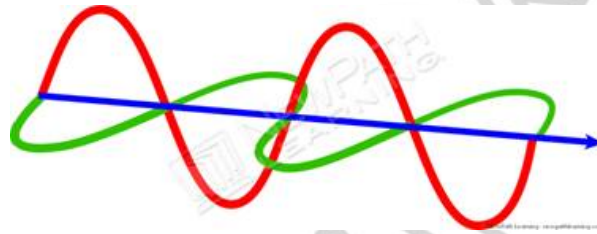


# LIGHT

## Overview

An **electromagnetic wave** is made up of vibrating electrical and magnetic fields that travel as quickly as light. Unlike many other types of waves, electromagnetic waves do not require a **medium** to pass through.



## Models of Light Wave Action

The diagram above is one of two models of electromagnetic waves. This one is called the **wave model**. Notice in this model how the two fields are vibrating perpendicular to each other. The wave model does simple waves travel

Another model suggests that light moves around in a stream of particles called photons.



**PREVIEW**

Please login or register to download the printable version of this study guide.

[www.newpathlearning.com](http://www.newpathlearning.com)

model  
etic  
model  
ons to  
travels a

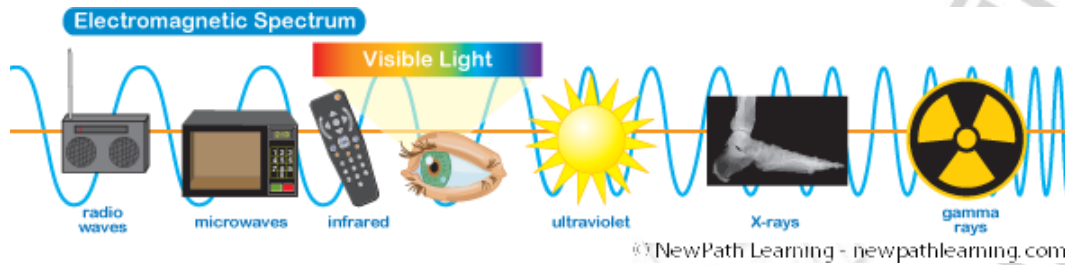
## LESSON CHECKPOINT:

*Explain the two models for electromagnetic waves.*

## Wave Speed

The speed of an electromagnetic wave is calculated by multiplying the wavelength by the frequency. In a vacuum, all electromagnetic waves travel at the same speed even though they have different wavelengths. The variations in wavelength are compensated by variations in frequency leaving the speed the same.

The diagram below shows the **electromagnetic spectrum** or complete range of all electromagnetic wavelengths.



The diagram above shows the various types of electromagnetic radiation and the differences in their wavelengths and frequencies. Notice that the radio waves on the left have larger wavelengths and lower frequencies while the gamma rays on the far right, have shorter wavelengths and greater frequencies.

### LESSON CHECKPOINT:

*What types of waves are in the electromagnetic spectrum?*



Please login or register to download the printable version of this study guide.

[www.newpathlearning.com](http://www.newpathlearning.com)

**Visible Light**  
Visible light spectrum  
When passing into the medium below shown

refracts  
diagram



*LESSON CHECKPOINT: How do these differences in wavelengths result in seeing different colors?*

When light hits an object, it either goes through easily, partially, or not at all. An object that lets *most* of the light through is said to be **transparent**. An example would be a window. Objects that allow only *some* light to get through are called **translucent**. An example of this is frosted glass. An **opaque** object prevents *all* light from getting through it and an example would be a solid brick wall.

**LESSON CHECKPOINT: What is the difference between transparent, translucent, and opaque objects?**

## Colors

The colors we see depend upon which wavelengths of visible light get reflected back to our eyes. For example, when ordinary light is shone on a green object, the green pigment of the object absorbs all the wavelengths except green and reflects only this wavelength back to our eyes.

wavelength  
none of the  
clothing in  
contribute



**PREVIEW**

Please login or register to download the printable version of this study guide.

[www.newpathlearning.com](http://www.newpathlearning.com)



**LESSON CHECKPOINT: Explain how the makeup of light causes us to see different colors.**