

Subject – Science      Class- -7      Topic – chapter-4

(Use Cordova Smart Class Software on the smart board in class)

**A** Tick (✓) the correct options.

- Example of physical change is
  - (a) rusting
  - (b) formation of curd
  - (c) melting of ice ✓
  - (d) browning of apple after cutting
- Example of chemical change is
  - (a) lighting of bulb
  - (b) milky change of limewater ✓
  - (c) water changes into water vapour
  - (d) melting of ghee
- Why are doors painted in our house?
  - (a) to protect it from sun rays
  - (b) to make it dust proof
  - (c) to prevent it from rusting ✓
  - (d) to protect it from birds
- The chemical formula of rust is
  - (a)  $Fe_2O_3 \cdot xH_2O$  ✓
  - (b) Fe
  - (c) FeO
  - (d)  $FeSO_4$

**B** Fill in the blanks.

- To make the solution of sugar is Physical change.
- Generally physical changes are reversible.
- Conversion of wheat grain into wheat flour is physical change.
- When carbon dioxide is passed in limewater, it turns milky. This is a chemical change.

**C** Match the following correctly.

- | Column A                      | Column B            |
|-------------------------------|---------------------|
| 1. Lighting bulb              | (a) Chemical change |
| 2. Rusting                    | (b) Physical change |
| 3. Getting crystals from alum | (c) Crystallisation |

**D** Short answer type questions

- Write the reaction of oxygen with magnesium. 55
- What is crystallisation? 58
- Which factors are responsible for rusting? 56
- What will be the colour of the product after reaction of starch and iodine? 53 Blue-black
- What kind of change is tearing of paper? Physical change

**E** Long answer type questions

- Explain the chemical change and physical change with proper examples. 50 to 53
- Explain crystallisation with the help of labelled diagram. 51
- Explain the process of rusting and how could it be prevented. 56, 57
- Write down four examples of physical and chemical changes from our daily life.



## ADDITIONAL QUESTIONS FOR PRACTICE

**A** Tick (✓) the correct options.

- Which of the following is not a permanent change?  
(a) ageing  
(b) growth of plant  
(c) making paper aeroplane  
(d) burning of fuels
- Which of the following changes is irreversible?  
(a) freezing  
(b) melting  
(c) condensation  
(d) ripening of fruits ✓
- Crystallisation is a  
(a) physical change  
(b) chemical change  
(c) irreversible change  
(d) permanent change
- Change in energy takes place during a  
(a) physical change  
(b) reversible change  
(c) chemical change ✓  
(d) temporary change
- An entirely new substance with different properties is formed during a  
(a) physical change  
(b) reversible change  
(c) chemical change ✓  
(d) temporary change
- Magnesium burns in oxygen to form  
(a) magnesium hydroxide  
(b) magnesium oxide ✓  
(c) carbon dioxide  
(d) magnesium nitride
- Burning of an incense stick is a  
(a) physical change  
(b) chemical change ✓  
(c) reversible change  
(d) temporary change
- Rusting is a **F**  
(a) reversible change  
(b) temporary change  
(c) chemical change ✓  
(d) physical change
- Rusting makes iron objects  
(a) weak  
(b) useless  
(c) both (a) and (b) ✓  
(d) none of these
- Which of the following substances undergoes rusting?  
(a) plastic bucket  
(b) rubber band  
(c) iron gate ✓  
(d) galvanised pipe

**B** Fill in the blanks.

- No new substance is formed during a Physical change.
- Properties such as shape, size, colour and state of a substance are called Physical properties.



3. Physical change can easily be reversed by reversing the conditions.
4. Crystals of copper sulphate are blue in colour.
5. Chemical changes cannot be reversed by simple Physical methods.
6. A large amount of energy is given out or absorbed during a chemical change.
7. Magnesium oxide dissolves in water to form Magnesium hydroxide,  $(Mg(OH)_2)$
8. iron is the cheapest and most easily available metal.
9. Rusting makes the iron objects weak and ultimately useless.
10. Molten iron is mixed with a fixed amount of carbon, manganese, chromium and nickel to form an alloy called stainless steel.

### C Short answer questions

1. What is meant by reversible change? Give two examples of reversible changes. 50
2. Write two examples each of temporary and permanent changes. by one
3. Classify the following changes into reversible and irreversible changes: boiling of water, ripening of fruit, melting of ghee, germination of seed
4. What are physical changes? Write two characteristics of physical changes.
5. Give two examples of chemical change.
6. What type of change is burning of magnesium ribbon? Give reason. 55
7. Why does the colour of cut fruits and vegetables change? 55 •
8. Why is digestion of food a chemical change? 55 •
9. Is rusting a physical or chemical change? Give reason.
10. Write the chemical equation of rusting of iron. 57
11. How does rusting damage iron objects? \*
12. What is galvanisation? 57
13. How is stainless steel formed from iron?

