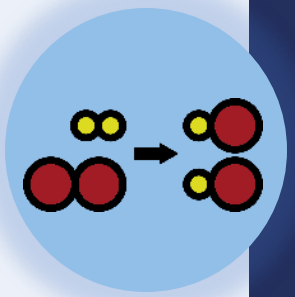
Introducing Concentration

Match each term with its description

Term	Description
A. A saturated solution	1. Made of one type of atom or compound
B. Dissolves	2. When the solute particles fill in the spaces between the solvent particles
C. A pure substance	3. The substance that dissolves in a solvent.
D. Solute	4. A solution in which no more solute will dissolve
E. Insoluble	5. A substance that will not dissolve to form a solution

A= **4**
B= **2**
C= **1**
D= **3**
E= **5**

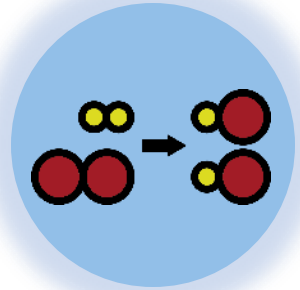


Do Now

Introducing Concentration

C3.2.7

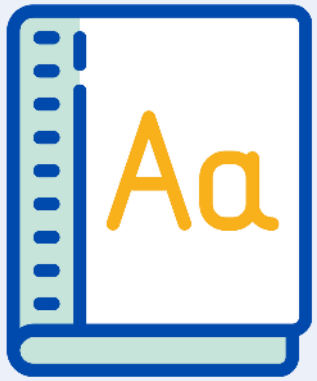
Science Mastery



Following this lesson, students will be able to:

- Convert units of volume between dm^3 and cm^3
- Describe what is meant by concentration
- Recall the unit of concentration

Key Words:



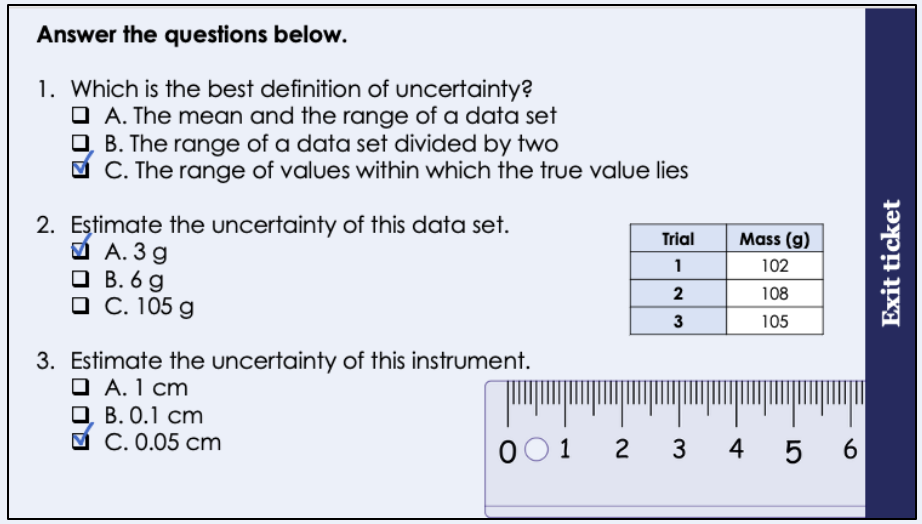
solute	**solvent**	**mass**
concentration	**volume**	

Lesson Objectives

This is the fix-it portion of the lesson

The **fix-it** is an opportunity to respond to gaps in knowledge, especially those identified by the previous lesson's exit ticket.

