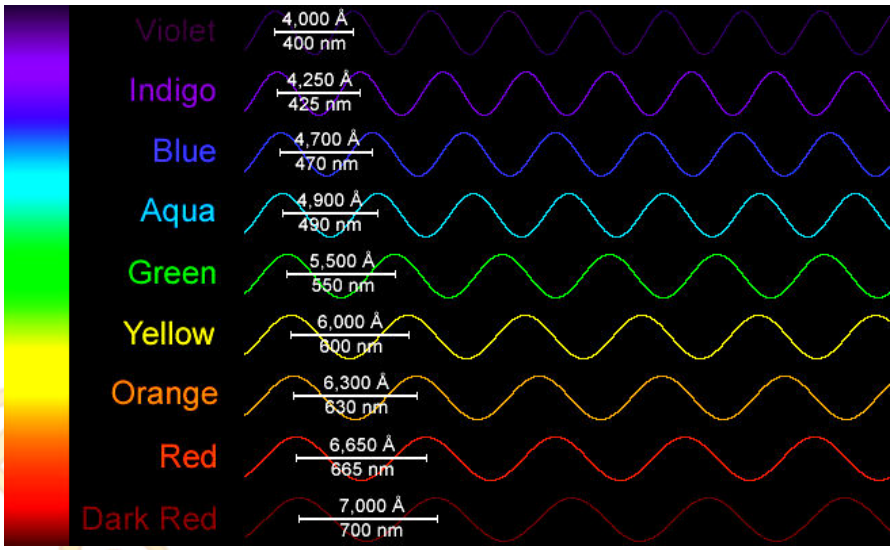
B5. Light Waves

Light Waves

Have you ever wondered how you are able to see the world around you? The answer lies in light waves! Light waves are a type of electromagnetic radiation that travels through space and carries energy. They are the reason we can see colors, and they play a vital role in our daily lives.



What Are Light Waves?

Light waves are a form of energy that travels in the form of electromagnetic radiation. They are called "waves" because they move in a pattern similar to waves in the ocean. These waves travel at an incredible speed of 186,282 miles per second, which is why light seems to reach us instantly!

The Speed of Light

As mentioned earlier, light travels at an incredible speed. In fact, it is the fastest thing in the universe! Its speed is so fast that it can go around the Earth about seven and a half times in just one second.

The Colors of Light

One of the fascinating things about light waves is that they come in different colors. When light passes through a prism, which is a special type of glass, it breaks into a spectrum of colors. This spectrum is commonly known as a rainbow. The colors in a rainbow are red, orange, yellow, green, blue, indigo, and violet.

Visible Light

The colors we can see with our eyes are called visible light. These are the colors of the rainbow. However, there are also other types of light waves that our eyes cannot see, such as infrared and ultraviolet rays.

Reflection and Refraction

When light waves encounter different surfaces, they can do two things: reflect and refract. Reflection occurs when light waves bounce back from a surface, like when you see your reflection in a mirror. Refraction happens when light waves bend as they pass through a substance, like water or glass.

The Speed of Light in Different Materials

Did you know that light waves travel at different speeds in different materials? For example, light waves travel slower in water than they do in air. This is why a straw in a glass of water appears bent.

Translucent, Transparent, and Opaque

Objects can be classified as translucent, transparent, or opaque based on how they interact with light waves. Translucent objects allow some light to pass through but scatter it, making objects on the other side appear blurry. Transparent objects allow light to pass through clearly. Opaque objects do not allow light to pass through at all.

Absorption of Light

When light waves strike an object, they can be absorbed, transmitted, or reflected. When light is absorbed, it means the object takes in the light waves and converts them into heat. This is why dark-colored objects can feel warmer in the sun.

1. Light waves are a type of what?
    A) Mechanical waves
    B) Electromagnetic radiation
    C) Sound waves
    D) Ocean waves

2. How fast do light waves travel in a vacuum?
    A) 100 miles per second
    B) 186,282 miles per second
    C) 300,000 miles per second
    D) 500,000 miles per second

3. What happens when light waves pass through a prism?
    A) They disappear
    B) They break into a spectrum of colors
    C) They slow down
    D) They become invisible

4. What are the colors of visible light in a rainbow?
    A) Red, yellow, blue
    B) Orange, green, violet
    C) Red, orange, yellow, green, blue, indigo, violet
    D) Blue, purple, pink

5. What do we call the colors we can see with our eyes?
    A) Invisible colors
    B) Transparent colors
    C) Visible light
    D) Translucent colors

6. What happens when light waves reflect off a surface?
    A) They disappear

B) They continue in a straight line
C) They scatter in all directions
D) They slow down

7. What is the term used for the bending of light waves as they pass through a substance?
   A) Reflection
   B) Absorption
   C) Refraction
   D) Transmission

8. How do objects appear on the other side of translucent materials?
   A) Clear and sharp
   B) Blurry
   C) Invisible
   D) Reflected

9. What happens when light waves are absorbed by an object?
   A) The object becomes invisible
   B) The object converts light into sound
   C) The object converts light into heat
   D) The object reflects light

10. What type of objects do not allow light to pass through at all?
    A) Translucent objects
    B) Transparent objects
    C) Opaque objects
    D) Reflective objects

ANSWERS & EXPLANATIONS

1. B - Electromagnetic radiation.
    - Light waves are a type of electromagnetic radiation that travels through space.

2. B - 186,282 miles per second.
    - Light waves travel at an incredible speed of 186,282 miles per second in a vacuum.

3. B - They break into a spectrum of colors.
    - When light waves pass through a prism, they break into a spectrum of colors, creating a rainbow.

4. C - Red, orange, yellow, green, blue, indigo, violet.
    - The colors of visible light in a rainbow are red, orange, yellow, green, blue, indigo, and violet.

5. C - Visible light.
    - The colors we can see with our eyes are called visible light.

6. C - They scatter in all directions.
    - When light waves reflect off a surface, they scatter in all directions.

7. C - Refraction.
    - Refraction is the term used for the bending of light waves as they pass through a substance.

8. B - Blurry.
    - Translucent objects allow some light to pass through but scatter it, making objects on the other side appear blurry.

9. C - The object converts light into heat.
    - When light waves are absorbed by an object, the object takes in the light and converts it into heat.

10. C - Opaque objects.
    - Opaque objects do not allow light to pass through at all.