

Glossary:

- I. dissolve** – when a substance mixes with another substance and becomes part of it.
- II. soluble** – is able to dissolve. For example, sugar is soluble because it can dissolve in water
- III. insoluble** – cannot dissolve. For example, chalk is insoluble because it cannot dissolve in water.
- IV. solution** – a mixture usually made of a solid dissolved in a liquid. Learners will also hear the word used to mean the solving of a problem or a correct answer, particularly in Maths.
- V. solute** – the solid that dissolves in a solution.
- VI. solvent** – the liquid part of the solution in which the solute dissolves.
- VII. universal** – involves many things, places or situations, for example, pollution is a universal problem.
- VIII. fertilisers** – chemicals that farmers put in the soil make their crops grow
- IX. pesticides** – chemicals that farmers spray on their crops to kill pests such as insects.
- X. uniform** – the same throughout
- XI. reversible** – can be changed back to the way it was before. The word is also used to describe something that has two sides that can both be used – e.g. a reversible coat or duvet cover.

Misconception

The solid solute in a solution no longer exists when it dissolves because we can't see it.

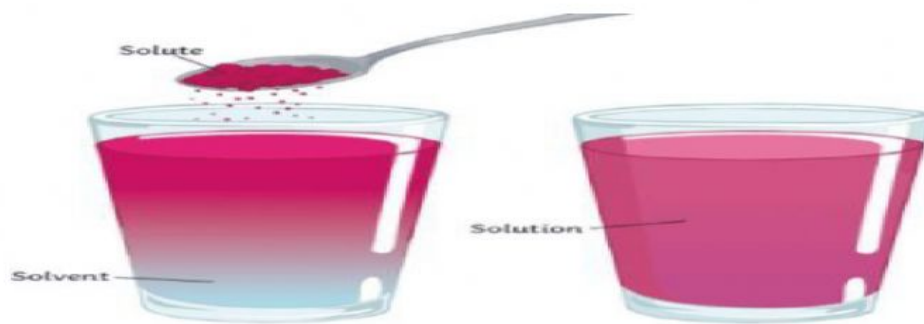
Dissolve some sugar in water. Taste the sugar solution. It tastes sweet which shows that the sugar (solute) is still there, even though we cannot see it.

Dissolving and solutions:

Tea is a liquid. Sugar is a solid. When you put sugar in your tea and stir it, the sugar seems to disappear, though you can taste it in the tea.

The sugar has dissolved in the tea. This means that the particles of sugar have spread out into the spaces between the particles of the tea.

Solids that can dissolve in a liquid are called soluble solids. Being able to dissolve is a property of the solid. Not all solids can dissolve. These solids are insoluble.

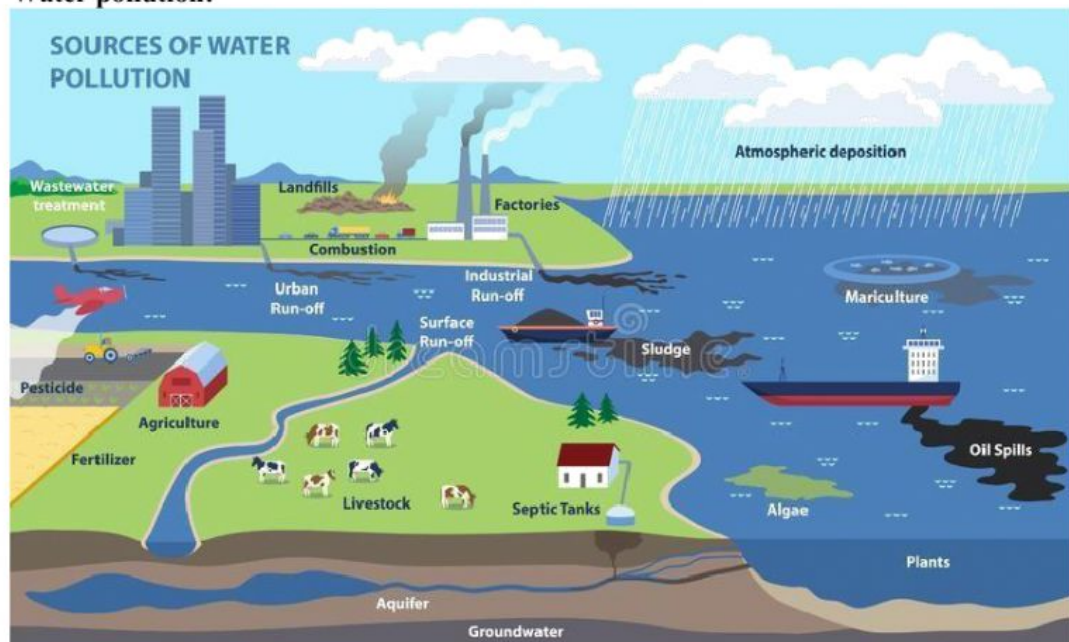


Mixtures are made of particles of different substances mixed together. Dissolving is a type of mixing because when the solid dissolves it mixes with the liquid. We call the mixture a solution. The solid in the solution is called the solute, for example sugar. The liquid is called the solvent, for example tea. Being able to dissolve a solid is a property of the liquid. A solution will always contain a solute and a solvent.

