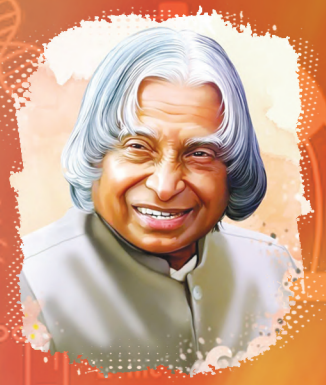
GENERAL SCIENCE HANDBOOK

7th Class

(Semester-1)

NEW VERSION



FEATURES

- Mind Map
- Main Points
- Definitions
- Intext Questions and Answers
- Let us Enhance Our Learning
- Exploratory Projects
- Investigates (Activities)
- Tables
- Prepare some Questions Based on your Learnings so Far
- Multiple choice questions
- CBA Questions

"Foundation Today, Achievement Tomorrow."

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Readiness – Key

Day - 1 **Acids, Bases and Salts**	**Fill in the blanks** **1)** a base 2) acidic 3) indicators 4) Salt, water
Day - 2 **Electric Circuits and their Components**	**Answer the following questions by using the words given below** (a) Filament (b) Electric cell (c) Electric bulb (d) Switch (d)Jute string
Day – 3 **Metals and Non-metals**	**Matching the Following** A – 3 B – 1 C – 5 D – 2 E – 4 F – 6
Day – 4 **Metals and Non-metals**	**Match the Following:** A – 6 B – 1 C – 4 D – 5 E – 2 F – 3
Day – 5 **Changes Around Us**	**Opposites** 1. Fast change 2. Undesirable change 3. Man-made change 4. Irreversible change 5. Non-periodic change 6. Chemical change **Fill in the blanks** 7. irreversible change 8. non-periodic change 9. undesirable change.
Day – 6 **Heat**	**Short Answer Questions** 1. Evaporation. 2. Ponds, tanks and rivers and Seas 3. Condensation 4. Precipitation or rain 5. Evaporation, condensation, and precipitation from a continuous cycle called the water cycle. **Fill in the blanks** 6. sun 7. cools 8. water cycle. **Look at the diagram** 9. Evaporation 10. Sun.
Day – 7 **Heat**	**Now fill in the blanks with the appropriate words** 1. solid 2. liquid 3. Gas 4. conductor 5. insulator 6. Thermometer (Clinical Thermometer)
Day – 8 **Light**	**1. Opaque:** Piece of rock, sheet of aluminium, mirror, wooden board, umbrella, wall, sheet of carbon paper, sheet of cardboard. **Transparent:** Air, water, sheet of polythene, sheet of plane glass, wire mesh. **Translucent:** Smoke, fog, CD. **Luminous:** Piece of red hot iron, lighted fluorescent tube, flame of a gas burner, lighted torch, kerosene stove (when burning), Sun, firefly. **Non-luminous:** Air, water, piece of rock, sheet of aluminium, mirror, wooden board, sheet of polythene, CD, smoke, sheet of plane glass, fog, umbrella, wall, sheet of carbon paper, sheet of cardboard, wire mesh, moon. 2. Yes. A cylindrical object (such as a **tin can**) gives a circular shadow when viewed from the top and a rectangular shadow when viewed from the side. 3. No. Because there is no light to reflect from our body to the mirror and then to our eyes.
Day – 9 **Measurement of Time and Motion**	**Apply: Answer the following** 1. Motion of a pendulum, Rotation of the hands of a clock 2. A car moving on a straight road, A boy running on a straight track 3. linear motion 4. periodic motion 5. 1. 10° C 2. 2° C 3. 6° C 6. We know that 1 km = 1000 m 3250 m = 3.25 km

Day – 10
Let's Classify Plants

1. Give three examples for each of the following.
a) Mint, Coriander, Spinach
b) Rose, Hibiscus, Cotton
c) Mango, Neem, Coconut
d) Rice, Wheat, Maize
e) Bean, Pea, Gram

Day – 11
Let's Classify Animals

Apply:
1. Write the relevant word to the picture. (From left to right, top row and bottom row)
Deer and Elephant – **Herbivores**
Lion – **Carnivore**
Bear – **Omnivore**
Human beings – **Omnivores**
Frog – **Amphibian**
Fishes – **Aquatic animals**
Elephant, Giraffe, Lion, Zebra – **Terrestrial animals**

2..

Herbivores	Carnivores	Omnivores
Cow, Goat, Rabbit	Cat, Tiger, Lion	Human beings, Dog, Crow

3.


Tiger


Rabbit


Dog

Day – 12
Am I Changing?

Apply: Choose the Correct Keyword
1. Infancy 2. Childhood 3. Adulthood
A. Life Cycle Ordering

A. Life Cycle Ordering: Rearrange the stages of human life from youngest to oldest:
Infancy → Childhood → Adolescence → Adulthood → Old Age

B. Statement: Your friend prefers to eat only potato chips and soft drinks for lunch every day.
1. **No.** Potato chips and soft drinks do not provide all the nutrients needed for good health. A balanced diet contains carbohydrates, proteins, fats, vitamins, and minerals. (or)
Yes. A balanced diet provides all the nutrients needed for healthy growth and development.
2. Eat a balanced diet, Eat fruits and vegetables daily, Drink plenty of water, Exercise and play regularly, Maintain personal hygiene, Get enough sleep.

Day – 13
Life processes in Animals

A. Match the following
1 – B 2 – C 3 – D 4 – A

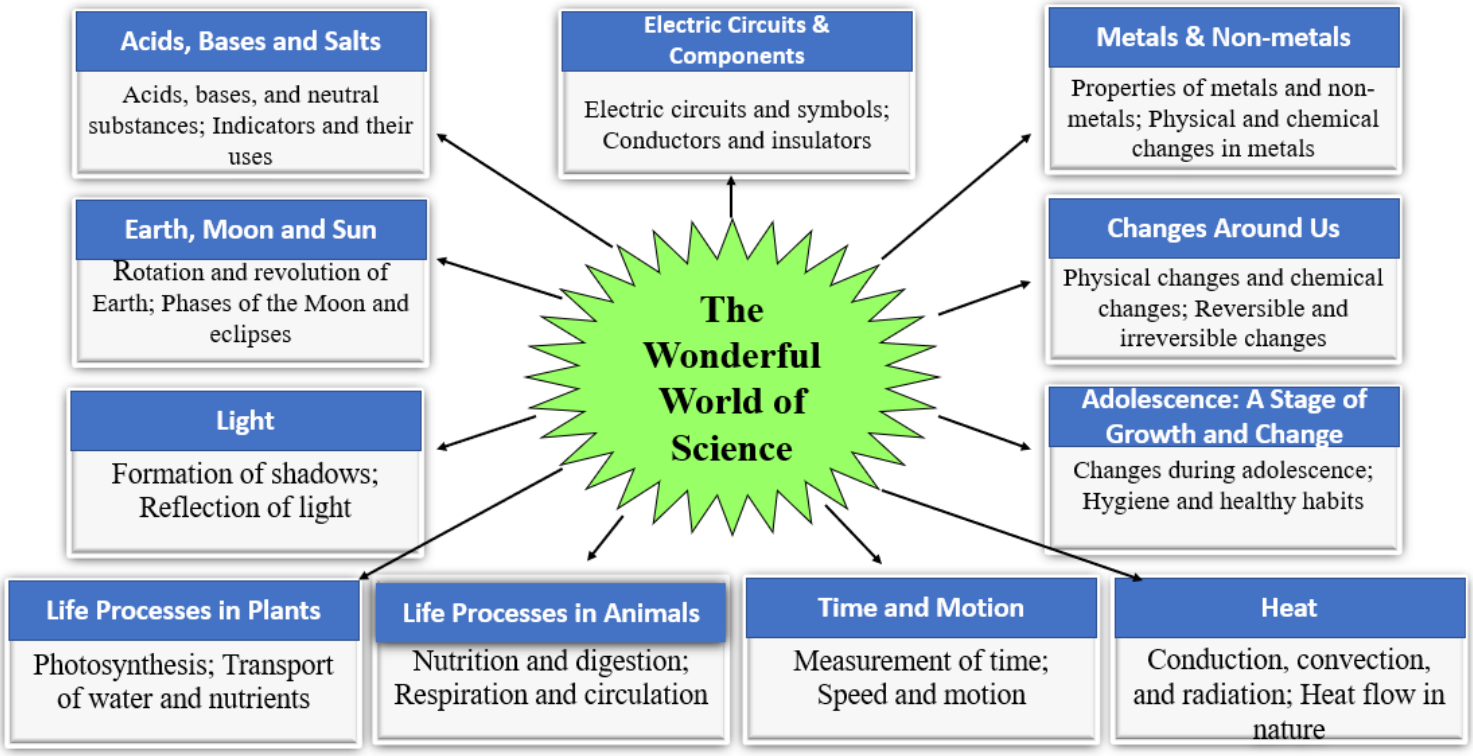
B. Draw your favourite food items in your drawing book.

Day – 14
Life process in Plants

Match the Kitchen parts with the scientific words

Kitchen Part	Scientific Term
The Tiny Windows	**Stomata**
The Stove (Heat)	**Sunlight**
The Finished Meal	**Starch**
The Delivery Straw	**Water and Minerals**
The Fresh Air Released	**Oxygen**

Put tick (✓) or mark (✗) to the correct answer
1. ✓ YES 2. ✗ NO 3. ✓ YES 4. ✗ NO 5. ✓ YES



Introduction

- Science is not just a textbook subject; it is a way of exploring and understanding the world around us.
- It encourages us to: 1. Ask interesting questions 2. Perform experiments
  3. Observe nature 4. Think creatively
  5. Experiment repeatedly 6. Discover new ideas
- Science is not only about facts but also about curiosity and exploration.

……. Main Ideas of the Chapter ……

1. Science is Everywhere

- Science exists in everything around us:
  - Tiny cells in leaves
  - Movement of the Sun and stars
  - Water flow underground
  - Materials used at home

- Learning science helps us become explorers and discoverers.

2. Curiosity Leads to Discovery

- Curiosity is the key to learning science.
- Scientists ask questions like:
  - How do things work?
  - Why do events happen?
  - What patterns exist in nature?

- Observation and experimentation help us find answers.

3. Learning Through Activities and Experiments

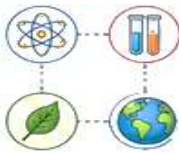
- Science is best learned through:
  - Activities
  - Experiments
  - Real-life observations

- These experiences help us:
  - Understand the environment
  - Learn responsibility
  - Protect nature
  - Build a sustainable world

4. Different Branches of Science are Connected

Science includes:

- Physics
- Chemistry
- Biology
- Earth Science



Though different, all branches are interconnected.

Topics Introduced in the Book

1. Materials Around Us

We study:

- Properties of materials
- Why some fruits are sour
- How soap removes stains

Classification of Materials

Materials are grouped as:

- Metals
- Non-metals

2. Electricity and Circuits

Students learn about:

- Electric batteries
- Wires
- Lamps
- Simple electric circuits

Important Idea

Some materials allow electricity to pass through them.

3. Changes Around Us

Examples of changes:

- Ice melting into water
- Fruits ripening
- Rocks breaking into pebbles
- Batteries running out

Types of Changes

1. Reversible Changes
   - Can be changed back
   - Example: Melting ice
2. Irreversible Changes
   - Cannot be changed back
   - Example: Ripening of fruits

4. Growth and Life Processes

- Living organisms grow and change.
- During middle-school years, bodies grow rapidly.
- Physical and emotional changes occur during adolescence.
- Growth is a natural life process.

In Animals

- Need food and oxygen
- Blood carries nutrients throughout the body

In Plants

- Plants also need food, water, and air to grow.

5. Heat and Water Cycle

- Heat causes changes in materials.
- Water evaporates due to heat from the Sun.
- Water later falls as rain.

Water Cycle Steps

1. Evaporation
2. Condensation
3. Rainfall
4. Collection of water

6. Measurement of Time

Humans measure time using:

- Clocks
- Watches

Ancient Method

- Early humans used shadows of the Sun to tell time.
- Sundials worked based on shadow positions.

7. Light and Shadows

- Light helps us see objects.
- Shadows form when light is blocked.

Uses of Light

- Reading
- Seeing objects
- Understanding nature and space

8. Earth, Moon and Sun

- Earth rotates on its axis.
- Moon revolves around Earth.
- Earth revolves around the Sun.

Effects

- Day and night
- Eclipses
- Seasons

Activity – Question the Answer

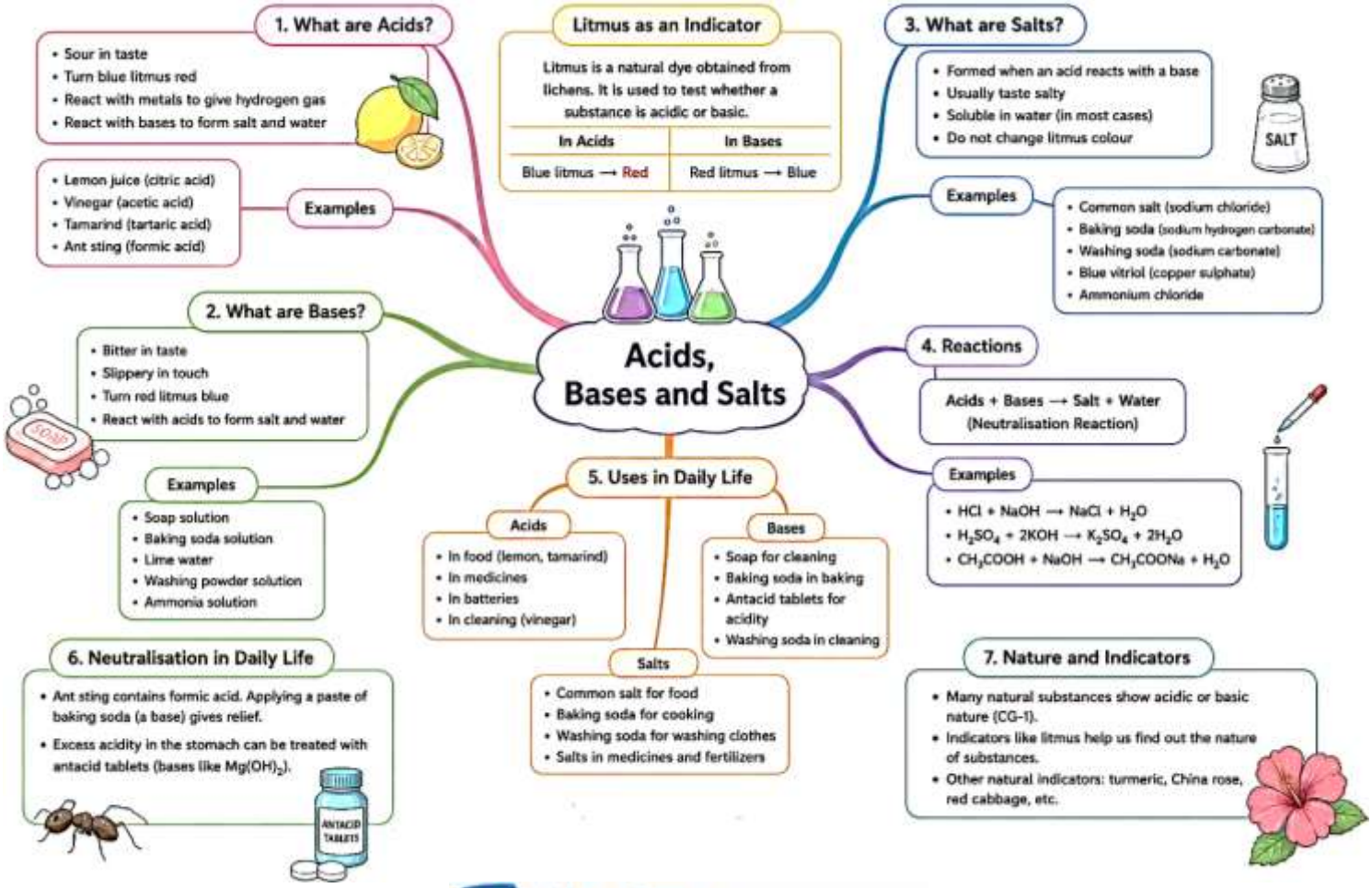
- Scientists do not just answer questions; they ask good questions.
- Creative thinking is important in science.
- Sample Answers and Possible Questions:

Answer	Possible Question
Just add some milk.	How can I reduce the spiciness of curry?
Because the cat's teeth were crooked.	Why did the cat have difficulty eating?
Don't panic, I have my towel.	What should we do if we get wet in the rain?
42	What is six multiplied by seven?

Motto of Science: "Observe, Question, Experiment, and Discover."

Chapter – 2: Acids, Bases and Salts

Mind Map



Main Points

1. Acids, bases and salts are important substances used in daily life.
2. Litmus paper is used to identify acidic and basic substances.
3. Blue litmus turns red in acidic substances.
4. Red litmus turns blue in basic substances.
5. Neutral substances do not change the colour of litmus paper.
6. Litmus is obtained from lichens.
7. Litmus is a natural indicator.
8. Acids generally have a sour taste.
9. Bases are generally bitter and slippery to touch.
10. Lemon juice contains citric acid.
11. Amla contains ascorbic acid (Vitamin C).
12. Tamarind contains tartaric acid.
13. Vinegar contains acetic acid.
14. Curd contains lactic acid.
15. Acids are used in food preservation like pickles.
16. Hydrochloric acid is present in the stomach and helps digestion.
17. Sulphuric acid is used in batteries.
18. Bases are used in soaps and detergents.
19. Antacids like milk of magnesia reduce acidity.
20. Lime is used in whitewashing and making plaster.
21. Baking soda is used in cakes and biscuits.
22. Red rose extract can be used as a natural indicator.

23. Red rose extract turns green in basic substances.
24. Turmeric paper is another natural indicator.
25. Turmeric turns reddish-brown in basic substances.
26. Turmeric does not change colour in acidic substances.
27. Some substances change smell in acidic or basic medium.
28. Such substances are called olfactory indicators.
29. Onion is an example of an olfactory indicator.
30. When acids and bases mix, neutralisation occurs.
31. Neutralisation forms salt, water and heat.
32. Neutralisation is an exothermic reaction.
33. Acidic soil can be treated with lime.
34. Ant bites and bee stings can be relieved using baking soda paste.
35. Factory wastes should be neutralised before releasing into lakes and rivers.

--------: Definitions :-------

Acid : Acids are substances that are sour in taste.
Base : Bases are bitter/slippery substances.
Salt : Salt is formed when an acid reacts with a base.
Indicator : Substances that show different colours in acidic and basic solutions are called acid-base indicators.
Litmus: Litmus is a natural substance obtained from lichens. It is available both as a solution and in the form of paper strips.
Acid-base Indicator: Substances that shows different colours in acidic and basic solutions are called an acid-base indicator.
Olfactory indicators: Substances whose smell changes in acidic or basic media are called olfactory indicators.
Neutralisation: A reaction in which an acid reacts with a base to form salt and water is called neutralisation.
Neutral Substance: A substance that does not affect either red or blue litmus paper.

Intext Questions and Answers

1. What are the red and blue litmus paper strips made of?
Ans: Litmus paper strips are made from a natural substance called *litmus*, which is obtained from lichens.
2. Why do litmus papers change colour?
Ans: Litmus papers change colour because they act as acid-base indicators and show different colours in acidic and basic substances.
3. What happens when blue litmus paper is placed in an acid?
Ans: Blue litmus paper turns red in acidic substances.
4. What happens when red litmus paper is placed in a base?
Ans: Red litmus paper turns blue in basic substances.
5. Which substances are acidic in nature?
Ans: Lemon juice, tamarind water, vinegar, and usiri juice are acidic in nature.
6. Which substances are basic in nature?
Ans: Soap solution, baking soda solution, lime water, and washing powder solution are basic in nature.
7. Which substances are neutral in nature?
Ans: Tap water, sugar solution, and salt solution are neutral substances.
8. Why are acids called sour substances?
Ans: Acids are called sour substances because they usually have a sour taste.
9. Why are bases called slippery substances?
Ans: Bases feel slippery or soapy when touched.
10. Name some common acids present in food items.
Ans: Lemon – Citric acid Amla – Ascorbic acid Tamarind – Tartaric acid Vinegar – Acetic acid
11. What is the use of hydrochloric acid in our body?
Ans: Hydrochloric acid in the stomach helps in digestion.
12. What are natural indicators?
Ans: Indicators obtained from natural substances like plants and flowers are called natural indicators.
13. How is red rose extract prepared?
Ans: Red rose petals are crushed, mixed with hot water, filtered, and the filtrate is used as the indicator.
14. What colour does red rose extract show in acidic substances?
Ans: Red rose extract remains red in acidic substances.
15. What colour does red rose extract show in basic substances?

Ans: Red rose extract turns green in basic substances.

16. What is turmeric paper?

Ans: Turmeric paper is paper coated with turmeric paste and used as a natural indicator.

17. What happens to turmeric paper in a basic substance?

Ans: Turmeric paper changes to reddish-brown colour in a basic substance.

18. Why does turmeric paper not help distinguish acids from neutral substances?

Ans: Turmeric paper does not change colour in acidic and neutral substances.

19. What are olfactory indicators?

Ans: Substances whose smell changes in acidic or basic media are called olfactory indicators.

20. Give an example of an olfactory indicator.

Ans: Onion is an example of an olfactory indicator.

21. What happens when acid and base are mixed together?

Ans: They neutralise each other and form salt and water.

22. What is a neutralisation reaction?

Ans: A reaction in which an acid reacts with a base to form salt and water is called neutralisation.

23. Is heat produced during neutralisation?

Ans: Yes, heat is produced during neutralisation.

24. Write the word equation for neutralisation reaction.

Ans: Acid + Base → Salt + Water + Heat

25. Why is baking soda applied on ant or bee stings?

Ans: Baking soda neutralises the acidic effect of the sting and gives relief.

26. How can acidic soil be treated?

Ans: Acidic soil can be treated with lime, which is basic in nature.

27. Why should factory waste be treated before releasing into lakes?

Ans: Acidic factory waste can harm aquatic life, so it should be neutralised before release.

28. What are lichens?

Ans: Lichens are organisms formed by the association of algae and fungi.

29. Why are indicators important?

Ans: Indicators help us identify whether a substance is acidic, basic, or neutral.

30. Name two synthetic indicators.

Ans: Litmus paper and other laboratory-made indicators are synthetic indicators.

Let Us Enhance Our Learning

1. Match the fruits with the acids naturally present in them.

Column I (Fruit)	Column II (Acid present)
P. Orange	1. Tartaric acid
Q. Amla	2. Citric acid
R. Tamarind	3. Ascorbic acid and citric acid
S. Tomato	4. Citric acid and oxalic acid

Choose the correct matching:

A. P–2, Q–3, R–1, S–4 B. P–3, Q–2, R–1, S–4 C. P–2, Q–1, R–3, S–4 D. P–4, Q–3, R–2, S–1

Ans: B. P–2, Q–3, R–1, S–4

2. Define the following: a) Acid-base indicators b) Neutralisation c) Olfactory indicators

Ans: a) Acid-base indicators: Substances that show different colours in acidic and basic solutions are called acid-base indicators.

b) Neutralisation: The reaction in which an acid and a base neutralise each other to form salt and water along with the evolution of heat is called neutralisation.

c) Olfactory indicators: Substances whose smell changes in acidic or basic solutions are called olfactory indicators. Example: Onion and vanilla.

3. Write any two characteristics each of Acid and Base.

Ans: Acids: i) Acids are sour in taste. **ii)** Acids turn blue litmus paper red.

Bases: i) Bases are bitter in taste. **ii)** Bases turn red litmus paper blue.

4. One of your friends has been suffering from indigestion and heartburn after eating a spicy meal. To relieve the problem, he has taken a tablet. Which of the following is the most likely active ingredient in the tablet?

A : Hydrochloric acid B : Magnesium hydroxide C : Common salt D : Soda Water

Ans: B : Magnesium hydroxide

5. How can natural indicators be prepared? Explain by giving an example.

Ans: Natural indicators can be prepared by extracting coloured substances from plant parts such as flowers and leaves.

Example: Red rose petals are crushed with water to obtain red rose extract. This extract turns red in acidic solutions and green in basic solutions.

6. Ravi was playing near a field when a red ant bit his ankle. He felt a sharp stinging pain, and the skin around the bite turned red. His grandmother immediately applied a paste made from a household substance, and Ravi felt relief after some time.

Which of the following best explains why the paste helped reduce the pain?

A. The paste absorbed moisture from the skin

B. The paste cooled the skin and reduced swelling

C. The paste killed the ant venom by chemical reaction

D. The paste neutralised the acidic substance injected by the ant

Ans: D. The paste neutralised the acidic substance injected by the ant.

7. A solution turns the red litmus paper to blue. Excess addition of which of the following solution would reverse the change?

(i) Lime water **(ii) Baking soda** **(iii) Vinegar** **(iv) Common salt solution**

Ans: (iii) Vinegar

8. You are provided with three unknown solutions labelled A, B, and C, but you do not know which of these are acidic, basic, or neutral. Upon adding a few drops of red litmus solution to solution A, it turns blue. When a few drops of turmeric solution are added to solution B, it turns red. Finally, after adding a few drops of red rose extract to solution C, it turns green. Based on the observations, which of the following is the correct sequence for the nature of solutions A, B, and C?

(i) Acidic, acidic, and acidic (ii) Neutral, basic, and basic

(iii) Basic, basic, and acidic (iv) Basic, basic, and basic

Ans: (iv) Basic, basic, and basic

9. Mani is blindfolded. She is given two unknown solutions to test and determine whether they are acidic or basic. Which indicator should Mani use to test the solutions and why?

Ans: Mani should use an olfactory indicator such as onion or vanilla essence because their smell changes in acidic and basic solutions, which can be identified without seeing.

10. Could you suggest various materials which can be used for writing the message on the white sheet of paper (given at the beginning of the chapter) and what could be in the spray bottle? Make a table of various possible combinations and the colour of the writing obtained.

Ans:

Material used for writing	Spray bottle contains	Colour obtained
Soap solution	Turmeric solution	Red/Brown
Lemon juice	China rose indicator	Dark pink
Baking soda solution	China rose indicator	Green
Vinegar	Litmus solution	Red
Lime water	Turmeric solution	Reddish brown

11. Keerthi wrote a secret message to her grandmother on her birthday using orange juice. Can you assist her grandmother in revealing the message? Which indicator would you use to make it visible?

Ans: Orange juice is acidic in nature. To reveal the message, spray a natural indicator such as **China rose indicator** on the paper. The writing will become dark pink and visible.

12. The extract of red rose turns the liquid X to green. What will the nature of liquid X be? What will happen when excess of amla juice is added to liquid X?

Ans: If red rose extract turns liquid X to green, then liquid X is **basic** in nature.

When excess amla juice is added to liquid X, the base gets neutralised and the solution may turn pink/red because amla juice is acidic.

13. Observe and analyse Figs. 2.13, 2.14, and 2.15, in which red rose extract paper strips are used. Label the nature of solutions present in each of the containers.

