

TOPIC 6: LIGHT ENERGY

LESSON THREE:

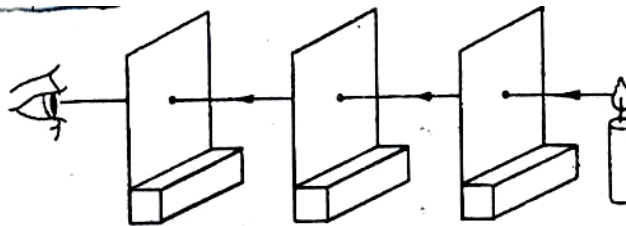
PROPERTY OF LIGHT

Vocabulary

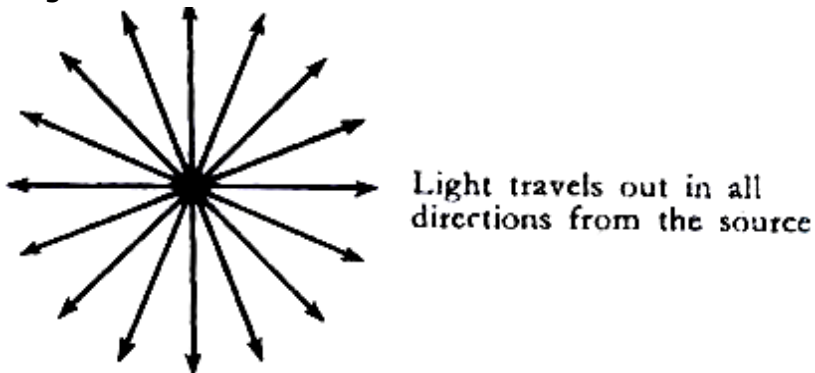
- Property
- Beam
- Ray

Light energy has several properties namely:

1. Light travels in a straight line



2. Light travels from a source in all directions.



RAY.

A ray is a path taken by light.

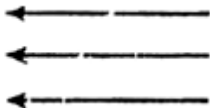


BEAMS OF LIGHT

A beam is a group of light rays traveling in the same direction.

Types of beams.

i. Parallel beams



ii. Divergent beam

iii. Convergent beam



Activity

A demonstration on light travelling in a straight line

LESSON FOUR:

EFFECTS OF DIFFERENT MATERIALS ON LIGHT

Vocabulary

- Transparent
- Opaque
- Translucent
- Frosted

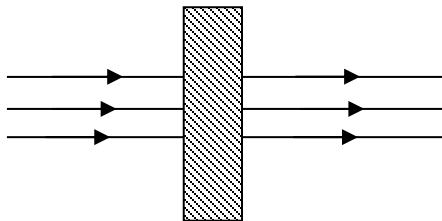
1. Transparent objects

These are materials that allow all light to pass through them

Examples of transparent materials

1. Clear glass
- ii. Clear water.
- iii. Air.

Diagram showing effect of light in transparent materials



2. Translucent materials.

These are objects which allow little light to pass through them.

We can't see through translucent objects because they scatter light passing through them.

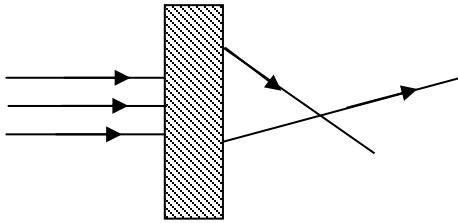
Examples of translucent materials.

- I. Frosted glass
- ii. Coloured glass.
- iv. Oiled paper.
- v. Smoky air.
- vi. Thin cloth.
- vii. Tracing paper etc.

Effects of translucent objects on light.

They allow little light to pass through them.
They diffuse the light

Translucent object



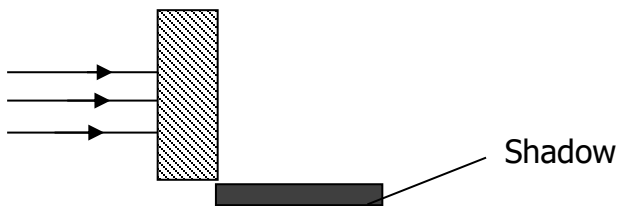
3. **Opaque objects.**

An opaque object is that which does not allow any light ray to go through it.

