

G5S SEED O SEED

## SEED 'O' SEED

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## SEED 'O' SEED



Our Earth looks green because different kinds of plants cover it. Do you know how these plants grow on our Earth's surface?

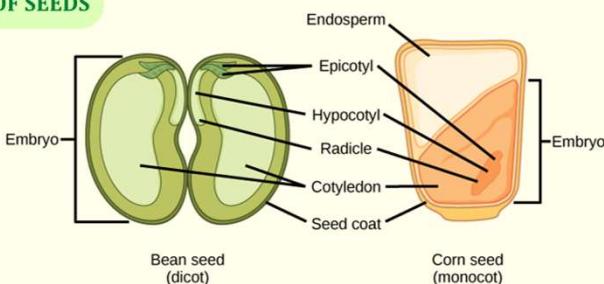


Write the names of two fruits with:

One seed \_\_\_\_\_  
Few seeds \_\_\_\_\_  
Many seeds \_\_\_\_\_

Seeds are responsible in most plants for the continuation of progeny. Seeds are special parts of the plant that are found inside the fruit of the plant. Seeds have a special structure called **cotyledon** that stores food inside them. This stored food is used by the plant when it is growing from the seed. A seed is made up of a **seed coat** and an **embryo**. The embryo is made up of a radicle, an embryonal axis and one (wheat, maize) or two cotyledons (gram and pea). A seed converts into a new plant when we sow it.

### TYPES OF SEEDS



There are two types of seeds.

(1) **Monocot:** A monocot seed has only one cotyledon, that is, the seed is not divided into two parts.

Example: Corn

(2) **Dicot:** A dicot has two cotyledons. The seed is divided into two parts.

Example: Beans

**Objective:** Students will understand the different types of seeds and their structure.

#### Opening Questions:

1. Have you ever planted a seed before? How did it grow?
2. What do you know about seeds? How do they contribute to the growth of plants?

#### Introduction:

Show the students pictures of different fruits and ask them to identify the seeds in each fruit. Discuss the importance of seeds in the life cycle of plants.

#### Guiding Questions:

1. What is the structure of a seed?
2. What is the purpose of the cotyledon?
3. How does a seed convert into a new plant?
4. How are monocot seeds different from dicot seeds?
5. Can you think of some examples of fruits that have one seed, a few seeds, or many seeds?

#### Activity:

1. Divide the class into groups and provide each group with a cut-out of a fruit (e.g. apple, watermelon, strawberry) and a collection of small seeds.
2. Instruct the students to place the seeds on the cut-out fruit according to whether it has one seed, a few seeds, or many seeds.
3. Have the groups discuss their findings and present their fruit with the seeds to the class.

#### Discussion:

1. What did you observe during the activity?
2. What similarities and differences did you notice between the fruits?
3. How do seeds contribute to the growth of plants?

#### Conclusion:

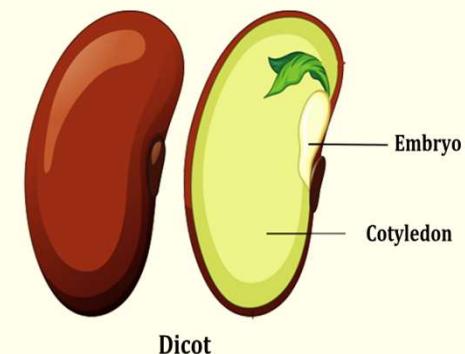
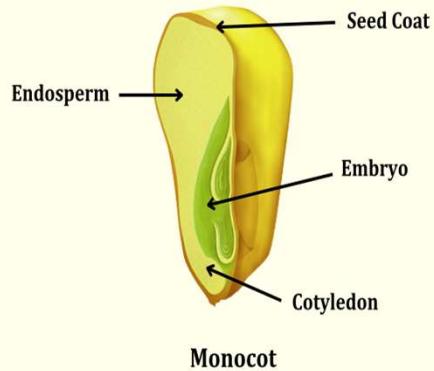
Recap the main points discussed during the lesson, emphasizing the importance of seeds in the growth and reproduction of plants.

#### Fun Activity: Joke Time

Q: Why did the tomato turn red?

A: Because it saw the salad dressing!

**Note:** This activity can be modified for virtual or at-home learning by providing images or descriptions of fruits and having students categorize the seeds accordingly.



### How long does a seed take to sprout and grow into a new plant?

Every type of plant takes different amounts of time to grow. Different seeds also take different amounts of time to sprout and grow.

#### Objectives:

- Identify the different parts of a seed.
- Understand the importance of each part in the growth of a new plant.
- Describe the differences between monocots and dicots.
- Explore the germination process of a seed.
- Develop critical thinking and observation skills.

#### Materials:

- Chart or diagram showing the parts of a seed
- Seeds (monocot and dicot)
- Sprouting tray or cups
- Soil
- Water
- Magnifying glasses

#### 1. Introduction

- Start by asking the students if they have ever looked closely at a seed and if they know what is inside it.
- Show the students a chart or diagram of a seed, pointing out the different parts (seed coat, endosperm, embryo, cotyledon).
- Ask guiding questions like: "Why do you think a seed has different parts?" "What do you think each part does?"

#### 2. Guided Discussion

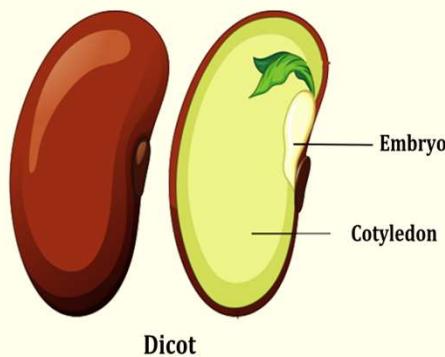
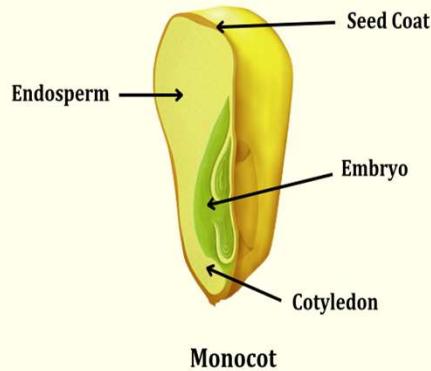
- Ask the students to describe the functions of each part of the seed.
- Encourage them to think critically and make connections between the parts and the growth of a new plant.
- Use guiding questions such as: "How does the seed coat protect the embryo?" "Why is the endosperm important during germination?"
- Write down their answers on the board for reference.

#### 3. Monocots and Dicots

- Explain the difference between monocots and dicots, referring to their seed structure (embryo and cotyledon).
- Ask questions like: "How are monocots and dicots different?" "Which type of seed do you think grows faster? Why?"

#### 4. Germination Experiment

- Divide the students into pairs or small groups.
- Give each group a sprouting tray or cup, soil, seeds, and water.
- Instruct them to plant the seeds in the soil, following the proper planting depth.
- Ask them to observe their seeds every day and record any changes they notice.
- encourage them to use magnifying glasses to get a closer look at any emerging parts.



### How long does a seed take to sprout and grow into a new plant?

Every type of plant takes different amounts of time to grow. Different seeds also take different amounts of time to sprout and grow.

### 5. Recap and Conclusion

- Gather the students back together as a whole class.
- Discuss their observations and findings from the germination experiment.
- Summarize the main points about the parts of a seed and the germination process.
- Ask the students to reflect on what they have learned and share any new insights they gained.

### 6. Activity: Seed Jigsaw Puzzle

- Give each student a copy of a seed jigsaw puzzle.
- Instruct them to cut out the pieces and then try to put it back together to form a complete seed.
- This activity will reinforce their understanding of the different parts of a seed.
- Encourage them to work together and help each other if needed.

### 7. Closure: Seed Joke

- End the lesson with a light-hearted joke related to seeds, such as: "Why did the scarecrow win an award? Because he was outstanding in his field!"

### Extensions:

1. Ask the students to research and present their findings on a specific type of seed or a plant that has interesting seed characteristics.
2. Have a class discussion on the importance of seeds in agriculture and our daily lives.
3. Conduct a seed collection activity, where students gather different types of seeds and create a display with labels and descriptions.

**Note:** Adjust the duration of each activity according to the time available for the lesson.

## Soaking and sprouting chart

Seed, Nut or Grain	Soak time	Sprout time
Alfalfa seeds	8 hours	2-5 days
Almonds seeds	8-12 hours	12 Hours
Barley seeds	6-8 hours	2 days
Broccoli seeds	8 hours	3-6 days
Buckwheat	6 hours	2 days
Clover	4-6 hours	4-5 days
Kamut	7 hours	2-3 days
Pumpkin seeds (hulled)	8 hours	1 day
Quinoa seeds	2 hours	1 day
Watercress seeds	4-6 hours	4-5 days
Sesame seeds	8 hours	1-2 days
Sunflower seeds (hulled)	2 hours	2-3 days

### Lesson Plan: Seed Soaking and Sprouting

#### Objective:

- To understand the process of seed soaking and sprouting
- To identify the optimal soak and sprout times for different seeds
- To explore the benefits of sprouting seeds

#### Materials:

- Chart of seed soaking and sprouting times (provided in the extract), Various seeds (alfalfa, broccoli, quinoa, etc.), Jars or containers for soaking the seeds, Water, Paper and pens/pencils.

#### Introduction:

1. Begin the lesson by asking the students if they have ever eaten sprouted seeds or heard of the term "seed sprouting."
  - What do they know about seed sprouting? Have they tried sprouting seeds at home?
  - Why do they think people sprout seeds? What are the benefits of seed sprouting?

#### Discussion:

2. Show the chart of seed soaking and sprouting times to the students.
  - Have the students read through the chart and notice the different times for soaking and sprouting different seeds.
  - Ask the students why they think different seeds require different soak and sprout times.
  - Prompt them to think about the size and hardness of the seeds, as well as their nutritional content.

#### Activity - Seed Soaking and Sprouting Experiment:

3. Divide the students into small groups or pairs.
4. Provide each group with a different type of seed (alfalfa, broccoli, quinoa, etc.), a jar or container, and water.
5. Instruct the students to follow the soaking and sprouting instructions for their assigned seed.
6. Ask the students to record their observations and measurements every day for a week:
  - How long does it take for their seeds to sprout?
  - What changes do they notice in the appearance and texture of the seeds?
  - How do the sprouts look and taste?

#### Discussion and Conclusion:

7. After a week, gather the students together to discuss their findings and observations from the experiment.
  - Start by asking each group to share their results and any interesting discoveries they made.
  - Lead a discussion on the benefits of seed sprouting, such as increased nutrient content and easier digestion.
  - Encourage the students to think about practical applications of seed sprouting in their daily lives.

#### Creative Activity:

8. To conclude the lesson, challenge the students to come up with a creative idea for using sprouted seeds in a recipe.
  - Ask the students to think about how they can incorporate sprouted seeds into healthy snacks, meals, or desserts.
  - Give the students time to brainstorm and write down their ideas.
  - If time permits, allow some students to share their creative recipes with the class.

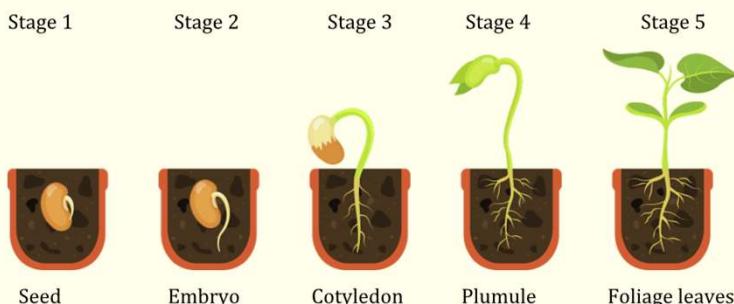
## GERMINATION

The process of changing a seed into a seedling is called **germination**. Some plants like rice, mustard, beans and mangoes grow from seeds. Flowers are the reproductive organs of such plants. Flowers dry up and change into fruits. Fruits have seeds inside them. Seeds germinate and grow into new plants. All the seeds do not grow into new plants. Some seeds are used by human beings while some are eaten by birds or animals.

## STAGES OF GERMINATION OF A SEED

Seeing a tiny seedling come out from a dry wrinkled seed and watching its growth and transformation is an elaborate process.

- (1) The first sign of germination is the absorption of water and oxygen from the air. This stage is referred to as **Imbibition**.
- (2) This activates the seeds that begins the plant growth. The seed starts to respire and store food. This is a lag phase of seed germination.
- (3) Soon the seed coat bursts open and a tiny root grows downwards whereas a shoot begins to grow upwards.
- (3) The shoot (plumule) develops and reaches towards the light while the root system develops deep in the soil.



**Objective:** To understand the process of germination and the stages involved in the growth of a seed into a seedling.

### Materials:

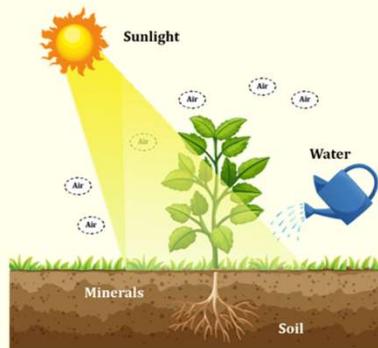
- Visual aids such as pictures or diagrams of different stages of germination, Whiteboard or chart paper, Markers or chalk

### Activity:

1. Begin the lesson by asking the students if they know what germination is and if they can give examples of plants that grow from seeds.
  - What is germination?
  - Can you give examples of plants that grow from seeds?
2. Show the students visual aids of the different stages of germination. Explain each stage using guiding questions.
  - What happens during the first stage of germination? (Imbibition)
  - What does the seed do during this stage? (Absorbs water and oxygen)
  - Why is water and oxygen important for the seed? (To activate the seed and start growth)
  - What happens during the second stage of germination? (Seed starts to respire and store food)
  - Can you think of any other living organisms that respire? Why is respiration important for a seed?
3. Draw a diagram on the whiteboard or chart paper to visually represent the stages of germination. Label each stage and ask the students to fill in any missing information.
  - What do we call the first stage of germination?
  - What happens during the second stage? (Seed coat bursts open, root grows downwards, shoot grows upwards)
  - What is the shoot called?
  - Where does the root grow towards?
4. Discuss the importance of each stage of germination. Ask the students to think about why each stage is necessary for the seed to grow into a seedling.
  - Why is it important for the seed to absorb water and oxygen?
  - Why does the seed need to store food?
  - Why does the root grow downwards and the shoot grow upwards?
  - Why is it important for the shoot to reach towards the light?
5. Fun and Creative Activity: Seed Observation
  - Divide the students into small groups and give each group a different type of seed (e.g., bean, sunflower, pumpkin).
  - Ask the students to observe the seeds and draw a labelled diagram of what the seeds look like.
  - Have the students discuss and write down their predictions on what they think will happen during germination.
  - Provide each group with a damp paper towel and ask them to place their seeds on the towel.
  - In the following days, have the students observe and record any changes they see in their seeds.
  - After a week or two, have the students compare their observations to their predictions and discuss the process of germination they observed.

## NECESSARY CONDITIONS FOR A SEED TO SPROUT

A seed needs enough air, water, sunlight and nutrients to grow into a new plant. If any condition is missing, the seed will not grow into a new plant. Some seeds need special treatment or conditions of light, temperature, moisture, etc. to germinate.



### Did You Know?



There exist fire-activated seeds that have a tough coating and need fire or smoke to germinate. One such example is Eucalyptus plant.

## DISPERSAL OF SEEDS

If all seeds fall and germinate close to one another, the seedlings will compete for space, water, light and nutrients.

That's why seeds spread out over large areas so that they do not grow near the plant. They will get all the conditions necessary for their germination.

### Lesson: Seed Germination and Dispersal

**Objective:** Students will understand the necessary conditions for seed germination and the methods of seed dispersal.

#### Materials:

- Whiteboard or chart paper, Markers, Seeds (various types), Magnifying glasses, Art supplies (paper, glue, scissors, colored pencils, etc.)

#### Warm-up:

1. Ask students if they have ever planted seeds or watched plants grow from seeds.
2. Discuss what they already know about seed germination and dispersal.

#### Introduction:

1. Write the word "germination" on the board.
2. Ask students what they think germination means and how it relates to seeds.
3. Discuss the necessary conditions for seed germination (air, water, sunlight, nutrients).
4. Ask students why these conditions are important for seed germination.

#### Activity:

1. Divide the class into small groups.
2. Give each group a variety of seeds and magnifying glasses.
3. Instruct students to observe the seeds and discuss what they notice about their appearance.
4. Ask guiding questions such as:
  - What do the seeds look like?
  - Do they all look the same or different?
  - Are there any similarities or differences in size, shape, colour, texture, etc.?
5. Have students share their observations with the whole class.

#### Discussion:

1. Ask students to recall the necessary conditions for seed germination.
2. Discuss why each condition is important and how it might affect the growth of a seed.
3. Prompt students to think critically with questions like:
  - What would happen if a seed didn't receive enough sunlight?
  - How might a lack of water affect seed germination?
  - Why do you think seeds need air to sprout?
  - What role do nutrients play in seed growth?

#### Creative Activity:

1. Explain to students that they will create their own seed dispersal method using art supplies.
2. Encourage them to think creatively and consider the various ways seeds can be dispersed (e.g., wind, water, animals, explosions, etc.).
3. Provide art supplies and allow students time to design and create their seed dispersal method.
4. After completion, have students share their creations and explain how their method would disperse seeds.

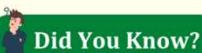
The process by which seeds of plants spread too far off places from their parent plant is called **seed dispersal**.

Seeds can be dispersed in a several different ways. They may be carried by wind, water, animals and explosion.

## MODES OF DISPERSAL OF SEEDS

### Dispersal of Seeds by Wind

Some seeds are small and light in weight. They have special tufts of wings or hair present around them. These structures help them get blown away with the help of winds. Seeds like dandelion have tufts of hair that help them to float in air.



#### Did You Know?

Cotton fabric is made from the hair on the seeds. Each hair is 3,000 times as long as it is wide.

#### Activity Zone

**Aim:** To study the dispersal of seeds by wind.

**Things we need:** Dandelion flower, clock and table fan.

**Method:** (1) Keep the fan on the table and switch it on. Hold the dandelion flower in front of the blowing fan.

(2) Observe the seeds for one minute.



### Lesson Plan: Seed Dispersal by Wind

#### Objective:

- To understand the concept of seed dispersal by wind
- To observe and analyse the process of seed dispersal by wind

#### Materials:

- Dandelion flower, Clock, Table fan

#### 1. Introduction

- Start the lesson by asking the students the following questions:
- Have you ever seen seeds floating in the air?
- How do you think seeds are able to travel such long distances?
- Allow the students to share their thoughts and ideas.

#### 2. Explanation

- Explain to the students that plants have different ways of spreading their seeds and one of the ways is through the wind.
- Show them the dandelion flower and explain that it has special tufts of hair that help the seeds to float in the air.
- Discuss with the students why it is beneficial for seeds to be dispersed by wind.

#### 3. Activity

- Divide the students into pairs or small groups.
- Give each group a dandelion flower, a clock, and a table fan.
- Instruct the students to hold the dandelion flower in front of the blowing fan and observe the seeds for one minute.
- Ask the students to record their observations and discuss why they think the seeds are able to float in the air.

#### 4. Discussion

- Bring the students back together and facilitate a discussion.
- Ask the students the following questions:
  - What did you observe during the activity?
  - How do you think the seeds are able to float in the air?
  - Why do you think some plants have evolved to disperse their seeds by wind?

#### 5. Conclusion and Summative Assessment

- Summarize the main points of the lesson.
- Ask the students to write a short paragraph explaining seed dispersal by wind and why it is important for plants.

#### Activity Zone: Joke

Why don't plants play cards together?  
Because they all have green thumbs!

- (3) What do you see?  
You see that the seeds of the dandelion flower get detached and spread around the room.  
(4) You get to know how seeds of some plants get dispersed with the help of wind.



**Look at the given pictures of plants dispersed by wind. Complete their names.**



C \_ T T \_ N



M \_ P \_ E



C \_ E M \_ \_ I \_



D \_ N \_ E L \_ O N

## Dispersal of Seeds by Water

Many aquatic plants that live near water have seeds that can float. They are carried by water. Plants living along streams and rivers have seeds that float downstream. Therefore, germination is possible at new sites. The size of the seed is not a factor in determining whether a seed can float. Some very large seeds like coconut can also float. The fruits of these plants are spongy.

A few seeds that spread with the help of water are coconut and lotus seeds.



Coconut seeds



Lotus seeds

## Lesson Plan: Dispersal of Seeds by Wind and Water

### Objective:

- To understand how some plants disperse their seeds with the help of wind and water.
- To learn about different types of seeds that are dispersed by wind and water.

### Materials:

- Pictures of plants dispersed by wind (included in the PDF booklet), Words to complete the names of wind-dispersed plants (included in the PDF booklet), Pictures of seeds dispersed by water (included in the PDF booklet)

### 1. Introduction:

- Begin by asking the students if they have ever seen plants with fluffy seeds that seem to float in the air.
- Ask the students if they know how these seeds get dispersed.
- Use the Socratic method to guide the students towards the idea that wind plays a role in dispersing these seeds.

### 2. Discussion on Wind Dispersal:

- Display the pictures of plants dispersed by wind.
- Ask the students to describe what they see in the pictures. Prompt them to notice the characteristics of the seeds or fruits.
- Ask the following guiding questions:
  - What do you notice about the structure of the seeds or fruits in these pictures?
  - How do you think these seeds or fruits get dispersed?
  - Can you think of any other plants that have similar seeds or fruits that get dispersed by wind?
- Discuss the students' ideas and provide additional information as needed.

### 3. Activity: Completing the Names

- Give each student a copy of the words to complete the names of wind-dispersed plants.
- Instruct the students to look at the pictures of the wind-dispersed plants and use the clues to complete the names of the plants.
- After completing the activity, review the answers together as a class.

### 4. Discussion on Water Dispersal

- Display the pictures of seeds dispersed by water.
- Ask the students if they know any plants that live near water and have seeds that can float.
- Use the Socratic method to guide the students towards the idea that water can help in dispersing seeds.
- Ask the following guiding questions:
  - How do you think these seeds are able to float in water?
  - Can you think of any other plants that have seeds that are dispersed by water?
- Discuss the students' ideas and provide additional information as needed.

### 5. Conclusion:

- Summarize the main points discussed during the lesson.
- Ask the students to share one thing they learned about seed dispersal by wind and water.

### Fun and Creative Activity: Seed Dispersal Game

- Divide the class into small groups.
- Give each group a set of cards or pictures depicting different methods of seed dispersal, including wind, water, animals, and explosion.
- Instruct each group to take turns picking a card or picture and describing how the seed is dispersed using the Socratic method.
- The other groups will have to guess the method of seed dispersal based on the description.
- Award points to each group for correct guesses.
- The group with the most points at the end of the game wins.

## Dispersal of Seeds by Animals

Animals disperse seeds in several ways. Humans and animals eat fleshy fruits and throw away their seeds in different places. Some fruits are eaten by animals and birds. The seeds, eaten along with the fruits are not digested. These animals excrete the seeds in different places. The seeds emerge into new plants.



Squirrel eating nuts



Black berries



Mimosa

Seeds of plants like xanthium, black berries and burdock have hook or spines. They stick to the hairy skin of animals or clothes of humans. They are carried away and deposited at a new site.



Burdock



Beggar Ticks

### It's Your Turn

Which plant's leaves shrink when we touch it?

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### Lesson Plan: Dispersal of Seeds by Animals

**Objective:** Students will understand how animals help in the dispersal of seeds and the different ways in which this happens.

**Materials needed:** Worksheet with the activity question, pencil or pen

**1. Warm-up:** Begin the lesson by asking the students if they have ever seen animals eating fruits or seeds. Ask them if they know why animals eat fruits and what happens to the seeds after they eat them. Encourage students to share their observations and thoughts.

**2. Introduction to seed dispersal:** Explain to students that animals play an important role in seed dispersal. Discuss how animals help in spreading seeds to new places where they can grow into new plants. Use the information provided in the text to explain different ways in which animals disperse seeds, such as through eating fruits and excreting seeds, or carrying seeds on their fur or feathers.

**3. Guided discussion:** Ask students the following questions to stimulate critical thinking and discussion:

- Why do animals eat fruits and seeds?
- How does the process of digestion help in seed dispersal?
- Can you think of any specific examples of animals that help in seed dispersal?
- What are some adaptations that plants have developed to stick to animal fur or feathers?

Encourage students to think deeply about these questions and provide their own insights and examples. Use follow-up questions to guide the discussion towards a better understanding of the topic.

**4. Activity:** Distribute the worksheet with the activity question, "Which plant's leaves shrink when we touch it?" Instruct students to write their answers and provide a brief explanation for their choice. Allow students some time to complete the activity individually.

**5. Group discussion:** Once students have completed the activity, bring the class together for a group discussion. Allow students to share their answers and explanations. Encourage students to ask questions or challenge each other's responses in a respectful manner.

**6. Fun and creative activity:** To reinforce the concept of seed dispersal by animals, organize a hands-on activity. Divide the class into small groups and provide each group with a variety of fruits and seeds. Instruct students to think about which animals might eat these fruits and seeds, and how the seeds might be dispersed after consumption. Ask each group to create a small diorama or visual representation illustrating the seed dispersal process by animals. Provide art supplies and allow some time for group work and creativity.

Because it wanted to become a plant-ed person!

**Closure:** Recap the key points from the lesson about seed dispersal by animals. Emphasize the importance of animals in helping plants spread their seeds to new places. Encourage students to continue observing nature and thinking about the different ways in which living organisms interact and depend on each other.

**Assessment:** Assess students' understanding through their participation in the class discussion and the completion of the activity worksheet. Observe their ability to provide explanations and examples related to seed dispersal by animals.

## Dispersal of Seeds by Explosion

Some fruits scatter their seeds by exploding the seed pods. When the seeds are ripe and the pod has dried, it bursts open and the seeds are scattered.

For example, pods of **squirting cucumber** spread their seeds by explosion.

**Pea** and **bean** plants also keep their seeds in a pod. When the seeds are ripe and the pod has dried, the pod bursts open. The peas and beans are scattered.



Dispersal of seeds by explosion



A squirting cucumber

## PLANTS THAT GROW WITHOUT SEEDS

There are some plants like the pineapple and the cucumber that do not produce seeds. They reproduce from their body parts like the root, stem or leaf. This type of reproduction is called **vegetative propagation**.

There are three types of vegetative propagation:

### FROM STEMS

Potatoes, ginger, rose, sugar cane and money plant can grow from their stem cutting.



