

How atoms join to make molecules

Grade 8 science (Year 9 · Class 8) · Test answers (mark scheme)

The model answers below show full marks. Follow the marking notes to see where each mark is earned, and note that a correct answer without a method may earn fewer marks.

Level: Grade 8 science (Year 9 · Class 8) · **Curriculum:** MS-PS1-1

Question 1 Definitions (2 marks)

(a) An atom is the smallest particle of an element. (b) A molecule is two or more atoms bonded together.

Marking: 1 mark for each correct definition.

Question 2 Counting atoms (2 marks)

(a) The coefficient is 4, so **4 molecules**. (b) Each molecule has $1 + 3 = 4$ atoms, so $4 \times 4 =$ **16 atoms**.

Marking: 1 mark for 4, 1 mark for 16.

Question 3 Model Y (3 marks)

(a) **Hydrogen and oxygen**. (b) 2 H and 2 O: **H₂O₂**. (c) The sticks join H-O, O-O and O-H: **3 bonds**.

Marking: 1 mark for each part.

Question 4 Element or compound (3 marks)

(a) Both are molecules, made of bonded atoms, and both contain oxygen atoms. (b) O₂ contains only one kind of atom, so it is an element. CO₂ contains two different kinds of atom (carbon and oxygen), so it is a compound.

Marking: 1 mark for (a); 1 mark for stating the difference and 1 for explaining it.

Question 5 Counting atoms in a line (2 marks)

Number = $0.050 \div 1 \times 10^{-10} =$ **5.0×10^8 atoms**.

Marking: 1 mark for correct division, 1 mark for the answer.

Question 6 Spot the mistake (2 marks)

The coefficient 2 multiplies the whole formula, so there are two molecules. Each has 2 H and 1 O, giving **4 hydrogen atoms and 2 oxygen atoms**.

Marking: 1 mark for explaining the coefficient, 1 mark for the correct numbers.

Question 7 Value of models (3 marks)

It shows how many atoms there are and how they are connected. It is unlike a real molecule because real atoms have no colour and are not solid balls, and the sticks and the sizes shown are not real.

Marking: 1 mark for the strength, 1 mark for each limitation.

Question 8 Ethane (3 marks)

(a) $2 + 6 =$ **8 atoms**. (b) $6 \div 8 \times 100 =$ **75 %**.

Marking: 1 mark for 8; 1 mark for the method $6/8$; 1 mark for 75 %.