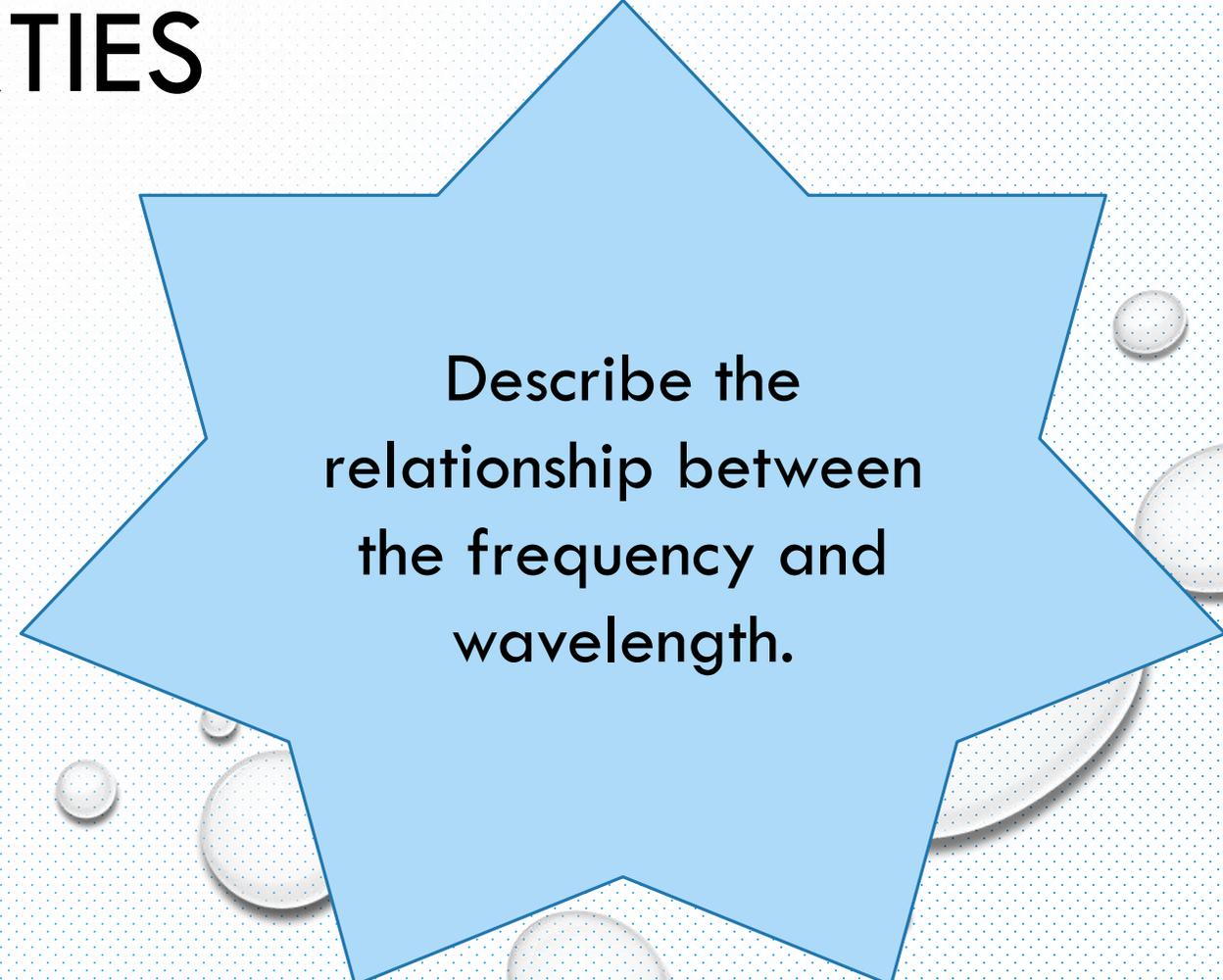
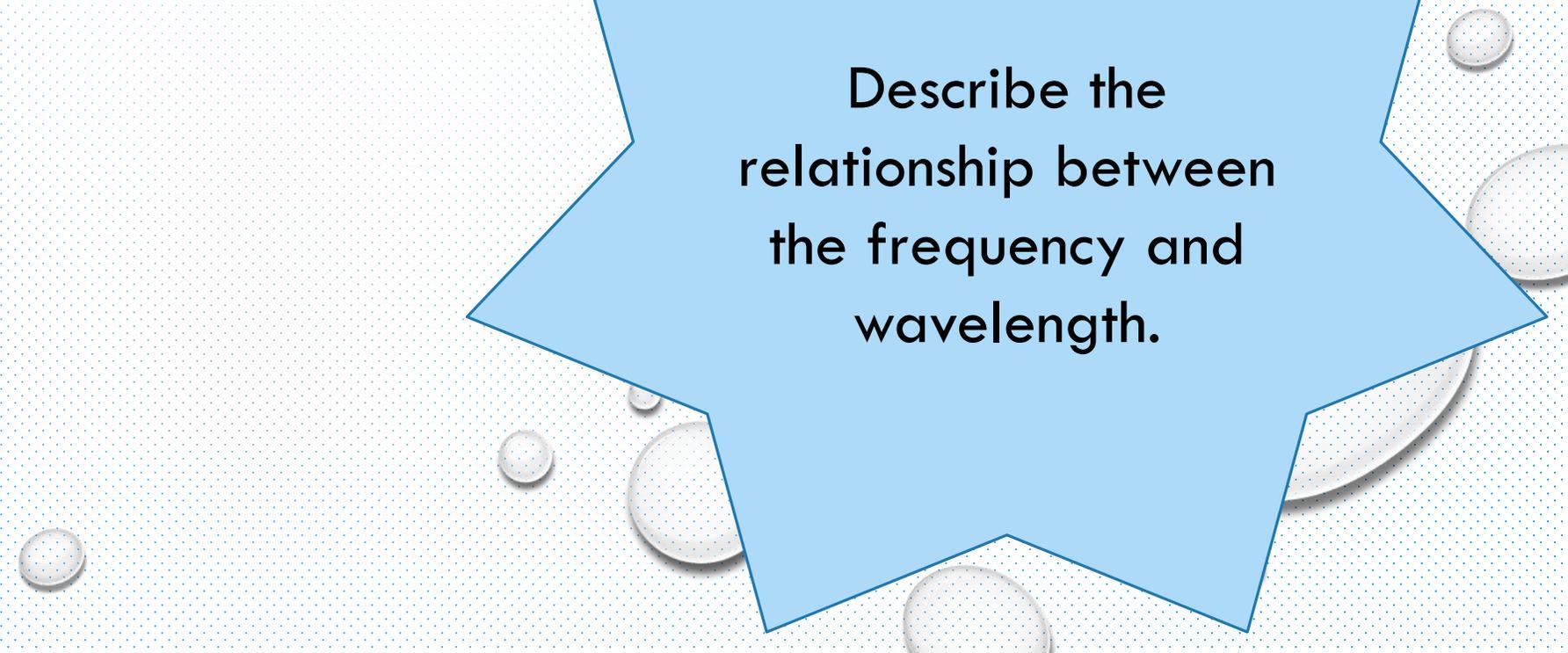