Potato plant

Plants like roses grow from stem cuttings. Cut the stem of the rose plant and bury it in the soil of another pot. Keep the pot under sunlight and water it regularly. After some days, the stem starts forming roots and sprouting new leaves. Potato, colocasia and ginger grow as underground stems. Buds are found on these plants at certain points, which grow into new plants under favourable conditions.

### Lesson Plan: Dispersal of Seeds and Vegetative Propagation

**Objective:** Students will understand the different ways plants disperse their seeds and how some plants reproduce without seeds through vegetative propagation.

**Introduction:** Begin the lesson by asking the students if they know how new plants grow. Do they come from seeds? Can plants grow without seeds?

**Exploration:** Show the students pictures or illustrations of exploding seed pods and explain that some plants disperse their seeds by exploding the seed pods. Ask the following guiding questions:

- Can you think of any other plants that might disperse seeds in this way?
- Why do you think plants have evolved this way of dispersing their seeds?
- Do you think this method of seed dispersal is effective? Why or why not?

Show the students pictures or illustrations of plants that reproduce without seeds through vegetative propagation. Explain that these plants can grow new plants from their body parts like the root, stem, or leaf. Ask the following guiding questions:

- Can you think of any other plants that might reproduce in this way?
- Why do you think some plants have evolved to reproduce without seeds?
- Do you think this method of reproduction is advantageous for these plants? Why or why not?

**Application:** Divide the students into pairs or small groups and give each group a few examples of plants that disperse seeds by explosion or reproduce through vegetative propagation. Ask them to research and create a presentation to share with the class about their assigned plant(s). The presentation should include information about the plant's characteristics, the benefits of their method of seed dispersal or reproduction, and any interesting facts they discovered.

- For example, one group could research the squirting cucumber and another group could research the pineapple.

Give the groups enough time to prepare their presentations, including creating visual aids if desired.

Have each group present their findings to the class.

**Conclusion:** Summarize the key points of the lesson, emphasizing the different ways plants disperse their seeds and reproduce without seeds through vegetative propagation.

### Activity: Seed Explosion Experiment

#### Materials:

- Seed pod (e.g. dried bean pod)
- Safety goggles
- Tray or container
- Pencil or toothpick

**Procedure:** Put on safety goggles to protect your eyes. Hold the seed pod over the tray or container. Use a pencil or toothpick to press or poke the seed pod. Observe what happens to the seeds inside the pod. Repeat the experiment with different types of seed pods and compare the results.

#### Joke:

Why did the seed go to school?

Because it wanted to become a planter!

G5S SEED O SEED

### Did You Know?

The biggest seed – Coco-de-Mer, also known as the double coconut, grows only in the Seychelles. It weighs up to 30kg.

## FROM ROOTS

Sweet potato, carrot and radish have modified roots that store food. They also have buds on them, which grow into a new plant when replanted.

Some root plants like dahlia, guava and asparagus also reproduce by their roots. These roots give rise to new plants in favourable conditions.



Roots of sweet potato

### Lesson Plan: From roots and leaves

**Objective:** Students will explore different ways in which plants reproduce and understand the importance of seeds in the plant life cycle.

#### Introduction:

Start the lesson by showing the students a picture of the Coco-de-Mer, the largest seed in the world, weighing up to 30kg. Ask the students if they can think of any other plants that have big seeds.

#### Guiding Questions:

- Why do plants produce seeds?
- What purpose do seeds serve in the plant life cycle?
- How do seeds help plants reproduce?

#### Discussion:

Engage the students in a discussion about the importance of seeds in the life cycle of plants. Encourage them to think critically and come up with their own ideas. Guide the discussion with the following questions:

1. Why do plants produce seeds?
2. What happens to seeds after they are produced?
3. How do seeds grow into new plants?
4. Can plants reproduce without seeds? How?

#### Activity:

Now it's time for a fun and creative activity called "Seed Dispersal Obstacle Course." Divide the students into small groups and provide each group with a variety of seeds (e.g., sunflower seeds, bean seeds, maple seeds). Assign each group a different type of seed and ask them to create an obstacle course that represents the different methods of seed dispersal (e.g., wind, water, animal dispersal).

The students will design the obstacle course using various materials such as cardboard, string, and tape. They should incorporate different challenges and elements that represent the methods of seed dispersal (e.g., creating a fan to simulate wind dispersal, creating a water channel for water dispersal).

Once the obstacle courses are ready, each group will take turns navigating through the other groups' courses, experiencing the different methods of seed dispersal.

#### Joke:

To end the lesson on a light note, share the following joke with the students:

Why did the scarecrow win an award?

Because he was outstanding in his field!

#### Closure:

Wrap up the lesson by having a brief summary discussion, emphasizing the importance of seeds in plant reproduction. Ask the students to reflect on what they learned during the activity and how it related to the lesson objectives. Encourage them to think about plants they encounter in their daily lives and how seeds help those plants reproduce.



Podophyllum



## G5S SEED O SEED

## INSPIRATION FROM NATURE

George de Mestral, a Swiss engineer and enthusiast mountaineer, was trekking in the woods with his dog in 1948. When he returned home, he saw the burrs that adhered to his clothes and pondered if such a concept may be effective in commercial use. He examined a burr under a microscope and discovered that it was coated in tiny hooks that allowed it to grip onto garments and fur that brushed against it in passing. This leads to the discovery of **Velcro**.



Velcro Strip

(1) Look at the given pictures and write the names of plants to which they belong.



A \_\_ L \_\_



P \_\_ A \_\_ H



A \_\_ R I \_\_ O \_\_



P \_\_ U \_\_

### Types of seeds commonly used in agriculture.

The three types of seeds mostly used in agriculture are:

(a) **Grasses**: The cereals, wheat, barley, oats, maize, sorghum and rice, are all grasses. Their embryo has just one cotyledon or seed leaf. Hence, they are called monocotyledons. The embryo usually sits close to the surface of the seed and often is referred to as the "foetus".



Wheat



Maize



Rice

## Title: Seed 'O' Seed - Inspiration from Nature

### Objectives:

- Identify different types of seeds found in nature.
- Understand the importance of seeds in agriculture.
- Explore the concept of adaptation in plants.

### Warm-up:

- Begin the lesson by asking students if they have ever seen seeds before.
- Show them pictures of different seeds and ask them to write down the names of the plants to which they belong.
- Discuss their answers as a class and clarify any misconceptions.

### Introduction:

- Tell the story of George de Mestral and his discovery of Velcro.
- Ask students guiding questions such as: What did George de Mestral observe in nature? How did he come up with the idea of using burrs for commercial use?
- Emphasize the importance of observing and learning from nature.

### Main Activity:

- Explain that seeds are also a marvel of natural engineering.
- Draw a diagram of a seed on the whiteboard or chart paper, labeling its different parts (seed coat, embryo, cotyledon).
- Discuss the three types of seeds used in agriculture: grasses, cereals (wheat, barley, oats, maize, sorghum, rice), and monocotyledons.
- Ask students: What is the difference between monocotyledons and dicotyledons? How are they adapted to survive in different environments?
- (Optional) If possible, use a microscope to show students a close-up view of a seed. Allow them to observe and describe what they see.
- Introduce the concept of adaptation in plants.
- Ask students: How do seeds adapt to ensure their survival? What are some examples of seed adaptations?
- Divide the class into small groups. Assign each group a different type of seed.
- In their groups, students will research and create a poster or presentation about their assigned seed, focusing on its adaptation and importance in agriculture.
- Each group will present their findings to the class.

### Fun and Creative Activity:

- Introduce the Velcro strip and explain that it was inspired by the hook-like structure of burrs.
- Challenge students to think of other everyday inventions inspired by nature.
- Ask questions like: Can you think of other examples where nature has inspired human inventions? How can we learn from nature to solve real-life problems?
- Give each student a piece of Velcro strip and instruct them to use it creatively to design and make something useful or fun.
- Allow students time to create their Velcro inventions.
- Have students share their creations with the class and explain how nature inspired their ideas.

**Joke:** Why do plants always win at Socratic discussions? Because they always have deep roots in their knowledge!

G5S SEED O SEED

(2) **Legumes:** This group (Legumes) includes peas, the various beans such as french beans, chickpeas and lentils. The embryo is normally inside the seed and includes two seed leaves (cotyledons), so they are called dicotyledons. Their food storage is contained in the **cotyledons**.



Peas



Beans



Chickpeas

(3) **Oilseeds:** This group (Oilseeds) includes sunflower and soyabean. These are also dicotyledons, but their food storage contains much higher levels of oil than the legumes or grasses.



Sunflower Oil



Soyabean Oil

Functions of a seed:

- (a) Seed coat protects the baby plant.
- (b) Cotyledons provide food and nourishment to the germinating seedlings.
- (c) A baby plant living inside the seed, grows into a seedling.

### It's Your Turn

Are grasses dicot plants or monocot plants?

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**Lesson Plan:** Grade 5 Socratic-style Lesson on Seeds

**Objective:** Students will understand the different types of seeds and their functions.

**Procedure:**

**1. Warm-up:**

Begin the lesson by asking the students to brainstorm different types of seeds they are familiar with.

- Write their ideas on the whiteboard or chart paper.

**2. Introduction to the topic:** Show the students the PDF booklet page on seeds, specifically the section on legumes and oilseeds.

- Ask the students: What are legumes? Give some examples.
- Encourage students to think about the structure of the legume seeds and why they are called dicotyledons.
- Repeat the same process for oilseeds.

**3. Guided discussion:** Divide the class into small groups and provide each group with a different image or example of a seed (legume or oilseed).

- Ask each group to describe the seed and its unique characteristics.
- Lead a discussion on the functions of a seed, using guiding questions such as:
  - What does the seed coat do?
  - What is the role of cotyledons in a seed?
  - What happens to the baby plant inside the seed?
  - How does the food storage differ in legumes, oilseeds, and grasses?

**4. Hands-on activity:** Provide each group with a selection of different seeds, including legumes, oilseeds, and grasses.

- Instruct the students to examine and compare the seeds, noting their similarities and differences.
- Ask each group to create a visual representation (e.g., posters or diagrams) showcasing their findings.
- Give each group an opportunity to present their visual representation to the class.

**5. Conclusion and reflection:** Gather the students' attention back to the whole class.

- Recap the main points discussed during the lesson, emphasizing the different types of seeds and their functions.
- Ask the students: What did you learn about seeds today? How do you think seeds are important in the life cycle of plants?

**Activity:**

- Tell the students the following joke: Why did the scarecrow win an award? Because he was outstanding in his field!
- Encourage the students to come up with their own jokes or puns related to seeds or plants.
- Ask volunteers to share their jokes with the class.

**Note:** Adjust the timing of each section of the lesson as needed to fit within the class period.

G5S SEED O SEED

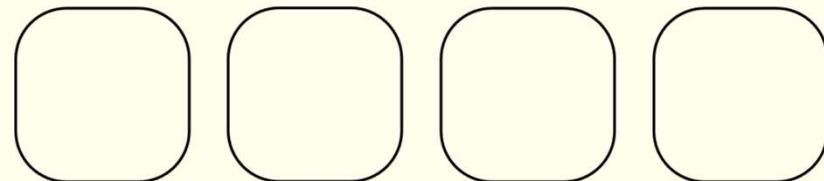
## CLASS ASSIGNMENT

### (A) Arrange the order of seed germination.

- (1) Seed coat breaks open and a root comes out.
- (2) When conditions are favourable water and oxygen are taken into the seed coat.
- (3) The seed is activated and it starts to breathe and grow a root.
- (4) Plumule starts showing up.

### (B) Now draw the growth of a seed.



### (C) Fill in the blanks with correct option.

- (1) The tiny plant that the seed coat protects is called the \_\_\_\_\_.  
(embryo/cotyledon)
- (2) Seeds store food in the \_\_\_\_\_. (cotyledon/monocots)
- (3) \_\_\_\_\_ are plants that develop from single cotyledon seeds.  
(Monocots/Dicots)
- (4) \_\_\_\_\_ are plants that develop from double cotyledon seeds.  
(Monocots/Dicots)

**Skill:** Understanding germination of seed

### Lesson Plan: Understanding Seed Germination

**Objective:** The students will understand the process of seed germination and the role of different parts of a seed in this process.

#### Procedure:

**1. Introduction:** Begin the lesson by asking the students if they know what happens when a seed is planted in soil. Encourage the students to share their ideas and thoughts about seed germination. Write their responses on the chart paper or whiteboard.

**2. Pre-Assessment:** Ask the students to identify the parts of a seed (seed coat, embryo, cotyledon). Write the names of the parts on the chart paper or whiteboard. Discuss the function of each part briefly.

**3. Guided Questions:** Ask the students the following guiding questions:

- What happens to a seed after it is planted in soil?
- How does a seed start growing into a plant?
- What are the necessary conditions for seed germination?
- What role does each part of the seed play in seed germination?

Encourage the students to think critically and discuss their ideas with their classmates. Write down their responses on the chart paper or whiteboard.

**4. Presentation of Information:** Show pictures or diagrams of seed germination to reinforce the discussion. Explain the process of seed germination step by step using the information gathered from the students.

Emphasize the role of each part of the seed in the process. Provide additional information as needed.

**5. Hands-on Activity:** (Optional) Distribute seeds and small pots to each student. Instruct the students to plant the seeds in the pots and observe the process of seed germination over the following weeks. Remind them to water the seeds regularly and provide appropriate conditions for germination.

**6. Recap and Conclusion:** Review the main points discussed in the lesson. Ask the students to summarize the steps of seed germination in their own words. Encourage them to ask any remaining questions or share any new insights they gained during the lesson.

**Fun and Creative Activity:** Generate a discussion about plants that have unusual or unique ways of germinating (e.g., aerial plants, epiphytes). Ask the students to research and present a short presentation on one such plant. They can include pictures or diagrams and explain the unique aspects of the plant's germination process. Encourage creativity and engagement by allowing the students to choose a plant that interests them personally.

## CLASS ASSIGNMENT

### (A) Arrange the order of seed germination.

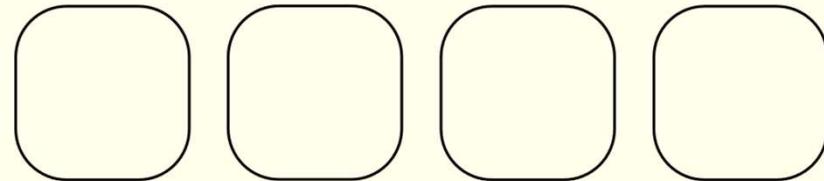
(1) Seed coat breaks open and a root comes out.

(2) When conditions are favourable water and oxygen are taken into the seed coat.

(3) The seed is activated and it starts to breathe and grow a root.

(4) Plumule starts showing up.

### (B) Now draw the growth of a seed.



### (C) Fill in the blanks with correct option.

(1) The tiny plant that the seed coat protects is called the \_\_\_\_\_.

(embryo/cotyledon)

(2) Seeds store food in the \_\_\_\_\_. (cotyledon/monocots)

(3) \_\_\_\_\_ are plants that develop from single cotyledon seeds.

(Monocots/Dicots)

(4) \_\_\_\_\_ are plants that develop from double cotyledon seeds.

(Monocots/Dicots)

**Skill:** Understanding germination of seed

### (A) Arrange the order of seed germination.

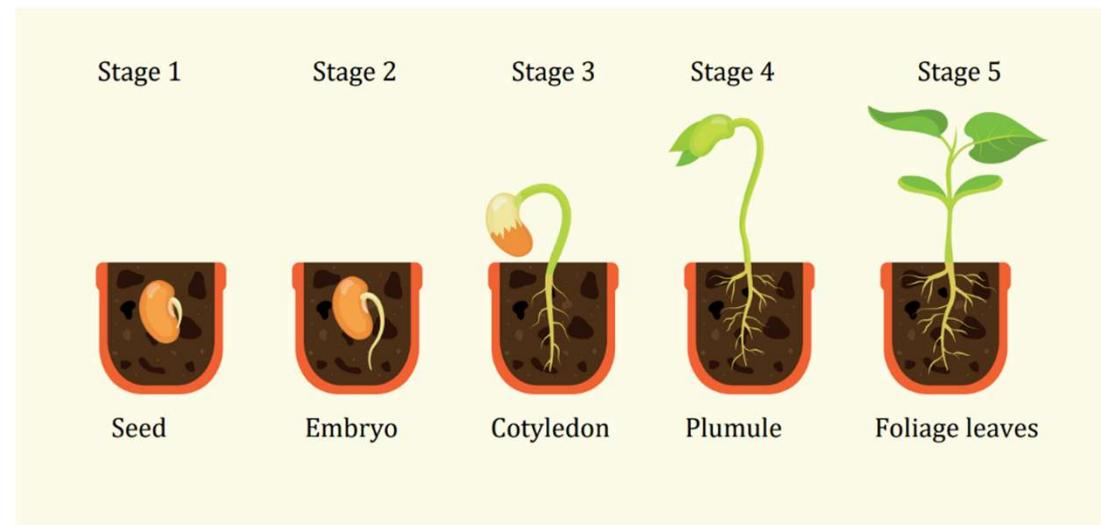
(1) Seed coat breaks open and a root comes out. [ 3 ]

(2) When conditions are favourable water and oxygen are taken into the seed coat. [ 1 ]

(3) The seed is activated and it starts to breathe and grow a root. [ 2 ]

(4) Plumule starts showing up. [ 4 ]

### (B) Now draw the growth of a seed.



### (C) Fill in the blanks with correct option.

(1) The tiny plant that the seed coat protects is called the embryo. (embryo/cotyledon)

(2) Seeds store food in the cotyledon. (cotyledon/monocots)

(3) Monocots are plants that develop from single cotyledon seeds. (Monocots/Dicots)

(4) Dicots are plants that develop from double cotyledon seeds. (Monocots/Dicots)

#### (D) Can you guess this?

- (1) I carry and protect the seed. I am \_\_\_\_\_.
- (2) I carry water and minerals to other parts of the plant. I am \_\_\_\_\_.
- (3) I allow the plant to reproduce. I am \_\_\_\_\_.
- (4) I help the plant to produce seeds. I am \_\_\_\_\_.
- (5) I am made of the blade and the petiole. I am \_\_\_\_\_.
- (6) I take up nutrients and water. I am \_\_\_\_\_.

#### (E) Name the Two Methods of dispersal of seeds.

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#### (F) Explain seed dispersal by Explosion.

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**Title:** Seed Dispersal and Plant Adaptations

**Objective:** - Students will understand the importance of seed dispersal for plant reproduction.

- Students will learn about different methods of seed dispersal and how plants have adapted to ensure successful dispersal.
- Students will engage in critical thinking and self-discovery through a Socratic-style lesson.

**Lesson Plan:**

**1. Introduction:** Start by asking the students if they know why plants produce seeds and what the purpose of seeds is. Encourage them to think about how new plants are formed. Write their responses on the whiteboard. Ask the students if they have ever seen seeds being dispersed and what they noticed about how it happens. Write down their observations.

**2. Socratic Questioning:** Distribute copies of the "Seed 'O' Seed" extract from the Grade 5 booklet to each student. Read out each statement from the extract and ask the students to fill in the blanks. Discuss their answers and ensure mutual understanding. Focus on engaging the students in critical thinking by asking questions like: "Why is it important for seeds to be carried and protected?" "How do water and minerals help a plant grow?" "What would happen if plants couldn't reproduce?" "Why do plants need to produce seeds?" "What are the functions of the blade and petiole in a leaf?" Allow students to answer and discuss their thoughts as a class.

**3. Methods of Seed Dispersal:** Ask the students to brainstorm different methods of seed dispersal based on their previous observations and knowledge. Write their responses on chart paper. Show images or diagrams of different seed dispersal methods, including explosion, wind, water, and animals. Discuss each method and ask guiding questions such as: "What are the advantages of seed dispersal by explosion?" "Why do some plants rely on wind to disperse their seeds?" "How do water and animals contribute to seed dispersal?" "What adaptations do plants have to ensure successful dispersal?" Allow students to share their thoughts and ideas.

**4. Seed Dispersal by Explosion:** Focus on seed dispersal by explosion and ask the students to explain how it happens based on the provided extract. Ask questions like: "Why do some plants use explosion to disperse their seeds?" "How does the structure of the seed and the plant contribute to the explosion?" "What environmental factors might trigger the explosion?" Discuss their answers and ensure understanding.

**5. Creative Activity: Seed Dispersal Adaptations:** Divide the students into small groups. Provide each group with construction paper, glue, scissors, markers, and any other materials they might need. Ask each group to choose a specific method of seed dispersal (explosion, wind, water, animals) and create a visual representation of a plant's adaptation for successful dispersal using the provided materials. Encourage creativity and critical thinking by asking the groups to explain their adaptations, how they help with seed dispersal, and why they are important. Allow each group to present their creations to the class and engage in a class discussion about the different adaptations and their significance.

**6. Conclusion:** Recap the main points discussed during the lesson. Ask the students to reflect on why seed dispersal is important for plants and how different methods of seed dispersal contribute to the survival and reproduction of plants. End the lesson by connecting these concepts to the real-world significance of plant reproduction and the role of plants in our daily lives. Encourage students to continue exploring and observing seed dispersal in their surroundings.

**(D) Can you guess this?**

- (1) I carry and protect the seed. I am \_\_\_\_\_.
- (2) I carry water and minerals to other parts of the plant. I am \_\_\_\_\_.
- (3) I allow the plant to reproduce. I am \_\_\_\_\_.
- (4) I help the plant to produce seeds. I am \_\_\_\_\_.
- (5) I am made of the blade and the petiole. I am \_\_\_\_\_.
- (6) I take up nutrients and water. I am \_\_\_\_\_.

**(E) Name the Two Methods of dispersal of seeds.**

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**(F) Explain seed dispersal by Explosion.**

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**(D) Can you guess this?**

- (1) I carry and protect the seed. I am seed coat.
- (2) I carry water and minerals to other parts of the plant. I am xylem.
- (3) I allow the plant to reproduce. I am flower.
- (4) I help the plant to produce seeds. I am ovule.
- (5) I am made of the blade and the petiole. I am leaf.
- (6) I take up nutrients and water. I am root.

**(E) Name the Two Methods of dispersal of seeds.**

Dispersal of seeds by water  
Dispersal of seeds by Animals

**(F) Explain seed dispersal by Explosion.**

Some fruits scatter their seeds by exploding the seed pods. When the seeds are ripe and the pod has dried, it bursts open and the seeds are scattered. For example, pods of squirting cucumber spread their seeds by explosion.



## DIY ACTIVITY



Watch the  
instructions here.

### CREATE YOUR OWN WINDOWSILL GARDEN

Tiny seeds grow into herb plants with the help of water and sunlight. Energy from the sun is captured by the plants and used to create food for the plants. This happens because of photosynthesis. By creating a food source, the plants can grow.



#### Objective

- (a) Create their own windowsill garden to grow a variety of herbs.
- (b) Explore how energy from the sun is used to grow plants.

#### Materials Required



Plastic Bottle



Scissors



Potting soil



Variety of herb/spice seeds



Water spray bottle

#### Lesson Plan: Photosynthesis and Seed Growth

**Objective:** To explore the process of photosynthesis and understand how energy from the sun is used to grow plants.

**Warm-up:** Ask the students to share their experiences with gardening or growing plants. What do they know about plants and how they grow?

**Introduction:** Ask the students: Have you ever wondered how seeds grow into plants? Where do they get their food from? Show them a picture of a seed and explain that inside the seed is a tiny plant waiting to grow. But how does it get the energy it needs to grow? Introduce the concept of photosynthesis - the process by which plants use sunlight to create food for themselves.

**Guided Inquiry:** Divide the students into small groups. Give each group a variety of seeds and ask them to observe the seeds carefully. What do they notice about the seeds? Are they all the same? What differences do they see? Ask the groups to make predictions about what will happen when they plant the seeds and provide them with water and sunlight. Will all the seeds grow? Why or why not? What factors might affect their growth? Have the groups plant their seeds in pots with potting soil. Ask them to make a hypothesis about how the seeds will use the energy from the sun to grow into plants. How do they think this process works?

**Group Discussion:** Bring the whole class together and ask each group to share their observations, predictions, and hypotheses. Encourage the students to ask questions and discuss their ideas with one another. Can they support their hypotheses with evidence or observations?

**Conclusion:** Summarize the main points discussed during the lesson. Revisit the concept of photosynthesis and emphasize how plants use sunlight to create food for themselves and grow. Remind the students of their planted seeds and encourage them to observe and document their growth over time.

#### Fun and Creative Activity:

**DIY Windowsill Garden:** Instruct the students to follow the provided instructions or watch the video on how to create their own windowsill garden using a plastic bottle, potting soil, and a variety of herb/spice seeds. Have the students decorate their planters with colorful labels or markers to identify the different types of herbs they are growing. Encourage the students to take responsibility for watering and taking care of their plants, observing how they grow and change over time. In a later class, have the students share their experiences with their windowsill gardens and discuss any interesting observations or insights they have gained.

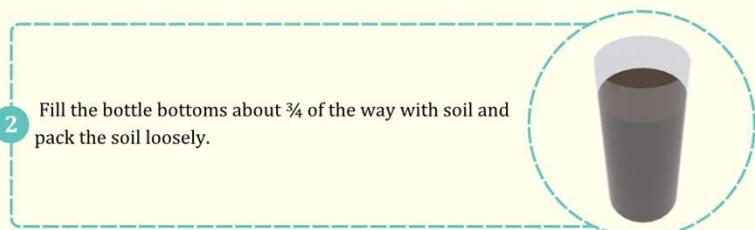
**Assessment:** Observe students' participation and engagement during the lesson and the windowsill garden activity. Assess their understanding through their group discussions, questions asked, hypotheses formulated, and their ability to explain the process of photosynthesis and seed growth.

## Procedure

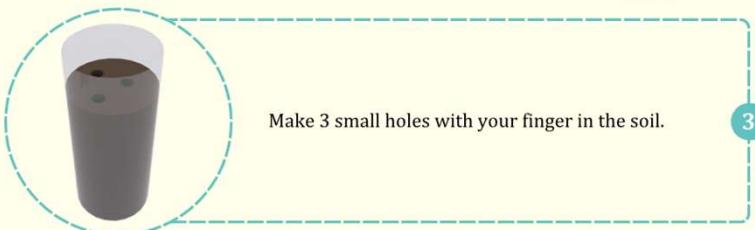


Carefully cut off the bottoms of the plastic bottle.

