Chapter 4 : Sorting Materials into Groups

BASIC CONCEPTS – A FLOW CHART

Grade : VI

Subject : Science

CLASSIFICATION

Grouping the objects on the basis of their similarities and dissimilarities.

Materials are classified Based on Their Properties

Features of characteristics of a material such as its strength, transparency, conduction, etc., are called its properties.

Advantages of Classification

- Helps in identification of objects
- Helps in sorting of objects.
- Helps in locating things
- Makes study different objects easy and more meaningful rather than studying each object separately.
- Helps to understand similarities and dissimilarities among objects.

Appearance

- Lustre: some materials have a shiny luster.
- Example: gold, silver. Some have no luster, and appear to be dull. Example. Sulphur, phosphorus.
- **Roughness:** Materials can have smooth surface (example: marble) or rough surface

Example: road.

Hardness

- A hard substance is one that cannot be scratched or cut easily.
- Diamond is the hardest Substance. Substances which can be scratched or compressed easily are called soft substances. Example: Talc.

Solubility

- Substances which completely disappear or dissolve in water liquid are called Soluble. Example: sugar, salt, etc.
- Substances which do not mix with water and not disappear or dissolve are called insoluble. Example : chalk powder, Sand etc.

Float/sink

- Substance will only float if its density is less than that of the surrounding liquid will sink if its density is greater than that of the surrounding liquid.

Transparenc

- Substances through which things can be seen are called **transparent.**'
- Example. Air, water, glass.
- Substances through which things cannot be seen are called **Opaque.**
- Example: box, metal container
- Substances through which things can be partly seen are called **transparent.**

Example: butter

Conduction of Heat

- Substances that allow heat to pass through them are called good conductors of heat. Example: metals.
- Substances that do not let heat pass through them are called bad conductors of heat. Example : wood, plastic .

States of matter

- Materials are of three types based on their states – solid, liquid and gas.
- Solids are incompressible materials with closely packed molecules.
- Liquids are nearly incompressible materials with less closely packed molecules.
- Gases are compressible materials with

Conduction of Electricity

- A material that allows electricity to pass through easily is called an electrical conductor. Example : metals.
- A poor electrical conductor is also called an electrical insulator. Example. Wood Plastic and rubber.

Attraction Towards magnets

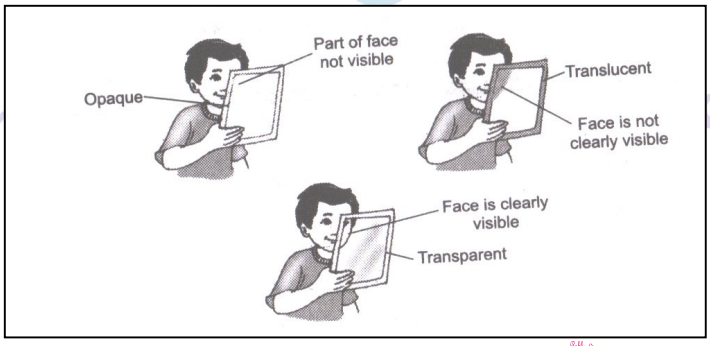
- Solids that get attracted to a magnet are called magnetic materials. Example: iron.
- Solids that do not get attracted towards magnets are known as non – magnetic materials. Example: glass, plastic

Combustibility

- Substances which burn heating at a particular temperature called combustible substances.
- **Combustible solids:** Wood, Paper, coal.
- **Combustible liquids:** Petrol, diesel, ghee, alcohol.
- **Combustible**

I. Know the Terms

- **Material:** The matter from which something is or can be made is called material.
- **Hard:** A material which is difficult to compress or scratch is said to be hard.
- **Insoluble:** Substances which do not mix with water and do not disappear in water even after stirring for a long time are called insoluble in water.
- **Soluble:** Substances which completely disappear or dissolve in water are called soluble in water.
- **Lustre:** Materials that are shiny, or their freshly cut surfaces are shiny are called lustrous materials and their shine is called lustre. Materials that have lustre are usually metals.
- **Metal:** It is a hard, shiny, solid material which is able to be shaped and can conduct electricity and heat.
- **Transparent:** The materials through which things can be seen clearly and light can pass through them are said to be transparent.
- **Translucent:** The materials through which objects can be seen but not clearly and light can pass partially through them are said to be translucent.
- **Opaque:** The materials through which we are not able to see or light cannot pass through them is said to be opaque.
- **Rough:** An object having an uneven or irregular surface, not smooth or levelled as polished is said to be rough.
- **Soft:** A material which can be compressed or scratched easily is called soft.
- **Appearance:** The materials look different from each other eg. Gold appears different from the iron.
- **Non metals:** They are commonly soft, broken into pieces on being beaten eg. carbon, sulphur, oxygen.
- Materials can be grouped on the basic of whether they are opaque, transparent or translucent materials. This can be tested by looking through them.



- Dividing materials in group makes it convenient and systematic to study their properties and also observe any patterns in these properties.

II. Know the Terms

- **Matter :** Anything that occupies space and has mass.
- **Texture :** The feel and physical appearance of any material.
- **Miscible :** Liquids that mix well with one another.
- **Immiscible :** Liquids that do not mix with one another.

