**Waves and Earthquake Warning – Honors Project**

**Purpose:**

1. To foster a completely independent research into an important global issue and fluid mechanics related catastrophe.

2. To develop note-taking skills and the ability to professionally collaborate with teachers in a long-term project.

3. Create a student generated solution to a global problem using one specific earthquake to help exemplify the warning system.

**Assignment 1: Properties of a Wave – detailed set of notes**

Date completed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date notes shown to Mr. F: \_\_\_\_\_\_\_\_\_\_ Grade: \_\_\_\_\_\_ / 25

In the link below, you will gain an understanding of what a wave is, and how it moves through a medium.

<http://www.physicsclassroom.com/class/waves/lesson-1/categories-of-waves>

You will complete all of lesson 2 (a – e), Properties of a Wave. This is research and background so you will more thoroughly understand the concepts and characteristics of waves in the medium of Earth during a temblor (aka an earthquake!). The following note sets should be taken and shown to Mr. F once completed. This will be what is referred to as a “Check-in”. Do not forget to record the answers to the questions you did in the lessons, as well as a “check” for correct and an “x” for incorrect on the quiz questions.

1. The Anatomy of a Wave
2. Frequency and Period of a Wave
3. Energy Transport and the Amplitude of a Wave
4. The Speed of a Wave
5. The Wave Equation

<http://www.physicsclassroom.com/class/waves/lesson-2/the-anatomy-of-a-wave>

**Assignment 2: Seismic Wave Introduction and Earthquake Technology**

Date completed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date notes shown to Mr. F: \_\_\_\_\_\_\_\_\_\_ Grade: \_\_\_\_\_\_ / 20

The objective of this PDF is to acquaint you with the way(s) that wave energy moves through the Earth in the form of seismic waves. You will gain an appreciation for how these moves as well as the technology that we use to monitor and measure them. You will use the PDF entitled “Seismic wave intro & technology.pdf” that Mr. F has posted to the website. Below is an example o fhow scientists are able to model the timing and arrival of earthquakes.

<https://vimeo.com/69912012>

**Assignment 3: What are Plate Tectonics?**

Date completed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date notes shown to Mr. F: \_\_\_\_\_\_\_\_\_\_ Grade: \_\_\_\_\_\_ / 20

The link below is for an introduction to plate tectonics, or the science behind the movement of Earth’s surface. This basic introduction will be followed up by a simulation of the different plate boundaries and the effects over a longer period of time on the surface of the Earth.

Plate tectonics activity (requires Adobe shockwave) [http://www.pbs.org/wgbh/aso/tryit/tectonics/#](http://www.pbs.org/wgbh/aso/tryit/tectonics/)

<http://sepuplhs.org/middle/iaes/students/simulations/SEPUP_Plate_simulation.swf>

A great resource to look at the pattern between plates, earthquakes, and the type of boundary:

<https://ees.as.uky.edu/sites/default/files/elearning/module04swf.swf>

**Assignment 4: Triangulation of an Earthquake’s Epicenter**

Date completed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date notes shown to Mr. F: \_\_\_\_\_\_\_\_\_\_ Grade: \_\_\_\_\_\_ / 20

Below is a link for an introduction to triangulation. Once completed, you will work through the triangulation practice packet to help you better understand how we find the source of an earthquake.

<https://www.youtube.com/watch?v=oBS7BKqHRhs>

**Assignment 5: Student Scientist Earthquake Warning System**

The objective of this culmination of the project is to develop your own earthquake warning system based, in part, on what you have researched so far. The first thing you will need to do is choose an earthquake event that has occurred at any time in recorded history. The [www.USGS.gov](http://www.USGS.gov) site is a great resource for this. The ever popular greatest magnitude or most damaging earthquakes in history is a way to go as well. Once you find this, you need to be able to investigate/research arrival times of waves at certain locations along the earthquake’s progression. These points will be used as your “points of warning”. This will be how you communicate the warning, as well as how severe it was. The checklist/rubric for this assignment is on the page to follow.