

## Block 4 Calculations Prep

1. Boron contains two different isotopes: boron-10 which is 20% of all boron atoms, and boron-11 which makes up 80% of boron atoms.

Calculate the relative atomic mass of boron.

2. Calculate the number of moles of copper in a copper pipe which has a mass of 720g.

3. What is the relative formula mass ( $M_r$ ) of aluminium chloride,  $AlCl_3$ ?

4. A scientist wishes to determine the formula of sodium oxide. They heat sodium in a crucible and take the following measurements:

Mass of crucible and lid (g)	24.31
Mass of crucible, lid and sodium (g)	24.77
Mass if crucible, lid, and sodium oxide after heating for the first time (g)	25.03
Mass if crucible, lid, and sodium oxide after heating for a second time (g)	25.03

- (a) Calculate the mass of sodium used
- (b) Calculate the mass of sodium oxide produced
- (c) Calculate the mass of oxygen in sodium oxide

5. Chlorine has a relative atomic mass of 35.5 and contains two isotopes:  $^{35}\text{Cl}$  and  $^{37}\text{Cl}$ . Calculate the percentage of chlorine-35 atoms in chlorine.

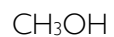
6. A scientist wishes to determine the formula of iron oxide. They heat iron oxide with aluminium to form iron metal. This is then separated off and the mass is measured.

Iron oxide (g)	12.8
Mass of iron produced (g)	8.96

- (a) Calculate the mass of oxygen lost during the reaction
- (b) Calculate the moles of iron
- (c) Calculate the moles of oxygen
- (d) What is the simplest ratio of Fe:O in iron oxide?
- (e) Give the formula of iron oxide
7. Which has a higher mass: 2.5mol of copper sulphate,  $\text{CuSO}_4$ , or 1.5mol of copper nitrate,  $\text{Cu}(\text{NO}_3)_2$ ?

8. 3.0g of an alcohol are burned in air. The scientist determined from the mass of carbon dioxide produced that this was 0.05mol of the alcohol.

Which of the following alcohols was burned by the scientist?



9. Bromine contains two isotopes in a 50:50 abundance. One of the isotopes is bromine-79.

0.47g of dibromoethane,  $\text{C}_2\text{H}_4\text{Br}_2$  is found to contain 0.0025 moles.

Determine the relative atomic mass of the other isotope of bromine.