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Shikha Gupta
Shikha Nautiyal

SCIENCE OLYMPIAD

National Science Olympiad

6

Strictly according to the latest syllabus of Science Olympiads

The Gen X Series

A SUCCESS PACKAGE FOR ASPIRANTS OF SCIENCE OLYMPIADS

NATIONAL SCIENCE OLYMPIAD

Exploring the World of Science

Class 6

Shikha Gupta
Shikha Nautiyal

V&S PUBLISHERS

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Publisher's Note

V&S Publishers, after the grand success of a number of Academic and General books, is pleased to bring out a series of *Science Olympiad books* under *The Gen X series – generating Xcellence in generation X* – which has been designed to focus on the problems faced by students. In all books the concepts have been explained clearly through various examples, illustrations and diagrams wherever required. Each book has been developed to meet specific needs of students who aspire to get distinctions in the field of science and want to become Olympiad champs at national level.

To go through Science Olympiads, students need to do thorough study of topics covered in the *Olympiad syllabus and the topics covered in the school syllabus as well*. The Olympiads not only tests subjective knowledge but Reasoning skills of students also. So the students are required to comprehend the depth of concepts and problems. The Olympiads check efficiency of candidates in problem solving. These exams are conducted in different stages at regional, and national levels. At each stage of the test, a candidate should be fully prepared to go through the exam. Therefore, this test requires careful attention towards comprehension of concepts, thorough practice, and application of concepts and rules.

While other books in market focus selectively on questions or theory; V&S Science Olympiad books are rather comprehensive. Each book has been divided into five sections namely *Science, Logical Reasoning, Achievers section, Subjective section, and Model Papers.* The theory has been explained through solved examples. To enhance problem solving skills of candidates, *Multiple Choice Questions (MCQs)* with detailed solutions are given at the end of each chapter. Two *Mock Test Papers* have been included to understand the pattern of exam. A CD containing Study Chart for systematic preparation, Tips & Tricks to crack Science Olympiad, Pattern of exam, and links of Previous Years Papers is accompanied with this book. The books are also useful for various other competitive exams such as NTSE, NSTSE, and SLSTSE as well.

We wish you all success in the examination and a very bright future in the field of science.

All the best

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Section 1
Science

1 Motion and Measurement of Distances

Learning Objective:

After reading the chapter, you will be able to:

- ❒ understand the science behind motion;
- ❒ learn how to measure distances.

Motion

We observe many objects in our daily life. Some of them move from one place to another, while others remain stationary.

Activity 1

On your way to school, observe your surroundings and classify the objects under:

Objects in motion **Objects at rest**

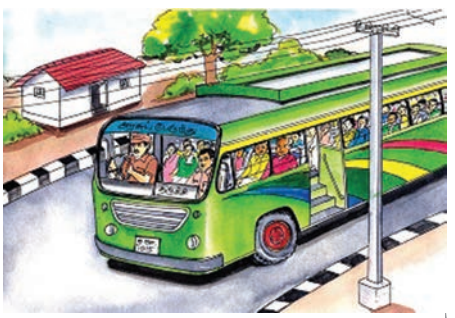
From the above activity, we have learnt that some objects move and some remain stationary.

Can we find out whether an object is at rest or in motion only by observing them directly?

We can observe that some objects change their position with time. In some cases though, we cannot see the objects change their position; we come to know about their motion from the effects they make.

If an object does not change its position with respect to time, it is said to be stationary or at rest. If an object changes its position with respect to time, then it is said to be in motion. Hence, **motion** can be defined as the change of position of an object with respect to time.

For example, a car which stops at a traffic light is said to be at rest or stationary. Let us take our earth as an example. Do you think earth is stationary or in motion? Earth is constantly in motion. If the earth doesn't rotate, there will be no day or night.



Now let's try and understand another concept. When you are sitting inside a bus, the buildings, trees, road etc. are in motion or stationary? While your bus is in motion, you will feel that all objects outside the bus are in motion too, isn't it? But is that the truth or just an illusion?

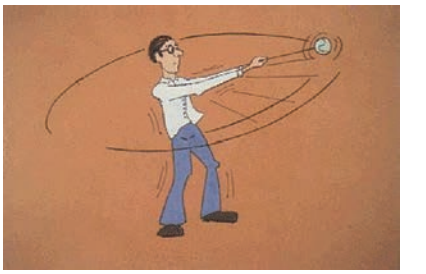
Now consider this: will a person standing at a bus stop see the road, trees and buildings in motion too? The answer is no. An object may appear stationary to one observer and appear to be moving for other. In other words, an object is at rest in relation to a certain set of objects and moving in relation to another set of objects. This implies that *rest and motion are relative*.

