Metric Conversions: Moving the Decimal Point

Grade 5 – 6 math · measurement

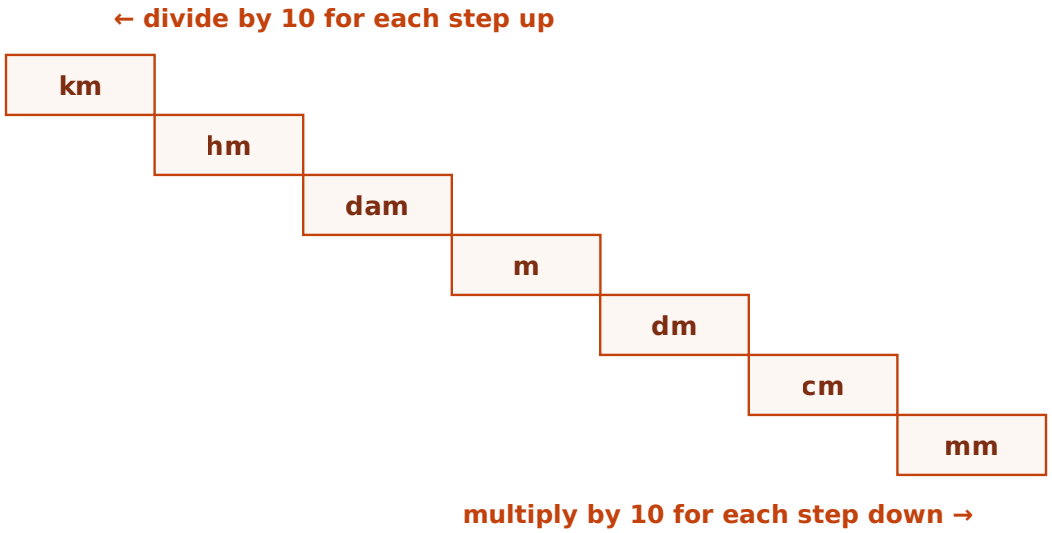
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A ladder, not a table

Most students learn metric conversions as a list of facts to memorise. There is a faster way, and it works for every metric unit ever invented.

Write the prefixes in order — **km hm dam m dm cm mm** — and notice that every neighbour differs by a factor of ten. To convert, count how many steps apart the two units are and move the decimal point that many places. Down the ladder, move right. Up the ladder, move left.

So 2.5 km to centimetres is five steps down, which means five places right: 250 000 cm. No multiplication is needed, and the same ladder works for grams and litres because the prefixes never change their meaning.



The ladder for length. Grams and litres use exactly the same prefixes.

The method

- The order is **km hm dam m dm cm mm**. Every neighbour is a factor of 10.
- Count the **steps** from the unit you have to the unit you want.
- Moving **down** the list, shift the decimal point that many places **right**.
- Moving **up** the list, shift it that many places **left**.
- Fill any gap with **zeros**: 2.5 km to cm is 5 steps, giving 250 000 cm.
- The same ladder works for **grams** and **litres**; only the base unit changes.

Part A — How many steps, and which way? (6 marks)

From → to	Steps	Point moves
km → m		

cm → m		
m → mm		
mg → g		
L → mL		
cm → km		

Part B — Convert (8 marks)

4.2 km → _____ m	**65 cm → _____ m**
0.75 L → _____ mL	**3400 mg → _____ g**
0.05 km → _____ cm	**18 mm → _____ m**
2.5 kg → _____ mg	**940 mL → _____ L**

Part C — Spot the mistake write the correct answer and say what went wrong (8 marks)

A student wrote	What went wrong	Correct
0.4 km = 40 m		
250 mL = 25 L		
6 cm = 0.6 mm		
1.2 g = 12 000 mg		

Part D — Explain (4 marks)

1. Explain why the same ladder works for grams and litres as well as metres.

Metric Conversions: Moving the Decimal Point — Answer Key

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Part A — How many steps, and which way?

1. km → m → **3 steps, right**
2. cm → m → **2 steps, left**
3. m → mm → **3 steps, right**
4. mg → g → **3 steps, left**
5. L → mL → **3 steps, right**
6. cm → km → **5 steps, left**

Part B — Convert

1. 4.2 km → **4200 m**
2. 65 cm → **0.65 m**
3. 0.75 L → **750 mL**
4. 3400 mg → **3.4 g**
5. 0.05 km → **5000 cm**
6. 18 mm → **0.018 m**
7. 2.5 kg → **2 500 000 mg**
8. 940 mL → **0.94 L**

Part C — Spot the mistake

1. 0.4 km = 40 m → **400 m**
   km to m is 3 steps down, so the point moves 3 places right, not 2.
2. 250 mL = 25 L → **0.25 L**
   mL to L is 3 steps up, so the point moves left, making the number smaller.
3. 6 cm = 0.6 mm → **60 mm**
   cm to mm is one step down, so the number gets bigger, not smaller.
4. 1.2 g = 12 000 mg → **1200 mg**
   g to mg is 3 steps, so 1.2 becomes 1200. Four places were moved instead of three.

Part D — Explain

1. **The prefixes mean the same thing whatever unit they are attached to.**
   Kilo- means a thousand and centi- means a hundredth whether the base unit is a metre, a gram or a litre, so the distance between any two prefixes is the same in every case. Learning the ladder once covers every metric unit, including ones a student has not met yet.