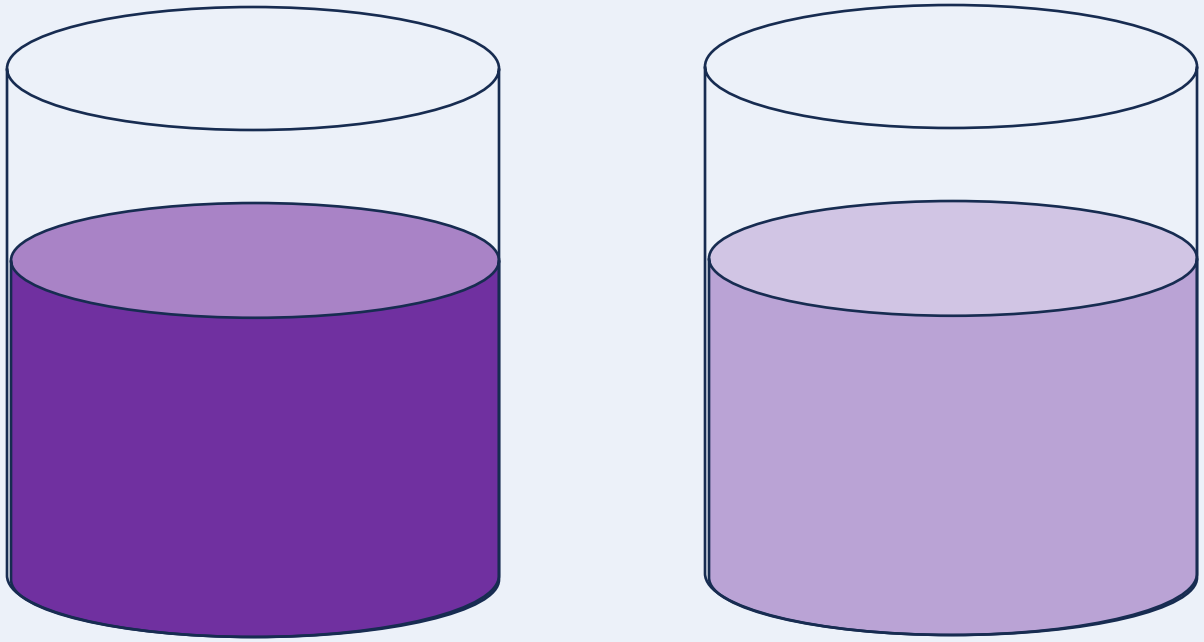
- The teacher should customise this slide as needed, to facilitate
  - **reteach**, **explanation, demonstration** or **modelling** of ideas and concepts that students have not yet grasped or have misunderstood.
  - **practise** answering specific questions or of key skills.
  - **redrafting** or **improving** previous work.



Fix-it

Which is more concentrated?

Purple juice is added to two glasses of water.



The concentration of a solution tells you how much **solute** is dissolved **in a given volume** of a **solution**.

Volume

Volume is the **amount of space** that a substance or object takes up.

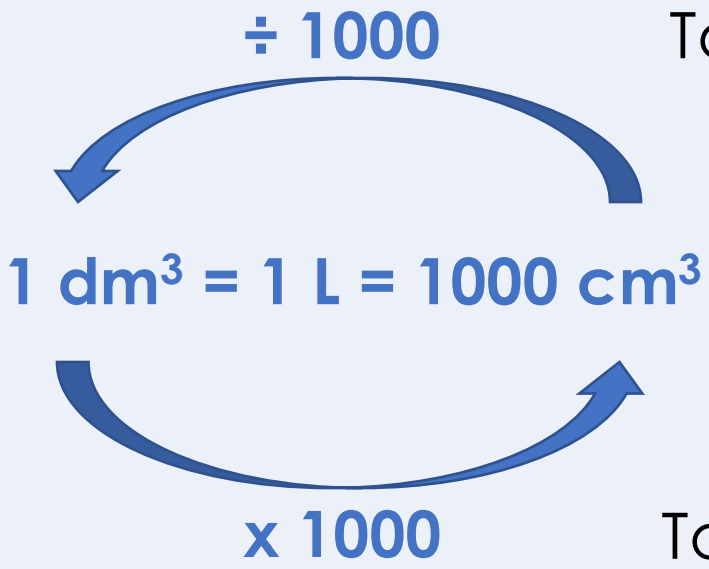
How many **units of volume** can you think of?

m^3 (cubic metres)
cm^3 (cubic centimetres)
L (Litres)
mL (millilitres)

Scientists use a different unit of volume: **dm^3** (cubic decimetres)

$1\ dm^3 = 1\ L = 1000\ cm^3$

Converting between units of volume



To change cm^3 to dm^3 you divide by 1000 (÷ 1000)

To change dm^3 to cm^3 you multiply by 1000 (x 1000)

Let's practice converting these volumes to different units.