LESSON 2-WAVES

WAVE PROPERTIES



Describe the relationship between the frequency and wavelength.





SCIENCE STARTER

1. COMPARE AND CONTRAST A TRANSVERSE WAVE AND A COMPRESSIONAL WAVE.
 2. HOW ARE THEY SIMILAR AND HOW ARE THEY DIFFERENT?
- 

REVIEW FROM LAST WEEK...

HOW ARE WAVES, ENERGY AND MATTER RELATED?

WAVES, ENERGY AND MATTER ARE RELATED BECAUSE ALL WAVES CARRY ENERGY AND SOME TRANSFER ENERGY THROUGH MATTER.

- **WHAT IS A WAVE?**

- RHYTHMIC DISTURBANCES THAT CARRY ENERGY WITHOUT CARRYING MATTER ARE CALLED **WAVES**.

- **WHAT IS ENERGY?**

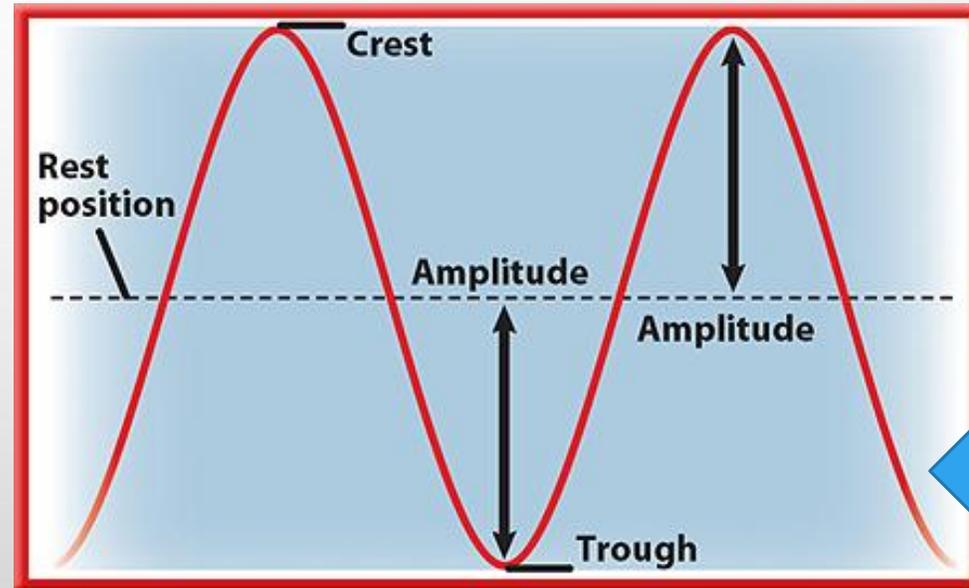
- "**ENERGY** IS DEFINED AS THE ABILITY TO DO WORK." [HTTP://WWW.KIDS.ESDB.BG/EXAMPLE_PRINCIPLES.HTML](http://www.kids.esdb.bg/example_principles.html)