Different Types of Motion

Linear Motion

When an object moves along a straight line, it is said to be in a **linear motion** or **rectilinear motion**. For example, a lift in any building follows a linear path to transport people from one floor to another; a coconut falling from a tree falls in a straight line which is again linear motion; a car speeding along a straight road is again linear motion.

Circular Motion



Take a stone, tie a thread to it and whirl it with your hand and observe the motion of the stone. The stone is moving along a circular path, isn't it? In this motion, at any point in the circular path, the distance of the stone from the centre of the circle (hand) remains the same, doesn't it? When an object moves in a circular path, it is said to be in **circular motion**. Other examples include: fan on the ceiling, spinning of a top, child sitting on a merry-go-round.

Periodic Motion

When an object repeats the same type of motion at regular intervals of time, it is said to be in a **periodic motion**. Examples include: the motion of a child swinging; motion of a pendulum in a wall clock; motion of the earth revolving around the sun; motion of moon revolving around the earth.

Random Motion

When an object moves at different speeds and in different directions, with no particular pattern, it is said to be in a **random motion**. Examples: fish swimming in a tank; movement of football on the field.

Measurement

Sanchit went to the market with his father. He observed various weighing instruments that were used to measure different things. He had a doubt and asked his father, "Why are there so many different units of measurement?"

Before we answer Sanchit's question, let's first do the following activity.

Activity 2

Fill up the table given below with the help of daily basis examples:

Item	Quantity	Measuring Instrument

We know that measuring instruments like metre scale, balance, clock, measuring jar, etc. are necessary for measuring different items.

The comparison of an unknown quantity with a certain fixed quantity of the same kind is called **measurement**. Any quantity that can be measured is called a **physical quantity**. You might have noticed how a vegetable vendor uses weights to measure the weight of a particular commodity. He measures the commodities and then totals up the charges associated with each commodity based on the measurement taken.

Units of Measurement

Lengths, mass and time are called **fundamental quantities**, because they cannot be expressed in terms of any other physical quantity. The units used to measure these fundamental quantities are called fundamental units.

Different types of quantities need to be measured differently. Hence, we use different units of measurement for each. Let us attempt to understand the ways to conduct accurate measurement.

1. *Measuring length:* The distance between two points is called the **length**. Let us try to measure the length of our classroom with the help of a meter scale. Suppose the length of the classroom is 2 meters. Here, **2 is the magnitude and meter is the unit of length**. Meter is the universal unit of measurement of length or distance, but the quantity or the magnitude has to be determined.
2. *Measuring weight:* The amount of matter contained in a body is called **mass**. We can also measure your weight or mass using a weighing scale. Suppose, you weigh 58 kilograms. Here, again, **58 is the magnitude** and **kilogram is a unit of mass**. Kilogram, like, meter is a known constant unit of measurement for mass and weight.
3. *Measuring time:* An interval between two events is called time. If it takes 20 minutes for you to reach your school, then **20 is the magnitude** and **minutes is a known unit to measure time**.

Any measurement that gives the same value for all is called **standard measurement**. Units used in standard measurement are called **standard unit**. Here are the most commonly used standard units:

1. Length: meter
2. Mass: kilogram
3. Time: seconds
4. Temperature: Kelvin

Multiples and Submultiples of Length, Time and Mass

Lengths, mass and time are also measured by other units. However, kilometre, kilogram and seconds are used are standard units to make the conversions.

Length

The distance between two points is called **length**. Draw a straight line in your note book. Mark two points A and B on the line. Measure the distance between the two points using a scale. What you have measured now is the length. The SI unit of length is meter. To measure length, we use measuring tape, meter scale, etc.

Activity 3

Measure the length of the following and write them, using appropriate units.

Length of your pencil _____

Length of your thumb _____

Length of your eraser _____

Length of a leaf _____

Length of your pen nib _____

Length of the nail of your little finger

Multiples and Submultiples of Length

In the above activity, larger distances such as the distance between two places are expressed in kilometre. This is called **a multiple of length**. We express smaller lengths, such as length of a pencil, pen nib, etc. in centimetre and millimetre. These are called **submultiples of length**.

Subunits of length

1 centimetre (cm) = 10 millimetre

1 decimetre (dm) = 10 centimetre = 100 mm

1 metre (m) = 100 centimetre

1 metre (m) = 1000 millimetre

1 kilometre (km) = 1000 metre

Mass

The mass of a body is the amount of matter contained in it. The SI unit of mass is kilogram. We use beam balance, physical balance and electronic balance for measuring mass.

Subunits of mass

1 gram (g) = 1000 milligram

1 kilogram (kg) = 1000 gram

1 kilogram (kg) = 1000000 milligram

1 quintal = 100 kilogram

1 metric ton = 1000 kilogram

Time

We perform many activities in our daily life,but the duration of each event/activity differs from one another. To understand it better, complete the following activity.