III. Know the Facts

- **Properties of solids, liquids and gases.**

S.No	Properties	Solids	Liquids	Gases
1	Shape	Definite	Take the shape of container	Indefinite
2	Volume	Definite	Definite	Indefinite
3	Arrangement of particles	Tightly packed	Less tightly packed	Loosely packed
4	Intermolecular force of attraction	Strongest	Weaker than solids but, stronger than gases	Weakest
5	Space between particles	Almost negligible	Larger than solids, but smaller than gases	Largest

I. Objective Types Questions. (1 mark each)

I. Multiple choice questions

1. Which of the following items is not soluble in water?

a. Sugar b. Salt c. Oil d. All of these

2. Which of the following will float on water?

a. Mud piece b. Cotton c. Wood piece d. Metal

3. Select a transparent substance

a. Metal b. Polished wood c. Mirror d. Glass

4. Copper metal is a :

a. Good conductor of heat b. Highly magnetic material

c. Translucent material d. Ornamental metal

5. An iron nail is kept in each of the following liquids. In which case would it lose its shine and appear dull ? **[NCERT Exemplar]**

a. Mustard oil b. Soft drink c. Coconut oil d. Kerosene

6. Pick one material from the following which is completely soluble in water**:** **[NCERT Exemplar]**

a. Chalk powder b. Tea leaves c. Glucose d. Saw dust

7. You are provided with the following materials :

i. Magnifying glass ii. Mirror iii. Stainless steel plate iv. Glass tumbler

Which of the above materials will you identify as transparent ? **[NCERT Exemplar]**

a. i. and ii. b. i. and iii. c. i. and iv. d. iii. and iv.

8. Boojho found a bag containing the following materials

i. Mirror ii. Paper stained with oil iii.Magnet iv. Glass spectacles

Help Boojho in finding out the materials. which is/are opaque : **[NCERT Exemplar]**

a. i. only b. iv. only c. i. and iii. d. ii. and iv.

9. While doing an activity in class, the teacher asked Paheli to handover a translucent material. Which among the following materials will Paheli pick and give her teacher? **[NCERT Exemplar]**

a. Glass tumbler b. Mirror c. Muslin cloth d. Aluminium foil

10. Which pair of substances among the following would float in a tumbler half filled with water ?

a. Cotton thread, thermocol b. Feather, plastic ball

c. Pin, oil drops d. Rubber band, coin

11. Which among the following are commonly used for making a safety pin ? **[NCERT Exemplar]**

a. Wood and glass b. Plastic and glass c. Leather and plastic d. Steel and plastic

12. Which of the following materials is not lustrous ? **[NCERT Exemplar]**

a. Gold b. Silver c. Wood d. Diamond

13. Which of the following statements is not true ? **[NCERT Exemplar]**

a. Materials are grouped for convenience

b. Materials are grouped to study their properties

c. Materials are grouped for fun

d. Materials are grouped according to their uses.

14. Find the odd one out from the following : **[NCERT Exempla]**

a. Tawa b. Spade c. Pressure cooker d. Eraser

15. Which type of the following materials is used for making the front glass (wind screen) of a car ? **[NCERT Exempla]**

a. Transparent b. Translucent c. Opaque d. All the above

16. Which of the following materials is hard ?

a. Butter b. Pastry c. Iron nail d. Sponge

17. Which of the following does not belong to the group ?

a. Window pane b. Cellophane sheet c. Mirror d. Air

18. Which of the following materials is not soluble it water ?

a. Salt b. Sand c. Sugar d. Honey

19. The space between particles is maximum in :

a. Solids b. Liquids c. Gases d. Both solids and liquids

20. Which of the following does not belong to the group ?

a. Ink b. Milk c. Honey d. Oil

21. The property' of a substance that decides whether it will float or sink in water is :

a. Volume b. Density c. Refractive index d. Viscosity

22. Select the odd one :

a. Glass b. Air c. Stone d. Water

1. c	2. c	3. d	4. a	5. b	6. c	7. c	8. c	9. c	10. b	11. d
12. c	13. c	14. d	15. a	16. c	17. d	18. b	19. c	20. d	21. b	22. c

I. Match the following

1. Match the items of column A with those of column B.

Column A	Column B
a. Completely disappears in water	i. Translucent
b. Air	ii. Opaque
c. Wood	iii. Transparent
d. Oiled paper	iv. Soluble

a. iv	b. iii	c. ii	d. i

II. Match the following

1. Match the objects given in Column I with the materials given in Column II.

(NCERT Exemplar)

Column I	Column II
a. Surgical instruments	i. Plastic
b. Newspaper	ii. Animal product
c. Electrical switches	iii. Steel
d. Wool	iv. Plant product

a. iii	b. iv	c. i	d. ii

2. Match the objects given below with the materials from which they could be made. Remember, an object could be made from more than one material and a given material could be used for making many objects. (NCERT Exemplar)

Objects	Materials
Book	Glass
Tumbler	Wood
Chair	Paper
Toy	Leather
Shoes	Plastic

Answers
Book – Paper
Tumbler – Glass
Chair – Wood, Plastics
Toy – Plastics, Wood
Shoe – Leather, Plastics