1

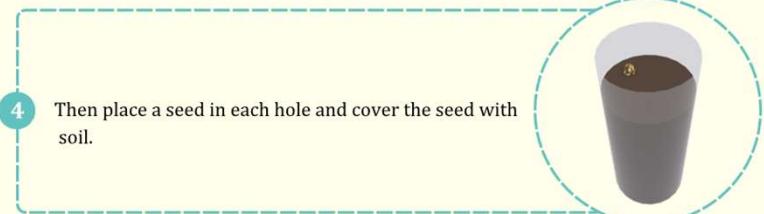


2 Fill the bottle bottoms about  $\frac{3}{4}$  of the way with soil and pack the soil loosely.



3 Make 3 small holes with your finger in the soil.

3



4 Then place a seed in each hole and cover the seed with soil.

## Lesson Plan: Seed Germination

**Objective:** To help students understand the process of seed germination and the factors that contribute to successful seed growth.

**Introduction:** Begin by asking the students if they have ever planted a seed before and what they think is needed for a seed to grow into a plant. Listen to their responses and encourage them to think about the different factors that contribute to successful seed growth.

**Engage in a Discussion:** Ask the following guiding questions to stimulate critical thinking and discussion:

1. What is germination? (Allow students to share their ideas and explanations.)
2. What do you think seeds need in order to germinate? (Prompt them to think about water, sunlight, and soil nutrients.)

**Demonstration:** Show the students the plastic bottle bottoms filled with soil, and the seeds ready to be planted. Ask the students to hypothesize about what will happen when the seeds are planted in the soil and given water and sunlight. Allow students to share their predictions and explanations.

**Hands-on Activity:** Divide the students into small groups and provide each group with a plastic bottle bottom, soil, seeds, water, and access to sunlight. Instruct them to follow the steps mentioned in the booklet to plant the seeds. Encourage them to observe the seeds daily and take notes on any changes they observe in terms of seed germination and plant growth.

**Reflection and Analysis:** Bring the students back together as a whole class and ask them to share their observations and experiences with the activity. Ask questions such as:

1. What changes did you observe in the seeds over time?
2. Why do you think those changes occurred?
3. What factors do you think contributed to the successful germination of the seeds?

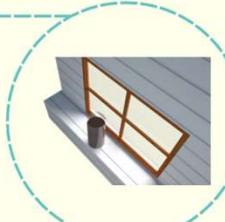
**Conclusion and Wrap-up:** Summarize the key points learned during the class discussion and hands-on activity. Emphasize the importance of water, sunlight, and soil nutrients for seed germination and plant growth. Conclude by asking the students what they have learned about seed germination and if they have any additional questions or insights.

**Fun and Creative Activity: Seed Journal:** Assign each student to maintain a seed journal throughout the duration of the project. In the journal, students can document their observations, drawings, and reflections on the growth of their seeds. Encourage them to decorate their journals with colorful drawings of plants and seeds. At the end of the project, students can share their journals with the class, showcasing their creativity and documenting the growth of their seeds.



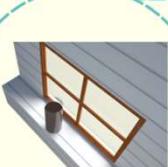
Add water to the soil using a spray bottle.

5



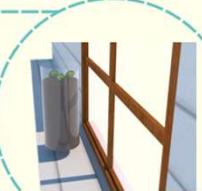
Place the jars on a south-facing windowsill that receives a lot of sunlight.

6



Water the herbs approximately every 2-3 days. Make sure the soil is moist but not soggy.

7



Harvest herbs after the plants have grown (few weeks).

8

### Topic: Plant Growth and Care

**Objective:** Students will understand the key factors required for plant growth and learn how to care for plants.

**Introduction:** Begin by asking the students if they have ever grown plants before. What were the key things they needed to do to ensure the plants grew well? Share the extract from the PDF booklet about growing herbs. Ask the students if they have any prior knowledge or thoughts about the process of planting and caring for herbs.

**Development:** Ask the students why it is important to add water to the soil when planting herbs. What role does water play in the growth of plants? Discuss the importance of sunlight in plant growth. Why do plants need sunlight? How does sunlight help with the process of photosynthesis? Have the students brainstorm ideas about where they could place their herb jars or pots to ensure maximum sunlight exposure. Encourage them to think about different areas in their homes or school grounds. Ask the students how often they should water the herbs. Why is it essential to ensure that the soil is moist but not soggy? How can they determine if the soil needs watering? Discuss the importance of patience in plant growth. Why is it necessary to wait a few weeks before harvesting the herbs? What are the signs that the plants are ready to be harvested?

**Activity:** Divide the students into small groups and provide each group with a spray bottle, jars or pots, soil, and herb seeds. Instruct the students to plant the seeds in the soil, following the instructions mentioned in the booklet. Ask each group to find a suitable spot to place their herb jars or pots. Have the students create a watering schedule for their herbs, ensuring that the soil remains moist but not too wet. Set a date in the future for the students to observe and document the growth of their herbs. Encourage them to record any changes they notice and any challenges they face in caring for the plants.

**Conclusion:** Have a class discussion to share and compare the students' observations about their plants. Ask the students to reflect on what they have learned about plant growth and care. What surprised them during this process? What will they remember for future plant-related projects? Conclude the lesson by emphasizing the importance of consistent care and patience in plant growth.

**Fun and Creative Activity:** To reinforce the learning about plant growth, ask the students to create a short skit or a comic strip that showcases the journey from planting the seeds to harvesting the herbs. Encourage them to include the key factors discussed in the lesson, such as water, sunlight, and patience. Allow the students to work in small groups and give them some time to prepare their skits or comic strips. Provide an opportunity for each group to present their skits or display their comic strips to the rest of the class. Encourage the students to ask questions and make observations about each group's portrayal of plant growth and care.

Write your Observation



**Topic:** Seed Dispersal

**Lesson Objectives:**

- Develop an understanding of seed dispersal mechanisms
- Stimulate critical thinking and inquiry skills through the use of the Socratic method
- Engage students in a fun and creative activity related to seed dispersal

**1. Introduction:** Start the lesson by asking the students questions to activate prior knowledge:

- What is a seed?
- What do you know about how plants spread their seeds?

Write down their responses on the chart paper or whiteboard.

**2. Discussion:** Ask the students the following questions to stimulate critical thinking and initiate a discussion on seed dispersal:

- Why do you think plants need to disperse their seeds?
- Can you think of any ways or methods by which plants can disperse their seeds?
- How do you think seeds can travel long distances away from their parent plant?
- Can you provide examples of plants that use different methods of seed dispersal?

Encourage students to support their answers with reasoning and evidence. Facilitate the discussion by asking follow-up questions such as:

- How might the characteristics of the seeds or the environment influence the method of dispersal?
- What advantages might certain methods of seed dispersal have over others?

**3. Seed Dispersal Methods:** After the Socratic-style discussion, provide information about different seed dispersal methods.

Write them down on the chart paper or whiteboard as you discuss, including examples: Wind dispersal (e.g., dandelion, maple seeds); Animal dispersal (e.g., burrs stuck to fur, fruits eaten by animals); Water dispersal (e.g., coconut); Self-dispersal (e.g., exploding seed pods)

**4. Observation Activity:** Distribute paper and pencils/pen to each student. Ask students to go outside and observe their surroundings for at least 10 minutes. They should try to find examples of plants using different seed dispersal methods. Instruct students to record their observations by drawing and labeling the plants they find, noting the characteristics of the seeds or fruits, and speculating on the method of seed dispersal. Once they return, have a class discussion where students share their observations and discuss their findings.

**5. Fun and Creative Activity: Seed Dispersal Simulation Game**

Divide the students into small groups. Explain that each group will create a game that simulates a specific seed dispersal method. Give each group markers and chart paper or any other materials they may need. Allow the students to brainstorm and design their game, considering the rules, objective, and materials required. Give them time to create the game, ensuring that it aligns with the seed dispersal method they have chosen. Once the games are ready, have each group present their game to the class and participate in playing each other's games to experience different seed dispersal methods.

**6. Conclusion:** Wrap up the lesson by summarizing the key concepts discussed, emphasizing the importance of seed dispersal for plants' survival. Ask students to reflect on what they have learned and how it relates to the world around them. Encourage any final questions before ending the class.

**Note:** Adjust the timing of activities based on your class's specific needs and the pace of discussion.

## HOME ASSIGNMENT

Please scan the QR Code before proceeding.  
This will help you to understand & revise the concepts learnt in class.



### (A) Put a tick against all the correct statements with reference to germination.

- (1) Seeds need warmth, moisture and air to germinate.
- (2) Seeds of xanthium have hooks so they stick to the animal.
- (3) Inside the bean there is only one cotyledon.
- (4) Inside the bean there are two cotyledons.
- (5) These cotyledons contain stored plant food which is used by the baby plant.
- (6) Seeds are carried by wind, water and air.

#### Training Plan: Germination and Seed Dispersal

**Objective:** By the end of this lesson, students will be able to understand the process of germination and the various methods of seed dispersal.

**1. Introduction:** Begin the lesson by asking the students if they know what germination is and why it is important for plants. Use guiding questions such as: What happens when a seed begins to grow? How does a seed turn into a plant? Why is germination important for the survival of plants?

**2. QR Code Activity:** Show the QR code on the screen and instruct the students to use their devices to scan it. Once scanned, the students will be directed to a website or video that explains the process of germination. Encourage the students to take notes or jot down any interesting information they learn during the activity.

**3. Discussion and Concept Reinforcement:** Facilitate a class discussion based on the information learned from the QR Code activity. Ask questions such as: What are the necessary conditions for germination? Why do plants need warmth, moisture, and air? Why do some seeds have hooks or wings? What is the purpose of cotyledons? How do cotyledons contribute to the growth of the baby plant?

**4. Seed Dispersal Activity:** Divide the students into small groups. Distribute different types of fruit samples to each group. Instruct the students to observe the fruits and discuss how the seeds are dispersed. Ask questions such as: How are the seeds of this fruit dispersed? What adaptations do you notice that help the seeds travel to new places? How are these methods of seed dispersal advantageous for the plant?

**5. Creative Activity:** Provide each student with construction paper, scissors, and glue. Instruct them to create a poster or collage depicting different methods of seed dispersal. Encourage the students to be creative and use their knowledge to design their artwork. After completion, have the students present their creations and explain the methods of seed dispersal depicted.

**6. Closure:** Recap the main points discussed in the lesson. Ask the students to briefly explain the process of germination and name at least three methods of seed dispersal. Provide positive feedback and encourage them to continue exploring and asking questions about the topic.

**Note:** The time duration mentioned for each activity is an estimate and can be adjusted based on the pace of the class. It is important to give enough time for discussions and encourage active participation from all students.

#### Fun and Creative Activity: Seed Dispersal Scavenger Hunt

**Objective:** To reinforce the concept of seed dispersal and provide a hands-on and engaging activity for students.

**Instructions:** Prior to the activity, hide the objects representing different methods of seed dispersal around the classroom or designated area. Divide the students into small groups and provide each group with an index card with a clue. Instruct the students to read the clue and search for the object that matches the description. Once a group finds the correct object, they can move on to the next clue and continue the scavenger hunt. Encourage the students to discuss and explain the method of seed dispersal represented by each object they find. The first group to successfully find all the objects and correctly identify the methods of seed dispersal wins the game. Conclude the activity by discussing the different methods of seed dispersal and their significance in plant reproduction and survival.

## HOME ASSIGNMENT

Please scan the QR Code before proceeding.  
This will help you to understand & revise the  
concepts learnt in class.



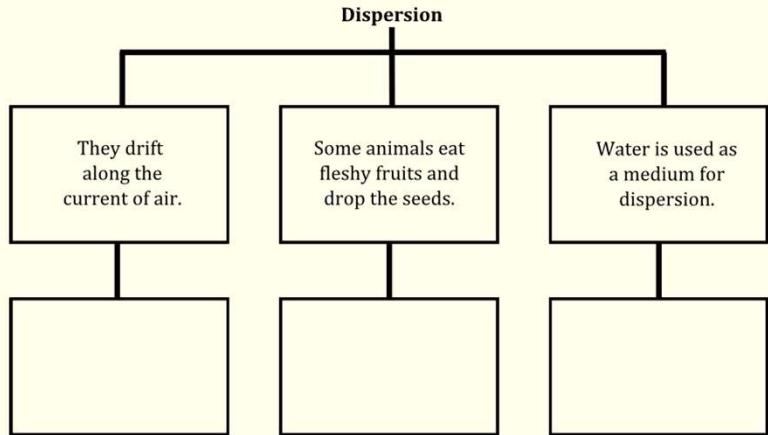
**(A) Put a tick against all the correct statements with reference to germination.**

- (1) Seeds need warmth, moisture and air to germinate. (✓)  
(2) Seeds of xanthium have hooks so they stick to the animal. (✓)  
(3) Inside the bean there is only one cotyledon. (✗)  
(4) Inside the bean there are two cotyledons. (✓)  
(5) These cotyledons contain stored plant food which is used by the baby plant. (✓)  
(6) Seeds are carried by wind, water and air. . (✗)

**(A) Put a tick against all the correct statements with reference to germination.**

- (1) Seeds need warmth, moisture and air to germinate.  
(2) Seeds of xanthium have hooks so they stick to the animal.  
(3) Inside the bean there is only one cotyledon.  
(4) Inside the bean there are two cotyledons.  
(5) These cotyledons contain stored plant food which is used by the baby plant.  
(6) Seeds are carried by wind, water and air.


(B) Name the types of dispersion in the boxes below



(C) Soak some bean seeds in the water and observe what happens after two days. Draw your observations.

(D) Soak some rajma seeds in the water. And observe what happens to the seeds after two days. Draw your observations.



Skill: Nutrition and plants

### Lesson Plan: Dispersion of Seeds

**Objective:** Students will understand the different types of dispersion of seeds and their importance in the plant life cycle.

**Procedure:**

**1. Introduction:** Begin by reviewing the concept of seed dispersal and its importance in plant reproduction. Ask the students if they can think of any ways in which seeds are dispersed. Write their responses on the board or chart paper.

**2. Discussion:** Show the students the extract from the Grade 5 booklet that discusses dispersion of seeds. Engage in a Socratic-style discussion by asking the following guiding questions:

What are the different types of dispersion mentioned in the extract?

Can you give examples of each type of dispersion? Why is dispersion important for plants?

How do you think water helps in dispersion? Write their answers on the board or chart paper.

**3. Activity: Observing Seed Soaking:** Divide the students into pairs or small groups. Provide each group with some bean seeds and containers with water. Instruct them to soak the bean seeds in the water and observe what happens after two days. Ask them to draw and label their observations on the drawing paper. Repeat the same activity with rajma seeds, using a different container. Allow the students to discuss and compare their observations within their groups.

**4. Reflection:** Bring the students back together as a whole class. Ask them to share their observations and discuss the differences between the bean and rajma seeds. Encourage them to make connections to the types of dispersion discussed earlier. Lead the discussion with questions like:

What did you observe about the seeds after soaking them in water?

How do you think the observations relate to the types of seed dispersion?

Which type of dispersion do you think the bean seeds represent? Why?

How do you think animals and water help plants in dispersing their seeds?

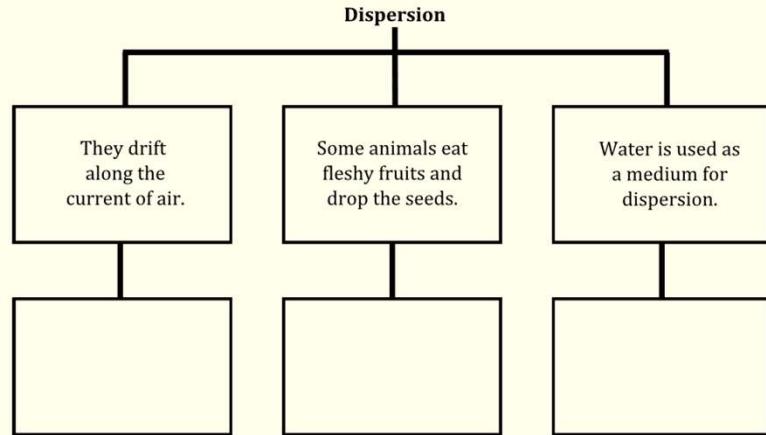
**5. Creative Activity: Craft Seed Dispersion:** Provide each student with a small paper plate, glue, and a variety of craft supplies like colored paper, feathers, cotton balls, etc. Instruct the students to create a visual representation of one of the types of seed dispersion using the craft supplies. Encourage them to be creative and think about how they can represent the concept visually. Once they have completed their craft, ask the students to explain their representation to the class, focusing on the type of seed dispersion they chose and how their craft represents it.

**6. Conclusion:** Summarize the key points discussed in the lesson, emphasizing the different types of seed dispersion and their importance in plant reproduction. Ask the students to reflect on what they have learned and how it connects to the natural world around them.

**Extension Activity:** Ask the students to research and write a short paragraph about a specific plant or tree that relies on a particular type of seed dispersion for survival. They can include information about the plant's characteristics, the type of dispersion it uses, and any adaptations it has developed for effective seed dispersal.

**Note:** Adjust the timings according to the class duration and the pace of the students.

(B) Name the types of dispersion in the boxes below

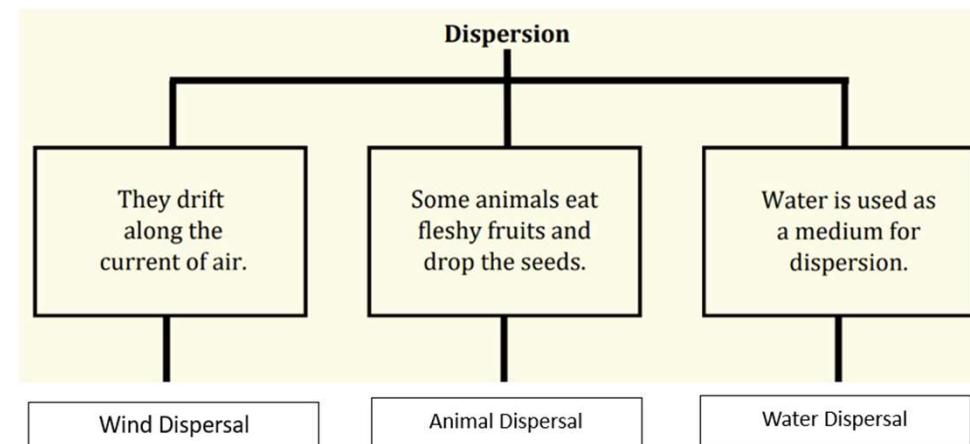


(C) Soak some bean seeds in the water and observe what happens after two days. Draw your observations.

(D) Soak some rajma seeds in the water. And observe what happens to the seeds after two days. Draw your observations.

Skill: Nutrition and plants

(B) Name the types of dispersion in the boxes below.



(C) Soak some bean seeds in the water and observe what happens after two days. Draw your observations.



(D) Soak some rajma seeds in the water. And observe what happens to the seeds after two days. Draw your observations.

Reference Image



## ASSESSMENT

### (A) Tick (✓) and write the correct option.

- (1) The hard outer covering of a seed is called:  
(a) Seed coat    (b) Seedling    (c) Cotyledons
- [ ]
- (2) Which of the following plant seeds are dispersed by wind?  
(a) Coconut    (b) Mimosa    (c) Dandelion
- [ ]
- (3) Which of the following plant seeds have hooks on them?  
(a) Burdock    (b) Lotus    (c) Maple
- [ ]
- (4) Which plant reproduces from its roots?  
(a) Radish    (b) Potato    (c) Bryophyllum
- [ ]
- (5) Dandelions have tufts of hair that help them to float in  
(a) Air    (b) Soil    (c) Water
- [ ]

### (B) Fill in the blanks.

- (1) A plant provides fruits that have \_\_\_\_\_ inside them.
- (2) \_\_\_\_\_ protects the baby plant.
- (3) Seeds that spread with the help of \_\_\_\_\_ are coconut and lotus seeds.
- (4) Some plants like \_\_\_\_\_ grow from stem cuttings.
- (5) The scattering of seeds to far-off places is called \_\_\_\_\_ of seeds.

### (C) Write T for true and F for false statements.

- (1) All the seeds do not grow into new plants.  
[ ]
- (2) Seedlings grow into baby plants.  
[ ]
- (3) All seeds have wings or hairs present around them.  
[ ]

### Lesson Plan: Seed Dispersal

**Objective:** Students will understand the different methods of seed dispersal and the adaptations of seeds for dispersal. They will also be able to identify examples of plants that use specific methods of seed dispersal.

**Warm-up:** Show students pictures or samples of different types of seeds and ask them to describe what they see. Encourage them to use descriptive words and think about how each seed might be adapted for dispersal.

#### Questions to guide discussion:

How does each seed look different from the others?

What features do you notice about the seeds that might help them to travel? Can you think of any plants that have these types of seeds?

**Introduction:** Introduce the concept of seed dispersal by asking students to think about how seeds might move away from their parent plant. Why might it be important for seeds to travel away from their parent plant? How do you think seeds could move without legs or wings?

**Main Activity:** Divide the students into small groups or pairs and give each group a handout with guiding questions about seed dispersal.

Encourage them to think critically and discuss their ideas with their peers. Circulate around the classroom to guide and facilitate their discussions.

#### Sample guiding questions:

- Can you think of any ways that seeds can be dispersed by wind?
- What are some examples of seeds that are dispersed by animals, and how do the seeds 'hitch a ride'?
- How do seeds with hooks or barbs attach to animals or clothing?
- What are some ways seeds can be dispersed by water?

After the groups have had time to discuss and answer the questions, reconvene as a class and have representatives from each group share their answers and ideas. Write their answers on the board to create a visual representation of the different methods of seed dispersal.

**Creative Activity:** As a fun and creative activity, provide various materials such as paper, scissors, glue, tape, and other art supplies. Instruct the students to create their own seed dispersal mechanism using the materials provided. They can draw or cut out different types of seeds and attach them to paper or other objects to simulate different methods of dispersal. Encourage them to be imaginative and come up with unique and inventive ways for seeds to travel.

**Conclusion:** Wrap up the lesson by summarizing the main points of seed dispersal and the adaptations of seeds for dispersal. Ask the students to reflect on what they have learned and think about the different ways seeds can travel and establish new plants.

Encourage them to think about the importance of seed dispersal for plant survival and biodiversity.

**Extension:** For further exploration, students can go on a nature walk around the school or local area to observe different types of plants and their seeds. They can take pictures or collect samples of seeds and identify the methods of dispersal for each one. They can create a class display or presentation to share their findings with the rest of the class or school community.

## ASSESSMENT

### (A) Tick (✓) and write the correct option.

(1) The hard outer covering of a seed is called:  
(a) Seed coat    (b) Seedling    (c) Cotyledons

[ ]

(2) Which of the following plant seeds are dispersed by wind?  
(a) Coconut    (b) Mimosa    (c) Dandelion

[ ]

(3) Which of the following plant seeds have hooks on them?  
(a) Burdock    (b) Lotus    (c) Maple

[ ]

(4) Which plant reproduces from its roots?  
(a) Radish    (b) Potato    (c) Bryophyllum

[ ]

(5) Dandelions have tufts of hair that help them to float in  
(a) Air    (b) Soil    (c) Water

[ ]

### (B) Fill in the blanks.

(1) A plant provides fruits that have \_\_\_\_\_ inside them.

(2) \_\_\_\_\_ protects the baby plant.

(3) Seeds that spread with the help of \_\_\_\_\_ are coconut and lotus seeds.

(4) Some plants like \_\_\_\_\_ grow from stem cuttings.

(5) The scattering of seeds to far-off places is called \_\_\_\_\_ of seeds.

### (C) Write T for true and F for false statements.

(1) All the seeds do not grow into new plants.

[ ]

(2) Seedlings grow into baby plants.

[ ]

(3) All seeds have wings or hairs present around them.

[ ]

### (A) Tick (✓) and write the correct option.

(1) The hard outer covering of a seed is called:

[ a ]

(a) Seed coat (b) Seedling (c) Cotyledons

(2) Which of the following plant seeds are dispersed by wind?

[ c ]

(a) Coconut (b) Mimosa (c) Dandelion

(3) Which of the following plant seeds have hooks on them?

[ a ]

(a) Burdock (b) Lotus (c) Maple

(4) Which plant reproduces from its roots?

[ b ]

(a) Radish (b) Potato (c) Bryophyllum

(5) Dandelions have tufts of hair that help them to float in

[ a ]

(a) Air (b) Soil (c) Water

### (B) Fill in the blanks.

(1) A plant provides fruits that have seeds inside them.

(2) Seed coat protects the baby plant.

(3) Seeds that spread with the help of water are coconut and lotus seeds.

(4) Some plants like roses and mint grow from stem cuttings.

(5) The scattering of seeds to far-off places is called dispersal of seeds.

### (C) Write T for true and F for false statements.

(1) All the seeds do not grow into new plants.

[ T ]

(2) Seedlings grow into baby plants.

[ T ]

(3) All seeds have wings or hairs present around them.

[ F ]

(4) The plants that grow in or near water are dispersed by soil. [ ]

(5) Potato and ginger are underground stems. [ ]

**(D) Give two examples of each of the following.**

(1) Seeds dispersed by explosion.

(2) Seeds dispersed by animals.

(3) Plants that reproduce from stems.

**(E) Answer the following questions.**

(1) What are the different parts of a seed? Also write their functions.

(2) What is germination of a seed?

(3) What are the different ways of plant reproduction?

(4) What is dispersal of seeds? Name some agents by which seeds are dispersed.

**Lesson Plan: Plant Reproduction and Seed Dispersal**

**Objective:** By the end of the lesson, students will be able to explain the different parts of a seed, describe the process of germination, discuss different methods of plant reproduction, and identify various agents that help in the dispersal of seeds.

**Introduction:** Begin the lesson by asking students if they know how new plants are formed. Elicit responses and write them on the board. Explain that today's lesson is about how plants reproduce and how their seeds are dispersed.

**Parts of a Seed:** Ask students if they know what parts make up a seed. Write down their answers on the board. Introduce the different parts of a seed (seed coat, embryo, endosperm). Ask guiding questions to help students understand the functions of each part. Encourage students to share their ideas and thoughts.

**Germination of a Seed:** Ask students if they know what happens when a seed starts to grow into a new plant. Elicit responses and write them on the board. Explain the process of germination, using simple language and diagrams if possible. Ask guiding questions to help students understand the factors necessary for germination. Encourage students to connect their own experiences of planting seeds to the concept of germination.

**Methods of Plant Reproduction:** Introduce the concept of plant reproduction and explain that there are different ways plants can reproduce. Ask students if they know any methods of plant reproduction. Elicit responses and write them on the board. Discuss the different methods of plant reproduction (sexual and asexual). Ask guiding questions to help students understand the advantages and disadvantages of each method. Encourage students to think of examples of plants that reproduce in these ways.

**Seed Dispersal:** Explain that plants need to disperse their seeds to grow in new places. Ask students if they know how seeds are dispersed. Elicit responses and write them on the board. Discuss different agents of seed dispersal (wind, water, animals). Ask guiding questions to help students understand the role of each agent in spreading seeds. Share interesting examples of plants and their specific methods of seed dispersal.

