NCEA Level 1 Numeracy - Number

Understanding place value

Content

This resource supports the teaching and learning of understanding of place value. The sequence is suitable for learners in many contexts, but is designed to underpin the further teaching and learning sequences of 'Multiplying and dividing numbers by powers of 10', 'Estimating answers to calculations' and 'Understanding the metric measurement system and simple conversions within that system'. This sequence is also suitable where tutors are gathering naturally occurring evidence for the achievement of the NCEA Level 1 Numeracy Unit Standard 26623.

Alignment

The content aligns with Step 5 of the *Make Sense of Number to Solve Problems* strand of the Learning Progressions, in particular the *Place Value* Progression.

Intent

After completing the teaching and learning sequence learners will know the place value of digits in any number and understand that as you move to the left in a number the value of each place gets ten times bigger and as you move to the right the value of each place gets ten times smaller.

Sequence

There are three parts to this sequence. Learners will:

1. understand that our number system is based on the number 10 and that the place of a digit in a number indicates the value of that digit ("place value")
2. know the place value of digits in any number
3. understand that, as you move to the left in a number, the value of each place gets ten times bigger and as you move to the right, the value of each place gets ten times smaller.

> **Vocab**
>
> This is a number: 236
>
> The number has the digits 2, 3 and 6 in it.
>
> There are ten digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

1. Understand that our number system is based on the number 10 and that the place of a digit in a number indicates the value of that digit (place value)

Step one: Show learners a number such as 236 and ask what the digits 2, 3 and 6 stand for. Listen for the response that the 2 represents 2 hundreds, the 3 represents 3 tens and the 6 represents 6 units.

Step two: Put the numbers in a three-column place value chart and ask learners what the relationship is between the three places.

Hundreds	Tens	Ones
2	3	6
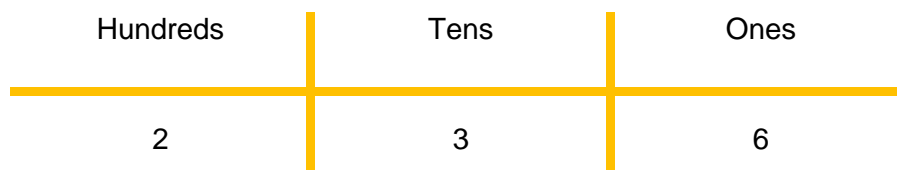
Listen for responses that indicate a relationship of 10 and ask learners if they would agree that we have a number system based on ten.
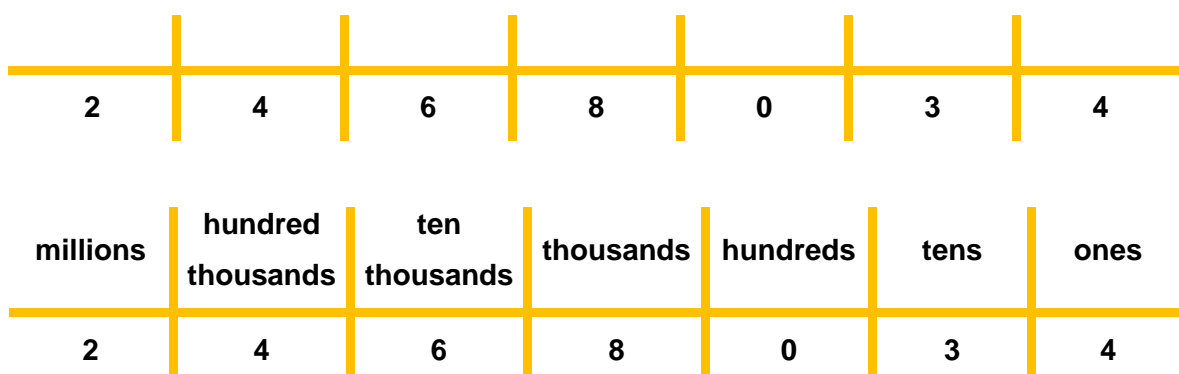

Interesting facts

The number system we use is based on ten and it developed because we have ten fingers! If we had 8 fingers we would have a number system based on 8. Computer language uses a number system based on 2: binary.

The number system we use is a place value system because the **place** of the digit indicates its **value**. Not all number systems are place value systems. The Roman number system is not. Here are some examples of Roman numbers which show that - VII for 7, C for 100.