Examples of opaque objects

1. A wall.
2. A hard paper.
3. Wood.
4. Stones.
5. Metals
6. Human Body etc.

Opaque object



Effects of opaque objects on light.

They obstruct light and form shadows.

LESSON FIVE& SIX:

SHADOWS

Vocabulary

- Shadow
- Umbra
- Penumbra

A shadow is a region of darkness caused by obstruction of light.

Formation of a shadow

a) **Shadows formed from a point of source of light**

A total shadow is formed.

b) **A shadow formed from a source of light bigger than a point**

- Each point on the source produces its own shadow
- All these shadows overlap to give a single shadow.
- This single shadow has a darker inner portion and less dark outer portion

Diagram showing formation of a shadow

Parts of a shadow

- i. **Umbra**- It is the darker part of a shadow.
It is formed by total obstruction of light
- ii. **Penumbra**- It is the lighter part of a shadow.
Penumbra is formed by partial obstruction of light.

ECLIPSE

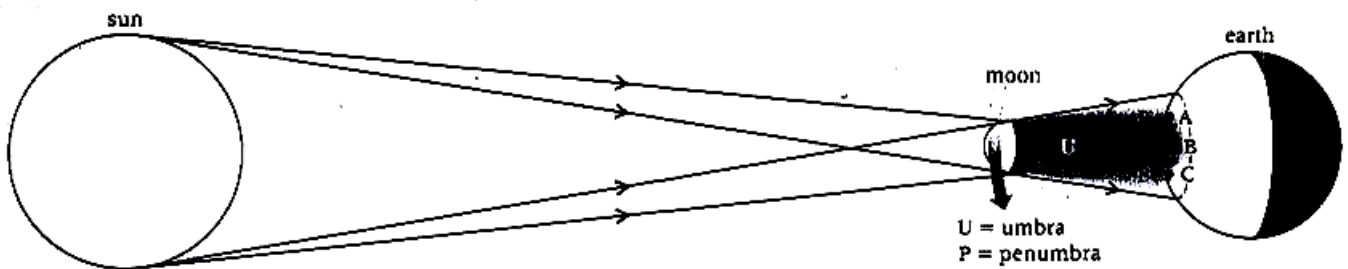
It is a total or partial blocking of sunlight when the earth or moon is between the other bodies. The sun, the moon and the earth are the bodies commonly involved in the eclipse.

Types of eclipse

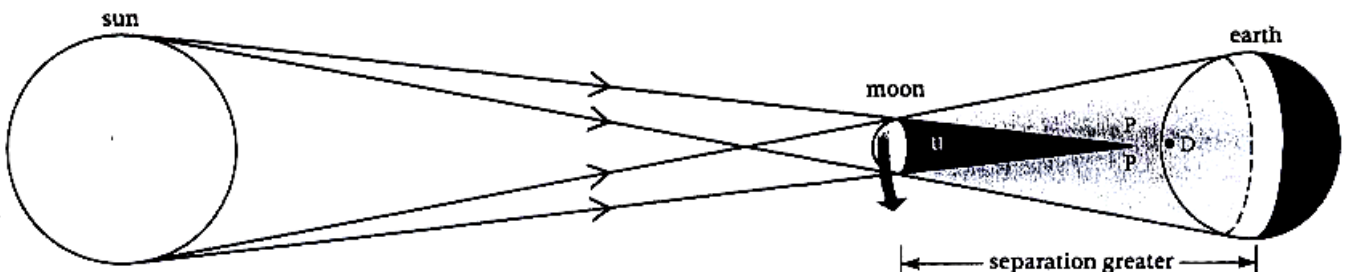
1. Solar eclipse.

This is the eclipse of the sun.

It occurs when the moon comes between the sun and the earth (SME)



