

# Measurements and Experimentation

## Chapter 1: Measurements and Experimentation · Topic 1

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### Key Concept

The SI system uses base units like metre (length), kilogram (mass), and second (time), ensuring consistency in scientific measurement worldwide.

Precision instruments, like Vernier callipers (accurate to 0.01cm) and screw gauges (accurate to 0.001cm), measure small lengths more precisely than rulers.

Systematic errors (consistent, repeatable errors) and random errors (unpredictable variations) both affect measurement accuracy and must be minimised.

Proper experimental technique, including repeated measurements and careful observation, ensures reliable, accurate scientific results.

### Quick Revision Notes

- SI units: metre, kilogram, second.
- Vernier callipers measure to 0.01cm accuracy.
- Screw gauges measure to 0.001cm accuracy.
- These are more precise than standard rulers.
- Systematic errors are consistent, repeatable.
- Random errors are unpredictable variations.
- Both affect measurement accuracy.
- Proper technique ensures reliable results.

### Practice Questions

- 1 Measure an object using a ruler and note precision.
- 2 Research how a Vernier calliper works.
- 3 Discuss the difference between systematic and random errors.
- 4 Explain why repeated measurements improve accuracy.
- 5 Research a screw gauge's use.
- 6 Discuss why measurement precision matters in physics experiments.