Length – Convert All Units using Place Value.

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Differentiate and Assess

Not every student will be ready to investigate this concept at this Level and so we will need to differentiate to ensure every student is learning at their leading edge. Select the Differentiate button on this screen.

Integrate

Every mathematical concept is integrally related to other mathematical concepts. Teaching and learning related concepts simultaneously develops deep relational understanding. Select the Integrate button on this screen.

Intervene

Some students may not yet be ready to investigate this concept at any Level, and so we will need to provide some intervention. Select the Intervention button on this screen.

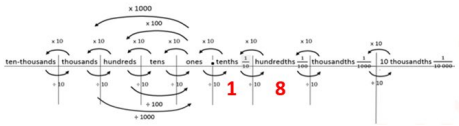
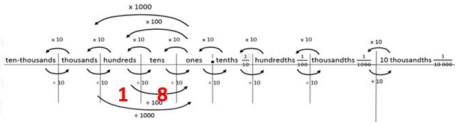
LENGTH – CONVERT ALL UNITS USING PLACE VALUE.

EXPLICIT TEACHING PLAN OVERVIEW PAGE

THIS PAGE IS A SUMMARY OF THE EXPLICIT TEACHING PLAN, INCLUDING STRATEGIC QUESTIONS, AND DESRIBING THE SEQUENCE WHICH WILL OCCUR OVER MULTIPLE LESSONS.

RESOURCES: PENCIL, PAPER

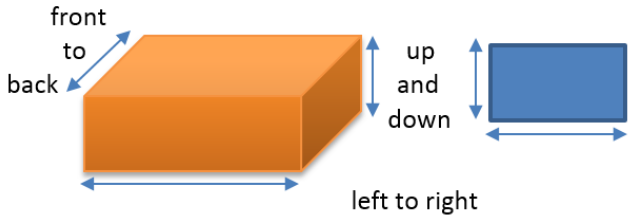
WHAT COULD WE DO?	WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?

Children:
• convert:
  • metres to kilometres, identifying a metre is $\frac{1}{1000}$ kilometre, so dividing number of kilometres by 1000, by moving the digits 3 spaces to the right, for example, 180 metres = 0.18 kilomet
 
 	
  • kilometres to metres, identifying there are 1000 metres in a kilometre, so multiplying number of kilometres by 1000, by moving the digits 3 spaces to the left, for example, 0.18 kilometres = 180 metres
 
 
  • millimetres to metres, identifying a millimetre is $\frac{1}{1000}$ metre, so dividing number of metres by 1000, by moving the digits 3 spaces to the right
  • metres to millimetres, identifying there are 1000 millimetres in a metre, so multiplying number of metres by 1000, by moving the digits 3 spaces to the left
  • centimetres to kilometres, identifying a centimetre is $\frac{1}{100\ 000}$ kilometre, so dividing number of centimetres by 100 000, by moving the digits 5 spaces to the right
• kilometres to centimetres, identifying there are 100 000 centimetres in a kilometre, so multiplying number of centimetres by 100 000, by moving the digits 5 spaces to the left
	Children
	• ask one another questions about converting between units of measurement using multiplicative place value, for example:
	▸ How could we convert from metres to kilometres using multiplicative place value?
	▸ How could we convert from kilometres to metres using multiplicative place value?
	▸ How could we convert from metres to millimetres using multiplicative place value?
	▸ How could we convert from millimetres to metres using multiplicative place value?
	▸ How could we convert from centimetres to kilometres using multiplicative place value?
	▸ How could we convert from kilometres to centimetres using multiplicative place value?

LENGTH – CONVERT ALL UNITS USING PLACE VALUE.