Activity 4

Look at the following activities. Discuss in small groups and tabulate the events/ activities according to their duration. Use appropriate units of time. Then categorize them accordingly.

1. Time taken for bathing
2. Duration of sleep
3. Working hours of your school
4. Time taken to blink your eyes
5. Time taken for ripening of fruits
6. Time taken for a plant to grow into a tree
7. Time taken for curdling of milk
8. Time taken to weave a saree
9. Time interval between a new moon and a full moon
10. Time interval between the first term and the second term examination
11. Time taken by a coconut to fall from a tree
    a. **Events/activities occurring in seconds:**
    b. **Events/activities occurring in minutes:**
    c. **Events/activities occurring in hours:**
    d. **Events/activities occurring in days/months:**
    e. **Events/ activities occurring in years:**

Subunits of time

1 minute = 60 seconds

1 hour = 60 minutes

1 day = 24 hours

1 year = 365 ¼ days

1 century = 100 years

Multiple Choice Questions

1. Movement of a branch of a tree in air is an example of _____.

(a) Random motion (b) Circular motion

(c) Periodic motion (d) Rotational motion

2. Which of the following statements is correct?

(a) A footstep can be used as a standard unit of measurement because its length is same for all the persons

(b) A footstep cannot be used as a standard unit of measurement because its length is not same for all the persons

(c) A footstep cannot be used as a standard unit of measurement because its length is 10 cm only for all the persons

(d) A footstep cannot be used as a standard unit of measurement because it always remains constant

3. Who found that a pendulum of a given length always takes the same time to complete one oscillation?

(a) Galileo Galilei (b) Archimedes

(c) Albert Einstein (d) Newton

4. The scale should be kept _____ the length while measuring a length.

(a) Perpendicular to (b) Inclined to

(c) Away from (d) Along

5. When the bob of the pendulum is released after taking it slightly to one side, it:

(a) Begins to move up and down

(b) Begins to move to and fro

(c) Becomes still and does not move

(d) Comes to rest at the mean position

6. The motion of a rolling ball is an example of _____ motion.

(a) Circular (b) Linear

(c) Rotational (d) Random

7. Identify the types of motion from the images below.

(a) Periodic, rotational, linear respectively

(b) Periodic, rotational, circular respectively

(c) Linear, rotational, periodic respectively

(d) Rotational, linear, periodic respectively

8. Three cars are running on the road with three different speeds: 78 mph, 59 mph, and 65 mph respectively. Calculate the average of these three speeds.

(a) 82.7 mph (b) 74.5 mph

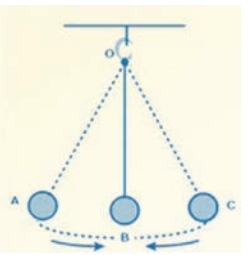
(c) 67.3 mph (d) 44.2 mph

9. What would be the best unit to use to measure the tip of your pencil?

(a) Feet (b) Kilometer

(c) Millimeter (d) Meter

10. Look at the following picture carefully.



Now read the following paragraph carefully and fill the blank with correct sequence of words.

A stone suspended with a non-stretchable thread makes a simple _____. When the pendulum is at rest, it is at position B. This is called the **rest position** or its _____. When it swings, it moves from B to A, back to B, from B to C and back to B. This completes one full swing of the pendulum. Each swing is called _____.

(a) Mean position, one oscillation, pendulum

(b) One oscillation, complete oscillation, pendulum

(c) Mean position, pendulum, complete oscillation

(d) Pendulum, mean position, one oscillation

11. Two athletes take part in two separate races and cover different distances in different times. Kavya runs 2 km in 10 minutes and Yamini runs 5 km in 20 minutes on two different tracks. Which of the following statements is correct?

(a) Yamini runs faster than Kavya

(b) Kavya runs faster than Yamini

(c) Yamini runs faster than Kavya in one minute

(d) Both A and C

Solution: If Kavya takes 10 minutes to cover 2 km, then in 1 minute, she will cover 2 km ÷ 10 = 0.2 km (using the formula: speed = distance travelled ÷ time taken) Similarly, if Yamini takes 20 minutes to cover 5 km, then in 1 minute she will cover 5 km ÷ 20 = 0.25 km.

12. Which of the following is not a unit of speed?

(a) km/min (b) m/min

(c) km/h (d) kg/s

13. Look at the picture carefully: Fill in the blanks using words: stationary, moving.

The potter at the railway station is _____ in relation to the train, but is _____ in relation to the bag on his head.

