Changes and Causes of Changes

☞ When we look at the changes around us, we realize that every change has a cause. Ice melt due to heat of the sun. Plants also use the sun's energy to grow. The changes in weather occur due to the revolution of the Earth around the Sun. Similarly, day and night are caused due to the rotation of the Earth. Change, therefore, is a phenomenon in which an object becomes that occur around us, let us classify them in the following categories:

1. Slow and fast changes

2. Reversible and irreversible changes

3. Physical and chemical changes

Fast Changes

Change that takes place over a short duration of time are called fast changes.

Experiment

Boll some milk and add a small amount of lemon juice to it. The milk will turn into a curdly substance, that is, cheese. The time required for this change is very less. In other words, the change of milk into cheese occurs very fast.

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Slow Changes

Changes that take a long time to complete are called slow changes.

Experiment

Add a small amount of curd into lukewarm milk. The bacteria that are already present in the curd convert the whole milk into the curd. It takes a few hours to convert milk into curd. It is a slow change.

Slow change	Fast change
1. The changes that take place in a longer duration of time are called slow changes.	1. The changes that take place quickly or in a shorter duration of time are called fast changes.
2. Some examples of slow changes are: • Change of seasons • Growth of a plant • Rusting of iron	2. Some examples of fast changes are: • Burning of a piece of paper • Glowing of bulb • Blowing of exhaled air on the glass to make it foggy

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Rust

Rust is the reddish brown product of corrosion of iron. Rust is formed when iron reacts with moisture and the oxygen that is present in air. It causes a great loss. So try to reduce the process of rusting by painting, polishing objects made of iron.

Reversible Changes

Experiment

When you put the butter in the sun, it melts very fast. When you put it back into the fridge it becomes hard again. This shows that a change can be reversible, that is, it can occur in two opposite directions.

Irreversible change

Experiment

At home, our mother takes the wheat flour and makes its dough. Then she makes puris with this flour in the oil. Now, the puri can't be changed back into the dough? Such a change can occur only in one direction.

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Reversible change	Irreversible change
1. A change in which substance can come back to its original form is called reversible change.	1. A change in which the substance cannot get its original form is called irreversible change.
2. These are temporary changes which can be reversed when the cause of the change is removed.	2. These are permanent changes which cannot be reversed even if the cause of the change is removed.
3. Some examples of reversible changes are: • Freezing of water • Evaporation • Stretching of rubber string • Switching on or off light	3. Some examples of irreversible changes are: • Burning of paper • Tearing of clothes • Getting older • Making of curd

The growth of an organism is an irreversible change that cannot be occurred.

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Physical Changes

Experiment

Switch on the electric bulb. It will result in emission of light when the current passes through it. But when we switch it off, it will retain its previous position as filament cools and stops glowing in this, no new substance is formed and we can get back to the original condition.

Take some sugar crystals. We know that it is white in colour and sweet in taste and has

Now grind the sugar in order to change it into powder form. We will observe that during powdering of sugar, only its form has changed. Previously it was in crystal form and later it changed into powder form. As such no new substance is formed. A change in which no new substance is formed is known as physical change.

Experiment

A few more examples are:

When an iron rod is heated, it becomes hot and red, but on cooling it regains previous position.

Tearing of paper is a physical change as the torn pieces are same as the original paper.

Breaking of glass tumbler is a physical change although when it breaks, its size shape and ability to hold water are lost yet no new substance is formed.

Changes and Causes of Changes

Chemical changes

Experiment

Take some sugar in a dish and heat it on a burner. You will observe that sugar becomes brownish black and bitter in taste. It is a permanent and irreversible change in which a new substance is formed. This type of change in which a new substance is formed is called a chemical change.

Some more examples are given below:

• Burning of wood is a chemical change. Before the wood is burnt, it is hard and brown in colour. During the burning of wood, it produces smoke, gases and vapour and changes into wood charcoal and ash.

• Change of milk into curd is a chemical change. Before the change, milk is a liquid. After the change, it is a semi-solid material which has a different taste.

Rusting of iron is a chemical change. Iron is a grey solid which is attracted to a magnet. After rusting, the surface of iron gets covered with a brown solid which is not attracted to a magnet.

Cooking food results in the formation of new substances that are different from the original ingredients used for cooking and we cannot get back the ingredients.

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☞ **Now let us compare physical change and chemical change**

Physical changes	Chemical changes
1. In physical change, we can get back the original substance.	1. In chemical change, it is difficult to get the original substance back.
2. No new substance is formed.	2. New substance with different properties is formed
3. The examples of physical changes are: • Tearing of paper • Kicking of football • Freezing of water • Glowing of bulb • Melting of ice	3.The examples of chemical change are: • Respiration in living beings • fermentation of sugarcane juice • Burning of paper • Growth of plants

Changes and Causes of Changes

☞ Desirable and Undesirable Changes

Desirable changes

Those changes which are useful, not harmful to our environment and desired by us are called as desirable changes.

Examples: Ripening of fruit, growth of plants, cooking of food, milk changing to curd.

Undesirable changes

Those changes which are harmful to our environment and not desired by us are called as Undesirable changes.

Examples: Deforestation, decaying of fruit, rusting of iron.

☞ Natural and Human Made Changes

Natural changes

Those Changes which take place in nature on their own and are beyond the control of human beings are called as Natural changes.

Examples: Rotation of the earth, Changing phases of the Moon, Rain.

Human made or Artificial Changes

Those changes which are brought about by human beings are called as human made or artificial changes. They will not happen on their own.

Examples: Cooking, Deforestation, Cultivating crops, construction of buildings.