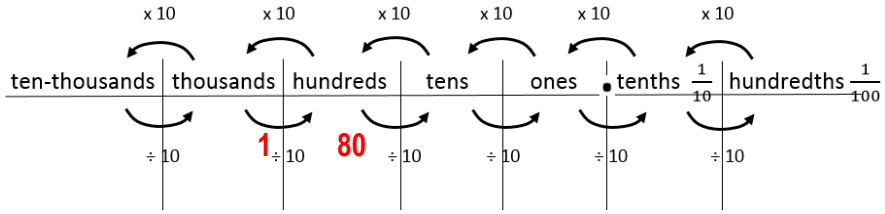
EXPLICIT TEACHING PLAN

FULL EXPLICIT TEACHING PLAN, EMBEDDING DEEP RELATIONAL UNDERSTANDING, METALANGUAGE, AND QUESTIONS THAT MAY BE USED OVER MULTIPLE LESSONS.

WHAT COULD WE DO?	WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?
Children think about, talk and listen to a friend about, then have the opportunity to share what they already know.	▸ Today brings an investigation about length. ▸ What do you know about length? ▸ Talk about length with a friend. ▸ Is anyone ready to share what they are thinking about length?
Display a shape and an object, indicating their dimensions, for example, 	▸ We've investigated measuring length. ▸ We found that when we measure the length of shapes and objects, we are measuring one dimension. ▸ We found we could measure its length up and down, or we could measure its length left to right, or we could measure its length front to back. ▸ We investigated measuring the length all the way around a shape or an object. ▸ And we found that this length was called a perimeter.
Display the length around a shape and an object, for example, 	▸ We've investigated the units we could use to measure lengths. ▸ And we found that we measure lengths in kilometres, metres, centimetres and millimetres. ▸ We found that we could convert between metres, centimetres and millimetres using multiplicative place value by multiplying and dividing by 10 and by 100.

Record, for example, 180 m

Record a place value chart, and record 180 in it, for example,

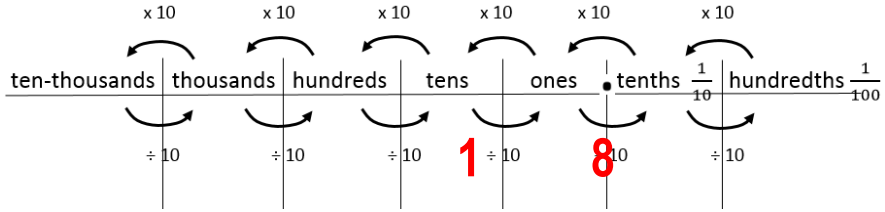


Record, for example, 1 kilometre = 1000 metres

Record, for example, 1000 TIMES more metres than kilometres to measure the same length.

Record, for example, 1000 TIMES fewer kilometres than metres to measure the same length.

Move the digits 3 places to the right, for example,



Record, for example, 0.18 = $\frac{18}{100}$

- Let's investigate using multiplicative place value to convert from metres to kilometres.
- Let's record our length in metres.
- Is our length, 180 metres?
- Let's record this length in a place value chart.
- How many metres in a kilometre?
- Are there 1000 metres in a kilometre?
- If there are 1000 metres in every kilometre, will there be 1000 times more metres than kilometres to measure the same length?
- Will there 1000 times fewer kilometres than metres to measure the same length?
- If there are 1000 times fewer kilometres than metres, will we divide the number of metres by 1000 to get the number of kilometres?
- How could we divide the number of kilometres by 1000?
- Will the digits move 3 places to the right?
- How many kilometres?
- Are there 0.18 kilometres?
- How could we record 0.18 as a fraction?
- Is 0.18, 18 hundredths?

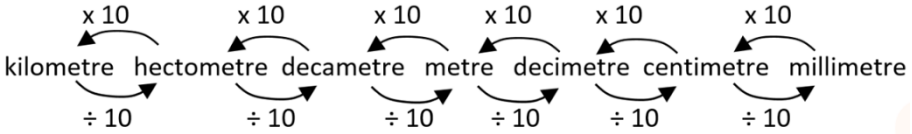
Record, for example, 180 metres = $\frac{18}{100}$ kilometre

- Is 180 metres, 18 hundredths of a kilometre?
- Does that make sense?