(a) Moving, stationary

(b) Stationary, moving

(c) Stationary, stationary

(d) Moving, moving

14. Why is measurement important to us?

(a) It is required by students to learn mathematics and science

(b) It is required only for advanced scientific calculations

(c) It is required by every human being for their day-to-day living

(d) It is required only to build satellites

15. Read the following two paragraphs. Analyze the situation and choose the correct options.

1. A bus runs from Kolkata to Guwahati. It covers a distance of 400 km in 7 hours and then a distance of 550 km in the next 7 hours.

2. Alisha takes part in a car race. She drives a distance of 70 km each in the first, second and third hours.

(a) First statement is an example of uniform motion and second statement is an example of non-uniform motion

(b) First statement is an example of non-uniform motion and second statement is an example of uniform motion

(c) Both first and second are examples of uniform motion

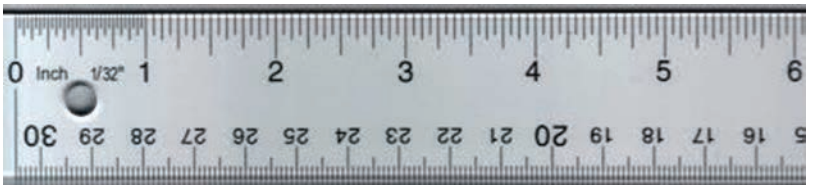
(d) Both first and second are examples of non-uniform motion

16. **1 cm** = ……. **m**

(a) 0.001 (b) 0.01

(c) 10 (d) 0.1

17. **The length of the blank card shown below is:**



(a) 1.6 inches (b) 1.6 cm

(c) 3.2 cm (d) 2.5 inches

18. **Which of the following objects cannot be used for measuring the length of a curved line?**

(a) Thread and ruler

(b) Screw gauge

(c) Set square

(d) None of them

19. **While reading an instrument, why is it important to place the eye in line with the reading?**

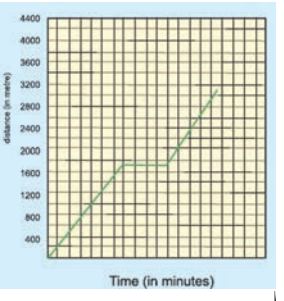
(a) To avoid parallax error

(b) To see more clearly

(c) To avoid reflections

(d) To get a better view of the entire instrument

20. **Look at the following graph. Observe it carefully.**



This graph shows:

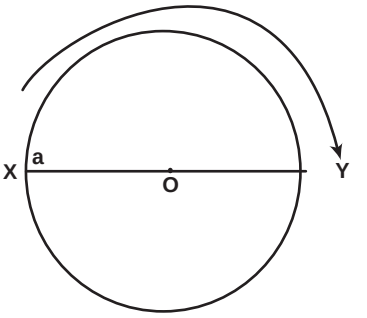
(a) The motion of a school bus

(b) The motion of Sanchit, who stops at the market on his way back home from school

(c) The motion of an ant as it collects rice grains

(d) The motion of an athlete running a 200 m race

21. A cyclist moves from a certain point X and goes round a circle of radius a and reaches Y, exactly at the other side of the point X as shown in the figure below. The displacement of the cyclist would be:



(a) πa (b) $2\pi a$

(c) $2a$ (d) $2\pi/a$

22. The unit of speed depends on the units of distance and time. Based on this statement, fill up the following table.

Units for distance	Units for time	Units for speed	
kilometers		kilometers per hour	Km/h
	second		
meter	minute		m/min

