

### \* 3.1. Reversible and irreversible changes

#### Reversible changes

Place the ice cubes in the sun or another warm place for five minutes.

What has happened to the ice after five minutes?

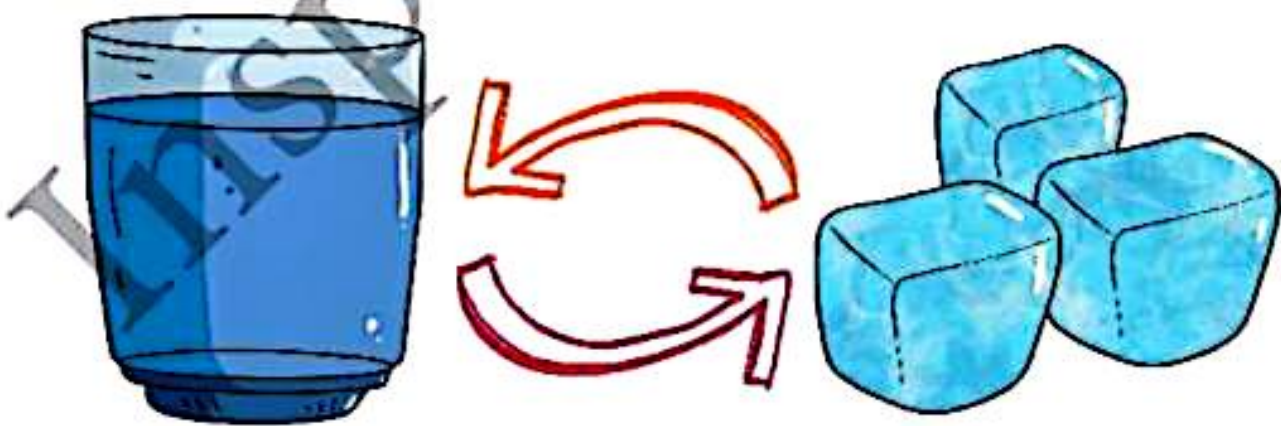
What causes the ice to change?

What will happen to the ice if you put it back in the freezer? Why?

You will need:  
ice cubes, a saucer and a watch.



In a warm place, the solid ice becomes liquid water. When you put the ice back in the freezer, it becomes a solid again. We say that the changes are **reversible** because we can change solid ice back to liquid water and liquid water back to solid ice. Heat causes the ice to melt. When the water loses heat and cools, it becomes solid again. This diagram shows phase changes between ice and water.







## Irreversible changes

When some substances are heated, the changes cannot be reversed. We call these **irreversible** changes. Sometimes irreversible changes turn one substance into another substance. For example, when we burn a match, the wood changes into a black substance called carbon.

Decide whether each of these changes is reversible or irreversible:

- a) melting butter in a hot pan .....
- b) baking a cake .....
- c) dissolving salt in water .....
- d) burning wood on a fire .....
- e) rusting on a tin can .....

-  Heat makes substances change.
-  Some change are reversible, for example, ice melting and refreezing.
-  Some changes are irreversible, for example, burning a match.
-  Some changes cause a new substance to form.

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## \* 3.2. Mixing and separating solids

### What is a mixture?

A **mixture** is made up of two or more different substances mixed together. The substances in a mixture are not chemically joined so we can separate them. Mixtures can be solids, liquids or gases. Air is a mixture of three main gases: nitrogen, oxygen and carbon dioxide. Think of some other mixtures.

### Separating mixtures

We can separate the substances in mixtures in different ways.

If you pick out the nuts in a mixture of nuts and raisins, then you **sort** the mixture. Gardeners use a sieve to separate stones from the soil.



Peanuts and raisins are a mixture of solids. If you don't like raisins, you can pick out the nuts.



### \* 3.3. Soluble and insoluble substances

Some solids like sugar can **dissolve** in a liquid. Sugar can dissolve in water. It is called a **soluble** substance.

Some solids do not dissolve in a liquid. Sand does not dissolve in water. We say it is **insoluble** in water.



What happens to the sugar that we stir into our tea?

Fill in the blanks.

- a) When a solid mixes with a liquid and becomes part of the liquid it .....
- b) A solid that dissolves in a liquid is .....
- c) A solid that does not dissolve in a liquid is .....

### \* 3.4. Solutions

You have found out that some substances can dissolve in water or other liquids. These substances are soluble. A soluble substance forms a **solution** with a liquid.

Solutions always have two parts:

- ◆ The substance that dissolves, called the **solute**.
- ◆ The liquid in which the solute dissolves, called the **solvent**.

Look at the picture of seawater.

Can you see the salt in the water? How do you know the water contains salt if you can't see it?

Seawater is a solution. The salt dissolves in the water to make the solution. The salt is the solute and the water is the solvent.



Primary Science

Can you identify the mixture / solution in this picture?

