

Welcome to AP Physics I. It is hoped that you enjoy the challenges offered by the study of Physics I. We can be reached all summer either through our emails [warren.palmeira@sau19.org](mailto:warren.palmeira@sau19.org), [sean.colligan@sau19.org](mailto:sean.colligan@sau19.org) or via the MOODLE site for AP Physics I.

*You need to sign out a textbook to complete some parts of this assignment. Also please pick up the necessary information for you to log onto the Physics I website through MOODLE. The password to log on is "Physics"*

The AP Physics I course covers a lot of territory. Topics include: vectors, scalars, kinematics in one and two dimensions, dynamics, work, energy, momentum, circular motion, rotational kinematics and rotational dynamics, gravitation, waves, sound and electric forces and simple DC electric circuits. Because of this, and the early test date, Tuesday, May 8, 2018, it is necessary to get a head start on the work, hence this assignment.

**The Assignment is divided in two parts.** *Part I* will deal with the vocabulary found in chapters 16 and 17 of your textbook: Cutnell & Johnson Physics 9<sup>th</sup> edition. *Part II* will involve explaining/creating a video or writing a short research paper.

#### Part I details:

You need to define each of the following terms or principles. You also need to include a sketch of each principle OR refer to a particular sketch or picture from the text as an example. If needed explain why the sketch illustrates the principle or term. For instance if the principle was breaking the sound barrier you might say: This occurs on Earth when traveling at 340 m/s, the speed of sound in air at 20 degrees Celsius. The opening chapter photo on page 467 shows a jet breaking through the sound barrier.

#### Terms/principles:

- |                                     |                                    |
|-------------------------------------|------------------------------------|
| -transverse waves                   | -Principle of linear superposition |
| -longitudinal or compressional wave | -constructive interference         |
| -periodic waves                     | -destructive interference          |
| -amplitude                          | -diffraction                       |
| -wavelength                         | -beats                             |
| -period of a wave                   | -transverse standing waves         |
| -frequency of a wave                | -harmonic frequencies              |
| -equation for the speed of a wave   | -natural frequency                 |
| -speed of a wave on a string        | -longitudinal standing waves       |
| -sound intensity                    | -complex sound wave                |
| -decibels                           |                                    |
| -Doppler Effect                     |                                    |

**Part II details: (Do either option I or II)**

-**Option 1** Find a wave or sound related YouTube video and write a one half to full page paper explaining what is happening and the Physics behind it as best you can. Include the YouTube link as well. You are encouraged to share this the first day of class. Alternately you could create your own You Tube video. It should somehow be related to waves or sound.

-**Option 2:** Write a one to two paper about some aspect of waves. You should include a visual and sources. **There are countless possibilities.** A few possibilities are:

-S and p waves occur during earthquakes, what are they? How does the study of these waves help understand the Earth?

-Discuss the nature of sonic booms and breaking the sound barrier by cars, jets and helicopter blades. Discuss advantages and disadvantages of supersonic flight? etc.

-Discuss how musical instruments work to create sound. Concentrate on one instrument or consider several. Include the role of harmonic frequencies, and resonance if possible .

- Discuss real world examples of resonance, such as its role in bridge failures to how a microwave works to cook food.

-Investigate vocalizations of the animal kingdom. How do animals as well as humans create sound?

-How does the ear work?

-Detail some uses of ultrasonic waves.

-How oscillations in the sun's surface help astronomers decipher the inner working of the sun.

-Discuss how the Doppler effect relates to speeding racecars, police radar and the expanding universe.

-How does Doppler radar work?

There are many other options. Follow your interests. You are encouraged to share this with the class day one. The research just needs to be related to waves and sound in some way

**This assignment is due on day 2.** We will view videos and discuss research as well as start discussing the Fluid concepts that you investigated in this assignment. The point total for the assignment is as follows: **Part I- 66points, part II - 66 points. (132 points counting towards quarter 1).**