(a) Hour, meter, meters per second, m/sec, meter/minute

(b) Second, meter/minute, meter/second, m/sec

(c) Meter, meter/second,meter/minute, m/sec,

(d) Meter/minute, centimeter, minute, Km/h

23. In circular motion, the:

(a) Acceleration is zero

(b) Velocity is constant

(c) Direction of the motion fixed

(d) Direction of the motion changes continuously

24. Which of the following is false?

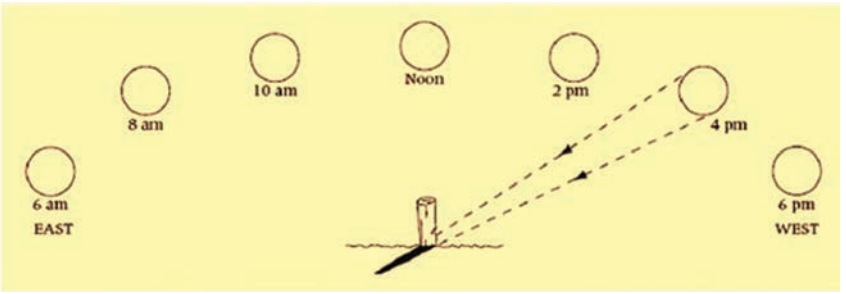
(a) A ceiling fan shows rotatory motion

(b) The motion of a swing is rectilinear as well as circular

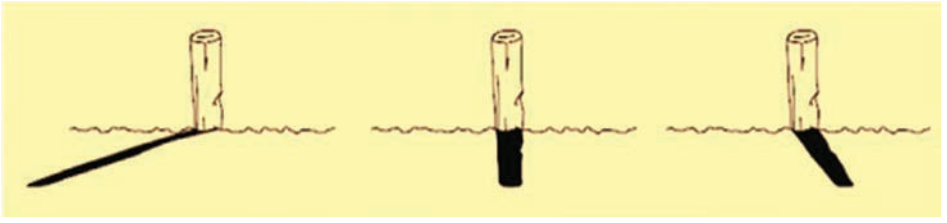
(c) A guitar shows vibratory motion

(d) The pendulum of a clock shows oscillatory motion

25. The picture here shows the position of the sun at different times of the day, if we were looking south. The picture also shows the shadow cast by the stick at 4 p.m.



What time of the day would it be if the stick made shadows like these?



(a) 6 pm, noon, 8 am
(b) 10 am, noon, 4 pm
(c) 6 pm, noon, 10 am
(d) 8 am, noon, 6 pm

Answer Key

1. (a)	2. (b)	3. (a)	4. (d)	5. (b)	6. (a)	7. (d)	8. (c)	9. (c)	10. (d)
11. (d)	12. (d)	13. (a)	14. (c)	15. (b)	16. (b)	17. (a)	18. (d)	19. (a)	20. (b)
21. (c)	22. (a)	23. (d)	24. (b)	25. (c)					

2 Light, Shadows and Reflection

Learning Objective:

After reading the chapter, you will be able to:

- ❒ learn about important characteristics of light;
- ❒ learn about luminous and non-luminous objects;
- ❒ study opaque, transparent and translucent objects;
- ❒ study the formation of shadows;
- ❒ understand the features of a shadow;
- ❒ learn about solar and lunar eclipses;
- ❒ differentiate between an image and a shadow;
- ❒ understand the formation of reflections.

We *see* a lot of things around us: Trees, birds, cars, road, school building, etc. You might have also noticed shadows of some objects. Ever wondered how are shadows formed? What is reflection?

We shall aim to answer all these questions through this chapter.

Light

The natural agent that stimulates sight and makes things visible is called **light**. Objects that generate their own light are called **luminous objects**. For example, the sun is a luminous object. Candles and stars are also examples of luminous objects. On the other hand, all those objects which cannot generate their own light are called non-luminous objects. For example, your hand, balls, gloves, rubber, etc. are **non-luminous objects**.

Light has the ability to travel through various substances. Based on whether light can pass through them or not, objects are divided into three main categories:

1. *Opaque objects:* Objects which do not allow the passage of light and through which one cannot see anything are called **opaque objects**. Examples include: wood, books, chair, shoes.
2. *Translucent objects:* Objects which allow light to pass through them partially and through which we are able to see but not clearly are called **translucent objects**. Umbrellas, coloured glass, wax paper, dirty water and certain kind of plastic objects.

3. *Transparent objects:* Objects through which light can pass through easily and one can see clearly are called **transparent objects**. Glass, cellophane paper, air, diamonds are all transparent objects.

Please note that light always **travels in a straight line**. We have already learnt about rectilinear motion. Light is an example of rectilinear motion and this property of light is called **rectilinear propagation of light**. For the purposes of drawing a diagram to depict light, the path of light is represented by a straight line with an arrowhead depicting the direction of light. Such a straight line with an arrowhead is called the **ray of light**.

Shadow

The darkness that an object causes while preventing the light to fall on another object is called a **shadow**. It is a dark region which doesn't contain any colour. The size of a shadow is relative to the position of the object with respect to the source of light. The shadow of an object is formed only on another opaque object which is called a **screen** or **surface**. A Shadow has the following characteristics:

1. A shadow is formed only when the light is blocked by an opaque object.
2. A shadow is only a dark region which does not have any colour.
3. A shadow may or may not resemble the actual shape of an object.
4. A shadow can only be formed on a screen or surface.
5. The size of a shadow is relative to the position of the light source with respect to the object.

Pinhole Camera

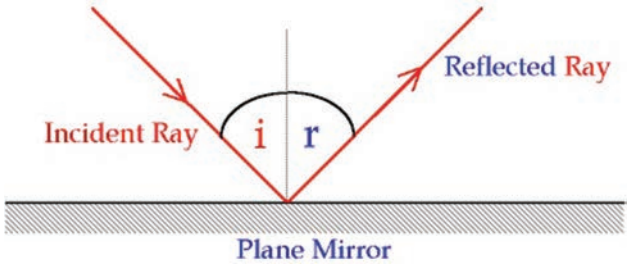
A pinhole camera is a small, light-tight can or box with a black interior and a tiny hole in the centre of one end. By using common household materials, you can make a camera that will produce pictures.

