

Activities

A Refraction magic!

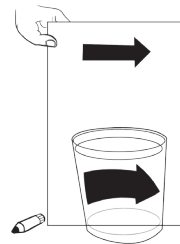
◀ Conceptual Understanding

AIM: To understand that the light ray gets refracted when it travels through different media

YOU WILL NEED: A thick sheet of paper, a marker, a glass of water and a table

PROCEDURE:

1. Take a thick sheet of paper and draw two arrows, equal in shape and size with the marker – one at the top of the sheet and another at the bottom.
2. Ensure that both the arrows point in the same direction.
3. Keep a glass of water on the table.
4. Slowly lower the sheet of paper behind the glass of water.
5. Look through the glass carefully and observe the arrow at the bottom of the sheet. See how it is different from the arrow at the top of the sheet.



OBSERVATION:

The arrow mark appears to bend or change its direction. This is because of refraction.

When we place the sheet behind the glass, the light rays travel from the image (arrow) to the glass and into the water and finally out of the glass and into the air again. As the speed of light is different when it passes through different media, the light rays appear to bend and hence the image (arrow).

B Make a water clock!

◀ Experiential Learning

AIM: To understand the working principle of a water clock

YOU WILL NEED: A clear plastic bottle, a knife, a compass or divider, a stopwatch, a glass of water, food colouring and a marker

PROCEDURE:

1. Take a plastic bottle and cut it in the middle into two equal halves using a knife. Ask an adult to help you in cutting the bottle.
2. Unscrew the cap of the bottle and make a hole on it using a compass or divider. Then screw the cap back on.
3. Place the top half of the bottle upside down inside the bottom half of the bottle.
4. Take the glass of water and add drops of food colouring to it.
5. Keep the stopwatch ready. Start the timer as you start pouring the coloured water into the top of the bottle.
6. For every 1 minute in the timer, use the marker to draw a line to mark the water level in the bottom half of the bottle.
7. Once all the water in the top of the bottle gets collected in the bottom half, pour it back again into the top half of the bottle.
8. From the marked water levels, you can find the time. Your water clock is now ready.



In ancient Greece, people used a water clock called **clepsydra** to measure time.

C Uniform or non-uniform motion! Find out.

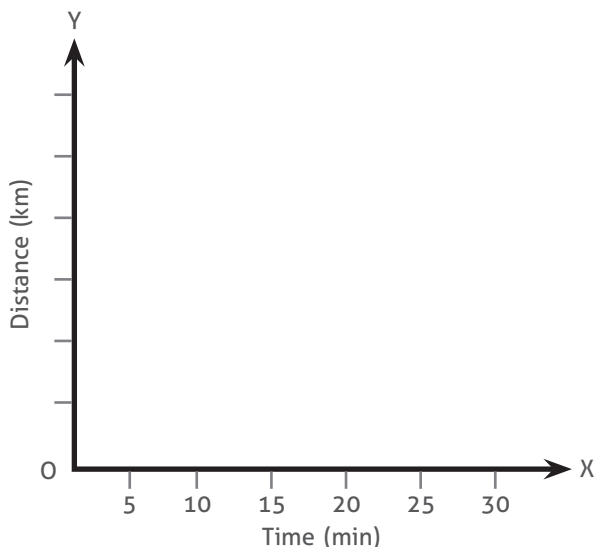
◀ **Experiential Learning, Multidisciplinary Approach**

AIM: To calculate the speed of a moving object

YOU WILL NEED: A wristwatch with a second hand, a notebook, a pen or a pencil

PROCEDURE:

- Ask an adult to take you out on drive in a car. She/He can choose a place which is not too crowded for driving.
- Note the distance in the odometer reading and write it in your notebook.
- Take the odometer reading at frequent intervals, for example, every 5 minutes in a 30-minutes drive.
- Plot a graph by taking time (min) on X-axis and distance (km) on Y-axis.



- What do you infer from the graph? Is it a uniform or non-uniform motion?
- Calculate the average speed of the car (km/h) during the travel.

D Role-play: Human respiratory system ◀ **Communication**

Organize a role-play to explain the different organs of the respiratory system.

Make a group of four students from the class. Each of them has to play the role of one of the following organs of the respiratory system.

1. Nose
2. Trachea
3. Bronchioles
4. Lungs

The students can draw these organs in a chart and use them in the class while doing their roles.

They need to talk about the importance of each organ and explain how they work collectively to help us breathe.



E The leaking hot-water tap ◀ **Experiential Learning**

A lot of water is wasted if a tap is leaking. Surprisingly, a hot-water tap is more likely to leak than a cold-water tap.

AIM: To find out how a hot-water and a cold-water taps leak

YOU WILL NEED: Two paper cups, a pin, two small glasses, water (both hot and cold) and ice cubes

PROCEDURE:

1. Right in the middle of the bottom of each paper cup, make a tiny pinhole with the help of the pin.
2. Set the paper cups on top of the glasses. Half-fill one cup with cold water. Drop in a



- couple of ice cubes so that the water becomes really cold.
- Half-fill the other cup with hot water.
 - Now observe the pinholes at the bottom of the cups.

