Earth Science Lab Performance Test

<u>Lab Activity 1</u>: **Rock and Mineral Classification:**

***Skills required**:*

Rock Type Classification:

1. Identify an observable characteristic on a rock sample that can be used to classify it is as either Igneous, Sedimentary, or Metamorphic (see chart below)

Rock Type	Igneous	Sedimentary	Metamorphic

Observable Characteristics	• Interlocking Crystals
	• Glassy Texture
	• Gas Pockets (Vesicular Texture)
		• Contains fossil
		• Clastic Texture
		    • pieces of rock cemented in mud
		• Bioclastic texture
		    • Cemented shell fragments
			• Foliated texture
			    • Wavy distorted layers
			    • Banding (high grade of foliation, shown by alternating strips of different color)

Mineral Identification:

1. Identify 4 Physical Properties of a mineral sample

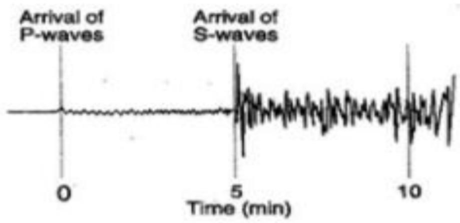
Physical Property	Luster	Cleavage vs. Fracture	Hardness	Streak
Description	How light reflects off a surface 1. <u>Metallic</u>: Silver, brassy 2. <u>Nonmetallic</u>: Glassy, pearly, earthy reds and greens	How a mineral breaks 1. <u>Cleavage</u>: flat surface(s) 2. <u>Fracture</u>: jagged, rough, uneven surfaces	Scratch test. Use the mineral to attempt to scratch a material to determine its relative hardness	Rub the mineral on a ceramic tile, and record the color of the powdered mineral residue

2. Use a flow chart to follow the minerals 4 physical properties to identify it

<u>Lab Activity 2</u>: Triangulating an Earthquake Epicenter:

Skills required:

1. Determine the **<u>difference in arrival times</u>** of the P and S waves on a seismogram



2. Use the **<u>difference in arrival times</u>** to determine the distance to the epicenter

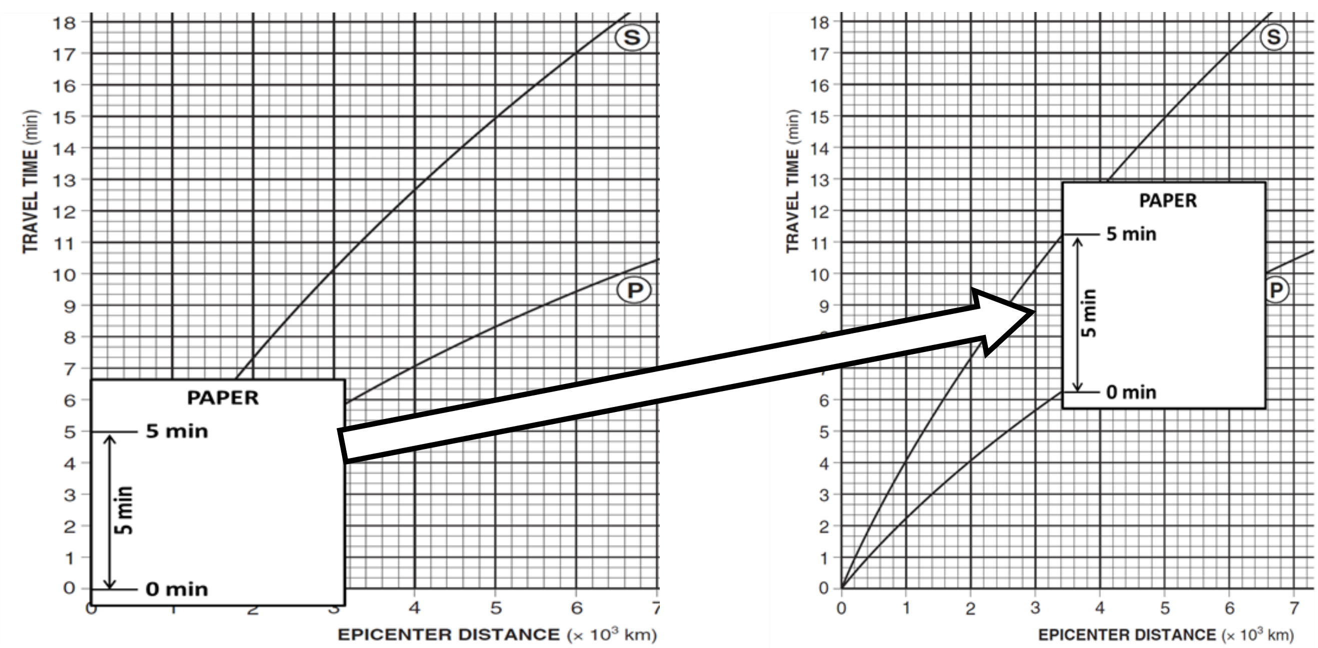
   a. Using the **Earthquake P-Wave and S-Wave Travel Time Graph** on p.11 ESRT