Mirrors and Images

We have learnt that opaque objects do not allow light to pass through them. So what happens to this light? It gets **scattered** in all directions. Every morning, when you get ready, do you see yourself in the mirror? What do you see? You see your own **image**.

In a dark room send a beam of light through a comb on to a mirror (as shown in Image 1). You will see a beautiful pattern getting formed (see Image 2). This pattern depicts that light travels in a straight line and also shows the **reflection** through the mirror.

A **mirror** is made of a thin glass, which is painted over with silver on one side. By polishing silver on one side, the mirror becomes an opaque object. When the light falls on the smooth surface of a mirror, it is sent out in a well-defined but different directions. This phenomenon is called **reflection**. A ray of light from an object falling onto a mirror is called an **incident ray**. The ray that is bounced back from the mirror is called a **reflected ray**. An image is formed only when a ray is reflected from a smooth and a shiny surface.

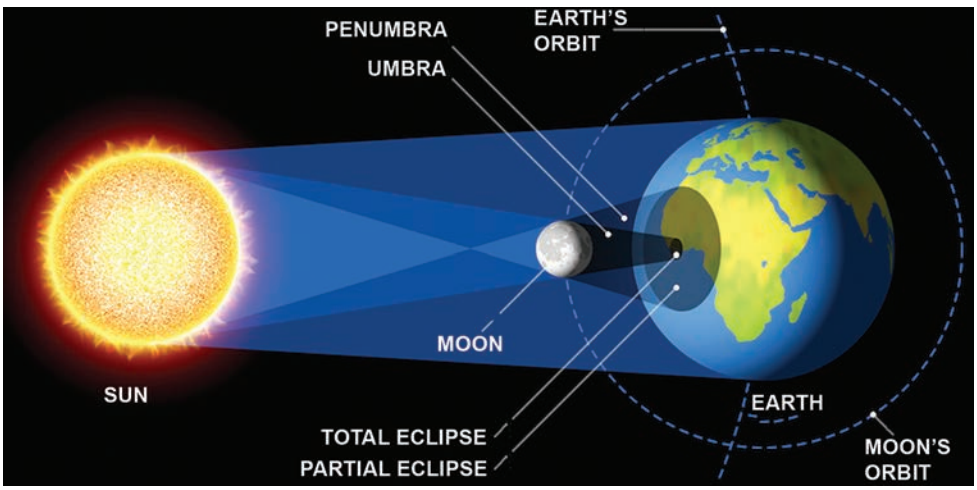


Eclipses

We know that the earth revolves around the sun and the moon revolves around the earth. Sometimes the earth, the sun and the moon come in a straight line. In such cases the light of the sun is blocked by either the earth or the moon. As a result, a shadow is formed. This phenomenon is called an **eclipse**. Following are the two types of eclipses:

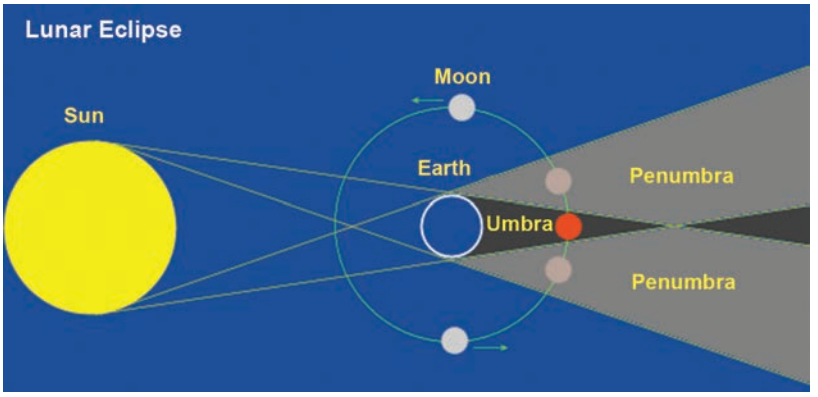
Solar Eclipse

When the moon comes in between the sun and the earth, the moon acts like an opaque object blocking the light from the sun. The earth is the screen, such that the shadow of the moon falls on earth. When people from the shadowed part of the earth try to see the sun, it is blocked or partially visible. This situation is called **solar eclipse**.



Lunar Eclipse

When the earth comes between the sun and the moon, it acts like the opaque object blocking the sun. The moon in this scenario is the screen. The shadow of the earth falls on the moon whose view gets partially or completely blocked for some time. This phenomenon is called **lunar eclipse**.



