Units, time and scale

Junior Cycle · Higher Level

Understand the idea

How to start

A measurement needs a number and a unit. One metre is the same length as 100 centimetres.

1. Write the starting unit and the unit you need.
2. Use a known conversion such as $1m = 100$ cm.
3. Check the size: the same length has more centimetres than metres.

Key terms & definitions

Scale
The ratio of a drawing length to the corresponding actual length.

Capacity
The volume a container can hold.

Duration
The amount of time between two events.

Key ideas

• Convert all lengths to compatible units before calculating.

• Area conversions square the length scale factor: $1\text{m}^2 = 10000\text{cm}^2$. Volume conversions cube it.

• $1\text{litre} = 1000\text{cm}^3$ and $1\text{m}^3 = 1000\text{litres}$.

• A decimal part of an hour is not minutes. Multiply the fractional hour by 60.

• A scale of $1 : 500$ means one unit on the diagram represents 500 of the same units in reality.

Quick reminder

• Use compatible units before calculating.

• Area scale factors are squared; volume scale factors are cubed.

• Multiply a fractional hour by 60 to convert it to minutes.

Worked examples

Example 01 · Converting units of length

Convert 4 cm to mm.

Why this method?

Identify the starting unit and the required unit. Use the conversion factor in the direction that gives the required unit.

$4\text{ cm} = 40\text{ mm}$	**Step 1** Use the ratio between the two units

Think about it: Before moving on: why does a number of centimetres become a bigger number of millimetres?

Example 02 · Converting units of mass and capacity

Convert 5 kg to g.

Why this method?

Identify the starting unit and the required unit. Use the conversion factor in the direction that gives the required unit.

$1\text{kg} = 1000\text{g}$	**Step 1** One kilogram contains one thousand grams.
$5 \times 1000 = 5000$	**Step 2** There are 5 lots of 1000 grams.
$5\text{kg} = 5000\text{g}$	**Step 3** The unit is smaller, so the number of units is larger.

Think about it: Before moving on: when you convert millilitres to litres, why is the answer a smaller number?

Example 03 · Hours, minutes and days

How many minutes are there in 3 hours and 25 minutes?

Why this method?

Identify the starting unit and the required unit. Use the conversion factor in the direction that gives the required unit.

$3 \times 60 = 180$ minutes	**Step 1** There are 60 minutes in each hour

$180 + 25 = 205$ minutes	**Step 2** Add the extra minutes

Think about it: Before moving on: why is 2 hours and 30 minutes not 230 minutes?

Example 04 · A scale plan

A room is $4.8m$ long. Draw its length at a scale of $1 : 50$.

Why this method?

Identify the starting unit and the required unit. Use the conversion factor in the direction that gives the required unit.

$4.8m = 480$ cm.	**Step 1** Use the same units
$480 \div 50 = 9.6$	**Step 2** Divide by the scale factor
The plan length is 9.6 cm.	**Step 3** State the drawing length

Common mistake

Using the length conversion factor for area. Since $1m = 100$ cm, $1\text{m}^2 = 100 \times 100 = 10000\text{cm}^2$, not 100cm^2.

Exam technique

Write units on every intermediate quantity and check the final unit matches the question.

Try it yourself

Work on paper before checking the answers at the end. These questions are for self-checking, not submitted homework.

Question 1

Convert $13m$ to cm.

Question 2

Convert $15000g$ to kg.

Question 3

How many minutes are there in 4 hours and 35 minutes?

Watch an explanation

Corbettmaths — Units: Metric units (length)

Corbettmaths — Time: calculations

Open the website chapter to load the embedded players. Use the rates and rules in your question for financial examples.

Self-check answers

Question 1

1300

Question 2

15

Question 3

275

Open the full chapter online