OBSERVATION:

If the pinholes are of the same size, we will see hot water leaking faster than cold water.

CONCLUSION:

Hot water is more likely to leak than cold water as the molecules in hot water move much faster than they do in cold water. The faster they move, the easier it is for them to slip past each other.

F Chemical formulae of compounds ◀ Problem Solving

Deduce the chemical formulae of the compounds using the following table. The number given above each symbol or formula represents the valency of the element or group.

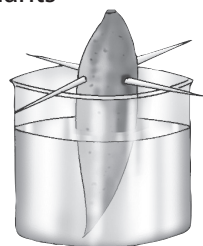
Name	Valency	Name	Valency
Lithium	Li ¹	Sulphur	S ²
Potassium	K ¹	Chlorine	Cl ¹
Sodium	Na ¹	Hydroxide	OH ¹
Silver	Ag ¹	Nitrate	NO ₃ ¹
Calcium	Ca ²	Sulphate	SO ₄ ²
Aluminium	Al ³	Oxygen	O ²
Hydrogen	H ¹	Carbon	C ⁴
Ammonium	NH ₄ ¹	Carbonate	CO ₃ ²

- Silver chloride
 - Potassium hydroxide
 - Sodium carbonate
 - Ammonium chloride
 - Calcium hydroxide
- (Note: Write the group in brackets.)

G Asexual reproduction in plants ◀ Experimental Learning

AIM: To observe asexual reproduction in plants

YOU WILL NEED: A sweet potato, beaker, toothpicks and water



PROCEDURE:

1. Fill the beaker three-fourths with tap water. Insert four toothpicks around the centre of the sweet potato and place the sweet potato with root side down, into the beaker.
2. Put the beaker near a sunny window. Observe the beaker every day.
3. Record the dates when the first new roots appear, and when the first new shoots appear.

H Limiting factors for photosynthesis ◀ Critical Thinking

We know that the intensity of light affects the rate of photosynthesis. If the intensity of light is limited, the rate of photosynthesis will also get limited, irrespective of how much carbon dioxide and water are available. Light is called a limiting factor for photosynthesis. Other limiting factors are carbon dioxide and temperature.

Design an experiment to study the effect of temperature on the rate of photosynthesis. Here is a hint. We can use the same apparatus as used to show that the rate of photosynthesis is affected by light. Remember that other factors like light intensity and amount of carbon dioxide must be kept constant.

Similarly, design an experiment to study the effect of carbon dioxide on the rate of photosynthesis. Here is a hint – adding sodium hydrogen carbonate (sodium bicarbonate) to water increases the concentration of carbon dioxide in water.

Projects

A Radiant heat waves

Scientific Temper

We have seen that radiant heat travels in the same way as light, and with the same speed. Did you know that radio signals and X-rays also travel in the same way and with the same speed? They are similar kinds of waves that can travel very fast even through vacuum. Find out the common name of these waves. Find out the specific name given to the waves that carry radiant heat.

B Presentation on 'Soils of India'

Digital Literacy

Make a PowerPoint presentation on 'Soils of India'. Get pictures of different types of soils from the Internet and use them in the presentation. Remember to quote the source of your material and pictures in a separate slide entitled 'Acknowledgements'.

C Ancient clocks

Collaboration/Teamwork

In ancient times, people used different instruments to measure time. We have already learnt about some instruments such as the sundial, sand clock and water clock. Find out other time-measuring instruments that were used in the olden days. Work in pairs and collect pictures of these devices from the Internet and paste them in a chart. Write a few lines about the clocks below the pictures.



D LED bulbs/tube lights

Scientific Temper

LED (Light Emitting Diode) bulbs/tube lights are the most energy-efficient and also eco-friendly. Traditional

electric bulbs get heated up quickly and result in wastage of electricity. Hence, people are gradually replacing traditional bulbs with LED bulbs for domestic use. With the help of the Internet or by referring to books, find out the following:

1. Working principle of an LED
2. Different types of LEDs
3. Advantages of using LED bulbs/tube lights

Discuss your findings in the class.

E Find out about William Harvey.

◀ Digital Literacy

Using the Internet and by referring to books, find out about William Harvey, who is associated with the discovery of the direction of blood circulation. Write an article about William Harvey based on the data with respect to the blood circulation you have collected.



F Explore, share and learn.

◀ Experiential Learning, Application of Knowledge

If you live in or nearby any coastal town or city, visit a place which has been recently affected by a cyclone. Interact with people there to know their first-hand experiences of the cyclone. Also discuss with them the precautions to be taken during a cyclone.

G Water contamination ◀ Problem Solving, Collaboration

The recent heavy rains contaminated the water sources in your neighbourhood with dirt and mud. The contaminated water finds its way to the taps in your home and all the neighbouring homes. The water is dirty, muddy and unusable. Discuss with your friends how this problem can be resolved. Prepare a short report on this suggesting the measures to be taken to solve the problem.