

How atoms join to make molecules

Grade 8 science (Year 9 · Class 8) · Test

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

This test covers atoms, molecules, formulas and models. Answer every question, show your working for calculations and write units where needed. You have 45 minutes and the test is worth 20 marks.

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

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

Question 1 Definitions (2 marks)

Define the terms **atom** and **molecule**.

- Atom (1 mark)
- Molecule (1 mark)

Question 2 Counting atoms (2 marks)

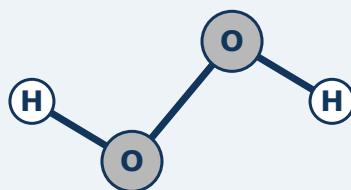
A chemist writes 4NH_3 .

- State the number of molecules. (1 mark)
- Calculate the total number of atoms. (1 mark)

Question 3 Model Y (3 marks)

Look at the model.

- State the names of the elements shown. (1 mark)
- Write the formula of the molecule. (1 mark)
- State the number of bonds. (1 mark)



Model Y: white = H, grey = O

Model Y.

Question 4 Element or compound (3 marks)

Oxygen is O_2 and carbon dioxide is CO_2 .

- Explain what the two molecules have in common. (1 mark)
- Explain one difference between them. (2 marks)

Question 5 Counting atoms in a line (2 marks)

An atom is about 1×10^{-10} m across. Calculate how many atoms fit side by side along a line 5.0 cm (0.050 m) long.

Question 6 Spot the mistake (2 marks)

A student says "2 H_2O means 2 hydrogen atoms and 1 oxygen atom". Explain why this is wrong and give the correct numbers.

Question 7 Value of models (3 marks)

Describe one thing a ball-and-stick model shows well and two ways in which it is unlike a real molecule.

Question 8 Ethane (3 marks)

Ethane has the formula C_2H_6 .

- Calculate the total number of atoms in one molecule. (1 mark)
- Calculate the percentage of atoms that are hydrogen. (2 marks)