NCEA Level 1 Numeracy - Number

Multiplying and dividing numbers by powers of ten using a place value chart

Content

This resource supports the teaching and learning of multiplying and dividing whole and decimal numbers by powers of 10. This resource is suitable for learners in many contexts but particular examples are contexts where problems require learners to make an estimate of an answer to a calculation or complete metric conversions. 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. Learners should be familiar with the content of the teaching and learning sequence *Understanding Place Value* before beginning this sequence.

Intent

After completing the teaching and learning sequence learners will be able to multiply and divide whole and decimal numbers by powers of 10.

Key learning point

Powers of 10 are:

$10^1 = 10$, $10^2 = 100$, $10^3 = 1000$ etc.

Key learning point

Dividing by 10 is the same as finding $\frac{1}{10}$

Dividing by 100 is the same as finding $\frac{1}{100}$

Dividing by 1000 is the same as finding $\frac{1}{1000}$

Sequence

There are five parts to this sequence. Learners will:

1. revise 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
2. multiply and divide numbers by 10 using a place value chart
3. multiply and divide numbers by 100 using a place value chart
4. multiply and divide numbers by 1000 using a place value chart
5. practise multiplying and dividing numbers by powers of 10 using a place value chart.

1. *Revise 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 columns below and ask them 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: Refer learners to the chart they completed in the teaching and learning sequence *Understanding Place Value*.

2. *Multiply and divide numbers by 10 using a place value chart*

Step one: Discuss with learners that multiplying by 10 is the same as making a number ten times bigger and dividing by ten is the same as making a number ten times smaller.
Therefore if we move a number:

- one place to the left on a place value chart we are making it ten times bigger
- one place to the right on a place value chart we are making it ten times smaller.

Step two: Work through the examples below with learners.

Examples of using a place value chart to multiply by 10

46 x 10 = 460

	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones or units	tenths	hundredths	thousandths
46						**4**	**6**			
46 x 10					**4**	**6**	**0**			

0.48 x 10 = 4.8

	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones or units	tenths	hundredths	thousandths
0.48							**0**	**4**	**8**	
0.48 x 10							**4**	**8**		

Examples of using a place value chart to divide by 10

243 ÷ 10 = 24.3

	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones or units	tenths	hundredths	thousandths
243					**2**	**4**	**3**			
243 ÷ 10						**2**	**4**	**3**		

3900 ÷ 10 = 390

	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones or units	tenths	hundredths	thousandths
3900				**3**	**9**	**0**	**0**			
3900 ÷ 10					**3**	**9**	**0**			

3. Multiply and divide numbers by 100 using a place value chart

Step one: Ask learners what you would do on the place value chart of you wanted to multiply or divide by 100. Listen and reinforce the response that you would move the numbers two places to the left (multiply by 100) or two places to the right (÷ 100).

Step two: Work through the examples below with learners.

Examples of using a place value chart to multiply by 100

46 x 100 = 4600

	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones or units	tenths	hundredths	thousandths
46						**4**	**6**			
46 x 100				**4**	**6**	**0**	**0**			

0.48 x 100 = 48

	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones or units	tenths	hundredths	thousandths
0.48							**0**	**4**	**8**	
0.48 x 100						**4**	**8**			

Examples of using a place value chart to divide by 100

243 ÷ 100 = 2.43

	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones or units	tenths	hundredths	thousandths
243					**2**	**4**	**3**			
243 ÷ 100							**2**	**4**	**3**	

3900 ÷ 100 = 39

	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones or units	tenths	hundredths	thousandths
3900				**3**	**9**	**0**	**0**			
3900 ÷ 100						**3**	**9**			

4. Multiply and divide numbers by 1000 using a place value chart

Step one: Ask learners what you would do on the place value chart of you wanted to multiply or divide by 1000. Listen and reinforce the response that you would move the numbers three places to the left (multiply by 1000) or three places to the right (÷ 1000).

Step two: Work through the examples below with learners.

Examples of using a place value chart to multiply by 1000

46 x 1000 = 46000

	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones or units	tenths	hundredths	thousandths
46						**4**	**6**			
46 x 1000			**4**	**6**	**0**	**0**	**0**			

0.48 x 1000 = 4.8

	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones or units	tenths	hundredths	thousandths
0.48							**0**	**4**	**8**	
0.48 x 1000					**4**	**8**	**0**			

Examples of using a place value chart to divide by 1000

243 ÷ 1000 = 0.243

	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones or units	tenths	hundredths	thousandths
243					**2**	**4**	**3**			
243 ÷1000							**0**	**2**	**4**	**3**

3900 ÷ 1000 = 3.9

	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones or units	tenths	hundredths	thousandths
3900				**3**	**9**	**0**	**0**			
3900 ÷ 1000							**3**	**9**		

5. Give learners a copy of the place value chart resources below and plenty of examples to practise

Place Value Charts