Record, for example, 10 metres = $\frac{1}{100}$ kilometre

- What is 1 hundredth of a kilometre?
- Is 10 metres 1 hundredth of a kilometre?
- If 10 metres is 1 hundredth of a kilometre, is 180 metres 18 hundredths of a kilometre?

Record a metric length chart and record 180 metres in it, for example,



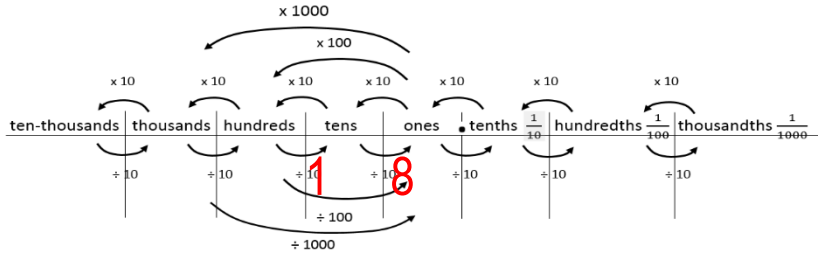
0 . 1 8

- If we record 180 metres in a metric length chart, can we also see it as 0.18 kilometres?
- If we record 0.18 kilometres in a metric length chart, can we also see it as 180 metres?

Record, for example, 1.8 km

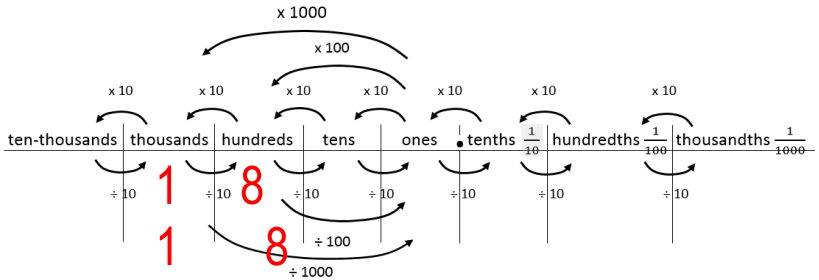
- Let's investigate using multiplicative place value to convert from kilometres to metres.
- Let's record our length in kilometres. Is our length, 1.8 kilometres?

Display a place value chart, with 1.8 recorded in it, for example,



- Let's record 1.8 kilometres in a place value chart.
- How many metres in a kilometre?
- Are there 1000 metres in a kilometre?
- If there are 1000 metres in every kilometre, will there be 1000 times more metres than kilometres to measure the same length?
- If there are 1000 times more metres than kilometres, will we multiply the number of kilometres by 1000 to get the number of metres?

Move the digits 3 places to the left, for example,



Record, for example, 1000 metres = 1 kilometre

Record, for example, 0.8 = $\frac{8}{10}$

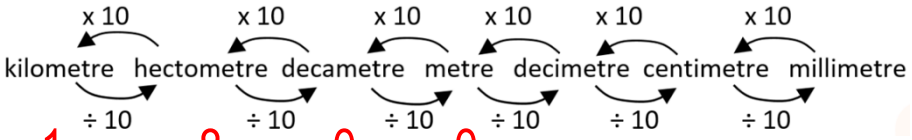
Record, for example, $\frac{1}{10}$ kilometre = 100 metres

Record, for example, $\frac{8}{10}$ kilometre = 800 metres

Record, for example, 1000 metres + 800 metres = 1800 metres

- How could we multiply the number of kilometres by 1000?
- Will the digits move 3 places to the left?
- How many metres?
- Are there 1800 metres?
- Is 1.8 kilometres equal to 1800 metres?
- Does that make sense?
- How many metres in 1 kilometre?
- Are there 1000 metres in 1 kilometre?
- So is the 1000 metres, 1 kilometre?
- What is the value of the 8 in 0.8?
- Is 0.8, 8 tenths?
- If there are 1000 metres in 1 kilometre, how many metres in 8 tenths of a kilometre?
- How many metres in 1 tenth of a kilometre?
- Are there 100 metres in 1 tenth of a kilometre?
- If there are 100 metres in 1 tenth of a kilometre, how many metres in 8 tenths of a kilometre?
- Are there 800 metres in 8 tenths of a kilometre.
- So we have 1000 metres plus 800 metres which equals 1800 metres.

