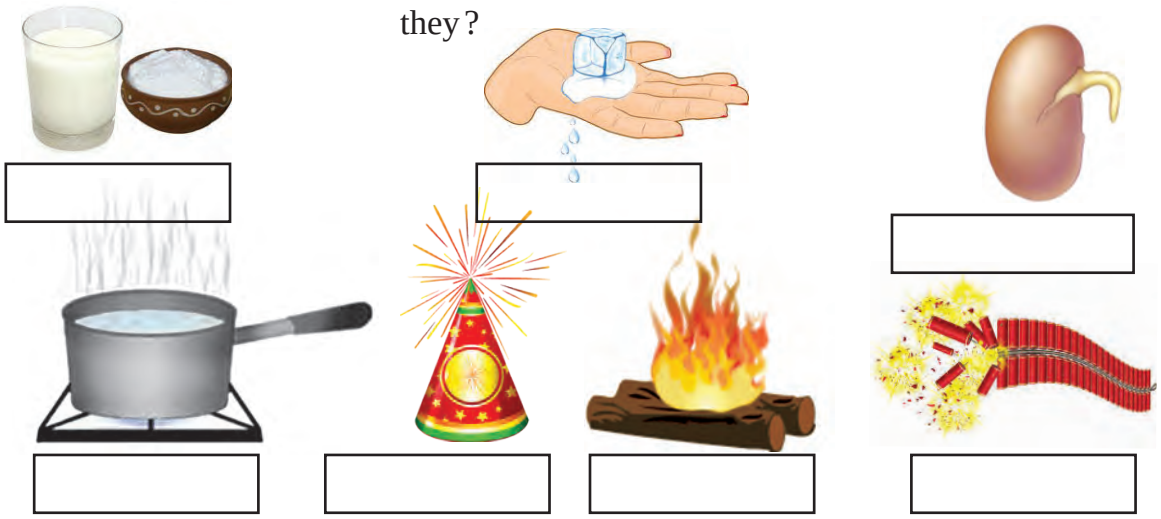
13. Changes – Physical and Chemical

Let's recall.

1. What are the causes of the changes occurring in our surroundings?
2. What is meant by man-made changes? Which are these changes?

Observe and discuss.

What changes have taken place in the materials seen in the following pictures ? What kind of changes are they?



13.1 Various changes

Which points will you consider while classifying the following changes into two groups – a fruit falling from a tree, rusting of iron, raining, lighting an electric bulb, cutting vegetables?

Can you tell ?

Which of the above changes have occurred of their own accord or naturally ?

We have previously studied some examples of changes. Changes like the ripening of a fruit, spoiling of milk occur naturally. These are called **natural changes**. Can you think of other examples of such natural changes?

What changes have you seen taking place in the materials in your surrounding?

Let us learn about changes in greater detail in this lesson.

Can you tell ?

We see many man-made materials in our day-to-day life. For what purposes are they produced?

Many changes such as sharpening a pencil, baking bread, cooking food are useful to us and these are, therefore, called **useful changes**. The changes that are not useful or changes that do us harm are called **harmful changes**.

Use your brain power !

1. What kind of change is the falling of a tree in a storm?
2. What kind of change is the conversion of milk into yoghurt?

Think about it.

Can you now classify the natural and man-made changes you have listed as useful and harmful changes ? So far, we have studied certain types of changes. What can you tell about two of these, namely, bursting of a balloon and ripening of a fruit, from the point of view of their duration i.e. the time they take to happen?

The duration of the bursting of a balloon is far shorter than that of the ripening of a fruit. Changes that take place in a short period of time are called **fast/quick changes**. While changes that take place over a long period of time are called **slow changes**.

Use your brain power!

Give some examples of fast and slow changes that occur in your surroundings.

Have some fun!

Apparatus : Pieces of glass bangles, a candle, a matchbox, etc.

Procedure : Hold a piece of glass bangle in the candle flame supporting it with your fingers. Take care to heat the piece in the middle keeping its two ends outside the flame. Observe it as the middle gets heated and becomes soft. It bends due to the finger-pressure on its ends. In this way, bring the two ends together and let the piece cool.

A *toran* can be made by linking such pieces with each other. Make such *torans* of different patterns and colours and decorate your class and home.

Can you tell ?

1. You made a link from the glass piece. How will you change the shape of the link to give it its original shape ?
2. How will you restore the original candle after melting one?

Melting some wax and obtaining the original solid wax again is something that we can do repeatedly. The changes that can occur in a forward and reverse direction again and again are called **reversible changes**. A ripe mango, however, cannot be transformed back into a raw mango. Wood cannot be obtained from the ash formed on burning the wood.

Use your brain power!

What is meant by irreversible change? Give some examples.

Can you tell ?

1. What comes after daytime?
2. What is the next stage after sunrise?
3. What comes after a high tide in the sea?
4. A bird sitting on a tree flies away.
5. Flooding
6. A meteor streaking across the sky.

