



## Section A:

1. Choose the correct words from the box below to complete the sentence.

|        |       |          |      |        |        |
|--------|-------|----------|------|--------|--------|
| volume | grams | solution | mass | weight | amount |
|--------|-------|----------|------|--------|--------|

Concentration is the \_\_\_\_\_ of solute in a given \_\_\_\_\_ of solution.

2. What are the correct units for concentration?

Tick one box.

$\text{dm}^3$

☐

$\text{g}/\text{dm}^3$

☐

$\text{dm}^3/\text{g}$

☐

3. A student has three test tubes, each containing  $100 \text{ cm}^3$  of water. They add different masses of salt to each. Which of these statements is correct?

Tick one box.

All the salt solutions will have the same concentration

☐

The salt solution with the greatest mass of salt dissolved will have the highest concentration

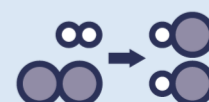
☐

The salt solution with the smallest mass of salt dissolved will have the highest concentration

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4. In the box below, write the equation that links concentration, mass and volume.

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| <br><br><br><br><br> |
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5. A student has a solution which has a concentration of  $0.5 \text{ g/dm}^3$ . Which action would make the solution less concentrated?

Tick one box.

Adding more water

☐

Adding more solute

☐

Splitting the solution between two test tubes

☐

6. A person adds sugar to glass of water. Identify the solute, solvent and solution.

Solute: \_\_\_\_\_

Solvent: \_\_\_\_\_

Solution: \_\_\_\_\_

### Section B

7. A student has two samples of sodium hydroxide solution. One has a concentration of  $24 \text{ g/dm}^3$  and the other has a concentration of  $12 \text{ g/dm}^3$ . Both have a volume of  $200 \text{ cm}^3$ .

a. Identify the sample with the higher concentration.

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b. Explain what it means for one sample to be more concentrated than the other.

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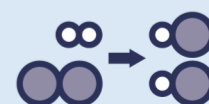
c. The student adds water to make the  $24 \text{ g/dm}^3$  solution up to a volume of  $400 \text{ cm}^3$ . Compare the concentrations of the samples now.

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8. Describe and explain how the concentration of a solution could be increased.





9. Describe and explain how the concentration of a solution could be decreased.

Show all working for the following questions:

10. Calculate the concentration (in  $\text{g/dm}^3$ ) of:

a. 40 g solute in  $350 \text{ dm}^3$

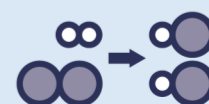
b. 100 g solute in  $77 \text{ dm}^3$

c. 0.08 g solute in  $20 \text{ cm}^3$

d. 90g solute in  $780 \text{ cm}^3$

11. The mass of  $\text{H}_2\text{SO}_4$  is 32.5 g and the volume of the solution is  $0.400 \text{ dm}^3$ . Calculate the concentration of the solution formed in  $\text{g/dm}^3$ .

12. A  $750 \text{ cm}^3$  solution of sodium chloride contains 25 g of solute. Calculate the concentration of the solution.





13. Calculate the mass of solute in:

a.  $25 \text{ cm}^3$  of a  $2.3 \text{ g/dm}^3$  solution.

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b.  $250 \text{ cm}^3$  of a  $71 \text{ g/dm}^3$  solution

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c.  $2.3 \text{ dm}^3$  of a  $61 \text{ g/dm}^3$  solution

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14. A solution of sodium chloride has a concentration of  $400 \text{ g/dm}^3$ . Calculate the mass of sodium chloride in  $0.8 \text{ dm}^3$  of solution.

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15. Using  $83\text{g}$  of solute, how much water is needed to:

a. Make a  $34 \text{ g/dm}^3$  solution?

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b. Make a  $0.1 \text{ g/dm}^3$  solution?

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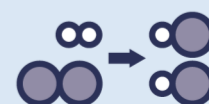
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c. Make a  $83 \text{ g/dm}^3$  solution?

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d. Make a  $79 \text{ g/dm}^3$  solution?

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### Section C

16. A person has eaten a big meal recently, and has digested many large carbohydrates to produce glucose.
- Calculate the relative formula mass of glucose ( $\text{C}_6\text{H}_{12}\text{O}_6$ ).
  - Calculate the percentage by mass of carbon in glucose.
  - State the substrate that is broken down to form glucose.
  - Name the enzyme that catalyses (speeds up) this reaction.
  - In the person's small intestine, there is  $30 \text{ g}$  of glucose in a  $320 \text{ cm}^3$  solution. Calculate the concentration of glucose in  $\text{g/dm}^3$ .
  - In a sample of blood from the person's bloodstream, there is  $50 \mu\text{g}$  of glucose in  $25 \text{ cm}^3$  of blood. Calculate the concentration of glucose in this blood sample.
  - Compare the concentration of glucose in the small intestine and the bloodstream.
  - Describe and explain what will happen to the glucose molecules.
  - Describe two adaptations of the small intestine that make it well suited for this function.