1000 cm^3 = **1** dm^3
5000 cm^3 = **5** dm^3
2403 cm^3 = **2.403** dm^3
145 cm^3 = **0.145** dm^3

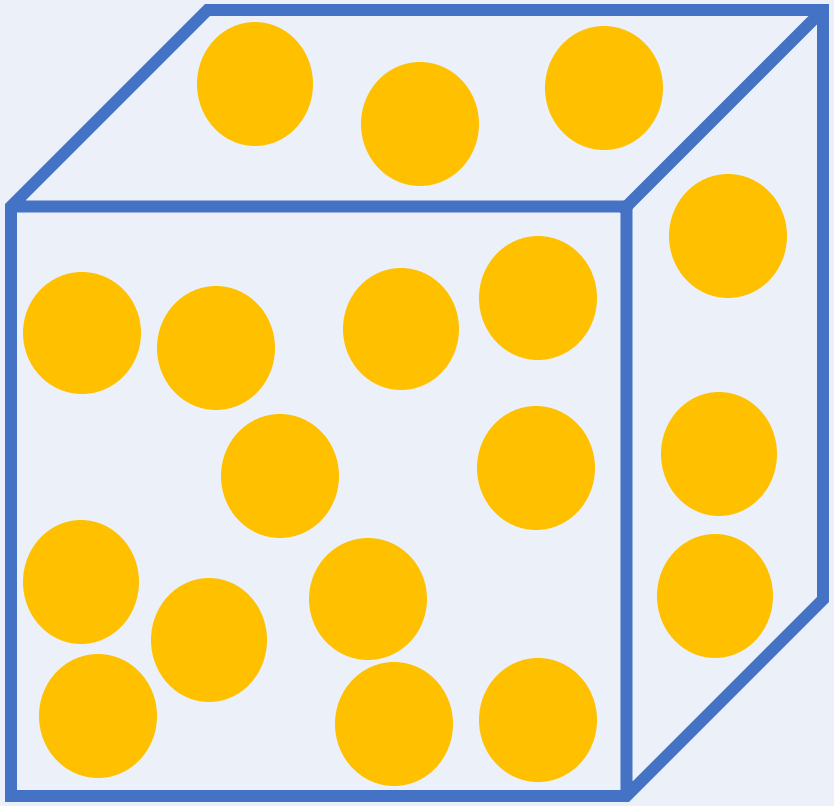
1 dm^3 = **1000** cm^3
10 dm^3 = **10000** cm^3
179 dm^3 = **179000** cm^3
0.2 dm^3 = **200** cm^3

