

Why total mass stays the same

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

Model answers and the marking guide are given below. Award marks for correct science even if the wording is different. Reward the unit and the reason in each answer, and apply error carried forward where a later part depends on an earlier one.

Level: Grade 7 science (Year 8 · Class 7) · **Curriculum:** MS-PS1-5

Question 1 Law and closed system (3 marks)

- a) In a closed system the total mass of the substances stays the same during a change.
- b) A container where no matter can enter or leave.
- c) A flask sealed with a stopper (or a sealed jar).

Marking: 1 mark each. Accept any sensible sealed container.

Question 2 Sugar solution (2 marks)

- a) $40\text{ g} + 360\text{ g} = \mathbf{400\text{ g}}$.
- b) The sugar breaks up into tiny particles that spread among the water particles, so it cannot be seen, but every particle is still in the solution.

Marking: 1 mark for the answer and unit; 1 mark for particles spread out and still present.

Question 3 Ice in a bag (2 marks)

- a) **250 g**.
- b) Melting only changes how the particles are arranged. No particles are lost or gained and the bag is sealed.

Marking: 1 mark each.

Question 4 Open flask data (3 marks)

- a) $188.5\text{ g} - 187.2\text{ g} = \mathbf{1.3\text{ g}}$.
- b) A gas (carbon dioxide) escaped from the open flask and took its mass with it.
- c) **188.5 g**, because the gas would stay in the flask.

Marking: 1 mark each; accept 'gas escaped'.

Question 5 Burning magnesium (3 marks)

- a) Mass of oxygen = $16.0\text{ g} - 9.6\text{ g} = \mathbf{6.4\text{ g}}$.
- b) A closed container (so no gas can enter or leave).

Marking: 1 mark for the subtraction, 1 mark for the answer with unit; 1 mark for closed container.

Question 6 Three experiments (3 marks)

- a) **Y** (wood burning on an open fire).
- b) $85\text{ g} - 80\text{ g} = \mathbf{5\text{ g}}$.
- c) The wood burned to make gases and vapour that escaped from the open fire, so the solid left was lighter.

Marking: 1 mark each; part c needs gases escaping.

Question 7 A rusting nail (2 marks)

- a) $10.4\text{ g} - 10.0\text{ g} = \mathbf{0.4\text{ g}}$.
- b) The nail joined with oxygen and water from the air, which were not weighed at the start. Their mass came from the air, so the total mass of the whole system was conserved.

Marking: 1 mark for the answer; 1 mark for oxygen or water from the air.

Question 8 Explaining at particle level (2 marks)

Atoms are rearranged into new substances, but none are created or destroyed.

The same atoms are present before and after, and each atom keeps its mass, so the total mass cannot change.

Marking: 1 mark for atoms rearranged, not created or destroyed; 1 mark for same atoms so same total mass.