- **WHAT IS MATTER?**

- "**MATTER** IS EVERYTHING AROUND YOU. MATTER IS ANYTHING MADE OF ATOMS AND MOLECULES. MATTER IS ANYTHING THAT HAS MASS AND TAKES UP SPACE."

Amplitude

- Amplitude-how high a wave rises above, or falls below, the normal level.
- Amplitude of a transverse wave is one-half the distance between a crest and a trough.



Draw this!



Amplitude and Energy

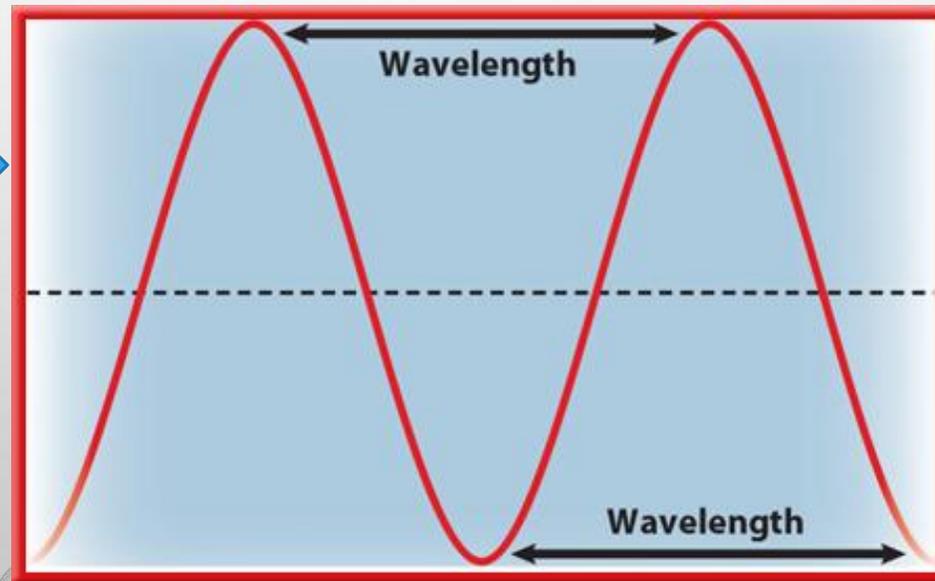
- A wave's amplitude is related to the energy that the wave carries.
- For example, the electromagnetic waves that make up bright light have greater amplitudes than the waves that make up dim light.

Wavelength for a Transverse Wave

- the distance from the top of one crest to the top of the next crest, or from the bottom of one trough to the bottom of the next trough.



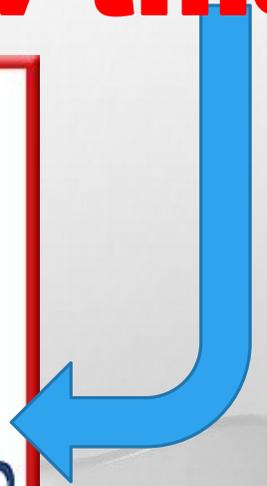
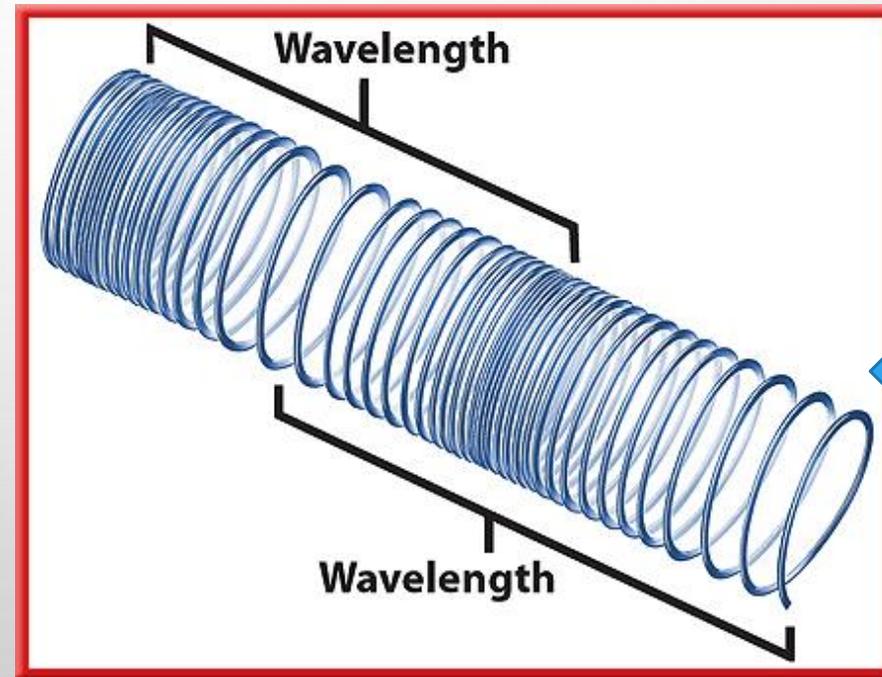
Draw this!



