CHAPTER – LIGHT

Light

Light is a form of energy that helps us see objects. We can see things only when light falls on them and reflects into our eyes.

CHARACTERISITICS OF LIGHT

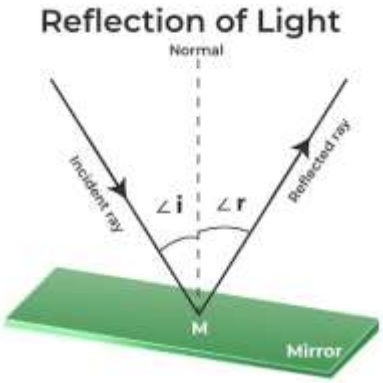
1. Light is an electromagnetic wave
2. Light travels in a straight line
3. Light can travel through vacuum
4. Light changes speed in different media

Laws of reflection of light

The laws of reflection are rules that describe how light behaves when it strikes a reflection surface such as mirror

There are 2 laws of reflection

1. First law of reflection
   The angle of incidence is always equal to the angle of reflection
   Examples: Seeing your face in a mirror
   When you stand infront of a mirror , light from your face strikes the mirror and reflect back into your eyes at equal angle, that is why your image appears clear and in correct position

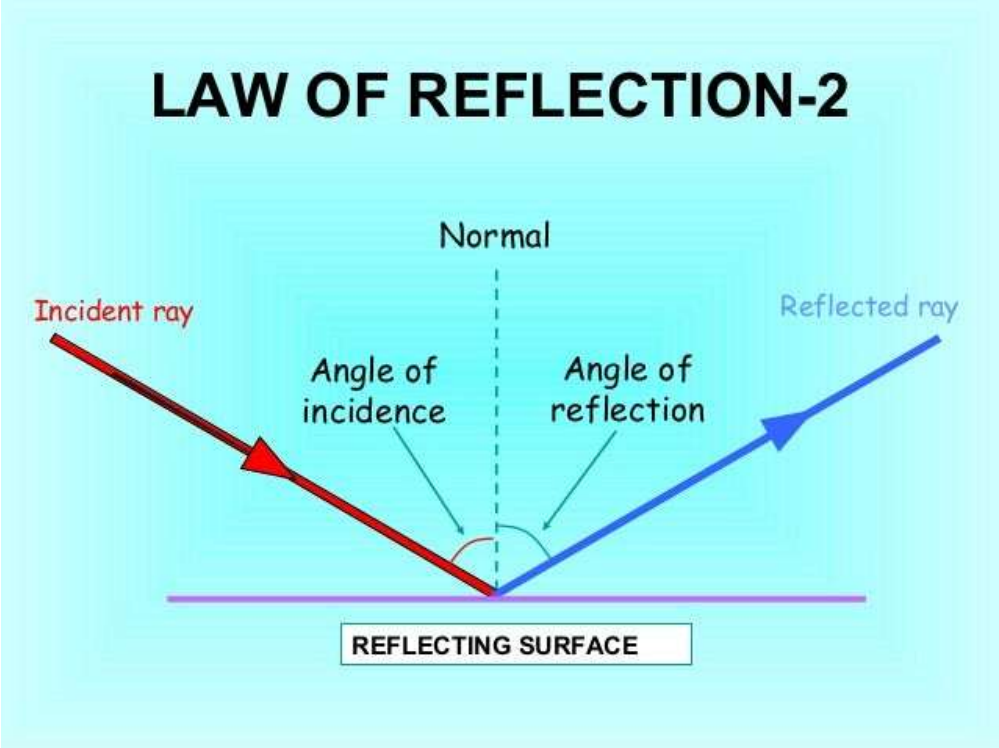


2. Second law of reflection

   The incident ray, the reflection ray , the normal at the point of incidence , and the reflecting surface all lie on the same surface

   Example : Laser point on a wall

   When a laser beam hits a wall , the incoming ray, reflected ray, and normal all stay on the same flat surface. You can trace the path of the light clearly



IMPORTANT TERMS

Incident Ray

The ray of the light that falls on a surface.

Reflected Rays

The ray of light that bounces back after hitting the surface

Normal

An imaginary line drawn perpendicular (90 degree)
to the surface at the point where light hits.

Angle of reflection

The angle between the reflected ray and the normal

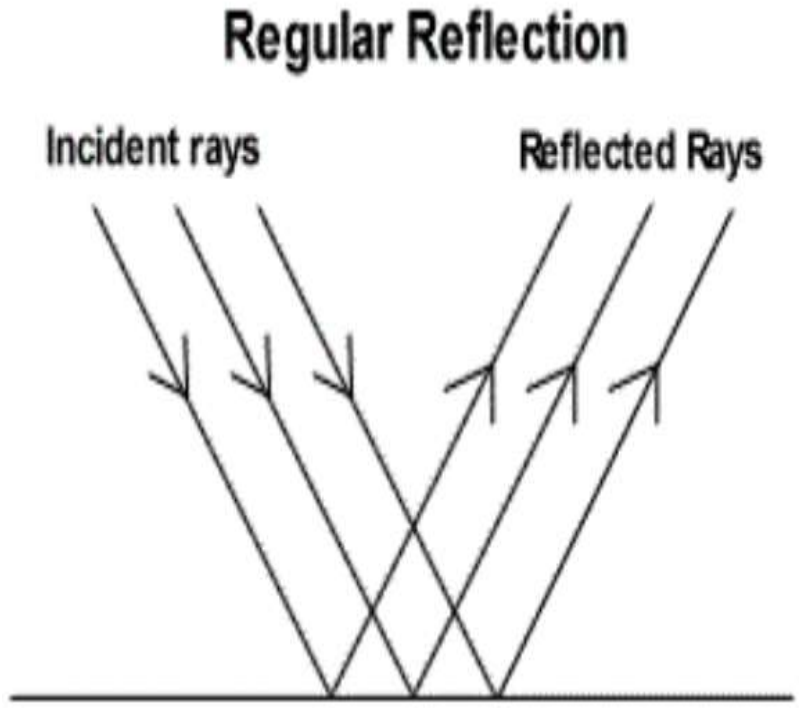
Angle of incidence

The angle between the incident ray and the normal

Types of reflection

1.Regular reflection (Specular reflection)

