 4.14).

\[
8 \div 2 = 4
\]

Now take the same group of 8 bottle tops and take away 2. Keep taking away 2 until we have nothing left.

How many times do we have to subtract 2 from 8 to get 0?

\[
8 - 2 = 6
\]

Now subtract 2 more.

\[
6 - 2 = 4
\]

Keep subtracting 2 until you reach 0.

\[
4 - 2 = 2
\]

\[
2 - 2 = 0
\]

2 was subtracted from 8 four times.

So \(8 - 2 - 2 - 2 = 0\).

and 8 divided by 2 is 4.

### 4.13 Divide single and 2-digit numbers by 2, 3, 4, 5, 10, without remainders.

The aim of this learning outcome is to develop students’ fluency in dividing numbers mentally.

This skill can be first developed by practicing dividing real objects into groups of equal size.

It can be further developed using games, flashcards and drills.

**With no remainders:**

- All even numbers can be divided by 2.
- All numbers ending in 5 or 0 can be divided by 5
- All numbers ending in 0 can be divided by 10.
- All multiples of 20 can be divided by 4, as can all numbers ending in 4 and 8, 16, 28, 32 and 36.

### 4.14 Read and write division number sentences that include the symbols ÷ and =.

An example of a number sentence that includes the division and equals signs is \(8 \div 2 = 4\). This is read aloud as “eight divided by two equals four.

This skill is developed at the same time as other learning outcomes in this unit.
4.15 Show the relationship between multiplication and division.

If you multiply a number by another, you can undo this operation by dividing by the same number.

In other words, since 6x3=18, then 18÷3=6.

Since division is the inverse, or opposite, of multiplication, you can use arrays to help students understand how multiplication and division are related.

The chart below is showing 4x12=48. However, it can also be used to show that 48÷12=4.

4.16 Solve word problems with real life applications using multiplication and division.

Students can begin to associate certain words or phrases with certain types of problem.

For example, “double” means multiply by two. “Halve” or “cut in half” means divide by two.

Other words and phrases often used in division problems include:

- share
- into equal groups
- split up

Some examples of real world problems are:

Michael wants to give three pencils to each of the other five students in his group. How many pencils will he need altogether?

A bag of water costs 25 cents. How many bags can Shajida buy with 75 cents?

A builder needs 10 concrete blocks for each row of a wall. The wall will be 8 rows high. How many blocks will he need.
DATA

**11.8 Collect data in real life situations.**

This learning outcome relates to quantifiable data, that is, things or events that can be counted. Data can be collected by direct observation or through asking questions. For example, students can collect data from each other related to their favourite colour, the month of their birthday, the animals they have and so on.

In infant one and infant two, students used tally charts to record data. This should be reviewed.

<table>
<thead>
<tr>
<th>Favourite Colours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
</tr>
<tr>
<td>blue</td>
</tr>
<tr>
<td>green</td>
</tr>
<tr>
<td>orange</td>
</tr>
<tr>
<td>red</td>
</tr>
<tr>
<td>yellow</td>
</tr>
</tbody>
</table>

**11.9 Represent data contained in a tally chart or frequency table using pictographs and bar graphs.**

A tally chart is made by putting a mark every time something occurs. A frequency table uses numbers to give the total number of occurrences.

Students should create frequency tables, pictographs and charts using the data collected in learning outcome 11.8.

<table>
<thead>
<tr>
<th>Favourite Colours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
</tr>
<tr>
<td>blue</td>
</tr>
<tr>
<td>green</td>
</tr>
<tr>
<td>orange</td>
</tr>
<tr>
<td>red</td>
</tr>
<tr>
<td>yellow</td>
</tr>
</tbody>
</table>

At this level, it is sufficient for one block or image to represent one object from the data. The pictograph below shows that there were 2 red, 3 yellow and 1 blue bicycle at school. The left hand column is not part of the count.

Colours of Bicycles at School
11.10 Analyse a tally chart of real life events that are based on chance.

This learning outcome requires students to apply an understanding of probability to data they have collected. The simplest task is tossing a coin.

<table>
<thead>
<tr>
<th>Coin Toss</th>
<th>Tally</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heads</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Tails</td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

Students can then answer the following questions.
1. How many times was the coin tossed?
2. Which result happened the most?
3. What is the difference between the number of “heads” and the number of “tails”? 

A good activity for increasing understanding of chance and probability is to record the sum of two dice rolls. 7 is the most likely result because it can be achieved in the most different ways (1+6, 2+5, 3+4, 4+3, 5+2, 6+1). The least likely results are 2 and 12 because they can only be achieved one way (1+1, 6+6). However, because there is an element of chance, the results of a real life experiment might not be exactly as expected.

<table>
<thead>
<tr>
<th>Sum of 2 Dice Rolls</th>
<th>Tally</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>4</td>
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<td>3</td>
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<td>2</td>
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<tr>
<td>11</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

11.11 Discuss situations that involve chance such as certain, impossible or equally likely events.

Students can discuss the data collected in learning outcomes 11.10 to attain learning outcome 11.11. Whenever a coin is tossed, the chance of getting heads is the same as the chance as getting tails.

They can also collect data from rolling a single dice and compare it to adding two dice together. When rolling a single dice, all results are equally likely.

An important understanding is that the chance of getting “heads” or a rolling a six is not affected by previous events. Even if I roll 6,6,6, then chance of getting another 6 is still the same as the chance of getting any other number.

Discussion of certain and impossible can begin with real life situations. Students need to understand the difference between very likely and certain, and between very unlikely and impossible.

This discussion can start by referring to natural and other real events.

In the dry season, it is very likely that the day will be hot. Is this certain or is it possible to get rain?
Is it very unlikely or impossible for there to be a snow storm in Belize?
If a team is winning a football game 10-0 at half time, are they certain to win?
It is certain that people will visit Mars. Do you agree?
11.12 Investigate probability using tables and graphs.

This learning outcome requires students to conduct a simple experiment. It allows them to apply skills learnt throughout the unit.

For example:

This spinner has 3 red sections, 2 yellow sections and 1 blue section.

Spin it 30 times and record the results on a tally chart. Create a frequency table based on the tallies and then a bar graph based on the frequency table.

Compare your group’s results with the results from other groups.

The expected results for the experiment with the spinner are as follows:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>5</td>
</tr>
<tr>
<td>Yellow</td>
<td>10</td>
</tr>
<tr>
<td>Red</td>
<td>15</td>
</tr>
</tbody>
</table>

Did your group get exactly these results? If not, why do you think that happened? Did any group in the class get the expected results?