Virtual Earthquake: Epicenter and Magnitude

**PROCEDURE**

* Click on a browser and type in http://www.sciencecourseware.org
  1. Click on “Virtual Courseware for Earth and Environmental Science.”
  2. Click on “Earthquake.”
  3. Click on “Epicenter and Magnitude.”
  4. Take a moment to read the text and then click “Start”

\* You may have to disable pop-up blockers

\* When a security warning pops-up, click “Yes.”

* Look at the lower half of the screen and select page marker labeled “Background” and read information aloud to the group. Then click on “Journal” and fill in each your names.
* Click on Earthquake icon (picture near top) on Taskbar/Toolbox

*\*Each red numbered box represents a seismograph station located at various points in an area.\**

-Click on “Trigger Earthquake”

* Click on S-P Lag times Icon on Taskbar/Toolbox
  1. For Station #1 drag mouse to measure S-P Lag time.
  2. Record the time in your journal
  3. Repeat these steps for 2 more stations of your choice.

\***Don’t pick stations with seismogram readings that go off the screen.**

\***Don’t forget to record your data!**

* Click on Amplitude Icon on Taskbar/Toolbox
  1. Measure amplitude for each station.
  2. Record amplitude in your journal
* Click on Time/Distance Icon on Taskbar/Toolbox
  1. Measure the distance according to your recorded S-P time.
  2. Record distance in your journal.
* Click on Triangulation Icon. Drag the circle from each of your chosen stations until distance matches your recorded distance.

\**The three circles should overlap and converge in a tight spot*!\*

* Click on Epicenter icon and drag **E** to where you think the epicenter of the earthquake is located.
* Click on Latitude/Longitude Icon.

a. Measure and record Latitude of **E.**

b. Measure and record Longitude of **E**.

\*Annoying Hint: One degree of Latitude or Longitude = 60 minutes (‘).

Ex: 34.75° N is reported as 34° 45’ N

* Click on Magnitude Icon and for each station:
  1. Drag line on the Distance scale to the distance of a station.
  2. Drag opposite end to corresponding amplitude
  3. Measure Richter magnitude on the middle scale and record in journal.
* **Make sure you have filled in data for all of the boxes in your journal! Your teacher may ask for a copy of this information to turn in with the questions for a daily grade!**
* Click on “Verify Answers” in the Journal.
* If you are not successful, the program will tell you where you have made a mistake. Go back through the lab and try your best to find the correct data. Try the verification step again.

**Virtual Earthquake Questions**

**Please answer these questions on your own sheet of paper using complete sentences.**

1. What are seismograph instruments and how *exactly* are they used?
2. Three different seismographs are needed at a seismic station to create seismogram date. (Refer to animations on “Earthquake” opening page.) Why would you need three at every single station?
3. If P and S waves start at an earthquake focus, and travel outward, why would they arrive at a seismograph station at different times?
4. Explain how S-P lag times are used to triangulate an earthquake’s epicenter. You should sketch a drawing to help you explain.
5. What is the magnitude of an earthquake?
6. Are amplitude of the seismogram and (Richter) magnitude of the quake related? If so, how?