III. Match the following

I. Objects	Materials
a. Book	i. Wood
b. Table	ii. Paper
c. Belt	iii. Brick
d. Wall	iv. Glass
e. Cup	v. Leather

a. ii	b. i	c. v	d. iii	e. iv

II. Column A	Column B
a. Air	i. Soluble in water
b. Oiled paper	ii. opaque
c. Wood	iii. Insoluble in water
d. Salt	iv. Transparent
e. Sand	v. translucent

a. iv	b. v	c. ii	d. i	e. iii

III. Column A	Column B
a. Most metals	i. Soluble in water
b. Stone	ii. Have lustre
c. Common salt	iii. Translucent
d. Frost glass	iv. Floats in water
e. Wax	v. Sinks in water

a. ii	b. v	c. i	d. iii	e. iv

I. Fill in the blanks

Complete the following with a suitable word/words:

i. Earthen pitcher is an example of _____ object.

ii. Grouping of things is done for _____.

iii. An object can be made of different _____.

iv. The objects through which we can see are known as _____.

v. Different objects can be grouped on the basis of their _____ and _____.

vi. Materials that have lustre are usually_____.

vii. The materials through which objects can be seen but not clearly are called _____.

i. Round	ii. convenience	iii. materials	iv. transparent
v. similarities, difference	vi. metals	vii. translucent	

II. Fill in the blanks

Fill in the Blanks :

1. Metals are good _____ of heat.
2. The property which is identified with nose is _____
3. Water is _____ while mustard oil is not.
4. Oil and water are _____.
5. Ice is _____ than water.
6. Ice is _____ whereas water is _____.
7. Objects lighter than a liquid _____in that liquid.
8. A substance that does not allow heat to pass through is called _____.
9. Butter paper is _____.
10. Petrol and spirit are _____.
11. _____ have no definite shape or volume.
12. Substances that are less than water can float on water.
13. Matter is any thing that has _____ and occupies _____.
14. Materials can be classified as _____ and _____ on the basis of their texture.
15. Liquids that are soluble in one another are called _____ liquids.

1. conductors	2. odour	3. transparent	4. immiscible	5. lighter
6. solid, liquid	7. float	8. bad conductor of heat	9. translucent	10. combustible
11. Gases	12. dense	13. mass, space	14. smooth, rough	15. miscible

I. True or False

State whether the statements given below are True or False.

1. Stone is transparent, while glass is opaque.
2. A notebook has lustre while eraser does not.
3. Chalk dissolves in water.
4. A piece of wood floats on water.
5. sugar does not dissolve in water.
6. Oil mixes with water.
7. Sand settles down in water.

1. False	2. False	3. False	4. True
5. False	6. False	7. True	

1. We can see clearly through translucent things.
2. Glass is transparent.
3. Mirror is transparent.
4. A wooden box is opaque.
5. Sponge is hard.

1. False	2. True	3. False	4. True	5. False

Quiz Time

1. Name two materials that can be used for making more than one type of an object.
2. Why do we choose a particular material for preparing an object?
3. Which can be compressed easily – a sponge or a lemon?
4. A boy added 10 g common salt to 250 ml of water. The salt disappeared. Whether the salt is still present in the water or evaporated?
5. You cannot see materials through a piece of plywood. What would you call the plywood?
6. When we pour a few drops of mustard oil to water. The oil floats on the surface of water. Why?
7. Shyam was able to see cricket match that his friends were playing in the park through a window, although the window was closed. How?
8. Give example of two translucent materials other than discussed in your book.

1. Wood, Plastics
2. Properties of the material and the purpose for which the object is to be used must be compatible.
3. Sponge
4. Salt has dissolved in water and is still present in water. We can find it our by tasting the water.
5. Opaque

6. Mustard oil is lighter than water and is also insoluble in water. So, it floats.
7. Shyam was able to see the cricket match through glass window panes which were transparent.
8. i. Frosted glass, ii. Butter paper / fog.

NCERT Corner

Intext Question

1. List some materials that are used for making more than one type of object.

Given below are some materials that are used for making more than one type of object :

(i) Wood : Chair, table, bullock cart, almirah etc.

(ii) Plastic : Buckets, pipes, bottles, toys, boxes etc.

(iii) Paper : Notebooks, books, newspaper, calendars etc.

(iv) Leather : Shoes, wallets, purses, belts etc.

(v) Steel : Spoons, plates, bucket, locks etc.

2. Why is a tumbler not made with a piece of cloth

A tumbler is not made with a piece of cloth because generally tumbler is used to keep a liquid and cloth can not hold it. So, tumbler is made up of glass, plastics or metals but not with a piece of cloth.

3. Why does iron appear different from copper and aluminium ?

Iron corrodes easily in the presence of air and moisture and it looses its shine and appears dull whereas copper and aluminium maintain their shine and do not corrode easily.

4. Check whether the substance disappears in water or not.

Substance	Disappears in water/does not disappear
Salt **Sugar** **Sand** **Chalk powder** **Sawdust**	**Disappears completely in water**

Substance	Disappears in water/does not disappear
Salt	Disappears completely in water
Sugar	Disappears completely in water
Sand	Does not disappear
Chalk powder	Does not disappear
Sawdust	Does not disappear

5. Do liquids dissolve in water ?

Some liquids dissolve in water completely. Some do not dissolve in water and form a separate layer when kept aside for some time.

