Kinetic energy and a pendulum model

Teacher / technician

YEAR 10 / LESSON 21 / PHYSICS + SCIENCE (DOUBLE AWARD)

Staff preparation and answer guidance. Keep separate from student sheets. Record actual measurements separately from labelled practice examples.

Coverage and delivery

Shared Physics / Double Award: 4.14–4.15. Kinetic energy and gravitational energy.

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

Requisition • class of 30, five groups of six

Item	Per pair / setup	Class total
Pendulum/stand/tray set	1 per group	5 sets
Rulers	1 per group	5
Balances	Shared	2
Booklets	1 per learner	30

Immediate safety

Use a small securely attached bob and low release height. Keep faces and hands out of the swing path, secure stands and do not swing towards people. Never release from beside your face.

Preparation and delivery

Read alongside the student method

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1. Prepare five groups of six. Check strings, bob attachments and stable clamped stands. Mark a small maximum release height after a pilot.

2. Measure height from the bob centre at rest to its centre at release. Discuss prediction versus measurement; the activity does not independently measure bottom speed.

Close of lesson

• Bring each bob to rest before returning equipment; remove it before carrying the stand.

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

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- Vertical change in the centre of mass.
- 0.40 J.
- It multiplies KE by four.
- Not in this ideal model, since mass cancels.
- Energy transfers to surroundings through drag and pivot friction.
- With an appropriately configured photogate or calibrated video measurement near the bottom.

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.