**Activity: Seed Dispersal Game:** Divide the class into small groups. Distribute the worksheet for the activity. Instruct students to play a game where they act out different agents of seed dispersal. Each group will take turns acting out a specific agent (wind, water, animals) while the others try to guess. After each round, discuss the importance of that agent in seed dispersal. Encourage students to think creatively and have fun with their acting skills.

**Recap and Conclusion:** Review the main concepts discussed in the lesson: parts of a seed, germination, plant reproduction, and seed dispersal. Ask students to share one thing they learned or found interesting during the lesson. Emphasize the importance of plants in our ecosystem and the role of seeds in their survival and reproduction.

**Optional Extension:** Assign students a research project on a specific plant and its method of seed dispersal. Ask students to create a diagram or model showcasing the different parts of a seed and their functions.

**Activity: Seed Dispersal Game Worksheet:** (agent) Guess the Seed Dispersal Agent! This agent helps seeds travel long distances by carrying them on their fur or feathers. This agent helps seeds travel short distances by being sticky and causing them to stick to its body. This agent picks up seeds and carries them away to be stored for later. This agent helps seeds float and travel through bodies of water. This agent moves seeds from place to place by blowing strong gusts of air. This agent eats fruits and drops the seeds in different locations. This agent launches seeds out of its pods or fruits, dispersing them forcefully. Have fun and enjoy the game!

**Note:** The worksheet can be customized to suit the specific examples and agents discussed during the lesson.

(4) The plants that grow in or near water are dispersed by soil.

[ ]

(5) Potato and ginger are underground stems.

[ ]

**(D) Give two examples of each of the following.**

(1) Seeds dispersed by explosion.

(2) Seeds dispersed by animals.

(3) Plants that reproduce from stems.

**(E) Answer the following questions.**

(1) What are the different parts of a seed? Also write their functions.

(2) What is germination of a seed?

(3) What are the different ways of plant reproduction?

(4) What is dispersal of seeds? Name some agents by which seeds are dispersed.

(4) The plants that grow in or near water are dispersed by soil. [ F ]

(5) Potato and ginger are underground stems. [ T ]

**(D) Give two examples of each of the following.**

(1) Seeds dispersed by explosion - pods of squirting cucumber, pea plants

(2) Seeds dispersed by animals - Burdock, Black berries

(3) Plants that reproduce from stems - Rose plant , Money plant

**(E) Answer the following questions.**

**(1) What are the different parts of a seed? Also write their functions.**

The different parts of a seed and their functions:

**Seed Coat:** This is the outer layer of the seed. It protects the seed from damage and prevents water from entering the seed until conditions are suitable for germination.

**Embryo:** This is the young plant itself, ready to emerge when conditions are right. The embryo contains the root (radicle), stem (hypocotyl), and leaves (plumule).

**Cotyledon:** These are the seed leaves found inside the seed. They are part of the embryo and provide nutrients to the embryo as it grows, until the seedling can carry out photosynthesis on its own top of form.

**(2) What is germination of a seed?**

Germination of a seed is the process by which an organism grows from a seed. It involves the growth of the embryo within the seed, and results in the formation of a seedling. It typically involves the seed absorbing water (imbibition), causing it to swell and break open the seed coat, followed by the growth of the root (radicle) and shoot (plumule).

**(3) What are the different ways of plant reproduction?**

The different ways of plant reproduction include:

**Sexual Reproduction:** This involves the fertilization of the female ovules by male pollen, resulting in the production of seeds, which can grow into new plants. This usually occurs within flowers.

**Asexual Reproduction:** This involves the formation of new plants from existing plant parts. It can occur through various means, including budding, fragmentation, and the formation of bulbs, tubers, and runners.

**(4) What is dispersal of seeds? Name some agents by which seeds are dispersed.**

Dispersal of seeds is the movement or transport of seeds away from the parent plant. Seeds can be dispersed in several ways, depending on the species of plant and the seed structure. Some common dispersal agents include: Wind (dandelion seeds), Water (coconut seeds), Animals (mimosa seeds), Explosion (pods of squirting cucumber).

## TEST WITH WATER



Have you ever noticed that a rubber ducky floats on water and a soap sinks in water?

### SINK AND FLOAT



Sink

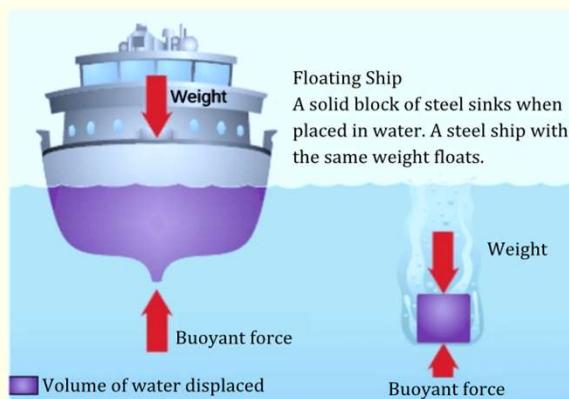


Float

The tendency of an object to remain on the surface of water is known as **floatation**. Objects such as leaves, wooden sticks, paper, plastic bottles float on the surface of water. When we see something balancing on the surface of water, we say it is **floating**.

Sinking is exactly opposite to floatation. The tendency of an object to go deep down in the fluid is known as **sinking**. In case the object goes under water, we say it has sunk. An iron nail, a metal object, bricks are some examples of sinking objects.

### CAUSE OF FLOATATION AND SINKING



### Lesson Plan: Topic: Sink and Float

**Objective:** By the end of this lesson, students will be able to understand the concepts of sink and float, and identify the factors that determine whether an object sinks or floats in water.

**Activity 1: Introduction:** - Begin the lesson by asking students if they have ever noticed that some objects float on water while others sink. Show them a rubber ducky and a soap, and ask why they think the rubber ducky floats and the soap sinks. Write down their responses on the whiteboard or chart paper.

**Activity 2: Understanding Floatation and Sinking:** Introduce the terms floatation and sinking. Explain that floatation refers to the tendency of an object to remain on the surface of water, while sinking refers to the tendency of an object to go deep down in the water. Show examples of objects that float (leaves, wooden sticks, paper, plastic bottles) and objects that sink (iron nail, metal object, bricks). Ask the students why they think the floating objects float and the sinking objects sink.

Encourage them to think about the weight and volume of the objects.

**Activity 3: Factors Affecting Floatation and Sinking:** Introduce the factors that determine whether an object sinks or floats - weight and buoyant force. Explain that weight is the force with which an object is pulled towards the earth, while buoyant force is the upward force exerted by a fluid on an object. Show a diagram of a floating ship and explain that a solid block of steel sinks in water because its weight is greater than the buoyant force, but a steel ship with the same weight floats because its weight is balanced by the buoyant force. Ask the students to think about how the volume of water displaced by an object affects its buoyant force.

**Activity 4: Guided Discussion:** Share with the students the equation for buoyant force: Buoyant force = Volume of water displaced x Density of water x Acceleration due to gravity. Ask the students how they think each factor in the equation affects the buoyant force. Discuss their ideas and guide the discussion towards the understanding that if the volume of water displaced by an object is greater than its weight, the object will float; if the weight is greater than the volume of water displaced, the object will sink.

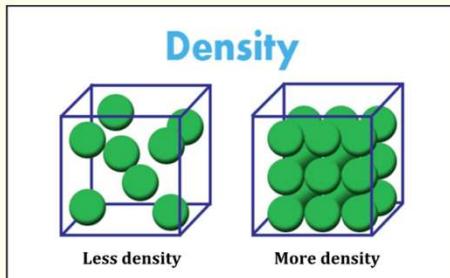
**Activity 5: Fun and Creative Activity:** Divide the students into small groups. Distribute various objects among the groups (e.g. rubber ducky, soap, wooden stick, paper, plastic bottle, iron nail, metal object). Instruct the groups to predict whether each object will sink or float in water, and explain why. Give each group a container of water and have them test their predictions. After the experiment, gather the groups together and discuss their findings. Were their predictions correct? Why or why not? Allow the students to share any interesting observations or questions that arose during the activity.

**Closure:** Summarize the main concepts discussed in the lesson, emphasizing the factors that determine whether an object sinks or floats. Encourage students to think about real-life examples of sink and float in their daily lives.

**Note:** It is important to continuously ask open-ended questions throughout the lesson to stimulate critical thinking and encourage students to discover the concepts on their own.

### Why do heavy ships float on the surface of water?

The floating or sinking of an object doesn't depend upon the weight of the object. It depends upon the density of the object and the density of the fluid. The **density** of an object is measured by calculating the amount of mass present in the given space. If an object's density is lesser than water, it will float. On the other hand, if the density of an object is more than water, it will sink.



### Why does a cork float in water while an iron key sinks?

This is because of the density of the object. The density of cork is lesser than water which means it will float on water while the density of iron key is more than water which means it will sink in water.

#### Activity Zone

**Aim:** To find objects that float and sink in water.

**Things we need:** A large container, water, two baskets (label the baskets as objects float on one basket and objects sink on another), towel, tweezers, objects present at home to check: feather, lego, bath toy, crayon, ping pong ball, plastic utensil, pencil, toy cars, coins, metal spoon, eraser, dry pasta.

**Method:**

- (1) Fill both the containers with water.
- (2) Using tweezers, take an object and place one item into the water at a time.
- (3) Observe whether it floats or sinks.
- (4) Remove them from the water with the tweezers.
- (5) Place the object into the corresponding labelled basket.
- (6) Repeat the exercise with every object.
- (7) Talk about why some objects sank, and others didn't.

**Observation:**

List out the objects which sink and float in water.

### Lesson Plan: Topic: Floating and Sinking

**Objective:** To understand the concept of density and how it relates to the floating and sinking of objects in water. To identify objects that float and sink in water through a hands-on activity.

**Introduction:** Show the PDF booklet page on Floating and Sinking to the students. Engage them by asking the question: "Why do heavy ships float on the surface of water?" Encourage students to think and discuss their ideas with a partner.

**Discussion:** Write the guiding questions on the board: What determines whether an object floats or sinks in water? Is it the weight of the object or something else? How is the density of an object related to its floating or sinking in water? Why does a cork float in water while an iron key sinks? Facilitate a discussion around these questions, allowing students to share their thoughts and explanations. Encourage students to think about the density of different materials and how it affects their ability to float or sink. Ask follow-up questions to deepen their understanding, such as: How can we measure the density of an object? Can you think of other examples of objects that float or sink?

**Activity: Testing Objects:** Explain the aim of the activity: To find objects that float and sink in water. Divide the students into small groups. Distribute the materials (large container, water, two baskets, towel, tweezers) and the objects for testing. Guide students through the steps of the activity as outlined in the PDF booklet. Emphasize the importance of observing and recording their findings.

Circulate among the groups, providing assistance and asking questions to stimulate critical thinking. Examples of questions: Why do you think this object is floating? What do you notice about the object that sinks?

**Class Discussion:** Gather the students together and ask them to share their observations from the activity. Record their findings on the board or a chart paper. Discuss the reasons why some objects floated and others sank. Encourage students to connect their observations to the concept of density and explain why certain materials have different densities. Ask questions to deepen their understanding: Can you think of other objects that float or sink in water? What factors affect an object's density?

**Conclusion:** Summarize the main points of the lesson: Floating and sinking of objects depend on the density of the object and the fluid it is placed in, not just the weight of the object. Recap the key ideas discussed during the activity and the class discussion. Connect the concept to real-life examples, such as ships and submarines. Encourage students to continue exploring the concept of density and its applications in the world around them.

**Extension Activity - Creative Float or Sink Game:** Divide the class into two teams. Each team will take turns selecting an object from a bag or box. The team must decide whether the object will float or sink in water. The object is then placed in a container of water to test their prediction.

Points are awarded to teams based on their correct predictions.

Encourage students to discuss their reasoning for each prediction and provide explanations for their choices.

Rotate the object selection and continue playing until all objects have been tested. Celebrate the winning team and discuss any surprising results or insights gained during the game.

## G5S TEST WITH WATER

## Dead Sea

There exists a sea situated between the hills of Judea in Israel to the west and the Transjordanian plateaus in Jordan to the east. The Dead Sea is one of the saltiest bodies of water on the planet, with about ten times the salt content than the typical seawater.



### Why do we float on dead sea while we sink in swimming pool?

The unusually high concentration of dissolved mineral salts in dead sea water causes it to be denser than ordinary fresh water. Our bodies float in the Dead Sea because water is dense in dead sea and the density of our body is less which leads to floating on water.

## SOLUBILITY

One important property of water is that it can dissolve many substances in it. Thus, water is often referred to as a universal solvent. A substance that dissolves in a solvent is said to be a soluble substance. Salt and sugar are soluble substances. Materials like wood, chalk, stone and oil do not dissolve in water and are called to be **insoluble substances**.

## SOLUBILITY OF SUBSTANCES IN WATER

Solubility is the capacity of a substance to dissolve in some other substance to form a mixture of uniform nature. The substance which gets dissolved is called a **solute** and in which the solute gets dissolved is called a **solvent**. The mixture obtained is called a **solution**.

## Topic: Solubility and Buoyancy

**Objective:** Students will understand the concept of solubility and how it affects buoyancy in different bodies of water.

**Introduction:** Begin the lesson by asking the students if they have ever been to the beach or a swimming pool. Ask them if they noticed any differences in how their body behaves in different bodies of water. Share the example of the Dead Sea being one of the saltiest bodies of water and how people float in it while sinking in a swimming pool. Ask the students why they think this happens. Encourage them to think about the concept of solubility and density.

**Development:** Explain to the students that solubility is the ability of a substance to dissolve in a solvent to form a mixture called a solution. Show a few examples of soluble substances such as salt and sugar, and insoluble substances such as wood and oil. Ask the students to think about why salt and sugar dissolve in water but wood and oil do not. Encourage them to discuss their ideas with a partner. Facilitate a class discussion about the concept of solubility and why different substances have different abilities to dissolve in water. Use guiding questions to lead the students towards understanding the relationship between solubility and buoyancy. For example: How does the solubility of a substance affect its density? How does the density of a substance affect whether it sinks or floats in water?

**Application:** Divide the students into small groups. Give each group a set of materials including salt, sugar, wood, and oil, as well as containers with water. Instruct the groups to experiment with the materials and record their observations about solubility and sinking/floating. Encourage the students to pose their own questions and hypotheses, and conduct their experiments accordingly. After the experiments, have each group present their findings to the class and explain their conclusions. Facilitate a class discussion to compare and contrast the findings of the different groups, and reinforce the connection between solubility and buoyancy.

**Conclusion:** Summarize the main points discussed in the lesson, emphasizing the relationship between solubility, density, and buoyancy.

Ask the students to reflect on why it is important to understand these concepts, and how they can apply them in real-life situations.

**Fun and Creative Activity:** Play a game of "Sink or Float" where the students are given various objects and have to predict whether they will sink or float in water. Have the students take turns presenting their objects and explain their predictions based on their understanding of solubility and density. Award points for correct predictions and encourage discussions and debates about the reasoning behind each prediction.

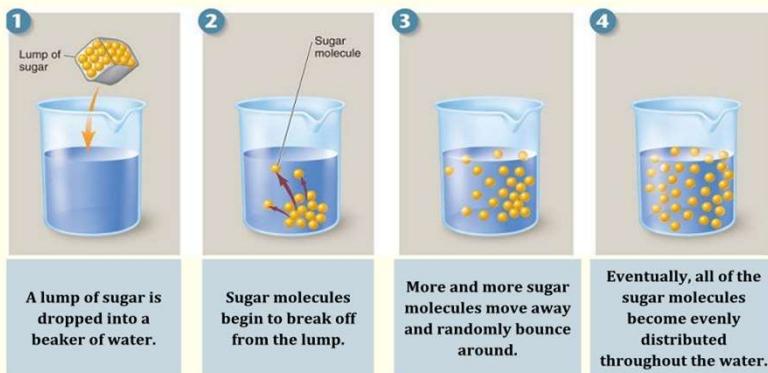


### Solubility of Solids in Water



When the particles of a solid substance fill the space among the particles of liquid, it mixes with liquid.

**For example:** Add a teaspoonful of sugar in water. Stir it well and leave it. You will get a solution of sugar in water. Sugar particles spread among the water particles.



### Lesson Plan: Solubility of Solids in Water

**Objective:** Students will understand the concept of solubility and how solids dissolve in water.

**Preparation:** Gather materials for a demonstration: beakers, sugar, water, stirring rods. Prepare questions for discussion and activities

**Introduction:** Begin by asking students if they have ever dissolved something in water before. What happened? Did it disappear completely or were there still some visible particles?

**Discussion:** Show the students a beaker of water. Ask them to predict what will happen if you drop a lump of sugar into the water. Will it dissolve? Why or why not? Allow students to share their predictions and reasons. Conduct the demonstration by dropping sugar into the water, stirring it, and observing what happens. Ask students to describe what they see. Is the sugar completely dissolved? Why or why not?

**Guided Exploration:** Engage students in a discussion about why the sugar dissolves in water. Ask questions such as:

- Why do you think the sugar dissolved in water?
- What happened to the sugar particles when they were added to the water?
- How do you think the sugar particles are spread throughout the water?
- Do you think all solids can dissolve in water? Why or why not?

Allow students to share their ideas and thoughts. Encourage them to think critically and support their answers with evidence. Introduce the concept of solubility by explaining that solubility is the ability of a substance to dissolve in a particular solvent. Ask students to think about what factors might affect the solubility of a solid in water. Discuss their ideas.

**Application Activity - Solubility Investigation:** Divide the class into small groups. Provide each group with a variety of solids (salt, baking soda, coffee powder, etc.) and water. Have each group choose one solid to test for solubility in water. Instruct the groups to add a small amount of the solid to a beaker of water and stir it. Ask the groups to observe if the solid dissolves completely, partially, or doesn't dissolve at all. Have the groups share their findings with the class, explaining their observations and any conclusions they drew about solubility.

**Conclusion:** Gather the class and discuss the findings from the investigation. Ask students to reflect on what they learned about the solubility of solids in water. What factors affect solubility? Are there any patterns they noticed? Summarize the main points and reinforce the concept of solubility.

**Fun and Creative Activity: "Solubility Experiment Relay":** Divide the class into two teams and set up relay stations with beakers of water and different solids. Each team member takes turns running to a station, adding a small amount of solid to the water, stirring, and observing the solubility. The team with the most solids dissolved wins the relay. After the game, have a discussion about the solubility of each solid and what factors might have influenced the results.

**Closure:** Review the main ideas discussed in the lesson and the findings from the investigation and relay activity. Ask students if they have any further questions or if there is anything they would like to explore more about solubility.

**Note:** Remember to adjust the time allotted for each activity based on the class dynamics and the level of

## Activity Zone

**Aim:** To find out the soluble and insoluble substances.

**Material Required:** Water, two transparent glasses, spoon, salt, chalk powder.

**Method:**

- (1) Take a spoonful of salt and a glass of water.
- (2) Take a spoonful of chalk powder and a glass of water.
- (3) Mix the salt and chalk powder with the water in their respective glasses.
- (4) Stir it for a few minutes and observe what is happening.

**Observation:**

Note down the object which disappears and the object which is still visible in water.

From this activity, we understand that sugar and salt are soluble in water while sand and chalk powder are insoluble in water and settle down at the bottom of the container.

**Example for soluble substance:** Sugar, salt, washing powder, tablets.

**Example for insoluble substance:** Chalk powder, sand, sawdust.

## Solubility of Liquids in Water

Some liquids can dissolve in water while some cannot. Liquids that dissolve in water or in other liquids are called **miscible liquids**. While the liquid that doesn't dissolve in water or in other liquids are called **immiscible liquids**.



Miscible

Immiscible

## Topic: Solubility of Substances in Water

**Objective:** By the end of the lesson, students will be able to differentiate between soluble and insoluble substances and understand the concept of solubility.

**Introduction:** Ask the students if they have ever seen substances dissolve in water. Have a brief discussion about their observations.

**Activity:** Divide the students into pairs and distribute the materials needed for the activity. Instruct the students to take a spoonful of salt and a glass of water, and another spoonful of chalk powder and another glass of water. Have the students mix the salt and chalk powder with the water in their respective glasses. Instruct the students to stir the mixtures for a few minutes and observe what is happening. Have the students note down the substances that disappear in the water and the substances that are still visible.

**Discussion:** Lead the students through a series of questions to guide their understanding:

What substances disappeared in the water?

What substances were still visible?

What were the properties of the substances that disappeared? (soluble)

What were the properties of the substances that were still visible? (insoluble)

Can you think of any other examples of soluble substances?

Can you think of any other examples of insoluble substances?

**Conclusion:** Summarize the discussion and highlight the key points regarding soluble and insoluble substances and their properties.

## Fun and Creative Activity: Solubility Experiment

**Objective:** To explore the solubility of different substances.

**Instructions:** Divide the students into groups and provide each group with different substances and small containers. Instruct the students to predict whether each substance will dissolve in water or not. Have the groups mix each substance with water and observe if they dissolve or not. Encourage the students to record their observations and compare their predictions with the actual results. Allow the students to discuss their findings and share their observations with the class.

**Extension Activity:** Have the students create a poster or infographic showcasing the properties of soluble and insoluble substances. Encourage them to include examples and illustrations to make it visually appealing. Allow the students to present their posters to the class and discuss their understanding of solubility.

**Assessment:** Observe student participation and engagement during the lesson and activity. Review the students' answers to the questions asked during the discussion and their understanding demonstrated in the extension activity.

## G5S TEST WITH WATER

## Activity Zone

**Aim:** To find out the miscible and immiscible liquids.

**Material Required:** Water, four transparent vessels, stirrer, lemon juice, milk, coconut oil, mustard oil.

**Method:**

- (1) Collect some lemon juice, milk, mustard oil and coconut oil samples.
- (2) Fill four vessels with half-filled water.
- (3) Pour the four liquids into each of the four vessels separately.
- (4) Stir it and let it be for a few minutes.

**Observation:**

Note down the liquids which completely dissolves and the liquids which keeps floating on the top surface of water.

**Example for miscible liquids:** milk, ink, glycerine, lemon juice, vinegar.

**Example for immiscible liquids:** mustard oil, coconut oil, kerosene.

## Solubility of Gas in Water

Some gasses like oxygen and carbon dioxide can dissolve in water. For example, aquatic animals like fish breathe in oxygen dissolved in water. Soft drinks contain carbon dioxide which makes them fizzy.

### It's Your Turn

- (1) Name any five fizzy drinks.

## Lesson Plan: Solubility of Liquids and Gases in Water

**Objective:** To understand the concept of solubility and the differences between miscible and immiscible liquids. To learn about the solubility of gases in water.

**Introduction:** Begin the lesson by asking the students if they know what solubility means. Encourage them to share their ideas and definitions. Guide the discussion towards understanding that solubility refers to the ability of a substance to dissolve in another substance. Ask the students if they can give any examples of substances that can dissolve in water. Write their responses on the board.

**Procedure:** Divide the students into small groups and distribute the materials. Instruct each group to fill four vessels with water, each half-filled. Ask the students to pour one of the liquids (lemon juice, milk, coconut oil, mustard oil) into each of the four vessels separately. Have the students stir the mixture and let it sit for a few minutes. Ask the students to observe and note down which liquids completely dissolve in water and which ones float on the top surface. As a whole class, discuss the observations and categorize the liquids as miscible (completely dissolve) or immiscible (float on the surface). Write down examples of miscible and immiscible liquids on the board.

**Discussion:** Ask the students why they think some liquids completely dissolve in water while others do not. Prompt them to think about the properties of the liquids, such as their molecular structure, density, and polarity. Encourage the students to share their thoughts and explanations, and guide them towards understanding that miscible liquids have similar properties that allow them to mix uniformly, while immiscible liquids have different properties that prevent them from mixing.

**Solubility of Gases in Water:** Explain to the students that not only solids and liquids can dissolve in water, but gases can as well. Use examples such as fish breathing in oxygen dissolved in water and carbon dioxide in fizzy drinks to illustrate the concept of gas solubility in water. Ask the students if they can think of any other examples of gases that can dissolve in water.

**Conclusion:** Summarize the main points discussed during the lesson, emphasizing the differences between miscible and immiscible liquids and the solubility of gases in water. Reinforce that solubility depends on the properties of the substances involved. Encourage the students to continue exploring solubility in their everyday lives and to think about other examples of solubility they encounter.

**Activity: Fizzy Drink Creation:** Divide the class into small groups and provide them with various carbonated beverages (fizzy drinks). Instruct the groups to create their own fizzy drink by mixing different flavors or adding different ingredients. Encourage the students to think about the solubility of gases in their creations and how it affects the fizziness. Have each group present their fizzy drink creations, explaining the ingredients and the solubility principles applied to their creations. As a class, taste and compare each group's fizzy drinks, discussing the similarities and differences in fizziness and flavour.

## G5S TEST WITH WATER

## REMOVAL OF INSOLUBLE SOLIDS FROM WATER

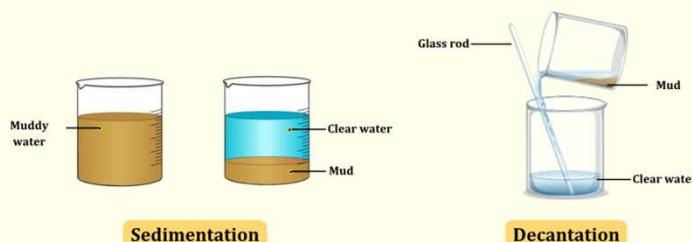
Insoluble particles contaminate water and make it unfit for drinking purposes. To separate insoluble solids from water, there are several processes discussed as below:

### SEDIMENTATION AND DECANIMATION

These methods work together to purify the water.

**What you will do:**

- (1) Take a glass full of water.
- (2) Add some sand in it.
- (3) Leave the glass undisturbed for some time.



**What you will see:**

You will see that the sand particles get settled down at the bottom of the glass. This process is called **sedimentation**.

When you pour this water into other glass, you will get pure water. This process is called **decantation**.

### FILTRATION

**What you will do:**

- (1) Keep the funnel over an empty glass and place the filter paper in the funnel.
- (2) Take a glass full of sandy water.
- (3) Pour this water in the funnel on the filter paper.

### Lesson Plan: Removal of Insoluble Solids from Water

**Objective:** To understand the processes of sedimentation, decantation, and filtration in the removal of insoluble solids from water. To develop critical thinking skills through the use of the Socratic method.

**Introduction:** Begin by asking the students if they have ever heard of or seen dirty water. Ask them why it is important to have clean and safe drinking water. Encourage students to share their thoughts and ideas.