### D Long answer questions

1. How are reversible changes different from irreversible changes? 50 by don't table
2. What happens when an iron nail is dropped into copper sulphate solution? Why does this change occur? Explain giving reaction.
3. Classify the following into physical and chemical changes. State which of the following changes are irreversible: wetting of dry clothes, freezing of milk, formation of water vapour from water, compressing of sponge, burning of wood

### E Think and answer

Rusting of iron objects is faster in coastal areas than in deserts. Why?



## Chapter 4: Physical And Chemical Changes

### Multiple Choice Questions

Page No. 52

1. (c)                      2. (b)

### Multiple Choice Questions

Page No. 56

1. (d)                      2. (a)

### Multiple Choice Questions

Page No. 58

1. (c)                      2. (d)

### EXERCISE

#### A. Tick (✓) the correct options.

1. (c)                      2. (b)                      3. (c)                      4. (a)

#### B. Fill in the blanks.

1. physical              2. reversible              3. physical              4. chemical

#### C. Match the following correctly.

1. (b)                      2. (a)                      3. (c)

#### D. Short answer type questions

1. Magnesium reacts with oxygen (present in the air) to form magnesium oxide.

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2. Crystallisation is a process of obtaining pure solid crystals having definite geometrical shapes from its solution.
3. The two factors responsible for the rusting are:  
(i) Presence of oxygen (from air)  
(ii) Presence of water or water vapour (moisture)
4. The colour of the product will be blue-black after reaction of starch and iodine.
5. Tearing of paper is a physical change.

#### E. Long answer type questions

1. A change in which only the physical properties of a substance change and no new substance is formed is called a physical change. For example, cutting of a paper, melting of wax, freezing of water

A change in which the chemical composition and properties of a substance change and one or more new substances are formed is called a chemical change. For example, rusting of iron, burning of candle, ripening of fruits

2. Crystallisation is the process of obtaining pure solid crystals having definite geometrical shapes from its solution.

We can explain the process of crystallisation by obtaining the crystals of copper sulphate in the following manner:

- (i) Take about 100 mL of water in a beaker. Add copper sulphate powder while stirring it with a glass rod continuously. Continue adding copper sulphate powder till no more powder can be dissolved. Add a few drops of dilute sulphuric acid to it. Filter the obtained solution to remove insoluble impurities and collect the filtrate in a china dish.
- (ii) Take a beaker half filled with water and put it on the tripod stand. Place the china dish containing copper sulphate solution on it. Heat it with the help of a Bunsen burner.
- (iii) Heat it to reduce it to one third of its volume. Dip a glass rod in the solution and take it out. Cool it by blowing air. Appearance of a crust or tiny crystals on the glass rod shows that crystallisation point has reached. Now, stop heating and allow the solution to cool slowly without disturbing it.
- (iv) After 24 hours of cooling, separate the copper sulphate crystals from the solution by decantation and dry the crystals by keeping them between the filter paper. We will obtain pure large crystals of copper sulphate by the process of crystallisation.

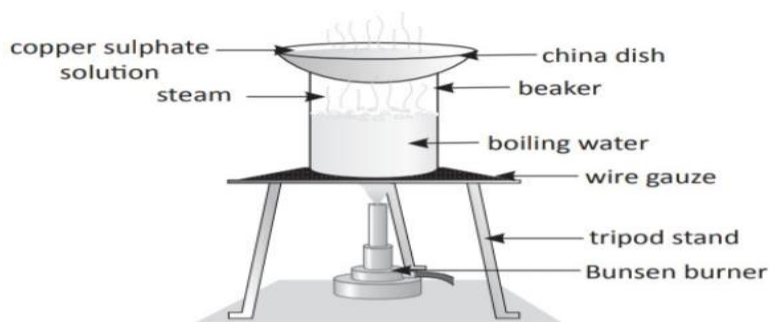


Fig. Preparing crystals of copper sulphate

3. Iron objects, like iron nails, iron pipes, iron grills and iron railings, when kept in moist air for a few days, get covered with reddish-brown flaky substance called rust. This process is called rusting of iron. The two conditions necessary for the rusting of iron are:
- Presence of oxygen (from air)
  - Presence of water or water vapour (moisture)
- Rusting can be prevented by:
- coating the iron surface with paint or grease
  - coating iron with other metals (galvanisation)
  - by converting iron into stainless steel or alloying

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4.

