

# PERISCOPE

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**Unit/Theme:** Reflection of Light and Colors

**Purpose:** To make scientific inferences about the reflection of light on different surfaces.

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**CURIOUS  
BOX** 



# Learning Outcomes and Process Components



Defines the characteristics of reflection events of light on different surfaces.



Records the data collected related to the reflection events of light on different surfaces.



Evaluates the reflection of light on different surfaces as regular and diffuse reflection.



## What Are The Things You Know?

• Is the Moon a source of light?

• How is an image formed in mirrors?



Explain what you know!

# Let's Spark Curiosity



Let's start exploring!

The sentences, “While we see ourselves clearly in front of a mirror, why do we see the metal spoon on the table as blurry? Why does the light reflected from a wooden surface not dazzle our eyes, whereas a shiny metal surface reflects light strongly? So, how can we see behind an obstacle using a periscope? Today, by examining these behaviors of light, we will explore regular and diffuse reflection and create our periscope model.” are said. Students are asked to take out the activity materials.

The activity video is watched by pausing necessary. The contents of the set are checked before starting the activity. All lids and packages are opened together with the students.



## Set Content

- Periscope Templates .....
- Label .....
- Mirrors .....

## How Do We Do It?



- 1.** Take the periscope templates in front of you and remove all the parts on the template one by one. Do not forget to open the hole spaces on the parts. Of the two pieces that will be fitted together, properly join the one with holes and the one without holes. Then, perform the same joining process for the other two pieces.
- 2.** Glue the mirrors onto the small template pieces. First, attach one of the mirrors onto one piece and remove the transparent protective film on the mirror. Then, attach the second mirror onto the other small piece and remove its protective film. Insert the prepared mirror pieces between the main body parts that were joined, ensuring that the mirrors remain inside the model.
- 3.** After placing the first small piece, insert the second small piece in the same way. After completing this process, finish the periscope by joining the remaining large pieces. Ensure that all parts fit properly and are securely fastened to one another. Finally, make the periscope more engaging by attaching the labels to the edges of the model.

# What Are The Things That Future Scientists Should Discover?



The following questions are asked to the students:

- What is a periscope?
- Do light rays reflect in the same way on all surfaces?
- What is the image formed on wavy water like?
- How does the process of vision occur?

## Periscope

A periscope is an optical device used to observe the surroundings from behind an obstacle or from under the sea. It is especially used in submarines to observe the surface of the water. In a periscope, the direction of incoming light is changed using mirrors, lenses, or reflective prisms. Periscopes work according to the laws of reflection of light.

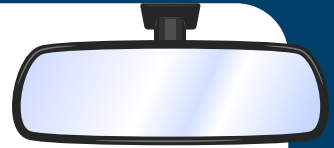
## Reflection

- Reflection is when light hits a surface and returns to the environment it came from.
- During reflection, the direction of light changes (except in some cases), but its color and speed stay the same.
- For us to see objects, light needs to be reflected.



## Do You Know?

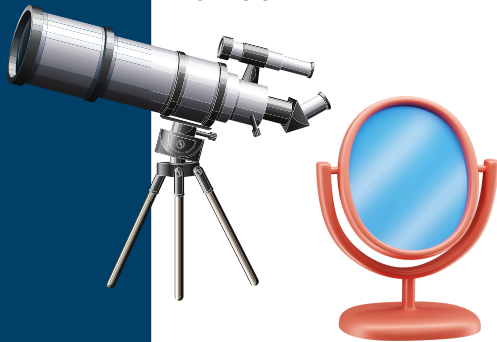
The writings on the front of ambulances and fire trucks are written in reverse so that they appear symmetrical in a mirror. Why? This design ensures that their reflections in mirrors are seen correctly. In this way, drivers in front can quickly notice emergency vehicles through their rear-view mirrors and give way. In other words, these writings are not just signs, but a life-saving symmetry!



The Moon does not produce its own light; it appears bright because it reflects the light coming from the Sun. Similarly, in mirrors, light coming from objects is reflected regularly and reaches our eyes, allowing us to see the image.

Light rays reflect in different ways depending on whether the surfaces they encounter are rough or smooth.

### Regular Reflection



- In regular reflection, the surface of the material that light encounters is flat, smooth, and polished.
- Light rays that arrive parallel to each other are reflected from the surface still parallel to one another.
- The image formed by regularly reflected rays is clear.
- Regular reflection occurs on surfaces such as marble, mirrors, granite, still water, and aluminum foil.

### Diffuse Reflection

- If the surface that light strikes is rough, diffuse reflection occurs.
- Even if the incoming rays are parallel, they are not reflected parallel to one another. They are reflected in different directions.
- Diffuse reflection occurs on surfaces such as crumpled aluminum foil and wavy water.
- In diffuse reflection, a clear image is not formed.

### Occurrence of Vision

The process of vision occurs when light rays coming from a light source strike objects and reach our eyes. For an object to be seen, there must be a light source in the environment. Places without a light source are dark, and objects cannot be seen. When light rays from a light source hit an object and reach our eyes, we see the object. However, black objects do not reflect light; therefore, they are not visible in the dark or when there is not enough light. This situation is directly related to the reflection of light from objects and its reaching our eyes.

# For the Inquisitive, Scientific Explanation



The following questions are asked to the students:

- What is needed to illuminate an environment without using a new light source?
- Why do texts appear reversed in mirrors?

## Mirrors

Mirrors with a flat reflective surface are known as plane mirrors. Plane mirrors are common sights in our homes and stores. We also make use of plane mirrors on building facades for heat and light insulation, and in tech gadgets like projectors, periscopes, and overhead projectors.

When light hits a plane mirror, it reflects and changes direction; this allows us to move light around a space without needing a new light source. For instance, if a room doesn't get direct sunlight, we can simply use mirrors to guide the light inside. Since mirrors reflect light in such a steady and predictable way, they are incredibly effective for these kinds of tasks.

Text can appear reversed in mirrors. The reason for this is that it's actually the front-back direction changing, not the left-right; when light hits the text, it reflects toward us and our eyes perceive this reflected light. Because of this, mirrors only reflect the image and change the linear path of light, not the reading direction of the text.



## What Have We Discovered?



The questions, “Today, we learned with you how the phenomenon of light reflection occurs and how it behaves on different surfaces. With the periscope model, we discovered how light changes direction thanks to regular reflection and how the image is formed. So, how did you feel?” are asked.

## What Else Can We Do?



Let's try!

### Dear Teacher,

By creating a periscope model, you observed together with your students how light changes direction thanks to regular reflection.

You can do the activity “Reflection of light from different surfaces”.

Why is it difficult to look through a window on a sunny day?

Question of The Day

# Materials-Procedure

## REFLECTION OF LIGHT FROM DIFFERENT SURFACES

### Materials:

- A small mirror
- A transparent glass filled with water
- A flashlight or hand torch
- White paper



### Procedure of The Experiment:

1. Place the glass filled with water on the table.
2. Point the flashlight toward the glass or the mirror and observe the reflection of the light on the paper.
3. Discuss how the light reflects differently from the water surface and the mirror.
4. Observe the movement and scattering of the light by gently shaking the surface of the water in the glass.

With this activity, students can observe both the law of reflection and the behavior of light on different surfaces.



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