#### Exploration:

**1. Sedimentation and Decantation:** Ask students to imagine that they have a glass of water contaminated with sand particles. Pose the question: How can we separate the sand particles from the water? Provide a glass full of water and add some sand to it. Ask the students to observe what happens when the glass is left undisturbed for some time. Ask: What do you see happening to the sand particles in the water? Help guide the discussion towards the concept of sedimentation, where the sand particles settle down at the bottom of the glass. Introduce the term "decantation" and explain that it is the process of carefully pouring the clear water into another glass, leaving the settled sand behind. Ask: What do you think will happen when we pour this water into another glass? Assist students in understanding that the clear water is separated from the sediment, or the insoluble solid.

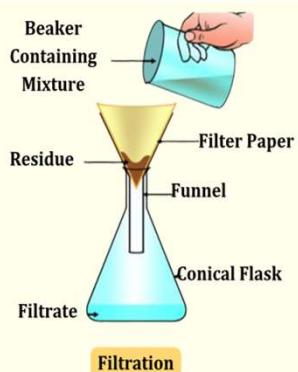
**2. Filtration:** Ask students to think about how they can remove smaller particles, such as mud or tiny dirt particles, from water. Pose the question: How can we separate the smaller particles from the water? Set up the filter funnel with the filter paper in front of the class. Show the glass full of sandy water and pour it into the filter funnel. Ask students to observe what happens as the water passes through the filter paper. Ask: What do you see happening to the smaller particles in the water? Lead the discussion towards the concept of filtration, where the filter paper acts as a barrier, allowing only clear water to pass through. Explain that the solid particles are left behind in the filter paper, while the water becomes clearer.

**Application:** Divide students into small groups and provide each group with a glass of water mixed with various insoluble solids such as sand, mud, and tiny pebbles. Ask each group to brainstorm and design their own experiment using sedimentation, decantation, and filtration to separate the solids from the water. Encourage students to ask guiding questions and guide them in their experimental process. Each group will present their experiment and explain the process they used to separate the solids from the water.

**Conclusion:** Recap the main concepts of sedimentation, decantation, and filtration in the removal of insoluble solids from water. Connect the lesson to the importance of having clean and safe drinking water. Ask students to reflect on the processes they learned and how they can apply them to purify water in real-life situations. Provide resources or suggestions for further exploration on water purification.

**Fun and Creative Activity: Create a Water Purification Filter:** Divide students into pairs or small groups and provide each group with materials such as cotton balls, sand, activated charcoal, and empty plastic bottles. Explain that their task is to create a water purification filter using the materials provided. Encourage students to think about the different properties of each material and how they can be used to filter water effectively. Allow time for students to experiment and construct their filters. Once the filters are ready, pour dirty water into each filter and observe the results. Discuss the effectiveness of each filter and the reasons behind their success or failure. Conclude with a class discussion on the importance of having various methods and materials to purify water in different situations.

## G5S TEST WITH WATER



#### What you will see:

You will see that impurities are left behind on the filter paper and pure water is obtained in the glass.

**Filtration** is the process in which solid particles in a liquid or gaseous fluid are removed using a filter medium that permits the fluid to pass through but retains the solid particles.

Dissolved impurities are called **soluble impurities**.

## EVAPORATION

The change of water into water vapour due to heating is called **evaporation**. The amount of water vapour present in the air is called **humidity**. Evaporation takes place all the time at all places.

#### Removal of soluble impurity (salt) from water:

#### What you will do:

- (1) Take a bowl full of water.
- (2) Add some salt in it.
- (3) Then keep the bowl in sunlight.

#### What you will see:

You will see that water evaporates leaving behind the salt in the bowl.

### Lesson Plan: Filtration and Evaporation

**Objective:** Students will understand the process of filtration and how it removes solid impurities from a liquid. Students will understand the process of evaporation and how it can be used to separate soluble impurities from a liquid. Students will apply their knowledge by conducting a hands-on activity to demonstrate filtration and evaporation.

**Introduction:** Begin the lesson by asking the students if they have ever seen or used a filter before. Ask them what they think filters are used for and how they work. Write down their responses on the board.

**Guided Exploration:** Show the students the materials needed for the filtration process (beaker, mixture, filter paper, funnel, conical flask).

Ask them what they think will happen if we pour the mixture into the funnel with the filter paper. Guide their thinking by asking questions like: What do you think will pass through the filter paper? What do you think will be retained on the filter paper? Conduct the filtration process in front of the students and have them observe the results. Ask them to describe what they see and explain why the solid impurities are left behind on the filter paper.

**Group Discussion:** Lead a discussion about the process of filtration, using the following guiding questions: What is filtration? How does the filter paper help in the filtration process? Why do you think only solid impurities are left behind on the filter paper? Can you think of any other examples where filtration is used?

**Introduction to Evaporation:** Ask the students if they have ever seen water disappear or turn into steam. Ask them how they think this happens and why the water does not always disappear.

**Guided Exploration:** Show the students the materials needed for the evaporation process (bowl, water, salt). Ask them to predict what will happen if we add salt to the water in the bowl and leave it in the sunlight. Guide their thinking by asking questions like: How do you think the salt will separate from the water? What will happen to the water when it is exposed to sunlight?

Conduct the evaporation process in front of the students and have them observe the results. Ask them to describe what they see and explain why the salt is left behind in the bowl.

**Group Discussion:** Lead a discussion about the process of evaporation, using the following guiding questions:

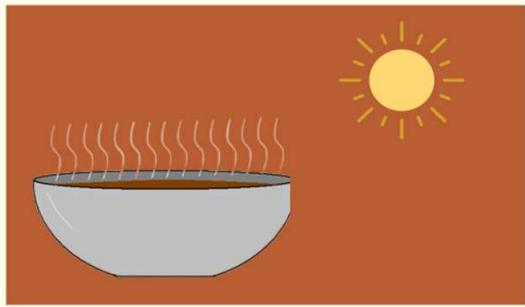
What is evaporation? How does heat or sunlight cause evaporation? Why does the salt remain in the bowl during evaporation? Can you think of any other examples where evaporation is used?

**Activity - "Separating the Mixture"** : Divide the students into pairs or small groups. Provide each group with a mixture of sand, salt, and water. Ask the students to come up with a plan to separate the three components using both filtration and evaporation. Have the groups complete the activity and discuss their results as a class. Allow the students to share their creative ideas and strategies for separating the mixture.

**Conclusion:** Summarize the key points discussed during the lesson about filtration and evaporation. Have a class discussion on the importance of these processes in everyday life. Encourage the students to think about how filtration and evaporation can be used to solve real-world problems.

**Fun and Creative Activity: "Build Your Own Filtration Device"**: Divide the students into small groups. Provide each group with various materials such as plastic bottles, sand, gravel, filter paper, cotton balls, etc. Explain to the students that their task is to design and build a filtration device using the provided materials. Encourage them to think creatively and work collaboratively. Once the devices are built, have the groups test them by pouring a mixture of water and solid impurities through their filtration devices. Have the students compare and discuss the effectiveness of their filtration devices. Conclude the activity by asking the students to reflect on the challenges they faced and what they learned from the experience.

**Note:** Adjust the time for each section of the lesson plan as needed to fit within the class period.



### Did You Know?

In March-April 1930, Mohandas (Mahatma) Gandhi led a large non-violent protest movement in India known as the **Salt March**, also known as the **Dandi March** or the **Salt Satyagraha**. It was a tax evasion effort against the British monopoly.

On April 5<sup>th</sup>, Gandhiji, along with the other marchers to the sea, arrived to Dandi. After reaching Dandi, Gandhiji made salt by evaporating seawater and said, "With this, I am shaking the foundations of the British Empire."



### Lesson Plan: Properties of Water

**Objective:** To understand the different properties of water and how they can be observed and tested.

#### Procedure:

- Introduction:** Begin the lesson by asking the students what they know about water. Write their responses on the board. Ask guiding questions such as "What is water made of?" and "How does water behave in different situations?" to stimulate critical thinking.
  - Presentation:** Explain that water is a unique substance with many interesting properties. Ask the students to observe a glass of water and describe its appearance. Ask questions such as "What do you notice about the surface of the water?" and "Do you see any movement in the water?"
  - Activity 1: Surface Tension:** Give each student a paper clip and ask them to carefully place it on top of the water in the glass. Ask questions like "What happens to the paper clip?" and "Why do you think the paper clip floats on the water?"
  - Activity 2: Ice Floats:** Drop an ice cube into the glass of water and ask the students to observe what happens. Ask questions like "What do you notice about the ice cube?" and "Why do you think the ice cube floats in water?"
  - Activity 3: Mixing Colors:** Give each student a small plastic cup filled with water and a pipette. Ask them to add a few drops of different food coloring to their cup and observe what happens. Encourage them to mix different colors and record their observations. Ask questions like "What happens when you mix different colors of food coloring?" and "Why do you think this happens?"
  - Wrap-up:** Recap the main points discussed during the lesson. Ask the students if their understanding of water has changed and if they have any questions or reflections.
  - Fun and Creative Activity: Water Experiments:** Divide the students into small groups and provide them with materials such as cups, straws, sponges, and bowls of water. Encourage them to come up with their own water experiments to test different properties. The students can present their experiments to the class and discuss their findings.
- Extensions:** Have the students research and present real-life examples of how water's unique properties are used in everyday life. Discuss the importance of water for living organisms and the environment. Explore the phases of water (solid, liquid, and gas) and their properties.
- Note:** The timings provided are estimations and can be adjusted based on the pace of the class and the availability of materials.

## How salt is formed from evaporation?

Under the intense heat of the Sun, the ocean's bounty is harvested from coastal sand. The water evaporates in Sun-soaked beds, leaving behind a gift of glimmering salt crystals for us to enjoy.



### Lesson Plan: How Salt is Formed from Evaporation

**Objective:** The students will understand the process of salt formation through evaporation and its relationship with the Sun.

#### Procedure:

- 1. Introduction:** Begin by asking the students if they have ever thought about where salt comes from and how it is made.
- b. Show them the picture of the ocean and explain that salt is actually formed from the water in the ocean.
- c. Write the guiding question on the board: "How is salt formed from evaporation?"

#### 2. Pre-Activity Discussion:

- a. Ask the students if they know what evaporation is and how it happens.
- b. Discuss with the students how the Sun plays a crucial role in the process of evaporation.
  - Ask questions like: "What happens when water is left out in the Sun for a long time?" "Why does it disappear?"
  - Write their responses on the board.
- c. Explain that the same process happens with the water in the ocean to create salt crystals.
  - Ask: "What do you think happens to the salt when the water in the ocean evaporates?"
  - Encourage the students to brainstorm and speculate. Write their ideas on the board.

#### 3. Activity: Testing the Formation of Salt through Evaporation (20 minutes):

- a. Divide the students into small groups and provide them with small containers, salt, and water.
- b. Instruct the students to pour a small amount of water into the containers and add a pinch of salt to each.
- c. Have them stir the mixture until the salt dissolves completely.
- d. Place the containers on a heat source (under adult supervision) and instruct the students to observe the changes over time.
- e. Encourage them to record their observations and discuss how the water is evaporating, leaving behind salt crystals.
- f. After the water has completely evaporated, have the students examine the salt crystals left in the containers.

#### 4. Post-Activity Discussion:

- a. Bring the students back together to discuss their observations and the process of salt formation through evaporation.
- b. Ask questions like: "What happened to the water in the containers?" "Why did the salt crystals form?"
- c. Write the key points and explanations on the board to reinforce their understanding.

#### 5. Conclusion:

- a. Summarize the main points discussed during the lesson on how salt is formed from evaporation.
- b. Emphasize the role of the Sun in the process and its connection to the oceans and salt production.
- c. Encourage the students to think about other natural processes that involve evaporation.

#### 6. Fun and Creative Activity: Salt Crystal Art:

- a. Provide each student with a piece of black construction paper and a small container of salt.
- b. Instruct them to use a glue stick to draw a design or write their name on the paper.
- c. Sprinkle the salt over the glue-covered areas, creating a layer of salt crystals.
- d. Let the artwork dry thoroughly and encourage the students to take their salt crystal art home as a reminder of the lesson.

**Note:** Ensure the activity is conducted under adult supervision and follow all safety guidelines for handling heat sources.

## CLASS ASSIGNMENT

(A) Tick (✓) and write the correct option.

(1) The heaviness or lightness of an object is called its \_\_\_\_\_.

- (a) volume
- (b) quantity
- (c) amount
- (d) density

(2) Small quantities of liquids are measured in \_\_\_\_\_.

- (a) millilitres
- (b) kilograms
- (c) litres
- (d) pounds

(3) Changing of liquid into solid is called \_\_\_\_\_.

- (a) freezing
- (b) evaporation
- (c) condensation
- (d) floatation

(4) \_\_\_\_\_ dissolves in water.

- (a) Salt
- (b) Sand
- (c) Chalk powder
- (d) All of the above

(B) Fill in the blanks.

(1) Water in its pure form is a colourless, tasteless and an \_\_\_\_\_ liquid.

(2) A substance that dissolves in a solvent is called to be \_\_\_\_\_.

(3) Filtration is the process of removing \_\_\_\_\_ impurities.

(4) \_\_\_\_\_ is the process of removing soluble impurities in water.

(5) Impurities that do not get dissolved are called \_\_\_\_\_ impurities.

**Objective:** To understand the properties of water and its interactions with other substances.

**Step 1: Introduction:** Begin by asking the students what they already know about water. Prompt them with questions such as: What is water? What are some of its properties? How is water different from other liquids? Take note of their responses and encourage discussion and sharing of ideas.

**Step 2: Exploring the properties of water (15-20 minutes)**

- Present the students with different samples of water, such as tap water, distilled water, and saltwater.
- Ask the students to observe and describe the physical properties of each sample. Prompt them with questions such as: Is there any difference in color, taste, or smell? Can you see any impurities in the water? Encourage the students to make comparisons and draw conclusions about the properties of water.

**Step 3: Understanding measurement:** Introduce the concept of measuring small quantities of liquids. Ask the students why it is important to measure liquids accurately. Discuss different units of measurement, such as milliliters and liters. Give examples of situations where we commonly measure liquids in our daily lives, such as cooking or taking medicine.

**Step 4: Solubility:** Explain the concept of solubility and how substances can dissolve in water.

Show the students different substances, such as salt, sugar, and sand. Ask them to predict which substances will dissolve in water and which will not. Conduct a simple experiment by adding small amounts of each substance to water and observing the results. Guide the students to reflect on their predictions and explain the concept of solubility.

**Step 5: Filtration:** Introduce the idea of filtration as a process to remove impurities from water. Ask the students why it is important to remove impurities from water. Explain the steps involved in the filtration process and show examples of common filtration methods, such as using a coffee filter or a sieve. Discuss the concept of soluble and insoluble impurities and why some impurities can be dissolved in water while others cannot.

**Step 6: Recap and Creative Activity:** Review the main points covered in the lesson by asking the students to summarize what they have learned about water, its properties, solubility, and filtration. Divide the class into small groups and provide each group with a different scenario related to the properties of water. Ask the groups to create a short skit or role play that demonstrates their understanding of the topic. Give the groups time to plan, rehearse, and perform their skits. Encourage creativity and participation from all group members.

**Step 7: Conclusion:** Wrap up the lesson by asking the students to share their favourite part of the activity or any new insights they gained. Emphasize the importance of water in our daily lives and the need to understand its properties and interactions.

**Note:** This lesson plan is designed to encourage critical thinking and active participation from the students. The Socratic method is utilized by asking guiding questions to stimulate discussion, reflection, and self-discovery of the topic. The creative activity at the end provides an opportunity for the students to apply their knowledge in a fun and engaging way.

## G5S TEST WITH WATER

## CLASS ASSIGNMENT

(A) Tick (✓) and write the correct option.

(1) The heaviness or lightness of an object is called its \_\_\_\_\_.

- (a) volume
- (b) quantity
- (c) amount
- (d) density

(2) Small quantities of liquids are measured in \_\_\_\_\_.

- (a) millilitres
- (b) kilograms
- (c) litres
- (d) pounds

(3) Changing of liquid into solid is called \_\_\_\_\_.

- (a) freezing
- (b) evaporation
- (c) condensation
- (d) floatation

(4) \_\_\_\_\_ dissolves in water.

- (a) Salt
- (b) Sand
- (c) Chalk powder
- (d) All of the above

(B) Fill in the blanks.

(1) Water in its pure form is a colourless, tasteless and an \_\_\_\_\_ liquid.

(2) A substance that dissolves in a solvent is called to be \_\_\_\_\_.

(3) Filtration is the process of removing \_\_\_\_\_ impurities.

(4) \_\_\_\_\_ is the process of removing soluble impurities in water.

(5) Impurities that do not get dissolved are called \_\_\_\_\_ impurities.

(A) Tick (✓) and write the correct option.

(1) The heaviness or lightness of an object is called its density.

- (a) volume
- (b) quantity
- (c) amount
- (d) density ✓

(2) Small quantities of liquids are measured in millilitres.

- (a) millilitres ✓
- (b) kilograms
- (c) litres
- (d) pounds

Changing of liquid into solid is called freezing.

- (a) freezing ✓
- (b) evaporation
- (c) condensation
- (d) floatation

(4) Salt dissolves in water.

- (a) Salt ✓
- (b) Sand
- (c) Chalk powder
- (d) All of the above

(B) Fill in the blanks.

(1) Water in its pure form is a colourless, tasteless and an odorless liquid.

(2) A substance that dissolves in a solvent is called to be soluble.

(3) Filtration is the process of removing insoluble impurities.

(4) Purification is the process of removing soluble impurities in water.

(5) Impurities that do not get dissolved are called insoluble impurities.

G5S TEST WITH WATER



## DENSITY OF DIFFERENT LIQUIDS



Watch the instructions here

Density is measured by how compact the particles are in a liquid, the pressure and temperature.  
Eg: Gas is less dense to water as the particles in gas are further apart.



### Objective

To understand the density or thickness of various materials or liquids.

### Materials Required



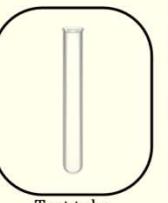
Honey



Oil



Soap Oil



Test tube

### Procedure



Take the test tube, add a few drops of soap oil into it.

1

### Lesson Plan: Density of Different Liquids

**Objective:** To understand the concept of density and compare the densities of different liquids.

**Introduction:** Begin the lesson by asking the students if they have ever wondered why some objects sink in water while others float. Encourage the students to share their observations and thoughts on this topic. Introduce the concept of density by explaining that it is a measure of how tightly packed the particles in a substance are.

**Pose the question:** How do you think density determines whether an object sinks or floats in a liquid?

**Exploration:** Divide the students into groups of four. Distribute the materials to each group. Instruct them to pour each liquid (honey, oil, soap, and water) separately into the test tube until it is about half full. Ask the students to make observations about the behavior of each liquid in the test tube. Guide them to question why some liquids mix together while others remain separate.

**Explanation:** Bring the students back together as a whole class. Ask them to share their observations and hypotheses about the behavior of the liquids. Introduce the concept of density again and explain that liquids with different densities do not mix together.

Ask the students: Why do you think some liquids have different densities?

**Application:** Divide the students into pairs and give each pair a set of different liquids (chosen from the original list) in separate containers. Instruct them to predict which liquid would be denser and which would be less dense based on their prior knowledge. Encourage them to support their predictions with reasons. Ask them to carefully pour the liquids into a transparent container and observe what happens. Have them compare their observations with their predictions. Ask the students: How does the concept of density explain what happened when the liquids were poured into the container?

### Conclusion:

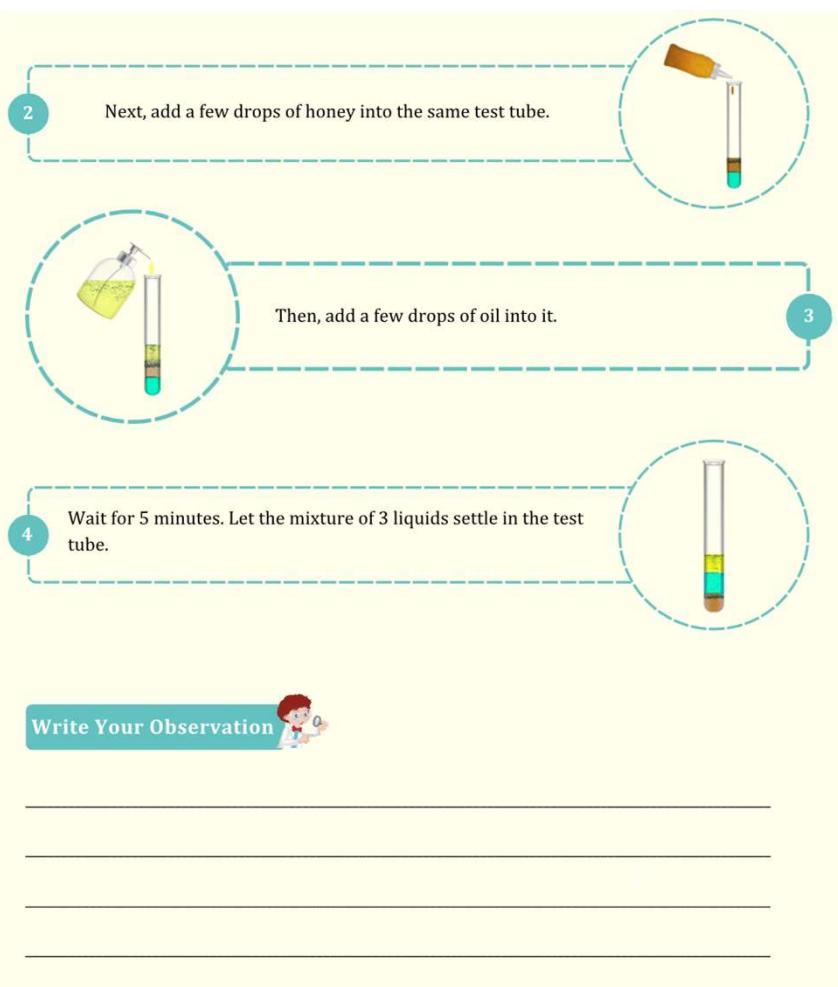
Summarize the main points discussed during the lesson about density and its relation to the behavior of liquids. Reinforce that denser liquids sink below less dense liquids because of their differences in particle arrangement. Encourage the students to think about how the concept of density is relevant in real-life situations.

**Fun and Creative Activity: "Density Tower":** Divide the students into small groups. Provide each group with different liquids of various densities, including water, honey, oil, and syrup.

- Instruct the students to layer the liquids in a transparent container, starting with the densest at the bottom.
- Encourage them to experiment with different orderings and observe the resulting density tower.
- Have each group present and explain their density tower creations to the class.
- Ask the students: What conclusions can you make about the densities of the liquids based on the observations of the density tower?

Note: The time allocations mentioned above are approximate and can be adjusted based on the class's pace and level of engagement.

## G5S TEST WITH WATER



**Introduce the concept of density:** Begin by explaining that density is a measure of how tightly packed the particles are in a substance. Emphasize that denser substances have particles packed closer together, while less dense substances have particles spread farther apart.

**Define density:** Clearly define density as the mass of a substance per unit volume. Explain that it is typically measured in grams per cubic centimeter ( $\text{g}/\text{cm}^3$ ) or grams per milliliter ( $\text{g}/\text{mL}$ ).

**Gather materials:** Collect a variety of materials and liquids with different densities, such as water, oil, honey, aluminum foil, plastic, and wood. Ensure that the materials are safe for students to handle.

**Conduct a prediction activity:** Engage students by asking them to predict which materials or liquids they think will be denser or less dense. Encourage them to provide reasons for their predictions based on their prior knowledge.

**Explore volume and mass:** Introduce the concepts of volume and mass. Explain that volume refers to the amount of space an object occupies, while mass is the measure of the amount of matter in an object.

**Measure mass and volume:** Demonstrate how to measure the mass of objects using a balance or scale. Teach students how to measure the volume of liquids using a graduated cylinder or other appropriate measuring tools. Ensure that they understand the units of measurement (grams and milliliters or cubic centimeters).

**Conduct density experiments:** Guide students in conducting simple density experiments. For example, have them compare the density of water and oil by pouring equal volumes of each liquid into a clear container and observing their behavior. Discuss their findings and the reasons behind the observations.

**Create a density column:** In a transparent container, guide students to layer liquids of different densities, such as water, oil, and syrup, one on top of the other. Observe how the liquids separate according to their densities and remain in distinct layers.

**Measure and compare densities:** Help students calculate the density of various objects or liquids by dividing the mass by the volume. Compare the densities of different materials and liquids. Discuss the results and ask students to explain any patterns or observations.

## G5S TEST WITH WATER



## EVAPORATION PROCESS



Watch the  
instructions here

The process of evaporation involves surface water turning into vapour when exposed to heat.



### Objective

To understand and witness the process of evaporation.

### Materials Required



Beaker



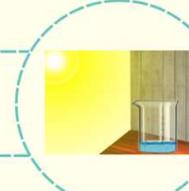
100 ml of water

### Procedure



Pour the water into the beaker.

1



Keep the beaker in direct sunlight.

2

**Introduce the concept of evaporation:** Begin by explaining that evaporation is the process by which a liquid turns into a gas. Emphasize that evaporation occurs when the molecules in a liquid gain enough energy to break free from the liquid's surface and become vapor.

**Set up a demonstration:** Gather the following materials: a shallow container (such as a petri dish or small bowl), water, a heat source (such as a hot plate or stove), and a clear glass or plastic cover to cover the container.

**Pour water into the container:** Fill the shallow container with water, ensuring that the water level is sufficient to observe the evaporation process easily. Place the container on a stable surface.

**Cover the container:** Carefully cover the container with the clear glass or plastic cover. Make sure it completely seals the container to prevent the escape of water vapor.

**Heat the container:** Place the container on a heat source, such as a hot plate or stove, and turn it on to a low to medium heat setting. Explain to the students that the heat source provides energy to the water molecules, increasing their kinetic energy and facilitating evaporation.

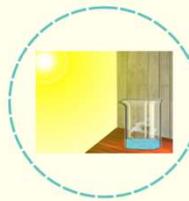
**Observe and discuss:** As the water heats up, the students will witness the process of evaporation occurring inside the container. Water molecules will gain enough energy to break free from the liquid and rise as vapor. Condensation may also occur on the inner surface of the cover.

**Explain the observations:** Once the evaporation process is clearly visible, guide the students in discussing what they observe. Ask questions such as: What changes are occurring? Why do you think the water is disappearing? Why do you think condensation is forming on the cover?

**Discuss factors affecting evaporation:** Engage the students in a conversation about factors that affect the rate of evaporation, such as temperature, surface area, humidity, and air movement. Help them understand that higher temperatures, larger surface areas, lower humidity, and increased air movement tend to accelerate evaporation.

