Unit 20 · Bearing and Scale Drawing

STUDY NOTES

Key terms

Compass: a small magnet needle that turns freely; its red end points **north**.

Main directions: North (N), East (E), South (S), West (W); halfway between them NE, SE, SW, NW.

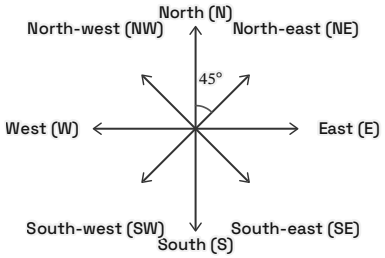
Bearing: the angle turned from **north**, **clockwise**, to face a place; always **three figures**.

Scale drawing: every length made smaller (or bigger) by the **same** number of times, so the shape stays.

Scale: that number of times: 1 cm = 2 m, or 1 : 200.

Eight directions

- fold a square sheet in half, in half again, then along both diagonals: 8 creases from the middle
- main directions 90° apart (360° ÷ 4); all eight **45**° apart (360° ÷ 8)



The eight directions, 45° apart.

Direction	Bearing	Direction	Bearing
North	000°	South	180°
North-east	045°	South-west	225°
East	090°	West	270°
South-east	135°	North-west	315°

Bearings

1. start at the **north line** where you stand
2. turn **clockwise** (as a clock's hands go) until you face the place
3. write three figures: 45° → **045**°, 7° → **007**°, 60° → **060**°

- from 000° up to 359°; a full turn, 360°, is north again: **000**°
- three figures: a missing figure is noticed at once ("45" could be "145" or "245")
- **never counter-clockwise**: north-west is 315°, not 045°
- a temple due west: **270**°; due east would be 090°

Measuring on a map

1. draw a north line, straight up, at the place measured **from**
2. join the two places with a straight line
3. protractor's center on the starting place, 0 on the north line; measure **clockwise**
4. over 180° (a half-circle protractor stops at 180°): measure the other way and take it from 360°

- 55° counter-clockwise from north: 360° − 55° = **305**°
- 55° past south, clockwise: 180° + 55° = **235**°
- a place just west of north: almost a full turn, 355°
- from Pokhara: Nepalgunj about 266° (just south of west)

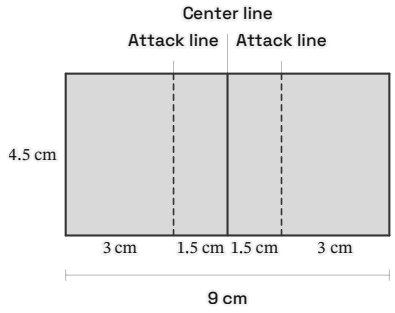
Scale drawing

real length = drawing × scale — at 1 cm = 500 m, 9 cm → 4.5 km. **Use:** drawing to real

drawing = real length ÷ scale — at 1 cm = 5 m, 30 m → 6 cm. **Use:** real to drawing

- two ways to write a scale: **1 cm = 2 m** (a length on paper, what it stands for), or **1 : 200** (both in the **same unit**: 2 m = 200 cm)
- choose the scale to suit the paper and the object; write it under the drawing
- a small thing drawn bigger, a big thing smaller: the shape stays
- **more meters per centimeter → a smaller drawing**: court 18 m × 9 m at 1 cm = 1 m is 18 cm (too long for a 15 cm sheet); at 1 cm = 2 m, 9 cm × 4.5 cm
- every length on the same drawing has the **same ratio**: court 9 cm : 1800 cm = 4.5 cm : 900 cm = 1 : 200

- plans of houses: often 1 : 100, 1 cm = 1 m
- a pole 9 cm tall at 1 : 100: 9 × 100 = 900 cm = 9 m
- to draw: divide each length, draw with right angles, write the scale under it (ground 125 m × 75 m at 1 cm = 10 m: 12.5 cm × 7.5 cm)
- a journey by scale drawing: 200 km east, then 300 km west, at 1 cm = 50 km: 4 cm, then 6 cm back: 2 cm past the start = 100 km



A volleyball court, 18 m × 9 m, at 1 : 200: 9 cm × 4.5 cm.

Back to Poon Hill

Peak	Bearing	Distance
Dhaulagiri	330°	about 38 km
Annapurna I	030°	about 25 km
Annapurna South	041°	about 17 km
Machhapuchhre	067°	about 28 km

- “north-east” covers three peaks; their bearings tell them apart
- at 1 cm = 5 km: Dhaulagiri 38 ÷ 5 = 7.6 cm; Annapurna South 17 ÷ 5 = 3.4 cm
- Annapurna South looks higher than Dhaulagiri: less than half as far away

Where it is used

- pilots, ships, trekkers and rescue teams: a direction as one three-figure number
- every map has a scale (a ratio, a line in km, or both)

COMMON MISTAKES

✗ north-west = 045°
✓ 315°: clockwise from north.

✗ 45° written as a bearing
✓ 045°: three figures.

✗ 360° as a bearing
✓ 000°.

✗ 1 cm = 2 m written 1 : 2
✓ 1 : 200: the same unit on both sides.

✗ real to drawing by multiplying (30 m at 1 cm = 5 m → 150 cm)
✓ divide: 6 cm.

✗ 1 cm = 200 m, 4 cm apart → 204 m
✓ multiply: 800 m.