

Name: \_\_\_\_\_ Date: \_\_\_\_\_

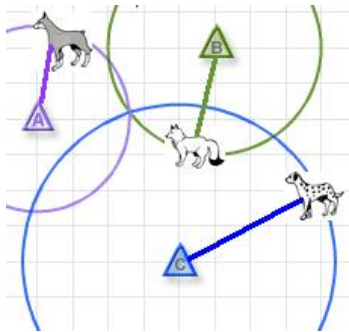
## Student Exploration: Earthquakes 2 – Determination of Epicenter

[NOTE TO TEACHERS AND STUDENTS: This exercise assumes that you have a data table and graph made while using the **Earthquakes 1 – Recording Center Gizmo™**. If you do not have those, or have never used that Gizmo before, do that first.]

**Vocabulary:** body wave, earthquake, epicenter, fault, focus, P wave, S wave, seismic wave, seismogram, seismograph

### Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

Three dogs meet in a park. Each dog is attached by a leash to its owner (triangles).



1. What does each colored circle represent? \_\_\_\_\_

\_\_\_\_\_

2. Where could all the dogs meet in one place? Draw this point on the diagram.

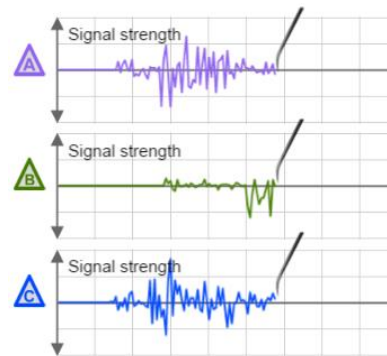
3. Is there another spot where all three dogs could meet? \_\_\_\_\_

Explain: \_\_\_\_\_

### Gizmo Warm-up

When you used the *Earthquakes 1 – Recording Station Gizmo™*, you learned how to find the distance from a recording station to the epicenter. With the *Earthquakes 2 – Determination of Epicenter Gizmo*, you will use data from three recording stations to find the exact location of the epicenter.

Click **Play** (▶), and then click **Pause** (⏸) when the seismograms are complete. Compare the three seismograms.




1. Which recording station is closest to the epicenter? \_\_\_\_\_

How do you know? \_\_\_\_\_

2. Which recording station is farthest from the epicenter? \_\_\_\_\_

How do you know? \_\_\_\_\_

<b>Activity:</b> <b>Locating the epicenter</b>	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> <li>• Click <b>Reset</b> (↺).</li> <li>• Click <b>Play</b>, and then click <b>Pause</b> when the seismograms are complete.</li> </ul>	
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**Goal:** Based on three seismograms, locate the epicenter of an earthquake.

1. Prepare: To complete this activity, you will need the table and graph you made in the *Earthquakes 1 – Recording Station* Student Exploration. Take this out now.
2. Measure: Turn on **Show time probe**. On each seismogram, locate the first P-wave and the first S-wave. Measure the time interval ( $\Delta t$ ) for each seismogram, and then use your graph to find the distance of each station to the epicenter.

Station	Time interval ( $\Delta t$ )	Distance to epicenter (km)
A		
B		
C		

3. Locate: Turn on the **Show station A** checkbox. Set the **Radius** to the distance of **station A** from the epicenter, based on your table above. Look on the circle on the map.

Where could the epicenter be located? \_\_\_\_\_

4. Locate: Turn on the **Show station B** checkbox. Set the **Radius** to the distance of **station B** from the epicenter. Look on the two circles on the map.

Which *two* places could the epicenter be located now? \_\_\_\_\_

5. Locate: Turn on the **Show station C** checkbox. Set the **Radius** to the distance of **station C** from the epicenter. If you did everything right, you should see the epicenter symbol (⊕). If you do not, recheck all of your distances. (You may need to adjust each radius slightly.)

Relative to the three circles, where is the epicenter located? \_\_\_\_\_

6. Practice: Click **Reset**. Try to locate at least five more epicenters. Each time you locate an epicenter, click the **Tools** palette and click **Screen shot**. Right-click the image, choose “Copy Image,” and paste the image into a blank document to turn in with this sheet.