6. Check whether the liquid mixes or does not mix in water.

Liquid	Mixes well/Does not mix
Vinegar	**Mixes well**
Lemon juice	
Mustard oil	
Coconut oil	
Kerosene	

The solubility of liquids is shown in following table :

Liquid	Mixes well/Does not mix
Vinegar	Mixes well
Lemon juice	Mixes well
Mustard oil	Does not mix
Coconut oil	Does not mix
Kerosene	Does not mix

7. Give two examples in which gas dissolves in water.

Oxygen : It gets dissolved in water and is useful for the survival of animals.

Carbon dioxide : It gets dissolved in water. e.g., It gets dissolved in cold drinks.

8. Do gases also dissolve in water?

Some gases are soluble in water while some are not soluble in water. e.g., oxygen gets dissolved in water.

9. Why do we need to group materials ?

We often group materials for our convenience. We need to group materials for their easy study and also to study their properties.

10. Why does a shopkeeper prefer to keep biscuits and sweets in a glass or plastic container?

Glass or plastic containers are transparent in nature. The consumers can see the objects kept in such containers easily. So a shopkeeper prefers to keep biscuits and sweets in a glass or plastic container.

Textbook Questions

1. Name five objects which can be made from wood.

(i) Chair (ii) Table (iii) Door

(iv) Bullock cart wheel (v) Boat

2. Select those objects from the following which shine :

Glass bowl, plastic toy, steel spoon, cotton shirt.

Ans. Glass bowl and steel spoon.

3. Given below are the names of some objects and materials : Water, basketball, orange, sugar, globe, apple and earthen pitcher. Group them as

a. Round shaped and other shapes

b. Eatable and non-eatables.

a. **Round shaped objects :** Basketball, Orange, Globe, Apple, Earthen pitcher.

Other shape objects/materials : Water, Sugar.

b. Eatable materials : Water, Orange, Sugar, Apple.

Non-eatable materials : Basketball, Globe, Earthen pitcher.

4. List all items known to you that float on water. Check and see if they will float on an oil or kerosene.

The items that float on water are given below :

Wood, plastic ball, balloon, paper boat, feather, hair, thermocol.

They will also float on an oil or kerosene.

5. Find the odd one out from the following :

a. Chair, Bed, Table, Baby, Cupboard

b. Rose, Jasmine, Boat, Marigold, Lotus

c. Aluminium, Iron, Copper, Silver, Sand

d. Sugar, Salt, Sand, Copper Sulphate.

a. Baby	b. Boat	c. Sand	d. Sand

I. Very Short Answer Type Questions

1. Is grouping necessary? Give one reason.

Yes, grouping is necessary. By grouping, we can find required items whenever required, easily and can also compare them with similar items.

2. If you have to select a handle made of steel, wood or rubber for your screw driver, which one will you prefer and why ?

I will prefer wood, as it is insulator of electricity as well as easily workable.

3. Cotton is a soft material that can be compressed. Name two hard materials.

Metals and stones.

4. Is wood ductile or not ?

No, it is not ductile.

5. Wood is used as a fuel. Which property makes it suitable for this purpose ?

Combustibility.

6. Name two substances that do not shine.

Wood and paper.

7. Why do we need to group materials ?

We need to group materials for convenience and to gain systematic knowledge.

8. What is the basis of grouping materials ?

Materials are grouped together on the basis of similarities and differences in their properties.

9. Why does wood float on water ?

Wood is lighter than water. Therefore, it floats on water.

10. How are the gases dissolved in water important for living organisms ?

The oxygen gas dissolved in water is essential for the survival of aquatic animals and plants because they respire with its help.

11. It was Paheli's birthday. Her grandmother gave her two gifts made of metals, one old dull silver spoon and a pair of lustrous gold earrings. She was surprised to see the difference in the appearance of the two metals. Can you explain the reason for this difference ? [NCERT Exemplar]

The silver spoon tarnished on long exposure to moist air and lost its shine and appears dull while gold does not tarnish or corrode.

12. Mixtures of red chilli powder in water, butter in water, petrol in water, and honey in water were given to Radha, Sudha, Sofia and Raveena, respectively. Whose mixture is in solution form ? [NCERT Exemplar]

Since honey gets dissolved in water so mixture of Raveena, i.e., honey in water is in solution form. Whereas red chilli powder, butter and petrol float on water.

13. On a bright sunny day, Shikha was playing hide and seek with her brother. She hide herself behind a glass door. Do you think her brother would be able to locate her. If yes, why ? If not, why not ? [NCERT Exemplar]

Yes, I think that her brother would be able to locate her because glass door is a transparent material.

14. Take a small cotton ball and place it in a tumbler/ bowl filled with water. Observe it for at least 10 minutes. Will it float or sink in water and why ? [NCERT Exemplar]

Ans. Cotton ball when placed in a tumbler filled with water, initially floats on water but after few minutes (i.e., 10 minutes), it will sink in water because it absorbs water.

15. Name the two gases used by aquatic plants and animals, that are soluble in water.

Oxygen and carbon dioxide.

II. Very Short Answer Type Questions

1. Which property of gases helps us in detecting leakage of cooking gas?

The property of diffusion.

2. What do you understand by the word 'classification'?

Classification means grouping the things on the basis of their similarities and dissimilarities.

3. Rahav has a opaque paper. A liquid drops on it, making the paper translucent, can you name the liquid that made the paper translucent?

It was an oil drop.

4. Give an example to explain that one object can be made from different materials.

A plate can be made from steel, glass or plastic.