Fig. 2.13 Fig. 2.14 Fig. 2.15

Ans: **Fig. 2.13** – Basic solution (strip turns green)

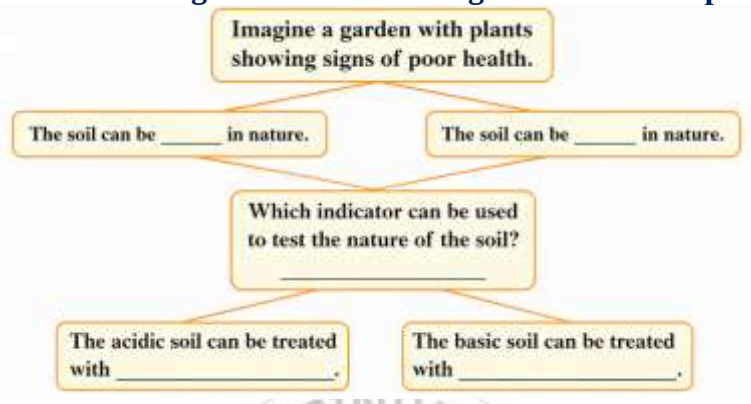
Fig. 2.14 – Neutral solution (no colour change)
Fig. 2.15 – Acidic solution (strip turns red/pink)

14. Three liquids are given to you. One is vinegar, another is a baking soda solution, and the third is a sugar solution. Can you identify them only using turmeric paper? Explain.

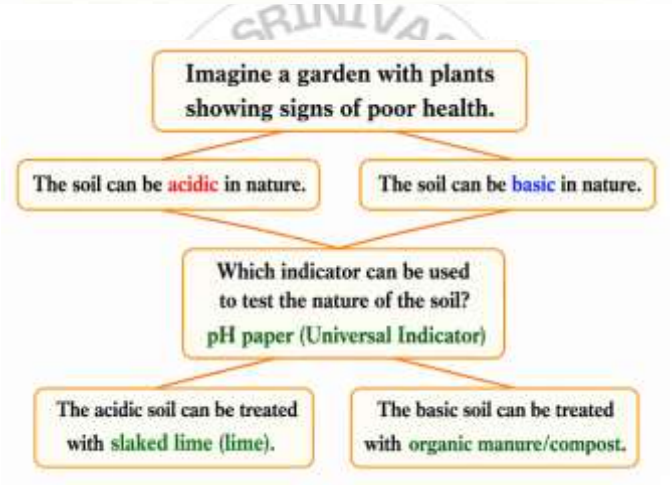
Ans: Yes.

i) Turmeric paper turns reddish brown in a base. So, the liquid that changes turmeric paper to reddish brown is baking soda solution.
ii) The liquids that do not change the colour are vinegar and sugar solution.
iii) Now add the baking soda solution to each of them:
iv) Vinegar reacts with baking soda producing bubbles.
v) Sugar solution shows no reaction.
vi) Thus, all three liquids can be identified.

15. Observe and analyse the information given in the following flowchart. Complete the missing information.



Ans:



16. A liquid sample from the laboratory was tested using various indicators:

Indicator	Red litmus	Blue litmus	Turmeric
Change	No change	Turned red	No change in colour

Based on the tests, identify the acidic or basic nature of the liquid and justify your answer.

Ans: The liquid is **acidic** in nature.

Justification: Blue litmus turned red, which indicates the presence of an acid.
Red litmus shows no change in acidic solution.
Turmeric shows no change in acidic solutions.

17. Grape juice was mixed with red rose extract; the mixture got a tint of red colour. What will happen if baking soda is added to this mixture? Justify your answer.

Ans: When baking soda is added, the colour of the mixture changes to **green**.

Justification: Grape juice is acidic. Baking soda is basic in nature. The base neutralises the acid and, in excess, turns the indicator green.

Exploratory Projects

1. Create rangoli using acidic or basic substances and natural indicators.

Title: Colourful Rangoli Using Acids, Bases, and Natural Indicators

Aim: To create a rangoli using acidic and basic substances with natural indicators and observe the colour changes produced by them.

Hypothesis: Natural indicators change colour when they react with acidic or basic substances. Therefore, using acids and bases in rangoli design will produce different colours and patterns.
Materials and Methods: Turmeric powder, China rose (hibiscus) petal extract, Lemon juice, Vinegar, Baking soda solution, Soap solution, Water, Small bowls or cups, Dropper or brush, White chart paper/floor tile, Spoon
Method / Procedure:

1. Draw a simple rangoli design on a white chart paper or floor surface.
2. Prepare natural indicators:
3. Mix turmeric with water to make turmeric indicator.
4. Crush china rose petals in warm water to prepare indicator extract.
5. Prepare acidic solutions such as lemon juice and vinegar.
6. Prepare basic solutions such as baking soda solution and soap solution.
7. Fill different portions of the rangoli with natural indicators.
8. Add acidic and basic substances carefully using a dropper or brush.
9. Observe the colour changes occurring in the rangoli.
10. Record the observations with date and time.

Observations and Data

Substance Used	Nature	Indicator Used	Observation
Lemon Juice	Acidic	China Rose	Dark pink colour
Vinegar	Acidic	China Rose	Pink colour
Baking Soda Solution	Basic	Turmeric	Reddish-brown colour
Soap Solution	Basic	Turmeric	Brownish-red colour

Applications:

1. Helps farmers choose suitable crops for cultivation.
2. Useful for improving soil quality in agriculture.
3. Helps in environmental and soil studies.
4. Encourages the use of eco-friendly natural indicators.

Results and Conclusion
Result: Different acidic and basic substances produced different colour changes when mixed with natural indicators in the rangoli.
Conclusion: The experiment proved that natural indicators react differently with acids and bases. Acids changed china rose indicator into shades of pink, while bases changed turmeric indicator into reddish-brown colour. The activity combined science and art in an interesting and creative way.
References: References, 7th class Science Textbook, Science Teacher's Guidance, Information from classroom discussion and observation
Acknowledgements: I sincerely thank my science teacher, parents, and classmates for their support and guidance in completing this project successfully.

2. You may discuss in your class the acidic, basic, or neutral nature of water obtained from various sources. You may like to test the water samples available from sources such as rain, taps, rivers, etc.

Title: Study of Acidic, Basic, and Neutral Nature of Water from Various Sources
Aim: To collect water samples from different sources and identify whether they are acidic, basic, or neutral using natural indicators.
Hypothesis: Different water sources contain dissolved substances and minerals. Therefore, some water samples may show acidic nature, some basic nature, while others may remain neutral.
Materials Required: Water samples from: Rain water, Tap water, River water, Pond water, Well water.
Turmeric indicator, China rose (hibiscus) indicator, Transparent cups or test tubes, Droppers.
Method / Procedure

1. Collect water samples from different sources in separate clean containers.
2. Label each container properly.
3. Prepare natural indicators:
4. Turmeric mixed with water
5. China rose petal extract prepared in warm water
6. Take a small amount of each water sample in separate cups or test tubes.
7. Add a few drops of turmeric indicator and observe the colour change.
8. Add china rose indicator to another set of samples.
9. Record all observations carefully.
10. Compare the colour changes and identify whether the water is acidic, basic, or neutral.

Observations and Data

Water Source	Indicator Used	Observation	Nature of Water
Rain Water	China Rose	Light pink colour	Slightly Acidic
Tap Water	Turmeric	No colour change	Neutral

River Water	China Rose	Very light pink	Slightly Acidic
Well Water	Turmeric	Slight reddish-brown	Slightly Basic
Pond Water	China Rose	No major change	Neutral

Applications:

1. Helps in checking the quality of water for daily use.
2. Useful in environmental studies and pollution testing.
3. Encourages the use of eco-friendly natural indicators.

Results and Conclusion

Result: Different water samples showed different colour changes with natural indicators.

Conclusion: The experiment showed that water from various sources can be acidic, basic, or neutral depending on the dissolved substances present in them. Natural indicators are simple and eco-friendly materials used for testing the nature of substances.

References: 7th Science Textbook, Classroom discussion and teacher guidance, Observation of local water samples.

Acknowledgements: I sincerely thank my science teacher, parents, and classmates for their guidance and support in completing this project successfully.

3. Collect a soil sample of your area and find out whether it is acidic, basic, or neutral in nature.

Title: Study of Acidic, Basic, or Neutral Nature of Soil

Aim: To collect a soil sample from the local area and determine whether it is acidic, basic, or neutral using natural indicators.

Hypothesis: Soil contains minerals and organic substances that may make it acidic, basic, or neutral in nature. Therefore, different soil samples may show different reactions with indicators.

Materials Required: Soil sample from nearby area, Clean water, Bowl or beaker, Spoon or stirrer, Filter paper or clean cloth, Turmeric indicator, China rose (hibiscus) indicator, Transparent cups or test tubes, Dropper.

Method / Procedure:

1. Collect a small soil sample from a nearby garden, field, or open area.
2. Remove stones, leaves, and other unwanted materials from the soil.
3. Take two spoons of soil in a bowl and add some clean water.
4. Stir the mixture well and allow it to settle for a few minutes.
5. Filter the liquid using filter paper or a clean cloth.
6. Take the filtered liquid in separate cups or test tubes.
7. Add a few drops of turmeric indicator and observe the colour change.
8. Add china rose indicator to another sample and observe the changes.
9. Record all observations carefully.
10. Identify whether the soil is acidic, basic, or neutral.

Observations and Data:

Indicator Used	Observation	Nature of Soil
Turmeric Indicator	Slight reddish-brown colour	Basic
China Rose Indicator	Light green colour	Basic

Applications:

1. Helps farmers choose suitable crops for cultivation.
2. Useful for improving soil quality in agriculture.
3. Helps in environmental and soil studies.

Result: The soil sample showed colour changes with natural indicators.

Conclusion: The experiment showed that the collected soil sample was basic in nature. Natural indicators helped identify the nature of the soil easily and safely.

References and Acknowledgements

References: 7th Science Textbook, Science teacher's guidance, Classroom discussion and observation.

Acknowledgements: I sincerely thank my science teacher, parents, and classmates for their support and guidance in completing this project successfully.

Activities

Activity 2.1

Aim: To test acidic, basic, and neutral substances using litmus paper.

Materials required: Blue litmus paper, red litmus paper, lemon juice, soap solution, vinegar, baking soda solution, tap water.

Procedure: 1. Take small pieces of blue and red litmus papers.
2. Put one drop of each sample on the papers.
3. Observe the colour changes.
4. Record the observations.

S.No	Name of the sample	Colour of blue litmus paper after putting a drop of sample	Colour of blue litmus paper after putting a drop of sample
1	Lemon juice	Red	No change (Red)
2	Soap solution	No change (Blue)	Blue
3	Vinegar	Red	No change (Red)
4	Baking soda solution	No change (Blue)	Blue
5	Tap solutions	No change (Blue)	No change (Red)

Observation: Acids turn blue litmus red. Bases turn red litmus blue. Neutral substances show no change.
Conclusion: Litmus paper helps identify acids, bases, and neutral substances.

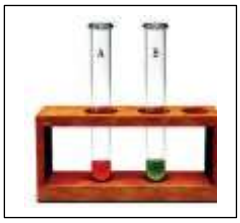
Activity 2.2

Aim: To identify acids and bases from taste and touch.
Materials required: Lemon, curd, tamarind, baking soda solution.
Procedure: 1. Taste edible substances carefully if instructed.
2. Touch baking soda solution with fingers.
3. Observe taste and feel.
Observation: Acidic substances taste sour. Basic substances feel slippery.
Conclusion: Acids are generally sour and bases are slippery.

Activity 2.3

Aim: To prepare red rose extract as a natural indicator.
Materials required: Red rose petals, hot water, glass tumbler, filter.
Procedure: 1. Collect and wash red rose petals.
2. Crush the petals.
3. Put them in hot water for some time.
4. Filter the liquid.
Observation: A coloured liquid extract is formed.
Conclusion: Red rose extract can be used as a natural indicator. It is an acid-base indicator.

Activity 2.4

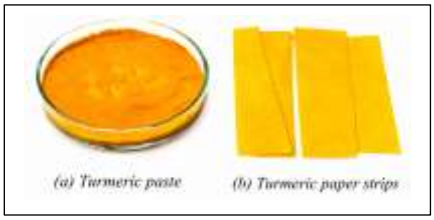


Aim: To test substances using red rose extract.
Materials required: Red rose extract, lemon juice, soap solution, test tubes.
Procedure: 1. Take red rose extract in two test tubes.
2. Add lemon juice to one and soap solution to another.
3. Observe the colour changes.

S.No	Name of the sample	The colour of the red rose extract after adding te sample	Nature of the substance
1	Lemon juice	Red	Acidic
2	Soap solution	Blue	Basic
3	Usiri(Amla) juice	Red	Acidic
4	Lime water	Blue	Basic

Observation: 1. Acidic solution changes the extract to red/pink.
2. Basic solution changes it to green.
Conclusion: Red rose extract helps identify acids and bases.

Activity 2.5



Aim: To prepare turmeric paper as an indicator.
Materials required: Turmeric paste, filter paper, water.
Procedure: 1. Prepare turmeric paste with water.
2. Dip filter paper in the paste.
3. Dry the paper and cut into strips.
4. Put drops of different samples on the strips.

S.No.	Name of the Sample	The Colour of the Turmeric Paper after Putting a Drop of the Sample
1.	Lemon juice	No change (Yellow)
2.	Soap solution	Reddish-brown
3.	Amla (Usiri) juice	No change (Yellow)
4.	Tamarind water	No change (Yellow)

Observation: 1. Turmeric paper changes to red-brown with bases.
2. No change occurs with acids.

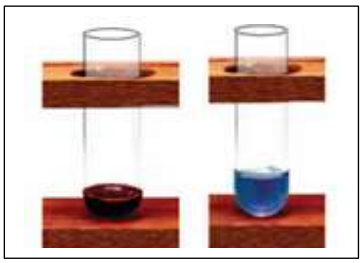
Conclusion: Turmeric paper is used to identify basic substances.

Activity 2.6

Aim: To observe change in smell in acidic and basic media.
Materials required: Onion pieces, cloth strips, tamarind water, baking soda solution.
Procedure: 1. Keep onion pieces overnight with cloth strips.
2. Put tamarind water on one strip and baking soda solution on another.
3. Smell both strips.
Observation: Smell changes in basic medium but not much in acidic medium.
Conclusion: Onion acts as an olfactory indicator.

Activity 2.7

Aim: To observe neutralisation reaction.
Materials required: Lemon juice, blue litmus solution, lime water, test tube.
Procedure: 1. Take lemon juice in a test tube.
2. Add blue litmus solution.
3. Add lime water slowly and stir.
4. Observe the colour change.
Observation: The solution changes from red to blue after adding lime water.
Conclusion: Acid and base react to form salt and water. This is called neutralisation.



TABLES

Table 2.1: Testing the Nature of Samples with Blue and Red Litmus Papers

S.No.	Name of the Sample	Colour of Blue Litmus Paper after Putting a Drop of Sample	Colour of Red Litmus Paper after Putting a Drop of Sample
1	Lemon juice	Red	No change (Red)
2	Soap solution	No change (Blue)	Blue
3	Usiri juice	Red	No change (Red)
4	Tamarind water	Red	No change (Red)
5	Vinegar	Red	No change (Red)
6	Baking soda solution	No change (Blue)	Blue
7	Lime water	No change (Blue)	Blue
8	Tap water	No change (Blue)	No change (Red)
9	Washing powder solution	No change (Blue)	Blue
10	Sugar solution	No change (Blue)	No change (Red)
11	Salt solution	No change (Blue)	No change (Red)
12	Any other (Ex: Curd)	Red	No change (Red)

Table 2.2: Grouping Samples Tested in Table 2.1

Group A (Acidic Substances)	Group B (Basic Substances)	Group C (Neutral Substances)
Lemon juice	Soap solution	Tap water
Usiri (Amla) juice	Baking soda solution	Sugar solution
Tamarind water	Lime water	Salt solution
Vinegar	Washing powder solution	—
Any other acidic sample (Ex: Curd)	—	—

Table 2.3: Testing the Nature of Samples with the Red Rose Extract

S.No.	Name of the Sample	The Colour of the Red Rose Extract after Adding the Sample	Nature of the Substance
1.	Lemon juice	Dark pink / Red	Acidic
2.	Soap solution	Green	Basic
3.	Usiri (Amla) juice	Dark pink / Red	Acidic
4.	Tamarind water	Dark pink / Red	Acidic

Table 2.4: Testing the Nature of Samples with Turmeric Paper

S.No.	Name of the Sample	The Colour of the Turmeric Paper after Putting a Drop of the Sample
1.	Lemon juice	No change (Yellow)
2.	Soap solution	Reddish-brown

3.	Amla (Usiri) juice	No change (Yellow)
4.	Tamarind water	No change (Yellow)

Competency Based Questions

Multiple Choice Questions

1. Abhi tasted lemon juice and noticed a sour taste. Lemon juice is most likely a
A) Base B) Acid C) Salt D) Neutral substance
2. A farmer finds that crops are not growing well because the soil is too acidic. What should be added?
A) Vinegar B) Lemon juice C) Lime D) Tamarind
3. Soap solution turns red litmus paper blue. This shows that soap solution is
A) Acidic B) Neutral C) Basic D) Salty
4. Keerthi wants to test whether a liquid is acidic or basic. Which material should she use?
A) Sand B) Litmus paper C) Salt D) Sugar
5. Which of the following is an acid?
A) Baking soda solution B) Soap solution
C) Lemon juice D) Lime water
6. A blue litmus paper turns red when dipped in a solution. The solution is
A) Acidic B) Basic C) Neutral D) Salty
7. A red litmus paper turns blue in a liquid. The liquid is
A) Acidic B) Basic C) Neutral D) Salt
8. Which household substance is commonly acidic?
A) Soap B) Vinegar
C) Washing powder D) Lime water
9. Why are indicators used instead of tasting chemicals?
A) To save time B) To increase colour
C) Chemicals may be harmful
D) To make solutions sweeter
10. What is formed when an acid reacts with a base?
A) Acid and water B) Base and salt
C) Salt and water D) Gas only
11. An ant sting causes irritation. Applying a mild base helps because
A) It increases acidity B) It neutralizes the acid
C) It forms sugar D) It cools the skin
12. Which of these is likely to be neutral?
A) Soap solution B) Lemon juice
C) Sugar solution D) Vinegar
13. Litmus is obtained from
A) Trees B) Animals C) Lichens D) Algae
14. What happens when acidic soil is neutralized?
A) Plants die faster B) Soil becomes unsuitable
C) Crop growth improves D) Water evaporates
15. Which solution is basic?
A) Tamarind water B) Usiri juice
C) Lime water D) Vinegar
16. A student spills vinegar on a table and adds baking soda. This is an example of
A) Neutralization B) Condensation
C) Evaporation D) Respiration
17. Which of these is NOT an indicator?
A) Litmus paper B) Rose indicator
C) Turmeric D) Salt
18. What does a litmus indicator help identify?
A) Colour of liquid B) Temperature
C) Acidic or basic nature D) Weight
19. Why does turmeric change colour in a base?
A) It acts as an indicator B) It dissolves
C) It evaporates D) It melts
20. A solution does not change red or blue litmus paper. It is most likely:
A) Acidic B) Basic C) Neutral D) Corrosive
21. Which acid is commonly found in tamarind?
A) Citric acid B) Tartaric acid
C) Hydrochloric acid D) Sulphuric acid
22. Why is neutralization useful in agriculture?
A) To increase acidity always B) To remove weeds
C) To balance soil pH D) To dry soil
23. Which pair contains only acidic substances?
A) Lemon juice, Vinegar B) Soap, Lime water
C) Baking soda, Soap D) Salt, Sugar
24. If blue litmus remains blue and red litmus remains red, the solution is:
A) Acid B) Base C) Neutral D) Corrosive
25. Which substance is used to prepare lime water?
A) Sugar B) Calcium hydroxide solution
C) Salt D) Vinegar
26. A student accidentally adds too much acid to soil. What should be done?
A) Add more acid B) Add a base like lime
C) Add sugar D) Add salt
27. What is the main purpose of acid-base indicators?
A) Measure mass B) Measure volume
C) Identify nature of substances D) Measure speed
28. Why is soap slippery?
A) It is acidic B) It is basic
C) It is neutral D) It is salty
29. Which substance would most likely turn blue litmus red?
A) Baking soda solution B) Soap solution
C) Lemon juice D) Lime water
30. A scientist uses colour change to identify a solution. Which scientific skill is being applied?
A) Observation B) Singing
C) Drawing D) Running

Answers

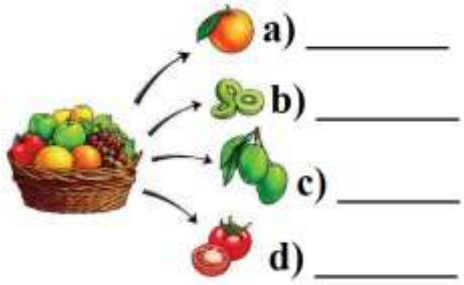
1.B	2.C	3.C	4.B	5.C	6.A	7.B	8.B	9.C	10.C	11.B	12.C	13.C	14.C	15.C
16.A	17.D	18.C	19.A	20.C	21.B	22.C	23.A	24.C	25.B	26.B	27.C	28.B	29.C	30.A

2 Marks Questions

1. Why is it unsafe to taste unknown substances to determine whether they are acidic or basic?
Ans: Unknown substances may be poisonous, corrosive, or harmful to health. Therefore, they should never be tasted.
2. A student notices that baking soda solution feels slippery. What does this suggest about its nature?
Ans: The slippery feel suggests that baking soda solution is basic in nature, as bases are generally slippery to touch.
3. Why is vinegar commonly used in preserving pickles?
Ans: Vinegar contains acetic acid, which prevents the growth of microorganisms and helps preserve food for a longer time.
4. Farmers add lime to acidic soil. Explain why.
Ans: Lime is basic in nature. It neutralises acidic soil and improves its fertility for better plant growth.
5. Red rose extract turns green when added to soap solution. What does this indicate?
Ans: The green colour indicates that soap solution is basic in nature.
6. Turmeric paper changes from yellow to reddish-brown when a sample is added. What is the nature of the sample?
Ans: The sample is basic in nature because turmeric turns reddish-brown in the presence of bases.
7. A student observes no colour change in either red or blue litmus paper after adding sugar solution. What can be concluded?
Ans: Sugar solution is neutral in nature because it does not affect either red or blue litmus paper.
8. Why are natural indicators preferred in some experiments?
Ans: Natural indicators are eco-friendly, easily available, and safe to use compared to some synthetic indicators.
9. Industrial waste should be neutralised before being released into water bodies. Why?
Ans: Acidic or basic waste can harm aquatic organisms and pollute water. Neutralisation reduces its harmful effects.
10. Why does red rose extract act as an acid-base indicator?
Ans: Red rose extract changes colour in acidic and basic media, helping identify the nature of substances.

4 Marks Questions

1. Explain how natural indicators such as turmeric and red rose extract help identify acids and bases.
Ans: i) Natural indicators change colour in acidic or basic media.
ii) Turmeric remains yellow in acids but turns reddish-brown in bases.
iii) Red rose extract turns red in acids and green in bases.
iv) These indicators are eco-friendly and safe to use.
2. Some common edible substances are given in the figure. Identify the names of the most common acids present in them?



Ans: a) Citric acid b) Ascorbic acid and Citric acid c) Tartaric acid d) Citric acid and Oxalic acid
3. A farmer finds that his crops are not growing well because the soil is acidic. Suggest a remedy and explain its scientific basis.
Ans: i) The farmer should add lime to the soil.
ii) Lime is basic in nature and neutralises the acidic soil.
iii) Acidic soil + Lime → Neutral soil
iv) Neutral soil improves nutrient availability and promotes better plant growth.
4. Compare acids and bases with respect to taste, touch, and effect on indicators.
Ans:

Property	Acids	Bases
Taste	Sour	Bitter
Touch	Not slippery	Slippery
Blue litmus	Turns red	No change
Red litmus	No change	Turns blue

5. Explain the process of neutralisation with two examples from daily life.

Ans: Neutralisation occurs when an acid reacts with a base to form salt and water.
Examples: i) Baking soda relieves ant bites by neutralising formic acid.
ii) Antacids neutralise excess hydrochloric acid in the stomach.

6. Find out and write the names of the most common acids present in the following substances?
a) Lemon b) Curd c) Tamarind d) Vinegar

Ans:

Substance	Lemon	Curd	Tamarind	Vinegar
Acid Present	Citric acid	Lactic acid	Tartaric acid	Acetic acid

8 Marks Questions

1. Explain the uses of acids and bases in our daily life.

Ans: Uses of Acids
i) Food preservation
ii) Cleaning agents.
iii) Batteries.
iv) Medicines and cosmetics.
v) Helps in digestion.

Uses of Bases
i) Cleaning: Soaps and detergents contains bases.
ii) Health: Antacids reduce acidity.
iii) Construction: Line used in whitewash and plaster.
iv) Cooking: Baking soda used in cakes and biscuits.
v) Industry: Used in making paper, textiles and medicines.

2. "Acids are useful when used properly but harmful when handled carelessly." Justify the statement with examples.

Ans: Acids are highly useful in daily life but can also be dangerous if not handled carefully.

Useful Effects	**Harmful Effects**
i) Hydrochloric acid helps digestion.	i) Strong acids can burn skin.
ii) Acetic acid preserves food.	ii) Acid spills can damage clothes and metals.
iii) Sulphuric acid is used in batteries.	iii) Industrial acids may pollute water bodies.
iv) Acids remove rust from metals.	iv) Careless handling can cause accidents.

3. Read the following situation:
While playing in the garden, Rajani is bitten by an ant and experiences pain and irritation.
Explain why the bite causes pain and suggest a scientific remedy based on the principle of neutralisation.

Ans: An ant bite causes pain and irritation because ants inject **formic acid** into the skin during the bite. This acid irritates the skin and causes a burning sensation.
According to the principle of **neutralisation**, an acid can be neutralised by a base.
Therefore, applying a mild base such as **baking soda (sodium hydrogen carbonate)** paste on the affected area helps neutralise the formic acid and provides relief from pain and irritation.

Formic acid + Baking soda (base) → Salt + Water + Heat

4. A student tests lemon juice, soap solution, vinegar, and sugar solution using litmus paper. Explain the observations and classify the substances.