Concentration

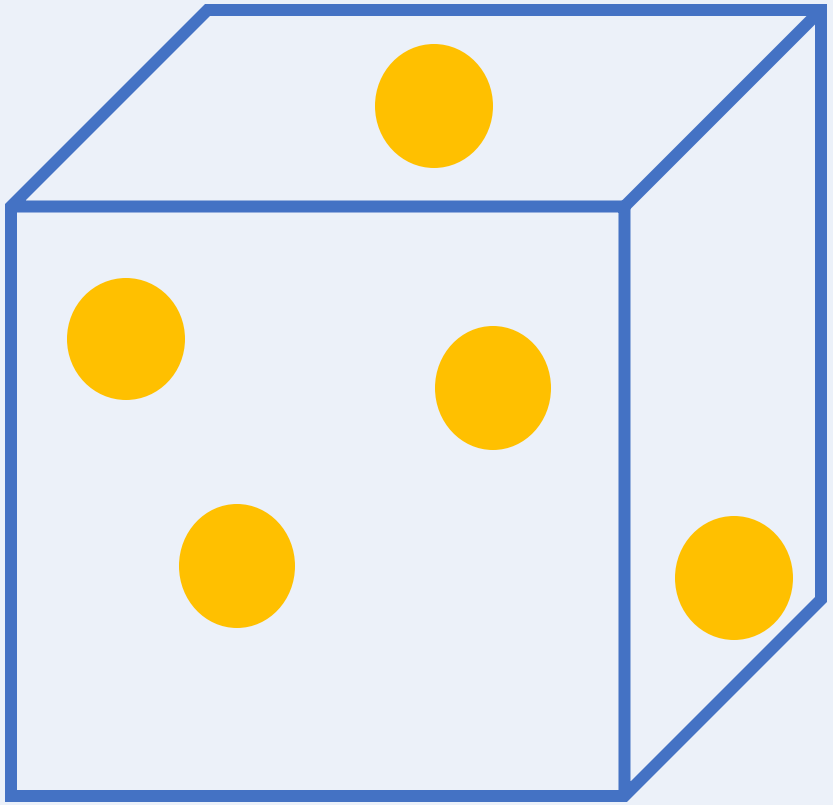
g dm^3

Concentration is the **mass** of a solute in a certain **volume** of solvent.