5. Give one example to explain that different materials are used to make one object.

A bag is made of cloth, plastic and metal.

6. What is a combustible material?

A material which burns on heating at a particular temperature is a combustible material.

III. Very Short Answer Type Questions

1. Suggest two bases on which we can group objects.

(i) Material used in making the object, e.g. wood or metal/plastic.

(ii) Material of the object is soft or hard, or substance is soluble or insoluble in water.

2. Is a substance which can be compressed soft or hard?

Soft.

3. Select a lustrous material out of the following substances: Wood, aluminium, plastic, cotton.

Aluminium.

4. Which material is generally used for making pens?

Plastic or metal.

5. Is oil soluble in water?

Oil does not dissolve in water so it is insoluble in water and floats on the surface of water.

6. Name two objects which are made from opaque materials.

Wooden doors, blackboard/steel plate.

7. What is common between salt and sand?

Both have mass and are in solid state.

8. List three liquids which are transparent.

Water, alcohol and Acetone/Benzene.

9. Write two substances which are made from leather.

Belt and shoes.

10. Name some substances which are made from plastics.

Toys, plates, cups, buckets, baskets.

11. Which is more hard, sponge or iron?

Iron is harder than sponge.

12. Name two gases which are insoluble in water.

Hydrogen and Nitrogen.

13. What are translucent objects?

The materials through which we can see but not clearly

14. Give two examples of translucent objects.

Rubber glass, oily paper, x-ray film etc.

15. Write the name two examples of transparent objects.

Water and glass

16. Name Two opaque materials.

Wall and Wood

17. What is the shape of full moon.

Round

18. Name a liquid metal.

Mercury (Hg)

19. Name a liquid non metal.

Bromine (Br)

I. Short Answer Type Questions.

1. Sugar, salt, mustard oil, sand, sawdust, honey, chalk power, petals or flowers, soil, copper sulphate crystals, glucose, wheat flour are some substances given to Paheli. She wants to know whether these substances are soluble in water or not. Help her in identify soluble and insoluble substances in water. [NCERT Exemplar]

Soluble in water : Sugar, Salt, Honey, Copper sulphate crystals, Glucose.

Insoluble in water : Mustard oil, Sand, Sawdust, Chalk powder, Soil, Petals of flower, Wheat flour.

2. How is density of an object related to its floating or sinking?

An object will only float if its density is less than that of the surrounding liquid. It will sink if its density is greater than that of the surrounding liquid.

3. Why do you think oxygen dissolved in water is important for the survival of aquatic animals and plants? [NCERT Exemplar]

Dissolved oxygen is available for animals and plants for respiration and survival.

II. Short Answer Type Questions

1. Why is water called universal solvent ?

Water is called universal solvent as it can dissolve maximum materials.

2. Why don't we use steel handles in utensils ?

Steel is a good conductor of heat, so it cannot be used as handle in utensils.

3. Name two translucent objects.

Butter paper and oiled paper are two examples of translucent objects.

4. Mustard oil and grease both are insoluble in water, but mustard oil floats whereas grease settles down, why?

Mustard oil is lighter than water hence it floats, while grease is heavier thus sinks.

5. Why don't we use papers to prepare tables and chairs ?

Paper is not hard and can get easily wet with water. Moreover, it is highly combustible and hence not used to make furniture.

6. Name two objects that can float on water and two objects which sink in water.

The objects which can float on water are : dried leaves and wood. The objects which sink in water are : a piece of iron and stone.

7. Name any two water soluble and water insoluble materials.

Soluble materials - Salt and sugar. Insoluble materials - Sand and chalk.

8. Define translucent materials. Give an example.

The materials through which objects are partially visible, are known as translucent materials, e.g., butter paper.

9. What type of materials float on the surface of water? Give two examples.

Materials which are lighter than water, float on water. Wood and oil are lighter than water and float on it.

10. How can you convert an opaque white paper into a translucent paper ?

An opaque white paper can be converted into a translucent paper by dropping some oil on it.

11. Write three advantages of grouping .

(1) It helps in gaining systematic knowledge of things.

(2) It gives a general idea about all the members of a group and the differences between the members of different groups.

(3) It is convenient to work with all members of a group after knowing their properties.

12. What do you mean by the hardness of materials ? Explain with an example.

Hardness is the property of materials that can be found out by pressing the materials. A material may be soft or hard.

Soft materials : The materials which can be compressed easily are known as soft materials. e.g., -cotton, sponge, etc.

Hard materials : The materials that are difficult to compress are known as hard materials. e.g., - iron, wood, etc.

13. How can materials be classified on the basis of physical state ?

Materials can be classified into three groups on the basis of physical state:

Solids : They have definite shape and volume, e.g., iron, ice, etc.

Liquids : They have definite volume but do not have definite shape, e.g., water.

Gases : They do not have definite shape and volume, e.g., air

14. What are lustrous materials ? Give two examples.

The materials which have shining surface are called lustrous materials. Gold and silver are examples of lustrous materials.

15. Which among the following materials would be identify as soft materials and why ?

Ice, rubber band, leaf, eraser, pencil, pearl, a piece of wooden board, cooked rice, pulses and fresh chapati. [NCERT Exemplar]

Rubber band, leaf, eraser, cooked rice and fresh chapati are soft materials because these materials can be compressed or stretched easily.