Ans:

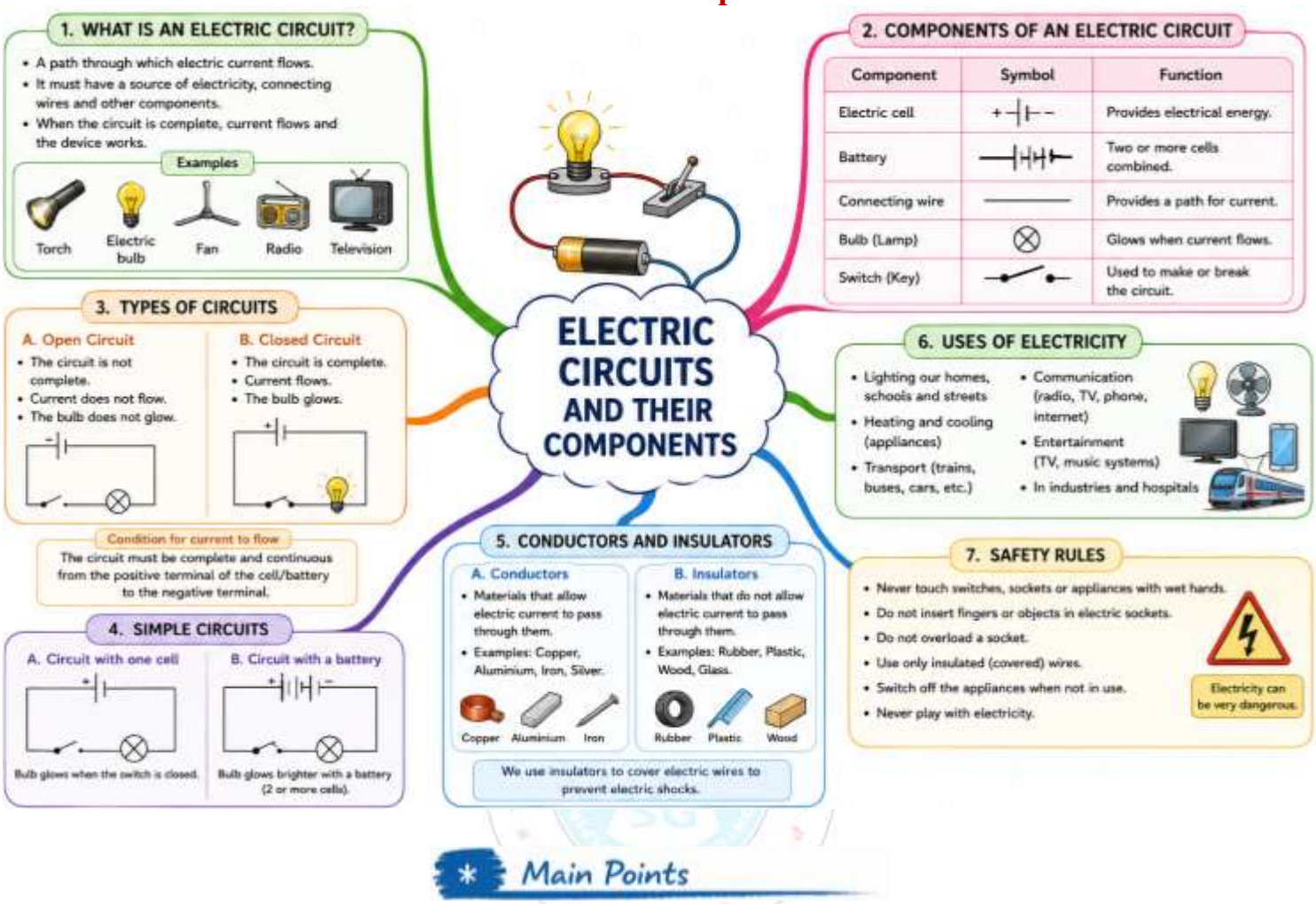
Substance	**Effect on Blue Litmus**	**Effect on Red Litmus**	**Nature**
Lemon juice	Turns red	No change	Acidic
Soap solution	No change	Turns blue	Basic
Vinegar	Turns red	No change	Acidic
Sugar solution	No change	No change	Neutral

5. "Neutralisation is a useful chemical reaction in solving real-life problems." Justify this statement with suitable examples from daily life.

Ans: Neutralisation occurs when an acid reacts with a base to form salt and water.
Neutralisation is very useful in solving many real-life problems.
1. Relief from Ant Bites: Baking soda or calamine neutralises formic acid and reduces pain.
2. Treatment of Indigestion: Antacids like milk of magnesia neutralise excess stomach acid.
3. Improving Acidic Soil: Lime is added to neutralise acidic soil and improve crop growth.
4. Treatment of Industrial Waste: Harmful acids and bases are neutralised before disposal to prevent pollution.

Chapter – 3: Electric Circuits and their Compounds

Mind Map



Main Points

1. Electricity is used in homes, schools, industries, transport, and communication.
2. A torchlight is a simple device that uses electricity.
3. An electric cell is a source of electrical energy.
4. Every electric cell has two terminals – positive (+) and negative (–).
5. A battery is a combination of two or more electric cells.
6. Cells in a battery are connected in a proper order.
7. An incandescent lamp contains a thin wire called filament.
8. The filament glows when electric current passes through it.
9. A broken filament stops the lamp from glowing.
10. LED means Light Emitting Diode.
11. LEDs do not have filaments.
12. LEDs have two terminals – positive and negative.
13. LEDs glow only when connected correctly.
14. Electric current flows through a complete path called an electric circuit.
15. A lamp glows only when the circuit is complete.
16. Electric current flows from the positive terminal to the negative terminal of a cell.
17. Wires are used to connect components in a circuit.
18. An electric switch is used to open or close a circuit.
19. In ON position, the switch completes the circuit.
20. In OFF position, the circuit is broken.
21. Circuit diagrams use symbols to represent electrical components.
22. A long line in a cell symbol represents the positive terminal.
23. A short line in a cell symbol represents the negative terminal.

24. Electrical components can be connected in series or parallel.
25. In a series circuit, components are connected one after another.
26. In a series circuit, if one bulb is removed, all bulbs stop glowing.
27. In a parallel circuit, components are connected through separate paths.
28. In a parallel circuit, other bulbs glow even if one bulb is removed.
29. Decorative lights often use series connections.
30. Household wiring generally uses parallel connections.
31. Materials that allow electricity to pass are called conductors.
32. Metals are good conductors of electricity.
33. Plastic, rubber, and ceramics are insulators.
34. Insulators are used to cover electric wires for safety.
35. Electrical appliances should not be handled with wet hands for safety.

--------: Definitions :-------

Electric Cell: Electric cell is a source of electricity.
Battery: A battery is a combination of two or more electric cells connected together.
Electric Circuit: An electric circuit is a complete path through which electric current flows.
Closed Circuit: In a closed electric circuit, electric current passes from one terminal of the electric cell to the other terminal.
Switch: Switch is a simple device that is used to either break the electric circuit or to complete it.
Filament: Filament is a thin wire inside an electric bulb that glows when electric current passes through it.
Conductors: Materials that allow electric current to pass through them are called conductors.
Insulators: Materials that do not allow electric current to pass through them are called insulators.
Circuit diagram: A representation of an electrical circuit using symbols is called its circuit diagram.
Series connection: In an electric circuit, the components are connected one after another in a single path is called a series connection.
Parallel connection: In an electric circuit, where first terminal components are connected to the one side and second terminals are connected other side is called a parallel connection.

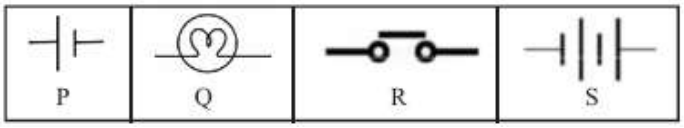
Intext Questions and Answers

1. What is a torchlight?
Ans: A torchlight is a simple electrical device that uses electric cells to produce light.
2. What is an electric cell?
Ans: An electric cell is a portable source of electrical energy.
3. How many terminals does an electric cell have?
Ans: An electric cell has two terminals – positive (+) and negative (–).
4. What is a battery?
Ans: A combination of two or more electric cells is called a battery.
5. Why are cells connected in a battery?
Ans: Cells are connected together to provide more energy to the circuit.
6. What is the glowing wire inside an incandescent lamp called?
Ans: The glowing wire inside the lamp is called a filament.
7. Why does the filament glow?
Ans: The filament glows when electric current passes through it.
8. What happens if the filament breaks?
Ans: The lamp does not glow because a broken filament stops the flow of current.
9. What does LED stand for?
Ans: LED stands for Light Emitting Diode.
10. Do LEDs have filaments?
Ans: No, LEDs do not have filaments.
11. How many terminals does an LED have?
Ans: An LED has two terminals – positive and negative.
12. Why does an LED glow only in one arrangement?
Ans: Electric current passes through an LED only in one direction.
13. What is an electric circuit?
Ans: A complete path through which electric current flows is called an electric circuit.
14. When does a lamp glow in a circuit?
Ans: A lamp glows only when the circuit is complete and current flows through it.

15. In which direction does electric current flow in a circuit?
Ans: Electric current flows from the positive terminal to the negative terminal of the cell.
16. What is an electric switch?
Ans: An electric switch is a device used to open or close an electric circuit.
17. What happens when the switch is ON?
Ans: The circuit becomes complete and the lamp glows.
18. What happens when the switch is OFF?
Ans: The circuit becomes incomplete and the lamp does not glow.
19. Why are symbols used in circuit diagrams?
Ans: Symbols make it easier to draw and understand electrical circuits.
20. What does the long line in a cell symbol represent?
Ans: The long line represents the positive terminal.
21. What does the short line in a cell symbol represent?
Ans: The short line represents the negative terminal.
22. What is a series connection?
Ans: A circuit in which components are connected one after another in a single path is called a series connection.
23. What happens if one bulb is removed in a series circuit?
Ans: All the bulbs stop glowing because the circuit becomes incomplete.
24. What is a parallel connection?
Ans: A circuit in which components are connected through separate paths is called a parallel connection.
25. What happens if one bulb is removed in a parallel circuit?
Ans: The other bulbs continue to glow because they have separate paths.
26. Why are parallel connections used in homes?
Ans: Each appliance can work independently.
27. What are conductors?
Ans: Materials that allow electric current to pass through them are called conductors.
28. Name some conductors of electricity.
Ans: Copper, aluminium, silver, and iron are conductors of electricity.
29. What are insulators?
Ans: Materials that do not allow electric current to pass through them are called insulators.
30. Name some insulators.
Ans: Plastic, rubber, glass, and ceramics are insulators.
31. Why are electric wires covered with plastic or rubber?
Ans: Plastic and rubber are insulators and protect us from electric shock.
32. Why should we not touch switches with wet hands?
Ans: Water can conduct electricity and may cause electric shock.
33. Why are metals used for making electric wires?
Ans: Metals are good conductors of electricity.
34. Which metals are the best electrical conductors?
Ans: Silver, copper, and gold are the best electrical conductors.
35. What is the difference between electricity from a cell and electricity from a wall socket?
Ans: Electricity from a cell is called Direct Current (DC), while electricity from a wall socket is called Alternating Current (AC).

Let Us Enhance Our Learning

1. Which of these symbols is used for a battery in a circuit?



A) P **B) Q** **C) R** **D) S**

Ans: D) S

2. Observe the circuit shown in Fig. 3.19. The switch is open. What will happen to the bulb?

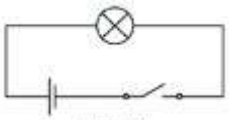


Fig. 3.19

A) The bulb glows due to filament.
B) The bulb glows because the cell is present.
C) The bulb does not glow because the circuit is incomplete.
D) The bulb does not glow because the cell is wrongly connected.

Ans: C) The bulb does not glow because the circuit is incomplete.

3. Choose the incorrect statement.
(i) A switch is the source of electric current in a circuit.
(ii) A switch helps to complete or break the circuit.
(iii) A switch helps us to use electricity as per our requirement.
(iv) When the switch is in 'OFF' position, there is an air gap between its terminals.

Ans: (i) A switch is the source of electric current in a circuit.

4. Ravi wants to check whether a key made of a new material conducts electricity. He connects the key in the gap of a simple circuit containing a cell and a bulb. The bulb does not glow. He then replaces the key with an iron nail, and the bulb glows. What can Ravi correctly conclude?
A) Both the key and the iron nail are insulators.
B) The key is an insulator, and the iron nail is a conductor.
C) The key is a conductor, but the iron nail is an insulator.
D) The bulb glows only because the iron nail is long.

Ans: B) The key is an insulator, and the iron nail is a conductor.

5. Define the following:
a) Electric conductors b) Insulators c) Electric cell d) Switch e) Circuit diagram

Ans: a) Electric conductors: Materials that allow electric current to pass through them are called electric conductors.
b) Insulators: Materials that do not allow electric current to pass through them are called insulators.
c) Electric cell: An electric cell is a source of electricity that provides electric current in a circuit.
d) Switch: A switch is a device used to complete or break an electric circuit.
e) Circuit diagram: A circuit diagram is a representation of an electric circuit using standard symbols.

6. Observe Fig. 3.20. With which material connected between ends A and B, the lamp will not glow?

Ans: The lamp will not glow if an insulator like plastic, rubber, or wood is connected between A and B.

7. Suppose the '+' and '–' symbols cannot be read on a battery. Suggest a method to identify the two terminals of this battery.

Ans: Connect the battery to an **LED**. If the LED glows, the terminal connected to the longer lead of the LED is the positive terminal.

8. A student forgot to remove the insulator covering from the connecting wires while making a circuit. If the lamp and the cell are working properly, will the lamp glow?

Ans: No. The lamp will not glow because the insulation prevents electric current from passing through the wires.

9. In Fig. 3.21:

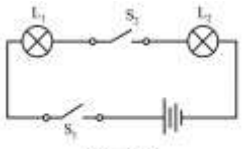


Fig. 3.21

(i) If S_2 is in 'ON' position and S_1 is in 'OFF' position, which lamp(s) will glow?
(ii) If S_2 is in 'OFF' position and S_1 is in 'ON' position, which lamp(s) will glow?
(iii) If S_1 and S_2 both are in 'ON' position, which lamp(s) will glow?
(iv) If both S_1 and S_2 are in 'OFF' position, which lamp(s) will glow?

Ans: i) No lamp will glow because the circuit is incomplete.
ii) No lamp will glow because the circuit is incomplete.
iii) Both L_1 and L_2 will glow.
iv) No lamp will glow.

10. Ramu has made the circuit as shown in Fig. 3.22. Even after closing the circuit,

the lamp does not glow. What can be the possible reasons? List as many possible reasons as you can for this faulty operation.
What will you do to find out why the lamp did not glow?

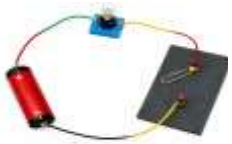
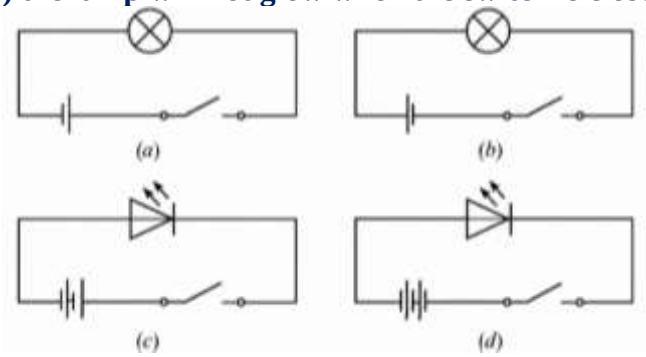


Fig. 3.22

Ans: Possible reasons
a) The bulb may be fused.
b) The cell may be weak or exhausted.
c) Connections may be loose.
d) The switch may not be working properly.
e) Wires may be damaged.
f) Insulation may not have been removed from the wire ends.

11. In Fig. 3.23, in which case(s) the lamp will not glow when the switch is closed?



Ans: The lamp will not glow in cases (b) and (d).

12. An LED requires two cells in series to glow.
Ramya made the circuit as shown in Fig.3.24.
Will the lamp glow?
If not draw the wires changed for correct connections.

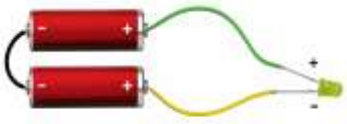


Fig. 3.26

Ans: No, it will not glow because the cells are not connected properly in series.
Correct connection: Positive terminal of one cell should be connected to the negative terminal of the other cell.

13. In Fig. 3.25, if the filament of one lamp is broken, will the other glow? Justify your answer.

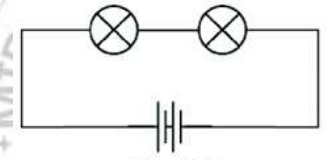
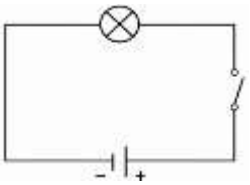


Fig. 3.25

Ans: No. The lamps are connected in series. If the filament of one lamp breaks, the circuit becomes incomplete and current cannot flow. Therefore, the other lamp will also not glow.

14. Draw a circuit diagram for a simple torch using symbols for electric components.

Ans:

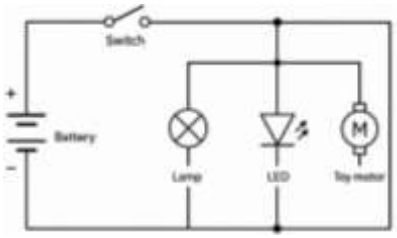


15. You are given six cells marked A,B,C,D,E and F. Some of these are working and some are not. Design an activity to identify which of them are working.
(i) List the items that you require.
(ii) Write the procedure that you will follow.
(iii) With the items, carry out the activity to identify the cells that are working.

Ans: i) Items required: Bulb, Connecting wires, Cell holder
(ii) Procedure: Connect each cell one by one in a simple circuit with a bulb.
(iii) Observation: If the bulb glows, the cell is working. If it does not glow, the cell is not working.

16. Draw a neat diagram using a battery, lamp, LED, toy motor, and switch in series and parallel connections.

Ans:



Exploratory Projects

1. Suppose that due to some problem, the power supply is disrupted in your area for two days. List out which actions from your daily life you would not be able to do.

Title: Study of Daily Activities Affected During a Two-Day Power Cut

Aim: To identify the daily life activities that are affected when there is no electricity supply for two days.

Hypothesis: Most modern household activities depend on electricity. Therefore, a long power disruption will affect communication, household work, comfort, education, and entertainment.

Materials Required: Notebook, Pen or pencil, Observation sheet, Discussion with family members

Method / Procedure:

1. Imagine that there is no electricity supply in your area for two days.
2. Observe which household activities depend on electricity.
3. Discuss with family members about problems faced during power cuts.
4. Make a list of activities that cannot be done without electricity.
5. Record all observations carefully.

Observations and Data

Activity	Problem Faced During Power Cut
Lighting	Lights do not work at night
Fans and AC	Rooms become hot and uncomfortable
Mobile Charging	Phones cannot be charged
Television	Entertainment is affected
Internet/Wi-Fi	Online work and classes stop
Refrigerator	Food may spoil
Water Pump	Water supply may stop
Washing Machine	Clothes cannot be washed easily
Mixer/Grinder	Cooking work becomes difficult
Elevator/Lift	Lifts do not function

Result: Many household and daily life activities stopped or became difficult during the power disruption.

Conclusion: Electricity is very important in modern life. A two-day power cut affects comfort, communication, education, water supply, cooking, and entertainment. This activity shows the importance of saving electricity and using it carefully.

References and Acknowledgements

References: 7th Science Textbook, Classroom discussion, Observations from home during power cuts.

Acknowledgements: I sincerely thank my science teacher, parents, and classmates for their guidance and support in completing this project successfully.

2. Using a solar panel (Fig. 3.22a) as a source of electrical energy, make a circuit to run a toy fan (Fig. 3.22b) as shown in Fig. 3.22c.

Title: Making a Simple Circuit Using a Solar Panel to Run a Toy Fan

Aim: To make a simple electrical circuit using a solar panel and run a toy fan using solar energy.

Hypothesis: A solar panel converts sunlight into electrical energy. Therefore, when connected properly to a toy fan motor, the fan will rotate in sunlight.

Materials Required: Small solar panel, Toy fan motor with blades, Connecting wires, Sunlight

Method / Procedure

1. Take a small solar panel and a toy fan motor.
2. Identify the positive and negative terminals of the solar panel and motor.
3. Connect the positive wire of the solar panel to the positive terminal of the motor.
4. Connect the negative wire of the solar panel to the negative terminal of the motor.
5. Ensure that all connections are tight and proper.
6. Place the solar panel under bright sunlight.
7. Observe the movement of the toy fan.
8. Cover the solar panel partially and observe the changes again.

Observations and Data:

Condition	Observation
Solar panel placed in bright sunlight	Fan rotated fast
Solar panel placed in weak sunlight	Fan rotated slowly
Solar panel covered	Fan stopped rotating
Proper wire connections	Circuit worked successfully

Applications:

1. Solar panels are used to generate electricity in homes and schools.
2. Solar energy helps reduce pollution and saves electricity.

3. Used in solar lamps, calculators, water heaters, and street lights.
4. Encourages the use of renewable energy sources.

Result: The toy fan rotated when the solar panel received sunlight.

Conclusion: The experiment proved that solar panels convert solar energy into electrical energy. The electrical energy produced by the solar panel operated the toy fan successfully. Greater sunlight produced more electrical energy, making the fan rotate faster.

References: 7th Science Textbook, Classroom activity and teacher guidance
Observation during the experiment

Acknowledgements

I sincerely thank my science teacher, parents, and classmates for their support and guidance in completing this project successfully.

3. Visit an electrical items shop. With the help of the shopkeeper, identify the various types of cells available. For each cell, also find out which device(s) it is used for. Prepare a report.

Title: Identification of Various Types of Cells and Their Uses

Aim: To visit an electrical items shop, identify different types of cells available, and study the devices in which they are used.

Hypothesis: Different electrical devices require different types of cells depending on their size, voltage, and power requirements.

Materials Required: Notebook, Pen or pencil, Observation sheet, Help from the shopkeeper

Method / Procedure:

1. Visit a nearby electrical or electronics shop.
2. Observe the different types of cells available in the shop.
3. Ask the shopkeeper about the names and sizes of the cells.
4. Find out which devices use each type of cell.
5. Record the information carefully in a table.
6. Prepare a report based on the observations.

Observations and Data:

Type of Cell	Size/Type	Devices Used In
Dry Cell	AA	Wall clocks, toys, torches
Dry Cell	AAA	TV remotes, wireless mouse
Button Cell	Small round cell	Watches, calculators
Rechargeable Cell	AA Rechargeable	Emergency lights, toys
Lithium Battery	Lithium-ion	Mobile phones, cameras
9V Battery	Rectangular battery	Smoke alarms, microphones
Pencil Cell	AA size	Radios, flashlights
Coin Cell	Flat round cell	Car keys, thermometers

Applications:

1. Helps students understand the practical use of cells.
2. Creates awareness about rechargeable and non-rechargeable batteries.
3. Helps in selecting the correct cell for different devices.
4. Encourages safe handling and proper disposal of batteries.

Result: Different types of cells were found in the electrical shop and each type was used for specific electrical devices.

Conclusion: The visit helped in understanding the various types of cells and their uses in daily life. Cells are important sources of electrical energy used in household and electronic devices.

References and Acknowledgements

References: 7th Science Textbook, Information provided by the shopkeeper, Classroom discussion and observation

Acknowledgements: I sincerely thank the shopkeeper, my science teacher, parents, and classmates for their guidance and support in completing this project successfully.

4. Prepare a list of objects in your home under three categories:
(i) Objects which are electrical insulators only (ii) Objects which are electrical conductors only
(iii) Objects which are made of both, whose some parts are insulators and some electrical conductors.

Title: Study of Electrical Conductors and Insulators in Household Objects

Aim: To identify and classify household objects as electrical conductors, electrical insulators, or objects containing both conductors and insulators.

Hypothesis: Objects made of metals will mostly act as conductors, while objects made of rubber, plastic, wood, or glass will act as insulators. Some electrical appliances may contain both conductors and insulators for safety and proper functioning.

Materials Required: Notebook, Pen or pencil, Household objects for observation.

Method / Procedure:

1. Observe different objects available at home.
2. Identify the material from which each object is made.
3. Check whether the material allows electric current to pass through it or not.
4. Group the objects into three categories:
5. Conductors only
6. Insulators only
7. Objects containing both conductors and insulators
8. Record all observations carefully in a table.

Observations and Data

(i) Objects Which Are Electrical Insulators Only

Object	Material
Rubber slippers	Rubber
Plastic bucket	Plastic
Wooden stool	Wood
Glass bottle	Glass
Eraser	Rubber

(ii) Objects Which Are Electrical Conductors Only

Object	Material
Iron nail	Iron
Copper wire	Copper
Steel spoon	Steel
Aluminium vessel	Aluminium
Metal key	Metal

(iii) Objects Which Have Both Conductors and Insulator

Object	Conducting Part	Insulating Part
Electric wire	Copper wire	Plastic covering
Screwdriver	Metal tip	Plastic handle
Electric iron	Metal plate	Plastic handle
Mobile charger	Metal pins	Plastic body
Plug	Metal pins	Plastic outer cover

Applications:

1. Helps in understanding electrical safety.
2. Useful in identifying safe materials for handling electricity.
3. Helps in learning the practical use of conductors and insulators.
4. Creates awareness about electrical appliances used at home.

Result: Different household objects were classified into conductors, insulators, and objects containing both conductors and insulators.

Conclusion: Metals such as copper, iron, steel, and aluminium are good conductors of electricity, while rubber, plastic, wood, and glass act as insulators. Many electrical appliances use both conductors and insulators to ensure safe and efficient use of electricity.

References and Acknowledgements

References: 7th Science Textbook, Classroom discussion and observation, Household object study

Acknowledgements: I sincerely thank my science teacher, parents, and classmates for their guidance and support in completing this project successfully.

Activities

Activity 3.1

Aim: To observe how a torch works.

Materials required: Torch light.

Procedure: 1. Take a torch and switch it ON and OFF.
2. Observe the lamp carefully.
3. Open the torch and see its parts.

Observation: The lamp glows in ON position and does not glow in OFF position.

Conclusion: A torch works using electric cells and a switch.

Fig. 3.1: A torch light

Activity 3.2

Aim: To identify the terminals of an electric cell.

Materials required: Electric cell.

Procedure: 1. Observe the electric cell carefully.
2. Find the positive (+) and negative (–) symbols.

Observation: The cell has two terminals — positive and negative.

Conclusion: An electric cell supplies electrical energy through its terminals.

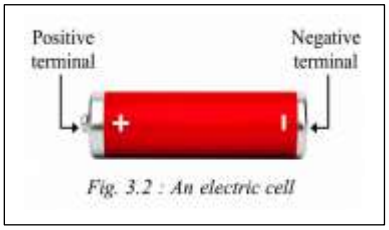
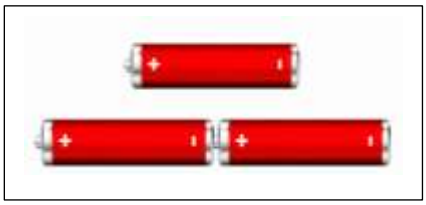


Fig. 3.2 : An electric cell

Activity 3.3

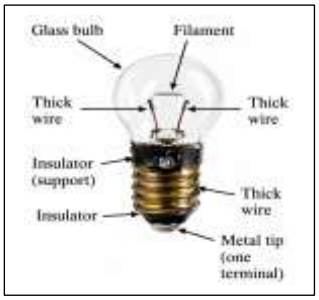
Aim: To understand how cells are connected in a battery.