**Reflect and summarize:** Conclude the demonstration by summarizing the key points about evaporation. Discuss its importance in the water cycle and everyday life, such as drying clothes or the cooling effect of sweating. Allow students to ask any remaining questions.

## G5S TEST WITH WATER



Check the volume of water, every 3 hours and write down your observations.

3

Write Your Observation

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## SOLVENT, SOLUTE AND SOLUTION



Watch the instructions here

Solvent refers to the liquid in which the solute (dissolvable substance) breaks down. The end result is called a solution.



### Objective

To understand the definition and action of a solute or a substance that dissolves when added to a liquid or solvent. The liquid is called the solvent and the liquid and solute mixture is known as a solution.

### Materials Required



Bottle of salt



Beaker



Spatula



100 ml of water

### Procedure



Take the beaker and pour the water in it.

1

**Define key terms:** Begin by defining the key terms. Explain that a solvent is a substance that has the ability to dissolve other substances. A solute is the substance that gets dissolved in the solvent. A solution is the resulting mixture when the solute is dissolved in the solvent.

**Provide examples:** Give examples of everyday solutions to help students grasp the concept. For instance, explain that when sugar (solute) is dissolved in water (solvent), it forms a sugar solution. Similarly, when salt (solute) is dissolved in water (solvent), it forms a salt solution.

**Discuss the dissolving process:** Explain that when a solute is added to a solvent, the solute particles mix with the solvent particles. Emphasize that the solute particles become evenly distributed throughout the solvent, creating a solution.

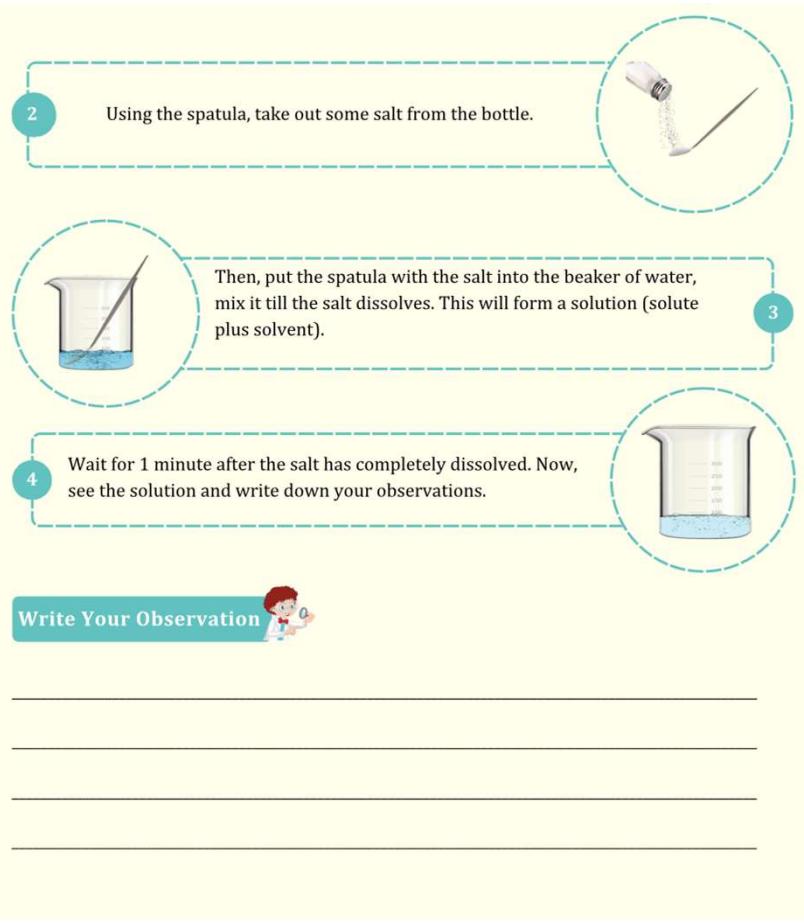
**Conduct a hands-on demonstration:** Prepare a simple demonstration to visually illustrate the concept. Take a clear glass of water (solvent) and gradually add a small amount of salt (solute) while stirring. Show how the salt particles disappear, indicating that they are being dissolved in the water to form a salt solution.

**Reinforce with visuals:** Use visual aids such as diagrams or illustrations to represent the different components of a solution. Draw a simple diagram showing a solvent with solute particles dispersed within it to help students visualize the concept.

**Engage in discussions:** Encourage students to share their understanding and ask questions. Prompt them to think about other examples of solvents, solutes, and solutions they encounter in daily life, such as lemonade, vinegar, or coffee.

**Compare solvents and solutes:** Discuss the properties of solvents and solutes. Highlight that solvents are typically present in larger amounts compared to solutes. Explain that solvents can be liquids (like water or alcohol) or even gases (like air). Solutes can be solids, liquids, or gases.

**Explore different types of solutions:** Introduce the idea that solutions can vary in concentration. Explain that a concentrated solution has a large amount of solute dissolved in the solvent, while a dilute solution has a smaller amount of solute dissolved.



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## G5S TEST WITH WATER



## SEDIMENTATION, DECANTATION AND FILTRATION



Watch the  
instructions here

Sedimentation happens when heavy un-dissolvable substances separate from the liquid in which they are placed. Decantation is when the top layer of liquid separates from a heavier liquid or solid undissolved substances, and this layer is poured out by tipping the container lightly. In Filtration, a liquid is passed through a filtration device like a filter paper to separate immiscible substances from it.



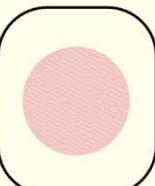
### Objective

To understand the processes of sedimentation, decantation and filtration.

### Materials Required



Soil



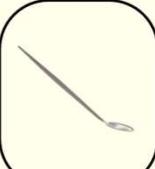
Filter paper



Beaker



Glass/Plastic cup



Spatula/ Wooden spoon

**Introduce the concepts:** Begin by explaining the three processes - sedimentation, decantation, and filtration - as methods used to separate mixtures based on the properties of the substances involved.

**Sedimentation:** Define sedimentation as the process in which heavier or denser particles settle down at the bottom of a liquid when left undisturbed. Give examples such as sand settling at the bottom of a glass of muddy water.

**Demonstrate sedimentation:** Prepare a mixture of water and a solid substance, such as sand or powdered chalk, in a transparent container. Allow the mixture to stand undisturbed for a while and observe the sedimentation process as the solid particles settle at the bottom.

**Decantation:** Explain that decantation is the process of carefully pouring off the clear liquid (the supernatant) from the top while leaving behind the settled solid particles (the sediment) at the bottom.

**Demonstrate decantation:** Once sedimentation has occurred and the solid particles have settled, gently pour off the clear liquid from the top into a separate container, taking care not to disturb the sediment. Emphasize the importance of pouring slowly and steadily to avoid mixing the sediment back into the liquid.

**Filtration:** Define filtration as the process of separating solid particles from a liquid or gas using a filter medium, such as filter paper or a sieve, which allows the liquid or gas to pass through while retaining the solid particles.

**Demonstrate filtration:** Set up a simple filtration apparatus using a funnel, filter paper, and a beaker. Place the filter paper inside the funnel and pour the mixture (containing solid particles) into the funnel. Observe as the liquid passes through the filter paper, leaving the solid particles behind.

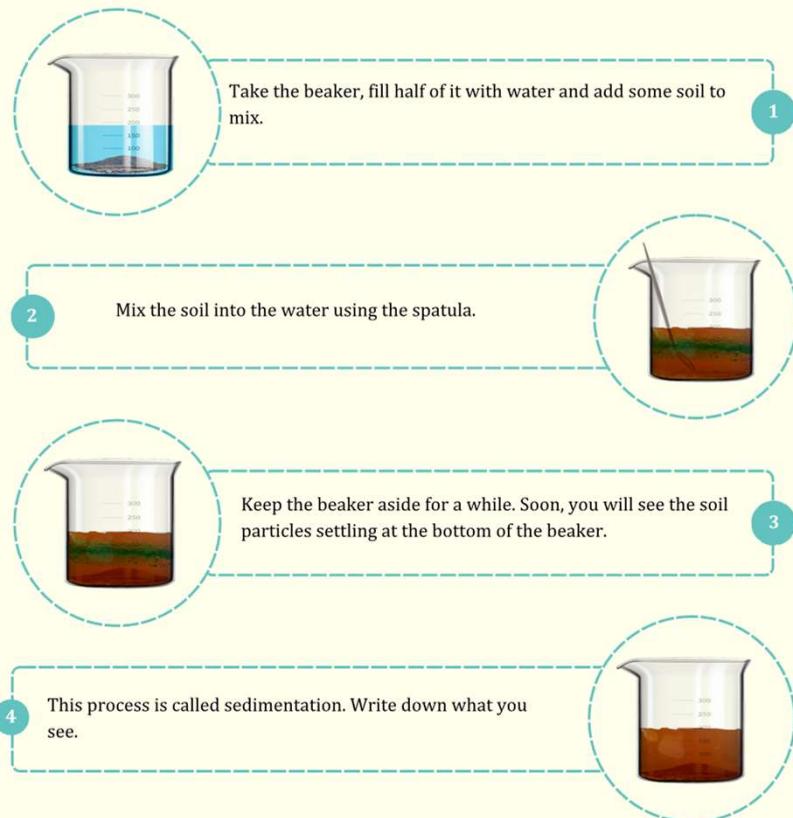
**Discuss practical applications:** Discuss real-life examples where sedimentation, decantation, and filtration are used. Examples can include separating sand and water at the beach, separating tea leaves from tea using a strainer, or filtering impurities from drinking water.

**Reinforce with visuals:** Use diagrams or illustrations to visually represent the processes of sedimentation, decantation, and filtration. Label the different components and steps involved to enhance students' understanding.

**Engage in discussions:** Encourage students to share their observations and understanding of the processes. Ask questions to prompt critical thinking and relate the concepts to everyday situations.

## Procedure

### For Sedimentation



**Introduce the concepts:** Begin by explaining the three processes - sedimentation, decantation, and filtration - as methods used to separate mixtures based on the properties of the substances involved.

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### For Decantation



Take the beaker with the water and soil. Also, take the empty glass.

1

2 Carefully pour the top layer of water from the beaker into the glass, without getting any soil particles into the glass.



You will have a beaker with major soil particles and a glass with some muddy water.

3

4 The process of pouring the top layer of liquid is called decantation.  
Write down your experience.



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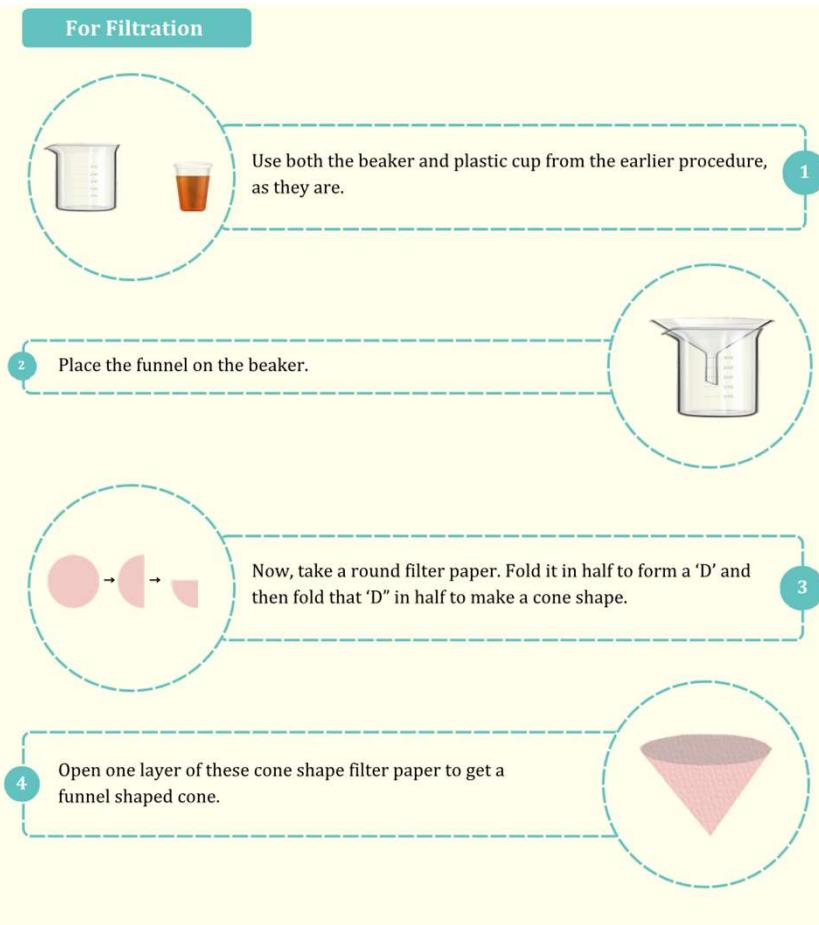
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Place the cone-shaped filter paper in the funnel placed on the beaker with the point facing down and the opening on top.

5



Now, pour the muddy water from the plastic cup into the beaker, through the filter paper. Clear water known as the filtrate will come through as the mud particles will be caught by the filter.



This process of extreme separation is called filtration. Write down what you see.

7

Write Your Observation



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Decantation: Explain that decantation is the process of carefully pouring off the clear liquid (the supernatant) from the top while leaving behind the settled solid particles (the sediment) at the bottom.

Demonstrate decantation: Once sedimentation has occurred and the solid particles have settled, gently pour off the clear liquid from the top into a separate container, taking care not to disturb the sediment. Emphasize the importance of pouring slowly and steadily to avoid mixing the sediment back into the liquid.

Filtration: Define filtration as the process of separating solid particles from a liquid or gas using a filter medium, such as filter paper or a sieve, which allows the liquid or gas to pass through while retaining the solid particles.

Demonstrate filtration: Set up a simple filtration apparatus using a funnel, filter paper, and a beaker. Place the filter paper inside the funnel and pour the mixture (containing solid particles) into the funnel. Observe as the liquid passes through the filter paper, leaving the solid particles behind. Discuss practical applications: Discuss real-life examples where sedimentation, decantation, and filtration are used. Examples can include separating sand and water at the beach, separating tea leaves from tea using a strainer, or filtering impurities from drinking water.

Reinforce with visuals: Use diagrams or illustrations to visually represent the processes of sedimentation, decantation, and filtration. Label the different components and steps involved to enhance students' understanding.

Engage in discussions: Encourage students to share their observations and understanding of the processes. Ask questions to prompt critical thinking and relate the concepts to everyday situations.



## TEST SOLUBILITY OF SUBSTANCES



Watch the instructions here.



Solubility is the ability of a solute to dissolve in a solvent.



### Objective

To test which substances are soluble or insoluble.

### Materials Required



Salt



Soil



Spatula



Beaker

### Procedure



Fill 100 millilitres of water in the beaker.

1

Introduce the concept of solubility: Begin by explaining that solubility is a measure of how well a substance can dissolve in a particular solvent. Emphasize that substances that dissolve easily are considered soluble, while those that do not dissolve or dissolve only to a limited extent are considered insoluble.

Define key terms: Define the terms "solubility," "soluble," and "insoluble" to ensure students understand their meaning. Provide examples to illustrate the differences between soluble and insoluble substances. Discuss factors affecting solubility: Explain that solubility can be influenced by various factors, such as temperature and the nature of the substances involved. Mention that some substances dissolve better in hot water, while others may dissolve better in cold water.

Prepare a variety of substances: Gather a selection of solid substances for testing, including common kitchen items such as sugar, salt, baking soda, coffee grounds, flour, and sand. Ensure the substances are safe for handling and clearly label each one.

Set up testing stations: Create different stations where students can perform solubility tests. Each station should have a small cup or container, water, stirring utensils (e.g., plastic spoons), and the substances to be tested.

Conduct solubility tests: Instruct students to take a small amount of each substance and place it into a cup or container. They should then add water to the container and stir the mixture to observe the dissolving process. Encourage them to record their observations.

Classify substances: After each test, guide students in classifying the substances as soluble or insoluble based on their observations. Emphasize the importance of careful observation and recording results accurately.

Discuss and analyze results: Lead a class discussion to analyze the results of the solubility tests. Prompt students to identify any patterns or trends they notice among the substances tested. Encourage them to think about the factors that may have influenced solubility in each case.

Summarize and reinforce concepts: Summarize the main points about solubility, soluble substances, and insoluble substances. Use the results of the tests and the class discussion to reinforce the concepts. Address any questions or misconceptions that may have arisen during the activity.

Extend learning opportunities: Provide additional activities or experiments to further explore solubility. For example, students can test the solubility of substances in different solvents (e.g., oil, vinegar) or investigate the effect of temperature on solubility.

2

Mix some salt into it using the spatula. Write down your observations.



3

Now, put some soil into the beaker with the salted water. Mix it with the spatula. Leave it alone for 5 minutes. Then, watch what happens.



Write Your Observation

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Introduce the concept of solubility: Begin by explaining that solubility is a measure of how well a substance can dissolve in a particular solvent. Emphasize that substances that dissolve easily are considered soluble, while those that do not dissolve or dissolve only to a limited extent are considered insoluble.

Define key terms: Define the terms "solubility," "soluble," and "insoluble" to ensure students understand their meaning. Provide examples to illustrate the differences between soluble and insoluble substances. Discuss factors affecting solubility: Explain that solubility can be influenced by various factors, such as temperature and the nature of the substances involved. Mention that some substances dissolve better in hot water, while others may dissolve better in cold water.

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Discuss and analyze results: Lead a class discussion to analyze the results of the solubility tests. Prompt students to identify any patterns or trends they notice among the substances tested. Encourage them to think about the factors that may have influenced solubility in each case.

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Extend learning opportunities: Provide additional activities or experiments to further explore solubility. For example, students can test the solubility of substances in different solvents (e.g., oil, vinegar) or investigate the effect of temperature on solubility.

## G5S TEST WITH WATER

## HOME ASSIGNMENT

Please scan the QR Code before proceeding.  
This will help you to understand & revise the  
concepts learnt in class.



### (A) Write 'T' for true and 'F' for false statements.

- |   |     |
|---|-----|
| (1) The heaviness or lightness of an object is called its irrigation. | [ ] |
| (2) The substance which gets dissolved is called a solvent.           | [ ] |
| (3) Oil dissolves in water.   | [ ] |
| (4) Mud and water create an invisible solution.                       | [ ] |
| (5) Evaporation happens when water is heated.                         | [ ] |

### (B) Define the following.

- |                       |
|-----------------------|
| (1) Evaporation _____ |
| (2) Floatation _____  |
| (3) Solute _____      |
| (4) Solvent _____     |

### (C) Observe the following and write down what you see.

- |  |
|--|
| (1) A bottle of water is removed from the fridge and kept outside. What happens to the outsides of the bottle? |
| (2) A cup of hot tea is covered with a lid. What happens to the inside of the lid?                             |
| (3) A wet piece of cloth is dried in the sun outdoors. What happens to the cloth?                              |

**Introduce the assignment:** Begin by clearly stating the purpose and objectives of the assignment. Explain how it connects to the topics covered in class and why it is important for students' learning.

**Explain the task:** Clearly explain what students need to do for the assignment. Provide a concise description of the task or prompt they need to address.

**Provide clear guidelines:** Outline the specific guidelines and expectations for the assignment. Include details such as the format, length, due date, and any additional criteria or requirements to be followed.

**Break down the steps:** Break the assignment into smaller steps, if applicable. Provide a step-by-step guide or checklist to help students understand what needs to be done and in what order.

**Clarify doubts and questions:** Encourage students to ask questions if they need clarification about any aspect of the assignment. Provide a platform or designated time for addressing their doubts and concerns.

**Emphasize independent work:** Highlight the importance of students taking ownership of their learning and completing the assignment independently. Encourage them to think critically and apply what they have learned.

**Establish a timeline:** Clearly communicate the timeline for the assignment. Provide a specific due date and, if necessary, suggest milestone dates for completing different parts of the assignment.

**Reinforce communication channels:** Inform students of the communication channels they can use to seek assistance or clarification. This may include email, online platforms, or designated office hours for virtual or in-person meetings.

**Encourage creativity and personal input:** Encourage students to bring their unique ideas and perspectives to the assignment. Emphasize that originality and creativity are valued in their work.

**Address submission guidelines:** Explain how students should submit their completed assignments. Clarify whether it should be submitted online, through email, or in person, and provide any specific instructions or file formats required.

## HOME ASSIGNMENT

Please scan the QR Code before proceeding.  
This will help you to understand & revise the  
concepts learnt in class.



### (A) Write 'T' for true and 'F' for false statements.

- |   |     |
|---|-----|
| (1) The heaviness or lightness of an object is called its irrigation. | [ ] |
| (2) The substance which gets dissolved is called a solvent.           | [ ] |
| (3) Oil dissolves in water.   | [ ] |
| (4) Mud and water create an invisible solution.                       | [ ] |
| (5) Evaporation happens when water is heated.                         | [ ] |

### (B) Define the following.

- |                 |       |
|-----------------|-------|
| (1) Evaporation | _____ |
| (2) Floatation  | _____ |
| (3) Solute      | _____ |
| (4) Solvent     | _____ |

### (C) Observe the following and write down what you see.

- |  |
|--|
| (1) A bottle of water is removed from the fridge and kept outside. What happens to the outsides of the bottle? |
| (2) A cup of hot tea is covered with a lid. What happens to the inside of the lid?                             |
| (3) A wet piece of cloth is dried in the sun outdoors. What happens to the cloth?                              |

### (A) Write 'T' for true and 'F' for false statements.

- |   |       |
|---|-------|
| (1) The heaviness or lightness of an object is called its irrigation. | [ F ] |
| (2) The substance which gets dissolved is called a solvent.           | [ F ] |
| (3) Oil dissolves in water.   | [ F ] |
| (4) Mud and water create an invisible solution.                       | [ F ] |
| (5) Evaporation happens when water is heated.                         | [ T ] |

### (B) Define the following.

- |                        |  |
|------------------------|--|
| (1) <b>Evaporation</b> | The process where a liquid changes to a gas or vapor, typically when heated or exposed to air.         |
| (2) <b>Floatation</b>  | The phenomenon of an object staying on the surface of a fluid because it is less dense than the fluid. |
| (3) <b>Solute</b>      | A substance that is dissolved in another substance, called a solvent, to form a solution.              |
| (4) <b>Solvent</b>     | The substance, typically a liquid, in which a solute is dissolved to form a solution.                  |

### (C) Observe the following and write down what you see.

- (1) A bottle of water is removed from the fridge and kept outside. What happens to the outsides of the bottle?

Water condenses on the outside of the bottle due to the difference in temperature between the cold bottle and the warmer surrounding air.

- (2) A cup of hot tea is covered with a lid. What happens to the inside of the lid?

Condensation appears on the inside of the lid because the steam from the hot tea cools down and turns back into liquid.

- (3) A wet piece of cloth is dried in the sun outdoors. What happens to the cloth?

The wet cloth dries because the water in it evaporates under the heat of the sun.

## ASSESSMENT

Answer the following questions in detail.

- (1) What is a universal solvent?
- (2) Differentiate between soluble and insoluble substances.
- (3) Define the density of an object.
- (4) Name a liquid that you drink, that is measured in litres. How many liters of that liquid should you drink in a day?
- (5) What are the things you have seen floating in water?
- (6) How is salt formed?
- (7) Why is it impossible to drown in the dead sea?
- (8) Describe the process of filtration with a suitable diagram.

Introduce the assessment: Begin by clearly stating that the purpose of the assessment is to evaluate the students' understanding of the topics covered. Explain that it is an opportunity for them to demonstrate their knowledge and skills.

Explain the assessment format: Clearly explain the format of the assessment, whether it is a test, quiz, project, or any other form of evaluation. Describe how many questions or tasks are involved and how the assessment will be graded.

Provide a timeframe: Specify the timeframe for completing the assessment. Communicate the start and end dates, and if applicable, the duration of the assessment (e.g., 45 minutes). Ensure students have sufficient time to complete the assessment without rushing.

Review the assessment content: Briefly review the topics or concepts that will be covered in the assessment. Remind students of the key ideas and skills they should focus on while preparing and answering the questions.

Highlight assessment instructions: Clearly explain any specific instructions or guidelines related to the assessment. For example, if it's a written test, specify whether answers should be written in complete sentences or if certain formats or units of measurement are required.

Address any available resources: Inform students if they are allowed to use specific resources during the assessment, such as textbooks, notes, or online references. Clearly state any limitations or restrictions regarding the use of external materials.

Emphasize independent work: Reinforce the importance of completing the assessment independently. Encourage students to rely on their own understanding and knowledge to answer the questions or complete the tasks.

Encourage time management: Remind students to manage their time wisely during the assessment. Suggest allocating appropriate time for each question or task to ensure completion within the given timeframe.

Clarify submission instructions: Explain how students should submit their completed assessments. Provide instructions for submitting it online, through email, a designated platform, or any other method specified by your school or institution.

## ASSESSMENT

Answer the following questions in detail.

- (1) What is a universal solvent?
- (2) Differentiate between soluble and insoluble substances.
- (3) Define the density of an object.
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- (6) How is salt formed?
- (7) Why is it impossible to drown in the dead sea?
- (8) Describe the process of filtration with a suitable diagram.

Answer the following questions in detail.

**(1) What is a universal solvent?**

Water, often referred to as the "universal solvent," can dissolve more substances than any other liquid due to its polarity. This property enables it to carry nutrients to cells, participate in biochemical reactions, and transport waste. However, it doesn't dissolve non-polar substances like oil and fats, and can carry pollutants, emphasizing the importance of clean water for health.

**(2) Differentiate between soluble and insoluble substances.**

Soluble substances are those that can be dissolved in a solvent, typically water, such as sugar or salt, due to their chemical structure allowing them to interact with the solvent. On the other hand, insoluble substances do not dissolve in a solvent, like oil in water, often because their molecules do not interact with the solvent in a way that allows dissolution.

**(3) Define the density of an object.**

The density of an object refers to how much mass it has relative to its volume. It is a measure of how tightly matter is packed together within the object, often expressed in units like grams per cubic centimeter ( $\text{g}/\text{cm}^3$ ) or kilograms per cubic meter ( $\text{kg}/\text{m}^3$ ).

**(4) Name a liquid that you drink, that is measured in litres. How many liters of that liquid should you drink in a day?**

Water is a liquid that we drink and it is measured in litres. As per general health guidelines, it is recommended that we should drink about 2 litres.

**(5) What are the things you have seen floating in water?**

In daily life, objects such as plastic toys, leaves, and pieces of wood are often seen floating in water, due to their lower density compared to water. Additionally, some aquatic animals and plants, like ducks and water lilies, have adapted to float on the water surface for survival and propagation.

