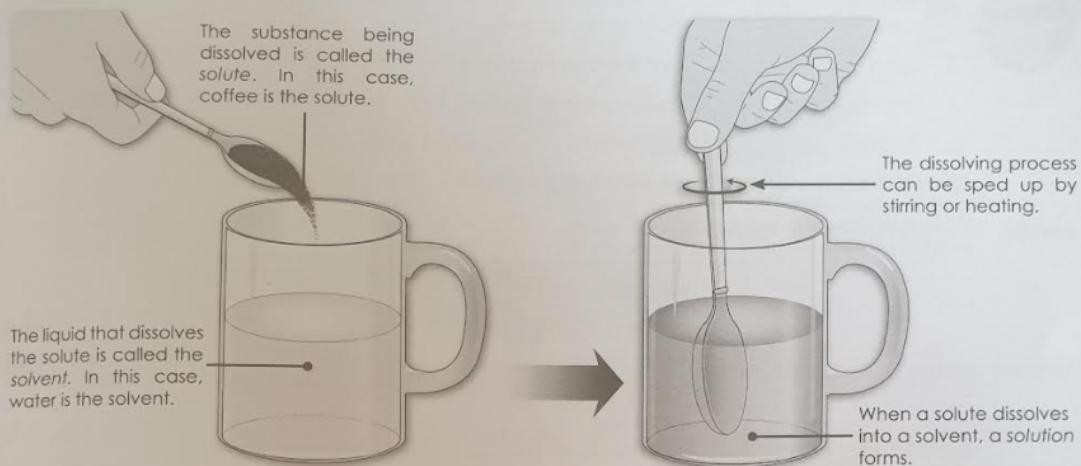


Solutions

When you swim in the sea you can taste the salt in the water even though you can't see it. When you stir sugar into water, the sugar seems to disappear, but you know that it must still be there in some form because you can taste it.

When salt or sugar 'disappears' into water, we say that the substance has *dissolved* in the water.

Some substances do not dissolve (e.g. sand will not dissolve in water). These substances are said to be *insoluble*.



1. Define the following terms:

- (a) Solute _____

- (b) Solvent _____

- (c) Solution _____

- (d) Soluble _____

- (e) Insoluble _____

2. Outline two ways in which the dissolving process can be sped up.

- (a) _____
- (b) _____

3. Give six examples of substances that are *soluble* in water.

- (a) _____ (d) _____
- (b) _____ (e) _____
- (c) _____ (f) _____

4. Give six examples of substances that are *insoluble* in water.

- (a) _____ (d) _____
- (b) _____ (e) _____
- (c) _____ (f) _____

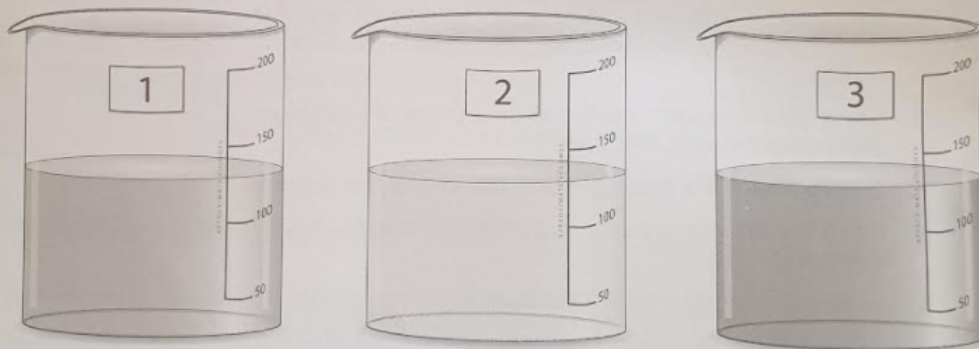
Each time 5 mL of solution was transferred from one test tube to the next, you were diluting the potassium permanganate by a factor of 2. So if we assume (or guess) that test tube 1 contained one particle of potassium permanganate for every 1 000 particles of water, when you transferred it to test tube 2, it was diluted to 1 particle of potassium permanganate for every 2 000 particles of water.

1. Complete the dilution calculations. The first two have been done for you.

Test tube number	Particles of Potassium Permanganate	Particles of water
1	1	1 000
2	1	2 000
3	1	
4	1	
5	1	
6	1	

