**Activity #7: Earthquake Triangulation Activity**

**Lesson Summary**

Distance of the earthquake from each seismic station is determined using the time difference between the arrival of the primary (P) and secondary (S) waves from the earthquakes.

**Materials**

Color pencils, ruler, calculator, compass

Student worksheetavailable on: blogs.oregonstate.edu/smile/

**Next Generation Science Standards**

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| --- | --- |
| **Performance Expectations** | **Crosscutting Patterns** |
| **HS-ESS2-2.** Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. | https://lh5.googleusercontent.com/qtmHQNrNJbL65nvkYRBfPtKmFFwA-Cjsh4q1kEb2LEFJGAfsLsOfz54Lr3K-OfYbQgIvp9wf5psYjJIOu19ztkakUFT-MkPM30QwqHVpeha81EdxARaDiEc-ZinyUBr1 |

**Introduction**

Earthquakes form when the plates of earth’s crust moves. The energy stored between these plates are released in the form of seismic waves. Primary waves (P) are the fastest seismic waves and stretch and compress the rocks in Earths crust. Secondary waves (S) are slower than P-waves, and move rocks perpendicular to the direction of the wave. The magnitude and arrival time of these seismic waves are measured with a seismometer. Data from 3 different seismometers, which are located at different seismic stations, can be used to locate the epicenter of an earthquake.

**Procedure**

1. Look at the seismograms: for each of the seismic stations, identify the time in which the p- and s- waves appear on the seismogram. Record these times in Table 1 on the worksheet.
2. Repeat step 1 for the remaining 2 seismic stations.
3. Calculate the difference in arrival time of the p- and s-waves for each station.
4. Calculate the distance between the epicenter and each seismic station by multiplying the difference in arrival time of the p- and s-waves by 8.
5. Calculate the radius of the epicenter from each seismic station by dividing the distance from the epicenter to the seismic station by 150 on Table 2.
6. To triangulate the exact location of the epicenter, you will need to draw a circle of a specific radius around each station. Use the ruler to adjust the size of the compass to the exact radius the epicenter is