

Why total mass stays the same

Grade 7 science (Year 8 · Class 7) · Test

Name: _____ Date: _____ Class: _____ Mark: ____ / 20

This test checks the law of conservation of mass, mass calculations and explanations about open and closed systems. You have 45 minutes and 20 marks. Show your working and include units. Do not use notes.

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

Time: 45 minutes · 8 questions · Total: 20 marks · Calculator allowed

Question 1 Law and closed system (3 marks)

- State the law of conservation of mass. (1 mark)
- Define a closed system. (1 mark)
- Give one example of a closed system. (1 mark)

Question 2 Sugar solution (2 marks)

Ngozi in Abuja dissolves 40 g of sugar in 360 g of water.

- Calculate the mass of the solution. (1 mark)
- Explain why the sugar seems to disappear although its mass is still there. (1 mark)

Question 3 Ice in a bag (2 marks)

A sealed bag contains 250 g of ice. The ice melts completely.

- State the mass of the water formed. (1 mark)
- Explain why this is the mass. (1 mark)

Question 4 Open flask data (3 marks)

An open flask with a fizzing mixture reads 188.5 g at the start and 187.2 g at the end.

- Calculate the mass lost. (1 mark)
- Explain why the mass fell. (1 mark)
- Predict the final reading if the same flask had been sealed. (1 mark)

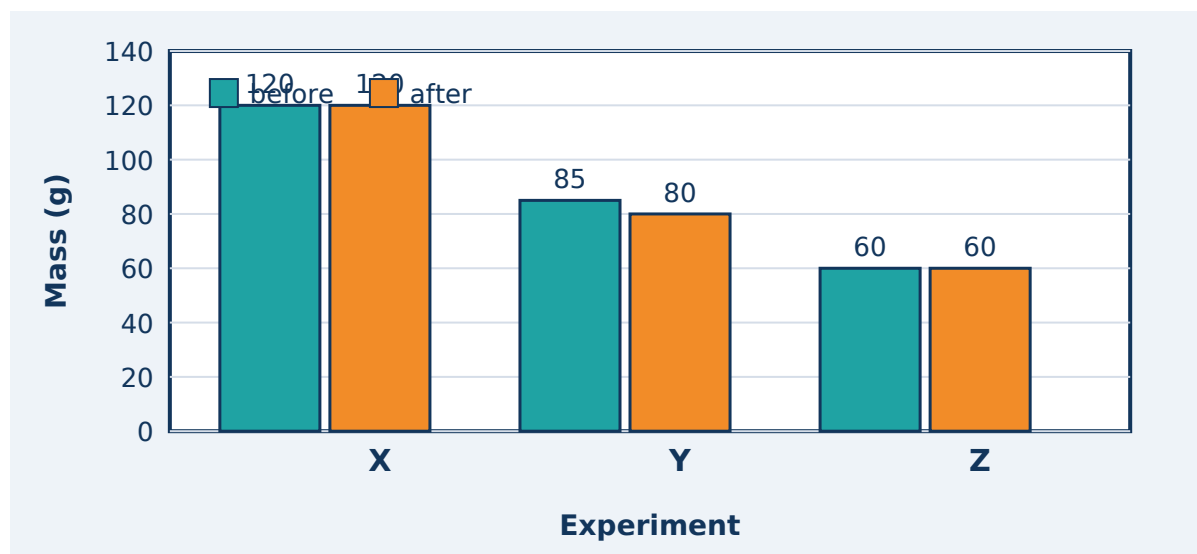
Question 5 Burning magnesium (3 marks)

A student burns 9.6 g of magnesium in oxygen. The product is 16.0 g of magnesium oxide.

- Calculate the mass of oxygen that combined with the magnesium. (2 marks)
- State what kind of container is needed to show that the total mass is conserved. (1 mark)

Question 6 Three experiments (3 marks)

The chart shows the mass before and after for three experiments: X is salt dissolving in a closed jar, Y is wood burning on an open fire and Z is ice melting in a sealed bag.



Mass before and after for experiments X, Y and Z.

- State which experiment lost mass. (1 mark)
- Calculate the mass lost. (1 mark)
- Explain the loss. (1 mark)

Question 7 A rusting nail (2 marks)

Tendai in Harare weighs an iron nail at 10.0 g. After weeks outside in damp air it has a mass of 10.4 g. He says the law of conservation of mass has been broken.

- Calculate the increase in mass. (1 mark)
- Explain why the law has not been broken. (1 mark)

Question 8 Explaining at particle level (2 marks)

Explain, using atoms, why the total mass is the same before and after a chemical reaction in a closed system. (2 marks)