So, the unit of concentration is g/dm^3



High concentration

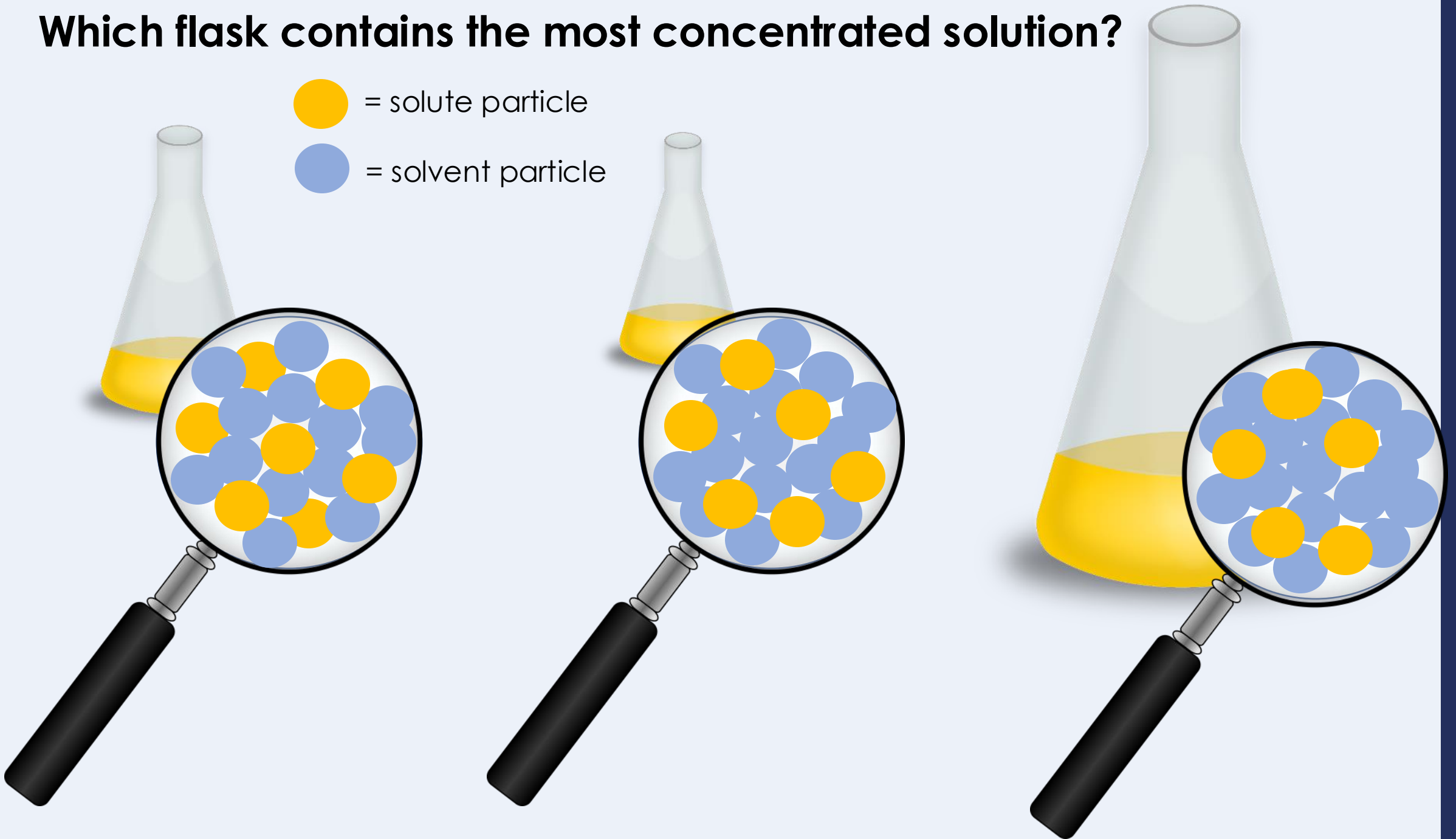


Low concentration

Which flask contains the most concentrated solution?

= solute particle

= solvent particle



Check for understanding

Sugar is added to hot water and stirred. After a while it can't be seen anymore.

Choose the correct statements below.

The sugar melts.

The sugar joins with the water to make a new liquid.

The sugar breaks up into smaller pieces and mixes with the water.

The sugar disappears.

Talk Task

Drill

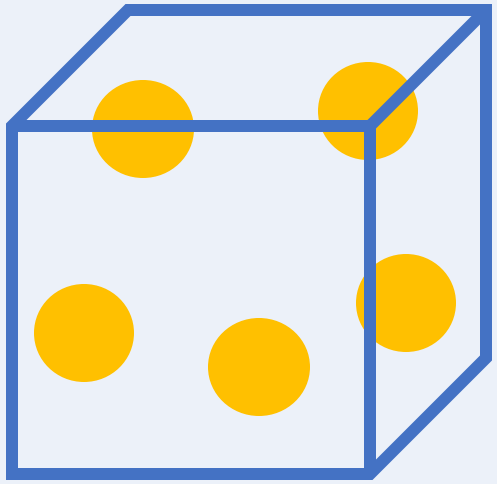
1. You have salt, water and salty water. Which is the solute?
2. You have salt, water and salty water. Which is the solvent?
3. You have salt, water and salty water. Which is the solution?
4. What is 1 dm^3?
5. What is 25 cm^3 in dm^3?
6. What is 0.253 dm^3 in cm^3?
7. Define concentration
8. How can you decrease concentration?
9. Draw a particle diagram to show low concentration.

Check for understanding

Drill answers

1. Salt
2. Water
3. Salty water
4. 1 litre / 1000 cm^3
5. $\frac{25}{1000}$=0.025 dm^3

6. 0.253 x 1000 = 253 cm^3
7. Concentration is the mass of a solute in a certain volume of solvent
8. You can decrease the concentration by increasing the solvent (diluting it)
9. diagram

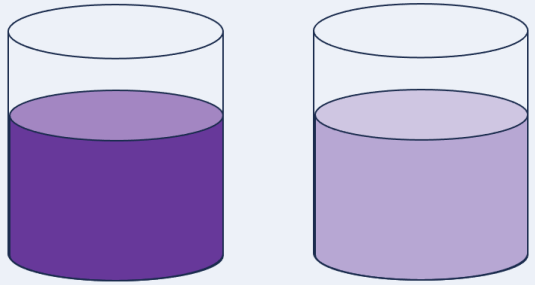


Check for understanding

I: Concentration

Example question:

Describe the difference in concentrations in this image.