Differences between an Image and a Shadow

Here are some crucial differences between an image and a shadow:

1. A shadow does not show the details of an object whereas an image gives an exact replica of the object.
2. A shadow is formed by blocking the light by an opaque object. An image on the other hand is formed due to a reflection from an opaque smooth and shiny surface.
3. A shadow is always dark while the image shows the true colours of the object.

Activity

Human eyes and light

Match the functions with the different parts of the eye that perform them.

1.	cornea	sends messages to the brain
2.	retina	protects the sensitive parts of the eye
3.	pupil	controls the amount of light let in by the pupil
4.	lens	lets in the correct amount of light
5.	iris	focuses the light to give a sharp image
6.	optic nerve	detects the light

Multiple Choice Questions

1. Why do the shadows made by the sun change in size during the course of the day?

(a) Because the weather changes

(b) Because the objects keep moving

(c) Because the sun appears to move across the sky during the course of the day

(d) Because the amount of light, emitted by the sun, keeps on changing

2. Light is a form of energy that is produced by a:

(a) Transparent object (b) Luminous object

(c) Non-luminous object (d) Opaque object

3. If a capital letter R is seen in an ordinary plane mirror, what does it look like?

(a) R (b) Я

(c) Ƨ (d) ꓤ

4. The image of an object formed in the water is:

(a) Diminished (b) Erect

(c) Inverted (d) None of the above

5. Ishani saw the sun at different positions in the sky at different times of the day. Which one of the following is the cause for her observations?

(a) Revolution of the earth

(b) Rotation of the sun

(c) Rotation of the earth

(d) Movement of the earth around the moon

6. Which of the following will not form a circular shadow?

(a) A CD (b) Shoe box

(c) Ice-cream cone (d) A ball

7. When the moon comes in between the sun and the earth in a straight line, then a solar eclipse is formed. The eclipse occurs because of the _____.

(a) Formation of a shadow of the earth on the moon

(b) Formation of a shadow of the moon on the earth

(c) Reflection of light by the earth

(d) Reflection of light by the moon

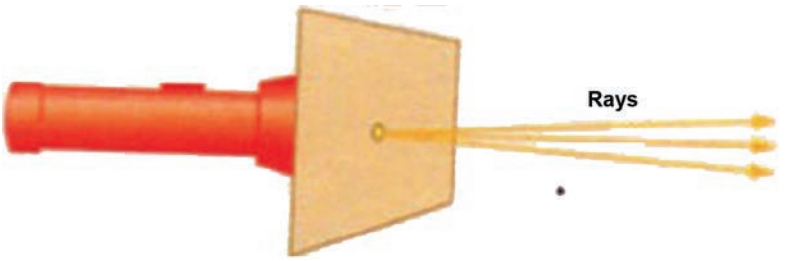
8. In a completely dark room, if you hold up a mirror in front of you, you will see:

(a) Your shadow (b) A sharp shadow

(c) Your image (d) No image

9. Sanchit performed the following experiment:

In a dark room, Sanchit took a flashlight, placed a cardboard in front of the flashlight and made a small hole at the centre of the cardboard. Then he switched on the flashlight.



He observed that the light appears to come out from the small hole in a straight line.

Conclusion of the above experiment could be:

(a) Light travels in a straight line

(b) This demonstrates the rectilinear propagation of light

(c) A and B both

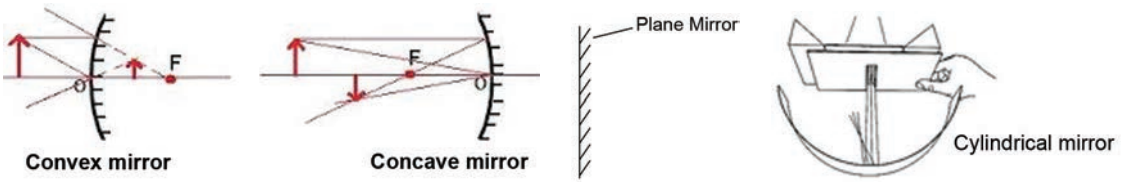
(d) None of the above

10. Butter paper is an example of _____ object.

(a) A transparent (b) A translucent

(c) An opaque (d) A luminous

11. Deepti is a dentist. She uses a mirror to focus light on the tooth of a patient. Look at the following pictures and find out that what kind of mirror she uses?



