

Support Worksheet – Chapter 1

Voles

A long time ago, in a far distant universe, chemistry lessons were very different and chemistry teachers were even stranger than they are on Earth.

In this strange and wonderful place they used a very different measurement of chemical quantities called the **vole**, named after a small green furry animal that lives in piles of rotting mashed potato.

1 vole is equal to 20 of anything.

As an example, 1 vole of ping pong balls (each 40 mm in diameter) piled one on top of the other would probably come up to somewhere near your waist.

The masses of atoms and molecules in this faraway place are much greater than on Earth, so that the mass of 1 vole of a substance is the same as the atomic masses or molecular masses on Earth. For example, 1 vole of sulfur has a mass of 32 g and contains 20 S atoms and 1 vole of CO₂ has a mass of 44 g and contains 20 CO₂ molecules.

- 1 What is the mass of 1 vole of water?
- 2 How many water molecules are there in 1 vole of water?
- 3 How many atoms are there in 1 vole of water?
- 4 Calculate the mass of one methane (CH₄) molecule if 1 vole of methane molecules has a mass of 16 g.
- 5 How many C atoms are there in 0.1 vole of ethane, C₂H₆?
- 6 What is the mass of one molecule of ethane in this faraway galaxy?
- 7 Which sample contains the greatest number of atoms:
32 g of O₂ or 4 g of H₂?
- 8 What is the total number of atoms in 132 g of CO₂?
- 9 Which of the following samples contains the smallest number of **atoms**?

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|-------------------------|--------------------------|
| 100 g of H ₂ | 100 g of O ₂ |
| 100 g of O ₃ | 100 g of P ₄ |
| 100 g of S ₈ | 100 g of Cl ₂ |
- 10 How many H atoms are there in 156 g of C₆H₆?