      ➔ Place a sheet of paper along the Travel Time axis as shown below

      ➔ Make 2 marks on the paper (shown below)

         1. At the **zero minute mark**

         2. At **the difference in arrival times** you established on the seismogram

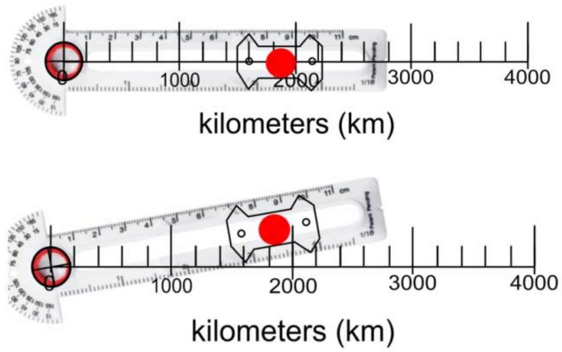


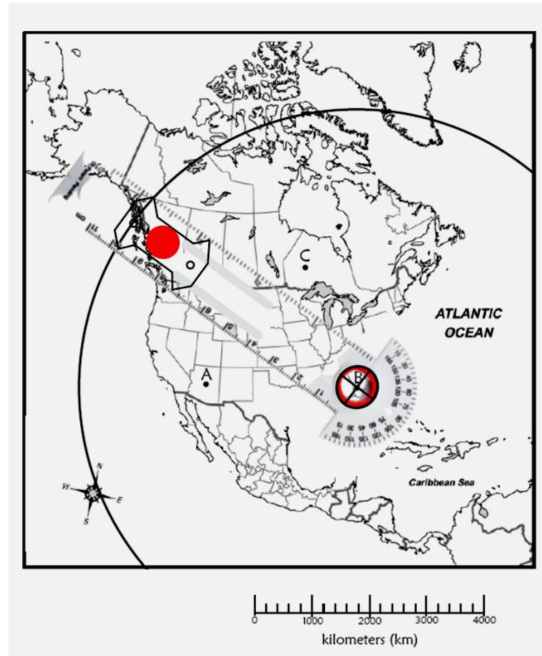
- (shown above) Keep one mark on the P-wave curve and slide the piece of paper along the curve. Continue sliding the paper until the second mark is on the S-wave curve
  <u>Caution</u>: Be sure to keep the paper parallel with the vertical lines on the graph

- Read straight down the edge of the paper until it crosses the **Epicenter Distance** axis.
  (**<u>Note</u>: The number is expressed in x 10^3 km)**

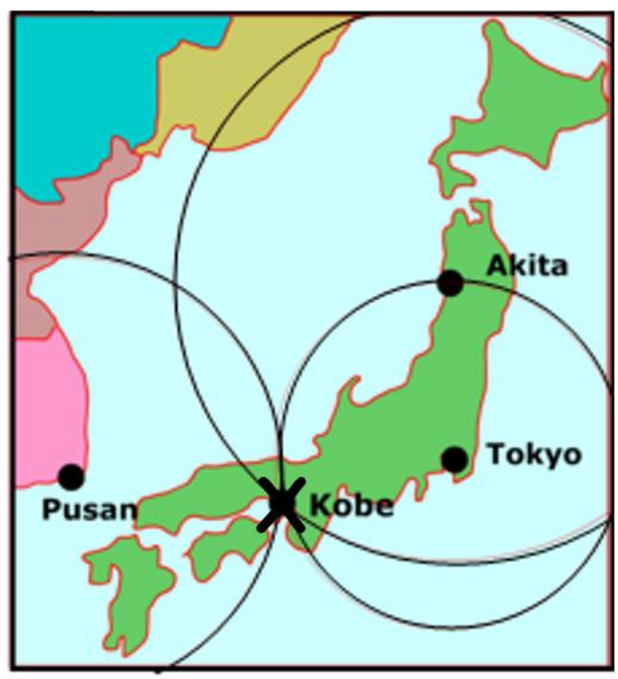
   - **Example above = 3.4 x 10^3 km = 3400 km**