(a) Concave mirror (b) Convex mirror

(c) Plane mirror (d) Cylindrical mirror

12. If you stand before a plane mirror, your left hand appears right. This phenomenon is:

(a) The reflection of light

(b) The lateral inversion of light

(c) The shadow formation

(d) The diffusion of light

13. Shadow is formed due to:

(a) The rectilinear propagation of light

(b) The parallel propagation of light

(c) The passing of light through object

(d) All of them

14. Sanchit, Ananya, Ruhi and Rohit are discussing light, shadow and reflection. Choose the incorrect statement.

(a) Sanchit: Light is a form of energy which cannot be seen

(b) Ananya: The image formed by a pin-hole camera is inverted

(c) Ruhi: We see the moon because it is a luminous body

(d) Rohit: Plane mirror is used in periscope

15. Three identical towels of green, blue and red colours are hung on a clothesline in the sun. What would be the colour of shadows of these towels?

(a) The colour of shadow does not depend on the colour of the object. The shadow is always black in colour. So, all three towels will form same colour shadow

(b) The colour of shadow depends on the colour of the object. So, all three towels will form same colour shadow as their original colours

(c) The colour of shadow does not depend on the colour of the object, it depends on the thickness of the object. The shadow is always black in colour. So, all three towels will form same colour shadow

(d) A and C both are correct

16.

Ambulance as seen through a mirror

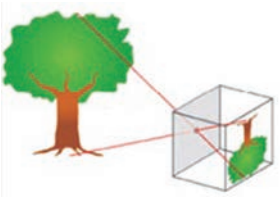
Look at the two pictures above and choose the correct statement given below.

(a) An image is a reflection of an object in the mirror. Mirrors generally change the direction of light which falls (incident) on them

(b) When an image of an object is formed in a plane mirror, some reversal of position takes place

(c) The reversal experienced by an image formed in a plane (flat) mirror is sideways

(d) All of them

17. 

The image given above depicts:

(a) A pinhole camera
(b) A periscope
(c) An eclipse
(d) A and C both

18. The following picture is an example of a:

(a) Concave mirror
(b) Convex mirror
(c) Plane mirror
(d) Cylindrical mirror

19. There are two imaginary objects A and B. Object A reflects more than object B. Therefore, object A is likely to be _____ object B.

(a) Made of the same material as
(b) Smoother than
(c) Just as smooth as
(d) Rougher than

20. One night, Ahana was sleeping on her terrace. She looked up at the night sky and observed the things she could see. She made a list of the sources of light in night sky. What should she have written down on her list?

(a) Moon
(b) Clouds
(c) Moon and stars
(d) Clouds and moon

21. A girl is 2 m away from a plane mirror. If she moves away from the mirror by 0.5 m, what will be the new distance between the object and its image?

(a) 2 m
(b) 1.5 m
(c) 3 m
(d) 5 m

22. The focus of a concave mirror is _____.

(a) Real
(b) Virtual
(c) Undefined
(d) At the pole

23. When light falls on the following objects, which among them would show the darkest shadows?

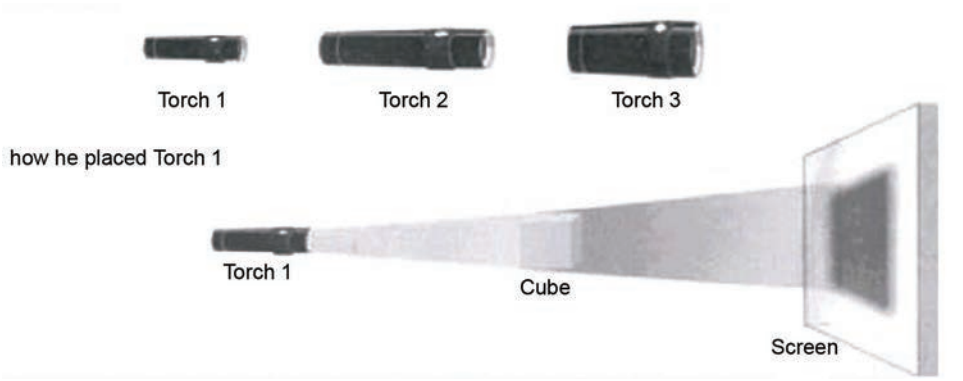
(a) A sheet of thin tissue paper
(b) A glass window

(c) A wooden chopping board

(d) Water in a glass

24. A boy did the following experiment.

He kept a wooden cube in front of a screen. He had three torches with him.



Without changing the position of the cube and the screen, he placed the other two torches one after the other, in the position of torch 1, and saw the shadow.

Which torch will make the largest shadow(umbra) on the screen?

(a) Torch 1

(b) Torch 2

(c) Torch 3

(d) The size of the shadow will be the same for all the three torches.

Answer the following questions based on the images below.

Natural light sources

Man-made sources of light

25. Natural light sources include sun, glowing rocks (lava from volcanoes), and _____.

(a) Fire

(b) Flame

(c) Torch

(d) Fire and flame