Materials required: Torch with two cells.
Procedure: 1. Open the torch and remove the cells.
2. Insert the cells in different directions.
3. Switch ON the torch.
Observation: The torch glows only when cells are connected correctly.
Conclusion: Cells in a battery should be connected properly.



Activity 3.4

Aim: To observe the parts of an incandescent lamp.
Materials required: Torch bulb/incandescent lamp.
Procedure: 1. Take the bulb and observe it carefully.
2. Look at the thin wire inside the bulb.
Observation: A thin wire called filament is present inside the bulb.
Conclusion: The filament glows when electric current passes through it.



Activity 3.5

Aim: To observe an LED lamp.
Materials required: LED lamp.
Procedure: 1. Observe the LED carefully.
2. Notice its two wires of different lengths.
Observation: One wire is longer and the other is shorter.
Conclusion: LED has positive and negative terminals.

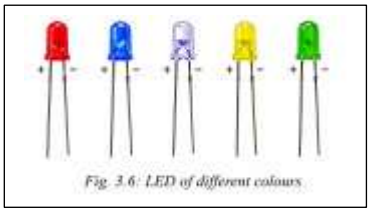
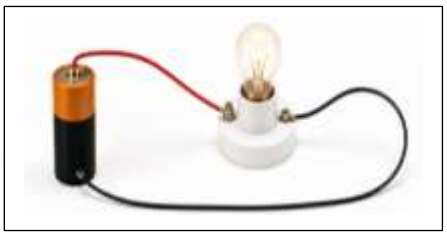


Fig. 3.6: LED of different colours

Activity 3.6

Aim: To make an electric lamp glow using a cell.
Materials required: Electric cell, wires, bulb, holder.
Procedure: 1. Connect the bulb to the electric cell using wires.
2. Complete the circuit properly.
Observation: The bulb glows when connections are correct.
Conclusion: Electric current flows only in a complete circuit.

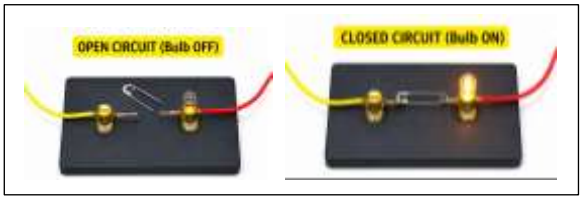


Activity 3.7

Aim: To make an LED glow.
Materials required: LED, electric cell, wires.
Procedure: 1. Connect the LED to the cell using wires.
2. Observe whether the LED glows.
3. Reverse the connections and observe again.
Observation: LED glows only in one direction of connection.
Conclusion: LED allows current to pass only in one direction.

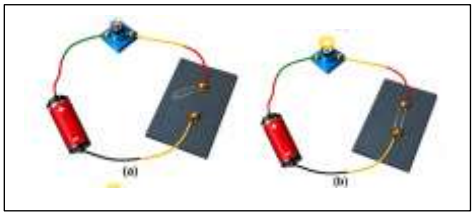
Activity 3.8

Aim: To make a simple electric switch.
Materials required: Cardboard, drawing pins, safety pin, wires.
Procedure: 1. Fix drawing pins on cardboard.
2. Attach a safety pin between them.
3. Connect the switch in a circuit.
Observation: The lamp glows when the safety pin touches both pins.
Conclusion: A switch opens or closes an electric circuit.

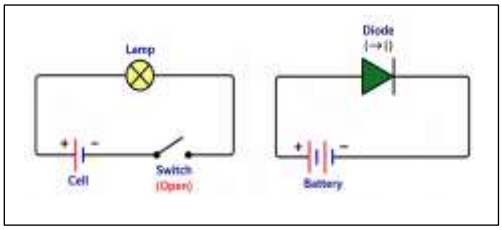


Activity 3.9

Aim: To test a switch in a circuit.
Materials required: Cell, bulb, switch, wires.
Procedure: 1. Connect the circuit with the switch.
2. Move the switch to ON and OFF positions.
Observation: The bulb glows in ON position and turns OFF in OFF position.
Conclusion: Current flows only when the circuit is closed.



Activity 3.10



Aim: To draw circuit diagrams using symbols.
Materials required: Notebook, pencil.
Procedure: 1. Observe the symbols of electrical components.
2. Draw circuit diagrams using these symbols.
Observation: Different symbols represent different electrical components.
Conclusion: Circuit diagrams help represent circuits easily.

Activity 3.11

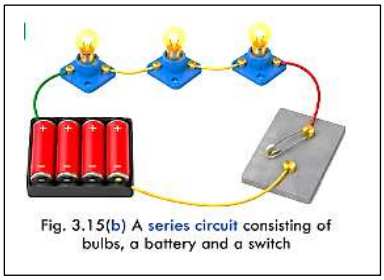
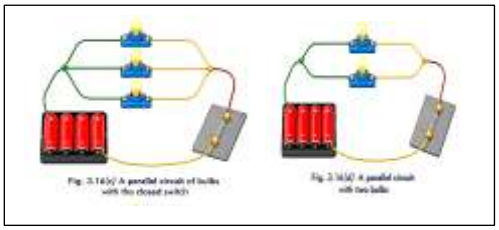


Fig. 3.15(b) A series circuit consisting of bulbs, a battery and a switch

Aim: To study series connection.
Materials required: Cells, bulbs, wires, switch.
Procedure: 1. Connect bulbs one after another in a single path.
2. Switch ON the circuit.
3. Remove one bulb and observe.
Observation: All bulbs glow together. If one bulb is removed, all bulbs stop glowing.
Conclusion: In a series circuit, current flows through a single path.

Activity 3.12



Aim: To study parallel connection.
Materials required: Cells, bulbs, wires, switch.
Procedure: 1. Connect bulbs in separate paths.
2. Switch ON the circuit.
3. Remove one bulb and observe.
Observation: Other bulbs continue to glow even if one bulb is removed.
Conclusion: In a parallel circuit, each bulb gets a separate path for current.

Activity 3.13

Aim: To identify conductors and insulators.
Materials required: Cell, bulb, wires, metal spoon, rubber, plastic, key, paper.
Procedure: 1. Connect the testing circuit.
2. Touch different materials between the wires.
3. Observe whether the bulb glows.
Observation: The bulb glows with metals but not with rubber or plastic.
Conclusion: Metals are conductors and rubber/plastic are insulators.

TABLES

Table 3.1: Trying to Make the Lamp Glow

S.No.	Prediction	Observation
1	Lamp will glow	Lamp glows; the arrangement of circuit is completed.
2	Lamp will not glow	Lamp does not glow; the arrangement of circuit is incomplete.
3	Lamp will not glow	Lamp does not glow; the arrangement of circuit is incomplete.
4	Lamp will not glow	Lamp does not glow; the arrangement of circuit is incomplete.
5	Lamp will not glow	Lamp not glows; the arrangement of circuit is incomplete.
6	Lamp will glow	Lamp glow; the arrangement of circuit is complete.

Table 3.3: Identifying Conductors and Insulators

S.No.	Object	Material it is made up of	Lamp glows (Yes/No)	Conclusion (Conductor/Insulator)
1	Stick	Wood	No	Insulator
2	Scale	Plastic	No	Insulator
3	Bangle	Glass	No	Insulator
4	Paper Strip	Paper	No	Insulator
5	Candle	Wax	No	Insulator
6	Key	Metal	Yes	Conductor
7	Eraser	Rubber	No	Insulator
8	Coin	Metal	Yes	Conductor
9	Safety Pin	Metal	Yes	Conductor

Competency Based Questions

Multiple Choice Questions

1. Siva connects a cell, bulb, and wire correctly, but the bulb does not glow. What should he check first?
A) Colour of bulb B) Closed circuit
C) Size of cell D) Length of wire

2. Which component is the source of electricity in a simple circuit?
A) Bulb B) Wire C) Switch D) Electric cell

3. A torch stops glowing because the switch is OFF. The circuit is
A) Closed B) Open C) Parallel D) Complete

4. Which material is a good conductor of electricity?
A) Plastic scale B) Copper wire
C) Rubber band D) Wooden stick

5. What is the function of a switch?
A) Produce electricity B) Store electricity
C) Break or complete a circuit
D) Increase brightness

6. The thin wire inside a bulb is called
A) Electrode B) Filament
C) Terminal D) Conductor

7. Why does a bulb glow?
A) Due to air inside it
B) Due to current through filament
C) Due to glass covering
D) Due to heat from surroundings

8. Which of the following is an insulator?
A) Iron nail B) Aluminium foil
C) Plastic spoon D) Copper wire

9. An electric cell has
A) One terminal B) Two terminals
C) Three terminals D) Four terminals

10. The positive terminal of a cell is represented by
A) – B) × C) + D) =

11. A student joins two cells together. The combination is called
A) Circuit B) Battery C) Switch D) Bulb

12. Which object can be tested as a conductor?
A) Eraser B) Coin C) Chalk piece D) Plastic cap

13. Why are electric wires covered with plastic?
A) To increase current B) To reduce weight
C) Plastic is an insulator D) Plastic produces electricity

14. In an open circuit
A) Current flows B) Bulb glows brightly
C) Current does not flow D) Cell becomes stronger

15. Which combination will make a bulb glow?
A) Open switch B) Broken wire
C) Closed circuit D) Plastic connection

16. A torch bulb glows dimly. One possible reason is
A) Weak cell B) Strong conductor
C) Closed switch D) New battery

17. Which of these is commonly used in household wiring?
A) Copper B) Rubber C) Wood D) Glass

18. A conductor allows
A) Heat only B) Electricity only
C) Electric current to pass D) Air to pass

19. Which material will NOT complete an electric circuit?
A) Iron key B) Steel spoon
C) Jute string D) Copper coin

20. Why is a bulb holder used?
A) To decorate bulbs
B) To hold bulb safely and connect it
C) To cool the bulb D) To store electricity

21. A child touches an exposed electric wire. Why is this dangerous?
A) Wire is colourful
B) Electricity may pass through body
C) Wire becomes cold D) Wire becomes shorter

22. Which device converts electrical energy into light energy?
A) Fan B) Heater C) Bulb D) Cell

23. A bulb has fused. What happened?
A) Filament is broken B) Cell is charged
C) Switch is closed D) Wire is insulated

24. The path through which electric current flows is called
A) Battery B) Circuit C) Terminal D) Filament

25. Why are metals generally used in electric circuits?
A) They are colourful B) They are conductors
C) They are soft D) They are light

26. A student uses a wooden ruler in a circuit. The bulb does not glow because wood is
A) A conductor B) A semiconductor
C) An insulator D) A battery

27. What happens when a switch is turned ON?
A) Circuit breaks B) Circuit completes
C) Cell stops working D) Bulb fuses

28. Which is the correct sequence in a simple electric circuit?
A) Cell → Wire → Bulb → Wire → Cell
B) Bulb → Cell only
C) Switch → Cell only D) Wire only

29. When current flows through the filament, it becomes
A) Cold B) Soft C) Hot and glowing D) Wet

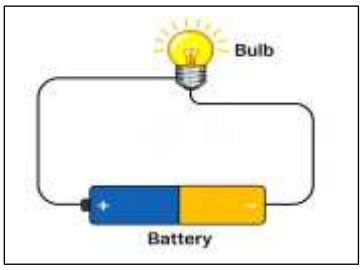
30. A science student tests different materials using a bulb and cell. Which scientific skill is mainly used?
A) Observation and experimentation
B) Memorization only
C) Drawing only D) Singing

Answer

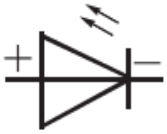
1-B	2-D	3-B	4-B	5-C	6-B	7-B	8-C	9-B	10-C	11-B	12-B	13-C	14-C	15-C
16-A	17-A	18-C	19-C	20-B	21-B	22-C	23-A	24-B	25-B	26-C	27-B	28-A	29-C	30-A

2 Marks Questions

1. Why should wet hands not be used to touch electric switches?
Ans: Water conducts electricity. Wet hands increase the risk of electric shock.
2. Why is a broken filament bulb unable to glow?
Ans: A broken filament breaks the circuit inside the bulb, preventing the flow of electric current.
3. Why does an electric lamp glow?
Ans: An electric lamp glows when electric current passes through its filament. The filament becomes hot and emits light.
4. The figure shows an electric circuit.
(i) What will happen, if another battery is added to the circuit?
(ii) What is the direction of the flow of electric current in the circuit?



Ans: (i) The bulb will glow much brighter.
(ii) Battery + terminal to Bulb + terminal
5. Mention advantages of circuit symbols.
Ans: Easy to draw, Universally accepted, Saves time,
Makes circuits easier to understand
6. Why are household circuits connected in parallel?
Ans: If one appliance fails, the others keep working. Failure of one does not affect others. Separate current paths exist.
7. Why is the filament made of a thin wire?
Ans: Thin wires offer more resistance. They heat up quickly. The filament becomes white hot. Thus, it emits light.
8. Draw the diagram of LED?
Ans:



9. Mention the applications of Parallel connection.
Ans: In household and industrial wiring.

4 Marks Questions

1. Observe a torch and explain its main components.

Ans: i) Electric cells (battery)
ii) Electric lamp/LED
iii) Switch
iv) Connecting wires
All these components work together to make the lamp glow.
2. Differentiate between an electric cell and a battery.
Ans:

Electric Cell	Battery
Single source of electrical energy	Combination of two or more cells
Has one positive and one negative terminal	Contains multiple cells connected together
Produces less energy	Produces more energy
Example: Torch cell	Example: Torch battery

3. Explain how an electric switch works.
Ans: i) A switch controls current flow.
ii) In ON position, the circuit is complete.
iii) Current flows through the circuit.
iv) The lamp glows.
v) In OFF position, the circuit breaks.
vi) Current stops flowing and the lamp goes off.
4. Why does an incandescent lamp glow?
Ans: i) The lamp contains a thin filament.
ii) Current passes through the filament.
ii) The filament becomes very hot.
iv) It emits light and glows.
5. Compare LED lamps and incandescent lamps.
Ans:

LED Lamp	Incandescent Lamp
No filament	Has filament
Uses less electricity	Uses more electricity
Longer life	Shorter life
Glows only in one direction	Glows in either direction

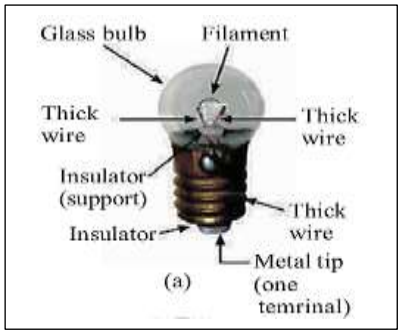
6. Explain the importance of conductors and insulators in daily life.

Ans: i) Conductors allow electricity to flow. ii) Copper and aluminium are widely used conductors.
iii) Electrical wiring is made of conductors. iv) Insulators prevent electric shocks.
v) Plastic and rubber are common insulators. vi) Wire coverings are made of insulators.
vii) Switches and plugs use insulating materials for safety.

7. Observe a Incandescent lamp and identify its main components.

.

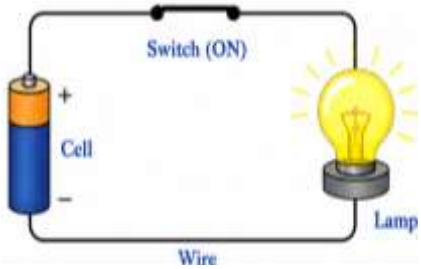
Ans:



8 Marks Questions

1. Explain the working of an electric circuit with a neat labelled diagram.

Ans: i) An electric circuit consists of a cell, wires, switch and lamp.
ii) The cell provides electrical energy.
iii) Wires provide a path for current.
iv) The switch controls current flow.
v) When the switch is ON, the circuit is complete.
vi) Current flows through the lamp.
vii) The lamp glows.
viii) When the switch is OFF, the circuit breaks and the lamp goes off.



2. Explain Series Connection and Parallel Connection with examples.

Ans: Series Connection

i) Components are connected one after another. ii) Current has only one path.
iii) If one bulb is removed, all bulbs go off. iv) Decorative festival lights are examples.

Parallel Connection

i) Components are connected in separate branches. ii) Current has multiple paths.
iii) If one bulb is removed, other bulbs continue glowing. iv) Household wiring is an example.

3. Compare Series Circuit and Parallel Circuit.

Ans:

Series Circuit	Parallel Circuit
Single path for current	Multiple paths for current
Components connected one after another	Components connected in separate branches
One bulb failure affects all bulbs	One bulb failure does not affect others
Used in decorative lights	Used in household wiring

4. A student observes that removing one bulb from a decorative light set causes all bulbs to go off. Identify the type of circuit and explain.

Ans: i) The bulbs are connected in a series circuit. ii) In a series circuit, current has only one path.
iii) Removing one bulb creates a gap. iv) The circuit becomes open.
v) Current cannot flow. vi) Therefore all bulbs stop glowing.
vii) This is a characteristic feature of series circuits. viii) Festival decorative lights commonly use such connections.

5. A house has three bulbs connected such that even if one bulb fuses, the others continue to glow. Explain why.

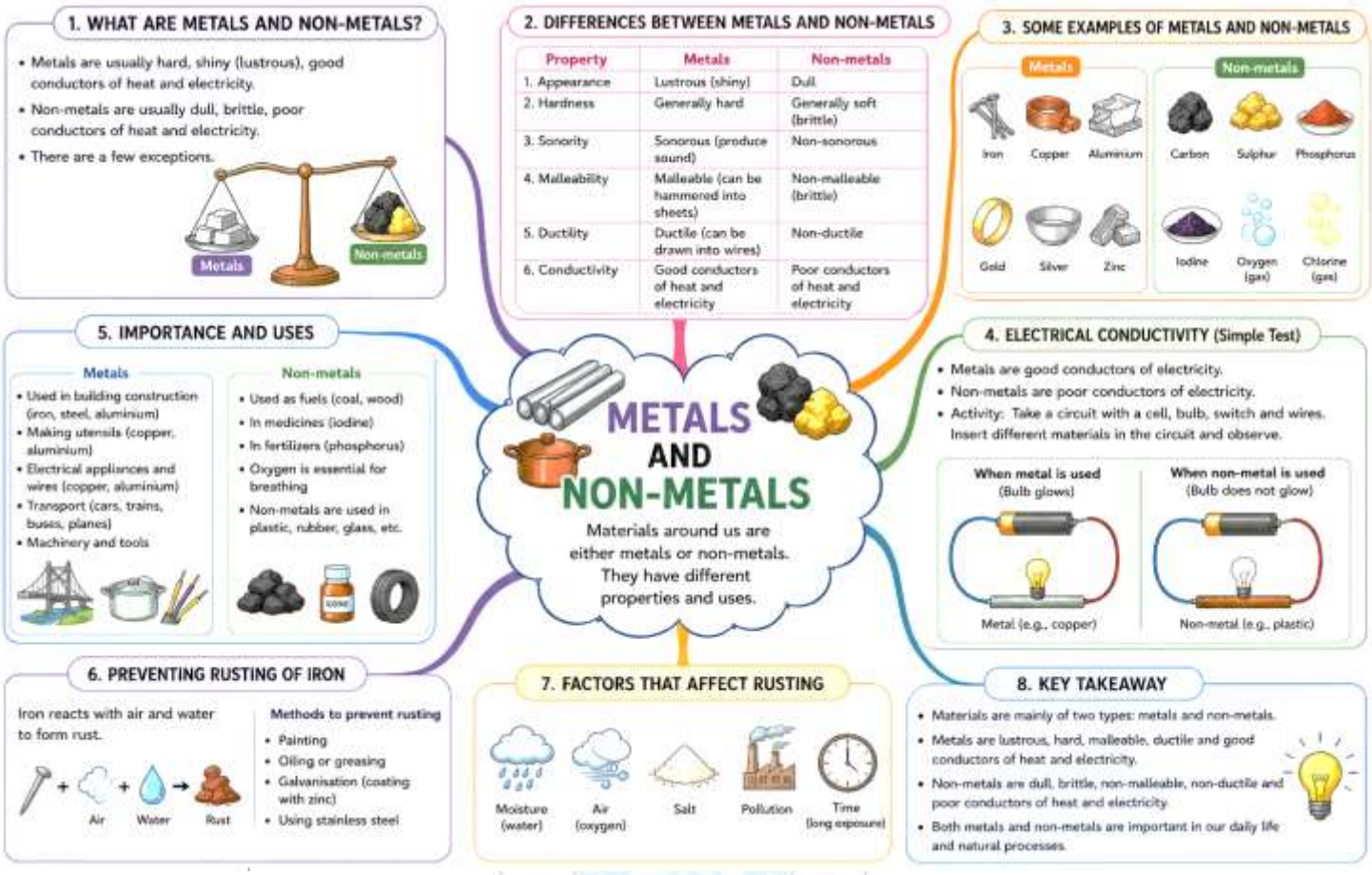
Ans: i) The bulbs are connected in parallel. ii) Each bulb has an independent path.
iii) Current flows through separate branches. iv) When one bulb fuses, only that branch is affected.
v) Other branches remain complete. vi) Current continues to flow through them.
vii) Therefore other bulbs keep glowing. viii) Household wiring follows this arrangement.

6. Explain safety precautions to be followed while handling electricity.

Ans: i) Never touch switches with wet hands. ii) Do not use electrical appliances in wet places.
iii) Do not touch damaged wires. iv) Use properly insulated wires.
v) Keep electrical devices away from water. vi) Switch OFF power before repairs.
vii) Use cells for school experiments. viii) Follow safety instructions to avoid electric shocks.

Chapter 4: Metals and Non-metals

Mind Map



Main Points

1. Materials are classified into metals and non-metals based on their properties.
2. Metals are generally lustrous (shiny).
3. Most non-metals are non-lustrous (dull).
4. Metals are usually hard and strong.
5. Sodium and potassium are soft metals.
6. Mercury is a metal that exists in liquid form at room temperature.
7. Metals can be beaten into thin sheets.
8. This property is called malleability.
9. Gold and silver are highly malleable metals.
10. Non-metals like coal and sulphur are brittle.
11. Metals can be drawn into thin wires.
12. This property is called ductility.
13. Gold is one of the most ductile metals.
14. Metal wires are used in electrical fittings and ornaments.
15. Metals produce a ringing sound when struck.
16. This property is called sonority.
17. School bells and musical instruments use sonorous metals.
18. Metals are good conductors of heat.
19. Cooking vessels are made of metals because of heat conduction.
20. Wood is a poor conductor of heat.
21. Metals are good conductors of electricity.
22. Plastic, rubber, and wood are poor conductors of electricity.
23. Electricians use rubber gloves for protection from electric shock.

24. Iron reacts with air and water to form rust.
25. Rust is hydrated iron oxide.
26. Rusting requires both air and moisture.
27. Rusting can be prevented by painting, oiling, and galvanisation.
28. Corrosion is the gradual destruction of metals by air, water, or chemicals.
29. Magnesium burns with a dazzling white flame.
30. Magnesium reacts with oxygen to form magnesium oxide.
31. Metal oxides are generally basic in nature.
32. Sulphur is a non-metal and burns to form sulphur dioxide gas.
33. Sulphur dioxide dissolves in water to form sulphurous acid.
34. Non-metals are generally poor conductors of heat and electricity.
35. Oxygen, carbon, nitrogen, and chlorine are important non-metals used in daily life.

--------: Definitions :-------

Lustre: The shiny appearance shown by metals is called metallic lustre.
Malleability: The property by which metals can be beaten into thin sheets is called malleability.
Ductility: The property by which metals can be drawn into wires is called ductility.
Sonority: The property of metals to produce a ringing sound when struck is called sonority.
Corrosion: The process of metals objects get damaged when exposed to moist air and water is called Corrosion.
Rusting: The process of formation of rust (brown deposit) on iron in the presence of air and water is called rusting.
Conduction: The transfer of heat from one point to another through a material is called conduction.
Good Conductors of Electricity: Materials that allow electricity to flow through them easily are called good conductors of electricity.
Poor Conductors of Electricity: Materials that do not allow electricity to pass through them are called poor conductors of electricity.

Intext Questions and Answers

1. What are metals?
Ans: Metals are materials that are generally hard, lustrous, malleable, ductile, and good conductors of heat and electricity.
2. What are non-metals?
Ans: Non-metals are materials that are generally dull, brittle, and poor conductors of heat and electricity.
3. What is metallic lustre?
Ans: The shiny appearance shown by metals is called metallic lustre.
4. Which metals are soft in nature?
Ans: Sodium and potassium are soft metals.
5. Which metal exists in liquid state at room temperature?
Ans: Mercury exists in liquid state at room temperature.
6. What is malleability?
Ans: The property by which metals can be beaten into thin sheets is called malleability.
7. Name some highly malleable metals.
Ans: Gold and silver are highly malleable metals.
8. Why are coal and sulphur called brittle substances?
Ans: Because they break into pieces when hammered.
9. What is ductility?
Ans: The property by which metals can be drawn into wires is called ductility.
10. Name a highly ductile metal.
Ans: Gold is a highly ductile metal.
11. Why are metal wires used in electric fittings?
Ans: Metals are ductile and good conductors of electricity.
12. What is sonority?
Ans: The property of metals to produce a ringing sound when struck is called sonority.
13. Why are school bells made of metals?
Ans: Metals are sonorous and produce ringing sounds.
14. Why are cooking vessels made of metals?
Ans: Metals are good conductors of heat.
15. Which spoon becomes hotter quickly in hot water – metal or wooden spoon?

Ans: The metal spoon becomes hotter quickly.

16. What is conduction?

Ans: The transfer of heat from one point to another through a material is called conduction.

17. Why is wood considered a poor conductor of heat?

Ans: Heat does not pass through wood easily.

18. What are conductors of electricity?

Ans: Materials that allow electric current to pass through them are called conductors of electricity.

19. Name some conductors of electricity.

Ans: Copper, aluminium, and iron are conductors of electricity.

20. What are insulators?

Ans: Materials that do not allow electric current to pass through them are called insulators.

21. Why do electricians wear rubber gloves?

Ans: Rubber is an insulator and protects them from electric shock.

22. What is rusting?

Ans: The formation of brown deposits on iron due to reaction with air and water is called rusting.

23. What is rust chemically called?

Ans: Rust is hydrated iron oxide.

24. What are the conditions necessary for rusting?

Ans: Both air and moisture are necessary for rusting.

25. What is corrosion?

Ans: The gradual destruction of metals by air, water, or chemicals is called corrosion.

26. How can rusting be prevented?

Ans: Rusting can be prevented by painting, oiling, greasing, and galvanisation.

27. What happens when magnesium ribbon burns?

Ans: Magnesium ribbon burns with a dazzling white flame and forms magnesium oxide.

28. What is the nature of magnesium oxide?

Ans: Magnesium oxide is basic in nature.

29. Why is sodium stored in kerosene?

Ans: Sodium reacts vigorously with oxygen and water.

30. What happens when sulphur burns in air?

Ans: Sulphur burns in air to form sulphur dioxide gas.