3. Draw a circle around the city you adjusted the compass to **(shown below).**



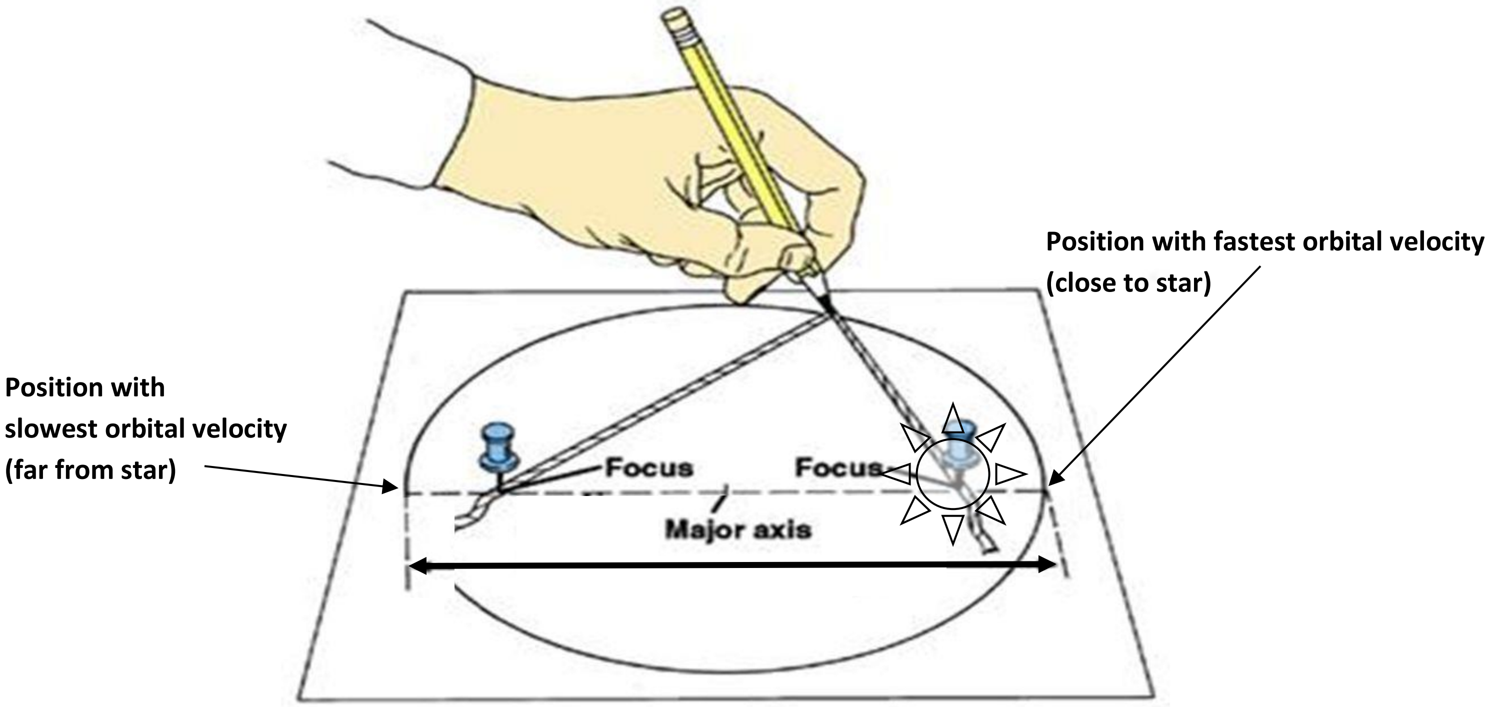


4. When 3 stations circles are drawn, all 3 will intersect at a single position… this is where the earthquake epicenter is located (see below)**.**



Mark it with an X

<u>Lab Activity 3</u>: Elliptical Orbits and Eccentricity:



***Skills required*:**

1. Use pins and string to construct an ellipse
2. Use a metric ruler to measure (Record your values to the nearest tenth of a cm):
    a. The distance between focal points
    b. The length of the major axis
3. Calculate the eccentricity of your ellipse to the nearest thousandth using the equation below (NO UNIT)

$$\text{Eccentricity} = \frac{\text{distance between foci}}{\text{length of major axis}}$$

4. Describe the relationship between the eccentricity value of an orbit and how elliptical the orbit appears
    - Lower eccentricity means less elliptical
    - Higher eccentricity means more elliptical
5. Identify the relative orbital velocity of an object orbiting a star based on its distance from the star:
    - Moves with the fastest orbital velocity when closest to the star
    - Moves with the slowest orbital velocity when farthest from the star