2. Was there any potassium permanganate in test tube 6? Explain your answer. _____

3. The diagram below shows three different solutions of copper sulfate.



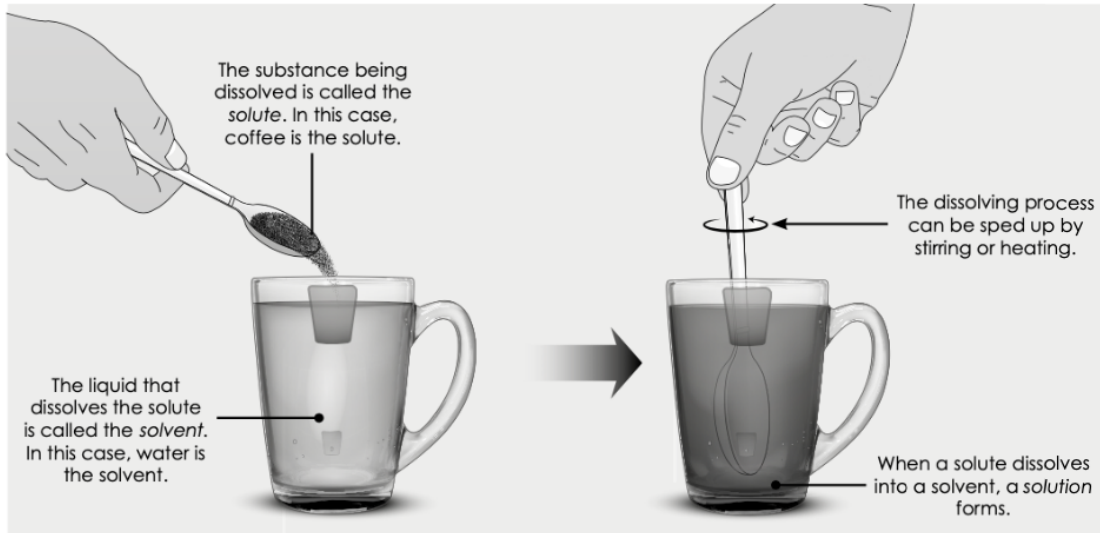
- (a) Identify the beaker that contains the :
- (i) most concentrated solution. _____
 - (ii) most dilute solution. _____
 - (iii) an intermediate concentration. _____
- (b) In terms of particles, which beaker contains the:
- (i) greatest number of copper sulfate particles? _____
 - (ii) least number of copper sulfate particles? _____
4. Use the word list to complete the paragraph.

concentrated - dilute - particles - solute

A _____ solution contains a small amount of solute. When more _____ is added, the solution will become more _____.

A _____ solution contains more solute _____ when compared to a dilute solution.

Answers



- Define the following terms:
 - Solute **A substance dissolved in a liquid (the solvent) to form a solution.**
 - Solvent **The liquid in which a solute is dissolved to form a solution.**
 - Solution **A mixture created when a solute dissolves in a solvent.**
 - Soluble **A substance which is able to be dissolved in a solvent.**
 - Insoluble **A substance which is unable to be dissolved into a solvent.**
- Outline two ways in which the dissolving process can be sped up.
 - Stirring**
 - Heating**
- Give six examples of substances that are *soluble* in water.
 - Any sensible answer accepted.**
 - _____
 - _____
 - _____
 - _____
 - _____
- Give six examples of substances that are *insoluble* in water.
 - Any sensible answers accepted.**
 - _____
 - _____
 - _____
 - _____
 - _____

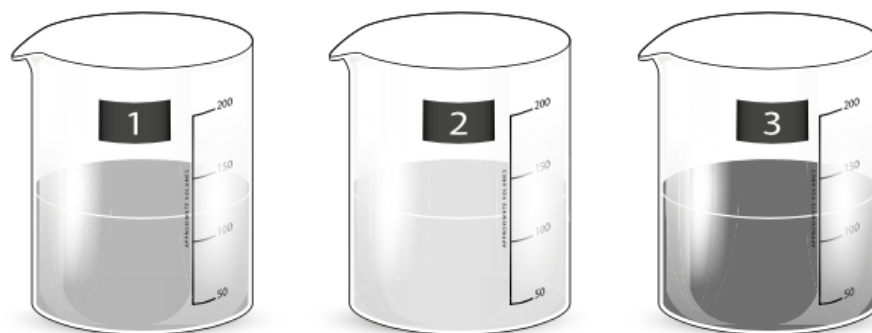
Each time 5 mL of solution was transferred from one test tube to the next, you were diluting the potassium permanganate by a factor of 2. So if we assume (or guess) that test tube 1 contained one particle of potassium permanganate for every 1 000 particles of water, when you transferred it to test tube 2, it was diluted to 1 particle of potassium permanganate for every 2 000 particles of water.

1. Complete the dilution calculations. The first two have been done for you.

Test tube number	Particles of Potassium Permanganate	Particles of water
1	1	1 000
2	1	2 000
3	1	4 000
4	1	8 000
5	1	16 000
6	1	32 000

2. Was there any potassium permanganate in test tube 6? Explain your answer. **There was practically no potassium permanganate particles left in test tube 6 as it had been diluted to 1 particle in 32 000 particles of water.**

3. The diagram below shows three different solutions of copper sulfate.



- (a) Identify the beaker that contains the :
- (i) most concentrated solution. **Beaker 3**
- (ii) most dilute solution. **Beaker 2**
- (iii) an intermediate concentration. **Beaker 1**
- (b) In terms of particles, which beaker contains the:
- (i) greatest number of copper sulfate particles? **Beaker 3**
- (ii) least number of copper sulfate particles? **Beaker 2**

4. Use the word list to complete the paragraph.

concentrated - dilute - particles - solute

A **dilute** solution contains a small amount of solute. When more **solute** is added, the solution will become more **concentrated**.

A **concentrated** solution contains more solute **particles** when compared to a dilute solution.