

Wk	M	T	W	T	F	S	S
23	1	2	3	4	5	6	7
24	8	9	10	11	12	13	14
25	15	16	17	18	19	20	21
26	22	23	24	25	26	27	28
27	29	30					

APPOINTMENT / MEETING

Class VII Date - 26.5.20

Chapter-2 Physical and Chemical Change

Chemistry

8

9 Answer the following

- 10 (1) What is dissolving? Give an eg.
- (2) What is freezing and freezing point?
- 12 (3) What is melting and melting point?
- (4) What is boiling and boiling point?
- 2 (5) What is evaporation?
- 3 (6) What is condensation and condensation point?
- 4 (7) Give the differences between evaporation and boiling.
- 6 (8) What are the conditions affecting evaporation and discuss them?
- (9) What is humidity?
- (10) What is burning?

Wk	M	T	W	T	F	S	S
23	1	2	3	4	5	6	7
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APPOINTMENT / MEETING

- (1) What is rusting?
- (2) What is charcoal?
- (3) Name a chemical change - which takes place in presence of Heat, Light and Electricity
- (4) What do you observe when
- Water is boiled
 - A piece of paper is burnt
 - Some ice cubes are kept in a glass tumbler.
 - Solid ammonium chloride is heated
 - An iron nail is kept in tap water for few days
 - A spoon of sugar is heated in a pan.
 - A lighted match stick is brought near the mouth of the test tube containing hydrogen gas.

07

July 2020

Wk	M	T	W	T	F	S	S
27			1	2	3	4	5
28	6	7	8	9	10	11	12
29	13	14	15	16	17	18	19
30	20	21	22	23	24	25	26
31	27	28	29	30	31		

JUNE 2020

DAY 155- 211 WEEK 23

WEDNESDAY

03

APPOINTMENT / MEETING

⑤ Quicklime is dissolved in water

① Little amount of curd is added to a bowl containing coarse mill and kept for five hours.

P. Suresh
26.5.20

1

2

3

Characteristics of a Physical Change

1. No new substance is formed.
2. There is no change in the composition of the substance.
3. The properties of the substance remain same.
4. The change is temporary and can be reversed by changing the conditions in most of the cases.
5. There may be changes in the state, size, shape, colour, and smell of substances during physical changes.
6. There may or may not be any exchange of energy during a physical change.

Examples of physical changes

Melting of ice-cream, melting of butter, glowing of a bulb, cutting of grass, heating of an electric iron, boiling or freezing of water, sublimation of camphor or iodine, making of sugar or salt solution in water, beating of metals into sheets, magnetisation of iron, formation of clouds or mist, shaping of glass, crystallization of sugar, dissolution of ammonium chloride in water *etc.*

TERMS INVOLVED IN SOME PHYSICAL CHANGES

Now you know that interconversion of state of matter is a physical change in which one state of matter changes into another state and vice versa. Similarly when a solution is formed, a substance mixes in another substance.

Now let us study the meaning of different terms used to explain physical changes.

- **Dissolving** : Dissolving is a process in which a substance known as solute mixes completely with another substance known as

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- **Dissolving** : Dissolving is a process in which a substance known as solute mixes completely with another substance known as

solvent to form a homogeneous mixture called solution. *Example* : Sugar dissolves in water.

- **Freezing** : The process in which a substance in a liquid state changes into its solid state on cooling at a particular temperature is called freezing or solidification.
- **Freezing point** : The temperature at which a liquid starts changing into its solid state at a given pressure is called its freezing point. All pure substances have a definite freezing point. *Example* : Pure water freezes at 0°C into ice.
- **Melting** : Melting is a process in which a substance in solid state changes into liquid state at a particular temperature.
- **Melting point** : Melting point of a solid is the temperature at which it starts melting. Solids have definite melting points. *Example* : Melting point of ice is 0°C . Numerically the melting point and freezing point of a substance are the same.
- **Boiling** : The process in which a liquid on heating changes into its vapour state at a particular temperature is called boiling.
- **Boiling point** : The temperature at which a liquid starts changing into its vapours on heating at a given pressure is called its boiling point. All pure liquids have a definite boiling point. *Example* : Boiling point of water is 100°C .
- **Evaporation** : The process due to which a substance in liquid state changes into its vapour state at any temperature below its boiling point is called evaporation or vaporisation. *Example* : Water from rivers, lakes, ponds, etc. change into vapour due to evaporation.