Wavelength for a Compressional Wave

- the wavelength is the distance between the center of one compression and the center of the next compression

Draw this!

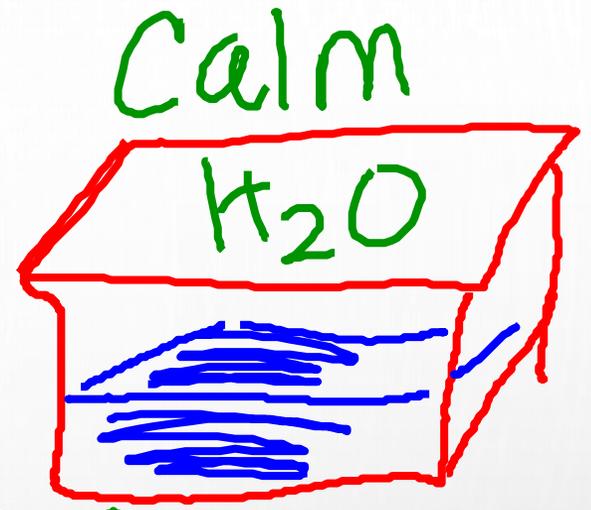


Frequency

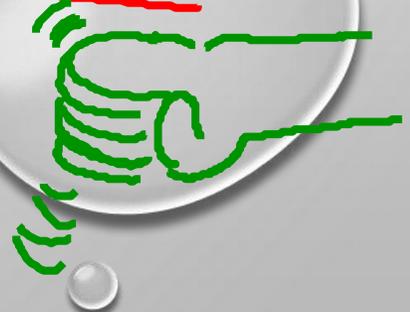
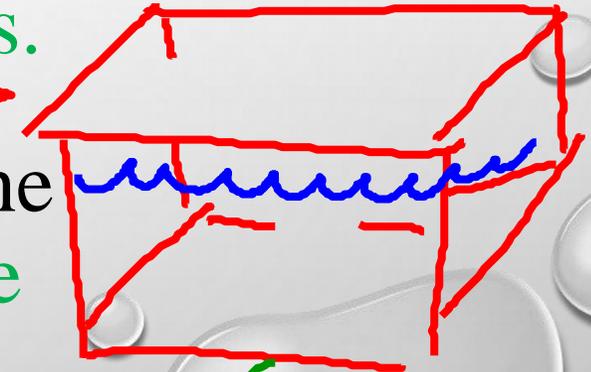
- **Frequency**- the number of wavelengths that pass a given point in 1 s.
- **Unit of frequency is the number of wavelengths per second, or hertz (Hz).**
- The faster the vibration is, the higher the frequency is of the wave that is produced.



Frequency and Wavelength



- Smaller frequencies=longer wavelengths.
- Higher frequencies=shorter wavelengths.
- This is true for all waves that travel at the same speed. As the frequency of a wave increases, its wavelength decreases.



Wave Speed

When mechanical waves, such as sound, and electromagnetic waves, such as light, travel in different materials, they change speed.

F.Y.I!

- Light travels through air at about 300 million m/s.
- Sound travels through air at about 340 m/s.

