Melting ice: temperature against time

Teacher / technician

YEAR 11 / LESSON 69 / PHYSICS ONLY

Staff preparation and answer guidance. Keep separate from student sheets. Continue the table to 600 s on the supplied sheet. A room-temperature bath replaces the former kettle/Bunsen heating arrangement.

Coverage and delivery

Physics only: 5.8P–5.11P. Changes of state and temperature–time graphs.

Allow about 60 minutes. Follow the student sequence and use the answers to check reasoning.

Requisition • class of 30, ten groups of three

Item	Per pair / setup	Class total
Sample cup, beaker and tray	1 set per group	10 sets
Digital probe, stirrer and timer	1 each per group	10 of each
Ice; cold sample water; bath water	20 g; 5 mL; 200 mL per group	200 g; 50 mL; 2 L total
Booklets and continuation/graph sheets	1 each per learner	30 of each

Immediate safety

Use room-temperature bath water only: no kettle, flame or hot plate. Staff prepare crushed ice; no pupil crushing. Use plastic cups, keep probes secure and wipe spills promptly. Do not taste samples or hold ice against skin.

Preparation and delivery

Read alongside the student method

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1. Pilot the stated 20 g ice sample and 200 mL bath with the actual cups and room temperature. If a smaller sample is needed, record the revised quantity before preparing all ten stations. Do not promise a fixed melting time.

2. Prepare continuation tables from 0 to 600 s at 30 s intervals and check probe calibration in an ice–water mixture. Keep equipment dry where required by its rating.

Close of lesson

- Pour meltwater into the sink, dry trays and probes according to their instructions and leave benches dry.

Check before teaching

Check the cards, reference data and quantities against this requisition. Keep the staff answer guide separate until the checking stage. Supplied numerical practice datasets are labelled examples; they are not class measurements.

Answers and teaching notes

Expected explanations • do not give as experimental observations

YEAR 11 / LESSON 69 / PHYSICS ONLY

- The warmer surrounding bath.
- To measure the sample rather than the wall temperature.
- Ice and liquid coexist; note when the last ice disappears.
- No; energy is used in the change of state.
- Probe calibration or lag, uneven temperature and impurities can affect readings.
- The actual readings and that melting was incomplete.

References and provenance

Pearson Physics specification

Prepared 22 November 2026. Original wording, tables and questions. Sources inform the concepts and technique; the lesson scope and classroom quantities are explicitly described here. No laboratory trial or final school risk approval is claimed.