31. What is formed when sulphur dioxide dissolves in water?

Ans: Sulphurous acid is formed.

32. What is the nature of sulphurous acid?

Ans: Sulphurous acid is acidic in nature.

33. Why are non-metals generally poor conductors?

Ans: Heat and electricity do not pass through them easily.

34. Name some important non-metals used in daily life.

Ans: Oxygen, carbon, nitrogen, chlorine, and iodine are important non-metals.

35. Why are non-metals essential in everyday life?

Ans: Non-metals are needed for breathing, plant growth, medicines, fertilizers, and many daily-life activities.

Let Us Enhance Our Learning

1. Define the following:

A) Malleability B) Ductility C) Sonority D) Corrosion E) Rusting

Ans: A) Malleability: The property of metals by which they can be beaten into thin sheets is called **malleability**.

B) Ductility: The property of metals by which they can be drawn into wires is called **ductility**.

C) Sonority: The property of metals to produce a ringing sound when struck is called **sonority**.

D) Corrosion: The process of metals objects get damaged when exposed to moist air and water is called **Corrosion**.

E) Rusting: The process of formation of rust (brown deposit) on iron in the presence of air and water is called **rusting**.

2. Write two properties each for metals and non-metals.

Ans: Metals: a) Metals are malleable. **b)** Metals are good conductors of electricity.

Non-metals: a) Non-metals are generally non-lustrous. **b)** Non-metals are poor conductors of heat and electricity.

3. A substance can be drawn into long wires used for electrical purposes. What property/properties does that substance show?

A) Only ductility **B) Only conductance of electricity**
C) Both ductility and conductance of heat **D) Both ductility and conductance of electricity**

Ans: D) Both ductility and conductance of electricity

4. Which of the following metal catches fire when it comes in contact with water?

A) Copper **B) Aluminium** **C) Zinc** **D) Sodium**

Ans: D) Sodium

5. Why are only a few metals suitable for making jewellery?

Ans: Only a few metals are suitable because they are lustrous, malleable, durable, and do not corrode easily.

6. What happens when oxygen reacts with magnesium and sulphur? What are the main differences in the nature of products formed?

Ans: Magnesium reacts with oxygen to form magnesium oxide, which is basic in nature.
Sulphur reacts with oxygen to form sulphur dioxide, which is acidic in nature.

7. An ironsmith heats iron before making tools. Why is heating necessary in this process?

Ans: Heating makes iron softer and easier to shape because metals are malleable. Therefore, heating helps the ironsmith make tools of desired shapes.

8. Students made statements about magnesium oxide solution:
Amar: It is basic. Turns red litmus blue.
Nandu: It is acidic. Turns blue litmus red.
Whose statement(s) is/are correct?

A) Only Amar **B) Only Nandu** **C) Both Amar and Nandu** **D) Neither Amar nor Nandu**

Ans: A) Only Amar

9. Which metal is commonly used to make food packaging materials as it is cheaper and its thin sheets can be folded easily into any shape?

A) Aluminium **B) Copper** **C) Iron** **D) Gold**

Ans: A) Aluminium

10. Match the following:

Column I	Column II
(i) Used in electrical wiring	(a) ENXYGO
(ii) Most malleable and ductile	(b) NECOHIRL
(iii) Living organisms cannot survive without it	(c)PEPORC
(iv) Plants grow healthy when fertilisers containing it are added to the soil	(d)TENGOINR
(v) Used in water purification – Chlorine	(e) OGDL

Ans: (i) - (c) COPPER (ii) – (e) GOLD (iii) – (a) OXYGEN (iv) – (d) NITROGEN (v) – (b) CHLORINE

11. The apparatus shown contains an iron nail suspended inside a closed bottle. Silica gel is placed at the bottom of the bottle. What will be observed after 10 days?

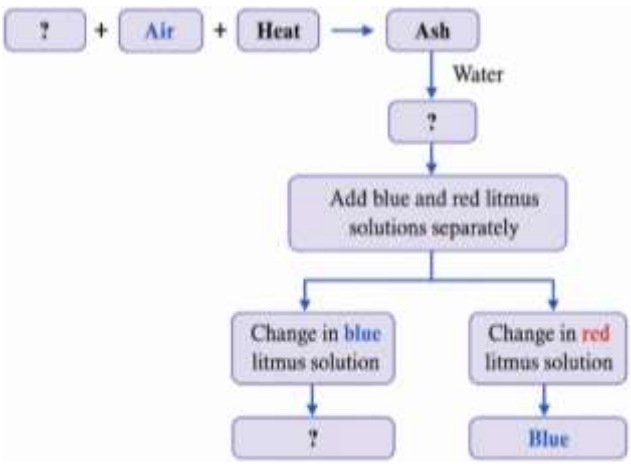
A) The iron nail rusts because air is present in the bottle
B) The iron nail rusts because silica gel absorbs moisture
C) The iron nail does not rust because moisture is absent
D) The iron nail does not rust because oxygen is absent

Ans: C) The iron nail does not rust because moisture is absent.

12. You are provided with three iron nails, each dipped in oil, water, and vinegar. Which iron nail will not rust, and why?

Ans: The nail dipped in oil will not rust because oil prevents contact with air and moisture.

13. Complete the flow chart:



Ans: **Magnesium ribbon** + Air + Heat → Ash
Ash + Water → **Magnesium oxide solution**
Change in blue litmus solution → **No change**
Change in red litmus solution → Blue

14. How do the different properties of metals and non-metals determine their uses in everyday life?

Ans: Metals are used for utensils, wires, machinery, and jewellery because they are strong, lustrous, malleable, ductile, and good conductors.
Non-metals are used in fertilizers, medicines, water purification, and respiration because of their special chemical properties.

15. State whether the following statements are True (T) or False (F):

(i) Aluminium and copper are examples of non-metals used for making utensils and statues. [ ]
(ii) Metals form oxides when combined with oxygen, the solution of which turns blue litmus paper to red. [ ]
(iii) Oxygen is a non-metal essential for respiration. [ ]
(iv) Copper vessels are used for boiling water because they are good conductors of electricity. [ ]

Ans: (i) – F (ii) – F (iii) – T (iv) – F

16. You are provided with iron, copper, sulphur, coal, plastic, wood, and cardboard. Which material would be most suitable for making a pan for boiling water and why?

Iron	copper	Sulphur	coal	plastic	wood	cardboard

Ans: Copper is most suitable because it is a good conductor of heat.

17. One method of protecting iron from rust is to coat it with zinc. Since sulphur does not react with water, can it be used for this purpose? Justify your answer.

Ans: No, sulphur cannot be used because it is brittle and non-metallic. It cannot provide a strong protective coating like zinc.

Exploratory Projects

1. Dhokra, Bidriware, Pembarthi, and Kamrupi are some of India's famous metal art styles. Find out the states where these artworks are made. Also, make a collage of their photographs.

Title: Study of Traditional Metal Art Styles of India
Aim: To identify famous metal art styles of India and locate the states where they are made.
Hypothesis: Different regions of India are famous for unique metal artworks that reflect their culture, tradition, and craftsmanship.
Materials Required: Notebook, Pen or pencil, Internet/books/library resources, Pictures or printed photographs.
Method / Procedure:

1. Collect information about famous Indian metal art styles.
2. Find out the states where these artworks are made.
3. Collect photographs of each metal art style from books or the internet.
4. Paste the photographs on chart paper to prepare a collage.
5. Label each artwork with its name and state.

Observations and Data:

Metal Art Style	State Where It Is Made
Dhokra	West Bengal, Odisha, Chhattisgarh
Bidriware	Karnataka (Bidar district)
Pembarthi	Telangana (Pembarthi village)
Kamrupi	Assam (Kamrup district)

Collage of Famous Metal Art Styles

Result: Different metal art styles were identified along with the states where they are traditionally practised.
Conclusion: India is rich in traditional metal craftsmanship. Dhokra, Bidriware, Pembarthi, and Kamrupi art forms represent the cultural heritage and artistic skills of different regions of India.

References: 7th Science Textbook, Internet and library resources, Classroom discussion and teacher guidance.
Acknowledgements: I sincerely thank my science teacher, parents, and classmates for their support and guidance in completing this project successfully.

2. On a map of India, mark the states where iron, gold, aluminium and other metals are found.

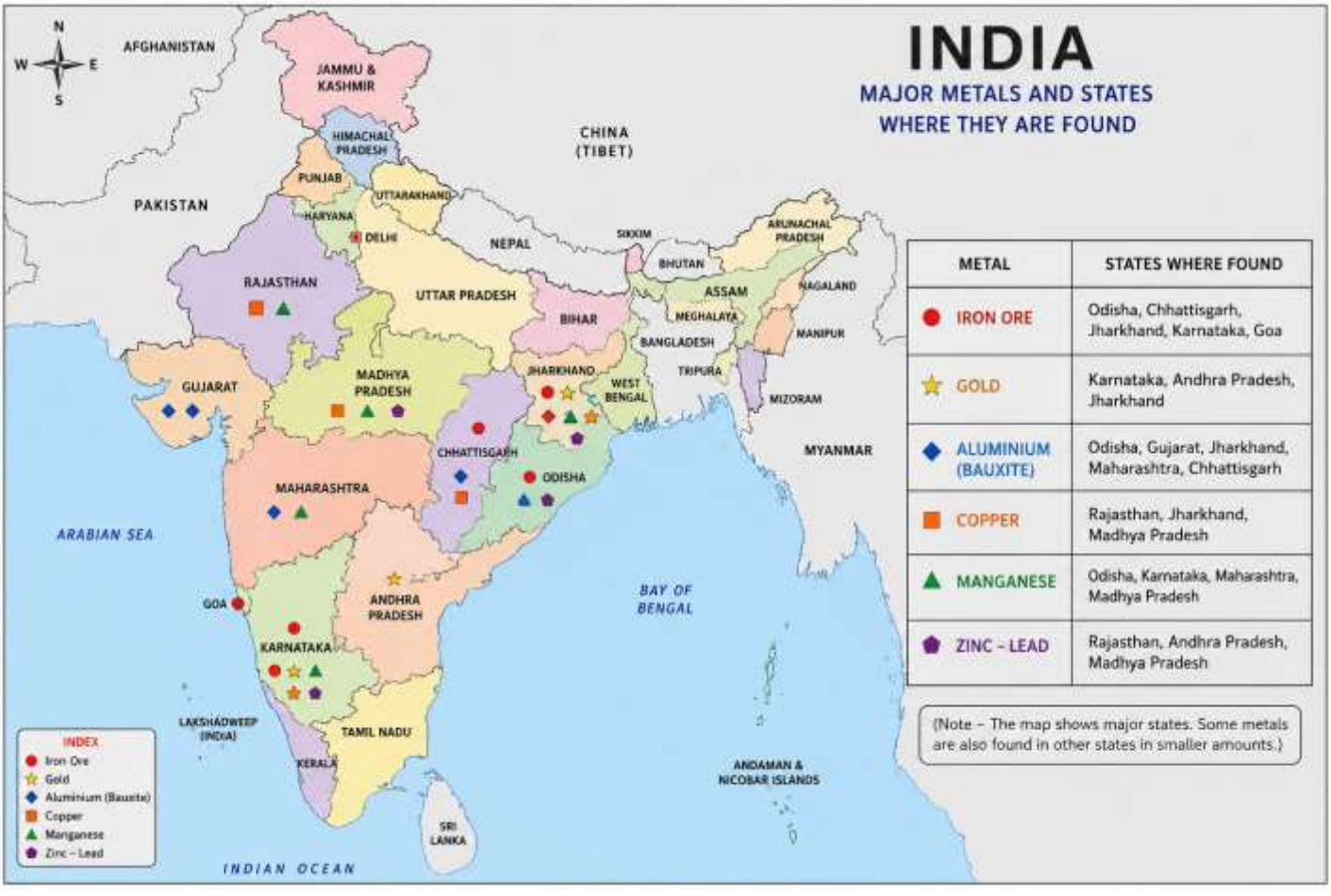
Title: Study of States in India Where Important Metals Are Found
Aim: To identify and mark on the map of India the states where iron, gold, aluminium, and other important metals are found.
Hypothesis: Different regions of India are rich in different mineral resources because of variations in geographical and geological conditions.
Materials Required: Outline map of India, Atlas or textbook, Colour pencils/sketch pens, Pencil and eraser›
Method / Procedure:

1. Collect information about the states where important metals are found in India.
2. Take an outline map of India.
3. Mark the states producing different metals using different colours or symbols.
4. Prepare a key/index for the map.
5. Label the states neatly and clearly.

Observations and Data:

Metal	Major States Where Found
Iron Ore	Odisha, Chhattisgarh, Karnataka, Jharkhand, Goa
Gold	Karnataka, Andhra Pradesh, Jharkhand
Aluminium (Bauxite)	Odisha, Gujarat, Maharashtra, Chhattisgarh, Jharkhand
Copper	Rajasthan, Madhya Pradesh, Jharkhand
Zinc	Rajasthan
Manganese	Odisha, Karnataka, Maharashtra, Madhya Pradesh
Lead	Rajasthan
Silver	Rajasthan

Reference Maps



Result: Different states of India were identified and marked according to the metals found there.
Conclusion: India is rich in mineral resources, and different states produce different metals such as iron, gold, aluminium, copper, and manganese. These minerals are important for industries, transportation, construction, and daily life.
References: 7th Science Textbook, Atlas and map resources, Classroom discussion and teacher guidance

Acknowledgements: I sincerely thank my science teacher, parents, and classmates for their support and guidance in completing this project successfully.

3. Explore the metals and non-metals found in smartphones and find out how they help the phone work properly.

Title: Study of Metals and Non-Metals Used in Smartphones and Their Functions
Aim: To identify the metals and non-metals present in smartphones and understand how they help the phone work properly.
Hypothesis: Smartphones contain different metals and non-metals because each material has special properties such as conductivity, strength, insulation, and energy storage.
Materials Required: Smartphone, Notebook, Pen or pencil, Internet/books for reference
Method / Procedure:

1. Observe different parts of a smartphone such as the screen, battery, speaker, charger, and body.
2. Find out which metals and non-metals are used in these parts.
3. Collect information from books, websites, or teachers.
4. Record the names of the materials and their uses in a table.
5. Analyse how these materials help the smartphone work properly.

Observations and Data:

Material	Metal / Non-Metal	Used In	Function
Copper	Metal	Wires and circuits	Conducts electricity
Aluminium	Metal	Phone body	Makes phone light and strong
Gold	Metal	Circuit boards	Prevents corrosion and conducts electricity
Lithium	Metal	Battery	Stores electrical energy
Silver	Metal	Electronic circuits	Good conductor of electricity
Iron	Metal	Speakers and internal parts	Provides strength
Silicon	Non-metal/Metalloid	Chips and processors	Controls electronic signals
Carbon (Graphite)	Non-metal	Battery electrodes	Helps store energy
Plastic	Non-metal	Phone cover and insulation	Prevents electric shock
Glass	Non-metal	Screen display	Protects screen and supports touch

Result: Many metals and non-metals were found in smartphones, each performing a specific function.
Conclusion: Metals help smartphones conduct electricity, store energy, and provide strength, while non-metals help in insulation, protection, and electronic functioning. Both metals and non-metals are essential for the proper working of smartphones.
References: 7th Science Textbook
Internet and library resources
Classroom discussion and teacher guidance
Acknowledgements: I sincerely thank my science teacher, parents, and classmates for their support and guidance in completing this project successfully.

4.Organise a classroom debate on whether the use of metals for comfort and luxury should be increased or decreased.

Title: Debate on Whether the Use of Metals for Comfort and Luxury Should Be Increased or Decreased.
Aim: To discuss and understand the advantages and disadvantages of using metals for comfort and luxury in daily life.
Hypothesis: Metals improve comfort and modern lifestyle, but excessive use of metals may lead to environmental damage and depletion of natural resources.
Materials Required: Notebook, Pen or pencil, Debate topic chart/poster, Information from books, newspapers, and internet, Classroom seating arrangement.
Method / Procedure:

1. Divide the class into two groups:
2. Group A: In favour of increasing the use of metals
3. Group B: Against increasing the use of metals
4. Ask students to collect information about the uses and effects of metals.
5. Conduct the debate in the classroom under teacher guidance.
6. Allow each group to present their arguments and counterarguments.
7. Note down the important points discussed during the debate.
8. Summarize the discussion and prepare a report.

Observations and Data:
Group A: Use of Metals Should be Increased

Points in Favour
Metals make life comfortable and convenient
Metals are strong and durable

Used in transportation, technology, and medical equipment
Luxury items improve lifestyle
Metals can be recycled and reused

Group B: Use of Metals Should be Decreased

Points Against
Mining causes environmental damage
Excessive use depletes natural resources
Metal industries create pollution
Luxury use increases unnecessary consumption
Alternative eco-friendly materials are available

Result: Students discussed both the benefits and disadvantages of using metals for comfort and luxury.
Conclusion: Metals are very important for modern life and development, but their excessive use may harm the environment and reduce natural resources. Metals should be used wisely, recycled properly, and conserved for future generations.

References and Acknowledgements

References: 7th Science Textbook, Classroom discussion, Newspapers, books, and internet resources.
Acknowledgements: I sincerely thank my science teacher, classmates, and parents for their support and guidance in completing this project successfully.

Activities

Activity 4.1

Aim: To observe the properties of different materials.
Materials required: Copper piece, aluminium piece, iron nail, coal, sulphur, wood, hammer.
Procedure: 1. Collect different materials.
2. Observe their appearance and hardness.
3. Hit them gently with a hammer.
4. Record the changes.
Observation: 1. Metals become flat on hammering.
2. Coal and sulphur break into pieces.
3. Metals are shiny and hard.
Conclusion: Metals are lustrous and malleable. Non-metals are generally dull and brittle.

Activity 4.2

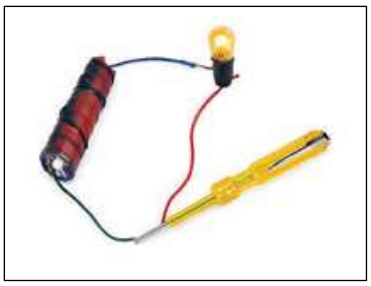
Aim: To study sonority of metals.
Materials required: Metal spoon, coin, coal, wood block.
Procedure: 1. Drop each object one by one from a small height.
2. Listen to the sound produced.
Observation: 1. Metals produce a ringing sound.
2. Coal and wood produce dull sounds.
Conclusion: Metals are sonorous in nature.

Activity 4.3

Aim: To compare conduction of heat in metals and wood.
Materials required: Metal spoon, wooden spoon, hot water, tumbler.
Procedure: 1. Fill a tumbler with hot water.
2. Place metal and wooden spoons in it.
3. Wait for a few minutes.
4. Touch the upper ends carefully.
Observation: The metal spoon becomes hotter than the wooden spoon.
Conclusion: Metals are good conductors of heat. Wood is a poor conductor of heat.

Fig. 4.3: Metal and wooden spoons immersed in hot water

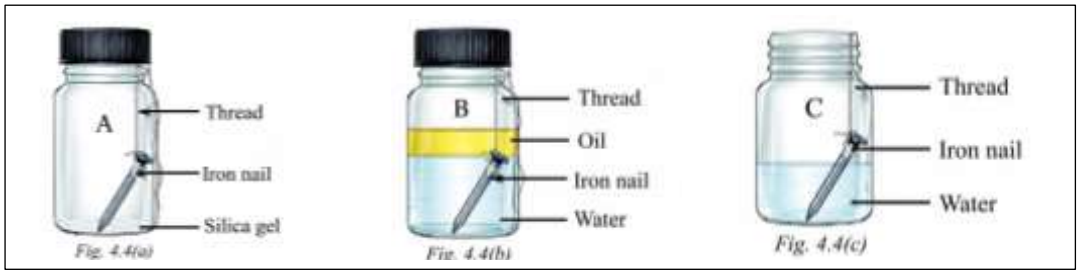
Activity 4.4



Aim: To identify conductors and insulators of electricity.
Materials required: Electric tester, aluminium foil, iron nail, sulphur, wood, rubber.
Procedure: 1. Connect the tester circuit.
2. Touch different objects between the tester wires.
3. Observe whether the bulb glows.
Observation: The bulb glows with metals but not with sulphur or wood.
Conclusion: Metals are conductors of electricity. Non-metals are poor conductors.

Activity 4.5

Aim: To observe rusting of iron.
Materials required: Iron nails, glass bottles, water, oil, silica gel.
Procedure: 1. Place iron nails in three bottles under different conditions.
2. Keep one bottle dry, one with boiled water and oil, and one with water and air.
3. Leave them for a few days.



Observation: Rust forms only on the nail exposed to both air and water.
Conclusion: Rusting requires both air and water.

Activity 4.6

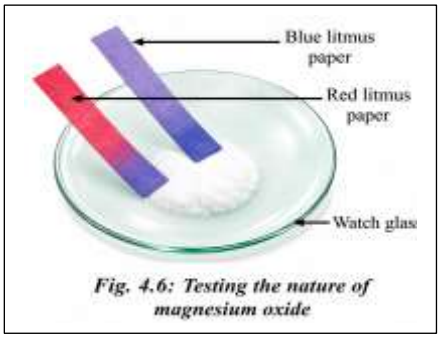


Fig. 4.6: Testing the nature of magnesium oxide

Aim: To observe burning of magnesium ribbon.
Materials required: Magnesium ribbon, candle/spirit lamp, watch glass, water, litmus paper.
Procedure: 1. Burn a magnesium ribbon carefully.
2. Collect the white ash formed.
3. Mix it with water.
4. Test the solution with litmus paper.
Observation: 1. Magnesium burns with a bright white flame.
2. The solution turns red litmus blue.
Conclusion: Magnesium oxide is basic in nature.

Activity 4.7

Fig. 4.7(c): Burning of sulphur

Aim: To study the nature of sulphur dioxide solution.
Materials required: Sulphur powder, deflagrating spoon, water, litmus paper.
Procedure: 1. Burn sulphur carefully.
2. Collect the gas in a jar.
3. Add water and shake well.
4. Test the solution with litmus paper.
Observation: Blue litmus turns red.
Conclusion: Sulphur dioxide solution is acidic in nature.

Activity 4.8

Aim: To observe the reaction of sulphur with water.
Materials required: Sulphur powder, water, glass tumbler.
Procedure: 1. Take sulphur powder in a tumbler.
2. Add water to it.
3. Observe carefully.
Observation: No reaction takes place. Sulphur remains unchanged.
Conclusion: Non-metals like sulphur do not react with water easily.

TABLES

Table 4.1: Appearance, Hardness, and Effect of Hammering on Different Objects or Materials

S.No.	Object/Material	Appearance (Lustrous / Non-lustrous)	Hard/Soft	Effect of Hammering (Flattens / Breaks into Pieces)
1	Piece of copper	Lustrous	Hard	Flattens
2	Piece of aluminium	Lustrous	Hard	Flattens
3	Iron nail	Lustrous	Hard	Flattens
4	Piece of coal	Non-lustrous	Hard	Breaks into pieces
5	Lump of sulphur (pea-sized)	Non-lustrous	Soft	Breaks into pieces
6	Block of wood	Non-lustrous	Hard	Breaks into pieces

Table 4.2: Conduction of Electricity by Different Objects or Materials

S.No.	Object/Material	Observation (Bulb Glows / Does Not Glow)	Good Conductor of Electricity or Poor Conductor of Electricity
1	Piece of aluminium foil	Bulb glows	Good conductor of electricity
2	Iron nail	Bulb glows	Good conductor of electricity
3	Lump of sulphur (pea-sized)	Bulb does not glow	Poor conductor of electricity
4	Piece of copper wire	Bulb glows	Good conductor of electricity
5	Plastic scale	Bulb does not glow	Poor conductor of electricity
6	Wooden stick	Bulb does not glow	Poor conductor of electricity

Table 4.3: Formation of Brown Deposit on Iron Nails

Glass Bottle	Presence of Water (Yes/No)	Presence of Air (Yes/No)	Observations
A	No	Yes	No brown deposit (No rusting)
B	Yes	No	No brown deposit (No rusting)
C	Yes	Yes	Brown deposit formed on iron nail (Rusting occurs)

Competency Based Questions

Multiple Choice Questions

1. A goldsmith beats a piece of gold into a thin sheet. Which property is demonstrated?
A) Ductility B) Malleability
C) Sonority D) Conductivity

2. Electric wires are usually made of copper because it is
A) Brittle B) Dull C) Ductile D) Transparent

3. When a steel plate is struck, it produces a ringing sound. This property is called
A) Lustre B) Ductility C) Sonority D) Malleability

4. Which of the following is a non-metal?
A) Iron B) Copper C) Sulphur D) Aluminium

5. A jeweller prefers gold ornaments because gold:
A) Rusts quickly B) Is non-lustrous
C) Does not corrode easily D) Breaks easily

6. Which metal is commonly used in electrical wiring?
A) Sulphur B) Copper C) Carbon D) Phosphorus

7. The shiny appearance of metals is known as
A) Sonority B) Ductility
C) Malleability D) Lustre

8. Which metal is widely used to make cooking vessels because it is light and conducts heat well?
A) Gold B) Silver C) Aluminium D) Zinc

9. What is formed when iron reacts with air and moisture?
A) Water B) Rust C) Salt D) Oxygen

10. Which gas is essential for respiration and burning?
A) Nitrogen B) Carbon dioxide
C) Oxygen D) Hydrogen

11. A student stretches a metal into a thin wire. Which property is used?
A) Ductility B) Sonority C) Rusting D) Brittleness

12. Which metal is commonly used in mirrors?
A) Aluminium B) Iron C) Silver D) Copper

13. Why are aluminium foils used for packing food?
A) They are transparent B) Aluminium is malleable
C) Aluminium is a non-metal
D) Aluminium floats on water

14. Which of the following is NOT a property of metals?
A) Lustrous B) Sonorous
C) Ductile D) Poor conductor

15. A bell produces a ringing sound when struck. This shows
A) Malleability B) Sonority
C) Conductivity D) Rusting

16. Sulphur is commonly used in
A) Electrical wiring B) Fertilizers and matchsticks
C) Water purification D) Glass making

17. Why does an iron gate rust during the rainy season?
A) Presence of sunlight
B) Presence of air and moisture
C) Presence of dust D) Presence of heat only

18. Which metal is considered precious?
A) Iron B) Aluminium C) Gold D) Copper

19. The ability of a material to allow electricity to pass through it is
A) Rusting B) Sonority
C) Conduction D) Malleability

20. Which material is a good conductor of heat?
A) Plastic B) Wood C) Aluminium D) Rubber

21. Which of the following is most likely to rust?
A) Gold chain B) Iron nail
C) Silver ornament D) Aluminium foil

22. Why are cooking utensils often made of metals?
A) Metals are transparent B) Metals are soft
C) Metals conduct heat well D) Metals absorb water

23. Which property allows silver to be made into ornaments?
A) Lustre B) Rusting
C) Brittleness D) Non-conductivity

24. A metal sheet can be hammered into different shapes. This property is:
A) Ductility B) Sonority
C) Malleability D) Corrosion

25. Which of the following is a metal?
A) Oxygen B) Sulphur C) Copper D) Carbon

26. Which property makes copper suitable for electric wires?
A) Ductility and conductivity
B) Sonority and rusting C) Lustre and brittleness
D) Malleability and softness

27. A student observes a reddish-brown coating on iron. This coating is
A) Dust B) Paint C) Rust D) Salt

28. Why is gold used for making jewellery?
A) It rusts easily B) It is dull
C) It is lustrous and does not corrode easily
D) It is brittle

29. Which pair contains only non-metals?
A) Copper, Gold B) Oxygen, Sulphur
C) Aluminium, Iron D) Silver, Copper

30. A student compares metals and non-metals through experiments. Which scientific skill is mainly developed?
A) Observation and analysis B) Singing
C) Memorization only D) Drawing only

Answer

1-B	2-C	3-C	4-C	5-C	6-B	7-D	8-C	9-B	10-C	11-A	12-C	13-B	14-D	15-B
16-B	17-B	18-C	19-C	20-C	21-B	22-C	23-A	24-C	25-C	26-A	27-C	28-C	29-B	30-A

2 Marks Questions

1. A goldsmith can make thin sheets of gold. Which property of metals helps him do this?
Ans: Metals can be beaten into thin sheets. This property is called **malleability**.
2. Electric wires are made of copper. Why?
Ans: Copper is a good conductor of electricity. It allows electric current to pass easily.
3. Why does a metal spoon produce a ringing sound when dropped?
Ans: Metals produce a ringing sound when struck. This property is called **sonority**.
4. Why is iron nail rusted only when both air and water are present?
Ans: Rusting requires both oxygen from air and moisture from water. In the absence of either one, rusting does not occur.
5. Why is plastic used to cover electric wires?
Ans: Plastic is an insulator. It prevents electric shocks.
6. Why are metals used for making suspension bridge cables?
Ans: Metals can be drawn into long wires. This property is called **ductility**.
7. Why are sulphur and coal not used for making wires?
Ans: Sulphur and coal are non-metals. They are not ductile and cannot be drawn into wires.
8. Name two metals that are highly malleable.
Ans: **Gold** and **silver** are highly malleable metals.