- **Condensation** : The process in which a substance in vapour or gaseous state changes into liquid state is called condensation.

- **Condensation point** : The temperature at which a gaseous substance starts changing into liquid state is called condensation point. Numerically the boiling point and condensation point of a liquid are the same.

Differences between evaporation and boiling

Evaporation	Boiling
1. Evaporation is a slow process.	1. Boiling is a fast process.
2. Evaporation takes place from the surface of the liquid.	2. Boiling takes place from all parts of the liquid.
3. Evaporation takes place at all temperatures below its boiling point.	3. Boiling takes place at a fixed temperature on heating i.e., at its boiling point.

CONDITIONS AFFECTING EVAPORATION

Evaporation is a slow process which occurs at all temperatures. Wet clothes dry up due to slow evaporation of water from the surface of those clothes.

Rate of evaporation depends upon the following :

- **Nature of liquids** : Some liquids evaporate faster like petrol, nail polish remover, alcohol etc. while some evaporate slowly like water.
- **Surface area** : Evaporation takes place from the surface of a liquid. Hence, if surface area of the liquid increases, evaporation increases.
Example : If water collected on small part of the floor is spread over the whole floor, it dries up quickly.
- **Temperature** : With increase in temperature evaporation increases.

- **Humidity** : Humidity is the amount of water vapour present in air. If humidity of air is high, evaporation is slow and if air is dry (with less water vapour), the evaporation is fast.

Wet clothes dry faster during summer due to high temperature and less humidity while they take time in drying during rainy season and winter.

Note : Boiling is extreme form of evaporation.

Chemical change

Chemical change is a permanent change in which new substance(s) is/are formed whose chemical composition and physical and chemical properties are completely different from those of the original substance(s).

Your mother daily cooks food for you from raw grain and raw vegetables. The cooking requires heat energy which is supplied by a kerosene stove, cooking gas or an electric heater. Now, it is interesting to know whether you can get back the raw grain and vegetables from this cooked food.

The answer is NO, because the composition of the raw substances change due to heat used for cooking and new substances are formed.

Raw vegetable $\xrightarrow{\text{heat}}$ Cooked vegetable

The cooked materials retain their new forms even after the cause of change (heating) is removed. This shows that the change is permanent and irreversible. Such changes are chemical changes.

Examples of chemical changes

Rusting of iron, ripening of fruits, bursting of a cracker, growing of a plant into

a tree, souring of milk, preparation of soap from oil, changing of sugar into a black powdery substance on heating, burning of magnesium ribbon, burning of coal, decomposition of organic matter, boiling of egg, etc.

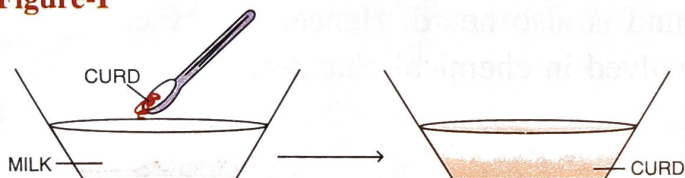
Some changes can be classified in more than one type. *For example :*

Formation of curd from milk is

- a desirable change
- a chemical change
- a slow change
- an irreversible change

The following figures and activities describe some more examples of chemical changes.

Figure-I



MILK CHANGING INTO CURD (A PERMANENT CHANGE)

Figure-II

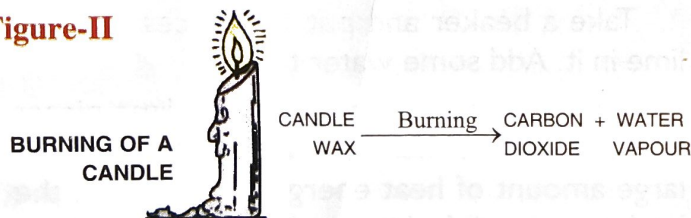


Fig. 2.4 Some chemical changes are shown above.

Activity 10

Roll out a roti from the ball of dough and bake it on a pan. Can we get the dough back ?

No, because it is a chemical change.

