

GRADE 11 STUDY GUIDE | 2025

Measurement and Maps

Mathematical Literacy

1. Units of Measurement

- Length: mm, cm, m, km. Conversions: 10 mm = 1 cm; 100 cm = 1 m; 1000 m = 1 km
- Mass: mg, g, kg, t. Conversions: 1000 mg = 1 g; 1000 g = 1 kg; 1000 kg = 1 t
- Volume/capacity: ml, l, kl. Conversions: 1000 ml = 1 l; 1000 l = 1 kl
- Time: seconds, minutes, hours. 60 s = 1 min; 60 min = 1 hr; 24 hr = 1 day
- Temperature: Celsius (deg C) is standard in SA; Fahrenheit used in USA

2. Perimeter, Area and Volume

Perimeter: sum of all sides

Area of rectangle = length x width

Area of triangle = (base x height) / 2

Area of circle = $\pi \times r^2$

Volume of rectangular prism = length x width x height

Volume of cylinder = $\pi \times r^2 \times \text{height}$

1 m² = 10 000 cm²; 1 m³ = 1 000 000 cm³; 1 litre = 1000 cm³

Example: A cylindrical water tank has radius 0.8 m and height 1.5 m. Find capacity in litres.

Volume = $\pi \times 0.8^2 \times 1.5 = 3.14159 \times 0.64 \times 1.5 = 3.016 \text{ m}^3$

= $3.016 \times 1000 = 3016$ litres

3. Scale and Maps

Scale ratio: 1 : n means 1 unit on map = n units in reality

Actual distance = Map distance x Scale denominator

Map distance = Actual distance / Scale denominator

Example: Scale 1:50 000. Two towns are 4.5 cm apart on the map.

Actual distance = $4.5 \text{ cm} \times 50\,000 = 225\,000 \text{ cm} = 2.25 \text{ km}$

4. Time, Speed and Distance

Distance = Speed x Time

$$\text{Speed} = \text{Distance} / \text{Time}$$

$$\text{Time} = \text{Distance} / \text{Speed}$$

Convert km/h to m/s: divide by 3.6

5. Reading Plans and Elevations

- Floor plan: bird's eye view (looking down); shows layout of rooms
- Elevation: front, back or side view; shows heights
- Scale on plans: e.g. 1:100 means 1 cm on plan = 100 cm (1 m) in reality
- Read dimensions carefully; note which unit is used
- Calculate area of rooms to find floor tiles, paint, carpet needed