16. Give an example each of a combustible solid, liquid and gas.

Coal is a combustible solid, petrol is a combustible liquid and CNG is a combustible gas.

17. You are provided with the following materials-turmeric, honey, mustard oil, water, glucose, rice flour, groundnut oil.

Make any three pairs of substances where one substance is soluble in the other and any three pairs of substances where one substance remains insoluble in the other substance.

[NCERT Exemplar]

Substances which are soluble in the other substance are :

(a) Honey in water

(b) Glucose in water

(c) Groundnut oil in mustard oil

Substances which are insoluble in the other substance are :

(a) Turmeric in water

(b) Rice flour in water

(c) Mustard oil in water

18. During summer holidays, a group of children collected a lump of salt, green grass, broken glass piece, a small thermocol box, pen, iron nail, glass marbles, hair, naphthalene ball, a piece of sugar candy (mishri) and tried to group them on the basis of properties given in Table 4.1 below. Help them in filling the Table.

Table 4.1

Name of the material	Appearance (Hard/Soft)	Transparency (Transparent/ Translucent /Opaque)	Floats/Sinks in water	Soluble/ Insoluble in water

[NCERT Exemplar]

The complete table with properties of given materials is shown below :

Name of the material	Appearance (Hard/Soft)	Transparency (Transparent/ Translucent /Opaque)	Floats/Sinks in water	Soluble/ Insoluble in water
Lump of salt	Hard	Opaque	Sinks	Soluble
Green grass	Soft	Opaque	Floats	Insoluble
Broken glass piece	Hard	Transparent	Sinks	Insoluble
A small thermocol box	Soft	Opaque	Floats	Insoluble

Pen	Hard	Opaque	Sinks	Insoluble
Iron nail	Hard	Opaque	Sinks	Insoluble
Glass marbles	Hard	Transparent	Sink	Insoluble
Hair	Soft	Opaque	Floats	Insoluble
Naphthalene ball	Hard	Opaque	Sinks	Insoluble
A piece of sugar candy (mishri)	Hard	Translucent	Sinks	Soluble

19. Arrange the jumbled words to arrive at the appropriate names of materials and also write two uses of each.

(a) milaunuim

(b) tcaslpi

(c) soekrnee

(d) gaviner **[NCERT Exemplar]**

(a) Aluminium : Uses - in foil and aircrafts
(b) Plastic : Uses - in bucket and pencil box
(c) Kerosene : Uses - as fuel and solvent
(d) Vinegar : Uses - as food ingredient and preservative

20. Pick five objects from the word box given in Fig. Which are opaque and would sink in water.

O	S	T	P	L	E
A	T	L	E	E	R
C	O	I	N	A	A
O	N	K	C	F	S
A	E	E	I	W	E
L	L	Y	L	R	R

The objects in figure, which are opaque and sink in water, are show below.

O	S	T	P	L	E
A	T	L	E	E	R
C	O	I	N	A	A
O	N	K	C	F	S
A	E	E	I	W	E
L	L	Y	L	R	R

i. Coal ii. Stone iii. Coin iv. Pencil v. Eraser

III. Short Answer Type Questions

1. Write any four properties of materials.

(a) Appearance (b) Hardness (c) Solubility

(d) Float or sink in water (e) Transparency

2. Why is a tumbler not made with a piece of cloth?

We use tumblers made of glass, plastic and metal to keep a liquid. These substances can hold a liquid.

A tumbler made of cloth cannot hold a liquid because: (i) Cloth piece is not hard enough to hold liquids and (ii) Cloth piece has very minute pores through which the liquid oozes out.

3. What are the similarities between iron, copper and aluminium?

(a) They all have lustre (b) They are all metals (c) They are hard

4. Mention some materials which are made up of paper.

Books, notebooks, newspapers, toys, calendars, etc.

5. Why is water important for our body?

Water can dissolve a large number of substances, so it is needed by the body. It is also major part of our body cells.

6. What is the basis for sorting materials?

Materials are grouped on the basis of similarities or dissimilarities in their tit properties.

7. Make a table of objects and the materials they are made of.

Objects	Materials they are made of
Plate (thali)	Steel, glass, plastic (any other)
Pen	Plastic, metal
Bucket	Plastic, metal
Knife	Steel/metal, wood/plastic

8. Make a table of different types of objects that are made from the same material.

S.No	Objects	Materials they are made of
1	Wood	Chair, table, plough, bullock cart and its wheels
2	Paper	Books, notebooks, newspaper, toys, calendars
3	Leather	Shoes, belts, purses, jackets, suitcase, bags
4	Plastics	Buckets, chairs, tables, bags, briefcase, lunch box
5	Cotton	Clothes, bandage, bed sheets, cushions, bags
6	Iron	Chairs, tables, doors, bathroom fittings, mesh, wheels and other railway goods

9. Metals have lustre (shine). Give reason why some metal articles become dull and loose their shine.

Metals when exposed to air react with moisture and gases present in it, thereby forming a dull layer of some other compound on it.

10. Kerosene, coconut oil, mustard oil do not dissolve in water, even on shaking. They separate after sometime forming two different layer. Explain why.

The molecules of water do not intermingle (mix) with the molecules of oil. The space between the molecules of water is not taken by oil, so they are immiscible in water.

11. Name a non-metal that has lustre.

Iodine.

12. Metals generally occur in solid state and are hard. Name a metal that exists in liquid state and a metal that is soft and can be cut with knife.

