Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pd: \_\_\_\_\_ Ast: \_\_\_\_\_

**WAVE PROPERTIES & INTERACTIONS Notes**

**I. WAVE PROPERTIES**

**1) Identify the two types of waves and draw a diagram of each:**

**2) Define and label:**

* Crest:
* Trough:
* Wavelength:
* Amplitude:
* Origin:



**II. LIGHT INTERACTIONS**

**3) Spear-Fishing Demo**

* Describe what happens if you aim your “spear” directly at the fish.
* Where do you have to aim in order to actually hit the fish with your “spear”?
* Refraction:
* What happens to the light coming from the fish when it leaves the water and begins travelling through air toward your eye? Draw a diagram.

**4) Mirror Demo**

* How do the reflected angles on your sheet compare to the incoming angles?
* Reflection:
* Law of Reflection:
* Draw a diagram:

**5) Diffraction**

* Diffraction:
* Draw a diagram of diffraction:

**6) Polarized Film Demo**

* Describe what you see when you look through one polarized film:
* What did you see as you rotated the second polarized film perpendicular to the first?
* Why does this occur? You may draw a diagram if you wish.

**7) Colors Demo**

* What do you see when one of the colored lights shines at the object?
* What do you see when two of the colored lights shine at the object?
* What do you see when all three colored lights shine at the object?
* Color depends on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the light. Light that contains all of the wavelengths in the visible spectrum is called \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_.

**III. WAVE MOTION**

**8) Frequency**

* Frequency:
* What is the metric unit for frequency? What is another way to think about this unit for waves?
* How do the amplitude and frequency of sound waves affect their sound?

**9) Period**

* Period:
* How is the period of a wave related to its frequency?

**10) Velocity**

* What is another term for “velocity”?
* What are the main metric units for velocity?
* What is the equation to calculate the velocity of a wave? (describe each variable)
* 100 waves pass a single point in 5 seconds. If the wavelength is 0.5 meters, how fast is the wave travelling?

**10) The Speed of Light**

* The speed of light depends on \_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_...however, the speed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as it travels through a substance.
* What is the speed of light in a vacuum? Why is this called the universal speed limit?
* Does the speed of light change if the source of the light is moving? What about if the observer is moving?

**11) The Doppler Effect**

- Even though a wave is moving at a constant speed, the \_\_\_\_\_\_\_\_\_\_ of the source or observer can affect one’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the light or sound.

* Define the Doppler effect:
* What happens to the frequency of a wave in the direction of motion?
* What happens to the frequency of a wave in the opposite direction?
* How does this affect sound and light differently?
* When astronomers observe other stars and galaxies, they almost always see a “redshift” in the light of these objects. What are the implications of this about our understanding of the universe?