Physical change	Chemical change
cutting of paper, melting of wax, freezing of water, boiling of water	rusting of iron, burning of candle, ripening of fruits, digestion of food

#### ADDITIONAL QUESTIONS FOR PRACTICE

##### A. Tick (✓) the correct options.

1. (c)      2. (d)      3. (a)      4. (c)      5. (c)  
 6. (b)      7. (b)      8. (c)      9. (c)      10. (c)

##### B. Fill in the blanks.

1. physical      2. physical      3. reversed      4. blue  
 5. physical      6. chemical      7. magnesium hydroxide  
 8. Iron      9. Rusting      10. iron

##### C. Short answer questions

1. The change that can be reversed by reversing the conditions is called reversible change. For example, stretching of rubber band and glowing of an electric bulb

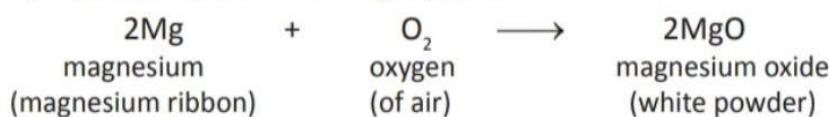
2. Examples of temporary changes are melting of wax and stretching of rubber.  
 Examples of permanent changes are burning of magnesium and rusting of iron.

3.

Reversible change	Irreversible change
boiling of water, melting of <i>ghee</i>	ripening of fruit, germination of seed

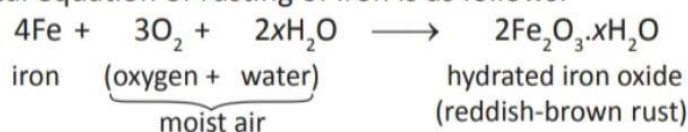
4. The changes in which only the physical properties of a substance change and no new substance is formed are called physical changes.  
 Characteristics of physical changes are—
- During a physical change, only physical properties such as size, shape, colour and state change.
  - During a physical change, no new substance is formed.
5. Explosion of crackers and digestion of food are the examples of chemical change.
6. Burning of magnesium ribbon is a chemical change. When magnesium ribbon burns in air, it combines with the oxygen (of air) to form a new substance called magnesium oxide (white powder). This change can be represented by the following equation:





This white powder cannot be converted back into magnesium ribbon. So, this change is irreversible and permanent. Thus, it is a chemical change.

7. The colour of cut fruits and vegetables change on keeping them in air due to the occurrence of a chemical change. For example, when we cut an apple and keep it in the open for some time, the slice of an apple acquires brown colour due to the formation of a new substance by the action of oxygen (from air) on the acid present in the apple.
8. Digestion of food involves the action of acids and enzymes on the food that results in the formation of some new, simpler substances having different chemical composition and properties. Food cannot be obtained back from these substances. Thus, digestion of food is a chemical change.
9. Rusting of iron is a chemical change. This is because iron reacts with oxygen and moisture to form a new substance, i.e., hydrated iron oxide (rust) and we cannot get back iron from rust.
10. The chemical equation of rusting of iron is as follows:



11. The layer of rust falls off from the surface of a rusted iron object, exposing fresh iron metal that starts rusting. The continuous rusting makes the iron objects weak and ultimately useless. In this way, rusting damages the iron objects.
12. The process of depositing a thin layer (or coating) of zinc metal on iron objects is called galvanisation.
13. Molten iron is mixed with a fixed amount of carbon, manganese, chromium and nickel. On cooling, it forms an alloy called stainless steel. In this way, stainless steel is formed from iron.

#### D. Long answer questions

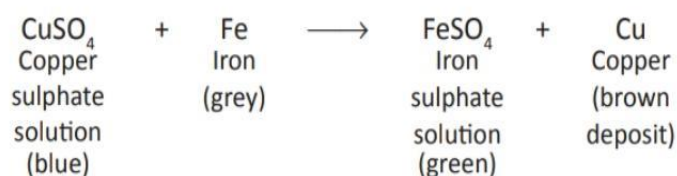
1. The changes that can be reversed by reversing the conditions are called reversible changes. For example, stretching of rubber band and melting of ice. Reversible changes are temporary changes.

The changes that cannot be reversed by reversing the conditions are called irreversible changes, for example, ageing of living organisms. Irreversible changes are permanent changes.

Irreversible changes are permanent changes.

2. When an iron nail is dropped into copper sulphate solution, the blue colour of copper sulphate solution changes to light green colour and a brown deposit is formed on the iron nail. These changes occur due to a chemical reaction between acidulated copper sulphate solution and the iron nail that produces two new substances– iron sulphate and copper. They have entirely different chemical composition and properties from copper sulphate and iron. The iron sulphate solution is green in colour, whereas the brown deposit on the iron nail is of copper.

This change can be written in the form of the following equation:



3.

Physical change	Chemical change
wetting of dry clothes, freezing of milk, formation of water vapour from water, compressing of sponge	burning of wood

Reversible change	Irreversible change
wetting of dry clothes, freezing of milk, formation of water vapour from water, compressing of sponge	burning of wood

**E. Think and answer**

Rusting of iron objects is faster in coastal areas than in deserts because higher moisture content is present in air of coastal regions that increases the rate of rusting.