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2. Know the place value of digits in any number

Step one: Put the number 2 468 034 in a seven-column place value chart and ask learners the name of each place. Record.

| 2	4	6	8	0	3	4
millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones
2	4	6	8	0	3	4

Step two: Ask learners to say the number out loud. It is *two million, four hundred and sixty-eight thousand and thirty-four.* Draw learners' attention to the key learning point below.

<table>
<tr><td colspan="2">Key learning point

The pattern of ones, tens, hundreds repeats for thousands and millions. Recognising this pattern helps with reading large numbers.</td></tr>
</table>

Millions			Thousands			Ones		
100s	10s	1s	100s	10s	1s	100s	10s	1s

Step three: Put the number 1.479 in a four-column place value chart and ask learners the name of each place. Record.

1	4	7	9
ones	tenths	hundredths	thousandths
1	4	7	9
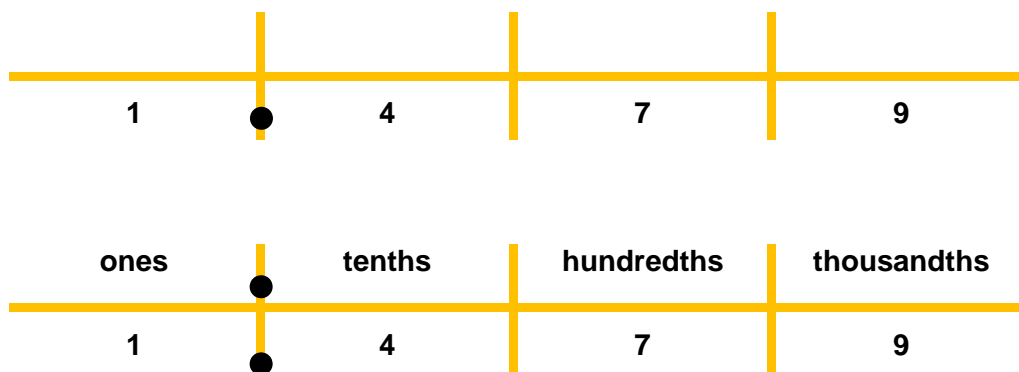
Step four: Ask learners to say the number out loud. It is *one point four seven nine.* Draw learners' attention to the key learning point below.

<table>
<tr><td>Key learning point

1.479 is said as 'one point four seven nine' NOT one point four hundred and seventy-nine.

Many learners have a problem with not seeing decimal numbers as behaving differently from whole numbers. Using the correct language helps with recognising this difference.</td></tr>
</table>

Step five: Have learners practise understanding of the place value of digits in any numbers by:

- showing them lots of whole and decimal numbers and asking them to identify the places of specific digits (For example, *what does the 3 in 4.639 represent?)*
- asking them to put a number in a calculator and increase or decrease the digit in a certain place (For example: key 3654 in a calculator and ask learners to make it 3854 or 3624).

3. *Understand that, as you move to the left in a number, the value of each place gets ten times bigger and as you move to the right, the value of each place gets ten times smaller*

Step one: Show learners the three-column chart below and ask them again to describe the relationship between the columns.

Hundreds	Tens	Ones
2	3	6
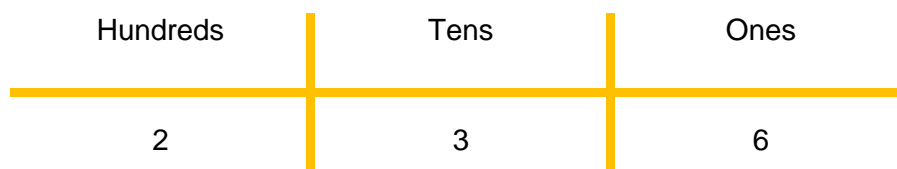
Step two: Listen for and reinforce that, as you move to the left, the value of each place gets ten times bigger and as you move to the right, the value of each place gets ten times smaller.

Step three: Give each learner a copy of the chart below and ask them to draw arrows indicating this.

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Place Value Chart

Draw arrows to show that, as you move to the left, each place gets ten times bigger.

Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones or units	Tenths	Hundredths	Thousandths

Draw arrows to show that, as you move to the right, each place gets ten times smaller.

Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones or units	Tenths	Hundredths	Thousandths