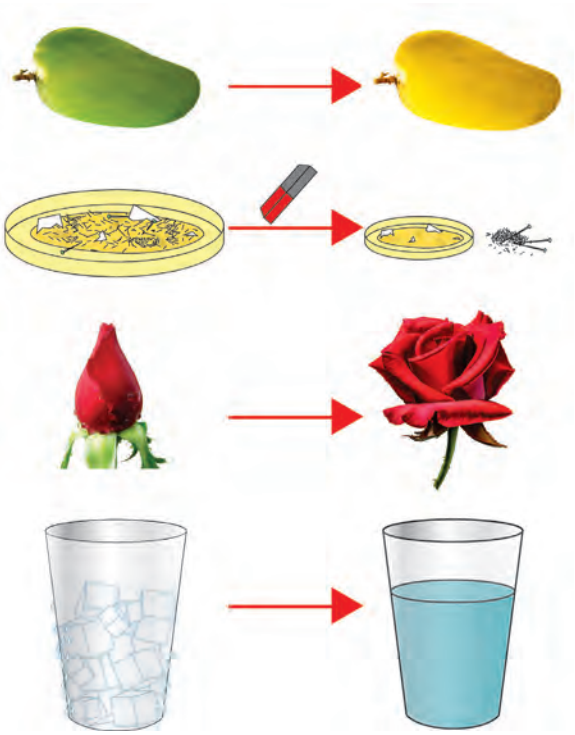
On considering the above examples, we find that some changes occur again and again after a definite interval of time. Such changes are called **periodic changes**. On the other hand, it cannot be said for sure when certain changes will recur after one occurrence. Even if they recur, the time interval is not fixed. Such changes are called **non-periodic changes**.

Use your brain power!

1. Which type of change is the change of seasons from summer to rains to winter?
2. Which hands of a clock show periodic changes from 6.00 am to 6.00 pm? How many times?

Observe.

1. Which of the changes shown in the picture alongside are temporary?
2. Which of the changes are permanent?
3. In which of the changes did the original matter undergo a change?
4. In which, did the original matter remain unchanged?
5. In which of the changes was a new substance with a new property formed?



In some of the above examples of changes, the properties of the original substances remain the same, that is, their composition remains unchanged. No new substance is formed. Such a change is called a **physical change**.

The change due to which one substance is transformed into another substance having new and different properties is called a **chemical change**.

13.2 Various chemical and physical changes

Let's recall.

1. What processes occur during the change of state of matter?
2. What happens when water is taken in a bowl and heated ?

The process of formation of vapour from a liquid is called evaporation. Drying of clothes, formation of salt from seawater are possible due to evaporation. We have studied some processes that are a part of the water-cycle. Which are these processes? Do the original properties of water change during those processes? Previously, we have learnt about the processes of dissolving, boiling, melting. They are all examples of physical change.

Use your brain power!

Which of the following are physical changes and which are chemical – making a table from wood, burning wood, breaking of a glass object, ripening of a tomato, rusting of iron?

Try this.

Apparatus : Evaporating dish, sugar, burner, tripod, etc.

Procedure : Take some sugar in an evaporating dish. Place the dish on a tripod and heat it. Observe the changes taking place in the sugar. Stop heating when a blackish substance is seen at the bottom of the evaporating dish. What kind of change does the above process bring about?

Corrosion

When an iron article rusts, a reddish brown layer forms on it. A greenish layer is seen to form on a copper article. This process is called corrosion of metals. Things become weak due to corrosion. Corrosion is caused by oxygen, moisture, vapours of chemicals in the air.

Always remember –

While classifying changes we take into account only one criterion at a time. However, a number of different criteria can be applied to the same change.

Do you know?

Iron articles are given a thin coat of zinc to prevent corrosion. This is called galvanization. Copper and brass articles are coated with tin. This is called tinning.

In this age of technology, a new process called powder coating has been developed. Coats of various colours are applied on metals like iron and aluminium. They prevent corrosion of the metal.

Exercise

1. Distinguish between the following.

(a) Physical change and chemical change
(b) Periodic change and non-periodic change
(c) Natural change and man-made change

2. Under which different types can the following changes be classified?

(a) Conversion of milk into yoghurt.
(b) Bursting of a cracker.
(c) Occurence of an earthquake.
(d) Revolution of the earth around the sun.
(e) Stretching of a spring.

3. Give reasons.

(a) While purchasing canned food, its expiry date should be checked.
(b) An iron article should be given a coat of paint.
(c) A wooden article should be polished.
(d) Copper and brass utensils should be tinned.
(e) A dry handkerchief gets wet at once on dipping in water, but it takes long for a wet handkerchief to dry.

4. What will you take into account while identifying the following?

(a) A physical change in a substance.
(b) A chemical change in a substance.

5. Read the paragraph and note down the various types of changes it mentions.

It was nearing six o'clock in the evening. The sun was setting. A breeze was blowing. Leaves on the tree were shaking. Sahil was sitting in the courtyard, rolling balls of wet soil and shaping them into various toys.Then he felt hungry and went into the house. Mother made a dough from wheat flour and fried purees. While eating hot purees, his attention was drawn outside the window. It had started raining. There was lightning, too. Sahil was enjoying his dinner in the dim light.

Project :

Visit a place where work like powder coating, spray painting is done. Make a note of the information you obtain.

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