Sea water is another solution. The salt dissolves in the water to make the solution. The salt is the solute and the water is the solvent.

Many substances dissolve in water. This is another one of water's properties. Water is sometimes called the universal solvent because so many substances can dissolve in water.

Water pollution:



Some solutions can be harmful. Some soluble substances can pollute water. We cannot see these substances because they are dissolved in the water, so we don't know that the water is polluted. Polluted water can harm plants, animals and people.

Dissolved chemicals, such as acids, from factories can pollute rivers and lakes.

Farmers put chemical fertilizers in the soil to make their crops grow better. These fertilizers sometimes wash into rivers and pollute the water.

Many farmers also spray chemicals on their crops to kill pests like insects. These chemicals are called pesticides. They can also pollute natural water sources when they dissolve in rainwater and get washed into rivers and the sea.

Insoluble substances in water can also cause pollution. Examples include human body waste, oil and plastics.

Questions

1 What is dissolving?

Dissolving is the process that occurs when a solute is added to a solvent and the solute disappears. For e.g. when you add sugar to the tea, the sugar has disappeared though you can taste it in the tea. It means that the sugar has dissolved in the tea.

2 a Can all solids dissolve?

No, not all solids can dissolve.

b How do we know if a solid has dissolved?

When the particles of a solid have spread out into the spaces between the particles of the liquid, we know that a solid has dissolved.

3 a Name the two parts of a solution.

The two parts of a solution are a solute and a solvent.

b Give an example of each of the two parts.

The solid in the solution is called the solute, for example sugar. The liquid is called the solvent, for example tea.

4 Why is a solution a mixture?

Mixtures are made of particles of different substances mixed together. Dissolving is a type of mixing because when the solid dissolves it mixes with the liquid. That is why we call the mixture a solution.

5 Why is water sometimes called the universal solvent?

Water is sometimes called the universal solvent because so many substances can dissolve in water.

6 Why can't we sometimes see water pollution?

There are some harmful soluble substances dissolved in the water which we cannot see, so we can't see the water pollution.

7 a Name two soluble substances that cause water pollution.

The dissolved chemicals, such as acids, from factories and the chemical fertilisers which the farmers put in the soil to kill the pests sometimes wash into rivers are the two soluble substances that cause water pollution.

b Name two insoluble substances that cause water pollution.

Human body waste, oil and plastics are the insoluble substances that cause water pollution.

8 How do you think the use of pesticides affects the environment?

Many farmers spray chemicals called pesticides on their crops to kill pests like insects. These pesticides can pollute natural water sources when they dissolve in rainwater and get washed into rivers and the sea. It simply means the presence of unsuitable substances in waters, which changes its properties, thereby making it contaminated and unsuitable for use.

Think like scientist 1:

Make a solution

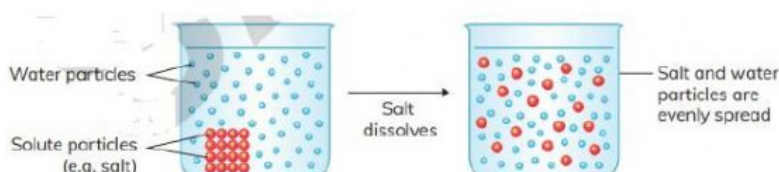
Explanation:

Over time that the crystals gets smaller and that the colour of the crystal (if using a coloured crystal) spreads out in the water.

Solids break up into very tiny particles as they dissolve. These particles are so tiny they are no longer visible to our eyes.

The crystals dissolve and spread through the water until the solution has uniform appearance.

Do not confuse physical change and chemical changes. Note that when a solid dissolves each particle of the solid remains unchanged. It does not combine with the water to make a new substance, as it would in a chemical reaction.



The particles of the solute move between the solvent particles when they dissolve. The solute particles spread evenly in the solvent. Because of this you cannot see the solute in a solution after it has dissolved. We say that a solution has a uniform appearance – it is the same throughout. This means

that it looks the same throughout. The picture shows how the solute particles spread when they dissolve in water.

Separating a solution

A solution is a mixture of the solute and the solvent. We can separate most mixtures because the particles of the substances in the mixture are not chemically joined together.



We can separate the dissolved solute from a solution by evaporation. We call this a reversible process because we can get back the dissolved solute from the solution.

Think like scientist 2

Explanation:

A solution is a mixture and that we can separate mixtures in different ways.

Dissolving is a reversible process and the salt (solute) can be recovered from a solution by evaporation, though it will not always be in the exactly the same form as at the start.

The type of scientific enquiry used here is observation over time method