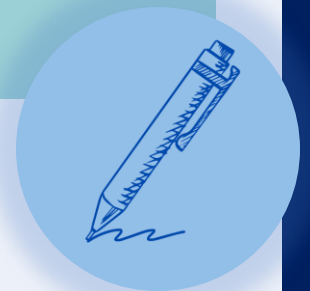


Model answer:

- The beaker on the left is more concentrated as it is darker in colour.
- The beaker on the right is lighter in colour, as it has had water added to it, so it is more dilute.
- So, the concentration of the lighter colour is lower than the darker coloured liquid.

To 'describe', your answer should:

- Use **bullet points.**
- Include each step of the process in a **logical order.**
- Use **keywords** throughout the answer
- Stay **focused** on the question.

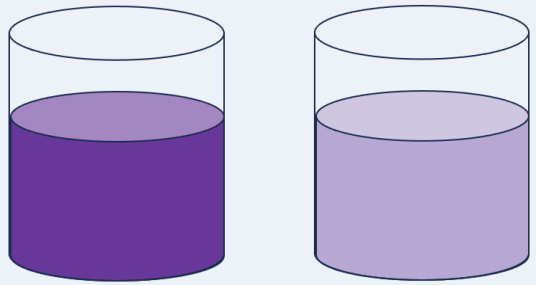


Writing like a scientist

We: Concentration

Example question:

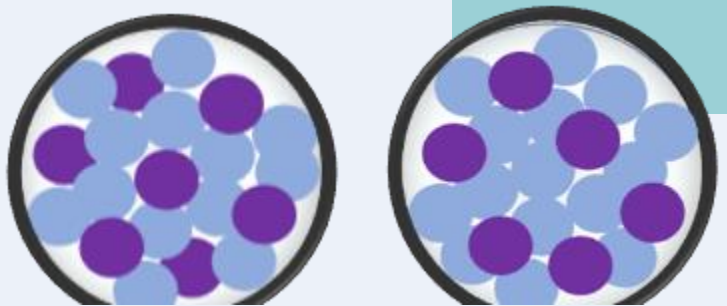
Explain the difference in concentrations in this image using particle diagrams.



Model answer:

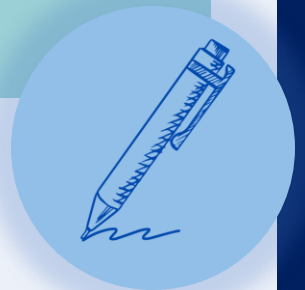
- The beaker on the left is more concentrated as it has many more particles of solute in the same volume as the one in the glass. (First diagram)

- The beaker on the right has had water added to it so it is more dilute. You can see that its lighter in colour. This means its concentration is less than the one in the bottle. So, there are less particles in the same volume (second diagram



To 'explain' your answer should:

- Begin with a **scientific statement**.
- Use 'this means that', 'because' or 'so' **to link your statement to the question**.