4 Marks Questions

1. Read the following case:
An electrician uses copper wires covered with plastic while repairing household appliances.
Explain why copper and plastic are used together in electrical wiring.
Ans: Copper is used in electrical wires because it is a **good conductor of electricity** and allows current to flow easily.
Plastic is used to cover the wires because it is an **insulator** and protects us from **electric shocks**.
Thus, copper carries electricity, while plastic provides safety. Therefore, copper wires covered with plastic are used in household wiring.
2. Why are some metals coated with zinc or painted before use? Explain the principle behind galvanisation and painting.
Ans: Metals are coated with zinc or painted to **prevent rusting**.
Galvanisation: Coating iron with **zinc** to protect it from air and water.
Painting: Covering the metal surface with paint to keep away air and moisture.
Thus, galvanisation and painting help metals last longer by preventing rust.
3. Differentiate between metals and non-metals.
Ans:

Metals	Non-metals
Lustrous	Generally non-lustrous
Malleable	Brittle
Ductile	Non-ductile
Sonority	Non-sonority
Good conductors of heat and electricity	Poor conductors of heat and electricity

4. Explain malleability with an example.
Ans: i) The property of metals by which they can be beaten into thin sheets is called **malleability**.
ii) Metals like gold, silver and aluminium show this property.
Example: Aluminium foil is made using malleability.
5. Explain the property of ductility.
Ans: i) The property of metals by which they can be drawn into wires is called **ductility**.
ii) Copper and aluminium are ductile.
Example: Electrical wires are made from ductile metals.
6. What is sonority? Give examples.
Ans: i) The property of metals to produce a ringing sound when struck is called **sonority**.
ii) Metals are sonorous.
Example: Metal spoon and metal coin produce ringing sounds.
7. Explain rusting of iron.
Ans: i) The process of formation of rust (brown deposit) on iron in the presence of air and water is called **rusting**.
ii) Iron reacts with oxygen and water. iii) A brown deposit called rust is formed.

8. Mention four methods to prevent rusting.
Ans: Painting, Oiling, Greasing, Galvanisation (zinc coating)
9. Explain why metals are good conductors of heat.
Ans: Metals are good conductors of heat because transfer heat quickly from one end to another.
Therefore, metals such as **aluminium** and **copper** are used to make **cooking utensils**.
Example: A metal spoon placed in hot tea becomes hot quickly because it conducts heat.

8 Marks Questions

1. Explain the physical properties of metals.
Ans: i) Metals are generally lustrous. ii) They are hard and strong.
iii) They are malleable and can be beaten into sheets. iv) They are ductile and can be drawn into wires.
v) Metals are sonorous. vi) They conduct heat well.
vii) They conduct electricity well. viii) These properties make metals useful in daily life.

2. Explain the effects of air and water on metals.
Ans: i) Metals react with air and moisture. ii) Iron forms rust in the presence of air and water.
iii) Copper develops a green coating. iv) Silver develops a black coating.
v) Such changes are called corrosion. vi) Corrosion damages metals.
vii) Rusting is a type of corrosion. viii) Proper protection is needed to prevent metal damage.

3. A school gate made of iron is left unpainted for several years. What changes will occur? Explain.
Ans: i) Iron reacts with oxygen and moisture. ii) A brown coating develops on the gate.
iii) This coating is called rust. iv) Rust weakens the iron.
v) The gate may become damaged. vi) Rusting is a form of corrosion.
vii) Painting prevents contact with air and water. viii) Hence painting protects iron objects.

4. Explain the importance of metals and non-metals in everyday life.
Ans: i) Metals are used for utensils, machines and electrical wiring. ii) Aluminium and iron are widely used in industries.
iii) Oxygen is essential for respiration. iv) Nitrogen helps plant growth through fertilizers.
v) Chlorine is used for water purification. vi) Carbon is important in fuels.
vii) Metals and non-metals support modern technology. viii) Therefore both are essential for daily life.

Chapter 5: Changes Around Us

Mind Map

1. WHAT ARE CHANGES?

A change is a modification that occurs in an object, substance or phenomenon. It may be in the size, shape, colour, state, smell, taste or any other property.

Examples

- Ice melting into water
- Milk turning into curd
- Iron rusting
- Paper burning
- Seasons changing

2. TYPES OF CHANGES

Changes can be of two types.

A. Physical Changes

Only physical properties change. No new substance is formed. Usually reversible.

Examples:
- Melting of ice
- Tearing of paper
- Dissolving sugar in water

B. Chemical Changes

New substance(s) are formed. Usually irreversible.

Examples:
- Burning of paper
- Milk turning into curd
- Rusting of iron

3. OBSERVING CHANGES IN DAILY LIFE

- We observe many changes in our surroundings every day.
- We can observe them with our senses of sight, smell, touch, hearing and taste.
- Some changes occur naturally (seasons, day and night).
- Some changes are caused by human activities (cooking, cutting, burning, writing, etc.).

Sight Smell Touch Hearing Taste

4. PHYSICAL CHANGES

- No new substance is formed.
- Only physical properties like size, shape, colour or state change.
- Usually reversible.

Examples

- Melting of ice
- Changing of day and night
- Tearing of paper
- Dissolving salt or sugar in water
- Boiling of water (liquid to gas)
- Cutting vegetables

CHANGES AROUND US

Changes are seen all around us in our daily life. They occur in objects, substances and nature.

5. CHEMICAL CHANGES

- New substance(s) are formed.
- Usually irreversible.
- Hard to reverse the change.

Examples

- Burning of paper
- Milk turning into curd
- Rusting of iron
- Cooking of food
- Ripening of fruits

6. FACTORS THAT BRING ABOUT CHANGES

- Heat
- Light
- Water
- Air (oxygen)
- Time
- Human activities

7. IMPORTANCE OF CHANGES

- Essential for life and growth.
- Help in cooking and digestion.
- Help in day-to-day activities.
- Lead to development and progress.
- Natural changes maintain balance in nature (seasons, water cycle).

8. KEY TAKEAWAY

Changes are a part of our life and nature. Some are physical and some are chemical. By observing carefully, we can understand the different changes around us and their effects.

Main Points

1. Many changes happen around us every day.
2. Changes may occur in size, shape, colour, smell, or state of substances.
3. Changes can be classified into physical and chemical changes.
4. In a physical change, only the appearance or state changes.
5. No new substance is formed in a physical change.
6. Folding paper changes its shape but not the material.
7. Inflating a balloon changes its size and shape.
8. Crushing chalk into powder is a physical change.
9. Changes of state like melting and evaporation are physical changes.
10. In a chemical change, new substances are formed.
11. Chemical changes are usually permanent.
12. Blowing air into lime water turns it milky.
13. Carbon dioxide reacts with lime water to form calcium carbonate.
14. Vinegar reacts with baking soda to produce carbon dioxide gas.
15. Formation of gas is an indication of a chemical change.
16. Rusting of iron is a chemical change.
17. Rust is formed when iron reacts with oxygen and moisture.

18. Combustion is a chemical reaction with oxygen producing heat and light.
19. Burning magnesium ribbon forms magnesium oxide.
20. Oxygen is necessary for combustion.
21. Fuel is needed for the combustion process.
22. Heat is required to reach ignition temperature.
23. Fire can be extinguished by cutting off air supply.
24. Burning of a candle involves both physical and chemical changes.
25. Melting of wax is a physical change.
26. Burning of wax vapour is a chemical change.
27. Reversible changes can be brought back to the original state.
28. Melting of ice and boiling water are reversible changes.
29. Irreversible changes cannot be reversed easily.
30. Cutting vegetables and making popcorn are irreversible changes.
31. Some changes are desirable while others are undesirable.
32. Conversion of milk into curd is a desirable change.
33. Rotting of food and rusting are undesirable changes.
34. Weathering of rocks is a slow natural change.
35. Changes can also be classified as slow/fast, natural/man-made, periodic/non-periodic, reversible/irreversible, and physical/chemical changes.

--------: Definitions :-------

Physical change: A change in which only the physical properties of a substance change and no new substance is formed is called a physical change.
Chemical change: A change in which one or more new substances with different properties are formed is called a chemical change.
Rusting: The process of formation of rust (brown deposit) on iron in the presence of air and water is called rusting.
Combustion: A chemical reaction in which a substance reacts with oxygen and produces heat and light is called Combustion.
Combustible substances: Substances that undergo combustion reactions are called combustible substances.
Weathering: The physical and chemical changes in rocks are collectively called Weathering.
Erosion: The movement of soil and rock particles from one place to another by water, wind, or ice is called erosion.
Ignition temperature: The lowest temperature at which a substance can catch fire is called its Ignition temperature.

Intext Questions and Answers

1. What are changes?
Ans: Any alteration in the size, shape, colour, state, smell, or properties of a substance is called a change.
2. What are physical changes?
Ans: Changes in which only the appearance, size, shape, or state changes and no new substance is formed are called physical changes.
3. Give examples of physical changes.
Ans: Folding paper, inflating a balloon, crushing chalk, melting ice, and evaporation are physical changes.
4. Why is folding paper considered a physical change?
Ans: Because only the shape changes and no new substance is formed.
5. What happens when a balloon is inflated?
Ans: Its size and shape change due to air filling inside it.
6. Is crushing chalk into powder a physical change?
Ans: Yes, because only the size changes and no new substance is formed.
7. What are chemical changes?
Ans: Changes in which one or more new substances are formed are called chemical changes.
8. What happens when we blow air into lime water?
Ans: Lime water turns milky.
9. Why does lime water turn milky?
Ans: Because carbon dioxide reacts with lime water to form calcium carbonate.
10. What is formed when carbon dioxide reacts with lime water?
Ans: Calcium carbonate and water are formed.
11. What happens when vinegar reacts with baking soda?
Ans: Carbon dioxide gas is produced with fizzing bubbles.

12. What indicates a chemical change in the vinegar and baking soda reaction?
Ans: Formation of gas indicates a chemical change.
13. What is rusting?
Ans: The formation of a brown coating on iron due to reaction with air and moisture is called rusting.
14. Why is rusting considered a chemical change?
Ans: Because a new substance called rust is formed.
15. What is combustion?
Ans: A chemical reaction in which a substance reacts with oxygen producing heat and light is called combustion.
16. What happens when magnesium ribbon burns?
Ans: It burns with a bright white flame and forms magnesium oxide.
17. What are combustible substances?
Ans: Substances that undergo combustion are called combustible substances.
18. Why does a candle covered with a glass tumbler stop burning?
Ans: Because oxygen supply gets cut off.
19. Is oxygen necessary for combustion?
Ans: Yes, oxygen is necessary for combustion.
20. What are the three requirements for combustion?
Ans: Fuel, oxygen, and heat to reach ignition temperature.
21. What is ignition temperature?
Ans: The minimum temperature at which a substance starts burning is called ignition temperature.
22. How can fire be extinguished?
Ans: Fire can be extinguished by cutting off the air supply.
23. What changes occur when a candle burns?
Ans: Both physical and chemical changes occur.
24. Why is melting of wax a physical change?
Ans: Because no new substance is formed.
25. Why is burning of wax vapour a chemical change?
Ans: Because new substances are formed during burning.
26. What are reversible changes?
Ans: Changes that can be brought back to the original state are called reversible changes.
27. Give examples of reversible changes.
Ans: Melting ice and boiling water are reversible changes.
28. What are irreversible changes?
Ans: Changes that cannot be brought back to the original state easily are called irreversible changes.
29. Give examples of irreversible changes.
Ans: Chopping vegetables and making popcorn are irreversible changes.
30. What are desirable changes?
Ans: Changes that are useful and beneficial are called desirable changes.
31. Give examples of desirable changes.
Ans: Conversion of milk into curd and cooking food are desirable changes.
32. What are undesirable changes?
Ans: Changes that are harmful or unwanted are called undesirable changes.
33. Give examples of undesirable changes.
Ans: Rusting of iron and rotting of fruits are undesirable changes.
34. What is weathering of rocks?
Ans: The breaking of rocks into smaller pieces over a long period is called weathering.
35. What is erosion?
Ans: The wearing away and movement of soil and rocks by wind or flowing water is called erosion.

Let Us Enhance Our Learning

1. Assertion (A): The flame of a burning candle covered with a glass tumbler goes out after some time.
Reason (R): Oxygen inside the glass tumbler gets gradually used up.
Options:
A) Both A and R are true, and R is the correct explanation of A.

B) Both A and R are true, but R is not the correct explanation of A.
C) A is true, but R is false. D) A is false, but R is true.

Ans: A) Both A and R are true, and R is the correct explanation of A.

2. Abdul focuses sunlight on a piece of paper using a magnifying glass, and the paper starts burning. The same paper does not burn when kept in sunlight without the magnifying glass. What is the most appropriate explanation?

A) Paper melts before burning.
B) The magnifying glass increases oxygen supply.
C) Paper burns only when sunlight falls on a small area.
D) Focusing sunlight raises the paper to its ignition temperature.

Ans: D) Focusing sunlight raises the paper to its ignition temperature.

3. Which of the following correctly represents the sequence of changes involved in the burning of a candle, along with their nature?

A) Wax melts (chemical change) → wax vapour burns (physical change)
B) Wax burns directly (physical change) → flame is produced (chemical change)
C) Wax evaporates (chemical change) → wax melts (physical change) → wax solidifies (physical change)
D) Wax melts (physical change) → wax evaporates at wick (physical change) → wax vapour burns (chemical change)

Ans: D) Wax melts (physical change) → wax evaporates at wick (physical change) → wax vapour burns (chemical change)

4. Which of the following is an example of a physical change?

A) Digestion of food B) Respiration in human C) Combustion of wood D) Evaporation of water

Ans: D) Evaporation of water

5. Which of the following statements are the characteristics of a physical change?

(i) The state of the substance may or may not change.
(ii) A substance with different properties is formed.
(iii) No new substance is formed.
(iv) The substance undergoes a chemical reaction.

(a) (i) and (ii) (b) (ii) and (iii) (c) (i) and (iii) (d) (iii) and (iv)

Ans: (c) (i) and (iii)

6. Define the following.

a) Physical change b) Chemical change c) Rusting d) Combustion
e) Weathering f) Erosion g) Ignition temperature:

Ans: a) Physical change: A change in which only the physical properties of a substance change and no new substance is formed is called a **physical change**.

b) Chemical change: A change in which one or more new substances with different properties are formed is called a **chemical change**.

c) Rusting: The process of formation of rust (brown deposit) on iron in the presence of air and water is called **rusting**.

d) Combustion: A chemical reaction in which a substance reacts with oxygen and produces heat and light is called Combustion.

e) Weathering: The physical and chemical changes in rocks are collectively called Weathering.

f) Erosion: The movement of soil and rock particles from one place to another by water, wind, or ice is called **erosion**.

g) Ignition temperature: The lowest temperature at which a substance can catch fire is called its **Ignition temperature.**

7. Write any two characteristics each of physical and chemical changes.

Ans: Physical changes: i) No new substance is formed. **ii)** They are usually reversible.
Chemical changes: i) New substances are formed. **ii)** They are usually irreversible.

8. What are the three essential requirements for a combustion process to occur?

Ans: i) Fuel ii) Oxygen (air) iii) Ignition temperature

9. Fill in the blanks in the following statements:

(i) Nalini observed that the handle of her cycle has got brown deposits. The brown deposits are due to _____ and this is a _____ change.
(ii) Folding a handkerchief is a _____ change and can be _____.
(iii) A chemical process in which a substance reacts with oxygen with evolution of heat is called _____, and this is a _____ change.
(iv) Magnesium, when burnt in air, produces a substance called _____. The substance

formed is _____ in nature. Burning of magnesium is a _____ change.

Ans: (i) rusting, chemical (ii) physical, reversed.
(iii) combustion, chemical (iv) magnesium oxide, basic, chemical

10. Predict which of the following changes can be reversed and which cannot:
(i) Stitching cloth to a shirt (ii) Twisting of straight string (iii) Making idlis from batter
(iv) Dissolving sugar in water (v) Drawing water from a well (vi) Ripening of fruits
(vii) Boiling water in an open pan (viii) Rolling up a mat (ix) Grinding wheat grains to flour
(x) Forming soil from rocks

Ans: (i) Stitching cloth to a shirt – Cannot be reversed (ii) Twisting of straight string – Can be reversed
(iii) Making idlis from batter – Cannot be reversed (iv) Dissolving sugar in water – Can be reversed
(v) Drawing water from a well – Can be reversed (vi) Ripening of fruits – Cannot be reversed
(vii) Boiling water in an open pan – Can be reversed (viii) Rolling up a mat – Can be reversed
(ix) Grinding wheat grains to flour – Cannot be reversed (x) Forming soil from rocks – Cannot be reversed

11. State whether the following statements are True or False. In case a statement is False, write the correct statement.
(i) Melting of wax is necessary for burning a candle. (True/False)
(ii) Collecting water vapour by condensing involves a chemical change. (True/False)
(iii) The process of converting leaves into compost is a chemical change. (True/False)
(iv) Mixing baking soda with lemon juice is a chemical change. (True/False)

Ans: (i) – True
(ii) – False
Collecting water vapour by condensing involves a physical change
(iii) – True
(iv) – True

12. Are the changes of water to ice and water to steam physical or chemical? Explain.

Ans: Both are physical changes because no new substance is formed. Only the state of water changes.

13. Natural factors such as wind and rain help in the formation of soil from rocks. Is this change physical or chemical and why?

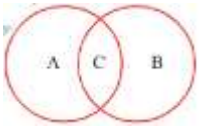
Ans: The formation of soil from rocks involves both physical and chemical changes because rocks break into smaller pieces and also undergo chemical changes due to water and air.

14. Read the following story titled 'Eco-friendly Prithvi', and tick the most appropriate option(s) given in the brackets. Provide a suitable title of your choice for the story.

Prithvi is preparing a meal in the kitchen. He chops vegetables, peels potatoes, and cuts fruits (physical changes/chemical changes). He collects the seeds, fruits, and vegetable peels into a clay pot (physical change/chemical change). The fruits, vegetable peels, and other materials begin to decompose due to the action of bacteria and fungi, forming compost (physical change/chemical change). He decides to plant seeds in the compost and water them regularly. After a few days, he notices that the seeds begin to germinate and small plants start to grow, eventually blooming into colourful flowers (physical change/ chemical change). His eff orts are appreciated by all his family members.

Ans: Suitable Title: **"Making Compost and Growing Plants"**
(i) Chopping vegetables, peeling potatoes and cutting fruits – **Physical changes**
(ii) Collecting peels into a clay pot – **Physical change**
(iii) Decomposition into compost – **Chemical change**
(iv) Germination and growth of plants – **Chemical change**

15. Some changes are given here. Write physical changes in the area marked 'A' and chemical changes in the area marked 'B'. Enter the changes which are both physical and chemical in the area marked 'C'



Process of burning a candle; Tearing of paper; Rusting; Curdling of milk; Ripening of fruits; Melting of ice; Folding of clothes; Burning of magnesium and Mixing baking soda with vinegar.

Ans: **A (Physical changes):** Tearing of paper, Melting of ice, Folding of clothes
B (Chemical changes): Rusting, Curdling of milk, Ripening of fruits, Burning of magnesium, Mixing baking soda with vinegar
C (Both physical and chemical): Burning of a candle

16. The experiments shown in Fig. 5.11a, b, c, and d were performed. Find out in which case(s) did lime water turn milky and why?

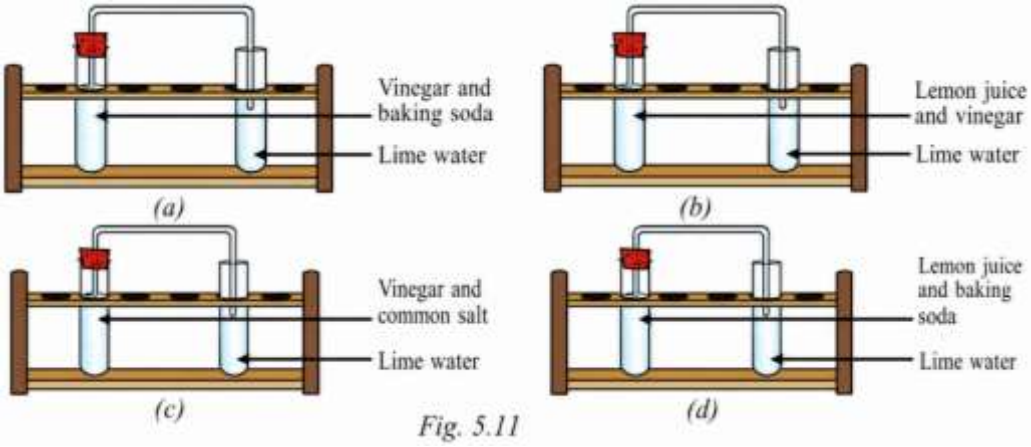


Fig. 5.11

Ans: Lime water turns milky in the cases (a) and (d).
(a) Vinegar + baking soda
(d) Lemon juice + baking soda
Reason: Carbon dioxide is produced and reacts with lime water to form calcium carbonate, making it milky.

17. Is curdling of milk a physical or chemical change? Justify your statement.

Ans: Curdling of milk is a chemical change because a new substance (curd) is formed and the change cannot be reversed.

Exploratory Projects

1. Write a message on a piece of paper using lemon juice as ink and let it dry. The message will become invisible. Now use a warm iron over the paper (or hold the paper over the flame of a candle, taking care that it does not catch fire). The invisible letters turn dark brown as the paper gets warm. Can any of these changes be reversed?

Title: Study of Reversible and Irreversible Changes Using Lemon Juice Invisible Ink
Aim: To observe the changes that occur when lemon juice is used as invisible ink and heated, and to identify whether the changes are reversible or irreversible.
Hypothesis: Lemon juice becomes visible when heated because heat causes a chemical change in the substances present in it. This change may not be reversible.
Materials Required: White paper, Lemon juice, Cotton bud/brush/toothpick, Small bowl, Warm iron or candle flame.
Method / Procedure:

1. Take some lemon juice in a small bowl.
2. Dip a cotton bud or brush into the lemon juice.
3. Write a secret message on a white sheet of paper.
4. Allow the paper to dry completely.
5. Observe that the writing becomes invisible.
6. Carefully warm the paper using a warm iron or hold it above a candle flame.
7. Observe the colour change in the hidden letters.
8. Record the observations and identify whether the changes are reversible or irreversible.

Observations and Data:

Step	Observation	Type of Change
Lemon juice dries on paper	Message becomes invisible	Physical Change
Heating the paper	Invisible letters turn dark brown	Chemical Change
Cooling the paper	Brown letters remain visible	Irreversible Change

Result: The invisible message became visible as dark brown letters after heating the paper.
Conclusion: The drying of lemon juice on paper is a physical and reversible change because the liquid only dries. The browning of letters on heating is a chemical and irreversible change because new substances are formed due to heating. Therefore, the dark brown letters cannot be changed back to their original invisible state.
References: 7th Science Textbook, Classroom activity and observation, Teacher's guidance.
Acknowledgements: I sincerely thank my science teacher, parents, and classmates for their support and guidance in completing this project successfully.

2. We hear a lot of news about landslides and breaking of rocks in hilly regions these days, causing a lot of damage to life and property. Discuss what steps we can take to reduce landslides and rock erosion.

Title: Study of Measures to Reduce Landslides and Rock Erosion
Aim: To study the causes of landslides and rock erosion in hilly regions and suggest steps to reduce their harmful effects.
Hypothesis: Human activities such as deforestation, mining, and unsafe construction increase landslides and rock erosion. Proper environmental protection and safety measures can reduce these disasters.
Materials Required: Notebook, Pen or pencil, Newspaper articles/internet resources
Method / Procedure:

1. Collect information about landslides and rock erosion from books, newspapers, and the internet.
2. Identify the major causes of landslides in hilly regions.
3. Discuss the effects of landslides on people, roads, forests, and property.
4. Find out different preventive measures used to reduce landslides and soil erosion.
5. Record all observations and prepare a report.

Observations and Data:

Cause of Landslides	Effects
Heavy rainfall	Soil and rocks slide downhill
Deforestation	Weakening of soil binding
Mining and quarrying	Loosening of rocks
Road cutting	Disturbance of hill slopes
Earthquakes	Sudden movement of rocks and soil

Steps to Reduce Landslides and Rock Erosion

Preventive Measure	Benefit
Planting more trees	Roots hold soil firmly
Avoiding deforestation	Prevents soil loosening
Building retaining walls	Supports hill slopes
Proper drainage systems	Reduces water accumulation
Controlling mining activities	Protects rocks and soil
Terrace farming	Reduces soil erosion
Safe construction practices	Prevents slope damage
Awareness programs	Educates people about safety

Result: The study showed that both natural causes and human activities contribute to landslides and rock erosion.
Conclusion: Landslides and rock erosion can cause severe damage to life and property. Planting trees, controlling mining, proper drainage, and safe construction methods can greatly reduce these disasters and protect the environment.
References: 7th Science Textbook, Newspapers and internet resources, Classroom discussion and teacher guidance.
Acknowledgements: I sincerely thank my science teacher, parents, and classmates for their support and guidance in completing this project successfully.

