

# 6th Grade Science Key Concepts

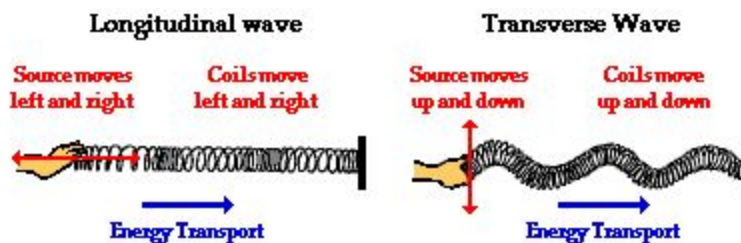
## Waves & Energy (6.P.1)

### 6.P.1.1 Waves can be seen in the light, sound and the action of earthquakes.

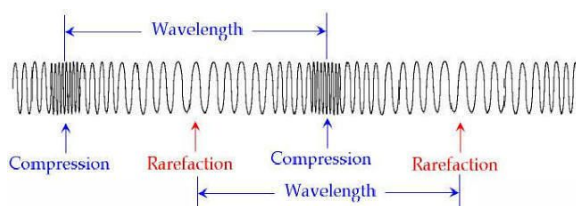
- **Waves**- transmit energy not matter, nearly all travel through matter, created when a source (force) creates a **vibration**. Waves are moving energy.
- **Vibrations** set up wavelike disturbances that spread away from the source.
- Wave behavior is determined by how fast the disturbance spreads (**frequency**) and the **wavelength**.
- **Wavelength** is the distance between two successive crests (top of the wave).

Type of Waves (by ability to transmit energy through a vacuum)	Examples	Wave Description
<b>Mechanical wave</b>	Water waves Sound waves Vibrating object Seismic wave	Requires a material ( <b>medium</b> ) for the wave to pass through
<b>Electromagnetic wave</b>	Light wave Heat wave Radio wave X-ray wave	Can move through space or vacuum

Waves can also be categorized as **longitudinal** or **transverse** based on the direction of the movement of the particles of the medium move in relation to the direction of that the wave travels.

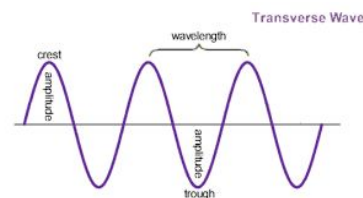


In **longitudinal** waves, the particles move parallel to the the direction the wave travels. A sound wave traveling through air is a longitudinal wave.



- In a longitudinal wave, a region where the particles are closest together is called a **compression**
- In a longitudinal wave, a region where particles are farthest together is called a **rarefaction**.

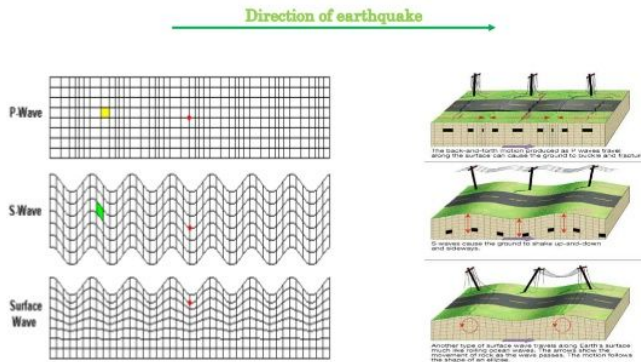
In **transverse** waves, the particles of the medium move perpendicular to the direction the wave travels. Light waves are transverse waves.



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### 3 types of seismic waves



**Seismic waves** are waves of energy that travel through the Earth's layers. They are caused by earthquakes, movement of magma, large landslides, & volcanic eruptions.

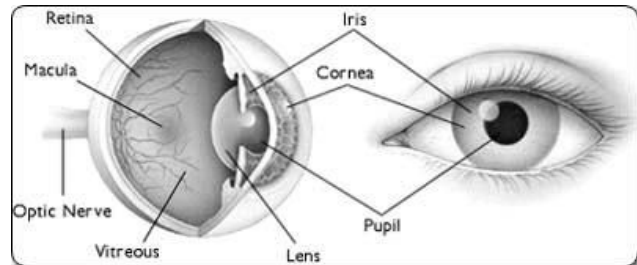
- **P-Waves** (Primary waves) are longitudinal body waves. They can travel through any type of material, including fluids. They travel faster than S-waves.
- **S-Waves** (Secondary waves) are transverse body waves. They can only travel through solids. They are slower

than P-waves.

- **Surface Waves** occur along the boundary between two different substances (e.g. rock and air). They can be either longitudinal or transverse. These waves travel slower than both S and P waves, but have a higher amplitude and so can be the most destructive of all the seismic waves.

### 6.P.1.2 Electromagnetic Spectrum

- Light travels in **transverse waves** and can travel through space (vacuum)
- Light can be absorbed or reflected by objects depending on the properties of the object and angle of light when it hits the object
- Some materials **reflect** light, some absorb light and others can scatter light.
- When light passes through a medium, the speed of the light wave can change. This is called **refraction**.
- The Human Eye can detect many colors in the visible spectrum that are reflected by objects. Different wavelengths of visible light are perceived as different colors.



### 6.P.1.3 Sound

- Sound can be perceived when sound waves enter the ear.
- **Pitch and loudness** are determined by the **frequency and amplitude** of the sound waves
- Sound can travel through solids, gases and liquids but not through a vacuum.
- **Pitch** is how high or low a sound is