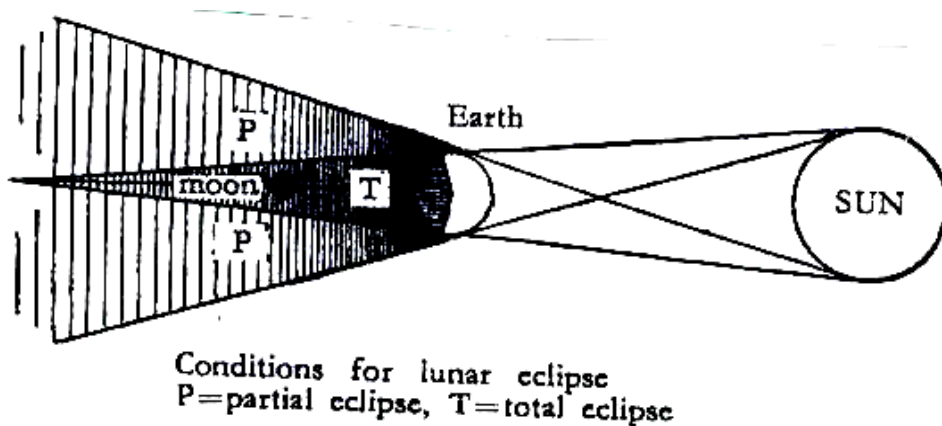
b) **Annular eclipse of the sun**



1. Lunar eclipse.

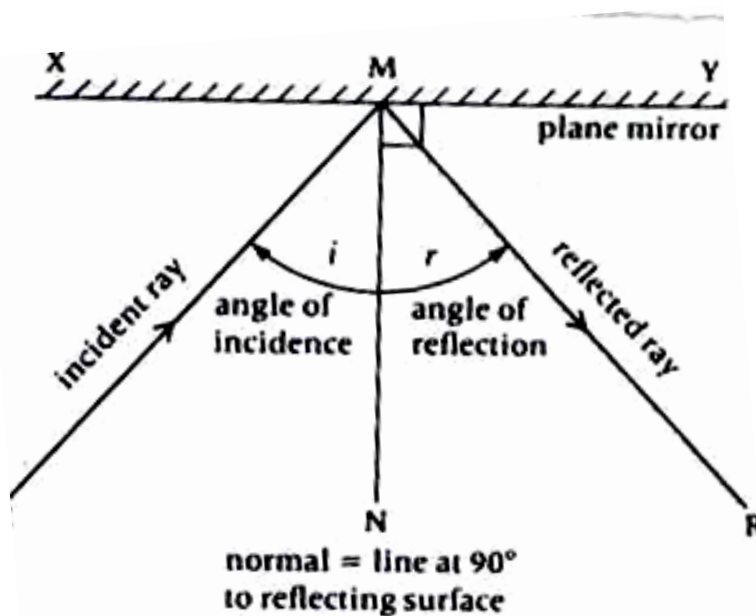
This is the eclipse of the moon

It occurs when the earth comes between the moon and the sun (MES/SEM).



LESSON SEVEN& EIGHT: REFLECTION

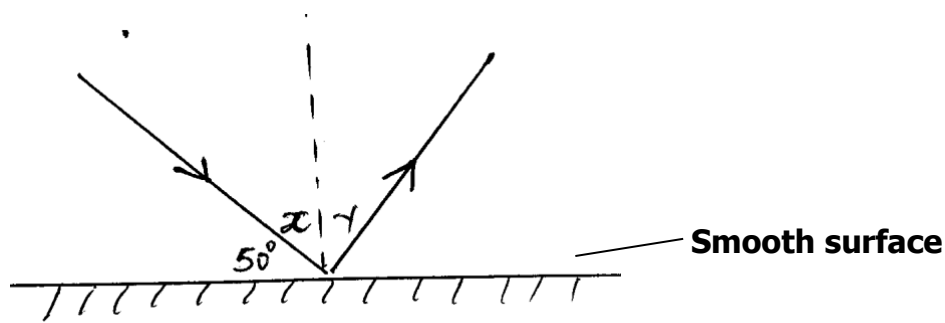
Reflection is the bouncing of light.



- The ray that hits the surface is the **incident ray**.
- The ray that bounces off the surface is the **reflected ray**.
- **The normal** is perpendicular between the incident ray and reflected ray.
- The angle between the normal and the incident ray is **angle of incidence**.
- The angle between the normal and the reflected ray is **angle of reflection**.