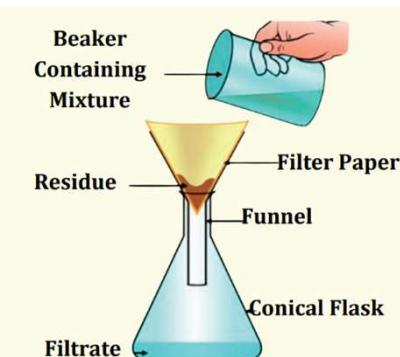
**(6) How is salt formed?**

Salt, or sodium chloride, is primarily formed from sea water. As the sea water evaporates under the heat of the sun, it leaves behind deposits of salt. These salt crystals are then collected, cleaned, and processed to be used as the table salt we commonly use in our homes.

**(7) Why is it impossible to drown in the dead sea?**

It's nearly impossible to drown in the Dead Sea because its water is about ten times saltier than most sea water, which increases its density, making people float easily. This high salt concentration keeps you afloat on the surface.

**(8) Describe the process of filtration with a suitable diagram.**



## HOW LIGHT WORKS



Light is a form of energy that travels through space at a very high speed. Light plays an essential role in our lives, allowing us to see and perceive the world around us. It is also important in many areas of science. We can see when light enters our eyes, and an image is formed. We perceive the image and recognize it. We can see different colours, shapes, and patterns.

### HISTORY

**Pythagoras** a Greek philosopher and mathematician proposed that we see objects because our eyes emit rays of light and strikes these objects.

**Empedocles** who was also a Greek philosopher thought that we see objects because light is emitted by both, the eye and the object.

**Epicurus** another ancient Greek philosopher believed that light is actually emitted by sources other than the eye and that vision is produced when light bounces off objects and enters the eye. We know now that Epicurus was right. Light is emitted by a source.

### SOURCES OF LIGHT

There are many sources of light, including natural sources and artificial sources.

#### NATURAL SOURCES OF LIGHT INCLUDE

- (1) **The Sun:** The Sun is the most important and ultimate natural source of light on Earth.
- (2) **Stars:** Stars emit light and other forms of energy too.
- (3) **Fire:** Fire produces visible light as well as heat.
- (4) **Bioluminescence:** Some organisms, such as fireflies produce light through a chemical reaction in their body.
- (5) **Lightning:** Lightning is a natural phenomenon that produces light as well as heat and sound.

#### Did You Know?

The Sun is so far away from the Earth, that it takes 8 to 9 minutes for the Sun's light to reach the Earth.

**Introduction to light:** Begin by explaining that light is a form of energy that allows us to see objects. Emphasize that light travels in straight lines and at a very high speed.

**Discuss the properties of light:** Introduce the properties of light, such as reflection, refraction, and absorption. Explain that light can bounce off surfaces (reflection), change direction when passing through different materials (refraction), and be absorbed by objects.

**Explain sources of light:** Discuss the different sources of light. Differentiate between natural sources (such as the sun) and artificial sources (such as light bulbs or candles). Emphasize that sources of light emit their own light, while objects that we see are visible because they reflect light.

**Explore natural sources of light:** Discuss natural sources of light, focusing on the sun. Explain that the sun is the primary natural source of light, which provides heat and light energy to Earth.

**Introduce artificial sources of light:** Discuss various artificial sources of light that we use in our daily lives, such as light bulbs, candles, flashlights, and LED lights. Explain how these sources generate light energy through different mechanisms.

**Conduct a light source sorting activity:** Prepare a collection of pictures or objects representing different sources of light. Have students sort them into natural and artificial categories. Discuss their choices and reasons for categorizing each source.

**Demonstrate how light travels:** Perform a simple experiment to demonstrate how light travels in straight lines. Use a flashlight and show how objects block the light when placed in its path. Discuss how shadows are formed when light is blocked by an opaque object.

**Discuss transparent, translucent, and opaque materials:** Explain that different materials interact with light differently. Discuss transparent materials (allowing light to pass through), translucent materials (allowing some light to pass through but scattering it), and opaque materials (blocking light completely).

**Provide examples and observations:** Use examples of everyday objects and materials to illustrate transparent, translucent, and opaque properties. Have students identify and classify objects or materials they encounter in their surroundings.

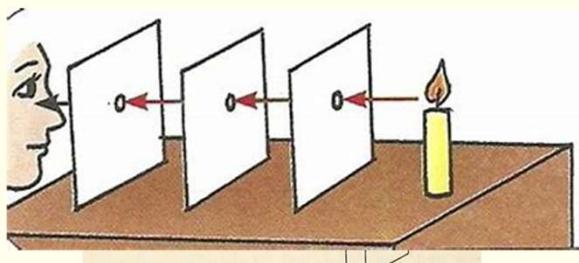
## ARTIFICIAL SOURCES OF LIGHT INCLUDE

- (1) **Bulbs:** Incandescent bulbs use a filament that is heated to produce light. There are different kinds of bulbs that use gases to emit light. We use these bulbs in our homes.
- (2) **LED lights:** LED lights use a special material to produce light and are highly energy-efficient. LED lights use less electricity and brighten up rooms.
- (3) **Neon lights:** Neon lights use gas to produce a coloured light. They are used in sign boards.
- (4) **Lasers:** Lasers produce a highly focused beam of light that is used in many applications, including surgeries and in industries to manufacture different types of things.

## PROPERTIES OF LIGHT

- (1) **Light always travels in a straight line.** When we observe a ray of light coming through a crack in our window, it lights up only a particular area of the room near the window. This is because light propagates in a straight line.

Try this out!



- (a) Light up a candle with the help of an adult and place it on the table. Use some melted wax to secure the candle in its place.
- (b) Take three cards and make a hole in the three cards with the help of an adult. Make sure that the level of these holes are aligned with the flame of the candle.
- (c) Place the cards as shown and observe the candle flame.
- (d) Move any one card so that the hole in that card is not aligned with the holes in the other card. Try to observe the flame now.

**Introduction to artificial sources of light:** Begin by explaining that artificial sources of light are human-made sources that produce light energy. Emphasize that these sources are designed to provide light for various purposes.

**Identify common artificial light sources:** Introduce students to common artificial sources of light, such as light bulbs, fluorescent tubes, LED lights, candles, and flashlights. Show examples of each source and discuss their uses and characteristics.

**Discuss properties of light:** Explain the properties of light, such as reflection, refraction, and absorption. Provide simple explanations for each property and how they relate to our perception of light.

**Explore reflection:** Discuss reflection as the bouncing back of light when it hits a surface. Demonstrate reflection by using a mirror and showing how light rays bounce off it and create a reflection. Encourage students to observe their own reflections in the mirror.

**Introduce refraction:** Explain refraction as the bending or change in direction of light when it passes through different materials. Show examples of refraction, such as light passing through a glass of water or a prism, causing the light to split into different colors.

**Discuss absorption:** Explain absorption as the process in which materials absorb or take in light energy. Discuss how different materials absorb different amounts of light, which can affect how objects appear to us.

**Conduct a light properties experiment:** Set up a simple experiment to explore the properties of light. For example, shine a flashlight on different surfaces and materials, such as mirrors, glass, paper, and aluminum foil. Observe and discuss how light behaves differently with each material.

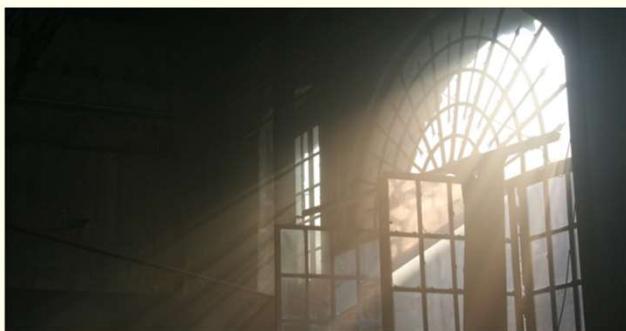
**Relate properties to artificial light sources:** Connect the properties of light to artificial light sources. For example, discuss how light bulbs use reflection and refraction to direct and spread light, while fluorescent tubes use gases that emit ultraviolet light to produce visible light.

**Discuss energy efficiency:** Explain to students the importance of energy-efficient light sources, such as LED lights, in conserving energy and reducing environmental impact. Discuss the benefits and characteristics of energy-efficient light sources.

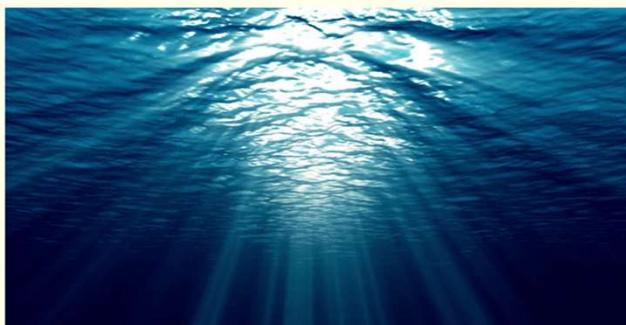
**You will observe that the flame is not visible. Where did the flame go?**

The flame did not disappear. Since light can travel in a straight line, it is unable to go through the mismatched hole of the card. Once you align the holes in the card perfectly, you can see the flame again.

**(2) Light can travel through any medium solids, liquids and gases.** Light is a special form of energy. It can pass through solids like glass, liquids like water and gases like air.



The sunlight can pass through the glass windows.



Sunlight can also pass through water in the ponds and oceans.

Introduce the concept of light travel: Begin by explaining that light is a form of energy that can travel through various mediums. Emphasize that light travels in straight lines and at a very high speed.

Define mediums: Define the term "mediums" as substances through which light can pass. Explain that mediums can be solids, liquids, or gases.

Discuss transparent, translucent, and opaque materials: Explain the different behaviors of light when it encounters different materials. Discuss transparent materials (allowing light to pass through), translucent materials (allowing some light to pass through but scattering it), and opaque materials (blocking light completely).

Focus on solids: Discuss how light travels through solids. Explain that in solids, such as glass or metal, light can pass through and propagate in a straight line due to the close arrangement of particles. Emphasize that some solids, like clear glass, are transparent, while others, like frosted glass, may be translucent.

Discuss liquids: Shift the focus to how light travels through liquids. Explain that light can also pass through liquids, such as water or oil, allowing us to see through them. Discuss how liquids, although less rigid than solids, still have particles that allow light to propagate.

Explore gases: Explain how light travels through gases. Discuss how light can pass through gases, such as air, due to the wide spacing between particles. Emphasize that the particles in gases allow light to propagate relatively unimpeded.

Conduct a demonstration: Set up a simple demonstration to show how light travels through different mediums. Use a flashlight or laser pointer to shine light through various materials, such as clear glass, water, and air. Observe how the light passes through each medium and discuss the differences.

Reinforce with visuals: Use diagrams or illustrations to visually represent the behavior of light as it travels through different mediums. Label the different mediums and discuss how light interacts with the particles in each medium.

Summarize and reinforce learning: Recap the main points about how light travels through different mediums. Reinforce the concepts by asking students to explain in their own words how light behaves in solids, liquids, and gases.

Engage in discussions and questions: Encourage students to ask questions and participate in discussions. Prompt them to think about practical applications of how light travels through different mediums and how it impacts our daily lives.

Remember to use age-appropriate language and examples, and encourage active participation from students through discussions and hands-on activities.



Sunlight can also pass through the air.

### Light Passing Through Different Types of Solids

#### Transparent Solids

Transparent solids are materials that allow light to pass through them completely.



#### Translucent Solids

Translucent solids are materials that allow only some light to pass through them.

Introduce the concept of light travel: Begin by explaining that light is a form of energy that can travel through different mediums, including solids. Emphasize that light travels in straight lines and at a very high speed.

Discuss transparent, translucent, and opaque materials: Explain the different behaviors of light when it encounters different materials. Discuss transparent materials (allowing light to pass through), translucent materials (allowing some light to pass through but scattering it), and opaque materials (blocking light completely).

Focus on solids: Explain that solids are materials with tightly packed particles. Discuss how light interacts with solids and how it can travel through certain types of solids.

Introduce transparent solids: Discuss transparent solids, such as clear glass or certain types of plastic. Explain that in these materials, light can pass through and propagate in a straight line due to the close arrangement of particles. Emphasize that transparent solids allow us to see through them.

Discuss translucent solids: Talk about translucent solids, such as frosted glass or wax paper. Explain that these materials allow some light to pass through but scatter it in different directions. Discuss how this scattering of light gives these materials their characteristic appearance.

Explain opaque solids: Discuss opaque solids, such as wood or metal. Explain that these materials block or absorb light, preventing it from passing through. Emphasize that we cannot see through opaque solids because the particles absorb or reflect the light.

Conduct a demonstration: Set up a simple demonstration to show how light travels through different solid materials. Use a flashlight or laser pointer to shine light through transparent, translucent, and opaque solids. Observe and discuss the differences in how light behaves with each material.

Reinforce with visuals: Use diagrams or illustrations to visually represent the behavior of light as it travels through different solid materials. Label the different types of solids and discuss how light interacts with the particles in each material.

Summarize and reinforce learning: Recap the main points about how light travels through solids. Reinforce the concepts by asking students to explain in their own words how light behaves in transparent, translucent, and opaque solids.



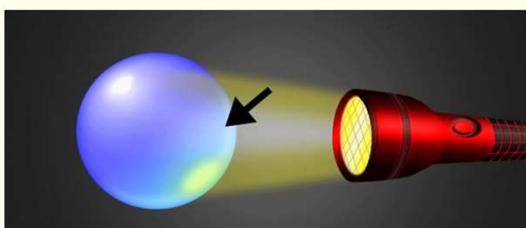
Frosted glass in a translucent object. When light hits this glass, only some rays can pass through it while some rays of light are blocked.

#### Did You Know?

Frosted glass is used to make window glass so that it keeps out the harsh sunlight and lets in only a few rays of light to brighten up the room.

#### Opaque Solids

Opaque solids are materials that completely block the path of light and do not allow any ray of light to pass through them.



A ball is an opaque object. It does not allow light to pass through it.

Introduce the concept of light travel: Begin by explaining that light is a form of energy that can travel through different mediums, including solids. Emphasize that light travels in straight lines and at a very high speed.

Discuss transparent, translucent, and opaque materials: Explain the different behaviors of light when it encounters different materials. Discuss transparent materials (allowing light to pass through), translucent materials (allowing some light to pass through but scattering it), and opaque materials (blocking light completely).

Focus on solids: Explain that solids are materials with tightly packed particles. Discuss how light interacts with solids and how it can travel through certain types of solids.

Introduce transparent solids: Discuss transparent solids, such as clear glass or certain types of plastic. Explain that in these materials, light can pass through and propagate in a straight line due to the close arrangement of particles. Emphasize that transparent solids allow us to see through them.

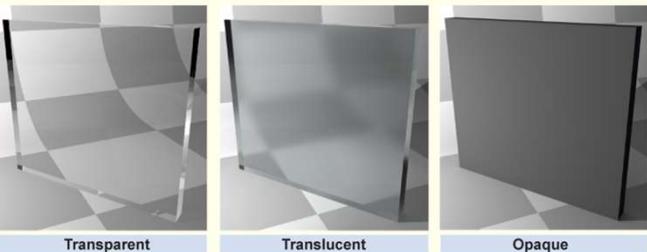
Discuss translucent solids: Talk about translucent solids, such as frosted glass or wax paper. Explain that these materials allow some light to pass through but scatter it in different directions. Discuss how this scattering of light gives these materials their characteristic appearance.

Explain opaque solids: Discuss opaque solids, such as wood or metal. Explain that these materials block or absorb light, preventing it from passing through. Emphasize that we cannot see through opaque solids because the particles absorb or reflect the light.

Conduct a demonstration: Set up a simple demonstration to show how light travels through different solid materials. Use a flashlight or laser pointer to shine light through transparent, translucent, and opaque solids. Observe and discuss the differences in how light behaves with each material.

Reinforce with visuals: Use diagrams or illustrations to visually represent the behavior of light as it travels through different solid materials. Label the different types of solids and discuss how light interacts with the particles in each material.

Summarize and reinforce learning: Recap the main points about how light travels through solids. Reinforce the concepts by asking students to explain in their own words how light behaves in transparent, translucent, and opaque solids.



## SHADOWS AND LIGHT

Shadows are areas where light is blocked by an object, creating a region of darkness behind the object. As we know that light is blocked by opaque objects, shadows can be formed only by opaque objects.

Shadows are always formed on the side of the object opposite to the light source.



Human beings have opaque bodies. Humans can form shadows when they stand against the sunlight.

**Introduction to shadows:** Begin by explaining that shadows are formed when light is blocked by an object. Emphasize that shadows are created because light cannot pass through certain materials, resulting in a darker area behind the object.

**Discuss light sources:** Introduce the concept of light sources. Explain that light sources emit light and are necessary for shadows to form. Provide examples of light sources, such as the sun, lamps, flashlights, or candles.

**Prepare visual aids:** Gather visual aids or pictures that demonstrate the formation of shadows. This can include images of objects casting shadows or diagrams illustrating the interaction between light sources and objects.

**Show examples of objects and shadows:** Display a picture that shows an object and its corresponding shadow. Point out the relationship between the object and its shadow, emphasizing how the shadow appears on the surface behind the object.

**Discuss the position of light sources:** Explain that the position of the light source affects the size and direction of the shadow. Show pictures that demonstrate how moving a light source closer or farther away from an object can change the size and length of the shadow.

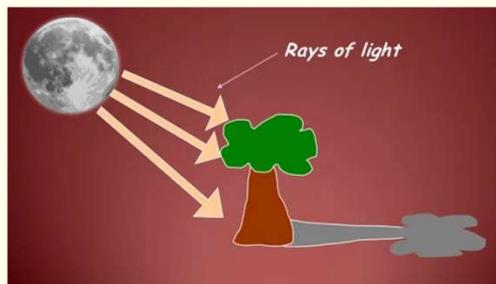
**Explore shadow shapes:** Display pictures of objects with different shapes and observe how their shadows appear. Discuss how the shape of an object influences the shape of its shadow. Encourage students to notice patterns and connections between the object's shape and the resulting shadow.  
**Experiment with shadow movement:** Use a picture or diagram to demonstrate how shadows change position as the angle or direction of the light source changes. Explain that the movement of shadows can help determine the position of the light source in real-world situations.

**Engage in discussions and questions:** Encourage students to actively participate in discussions. Prompt them to observe the pictures, ask questions, and share their own observations and experiences with shadows and light.

**Relate to everyday life:** Connect the concept of shadows to everyday situations. Discuss how shadows change throughout the day due to the movement of the sun, and how they can be used to estimate time or direction.

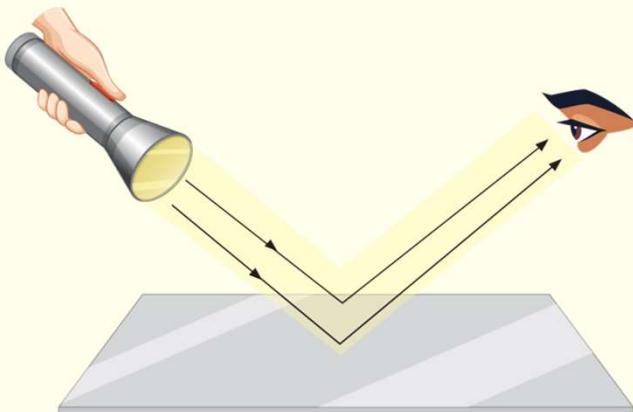
### Did You Know?

Shadows are cast even at night under the moonlight.



Shadows are formed on the opposite side of the light source.

### REFLECTION OF LIGHT



When light strikes the surface of a mirror, the light bounces off the surface and hits the observer's eye. This is called the **reflection of light**.

**Introduction to reflection:** Begin by explaining that reflection is the bouncing back of light when it hits a surface. Emphasize that reflection plays a key role in how we see objects and perceive our surroundings.

**Discuss reflective surfaces:** Explain that certain surfaces are more reflective than others. Introduce the concept of a reflective surface and provide examples such as mirrors, shiny metals, or still water.

**Prepare a visual aid:** Obtain an image or diagram that clearly shows the reflection of light. This can be an illustration or a photograph that highlights reflection in everyday objects or scenes.

**Show the image:** Display the chosen image to the students. Point out the areas where reflection is occurring and discuss the characteristics of the reflected light.

**Discuss incident and reflected angles:** Explain the angles involved in reflection. Discuss the incident angle (the angle at which light strikes the surface) and the reflected angle (the angle at which light bounces off the surface).

**Explain the law of reflection:** Introduce the law of reflection, which states that the incident angle is equal to the reflected angle. Use the image as a visual reference to help students understand how the angles relate to each other.

**Identify examples of reflection:** Engage students by asking them to identify examples of reflection in the image or provide examples themselves. Prompt them to look for objects or surfaces that exhibit the characteristics of reflection.

**Explore everyday reflections:** Relate the concept of reflection to everyday life. Discuss how we encounter reflections in our surroundings, such as in mirrors, glass windows, or polished surfaces. Encourage students to share their own experiences with reflections.

**Engage in discussions and questions:** Encourage students to actively participate in discussions. Prompt them to observe the image, ask questions, and share their own observations and experiences with reflection of light.



### It's Your Turn

- (a) Can you see a reflection in the mirror with the lights are turned out?
- (b) What happens to our shadows in the sunlight at 12 noon?
- (c) Which artificial source of light is used in your classroom?

## PROPERTIES OF LIGHT

### Refraction of Light



Refraction of light is the bending of light as it passes from one material to another. When light passes through air, the speed of light is normal. But when it enters another medium like water, the speed of light slows down a little, that is why light bends.

### Instructions:

Begin by informing the students that they will be completing an assessment to evaluate their knowledge and understanding of forces and motion.

Explain that the assessment will consist of multiple-choice questions and short-answer questions. Distribute the assessment papers to each student or project it on a screen for them to view. Instruct the students to read each question carefully and choose the best answer for the multiple-choice questions. They should mark their answers clearly on the provided answer sheet or write the letter corresponding to their choice.

Remind the students to review their answers before moving on to the short-answer questions. For the short-answer questions, instruct the students to provide concise and clear answers. Encourage them to use proper scientific vocabulary and explain their reasoning whenever necessary.

Set a time limit for the assessment, clearly indicating the start and end times. Communicate any specific time constraints for each section of the assessment.

While the students are working on the assessment, ensure a quiet and focused environment. Be available to address any questions or clarifications they may have regarding the questions. Once the allotted time is up, collect the assessment papers from the students. Remind them to put their names on their answer sheets and ensure that they have completed all the required sections.

Review the assessments to evaluate the students' understanding of forces and motion concepts. Grade the multiple-choice questions based on the provided answer key, and assess the short-answer questions based on the accuracy and completeness of the responses.

Did you know that the formation of a rainbow is a result of refraction of light?

Sunlight seems to be white in colour but in reality, it is made up of many different colours - red, orange, yellow, green, blue, indigo and violet. To remember the colours in the proper order, we can simply remember the word "**VIBGYOR**" for Violet, Indigo, Blue, Green, Yellow, Orange and Red. When sunlight enters a raindrop, it bends, or refracts, and separates into all these different colours.



Then, the white light bounces off the back of the raindrop and comes out as a beam of coloured light. Since the light rays move from air to water, they tend to bend in a way that makes it separate into the seven colours of the rainbow. When many raindrops are in the air, the coloured light beams from all the raindrops combine and form a big, beautiful arch of colours in the sky - a **rainbow!**

**Introduction to refraction:** Begin by reviewing the concept of refraction, which is the bending or change in direction of light when it passes from one medium to another. Remind students that refraction occurs due to the change in the speed of light as it travels through different materials.

**Define refraction in nature:** Explain that refraction is a phenomenon that occurs naturally in the environment around us. It can be observed in various situations and plays a significant role in how we perceive and experience the world.

**Discuss natural examples of refraction:** Provide examples of how refraction occurs in nature. Here are a few common examples to discuss:

- Rainbows:** Explain how rainbows are formed through the refraction, dispersion, and reflection of sunlight in raindrops. Discuss how the bending of light causes the separation of colors and the formation of the characteristic arc shape.
- Mirages:** Discuss how mirages occur in hot desert regions due to the refraction of light through layers of air at different temperatures. Explain that this bending of light creates an illusion of water or objects that are not actually there.
- Apparent bending of objects in water:** Explain how objects, such as a pencil or straw, appear bent or broken when partially submerged in water. Discuss how the change in medium (from air to water) causes the light rays to bend, resulting in the distorted appearance.

**Use visual aids and images:** Enhance understanding by using visual aids, images, or videos to showcase natural examples of refraction. Show pictures of rainbows, mirages, or objects appearing bent in water. This helps students visualize and connect with the phenomena.

**Conduct related experiments or demonstrations:** Perform simple experiments or demonstrations to further illustrate refraction in nature. For example, use a prism or glass of water to demonstrate the separation of colors in white light, or use a magnifying glass to show the bending of light rays.

**Engage in discussions and questions:** Encourage students to actively participate in discussions. Prompt them to share their observations, ask questions, and relate their own experiences or encounters with refraction in nature.

## CLASS ASSIGNMENT

### (A) Fill in the blanks.

- (1) Light is a form of \_\_\_\_\_ that travels through space at a very high speed.
- (2) \_\_\_\_\_ and \_\_\_\_\_ are natural sources of light.
- (3) Some living things like \_\_\_\_\_ produce light in their body.
- (4) Pythagoras thought that we see objects because \_\_\_\_\_ emit light.
- (5) Rainbows are formed when the sunlight passes through \_\_\_\_\_.

### (B) Answer the following.

- (1) Why do windows have frosted glass on them?
- (2) Name some natural sources of light.
- (3) Which kind of objects cast a shadow? Why?
- (4) Explain with a diagram the path of light.
- (5) What kind of materials are metals and wood? Do they allow light to pass through them?

### (C) Match the following.

Translucent objects	Are energy-efficient lights
Shadows	Block light
Opaque objects	Allow only some light to pass through them
LED lights	Is a type of opaque material
Wood	Cannot be seen in the dark

**Introduction to refraction:** Begin by reviewing the concept of refraction, which is the bending or change in direction of light when it passes from one medium to another. Remind students that refraction occurs due to the change in the speed of light as it travels through different materials.

**Define refraction in nature:** Explain that refraction is a phenomenon that occurs naturally in the environment around us. It can be observed in various situations and plays a significant role in how we perceive and experience the world.

