

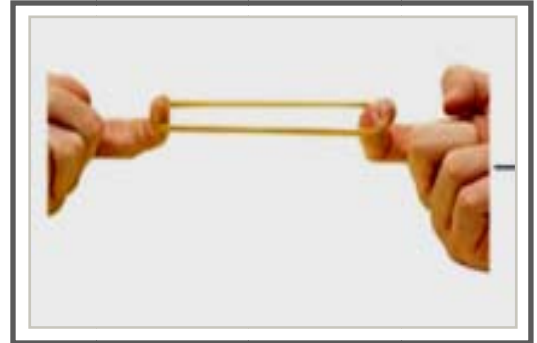
Changes Around Us

Reversible

Take a rubber band. Stretch it and then release it.

What happens to the rubber band?

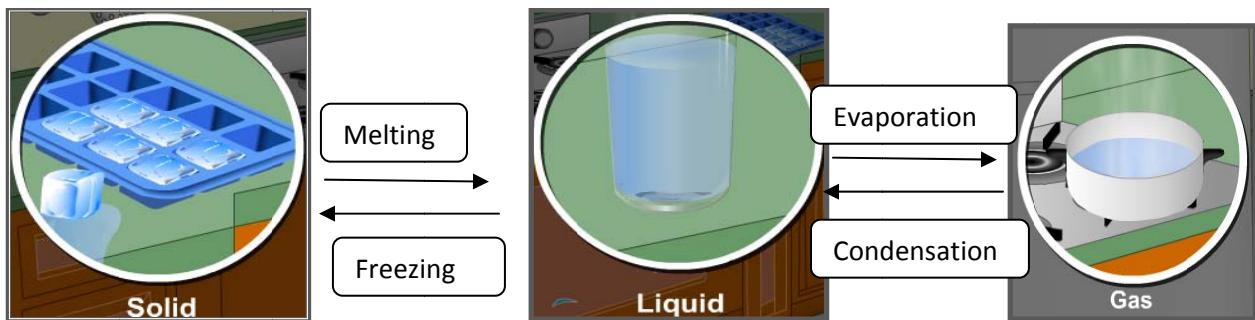
Does the stretched band recover its original shape and size on releasing or does its shape change permanently when it is stretched?



It will be observed that the rubber band regains its shape when it is released. Thus, the change that the rubber band undergoes on stretching is a reversible change. For examples: Melting of ices, melting of wax, evaporation of water, dissolution of common salt, boiling of water, freezing of water, etc.

A reversible change is the one in which a substance that is undergoing the change can be recovered in its original form.

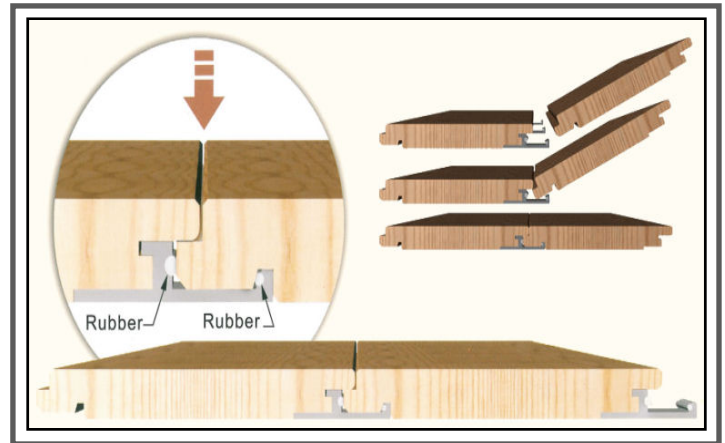
For example, when ice cubes are kept at room temperature for some time, they melt to give water. If the same tray containing water is kept in a freezer, then the water turns into ice. As the ice cubes are re-obtained when the tray is kept in the freezer, the change is reversible.



Expansion and Contraction in Materials by Heating and Cooling

All metals expand when heated and contract when cooled.

When heated, if there is an increase in the volume of a substance, then the process is known as expansion. Again, when cooled, if there is a decrease in the volume of a substance, then the process is called contraction.

