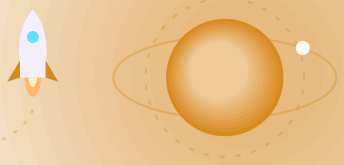
TEACHER ANSWER KEY

Middle School Bridge Lessons (6–8)



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Predictions below have fixed answers. Questions marked **Measured live** are graded against what the simulation actually produces, so the exact value depends on the student's run; use the tolerance shown in-game.

M-01 · Newton's Three Laws (Middle School (6–8))

P1. Same rocket, two pushes: a small push (half throttle) and a big push (full throttle). Which one makes the rocket speed up faster?

Answer: Measured live in the sim: compare the student's answer with the result shown after the flight (tolerance applies).

P2. Same engine push, two rockets: one is light and one is twice as heavy. Which rocket speeds up faster?

Answer: Measured live in the sim: compare the student's answer with the result shown after the flight (tolerance applies).

Standards: MS-PS2-2 (practice) – Compare accelerations for different forces and masses; the exhaust reaction is the third law. Teacher note: the craft is fixed (22,670 kg, 250 kN) and starts resting on the Moon (no air), so the push is the only force that changes and it does not fall while the briefing is read. The heavier-rocket question is answered from the numbers; the push question is measured in flight.

M-02 · Mass vs Weight (Middle School (6–8))

P1. How much will this capsule weigh when it sits on the Moon? Mark the range you expect.

Answer: Measured live in the sim: compare the student's answer with the result shown after the flight (tolerance applies).

Standards: MS-PS2-4 (practice) – Weight depends on the pull of the world the mass sits on; mass does not change. Teacher note: the capsule starts resting on the Moon, so the scale reading (mass × measured acceleration, at rest) is its weight from the first second. The band is graded on its centre, within 10% of m × g. The same craft can be flown again on Luna and Ares.

M-03 · Layers of the Atmosphere (Middle School (6–8))

P1. In Earth's real air, how high up does the temperature stop getting colder? Mark the range you expect.

Answer: Measured live in the sim: compare the student's answer with the result shown after the flight (tolerance applies).

Atmosphere layers are enrichment; no standard code is claimed. Teacher note: the graded value is the tropopause of Earth's real air (1976 US Standard Atmosphere, 11 km, ±2,000 m); the simulator's air keeps a simple temperature, so the temperature part of the answer is a reference value and the measured part is the air pressure.

M-04 · Energy Conservation (Middle School (6–8))

P1. The engine is off and there is no air. As the satellite coasts along its orbit, what happens to its total energy (moving energy plus height energy)?

Answer: Measured live in the sim: compare the student's answer with the result shown after the flight (tolerance applies).

Energy conservation in a coast; no standard code is claimed. Teacher note: the satellite starts in an oval orbit (lowest point 100 km, highest 600 km) on its way up, so moving energy and height energy visibly trade places; height energy is measured from the ground.

M-05 · Basic Orbit (Middle School (6–8))

P1. A rocket is high above Earth, going around it in orbit. What keeps it from falling to the ground?

Answer: Its sideways speed: it is falling around the world

Orbits as falling around a world; no standard code is claimed. Teacher note: the T4-01 scenario, simplified; the check reads the lowest point of the learner's orbit and top speed.