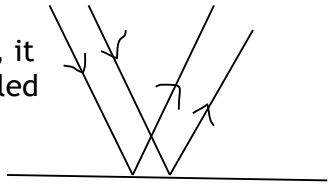
6th – Light: Shadow and Reflection II

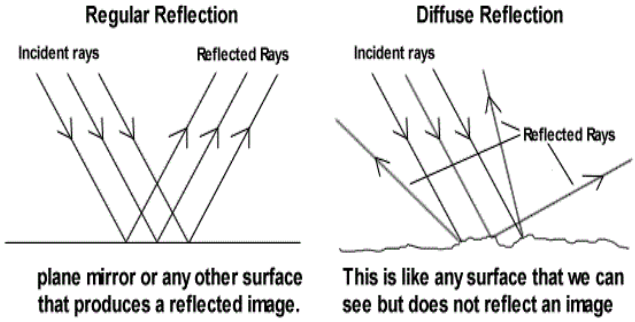
Reflection:

When a ray of light hits a mirror, or any polished surface, it bounces off the surface. This phenomenon is called reflection of light.



Reflecting surfaces:

Reflection of light by a surface depends on the nature of the surface. A rough and bumpy surface (also called an irregular surface) reflects a parallel beam of light incident upon it in different directions. A good example of a rough surface is bark of a tree and blanket. This kind of reflection is called diffused reflection.



A smooth surface (a highly polished surface) reflects a parallel beam of light incident upon it in one direction. A good example of a smooth surface is a mirror. When you stand in front of a mirror you can see yourself in the mirror. This is called your image.

Lateral inversion:

When we lift our right hand, the image in the mirror appears to lift its left hand. This seeming left- right reversal is called lateral inversion.

Image:

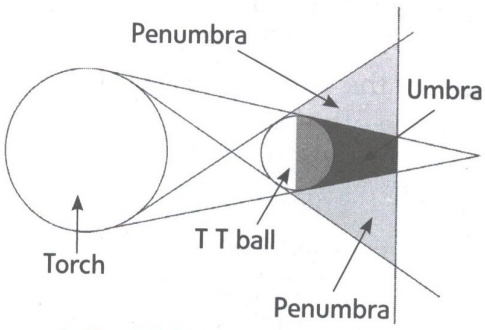
Stand in front of plane mirror. What you can see in the mirror is your image. Compare it with your shadow formed due to the sun. What are the differences between the two?

Difference between the image and the shadow of an object

Image	Shadow
1. Has the colour of the object	It is always black, regardless of the color of the object.
2. Gives the details as well as the outline of the object	Gives only the outline of the object.
3. Undergoes lateral inversion (i.e, left-right reversal)	Does not undergo lateral inversion.

Forming Shadow with a Large Source:

In a dark room, throw light from a torch on a table tennis ball. Observe the shadow of the ball on the wall. The shadow consists of a dark patch surrounded by a partially dark patch. The dark part of the shadow is called umbra. The umbra does not receive any light from the source. The partially dark patch is called penumbra. The penumbra region is less dark because it receives only some amount of light.



LEARNING WITH INNOVATION....

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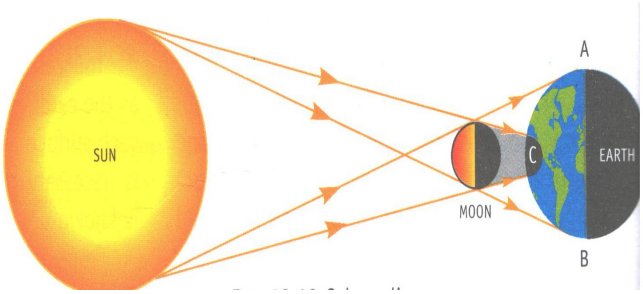
Eclipses:

Sometimes the moon and the earth also cast shadow on each other. This happens when the sun, moon and earth align in a straight line. These are examples of shadow formation by heavenly bodies.

Let us understand how this happens.

Solar Eclipse:

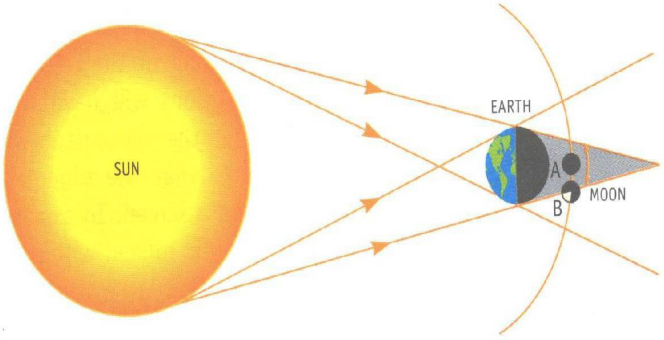
When the sun, moon and earth are in a straight line, the moon very briefly blocks the light of the sun from reaching earth. In other words, the moon casts its shadow on the earth. This phenomenon is known as solar eclipse. Thus, a solar eclipse always occurs on a new moon day.



In the region C, the sun will be blocked totally at these places, and a total solar eclipse can be seen. In the rest of the region between A and B, the sun will be partially blocked by the moon and a partial solar eclipse can be seen.

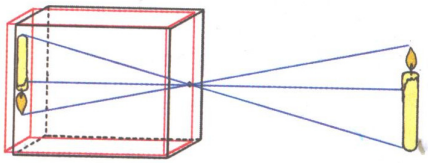
In A Lunar Eclipse:

When the sun, the earth and the moon come in a straight line, with the earth in the middle, the shadow of the earth falls on the moon. When the moon is in position A, no light from the sun falls on it, and we observe a total lunar eclipse. In position B, a partial lunar eclipse can be seen.



Pinhole Camera:

A pinhole camera is a simple device to show that light travels in a straight line. A pinhole camera is just a box with a very tiny hole on one of its sides. Light falls on the hole, and an inverted image is formed on the side opposite to the hole. The human eye acts very much like a pin hole camera.



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