

Why weight changes from planet to planet

Grade 7 science (Year 8 · Class 7) · Test answers (mark scheme)

Model answers with the marks available. Award marks for the correct substitution even when the final arithmetic has a slip, and check carefully that the unit is correct.

Level: Grade 7 science (Year 8 · Class 7) · **Curriculum:** MS-PS2-4

Question 1 Mass and weight (2 marks)

Mass is measured in **kilograms** and weight in **newtons**. The **weight** changes; the mass stays the same.

Marking: 1 mark for both units; 1 mark for weight changes.

Question 2 Sack of grain (3 marks)

- a. $W = m \times g$.
- b. $W = 12 \times 9.8 = \mathbf{117.6\ N}$, about 118 N.

Marking: (a) 1 mark; (b) 1 mark for substitution, 1 for the answer with unit.

Question 3 Weight on Mars (3 marks)

- a. $W = 70 \times 3.7 = \mathbf{259\ N}$.
- b. **70 kg**, because mass does not change.

Marking: (a) 1 mark for substitution, 1 for the answer; (b) 1 mark.

Question 4 Earth and Moon (3 marks)

- a. **60 kg**.
- b. The arrow shows weight, the pull of gravity. The Moon has less mass than Earth so its gravitational field strength is smaller, and the weight of the same mass is smaller.

Marking: (a) 1 mark; (b) 1 mark for weight is the pull of gravity, 1 mark for the Moon's weaker gravity.

Question 5 Finding a mass (2 marks)

$$m = W \div g = 58.8 \div 9.8 = \mathbf{6.0\ kg}.$$

Marking: 1 mark for the substitution; 1 mark for the answer with unit.

Question 6 Why the Moon is weaker (3 marks)

Gravity depends on the mass of the planet, and the Moon has much less mass than Earth, so it pulls with a smaller force on each kilogram. A rock would feel lighter because its weight is smaller, but its mass is the same, so it is still as hard to start it moving sideways.

Marking: 1 mark for Moon has less mass; 1 mark for smaller pull on each kilogram; 1 mark for lighter weight but same mass.

Question 7 Bathroom scale (2 marks)

It displays a **mass**. It really measures the force of gravity pulling on the person and converts it to kilograms using $g = 9.8 \text{ N/kg}$.

Marking: 1 mark for mass; 1 mark for measuring a force then converting.

Question 8 Spring scale reading (2 marks)

$W = 0.80 \times 9.8 = \mathbf{7.84 \text{ N}}$, about 7.8 N.

Marking: 1 mark for the substitution; 1 mark for the answer with unit.