3. Observe the activities going on in the kitchen and note any changes that can be reversed. Are these physical or chemical changes?

Title: Study of Reversible Changes in Kitchen Activities
Aim: To observe activities taking place in the kitchen and identify reversible changes and whether they are physical or chemical changes.
Hypothesis: Some changes taking place in the kitchen can be reversed because no new substance is formed. Such changes are mainly physical changes.
Materials Required: Notebook, Pen or pencil, Kitchen items such as ice, water, butter, sugar, utensils, etc.
Method / Procedure:

1. Observe different activities happening in the kitchen.
2. Identify changes that can return to their original form.
3. Record the observations carefully.
4. Determine whether the changes are physical or chemical.
5. Prepare a table showing the type of change.

Observations and Data

Kitchen Activity	Reversible Change	Physical/Chemical Change
Melting of ice into water	Water can freeze back into ice	Physical Change
Boiling water into steam	Steam can condense back into water	Physical Change
Melting butter or ghee	Solidifies again on cooling	Physical Change
Dissolving sugar in water	Sugar can be recovered by evaporation	Physical Change
Folding dough into shapes	Dough can be reshaped	Physical Change

Applications

1. Helps in understanding physical changes in daily life.
2. Useful in learning about reversible and irreversible changes.
3. Improves observation skills in science.

Result: Several kitchen activities were found to be reversible changes.
Conclusion: Most reversible changes observed in the kitchen are physical changes because no new substance is formed and the original substance can be obtained again. **References:** 7th Science Textbook, Classroom discussion and observations, Kitchen activity observations at home.
Acknowledgements: I sincerely thank my science teacher, parents, and classmates for their guidance and support in completing this project successfully.

Activities

Activity 5.1

Aim: To observe different changes around us.
Materials required: Notebook and pen.
Procedure: 1. Observe changes happening around you such as melting ice, burning paper, rusting iron, etc.
2. Write your observations in a table.
Observation: Some changes are temporary while others are permanent.
Conclusion: Different kinds of changes occur around us every day.

Activity 5.2

A. Creating objects with paper

Aim: To observe change in shape of paper.
Materials required: Sheets of paper.
Procedure: 1. Fold paper into different shapes.
2. Unfold the paper again.
Observation: Only the shape changes. Paper remains the same.
Conclusion: Changing shape is a physical change.

B. Playing with a balloon
Aim: To observe changes in a balloon.
Materials required: Balloon and pin.
Procedure: 1. Inflate a balloon and release the air.
2. Inflate another balloon and burst it using a pin.
Observation: Air can be removed from the balloon, but a burst balloon cannot return to its original form.
Conclusion: Some changes are reversible while others are irreversible.

C. Crushing chalk
Aim: To observe physical change in chalk.
Materials required: Chalk piece.
Procedure: Crush a chalk piece into powder.
Observation: Only the size and shape change.
Conclusion: No new substance is formed in a physical change.

Activity 5.3

Fig. 5.2: Blowing air in (a) tap water; (b) lime water

Aim: To observe a chemical change.
Materials required: Two tumblers, tap water, lime water, straws.
Procedure: 1. Blow air into tap water using a straw.
2. Blow air into lime water using another straw.
3. Observe both tumblers.
Observation: Tap water shows bubbles only. Lime water turns milky.
Conclusion: A new substance is formed in lime water, showing a chemical change.

Activity 5.4

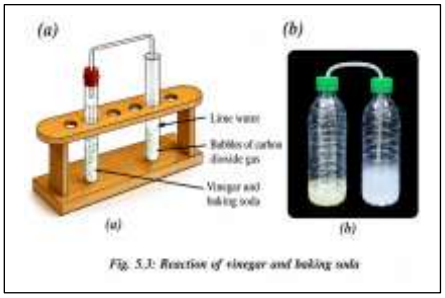


Fig. 5.3: Reaction of vinegar and baking soda

Aim: To observe the reaction between vinegar and baking soda.
Materials required: Vinegar/lemon juice, baking soda, test tube, lime water.
Procedure: 1. Take vinegar in a test tube.
2. Add baking soda slowly.
3. Pass the gas formed into lime water.
Observation: Bubbles are formed and lime water turns milky.
Conclusion: Carbon dioxide gas is produced in this chemical change.

Activity 5.5

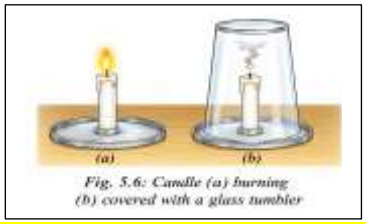


Fig. 5.6: Candle (a) burning (b) covered with a glass tumbler

Aim: To show that oxygen is needed for combustion.
Materials required: Two candles, petri dishes, glass tumbler.

Procedure: 1. Light both candles.
2. Cover one candle with a glass tumbler.
3. Observe both flames.

Observation: The covered candle goes off after some time. The uncovered candle keeps burning.
Conclusion: Oxygen is necessary for combustion.

Activity 5.6

Aim: To show that heat is needed for combustion.
Materials required: Paper, magnifying glass, sunlight, matchstick.
Procedure: 1. Focus sunlight on paper using a magnifying glass.
2. Observe carefully.

Observation: Paper starts smoking and catches fire.
Conclusion: Heat is required for combustion.

Activity 5.7

Aim: To observe physical and chemical changes in a burning candle.
Materials required: Candle and matchbox.
Procedure: Light a candle and observe carefully.
Observation: 1. Wax melts and changes shape.
2. The candle burns and produces heat and light.

Conclusion: Both physical and chemical changes occur when a candle burns.

Activity 5.8

Aim: To identify reversible and irreversible changes.
Materials required: Examples like ice cubes, vegetables, water, popcorn.
Procedure: Observe different changes and check whether the original state can be obtained again.
Observation: 1. Melting ice and boiling water are reversible.
2. Cutting vegetables and making popcorn are irreversible.

Conclusion: Some changes are reversible while others are irreversible.

TABLES

Table 5.1: Some Changes Observed Around Us

S.No.	Change	Observations
1	Evaporation of water in lakes	Water changes into water vapour and mixes with air.
2	Burning of paper	Paper changes into ash and smoke; cannot be changed back.
3	Change of seasons	Weather conditions change periodically throughout the year.
4	Making designs using papers	Shape and size of paper change.
5	Change of day and night	Day changes to night and night changes to day regularly.
6	Earthquakes	Sudden shaking of the Earth's surface occurs.
7	Conversion of milk into curd	Milk changes into curd and cannot be changed back into milk.
8	Rotting of fruits	Fruits spoil, change colour, smell, and taste.
9	Water from steam	Steam cools and changes into liquid water.
10	Rusting of iron	A brown rust layer forms on iron in the presence of air and water.
11	Any other – Melting of ice	Ice changes into water on heating.

Table 5.2: Can Changes be Reversed?

S.No.	Change	The Original State can be Brought Back (Yes/No)
1	Melting ice cubes	Yes
2	Chopping vegetables	No
3	Boiling water	Yes
4	Making popcorn from corn	No
5	Evaporation of water	Yes
6	Burning of paper	No
7	Water from steam (condensation)	Yes
8	Conversion of milk into curd	No
9	Stretching a rubber band	Yes
10	Rusting of iron	No
11	Inflating a balloon	Yes
12	Rotting of fruits	No

Competency Based Questions

Multiple Choice Questions

1. Ice melts when kept outside a refrigerator. This is an example of
A) Chemical change B) Physical change
C) Slow change D) Irreversible change

2. Burning a piece of paper is:
A) Reversible change B) Physical change
C) Chemical change D) Periodic change

3. A student freezes water into ice and then melts it again. This change is
A) Irreversible B) Reversible
C) Chemical D) Desirable

4. Which of the following is a natural change?
A) Cooking rice B) Making a toy
C) Changing of seasons D) Building a house

5. An earthquake is classified as
A) Periodic change B) Non-periodic change
C) Reversible change D) Man-made change

6. Ripening of mangoes is considered
A) Undesirable change B) Desirable change
C) Periodic change D) Reversible change

7. Spoiling of food is
A) Desirable change B) Reversible change
C) Undesirable change D) Periodic change

8. Which of the following is a man-made change?
A) Rainfall B) Germination of seed
C) Cooking food D) Day and night

9. The movement of clock hands is
A) Periodic change B) Non-periodic change
C) Chemical change D) Irreversible change

10. Which change produces a new substance?
A) Melting wax B) Breaking glass
C) Burning wood D) Stretching rubber band

11. A glass tumbler breaks accidentally. This change is
A) Reversible B) Irreversible
C) Periodic D) Natural

12. Which is a fast change?
A) Growth of a tree B) Rusting of iron
C) Lightning D) Ripening of fruit

13. Growth of a plant is
A) Fast change B) Slow change
C) Periodic change D) Reversible change

14. Formation of curd from milk is
A) Physical change B) Reversible change
C) Chemical change D) Periodic change

15. Which of the following is a physical change?
A) Burning candle wick B) Rusting iron
C) Melting ice D) Cooking vegetables

16. A student sharpens a pencil. This is
A) Physical change B) Chemical change
C) Natural change D) Periodic change

17. The occurrence of sunrise every day is
A) Non-periodic change B) Periodic change
C) Chemical change D) Man-made change

18. Which change cannot be reversed?
A) Folding paper B) Melting butter
C) Burning paper D) Freezing water

19. A balloon inflates when air is blown into it. This is
A) Chemical change B) Physical change
C) Irreversible change D) Natural change

20. Why is cooking food considered a chemical change?
A) Shape changes only B) A new substance is formed
C) Size changes only D) No change occurs

21. Which pair represents reversible changes?
A) Burning paper, rusting iron
B) Melting ice, freezing water
C) Cooking rice, baking cake
D) Ripening fruit, spoiling food

22. Rusting of iron is
A) Physical change B) Reversible change
C) Chemical change D) Periodic change

23. A festival occurs every year. This can be considered
A) Non-periodic B) Periodic
C) Chemical D) Irreversible

24. Which of the following is an undesirable change?
A) Germination of seeds B) Ripening of fruits
C) Spoilage of milk D) Growth of crops

25. A child moulds clay into different shapes repeatedly. This is
A) Reversible change B) Chemical change
C) Non-periodic change D) Natural change

26. The falling of leaves from trees during a season is
A) Natural change B) Man-made change
C) Chemical change only D) Periodic change only

27. Which of the following is both a slow and natural change?
A) Burst of a cracker B) Growth of a tree
C) Breaking glass D) Lighting a matchstick

28. Making chapati from dough involves:
A) Only physical change
B) Chemical change during cooking
C) Periodic change D) Natural change

29. A student classifies changes as reversible and irreversible. Which skill is being used?
A) Classification B) Singing
C) Drawing D) Memorization only

30. Why is understanding changes important in daily life?
A) To identify useful and harmful changes
B) To increase weight of objects
C) To stop all changes
D) To make time move faster

Answer

1-B	2-C	3-B	4-C	5-B	6-B	7-C	8-C	9-A	10-C	11-B	12-C	13-B	14-C	15-C
16-A	17-B	18-C	19-B	20-B	21-B	22-C	23-B	24-C	25-A	26-A	27-B	28-B	29-A	30-A

2 Marks Questions

1. Give one example each of a natural change and a man-made change.
Ans: Natural change: Change of seasons
Man-made change: Making designs using paper

2. Why is the conversion of milk into curd considered different from melting of ice?
Ans: Milk changes into curd by forming a new substance, making it a chemical change. Melting of ice forms no new substance and is a physical change.

3. A student melts an ice cube and gets water. What type of change is this? Why?
Ans: It is a **physical change**. No new substance is formed and the change can be reversed.

4. Why is rusting of iron considered a chemical change?
Ans: A new substance called rust (iron oxide) is formed. Hence, it is a chemical change.

5. Why is burning of paper an irreversible change?
Ans: The original paper cannot be obtained back. Therefore, it is an irreversible change.

6. What happens when carbon dioxide is passed through lime water?
Ans: Lime water turns milky. Calcium carbonate is formed.

7. Name any two conditions necessary for combustion.
Ans: Presence of oxygen, A combustible substance (fuel)

8. Why does a candle covered with a glass tumbler stop burning?
Ans: The oxygen inside the tumbler gets used up. Without oxygen, combustion stops.

9. Why is tearing paper usually considered irreversible, even though no new substance is formed?
Ans: Tearing paper does not produce a new substance, but the original paper cannot be obtained back easily. Therefore, it is an irreversible physical change.

4 Marks Questions

1. Differentiate between Physical Change and Chemical Change.
Ans:

Physical Change	Chemical Change
No new substance is formed	New substance is formed
Usually reversible	Usually irreversible
Only physical properties change	Chemical properties change
Example: Melting of ice	Example: Rusting of iron

2. Classify the following processes into physical or chemical changes.
(a) Beating of Aluminium metal to make Aluminium foil. **(b) Cooking**
(c) Breaking of glass **(d) Burning of papers**
Ans: Physical change: Beating of Aluminium metal to make Aluminium foil, Breaking of glass.
Chemical Change: Cooking, Burning of papers.

3. Explain why blowing air into lime water causes it to turn milky.
Ans: i) Exhaled air contains carbon dioxide. ii) Carbon dioxide reacts with lime water.
iii) Calcium carbonate is formed. iv) Calcium carbonate makes lime water appear milky.

4. What observations indicate a chemical change?
Ans: i) Formation of a new substance. ii) Change in colour.
iii) Formation of gas. iv) Production of heat or light.

5. Why is burning of magnesium ribbon a chemical change?
Ans: i) Magnesium reacts with oxygen. ii) A white powder (magnesium oxide) is formed.
iii) Heat and light are produced. iv) A new substance is formed.

6. Explain reversible and irreversible changes with examples.
Ans: Reversible Changes: Changes that can be brought back to the original state are called reversible changes.
Examples: Melting of ice, boiling water.
Irreversible Changes: Changes that cannot be brought back to the original state easily are called irreversible changes.
Examples: Burning paper, rusting iron.

7. Why is combustion important in daily life?
Ans: i) Combustion provides heat. ii) It is used for cooking food.
iii) It helps in running vehicles. iv) It provides energy for many activities.

8. Differentiate between desirable and undesirable changes.
Ans:

Desirable Changes	Undesirable Changes
Useful changes	Harmful changes

Milk to curd	Rusting of iron
Growth of plants	Rotting of fruits
Cooking food	Decay of food

8 Marks Questions

1. Explain different types of changes occurring around us with suitable examples.

Ans: Changes can be classified into various types.

Natural and Man-made Changes: Natural: Change of seasons
Man-made: Burning paper

Physical and Chemical Changes: Physical: Melting ice
Chemical: Rusting of iron

Reversible and Irreversible Changes: Reversible: Freezing water
Irreversible: Burning paper

Slow and Fast Changes: Slow: Growth of plants
Fast: Bursting crackers

2. Explain the characteristics of Physical Changes.

Ans: i) Only physical properties change. ii) No new substance is formed.
iii) Shape, size or state may change. iv) Chemical composition remains unchanged.
v) Usually reversible. vi) Original substance can often be obtained back.
vii) Heat may or may not be involved. viii) Examples include melting ice and folding paper.

3. Explain the characteristics of Chemical Changes.

Ans: i) New substances are formed. ii) Properties of products differ from original substances.
iii) Usually irreversible. iv) Heat or light may be produced.
v) Gas may be evolved. vi) Colour change may occur.
vii) Chemical reactions take place. viii) Examples include rusting, burning and curd formation.

4. Explain the process of combustion and its requirements.

Ans: i) A chemical reaction in which a substance reacts with oxygen producing heat and light is called combustion.
ii) Oxygen is necessary for combustion. iii) A combustible substance (fuel) is required.
iv) Ignition temperature must be reached. v) Heat and light are produced.
vi) New substances are formed. vii) Burning paper and wood are examples.
viii) Absence of any requirement prevents combustion.

5. Explain how both physical and chemical changes occur during candle burning.

Ans: i) Wax near the flame melts. ii) Melted wax evaporates.
iii) Melting and evaporation are physical changes. iv) Wax vapour burns in air.
v) Burning produces heat and light. vi) New substances are formed.
vii) Burning is a chemical change.
viii) Therefore candle burning involves both physical and chemical changes.

6. Explain weathering of rocks.

Ans: i) Rocks break into smaller pieces over time. ii) Temperature changes cause expansion and contraction.
iii) Water enters cracks in rocks. iv) Roots of plants also break rocks.
v) Both physical and chemical changes occur. vi)Rocks gradually disintegrate.
vii) Soil is formed from weathered rocks. viii) Weathering is a slow natural change.

7. A farmer finds that an iron plough has developed a brown coating after the rainy season. Explain the reason and identify the type of change.

Ans: i) Iron reacts with oxygen and moisture. ii) Rust is formed on the surface.
iii) Rust is a new substance. iv) The brown coating is iron oxide.
v) This process is called rusting. vii) Rusting is a chemical change.
vii) It is irreversible. viii) The original iron cannot be obtained easily.

8. Classify the following changes and justify:

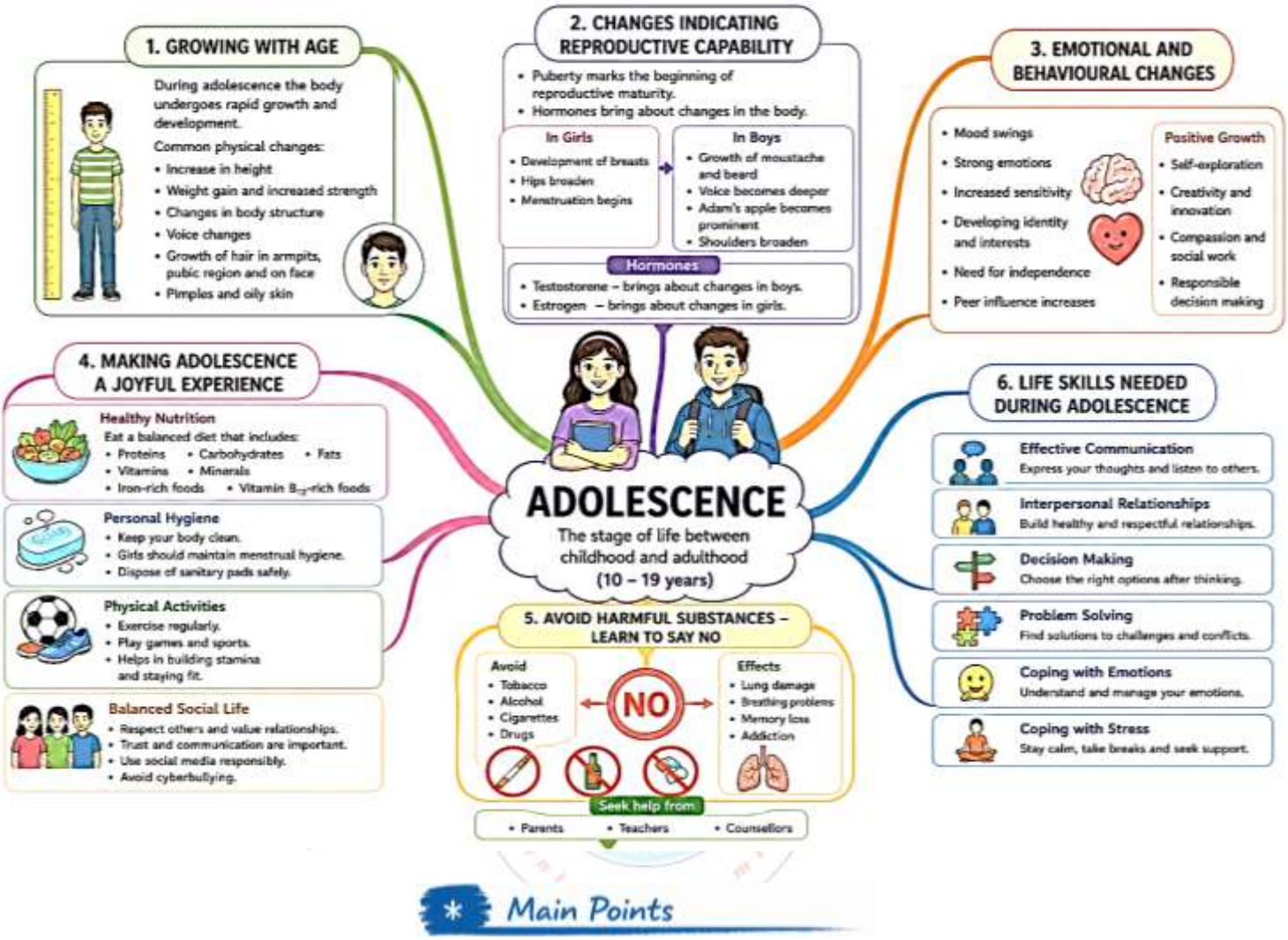
(a) Melting of ice (b) Burning of paper (c) Milk to curd (d) Boiling of water

Ans:

Change	Type of Change	Reason
Melting of ice	Physical, Reversible	No new substance formed
Burning of paper	Chemical, Irreversible	New substances formed
Milk to curd	Chemical, Irreversible	New substance formed
Boiling of water	Physical, Reversible	Water can be recovered

Chapter-6: Adolescence

Mind Map



Main Points

1. Adolescence is the stage between childhood and adulthood.
2. Adolescence usually occurs between the ages of 10 and 19 years.
3. During adolescence, physical, emotional, and behavioural changes occur.
4. Puberty is the stage when the body becomes capable of reproduction.
5. Increase in height is a major change during adolescence.
6. Weight, strength, and body structure also change during this stage.
7. Boys develop broader shoulders and more muscles.
8. Girls develop breasts and changes in body shape.
9. Voice changes occur during adolescence.
10. Boys develop a deeper voice due to growth of the voice box.
11. The visible part of the enlarged voice box is called Adam's apple.
12. Hair grows in the armpits and pubic region during adolescence.
13. Boys may also develop facial hair, chest hair, and beard growth.
14. Pimples and acne are common during adolescence.
15. Acne occurs due to increased oil secretion in the skin.
16. The timing and nature of adolescence vary from person to person.
17. Secondary sexual characteristics prepare the body for reproduction.
18. Menstruation begins in girls during adolescence.
19. Menstrual cycle usually occurs every 28–30 days.
20. Menstruation is a natural biological process.
21. Menopause is the stage when menstruation stops permanently.

22. Adolescents also experience emotional and behavioural changes.
23. Mood swings and strong emotions are common in adolescence.
24. Healthy activities like music, dance, and sports support positive growth.
25. Nutritious food is very important during adolescence.
26. Proteins, carbohydrates, vitamins, minerals, and fats are needed for growth.
27. Iron-rich foods help in blood formation.
28. Personal hygiene is very important during adolescence.
29. Menstrual hygiene should be maintained properly.
30. Regular exercise and physical activities keep the body healthy and fit.
31. Balanced social life and respectful behaviour are important.
32. Cyberbullying and unsafe social media use should be avoided.
33. Harmful substances like tobacco, alcohol, and drugs should be avoided.
34. Life skills like communication, decision-making, and problem-solving are essential.
35. Hormones control many changes that occur during adolescence.

--------: Definitions :-------

Adolescence: Adolescence is a stage of development between childhood and adulthood and is called adolescence.
Puberty: Puberty is the stage in which the body of an adolescent undergoes external and internal changes to develop into an adult capable of reproduction.
Secondary Sexual Characteristics: Characteristic changes that help distinguish males from females are called secondary sexual characteristics.
Menstrual Cycle: The onset of the menstrual cycle is an important internal change associated with adolescent girls.
Menstruation: The phase of the cycle when blood discharge occurs from the body is referred to as menstruation.
Menopause: Usually by the age of 45–55 years, menstruation stops naturally, marking the end of reproductive capability in a woman's life. This stage is called menopause.
Menstrual Hygiene: Maintaining proper hygiene during menstruation is essential for both comfort and health.
Substance Abuse: Repeated use of harmful substances leading to addiction is called substance abuse.
Hormones: Hormones are certain chemicals produced in our bodies that regulate growth and development.
Balanced Diet: A balanced diet provides all the nutrients needed for growth and development.
Personal Hygiene: Maintaining body hygiene helps protect us from potential infections.

Intext Questions and Answers

1. What is adolescence?
Ans: Adolescence is the stage of development between childhood and adulthood.
2. Between which ages does adolescence usually occur?
Ans: Adolescence usually occurs between the ages of 10 and 19 years.
3. What changes occur during adolescence?
Ans: Physical, emotional, behavioural, and reproductive changes occur during adolescence.
4. What is the most noticeable change during adolescence?
Ans: Increase in height is the most noticeable change during adolescence.
5. What changes occur in boys during adolescence?
Ans: Boys develop broader shoulders, increased muscle growth, facial hair, and a deeper voice.
6. What changes occur in girls during adolescence?
Ans: Girls develop breasts, changes in body shape, and growth in height and weight.
7. Why does the voice change in boys during adolescence?
Ans: The voice changes due to the growth of the voice box.
8. What is Adam's apple?
Ans: The visible enlarged part of the voice box in boys is called Adam's apple.
9. Why does hair grow in different parts of the body during adolescence?
Ans: Hair grows due to hormonal changes during adolescence.
10. Why do pimples occur during adolescence?
Ans: Pimples occur because of increased oil secretion in the skin.
11. What are secondary sexual characteristics?
Ans: Changes such as growth of facial hair in boys and development of breasts in girls are called secondary sexual characteristics.
12. What is puberty?
Ans: Puberty is the stage when the body becomes capable of reproduction.

13. What is menstruation?
Ans: Menstruation is the monthly discharge of blood from the body of reproductive-age girls.
14. How often does the menstrual cycle usually occur?
Ans: The menstrual cycle usually occurs every 28–30 days.
15. What is menopause?
Ans: Menopause is the stage when menstruation stops permanently.
16. What emotional changes are common during adolescence?
Ans: Mood swings, strong emotions, and increased sensitivity are common.
17. How can adolescents manage emotions positively?
Ans: By participating in activities like music, dance, sports, and social work.
18. Why is nutritious food important during adolescence?
Ans: Nutritious food supports proper growth and development.
19. Which nutrients are important during adolescence?
Ans: Proteins, carbohydrates, fats, vitamins, minerals, calcium, and iron are important.
20. Why is iron important for adolescents?
Ans: Iron helps in the formation of blood.
21. Why is calcium important during adolescence?
Ans: Calcium helps in healthy bone growth.
22. What is personal hygiene?
Ans: Personal hygiene means keeping the body clean and healthy.
23. Why is menstrual hygiene important?
Ans: Menstrual hygiene prevents infections and maintains comfort and health.
24. What should be done before disposing sanitary pads?
Ans: Sanitary pads should be wrapped properly before disposal.
25. Why are physical activities important during adolescence?
Ans: Physical activities keep the body fit, healthy, and increase stamina.
26. What is balanced social life?
Ans: Maintaining respectful and healthy relationships with others is called balanced social life.
27. What is cyberbullying?
Ans: Cyberbullying is the use of digital devices or online platforms to harass or hurt others.
28. Why should personal information not be shared online?
Ans: Because strangers may misuse personal information.
29. Which harmful substances should adolescents avoid?
Ans: Tobacco, alcohol, cigarettes, drugs, and e-cigarettes should be avoided.
30. What is substance abuse?
Ans: Regular use of harmful addictive substances is called substance abuse.
31. What problems can harmful substances cause?
Ans: They can cause breathing problems, memory loss, and lung damage.
32. What are life skills?
Ans: Life skills are practical abilities that help people manage daily life successfully.
33. Name some important life skills.
Ans: Communication, decision-making, problem-solving, coping with emotions, and stress management.
34. What are hormones?
Ans: Hormones are chemical substances produced in the body that regulate growth and development.
35. Which hormones are responsible for physical changes during adolescence?
Ans: Testosterone in boys and estrogens in girls are responsible for physical changes during adolescence.