MECHANICAL WAVES

- TEND TO TRAVEL FASTER IN SOLIDS AND SLOWER IN GASES

ELECTROMAGNETIC WAVES

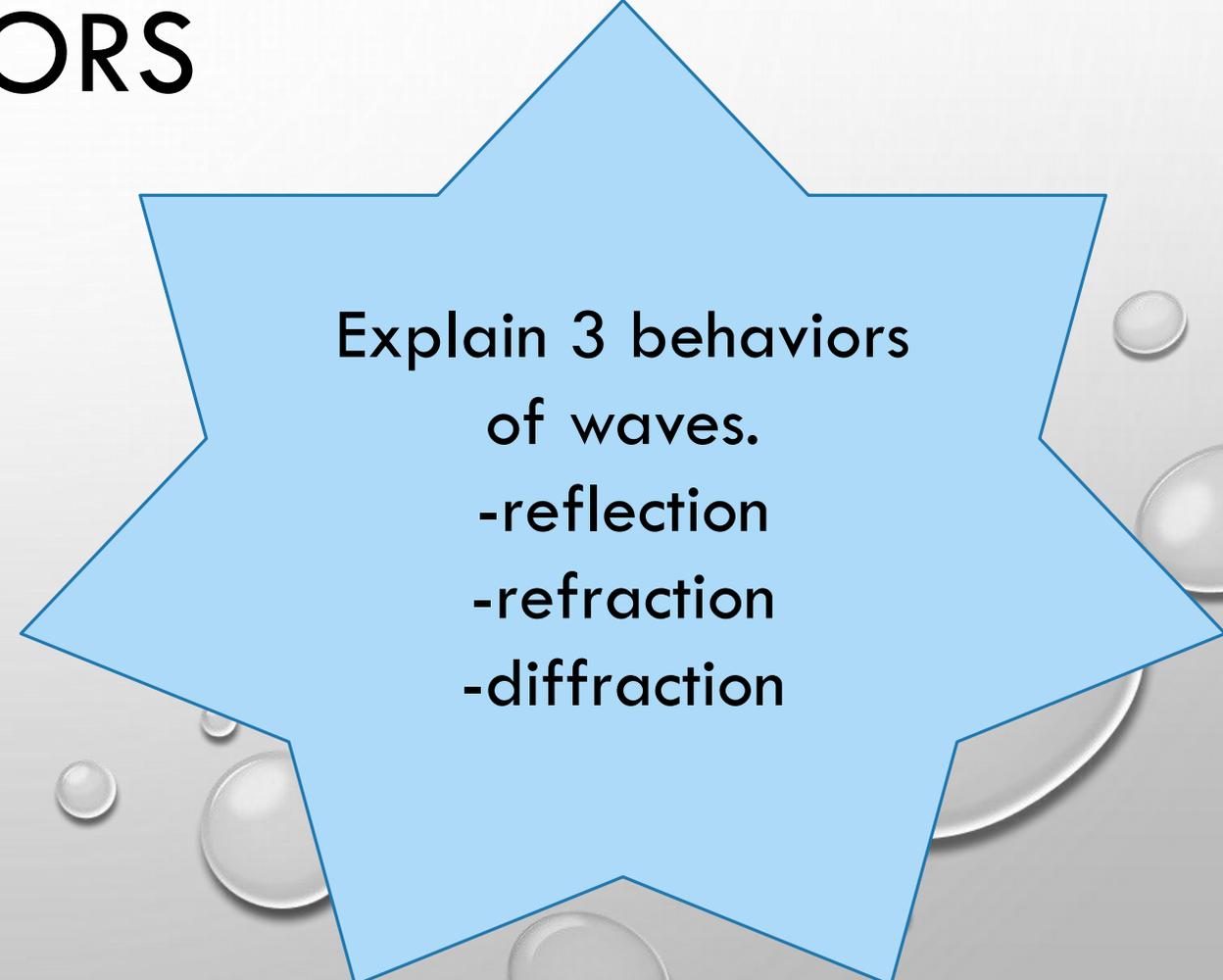
- TEND TO TRAVEL FASTER IN GASES AND SLOWER IN SOLIDS