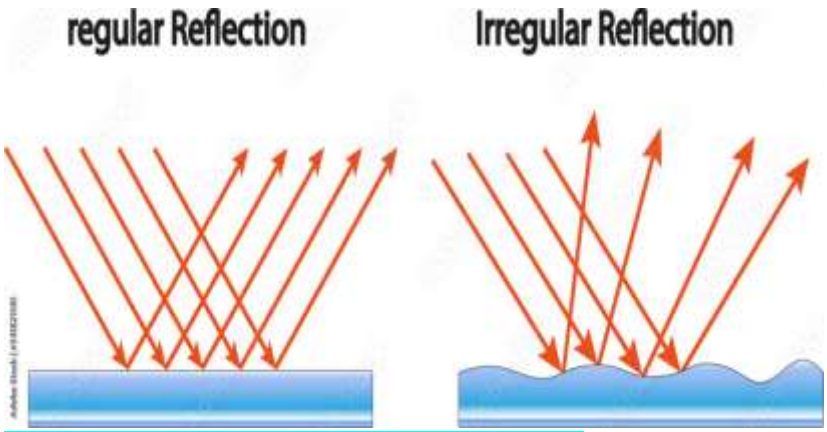
- Occurs on smooth and polished surfaces like plane mirror
- Reflected rays remain parallel
- Produces a clear, sharp image



2.Irregular reflection (Diffused reflection)

- Occurs on rough surfaces like walls
- Reflected rays scatter in different directions
- No clear image is formed

  Even in diffused reflection, each ray obeys the law of reflection



Images formed by a plane mirror

When light reflects from a plane mirror , an image is formed , This image has a special properties as mentioned below:

- Image is virtual and upright
  Virtual means cannot be caught on a screen
  Upright means Image is straight , not upside down
  Example: Your image in a bathroom mirror

- Lateral Inversion
  Left side become right and right side becomes left
  Example: “AMBULANCE” is written in reverse on vehicles so it reads correctly in a rear – view mirror.

- Image is same size as the object
  Image height = Object height
  Example : You do not look taller or shorter in a plane mirror

- Distance Rule (Distance is equal)
  Distance of object from mirror.

- Image is laterally inverted but not vertically inverted

Head is at top ,and feet is at bottom and left and right are not exchanged.

PERISCOPE

A periscope is an optical instrument that helps us see objects that re not in the direct line of sight , usimg reflection of light

IT WORKS ON THE PRINCIPLE OF MULTIPLE REFLECTION

How does a periscope work?

- Light from the object falls on mirror 1
- Mirror 1 reflects the light downwards
- Light strikes Mirror 2
- Mirror 2 reflects light into the observer's eye
- Thus , the object is seen clearly

Example : Submarine

Soldiers inside the submarine use a periscope , they can see ships above the water while staying underwater

What is dispersion of light

Dispersion of light is the splitting of white light into seven different colours when it passes through a prism

These 7 colours together form the spectrum.

COLOURS OF SPECTRUM – VIBGYOR

How does dispersion happen in a prism

- While light enters the prism

- Different colours travel at different speeds inside the prism
- Because of this, each colour bends by a different amount
- As a result , white light splits into 7 colours
- Violet bends the most and Red bends the least

Example: Rainbow

Why different colours bend differently?

Each colour has a different wavelength , so each colour travels at different speed in the glass

THE HUMAN EYE

The human eye is one of our five sense of organ. It helps us see things around us.

How we see objects

- Light from an object enters our eyes
- The eye focuses this light
- An image is formed inside the eye
- The brain understands this image and we can see the object

MAIN PARTS OF HUMAN EYE

- Cornea
- Iris
- Pupil
- Eye lens
- Retina
- Optic nerve
- Blind spot

ACCOMODATION OF THE EYE

The eye can see near and far objects clearly, this is because the eye lens changes its shape this ability is called as accommodation.
Example:
When you move from bright sunlight into a dark room , your eyes take some time to adjust. This happens because the pupil size changes to control the light.

Defects of the eye

Sometimes our eyes do not focus the light properly on the retina. This causes defects of the vision. The main defects shown are as follows :

- Myopia (Short-sightedness)
  Person can see near objects clearly, distant objects look blurry and image is formed infront of the retina.. It can be corrected by using the concave lens
  Example Wearing spectacles to see far objects clearly
  Example:
  You can read a book clearly but you cannot read the blackboard from the last bench

- Hypermetropia (Long – Sightedness)
  Person can see distant objects clearly , near objects look blurry, image is formed behind the retina. It can be corrected by using convex lens
  Example: Reading glasses
  Example: You can see the blackboard clearly, but reading a book or mobile is difficult

TAKING CARE OF OUR EYES

Our eyes is very sensitive , so we must protect them by following the tips which is mentioned below

- Wash eyes with clean water regularly
- Do not read or work in dim light
- Do not look directly at the sun or bright flames
- Watch TV from a safe distance
- Reducing the screen time
- Eat vitamin A rich foods like carrots, milk, and green vegetables

MAKE SURE TO WORKOUT THE PROBLEMS ON FIRST LAW OF REFLECTION WHICH IS GIVEN IN YOUR TEXTBOOK

ALL THE BEST DO WELL