Activity 11

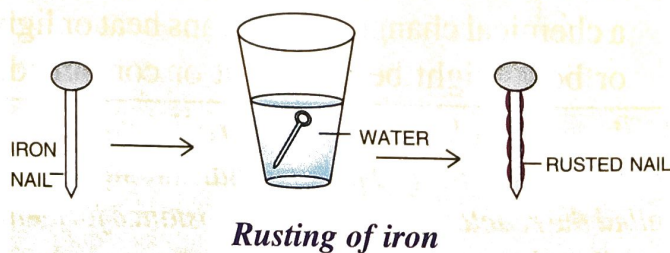
Take a piece of paper and burn it. It turns into *ash*. This is a new substance, whose properties are different from that of the paper. Ash cannot be changed into paper again. Therefore, the burning of paper is a chemical change.

Give examples of some other substances which on burning produce ash.

Burning : Burning is a chemical change in which a substance reacts with oxygen or air to produce a new substance called oxide with the evolution of energy in the form of heat and light. *Example :* Burning of fuel, candle, etc.

Activity 12

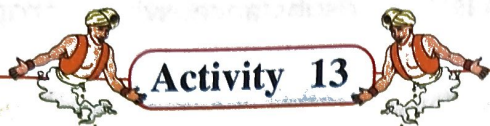
Take an iron nail and bring it near a magnet. The nail gets attracted towards the magnet. Now leave the nail in tap water for few days. Then take it out and observe carefully. You will see a reddish brown coating on the nail. This coating is called **rust***. Again bring the magnet near the nail. But now the nail is not attracted towards the magnet. This shows that rust is a new substance, which is not magnetic in nature. You cannot get iron back from rust. Therefore, the change is irreversible and permanent. Hence, rusting of iron is a chemical change.



Rusting of iron

* **Rust** is a hydrated oxide of iron.

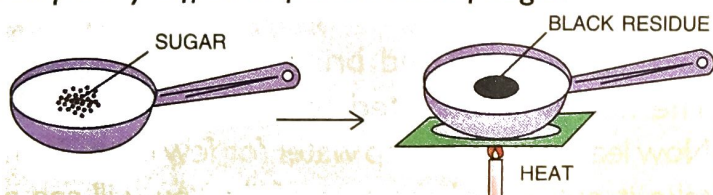
Rusting is a chemical process in which iron reacts with oxygen in presence of moisture to produce a reddish brown substance called **rust**.



Activity 13

Put a spoonful of sugar in a pan and heat it. You will observe that the sugar first melts and then changes its colour to reddish brown. Ultimately, it turns black and gets charred. Now stop heating the sugar and try to get it back. You cannot. On heating the sugar you get a black residue, called **charcoal**[#] and some gaseous products like carbon-dioxide and water vapour. The gases immediately mix with air and you do not even see them.

Now, taste the black substance, charcoal. It is not sweet. This shows that *its properties are completely different from those of sugar*.

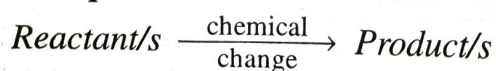


Burning of sugar

Characteristics of a Chemical Change

1. The change is permanent and cannot be reversed.
2. One or more new substances are formed.
3. Composition and properties of the original substance changes.
4. There is an exchange of energy during a chemical change. This means heat or light or both might be given out or consumed.

A chemical change is generally called a **chemical reaction**. The original substance is called the **reactant** and the new substance formed is called the **product**.



[#] **Charcoal** is a form of carbon, an element.

How will you know that a chemical change has taken place ?

It is possible because a chemical change is usually accompanied by :

Change in colour : Ripening of fruit is a chemical change. The colour of the raw fruit changes on ripening. Heating of sugar or burning of a matchstick gives a black substance.

Evolution of a gas : Reaction of a metal like zinc with dilute hydrochloric acid is a chemical change because a salt called zinc chloride is formed and a gas called **hydrogen** is evolved.

Release or absorption of energy in the form of heat, light and sound : Burning of a cracker is a chemical change. When a cracker explodes, it produces heat and light energy and sound is also heard. Hence, energy change is involved in chemical changes.

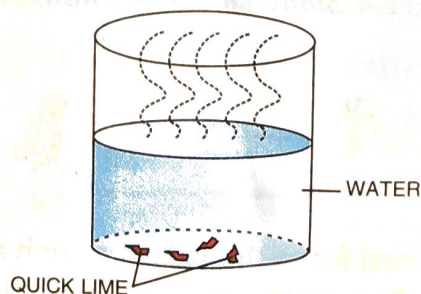


Activity 14

To be demonstrated by the teacher.

Take a beaker and put 1-2 pieces of quick lime in it. Add some water to it.