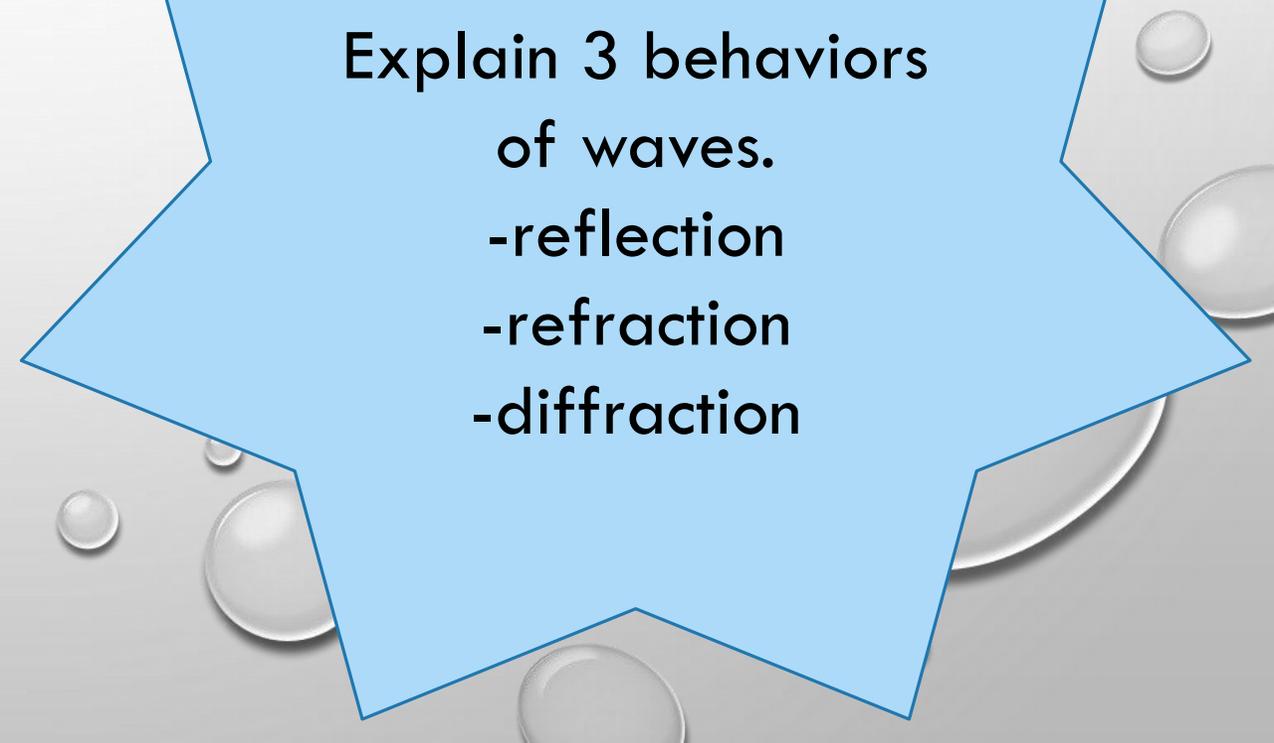


LESSON 2-WAVES

WAVE BEHAVIORS



Explain 3 behaviors
of waves.
-reflection
-refraction
-diffraction





SCIENCE STARTER

1. DESCRIBE THE RELATIONSHIP BETWEEN FREQUENCY AND WAVELENGTH.



Reflection

- **Reflection occurs when a wave strikes an object or surface and bounces off.**
- Sound reflects from all surfaces.
- Your echo bounces off the walls, floor, ceiling, furniture, and people.

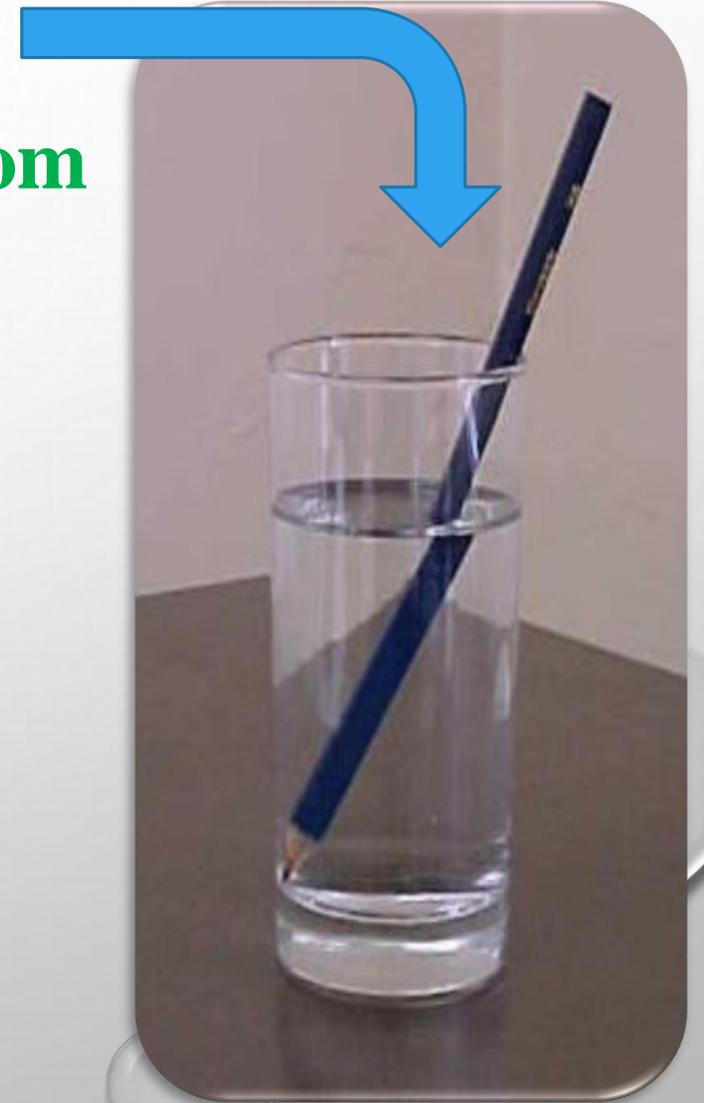


Refraction

- The bending of a wave as it moves from one medium into another is called refraction.