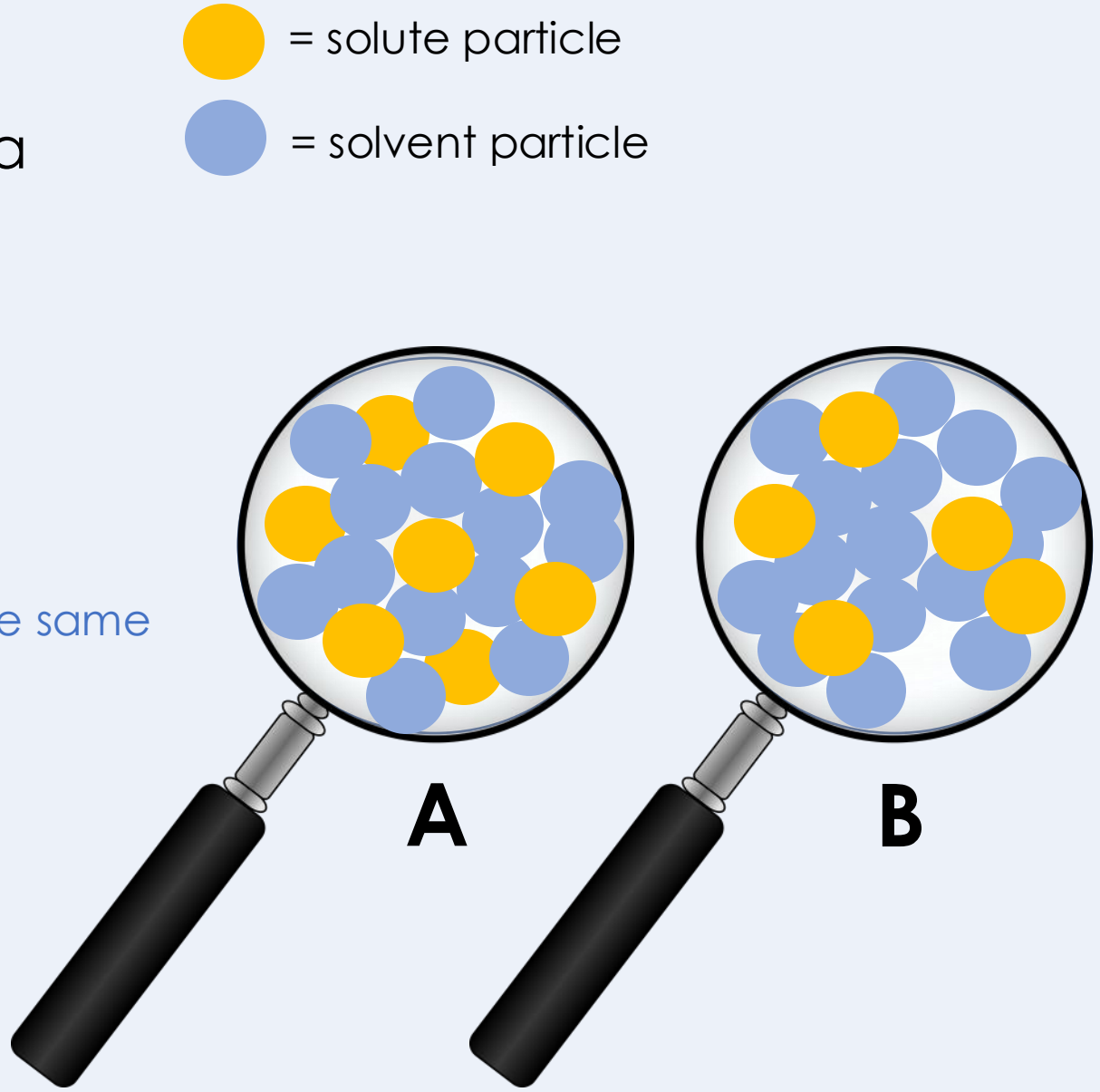


Writing like a scientist

You: Concentration

Example question:

Explain which of these samples has a higher concentration. Both samples have the same volume.



Model answer:

- A has a higher concentration
- Because there are more solute particles in the same volume

Check for understanding

Answer the questions below.

1. Salt dissolves in water. Which word describes salt best?
   - ☑ A. soluble
   - ☐ B. insoluble
   - ☐ C. solvent

2. 5 g of solute is dissolved in 200cm^3 of solution. Which of these quantities has the same **volume** as this solution?
   - ☑ A. 0.2 dm^3
   - ☐ B. 200000 cm^3
   - ☐ C. 0.005 kg

3. Select the answer below which is equal to 0.05 dm^3.
   - ☐ A. 500 cm^3
   - ☑ B. 50 cm^3
   - ☐ C. 0.00005 cm^3

Exit ticket

Feedback

Lesson C3.2.7	
What was good about this lesson?	What can we do to improve this lesson?

Send us your feedback by clicking this link
or by emailing sciencemastery@arkonline.org
Thank you!