Mercury is a metal that exists in liquid state. Sodium and Potassium are soft metals and can be cut with knife.

13. Name the naturally occurring hardest substance known.

Diamond, it is made up of carbon (non-metal).

14. Why water is called a universal solvent?

Water dissolves a large number of substances in it. So it is called universal solvent.

15. Write two advantages of grouping materials.

(i) It helps to locate the objects easily.

(ii) It makes easy to study the properties of materials.

16. Define the term solubility.

How much substance dissolved in a particular amount of water is known as solubility.

17. Sort out the metals and non metals from the following - Iron, Carbon, Copper and Oxygen

Metals : Iron, and Copper

Non Metals : Carbon and Oxygen

I. Long Answer Type Questions.

1. (a) What do you understand by the term `classification'?

(b) Differentiate between transparent and opaque materials. Give two examples for each.

(c) How can we make a normal paper translucent ?

(a) Classification means grouping the things on the basis of their similarities and dissimilarities.

(b)

Transparent materials	Opaque materials
Those materials through which things can be seen are called transparent materials. e.g., glass, water	Those materials through which things can not be seen are called opaque materials. e.g., wood, card-board.

(c) We can make a normal paper translucent by putting few drops of oil on it.

2. Chalk, iron nail, wood, aluminium, candle, cotton usually look different from each other. Give some properties by which we can prove that these materials are different.

[NCERT Exemplar]

There are following properties by which we can prove that these materials are different:

Material	Lustre	Hardness/ softness	Roughness/ smoothness
Chalk	-	Soft	Rough
Iron nail	Lustrous	Hard	Rough
Wood	-	Hard	Rough
Aluminium	Lustrous	Hard	Smooth
Candle	Lustrous	Soft	Smooth
Cotton	-	Soft	Smooth

3. Why do you think oxygen dissolved in water is important for the survival of aquatic animals and plants ? **[NCERT Exemplar]**

The aquatic animals and plants need dissolved oxygen in water for respiration. It is necessary for the survival of fish, invertebrates, bacteria and underwater plants. Dissolved oxygen is also required for the decomposition of organic matter present in water. Oxygen is a necessary element to all forms of life.

4. Differentiate among opaque, translucent and transparent materials, by giving one example of each. **[NCERT Exemplar]**

Opaque, translucent and transparent materials can be differentiated as follows :

S.No.	Opaque materials	Translucent materials	Transparent materials
(i)	Materials through which things can not be seen are called opaque materials.	Materials through which things can be seen but not clearly are called translucent materials.	Materials through which things can be seen are called transparent materials.
(ii)	e.g., Card board	e.g., Oily paper	e.g., Glass

II. Long Answer Type Questions.

1. 'Grouping of objects helps the shopkeeper.' Justify the statement.

Proper grouping of objects helps shopkeeper in the following ways:

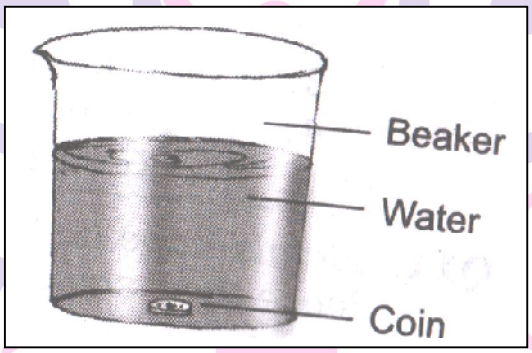
(i) He can locate the required object easily and quickly.

(ii) He can easily come to know what stocks are going to finish and he should purchase them for his customers.

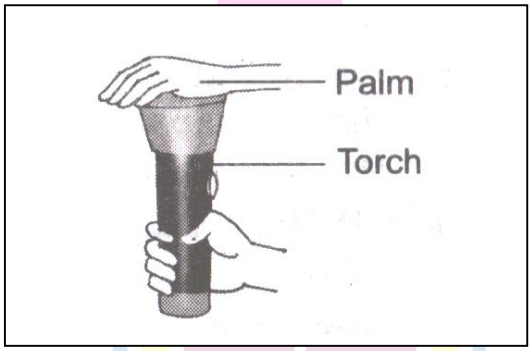
2. Describe an experiment to prove that water is transparent.

Take a beaker half-filled with clean water. Put a coin in beaker of water.

Place the beaker undisturbed for a few minutes where enough light is present. Now, observe the coin immersed in water from the top of the beaker. Are you able to see the coin? You can clearly see the coin immersed in water. This proves that water is a transparent liquid.



3. Write an experiment to show that our palm is translucent.



Experiment to show that our palm becomes translucent when light is passed.

Cover the glass of a torch with your palm at a dark place. Switch on the torch and observe from the other side of palm. We see that the light of torch passes through palm but not clearly. This experiment shows that our palm becomes translucent when a strong beam of light passes through it.

4. How can you show that some solids like sugar, salt are soluble in water whereas solids like chalk powder and sand are not soluble in water?

Collect samples of sugar, salt, chalk powder and sand. Take four beakers. Fill each one of them about two-third with water. Add a teaspoonful of sugar to the first beaker, salt to the second, chalk powder to the third and sand to the fourth. Stir the contents of each beaker with a spoon/stirrer.