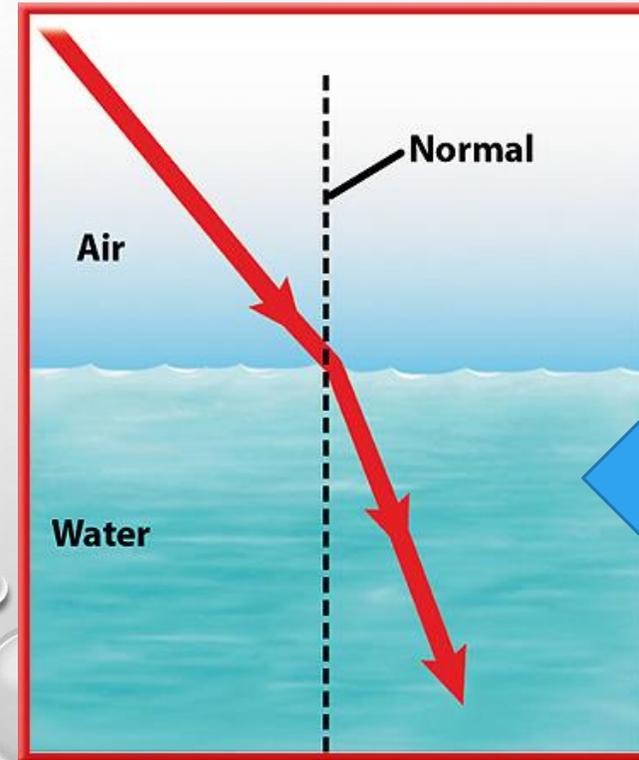


Draw this!



Refraction and Wave Speed

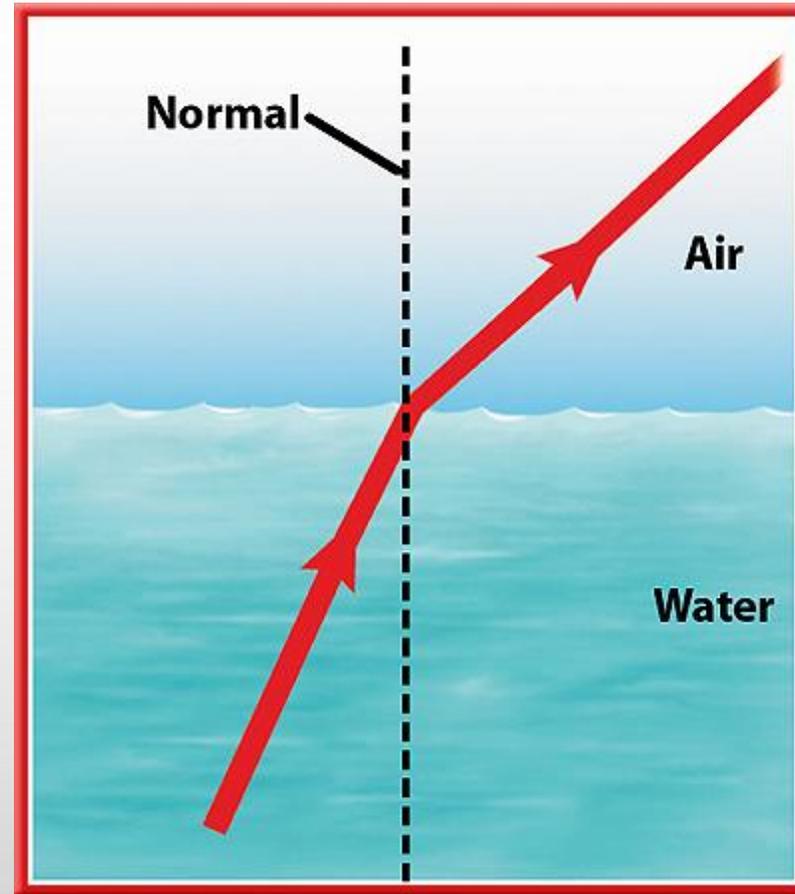
- Happens when the speed of a wave changes as it passes from one substance to another.
- A line that is perpendicular to the water's surface is called the **normal**.
- When a light ray passes from air into water, it slows down and bends toward the normal.



Draw this!