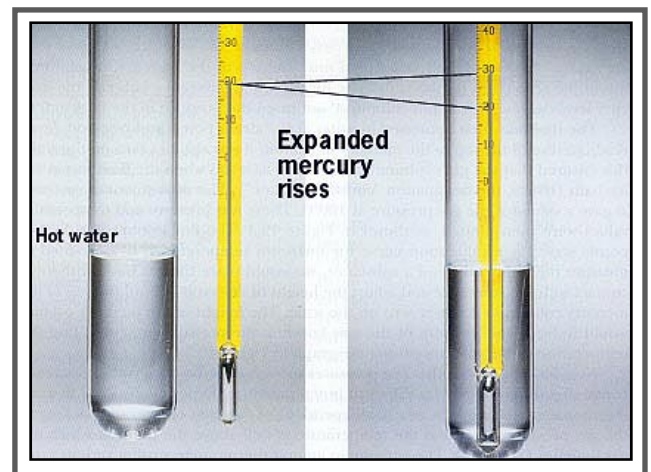


Silicone beads cushion the planks to reduce noise that results from normal

Expansion and Contraction in Liquids

When the particles in a liquid are heated, their average energy increases and they need more room, so they expand.

When the particles in a liquid are cooled, as result the volume decreases, or contracts due to the particles need less room. This is demonstrated by the liquid used in a thermometer. As the liquid expands and contracts, it moves up and down the inside tubing of the thermometer.



Expansion and Contraction in Gases

When the particles in a gas are heated, their average energy increases and they need more room, so they expand.

When the particles in a gas are cooled, the volume decreases, or contracts, because the particles need less room.

Under extremely high temperature conditions (like the temperatures inside the Sun, particles can be split into what makes them up (electrons and ions). This creates a fourth state of matter called plasma.

Activity

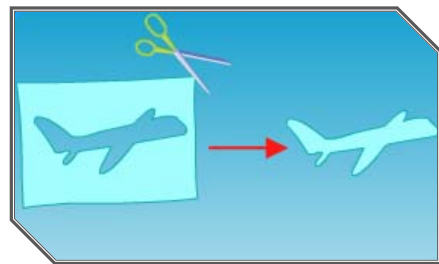
Take a metal ball and goes easily through the ring. Burn a Bunsen burner. Hold metal ball above flame and heat for a minute. Try to put the heated metal ball through the ring and observe. You will be observed that ball cannot pass easily through the ring due to expansion of ball on heating. Put the heated metal ball in the beaker with the cold water. Put the cooled metal ball through the ring again. You will notice that ball goes easily through the ring due to contraction on cooling.

Irreversible change

The change in which a substance that is undergoing the change cannot be re-obtained is known as an irreversible change. Hence, it can be said that an irreversible change is the one in which a substance that is undergoing the change cannot be recovered in its original form.

Activity

Take a piece of paper and draw aeroplane on it and then cut along its outline, as shown in the figure.



Take two raw eggs and boil one of them.

Compare the raw egg with the boiled egg.

Few examples:

- Cooking of food
- Burning of wood
- Ripening of fruits
- Burning of cracker

Slow and fast changes

Slow changes are those which occur very slowly. On the other hand, fast changes are those which occur very fast.

Example for Slow Change

- Rusting of iron
- Growth of plants
- Curdling of milk

Example for Fast Change

- Lighting of electric bulb
- Bursting of a balloon
- Burning of paper

Desirable and undesirable changes

Change brought about by a person or the nature, which is useful, is called a desirable change. On the other hand, change brought about by a person or the nature, which is harmful, is called an undesirable change.

Some examples of desirable changes

- Formation of manure from animal dung and dead leaves is a desirable change as these waste materials are converted to useful manure.
- Formation of curd is a desirable change as it is more easily digestible than milk.
- Cooking of food is a desirable change.



Rusting of Iron



Some examples of undesirable changes

- Spoiling of food in summer is an undesirable change as spoiled food is not edible.
- Flooding of rivers during rainy season is an example of undesirable change. This is because floods not only damage property and endanger the lives of humans and animals, but also have other detrimental effects.
- Breaking of glass articles is an undesirable change as broken glass cannot be rejoined.



Spoiling of food in summer

Periodic and Non-periodic Changes

Changes that occur again and again after a fixed interval of time are called periodic changes. On the other hand, changes that do not occur repeatedly after regular intervals of time are called non-periodic changes.