Calculations about reflection of light

Example



From the diagram

i. Calculate the angle marked x and y

$$x + 50^\circ = 90^\circ$$

$$x + 50^\circ - 50^\circ = 90^\circ - 50^\circ$$

$$x = 40^\circ$$

$$\text{Angle } y = 40^\circ (\text{angle } i = \text{angle } r)$$

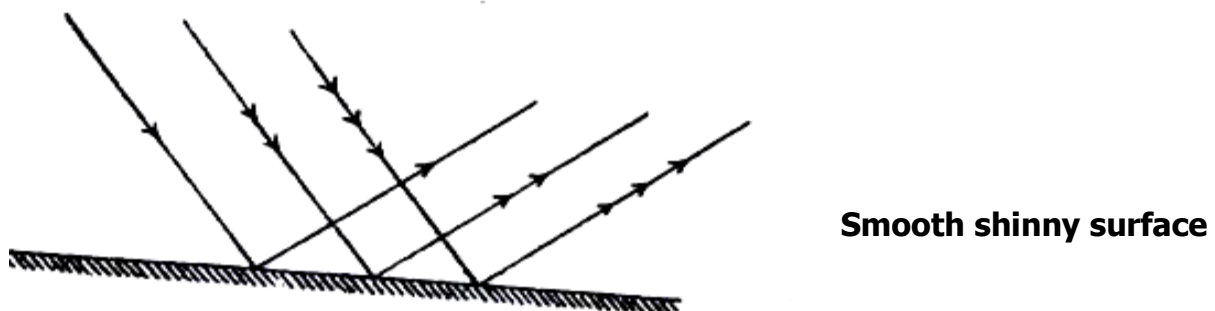
Types of reflection

There are two types of reflection namely:

1. Regular reflection.
2. Irregular reflection/Diffuse reflection.

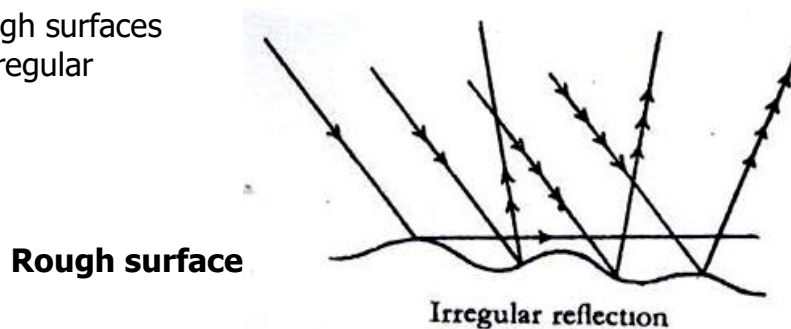
Regular reflection

It occurs on shiny smooth surfaces.
The reflections are regular.



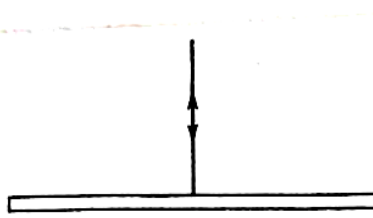
Irregular/diffuse reflection.

It occurs in shiny rough surfaces
The reflections are irregular



Normal reflection

When a ray strikes a mirror at right angle, it is reflected through the same path.



The laws of reflection

- 1.The incident ray, the reflected ray and the normal at the point of incidence all lie on the same plane.
- 2.The angle of incidence is equal to the angle of reflection.

The ray travelling along the normal is reflected back along itself.

LESSON NINE: REFLECTION AND LIGHT

- Light coloured objects reflect more light than the dull ones.
- White light contains all the three primary colours of light.
- A white object absorbs no colour but reflects all.
- A black object absorbs all the primary colors and reflects none.
- An object which absorbs all the primary colors appears black.
- Black light means absence of any color.

When light falls on an object, the following can happen:

- a) It is reflected either regularly or irregularly.
- b) It can pass through a body totally or partially.
- c) It is either refracted or diffused.
- d) It can be absorbed either partially or completely**

The table shows why certain colours appear the way they do:

colour	Absorbs	Reflects	Appears as
Red object	Green, Blue	Red	Red
Blue object	Red, green	Blue	Blue
Green object	Red, blue	Green	Green
Black object	Red, Blue, Green(all)	None	Black.
White object	None	Red, Blue, Green(all)	White

Uses of reflection in our daily life

1. People can watch a football match over the heads of the crowd using a periscope.
2. Soldiers can see enemies without exposing themselves using periscopes.
3. Submariners can see ships on the surface of the sea using periscopes.
4. Mirrors are used on vehicles to see traffic behind and avoid causing accidents.
5. Torches, car headlamps have concave reflectors.
6. Solar cookers use a concave mirror to focus sunlight on spot and use it for cooking.
7. Some shaving mirrors are concave and they magnify the image.