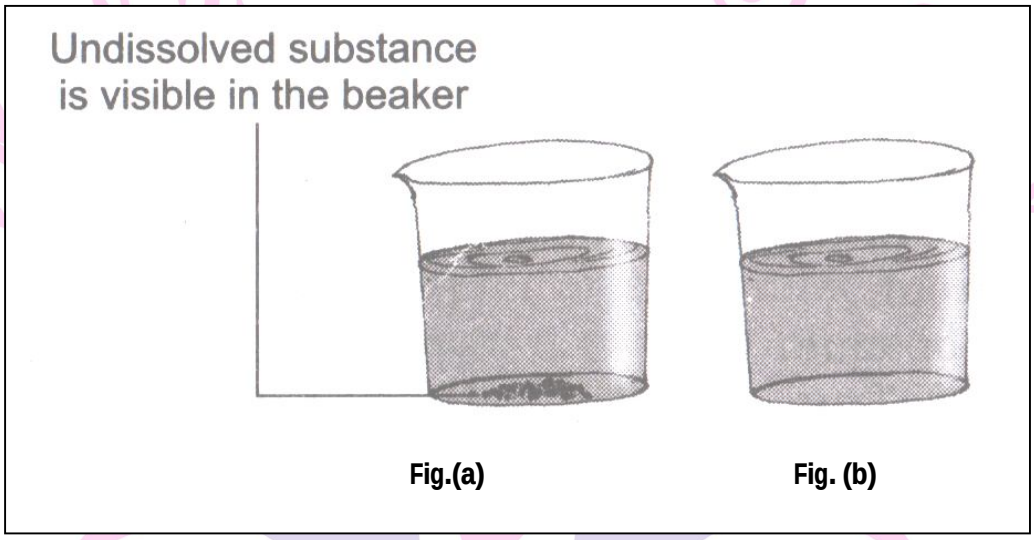


Fig.(a) **Fig. (b)**

(a) Insoluble substance **(b) Soluble substance**

Fig. (a) The solid substance is visible in water and hence insoluble (chalk powder and sand).

(b) The solid is not visible in water and hence soluble (sugar and salt).

Wait for a few minutes and observe what happens to the substances added to the water. Note down your observations in the following table.

Table: Mixing different solid materials in water

S.No.	Substance	Disappears in water/does not disappear
1	Sugar	Disappears completely in water
2	Salt	Disappears completely in water
3	Chalk powder	Does not disappear in water
4	Sand	Does not disappear in water

Inference: (i) Sugar and salt are soluble in water.

(ii) Chalk powder and sand are insoluble in water.

III. Long Answer Type Questions.

1. Given below are the names of some objects and materials.

Water, basketball, orange, sugar, globe, apple and earthen pitcher.

[NCERT Exemplar]

Group them as:

i. Round shaped and other shapes.

ii. Eatable and non-eatables.

i. Round Shaped	Other shapes
Basketball	Sugar
Orange	Apple
Globe	Earthen pitcher

ii. Eatables	Non-eatables
Water	Basketball
Orange	Globe
Sugar	Earthen pitcher
Apple	

4. How can materials be grouped together? In what ways do we classify materials?

Different materials have different properties. Materials with similar properties can be grouped together.

Different types of materials can be grouped based on any of the following properties.

- Appearance
- Solubility
- Transparency
- Conductivity
- Combustibility – Easily burn or not
- Attraction towards magnet.

I. High Order Thinking Skills (HOTS) Questions.

1. Why it is easier to hold a steel tumbler with cold milk than the one with hot milk?

It is easier to hold a steel tumbler with cold milk than the one with hot milk because steel is a good conductor of heat and steel tumbler becomes hot due to hot milk and it can burn our hands.

2. A solid is put in a bucket of water. It floats just below the surface of the water. What do you think is the density of the object in relation to the density of water?

Solid floats just below the surface of water and it neither sinks nor floats on water due to almost same density of the solid and water.

II. High Order Thinking Skills (HOTS) Questions.

1. Water and starch are mixed in a container. What kind of solution will be get?

When little amount of starch is added it will dissolve in water. But as the amount of starch increases, the solution starts thickening and forms a suspension.

III. High Order Thinking Skills (HOTS) Questions.

1. Observe the following figure and answer the questions.

i. Why should we not use a tumbler made of cloth?

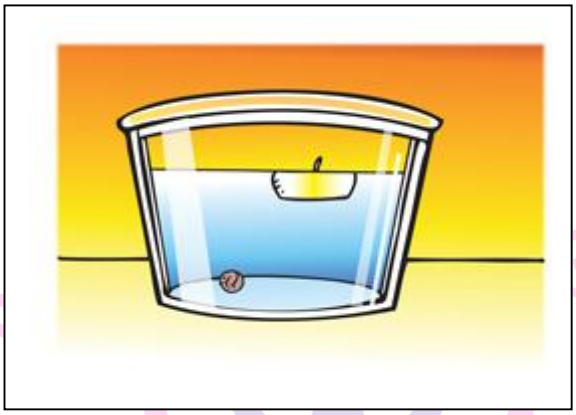
ii. What inference can we draw from it?

i. We should choose a material to make an object depending the object is to be used.

ii. We should choose a materials to make an object depending on its properties and the purpose for which the object is to be used.

2. Draw a diagram to show the various things around us.

3. Draw a picture to show objects which float or sink in water.



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