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- a. Rainbows: Explain how rainbows are formed through the refraction, dispersion, and reflection of sunlight in raindrops. Discuss how the bending of light causes the separation of colors and the formation of the characteristic arc shape.
- b. Mirages: Discuss how mirages occur in hot desert regions due to the refraction of light through layers of air at different temperatures. Explain that this bending of light creates an illusion of water or objects that are not actually there.
- c. Apparent bending of objects in water: Explain how objects, such as a pencil or straw, appear bent or broken when partially submerged in water. Discuss how the change in medium (from air to water) causes the light rays to bend, resulting in the distorted appearance.

**Use visual aids and images:** Enhance understanding by using visual aids, images, or videos to showcase natural examples of refraction. Show pictures of rainbows, mirages, or objects appearing bent in water. This helps students visualize and connect with the phenomena.

**Conduct related experiments or demonstrations:** Perform simple experiments or demonstrations to further illustrate refraction in nature. For example, use a prism or glass of water to demonstrate the separation of colors in white light, or use a magnifying glass to show the bending of light rays.

**Engage in discussions and questions:** Encourage students to actively participate in discussions. Prompt them to share their observations, ask questions, and relate their own experiences or encounters with refraction in nature.

## CLASS ASSIGNMENT

### (A) Fill in the blanks.

- (1) Light is a form of \_\_\_\_\_ that travels through space at a very high speed.
- (2) \_\_\_\_\_ and \_\_\_\_\_ are natural sources of light.
- (3) Some living things like \_\_\_\_\_ produce light in their body.
- (4) Pythagoras thought that we see objects because \_\_\_\_\_ emit light.
- (5) Rainbows are formed when the sunlight passes through \_\_\_\_\_.

### (B) Answer the following.

- (1) Why do windows have frosted glass on them?
- (2) Name some natural sources of light.
- (3) Which kind of objects cast a shadow? Why?
- (4) Explain with a diagram the path of light.
- (5) What kind of materials are metals and wood? Do they allow light to pass through them?

### (C) Match the following.

Translucent objects	Are energy-efficient lights
Shadows	Block light
Opaque objects	Allow only some light to pass through them
LED lights	Is a type of opaque material
Wood	Cannot be seen in the dark

### (A) Fill in the blanks.

- (1) Light is a form of electromagnetic radiation that travels through space at a very high speed.
- (2) Sun and stars are natural sources of light.
- (3) Some living things like fireflies produce light in their body.
- (4) Pythagoras thought that we see objects because our eyes emit light.
- (5) Rainbows are formed when the sunlight passes through water droplets in the atmosphere.

### (B) Answer the following.

#### (1) Why do windows have frosted glass on them?

Windows have frosted glass on them to allow light in while maintaining privacy as it obscures the view from outside.

#### (2) Name some natural sources of light.

The sun, stars, and fire are some natural sources of light.

#### (3) Which kind of objects cast a shadow? Why?

Opaque objects, like a book or a person, cast a shadow because they do not allow light to pass through them.

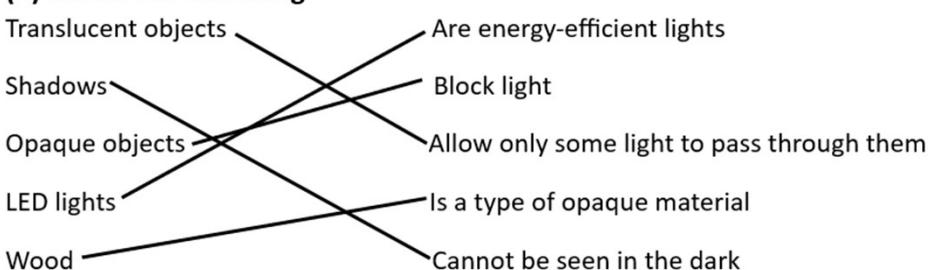
#### (4) Explain with a diagram the path of light.

The path of light is typically straight. It begins from a light source, travels in a straight line, and when it hits an object, it can be reflected, absorbed, or refracted.

#### (5) What kind of materials are metals and wood? Do they allow light to pass through them?

Metals and wood are opaque materials. They do not allow light to pass through them, meaning they block light completely.

### (C) Match the following.





### Category: Natural Phenomenon

Shadows are formed when light strikes an object that is placed in the path of light and acts as an obstruction.



#### Objective

To test which materials can form shadows.

#### Materials Required



Hard sheet



Translucent sheet



Opaque sheet



Transparent sheet



Straw



Torch



Cut-out



Double-sided tape

**Review the assignment:** Begin by reviewing the details of the assignment with the students. Remind them of the purpose, objectives, and specific requirements of the assignment.

**Clarify any questions:** Give students an opportunity to ask questions or seek clarification about any aspect of the assignment. Address any confusion or concerns they may have and provide clear explanations.

**Break down the assignment:** Break the assignment into smaller tasks or steps, if applicable. Provide a step-by-step guide or checklist to help students understand what needs to be done and in what order.

**Allocate time:** Allocate sufficient time for students to work on the assignment. Determine whether it will be completed in-class or as homework, and provide a reasonable deadline for submission.

**Create a supportive environment:** Foster a supportive and conducive environment for completing the assignment. Encourage students to work independently or in small groups, and provide any necessary resources or materials.

**Offer guidance and assistance:** Be available to offer guidance and assistance as students work on the assignment. Circulate around the classroom, providing help when needed and answering questions that arise.

**Encourage critical thinking:** Encourage students to think critically and creatively while completing the assignment. Prompt them to explore different perspectives, analyze information, and generate original ideas.

**Monitor progress:** Monitor students' progress as they work on the assignment. Check in with individuals or groups to ensure they are on track and offer support as needed.

**Encourage peer collaboration:** Encourage students to collaborate and help one another during the assignment. Foster a sense of teamwork and provide opportunities for peer review or feedback if appropriate.

**Foster accountability:** Remind students of the importance of completing the assignment to the best of their abilities. Encourage them to take ownership of their work and to meet the specified requirements and deadlines.

### Procedure

- Take the cut-out named DOS-2 and insert it vertically in the groove of DOS-1.



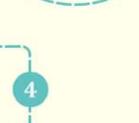
- Next, insert the cut-out DOS-4 in the groove of DOS-1.

2



- Take 2 straws and put them in the holes of DOS-4. Place the DOS-5 cut-out on the other ends of the straws as shown in the figure.

3



- Then insert the straws in the hole of cut-out DOS-2. Now the straws should be passing through DOS-2, 4 and 5.

4



- Stick double sided tape on the 4 corners of DOS-2, as seen in the diagram.

5

**Introduction to shadows:** Begin by explaining that shadows are formed when an object blocks light. Emphasize that shadows are created because light cannot pass through certain materials, resulting in a darker area behind the object.

**Discuss light sources:** Introduce the concept of light sources. Explain that light sources emit light and are necessary for shadows to form. Provide examples of light sources, such as the sun, lamps, flashlights, or candles.

**Prepare materials:** Gather the following materials for the activity:  
Objects of varying shapes and sizes (such as books, blocks, or toys)  
A table or flat surface  
A light source (lamp or flashlight)  
Sheets of paper or cardboard

**Set up the activity:** Place the table or flat surface in a well-lit area of the classroom. Position the light source to shine light onto the table. Ensure that the light source is stable and does not pose any safety hazards.

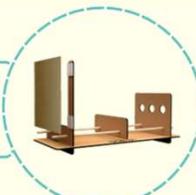
**Demonstrate shadow formation:** Select one object and place it on the table. Direct the light source toward the object, making sure the light shines on one side. Observe and point out the formation of the shadow behind the object.

**Explore different object placements:** Encourage students to take turns selecting objects and placing them on the table. Instruct them to position the objects in different ways—upright, tilted, or lying flat—and observe the resulting shadows.

**Observe shadow sizes:** Discuss how the size of the shadow changes depending on the distance between the object and the light source. Encourage students to move the objects closer to or farther from the light source and note the corresponding changes in shadow size.

**Experiment with multiple light sources:** Introduce additional light sources (if available) to the activity. Instruct students to position the objects between different light sources and observe how multiple shadows can be formed.

**6** Place and stick the hard sheet as shown in the figure using double sided tape.



**7** Take another piece of double sided tape, place it on DOS-5 and stick DOS-6 to it.



**8** Fix the torch in the hole of the cut-out as seen in the figure. The torch is the light source, the duck is the object and the hard sheet is the screen.



**9** Turn on the torch and record your observation. You can also move the duck closer to the light and see what happens to its shadow on the screen.



**10** Take out the straws and uninstall DOS-5 and DOS-6 from the set-up.



**Introduction to shadows:** Begin by explaining that shadows are formed when an object blocks light. Emphasize that shadows are created because light cannot pass through certain materials, resulting in a darker area behind the object.

**Discuss light sources:** Introduce the concept of light sources. Explain that light sources emit light and are necessary for shadows to form. Provide examples of light sources, such as the sun, lamps, flashlights, or candles.

**Prepare materials:** Gather the following materials for the activity:  
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A light source (lamp or flashlight)  
Sheets of paper or cardboard

**Set up the activity:** Place the table or flat surface in a well-lit area of the classroom. Position the light source to shine light onto the table. Ensure that the light source is stable and does not pose any safety hazards.

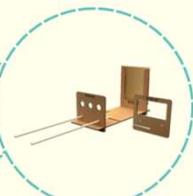
**Demonstrate shadow formation:** Select one object and place it on the table. Direct the light source toward the object, making sure the light shines on one side. Observe and point out the formation of the shadow behind the object.

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**Observe shadow sizes:** Discuss how the size of the shadow changes depending on the distance between the object and the light source. Encourage students to move the objects closer to or farther from the light source and note the corresponding changes in shadow size.

**Experiment with multiple light sources:** Introduce additional light sources (if available) to the activity. Instruct students to position the objects between different light sources and observe how multiple shadows can be formed.

11 Put DOS-3 in the middle and put the straws inside the holes. See image.



12 Take DOS-5 and pass light through it.



13 Stick 4 pieces of double-sided tape on the four corners of DOS-3 and remove the papers from the tape.



14 Stick the transparent sheet on DOS-3. Turn on the torch and write down your observations about the shadow on the screen.



15 Remove the transparent sheet and replace it with the translucent sheet. Turn on the torch. Write down your observations.

**Introduction to shadows:** Begin by explaining that shadows are formed when an object blocks light. Emphasize that shadows are created because light cannot pass through certain materials, resulting in a darker area behind the object.

**Discuss light sources:** Introduce the concept of light sources. Explain that light sources emit light and are necessary for shadows to form. Provide examples of light sources, such as the sun, lamps, flashlights, or candles.

**Prepare materials:** Gather the following materials for the activity:  
Objects of varying shapes and sizes (such as books, blocks, or toys)  
A table or flat surface  
A light source (lamp or flashlight)  
Sheets of paper or cardboard

**Set up the activity:** Place the table or flat surface in a well-lit area of the classroom. Position the light source to shine light onto the table. Ensure that the light source is stable and does not pose any safety hazards.

**Demonstrate shadow formation:** Select one object and place it on the table. Direct the light source toward the object, making sure the light shines on one side. Observe and point out the formation of the shadow behind the object.

**Explore different object placements:** Encourage students to take turns selecting objects and placing them on the table. Instruct them to position the objects in different ways—upright, tilted, or lying flat—and observe the resulting shadows.

**Observe shadow sizes:** Discuss how the size of the shadow changes depending on the distance between the object and the light source. Encourage students to move the objects closer to or farther from the light source and note the corresponding changes in shadow size.

**Experiment with multiple light sources:** Introduce additional light sources (if available) to the activity. Instruct students to position the objects between different light sources and observe how multiple shadows can be formed.



Lastly, remove the translucent sheet and replace it with the opaque sheet. Turn on the torch and write your observations and comparisons.

16

Write your Observation



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**Introduction to shadows:** Begin by explaining that shadows are formed when an object blocks light. Emphasize that shadows are created because light cannot pass through certain materials, resulting in a darker area behind the object.

**Discuss light sources:** Introduce the concept of light sources. Explain that light sources emit light and are necessary for shadows to form. Provide examples of light sources, such as the sun, lamps, flashlights, or candles.

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A table or flat surface  
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**Set up the activity:** Place the table or flat surface in a well-lit area of the classroom. Position the light source to shine light onto the table. Ensure that the light source is stable and does not pose any safety hazards.

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## LIGHT REFRACTION



### Category: Natural Phenomenon

Refraction refers to the phenomenon when a ray of light changes direction when passing from one medium to another. How much the light deflects depends on the angle of the incidence and change in the speed of the light.



#### Objective

To understand refraction of light when it passes through different mediums of water and air.

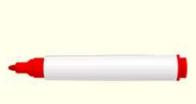
#### Materials Required



Paper



Glass



Marker



#### Procedure

- Take a glass and fill it with water.



## G5S HOW LIGHT WORKS

**Introduction to shadows:** Begin by explaining that shadows are formed when an object blocks light. Emphasize that shadows are created because light cannot pass through certain materials, resulting in a darker area behind the object.

**Discuss light sources:** Introduce the concept of light sources. Explain that light sources emit light and are necessary for shadows to form. Provide examples of light sources, such as the sun, lamps, flashlights, or candles.

**Prepare materials:** Gather the following materials for the activity:  
 Objects of varying shapes and sizes (such as books, blocks, or toys)  
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 Sheets of paper or cardboard

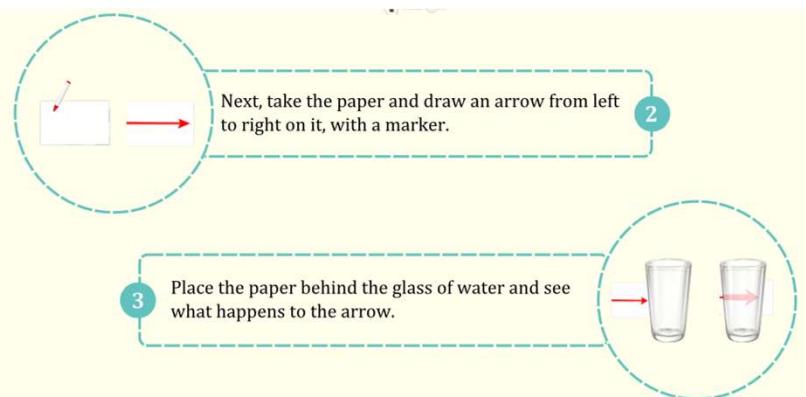
**Set up the activity:** Place the table or flat surface in a well-lit area of the classroom. Position the light source to shine light onto the table. Ensure that the light source is stable and does not pose any safety hazards.

**Demonstrate shadow formation:** Select one object and place it on the table. Direct the light source toward the object, making sure the light shines on one side. Observe and point out the formation of the shadow behind the object.

**Explore different object placements:** Encourage students to take turns selecting objects and placing them on the table. Instruct them to position the objects in different ways—upright, tilted, or lying flat—and observe the resulting shadows.

**Observe shadow sizes:** Discuss how the size of the shadow changes depending on the distance between the object and the light source. Encourage students to move the objects closer to or farther from the light source and note the corresponding changes in shadow size.

**Experiment with multiple light sources:** Introduce additional light sources (if available) to the activity. Instruct students to position the objects between different light sources and observe how multiple shadows can be formed.



Write your Observation

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#### Materials needed:

A clear glass or plastic container (e.g., a glass of water or a transparent plastic cup)

A pencil or straw

A sheet of paper

A flashlight or a strong light source

Colored markers or pencils (optional)

#### Instructions:

Begin by introducing the concept of light refraction to the students. Explain that light travels in straight lines but changes direction when it passes from one material to another. This change in direction is called refraction.

Gather the materials and distribute them to each student or group.

Instruct the students to fill the container with water, leaving some space at the top.

Ask the students to place the sheet of paper behind the container, serving as a background.

Have the students shine the flashlight or strong light source through the water-filled container,

so the light beam passes from the water to the air and hits the paper.

Instruct the students to observe and draw what they see on the paper. They should note the direction of the light beam before and after it passes through the water.

Discuss the observations as a class. Guide the students to recognize that the light beam appears bent or refracted when it passes from water to air.

Now, give each student a pencil or straw and ask them to place it into the water at an angle. Have them observe the pencil/straw from the side of the container.

Guide the students to observe that the pencil/straw appears bent or broken at the water's surface. Explain that this is an example of refraction due to the change in the light's path when it passes from water to air.

Optional: To further explore the effects of light refraction, students can use colored markers or pencils to draw a shape on a separate sheet of paper. They should then place the paper behind the container and observe how the shape appears distorted when viewed through the water.

Conclude the activity by summarizing the key points: light travels in straight lines, but it changes direction when it passes from one material to another, which is called refraction. Emphasize that light refraction is responsible for various phenomena we encounter daily, such as the bending of light in water, the appearance of broken objects in water, and even the formation of rainbows.

Note: Ensure safety precautions are followed throughout the activity, such as avoiding spills and handling the flashlight responsibly.

By following these instructions, the Grade 5 teacher can effectively teach light refraction to the students using an engaging and hands-on activity.

## HOME ASSIGNMENT

Please scan the QR Code before proceeding.  
This will help you to understand & revise the  
concepts learnt in class.



**(A) Classify all the things you use at home and outside, into groups of transparent, translucent and opaque objects.**

**Example:** Car / Book / Fruits / Candy / Clothes etc.

Transparent	Translucent	Opaque

### Materials needed:

A clear glass or plastic container (e.g., a glass of water or a transparent plastic cup)

A pencil or straw

A sheet of paper

A flashlight or a strong light source

Colored markers or pencils (optional)

### Instructions:

Begin by introducing the concept of light refraction to the students. Explain that light travels in straight lines but changes direction when it passes from one material to another. This change in direction is called refraction.

Gather the materials and distribute them to each student or group.

Instruct the students to fill the container with water, leaving some space at the top.

Ask the students to place the sheet of paper behind the container, serving as a background.

Have the students shine the flashlight or strong light source through the water-filled container, so the light beam passes from the water to the air and hits the paper.

Instruct the students to observe and draw what they see on the paper. They should note the direction of the light beam before and after it passes through the water.

Discuss the observations as a class. Guide the students to recognize that the light beam appears bent or refracted when it passes from water to air.

Now, give each student a pencil or straw and ask them to place it into the water at an angle. Have them observe the pencil/straw from the side of the container.

Guide the students to observe that the pencil/straw appears bent or broken at the water's surface. Explain that this is an example of refraction due to the change in the light's path when it passes from water to air.

Optional: To further explore the effects of light refraction, students can use colored markers or pencils to draw a shape on a separate sheet of paper. They should then place the paper behind the container and observe how the shape appears distorted when viewed through the water.

Conclude the activity by summarizing the key points: light travels in straight lines, but it changes direction when it passes from one material to another, which is called refraction. Emphasize that light refraction is responsible for various phenomena we encounter daily, such as the bending of light in water, the appearance of broken objects in water, and even the formation of rainbows.

Note: Ensure safety precautions are followed throughout the activity, such as avoiding spills and handling the flashlight responsibly.

By following these instructions, the Grade 5 teacher can effectively teach light refraction to the students using an engaging and hands-on activity.

## HOME ASSIGNMENT

Please scan the QR Code before proceeding.  
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concepts learnt in class.



(A) Classify all the things you use at home and outside, into groups of transparent, translucent and opaque objects.

Example: Car / Book / Fruits / Candy / Clothes etc.

Transparent	Translucent	Opaque

(A) Classify all the things you use at home and outside, into groups of transparent, translucent and opaque objects. Example: Car / Book / Fruits / Candy / Clothes etc.

Transparent	Translucent	Opaque
Glass windows	Frosted glass	Books
Plastic wrap	Wax paper	Cars
Eye glasses	Tissue paper	Fruits
Clean water in a glass	Some types of plastic bags	Clothes
Some plastic bottles	Thin curtains	Candy
Car windshields	Some types of lampshades	Wooden furniture

OR

**(B) Activity**

Gather some materials like plastic spoons, metal spoon, blanket, water bottle, bag, toys, etc. Use a flashlight and try to find out if the materials are transparent, translucent or opaque.

Item (write down the name of the item)	Type of material (transparent, translucent, opaque)

**Instructions:**

Begin by explaining to the students that they will be completing a home assignment on simple machines.

Introduce the concept of simple machines, explaining that they are basic tools that make work easier by changing the direction or magnitude of a force.

Provide examples of common simple machines, such as levers, pulleys, wheels and axles, inclined planes, wedges, and screws. Explain their functions and how they are used in everyday life.

Explain the assignment task: Students are required to identify and document at least three different examples of simple machines in their home or community.

Provide students with a simple machines identification sheet or template, including columns for the name of the simple machine, a description of its function, and a sketch or picture of the machine.

Instruct students to explore their homes, backyards, or local surroundings to find examples of simple machines. Encourage them to look for objects or devices they may not have previously recognized as simple machines.

Students should observe and identify at least three different examples of simple machines. They can use the identification sheet or template provided to record their findings.

Encourage students to be creative and thorough in their observations. They can consider objects such as door handles, ramps, bicycles, scissors, wheelbarrows, and more.

Set a deadline for the completion of the assignment and instruct students to submit their identification sheets or templates by that date. Clarify the submission method, such as through email or in-person hand-in.

Emphasize the importance of accuracy and clarity in their identification sheets or templates. Encourage students to use clear descriptions and include accurate sketches or pictures of the simple machines they identify.

Provide additional resources or references for students who wish to explore further or require extra guidance.

Conclude by highlighting the significance of understanding simple machines in our daily lives, and express excitement about reviewing and discussing the findings in the next class.

By following these instructions, the Grade 5 teacher can assign a home assignment that promotes independent exploration, critical thinking, and application of knowledge related to simple machines.

OR

**(B) Activity**

Gather some materials like plastic spoons, metal spoon, blanket, water bottle, bag, toys, etc. Use a flashlight and try to find out if the materials are transparent, translucent or opaque.

Item (write down the name of the item)	Type of material (transparent, translucent, opaque)

OR

**(B) Activity**

Gather some materials like plastic spoons, metal spoon, blanket, water bottle, bag, toys, etc. Use a flashlight and try to find out if the materials are transparent, translucent or opaque.

Item (write down the name of the item)	Type of material (transparent, translucent, opaque)
Plastic spoons	Depending on the type of plastic used, it could be either translucent (if it's a somewhat see-through plastic) or opaque (if it's a solid, non-see-through plastic).
Toys	This will depend on the specific toy and the material it's made from, but many toys are opaque.
Bag	Depending on the material of the bag, it could be opaque (like a leather or thick fabric bag) or translucent (like a thin fabric or plastic bag).
Water bottle	This could be either transparent (if it's a clear plastic bottle and you can see clearly through it) or translucent (if it's a colored or cloudy plastic and you can only see light through it but not clear images).
Blanket	Opaque, because it blocks out all the light.
Metal spoon	Opaque, because you cannot see any light through it.
Sunglasses	The lenses are typically translucent. While they allow some light to pass through, you can't see clearly through them like you would with a transparent material.

## ASSESSMENT

### (A) Answer the following questions.

- (1) Why are spectacles made using transparent materials?
- (2) What did Empedocles think about the way we see things? Why was he incorrect?
- (3) What is refraction of light?
- (4) Explain how a rainbow is formed.
- (5) Plants need sunlight to grow? How do aquatic plants survive?

### (B) Fill in the blanks with the correct word.

- (1) Light travels in a \_\_\_\_\_ line. (straight/wavy)
- (2) Light cannot pass through \_\_\_\_\_ (glass/metal)
- (3) Shadows are cast by only \_\_\_\_\_ objects. (translucent/opaque)
- (4) \_\_\_\_\_ are a natural source of light. (Laser/Stars)
- (5) \_\_\_\_\_ lights use lesser energy to light up. (LED/Laser)

### (C) Choose the correct answer from the options given below.

reflective opaque translucent bulbs gas  
transparent refraction filaments reflection

- (1) \_\_\_\_\_ uses a \_\_\_\_\_ that is heated up to produce light.
- (2) Light can pass through air because air is \_\_\_\_\_.
- (3) Mirrors are \_\_\_\_\_ surfaces.
- (4) The bending of light when it moves from air to water is called \_\_\_\_\_.
- (5) Neon signs use a \_\_\_\_\_ to produce light.

#### Instructions:

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## ASSESSMENT

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- (2) What did Empedocles think about the way we see things? Why was he incorrect?
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- (4) Explain how a rainbow is formed.
- (5) Plants need sunlight to grow? How do aquatic plants survive?

### (B) Fill in the blanks with the correct word.

- (1) Light travels in a \_\_\_\_\_ line. (straight/wavy)
- (2) Light cannot pass through \_\_\_\_\_ (glass/metal)
- (3) Shadows are cast by only \_\_\_\_\_ objects. (translucent/opaque)
- (4) \_\_\_\_\_ are a natural source of light. (Laser/Stars)
- (5) \_\_\_\_\_ lights use lesser energy to light up. (LED/Laser)

### (C) Choose the correct answer from the options given below.

reflective      opaque      translucent      bulbs      gas  
transparent      refraction      filaments      reflection

- (1) \_\_\_\_\_ uses a \_\_\_\_\_ that is heated up to produce light.
- (2) Light can pass through air because air is \_\_\_\_\_.
- (3) Mirrors are \_\_\_\_\_ surfaces.
- (4) The bending of light when it moves from air to water is called \_\_\_\_\_.
- (5) Neon signs use a \_\_\_\_\_ to produce light.

### (A) Answer the following questions.

#### (1) Why are spectacles made using transparent materials?

Spectacles are made using transparent materials to allow users to see clearly through them without obstructing their vision.

#### (2) What did Empedocles think about the way we see things? Why was he incorrect?

Empedocles thought that we see things when light from objects enters our eyes. He was incorrect because it's actually the light from a source reflecting off objects and into our eyes that enables us to see.

#### (3) What is refraction of light?

Refraction of light is the bending or change in direction of light when it passes from one medium to another, like from air to water, due to a change in its speed.

#### (4) Explain how a rainbow is formed.

A rainbow is formed when sunlight is refracted, or bent, and then reflected by water droplets in the atmosphere, dispersing the light into its various color components.

#### (5) Plants need sunlight to grow? How do aquatic plants survive?

Aquatic plants survive by absorbing sunlight that penetrates the water surface. Clear water allows more sunlight to reach them for photosynthesis.

### (B) Fill in the blanks with the correct word.

- (1) Light travels in a straight line. (straight/wavy)
- (2) Light cannot pass through metal. (glass/metal)
- (3) Shadows are cast by only opaque objects. (translucent/opaque)
- (4) Stars are a natural source of light. (Laser/Stars)
- (5) LED lights use lesser energy to light up. (LED/Laser)

### (C) Choose the correct answer from the options given below.

- (1) Bulbs uses a filament that is heated up to produce light.
- (2) Light can pass through air because air is transparent.
- (3) Mirrors are reflective surfaces.
- (4) The bending of light when it moves from air to water is called refraction.
- (5) Neon signs use a gas to produce light.