Let Us Enhance Our Learning

1. Ramesh, an 11-year-old boy, developed a few pimples on his face. His mother told him that this is because of ongoing biological changes in his body.
(i) What could be the possible reasons for the development of these pimples on his face?
(ii) What can he do to get some relief from these pimples?
Ans: (i) Pimples occur during adolescence due to increased activity of oil glands caused by hormonal changes. Excess oil blocks skin pores and may lead to infections.
(ii) a) Wash the face regularly with clean water and mild soap. b) Maintain personal hygiene.

c) Avoid squeezing or scratching pimples. d) Eat a balanced diet and drink plenty of water.

2. Which of the following food groups would be a better option for adolescents and why?

(i)

(ii)

Ans: Food group **(i)** is a better option because it is a balanced diet containing carbohydrates, proteins, fats, vitamins, and minerals required for proper growth and development during adolescence.

3. Unscramble the underlined word in the following sentences:

(i) The discharge of blood in adolescent girls which generally occurs every 28–30 days is nstmnoiaretu.

(ii) The hoarseness in the voice of adolescent boys is due to enlarged iceov xob.

(iii) Secondary sexual characteristics are natural signs that the body is preparing for adulthood and mark the onset of urtypeb.

(iv) We should say NO to lahoclo and srugd as they are addictive.

Ans: (i) Menstruation (ii) Voice box (iii) Puberty (iv) Drugs

4. Sailu told her friend, "Adolescence brings only physical changes, like growing taller or developing body hair." Is she correct? What would you change in this description of adolescence?

Ans: No, this statement is not correct.

Adolescence brings not only physical changes but also emotional, behavioural, and reproductive changes.

5. During a discussion in the class, some of the students raised the following points. What questions would you ask them to check the correctness of these points?

(i) Adolescents do not need to worry about behavioural changes.

(ii) If someone tries a harmful substance once, they can stop anytime they want.

Ans: (i) a) Do adolescents experience mood swings?
b) Can emotions influence behaviour during adolescence?
c) Why is learning to manage emotions important?
(ii) a) Can harmful substances become addictive?
b) How does addiction affect health?
c) Is it easy to quit after becoming addicted?

6. Adolescents sometimes experience mood swings. On some days, they feel very energetic and happy, while on other days, they may feel low. What other behavioural changes are associated with this age?

Ans: Mood swings, Strong emotions, Feeling self-conscious, Desire for independence, Increased curiosity, Friendship and peer influence, Anxiety or stress

7. While using a toilet, Mohini noticed that used sanitary pads were scattered near the bin. She got upset and shared her feelings with her friends. They discussed the importance. of menstrual hygiene and healthy sanitary habits. What menstrual hygiene and sanitary habits would you suggest to your friends?

Ans: i) Use clean sanitary pads. ii) Change pads regularly.
iii) Maintain personal hygiene. iv) Never flush sanitary pads in the toilet.
v) Dispose of used pads safely by wrapping them properly. vi) Keep surroundings clean.
vii) Wash hands before and after changing pads.

8. Likitha and Vijay were classmates and good friends. On turning 11, Likitha developed a little bulge on the front of her neck. She visited the doctor who gave her medication and asked to take iodine-rich diet. Similarly, a bump was developed on the front of Vijay's neck when he turned 12. However, the doctor told him that it was a part of growing up. According to you, what could be the possible reason for advising Likitha and Vijay differently?

Ans: Likhita's neck bulge was likely due to iodine deficiency, which can cause enlargement of the thyroid gland (goitre). Therefore, the doctor advised her to take an iodine-rich diet and medication.

Vijay's neck bulge was the Adam's apple, which develops naturally in boys during adolescence as the voice box grows larger. It is a normal physical change and does not require treatment.

9. During adolescence, the boys and girls undergo certain physical changes, a few of which are given below.

(i) Change in voice (ii) Development of breasts (iii) Growth of moustache
(iv) Growth of facial hair (v) Pimples on the face (vi) Growth of hair in the pubic region
(vii) Growth of hair in armpits

Categorise these changes in the table given below:

Physical changes during adolescence		
Observed only in boys	**Observed only in girls**	**Common in boys and girls**

Ans:

Observed only in boys	Observed only in girls	Common in boys and girls
Change in voice	Development of breasts	Pimples on the face
Growth of moustache	—	Growth of hair in pubic region
Growth of facial hair	—	Growth of hair in armpits

10. Prepare a poster mentioning the tips for adolescents to live a healthy lifestyle.

Ans:

11. Ramu struggle to adjust in the hotel with his peer group. What life skills should he acquire?

Ans: Ramu should acquire the following life skills

a) Effective communication
b) Interpersonal relationships
c) Decision making
d) Problem solving
e) Coping with emotions
f) Coping with stress

Exploratory Projects

1. Find out about some personalities and organisations working in your locality to improve mental health of youth. Interview them. List at least five questions that you will ask Art Society Economy in the interviews.

Title: Study of Personalities and Organisations Working for Youth Mental Health

Aim: To identify personalities and organisations working to improve the mental health of youth and understand their contribution through interviews.

Hypothesis: Counsellors, doctors, teachers, and social organisations help improve the mental health and emotional well-being of young people through awareness, counselling, and support activities.

Materials Required: Notebook, Pen or pencil, Interview questionnaire

Method / Procedure:

1. Identify local personalities or organisations working for youth mental health.
2. Contact them politely and request an interview.

3. Prepare questions related to mental health awareness and youth well-being.
4. Conduct interviews and note the responses carefully.
5. Analyse the information collected.
6. Prepare a report based on the findings.

Personality / Organisation	Work Done
School Counsellor	Provides emotional guidance to students
Psychologist	Helps youth manage stress and anxiety
NGO for Child Welfare	Conducts awareness programs
Social Worker	Supports mental and emotional well-being
Youth Welfare Organisation	Organises counselling and motivational activities

Interview Questions

Questions Related to Society

1. What are the major mental health problems faced by youth in society today?
2. How can parents and teachers support children emotionally?
3. How does social media affect the mental health of students?

Questions Related to Art

1. Can activities like music, painting, dance, and drama help improve mental health? How?
2. Do you organise art or creative therapy sessions for youth?

Questions Related to Economy

1. Does financial stress affect the mental health of young people and families?
2. How can education and employment opportunities improve youth mental well-being?

General Questions

1. What advice would you give to students to maintain good mental health?
2. How important is counselling for teenagers?
3. What activities should schools organise for mental health awareness?

Observations and Data:

Observation	Details
Common problems among youth	Stress, anxiety, academic pressure
Helpful activities	Counselling, yoga, art, sports
Role of organisations	Awareness and emotional support
Importance of family support	Improves confidence and emotional safety

Applications:

1. Creates awareness about mental health among students.
2. Encourages youth to seek help when needed.
3. Promotes emotional well-being and positive thinking.

Result: The interviews showed that mental health awareness, counselling, family support, art activities, and positive social environments help improve the well-being of youth.

Conclusion: Mental health is very important for students and young people. Personalities and organisations working in this field help youth overcome stress, anxiety, and emotional difficulties. Awareness programs and supportive environments are necessary for healthy development.

References: 7th Science Textbook, Interviews with local personalities and organisations, Classroom discussion and teacher guidance

Acknowledgements: I sincerely thank the interview participants, my science teacher, parents, and classmates for their support and guidance in completing this project successfully.

2. Perform a role play on the theme 'Child marriage: A social evil', highlighting how it negatively impacts the overall well-being of children, particularly the health of young girls.

Role Play

Theme: "Child Marriage – A Social Evil"

Characters: Narrator, Father, Mother, Young Girl – Anu, Teacher, Doctor, Social Worker, Village Head / Police Officer

Scene 1 – At Home

Narrator: In a small village, a young girl named Anu dreams of becoming a teacher. But her parents decide to arrange her marriage at an early age.

Father: Anu is now 15 years old. We should arrange her marriage soon.

Mother: Yes, many people in the village are asking about it.

Anu: Father, I want to continue my studies and achieve my dreams.

Father: Girls should marry early. Education is not necessary.

Scene 2 – At School

Teacher: Why are you looking sad, Anu?

Anu: My parents want to stop my education and arrange my marriage.

Teacher: Child marriage is harmful and illegal. It affects health, education, and the future of children.

Scene 3 – Doctor Explains Health Problems

Doctor: Young girls who marry early may face:

a) Weak health and malnutrition
b) Mental stress and depression
c) Early pregnancy complications
d) Health risks during childbirth
e) Lack of proper education and nutrition
f) Girls need education, healthcare, and emotional support for healthy growth.

Scene 4 – Social Worker Creates Awareness

Social Worker: Child marriage is a social evil because it:

a) Stops children from completing education
b) Increases poverty and unemployment
c) Harms physical and mental health
d) Violates children's rights and freedom
e) Reduces confidence and opportunities for girls
f) Children should be allowed to study and build their future.

Scene 5 – Final Decision

Village Head / Police Officer: Child marriage is against the law. Girls below 18 years and boys below 21 years cannot be legally married.
Father: I understand my mistake now. Anu should continue her studies.
Mother: We will support her dreams and education.
Anu: Thank you! I will study hard and help society in the future.
Conclusion by Narrator: Child marriage destroys childhood, education, health, and future opportunities. It especially harms the health and well-being of young girls. Society must work together to stop child marriage and protect every child's right to education, safety, and a healthy life.
Message: "Let Children Learn, Grow, and Dream — Say No to Child Marriage!"

3. 21 June is celebrated as International Yoga Day. Organise a small camp with the help of your teachers and practise some asanas.

Title: Organisation of a Small Yoga Camp on International Yoga Day
Aim: To organise a small yoga camp with the help of teachers and practise yoga asanas for physical fitness and mental well-being.
Hypothesis: Regular practice of yoga improves physical health, concentration, flexibility, and mental peace.
Materials Required: Yoga mats or floor mats, Drinking water, Comfortable dress, Open ground or hall
Method / Procedure:

1. Discuss the importance of International Yoga Day in the classroom.
2. Arrange a small yoga camp with the help of teachers.
3. Gather students in the school ground or hall.
4. Begin the session with simple warm-up exercises.
5. Practise different yoga asanas under teacher guidance.
6. Perform breathing exercises and meditation.
7. Observe the physical and mental feelings after yoga practice.
8. Record the activities and observations.

Name of Asana	Benefits
Tadasana	Improves posture and balance
Vrikshasana	Increases concentration and stability
Bhujangasana	Strengthens back muscles
Vajrasana	Helps in digestion
Padmasana	Helps in meditation and relaxation
Pranayama	Improves breathing and reduces stress

Observations and Data:

Activity	Observation
Warm-up exercises	Body became active and relaxed
Yoga asanas	Improved flexibility and balance
Breathing exercises	Felt calm and refreshed
Meditation	Improved concentration and peace of mind

Applications:

1. Helps maintain physical fitness and flexibility.
2. Reduces stress and improves mental health.

3. Improves concentration and discipline among students.

Result: Students actively participated in the yoga camp and experienced freshness, relaxation, and improved concentration.

Conclusion: Yoga helps maintain physical fitness and mental well-being. Practising yoga regularly improves flexibility, breathing, concentration, and reduces stress. International Yoga Day creates awareness about healthy living through yoga.

References: 7th Science Textbook, Guidance from yoga teacher/science teacher, Classroom discussion and observation.

Acknowledgements: I sincerely thank my teachers, parents, and classmates for their support and guidance in organising and participating in the yoga camp successfully.

Activities

Activity 6.1

Aim: To observe changes that occur during adolescence.

Materials required: Paper slips, jar, pen.

Procedure: 1. Write different changes noticed during growing age on paper slips.
2. Fold the slips and place them in a jar.
3. Pick the slips one by one and discuss the changes.

S.No	Change	Your observation
1	Height	Height increases rapidly during adolescence.
2	Weight and strength	Weight and strength increase with growth.
3	Appearance	Changes occur in body structure and appearance
4	Behaviour and emotions	Mood swings and emotional changes are observed.

Observation: Changes such as increase in height, weight, voice, and appearance are observed.

Conclusion: Many physical changes occur during adolescence.

Activity 6.2

Aim: To list emotional and behavioural changes during adolescence.

Materials required: Notebook and pen.

Procedure: 1. Think about emotional and behavioural changes in yourself or friends.
2. Write them in a table.
3. Discuss their effects and positive ways to manage them.

Key emotional changes	Probable effect on behaviour	Ways for positive growth and development
Mood swings	Engage in varied activities like music, dance or sports	Self-exploration and involvement in activities that may lead to creativity and innovation.
Strong emotions	Increased sensitivity	Compassion, involvement in social work
Curiosity and excitement	Interest in learning new things and trying new activities.	Participation in creative educational and skill-based activities.

Observation: Mood swings, strong emotions, and increased sensitivity are noticed.

Conclusion: Adolescents experience emotional and behavioural changes that can be managed positively.

Activity 6.3

Aim: To identify healthy foods and nutrients needed during adolescence.

Materials required: Pictures or samples of healthy foods, notebook.

Procedure: 1. List different healthy foods.
2. Identify the nutrients present in them.
3. Write their functions in the body.

Food Sources	Nutrients we get from them	Function of these Nutrients
Milk, millets, curd, cheese and paneer	Calcium, proteins, fats	To help optimal bone growth
Eggs, fish, pulses and nuts	Proteins	To help proper growth, gain strength and improve levels of energy.
Spanish, Kidney beans and dried fruits like raisins and figs	Iron	To help in the formation of blood

Observation: 1. Milk gives calcium and protein.
2. Spinach provides iron.
3. Different foods supply different nutrients.

Conclusion: A balanced diet is important for healthy growth during adolescence.

Activity 6.4

Aim: To spread awareness about responsible social media behaviour.
Materials required: Chart papers, colours, pens.
Procedure: 1. Prepare posters or pamphlets about safe social media use.
2. Write important do's and don'ts.
3. Display them in school or classroom.

Do's	Dont's
Be respectful and kind	Do not share personal photos with strangers/ virtual friends
Think before posting	Do not spread false information or rumours.
Protect privacy	Do not use abusive or hurtful language online

Observation: Students learn safe and respectful use of social media.
Conclusion: Responsible use of social media helps avoid cyberbullying and protects privacy.

TABLES

Table 6.1: Most Common Changes During Growing Up

S.No.	Change	Your Observations
1	Height	Height increases as children grow older.
2	Weight and strength	Weight and muscle strength increase with age.
3	Appearance	Changes occur in body shape, facial features, and overall appearance.
4	Behaviour	Thinking, emotions, and behaviour become more mature.
5	Voice	Voice may change, especially during adolescence.
6	Hair growth	Hair grows in different parts of the body.

Table 6.2: Emotional Changes, Their Probable Effects on Behaviour, and Ways for Positive Growth and Development

Key Emotional Changes	Probable Effect on Behaviour	Ways for Positive Growth and Development
Mood swings	Engage in varied activities like music, dance, or sports	Self-exploration and involvement in creative activities
Strong emotions	Increased sensitivity	Compassion and involvement in social work
Feeling self-conscious	Shyness or concern about appearance	Build self-confidence and maintain a positive attitude
Desire for independence	Making own decisions and seeking freedom	Take responsibility and discuss decisions with elders
Increased curiosity	Asking more questions and exploring new ideas	Encourage learning, reading, and scientific thinking
Friendship and peer influence	Spending more time with friends	Choose good friends and develop healthy relationships
Any other: Anxiety or stress	Worry about studies or future	Practice relaxation, time management, and seek guidance from parents and teachers

Table 6.3: Food Sources, Nutrients Present in Them, and Functions of These Nutrients

Food Sources	Nutrients We Get from Them	Functions of These Nutrients
Milk, millets, curd, cheese, and paneer	Calcium, proteins, fats	To help optimal bone growth, strong teeth, and energy supply
Eggs, fish, meat, pulses, and beans	Proteins	To help proper growth, gain strength, and improve energy levels
Spinach, kidney beans, dried fruits like raisins, and figs	Iron	To help in the formation of blood and prevent anaemia

Table 6.4: Do's and Don'ts to be Followed on Social Media

Do's	Don'ts
Be respectful and kind.	Do not share personal photos with strangers/virtual friends.
Think before posting.	Do not post hurtful, rude, or false messages.
Protect privacy.	Do not share passwords or personal information online.

Competency Based Questions

Multiple Choice Questions

1. Ravi noticed that his height increased rapidly during middle school. This stage is called
A) Infancy B) Childhood C) Adolescence D) Old age
2. Which period is often called the transition stage between childhood and adulthood?
A) Infancy B) Childhood C) Adolescence D) Old age
3. During adolescence, the body changes mainly due to:
A) Weather B) Hormones
C) Food colour D) Air pressure
4. A balanced diet is important during adolescence because
A) Growth is rapid B) Students play games only
C) School timings increase D) Sleep decreases
5. Which nutrient is especially important for muscle growth?
A) Vitamins B) Minerals C) Proteins D) Water
6. A girl often feels tired and weak. The doctor says she has anaemia. This is mainly due to deficiency of
A) Calcium B) Iron C) Vitamin C D) Iodine
7. Which of the following is a healthy habit?
A) Skipping breakfast B) Sleeping late daily
C) Regular exercise D) Eating junk food frequently
8. Good hygiene helps to
A) Increase diseases
B) Keep the body clean and healthy
C) Reduce growth D) Increase stress
9. Which food is most suitable for a balanced diet?
A) Chips and soft drinks B) Only rice
C) Rice, vegetables, pulses, fruits and milk
D) Only sweets
10. What is the main purpose of adolescence?
A) Body growth and development
B) Decrease in learning C) Stop physical changes
D) Reduce energy needs
11. Which of the following is a physical change during adolescence?
A) Increase in height B) Learning mathematics
C) Reading books D) Watching television
12. Maintaining personal hygiene can help prevent
A) Infections B) Growth C) Learning D) Exercise
13. A student eats only fast food every day. What may happen?
A) Better nutrition B) Balanced growth
C) Nutritional deficiencies D) Increased immunity
14. Which stage comes immediately after childhood?
A) Infancy B) Old age
C) Adolescence D) Adulthood
15. Which of the following is NOT a healthy habit?
A) Drinking clean water B) Regular exercise
C) Eating stale food D) Sleeping adequately
16. Why is iron-rich food important for adolescents?
A) To improve eyesight only B) To prevent anaemia
C) To reduce height D) To stop growth
17. Which food is rich in protein?
A) Pulses B) Sugar C) Salt D) Oil
18. A student washes hands before meals. This practice promotes
A) Hygiene B) Pollution C) Deficiency D) Disease
19. Which of the following contributes to good health?
A) Balanced diet B) Junk food only
C) Lack of sleep D) No exercise
20. The ability of living organisms to produce young ones is called
A) Nutrition B) Respiration
C) Reproduction D) Excretion
21. What is the correct sequence of human life stages?
A) Childhood → Infancy → Adolescence → Adulthood
B) Infancy → Childhood → Adolescence → Adulthood
C) Adolescence → Childhood → Adulthood → Old age
D) Childhood → Adulthood → Infancy → Old age
22. A student feels energetic because of healthy food and exercise. This indicates
A) Good health B) Disease
C) Deficiency D) Infection
23. Which mineral is essential for strong bones and teeth?
A) Iron B) Calcium C) Sodium D) Potassium
24. Why do adolescents need more nutritious food than younger children?
A) Due to rapid growth and development
B) Due to fewer activities
C) Due to less energy use D) Due to shorter height
25. A child who eats vegetables, fruits, milk and pulses regularly is likely to
A) Become unhealthy B) Have balanced nutrition
C) Develop deficiencies D) Stop growing
26. Which of the following is a sign of healthy living?
A) Regular physical activity
B) Sleeping very late daily
C) Skipping meals D) Eating junk food often
27. Why should adolescents avoid substance abuse?
A) It improves growth B) It is harmless
C) It affects health and development
D) It increases immunity
28. A student plans a daily routine with study, play, healthy food and sleep. This reflects
A) Healthy lifestyle B) Poor hygiene
C) Nutritional deficiency D) Disease
29. Which scientific skill is developed when students compare childhood and adolescence?
A) Observation and analysis B) Singing
C) Drawing only D) Memorization only
30. Why is adolescence considered an important stage of life?
A) It prepares individuals for adulthood
B) It stops physical growth
C) It reduces learning ability
D) It eliminates body changes

Answers

1. C	2. C	3. B	4. A	5.C	6.B	7.C	8. B	9.C	10.A	11.A	12.A	13.C	14.C	15.C
16.B	17.A	18.A	19.A	20.C	21.B	22.A	23.B	24.A	25.B	26.A	27.C	28.A	29.A	30.A

2 Marks Questions

1. A 13-year-old boy notices his voice becoming deeper. What stage of life is he experiencing?
Ans: i) He is experiencing **adolescence**. ii) Voice change is a common physical change during adolescence.

2. Why do adolescents grow rapidly in height?
Ans: i) Hormones released during adolescence promote growth. ii) This leads to a rapid increase in height.

3. Why do pimples commonly appear during adolescence?
Ans: i) Oil secretion from skin glands increases. ii) This may block pores and cause pimples.

4. What is puberty?
Ans: i) Puberty is the stage when the body develops reproductive capability.
ii) It marks the beginning of adolescence.

5. Why is personal hygiene important during adolescence?
Ans: i) It helps prevent infections and diseases. ii) It keeps the body healthy and clean.

6. Name two nutrients important during adolescence.
Ans: i) Proteins ii) Vitamins

7. Why is regular physical exercise important during adolescence?
Ans: i) Exercise keeps the body fit and healthy. ii) It improves stamina and strength.

8. Why should adolescents avoid harmful substances such as tobacco and alcohol?
Ans: i) They damage health and may cause addiction. ii) They affect growth and development.

4 Marks Questions

1. Mention any four physical changes that occur during adolescence.
Ans: i) Increase in height. ii) Increase in weight and strength.
iii) Appearance of hair in different body parts. iv) Changes in voice.

2. Explain the role of hormones during adolescence.
Ans: i) Hormones are chemical substances produced in the body. ii) They regulate growth and development.
iii) They cause physical changes during adolescence. iv) Testosterone and estrogen are important hormones.

3. Why is a balanced diet necessary during adolescence?
Ans: i) Adolescents grow rapidly. ii) They need more energy.
iii) Nutrients help body growth and development. iv) A balanced diet keeps them healthy and active.

4. Explain menstrual cycle briefly.
Ans: i) Menstruation begins during adolescence in girls. ii) It usually occurs once every 28–30 days.
iii) Blood is discharged from the body for a few days. iv) It is a natural and healthy process.

5. What are emotional changes seen during adolescence?
Ans: i) Mood swings. ii) Strong emotions. iii) Increased sensitivity. iv) Desire for independence.

6. Mention four practices of personal hygiene during adolescence.
Ans: i) Bathing regularly. ii) Keeping the body clean.
iii) Wearing clean clothes. iv) Maintaining menstrual hygiene.

7. Why is a balanced social life important for adolescents?
Ans: i) It develops mutual respect. ii) It improves communication skills.
iii) It promotes healthy relationships. iv) It supports emotional well-being.

8. Mention four life skills needed during adolescence.
Ans: i) Effective communication. ii) Decision making. iii) Problem solving. iv) Coping with emotions.

8 Marks Questions

1. Explain the physical changes that occur during adolescence.
Ans: i) Height increases rapidly. ii) Weight and strength increase.
iii) Body structure changes. iv) Voice changes, especially in boys.
v) Hair appears in armpits and pubic region. vi) Facial hair develops in boys.
vii) Girls develop breasts. viii) Pimples may appear due to increased oil secretion.

2. Explain the importance of nutrition during adolescence.
Ans: i) Adolescence is a period of rapid growth. ii) Proteins help body building and growth.
iii) Carbohydrates provide energy. iv) Fats provide stored energy.
v) Vitamins protect from diseases. vi) Minerals help proper body functioning.
vii) Calcium strengthens bones and teeth. viii) Iron helps in blood formation.

3. Explain the importance of personal hygiene during adolescence.
Ans: i) Personal hygiene prevents infections. ii) Regular bathing keeps the body clean.

ii) Clean clothes maintain good health. iv) Proper menstrual hygiene is important for girls.
v) Hygiene reduces body odour. vi) It promotes confidence and well-being.
vii) Clean surroundings support health. viii) Good hygiene habits continue throughout life.

4. Explain emotional and behavioural changes during adolescence and ways to manage them.

Ans: i) Adolescents may experience mood swings. ii) They may become more sensitive.
iii) Strong emotions are common. iv) Behavioural changes occur due to growth and development.
v) Participation in sports helps manage emotions. vi) Talking with parents and teachers provides support.
vii) Positive activities improve confidence. viii) Self-control and understanding help emotional balance.

5. Explain the importance of physical activities during adolescence.

Ans: i) Physical activities improve fitness. ii) They strengthen muscles and bones.
iii) Exercise increases stamina. iv) It improves overall health.
v) Sports develop teamwork. vi) Physical activity reduces stress.
vii) It supports healthy growth. viii) Regular exercise promotes a healthy lifestyle.

6. Explain why adolescents should avoid harmful substances.

Ans: i) Harmful substances include tobacco, alcohol and drugs. ii) They affect lungs and other organs.
iii) They can cause addiction. iv) They affect physical growth.
v) They reduce concentration. vi) They may cause serious health problems.
vii) Healthy habits protect well-being. viii) Adolescents should learn to say "No" to such substances.

7. Explain the role of life skills in adolescence.

Ans: i) Life skills help adolescents handle challenges. ii) Communication improves relationships.
ii) Decision making helps choose wisely. iv) Problem solving develops confidence.
v) Coping with emotions reduces stress. vi) Interpersonal skills improve social interactions.
vii) Coping with stress promotes mental well-being. viii) These skills help in successful adulthood.

8. A 14-year-old student feels confused due to physical and emotional changes. What advice would you give based on the chapter?

Ans: i) Understand that adolescence is a natural stage of life. ii) Physical and emotional changes are normal.
iii) Eat a balanced diet. iv) Maintain personal hygiene.
v) Participate in sports and physical activities. vi) Share concerns with parents, teachers or elders.
vii) Avoid harmful substances and bad habits. viii) Develop life skills and make healthy decisions.
ix) Stay confident and positive during adolescence.

GENERAL SCIENCE HANDBOOK

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