Record a metric length chart and record 1800 metres in it, for example,

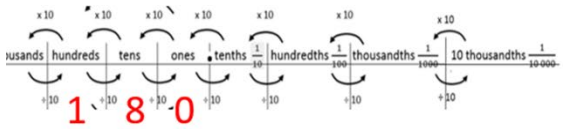


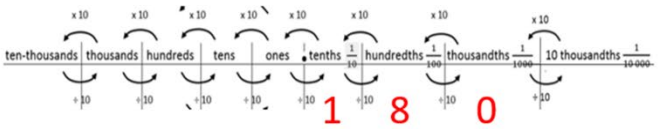
1 8 0 0

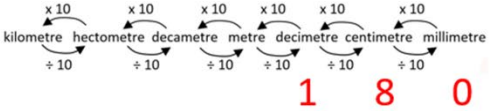
1 . 8

- If we record 1800 metres in a metric length chart, can we also see it as 1.8 kilometres?
- If we record 1.8 kilometres in a metric length chart, can we also see it as 1800 metres?

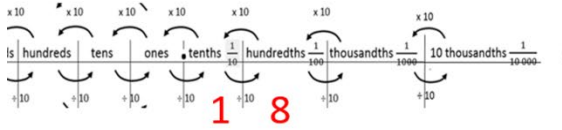
Convert from millimetres to metres, identifying a millimetre is $\frac{1}{1000}$ metre, so dividing number of metres by 1000, by moving the digits 3 spaces to the right for example, 180 millimetres = 0.18 metres. Record 180 mm in a metric measurement chart.

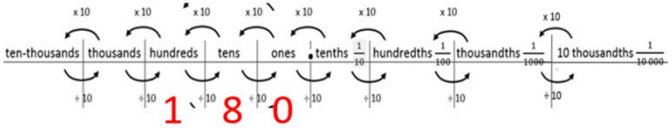


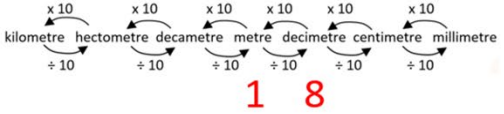




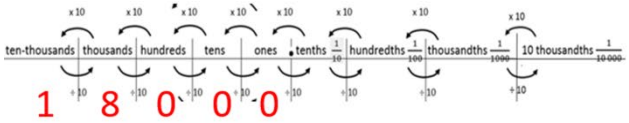
Convert from metres to millimetres, identifying there are 1000 millimetres in a metre, so multiplying number of metres by 1000, by moving the digits 3 spaces to the left for example, 0.18 metres = 180 millimetres. Record 1.8 m in a metric measurement chart.

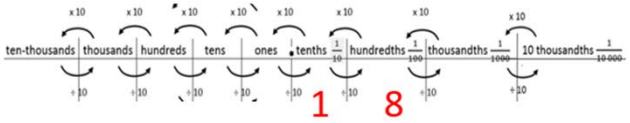


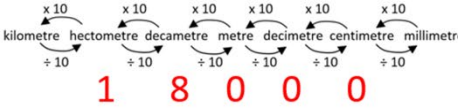




Convert from centimetres to kilometres, identifying a centimetre is $\frac{1}{100\ 000}$ kilometre, so dividing number of centimetres by 100 000, by moving the digits 5 spaces to the right for example, 18 000 centimetres = 0.0018 kilometres. Record 18 000 cm in a metric measurement chart.







Kilometres to centimetres, identifying there are 100 000 centimetres in a kilometre, so multiplying number of centimetres by 100 000, by moving the digits 5 spaces to the left for example, 0.0018 kilometres = 18 000 centimetres. Record 0.0018 km in a metric measurement chart.