Physical Setting/Physics

Released form evidence

The five public June forms each have 85 scoring slots. June 2026 includes a spring graph, point charges, photon emission, a roller-coaster energy situation, a circuit and a light ray crossing an interface. Several numbered slots share one underlying prompt.

No public January or August form in this series in the five-year window. The engine supplies June descriptions and abstains from a seasonal estimate. A restricted administration is never treated as a zero.

Eligible public forms • January 0 / June 5 / August 0

Worked responses and follow-up questions

1 Get the slope and the area

Slope = 6/3 = 2 m/s². Area = average velocity times time = (2+8)/2 × 3 = 15 m. Acceleration is slope and displacement is signed area.

If 6 m is reported as displacement, ask what quantity has units of m/s before multiplying by time.

2 Compare net and individual forces

Weight downward and normal upward balance. Initial horizontal net 15 N gives +3.0 m/s². With pull removed, net −9 N gives −1.8 m/s² until conditions change. Negative acceleration need not mean negative velocity.

If friction is omitted after release, ask what still touches the sled.

3 Use a parallel-circuit check

Currents are 2 A and 4 A. Total 6 A. Equivalent resistance 12/6 = 2 Ω, less than either branch. The additional path increases conductance.

If resistances are added directly, label voltage across each individual branch.

Average mapped multiple-choice slots per released form

Feature	January	June	August
Standard 4 / 5.1	—	23.00	—
Standard 4 / 4.1	—	11.40	—
Standard 4 / 4.3	—	10.80	—

A dash marks an unavailable month. Rows can overlap. See seasonal_evidence.csv for counts, uncertainty and the full feature set.

Official design or administration guidance

Physical Setting/Physics

4 Follow light at a boundary

sin $\theta_2 = 0.5/1.5 = 1/3$, so $\theta_2 \approx 19.5°$. It bends toward the normal as its speed decreases in higher-index glass. Angles are measured to the normal.

If the result exceeds 30°, check which material light enters and the ratio in Snell's law.

5 Translate an energy-level change

The atom loses 3.0 eV, so a photon is emitted with positive energy 4.8×10^{-19} J. Frequency E/h ≈ 7.2×10^{14} Hz. Distinguish the atom's negative change from photon energy.

If the photon energy is negative, write the energy lost by the atom and gained by radiation separately.

6 Link graph, work and speed

Stored energy = ½(12)(0.20) = 1.2 J. Ideal speed = √(2 × 1.2/0.40) ≈ 2.45 m/s. Measured translational energy is 0.80 J; friction, wheel rotation or other transfers could account for the 0.40 J difference.

If the student uses 12 × 0.20, compare the varying force with a rectangular constant-force graph.

Released practice for each week

Week 1 2025-06 • Q69 • Momentum plotted over time

Question booklet **Official mapping / guide**

Week 2 2025-06 • Q63 • Refraction and angle measurement

Question booklet **Official mapping / guide**

Week 3 2024-06 • Q78 • Wave frequency

Question booklet **Official mapping / guide**