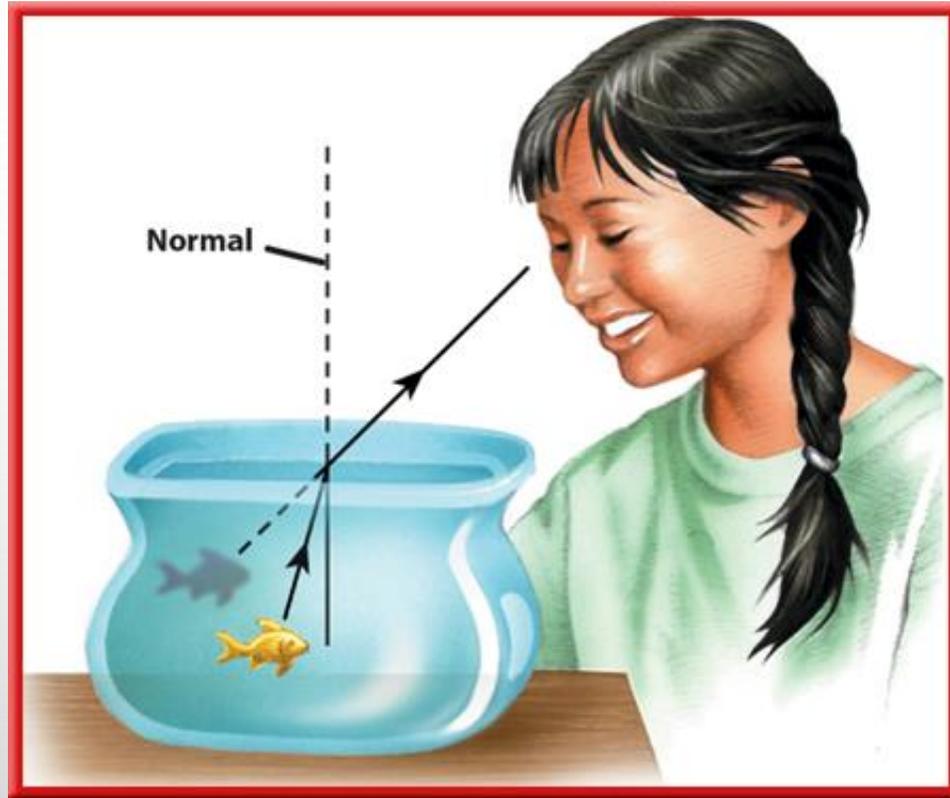
Refraction and Wave Speed

- When the ray passes from water into air, it speeds up and bends away from the normal.



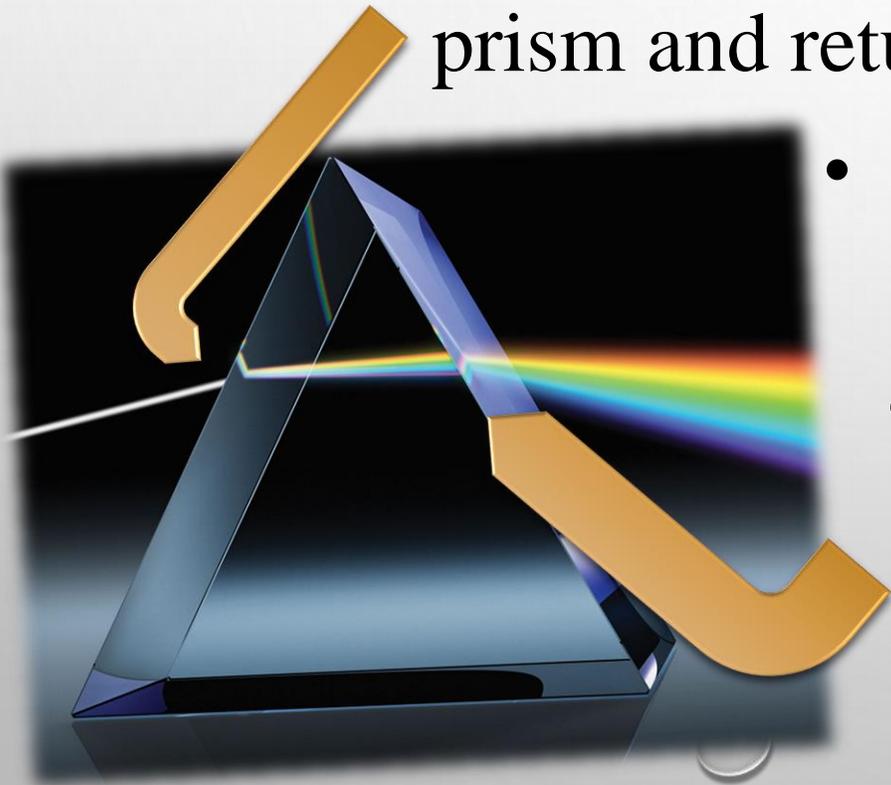
Example of Refraction and Wave Speed

- Refraction makes the fish appear to be closer to the surface and farther away from you than in really is.



Color from Refraction

- When sunlight passes through a prism, refraction occurs twice: once when sunlight enters the prism, and again when it leaves the prism and returns to the air.



- Violet light has the shortest wavelength and is bent the most.
- Red light has the longest wavelength and is bent the least.

Color from Refraction

- Refraction produces a rainbow when light waves from the Sun pass into and out of water droplets.



- Colors in a rainbow are in order of decreasing wavelength:
 - Red (largest wavelength)
 - Orange
 - Yellow
 - Green
 - Blue
 - Indigo
 - Violet (smallest wavelength)



Diffraction

- Why can you hear music from the band room when you are down the hall?
 - Sound waves bend as they pass through an open doorway.
- **Diffraction is the bending of waves around a barrier.**
 - Light waves do bend around the edges of an open door.
 - However, for an opening as wide as a door, the amount the light bends is extremely small.



Wave Interference

- While two waves overlap a new wave is formed by adding the two waves together.
- Interference-two waves combine to form a new wave