You will observe that, the quick lime pieces first crumble and then dissolve in water, evolving large amount of heat energy. If you touch the beaker, you will feel it very hot.



Large amount of energy is evolved during a chemical change

A new white solid substance, calcium hydroxide is formed which partially dissolves in water to produce an alkaline solution called lime water. The remaining white solid settles at the bottom of the beaker, which is slaked lime.

This proves that dissolution of quick lime in water is a chemical change in which energy change also takes place.

Different types of energy are needed for different chemical changes.

Example :

- **Heat** is necessary for the cooking of food, burning of paper, etc.
- **Light** is necessary for photosynthesis which takes place during daytime or during photography.
- **Electricity** is necessary to decompose water into its constituent elements hydrogen and oxygen.



Activity 15

Take some dilute hydrochloric acid in a test tube. Add some zinc granules to the acid in the test tube.

You will observe some bubbles coming out with some sound. This indicates **evolution of a gas**.

Touch the test tube. It has become hot. This indicates that some heat energy has been released during the reaction.

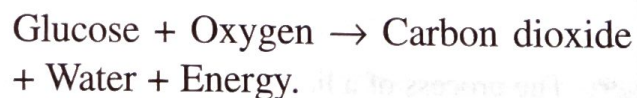
Bring a lighted match stick near the mouth of the test tube. A pop sound is heard and the flame of the match stick gets extinguished. This confirms that the gas evolved is **hydrogen gas**. [To be demonstrated by the teacher].

IMPORTANCE OF CHEMICAL CHANGES

Various types of chemical changes take place in our daily life. Some are natural while some are man-made. Most of them are very useful to us. Some are listed below :

1. Raw grains cannot be eaten but when they change chemically on cooking, they become edible.
2. Soaps, detergents, paints, fertilizers, medicines, *etc.*, are all produced due to chemical changes.
3. Many useful metals like iron, aluminium, copper, *etc.*, are extracted from their combined states by various chemical processes.
4. Burning of fuel is an important chemical change because it produces a lot of heat energy which is used for domestic and industrial purposes.
5. Different life processes taking place in plants and animals are all chemical changes which help to sustain life. *Examples :*

- Digestion of food is a process which makes our food simple by the action of enzymes to be absorbed in our body.
- Respiration is a chemical process that takes place in all living beings. In this process oxygen present in air, inhaled by the living beings reacts with the digested food to release energy, carbon dioxide and water.



This change can not be reversed.

An example of simultaneous physical and chemical change

When a candle is lit, the wax melts and turns into liquid state. As some of the molten wax drops on the floor or table, it solidifies again. Therefore, this is a **physical change**.



Simultaneously, most of the molten wax rises up the wick, turns into vapour and burns with the flame. Two new substances are formed: water vapour and carbon dioxide. The candle becomes smaller and smaller. This is a **chemical change**.

Thus, we see that the melting of wax is a physical change and the burning of the candle is a chemical change.

Differences between physical and chemical changes

Physical change	Chemical change
1. Change is temporary.	1. Change is permanent.
2. No new substance is formed. There is change only in physical properties.	2. New substances are formed, with entirely different properties.
3. Change can be reversed by simple methods.	3. Change cannot be reversed by simple methods.
4. Heat or light, may or may not be given out or consumed.	4. Heat or light, or both, are given out or consumed.
5. The original form of the substance can be obtained easily by simple physical methods.	5. The original substance cannot be obtained by simple physical methods.

RECAPITULATION

- ☛ Changes in matter take place around us all the time.
- ☛ The changes that we see around us can be classified as natural or man-made, slow or fast, desirable or undesirable, periodic or non-periodic, reversible or irreversible, physical or chemical, etc.
- ☛ All changes can broadly be classified into two types (i) physical and (ii) chemical changes.
- ☛ A change in which no new substance is formed and where the composition and the properties of the substance involved remain the same is known as a physical change.
- ☛ A change in which a new substance is formed, whose composition and properties are entirely different from those of the original substance is known as a chemical change.
- ☛ Energy is either released or absorbed during these changes. Physical changes may or may not involve energy exchange but chemical changes always do so, in the form of heat and light.
- ☛ Rusting is a slow chemical process while burning is a fast chemical process.
- ☛ The process of a liquid changing into a gas at a particular temperature is called **boiling**. It is a fast process.
- ☛ The process of a liquid changing into a gas at room temperature is called **evaporation**. It takes place from the surface of a liquid and is a slow process.