

Name: _____ Date: _____ Period: _____

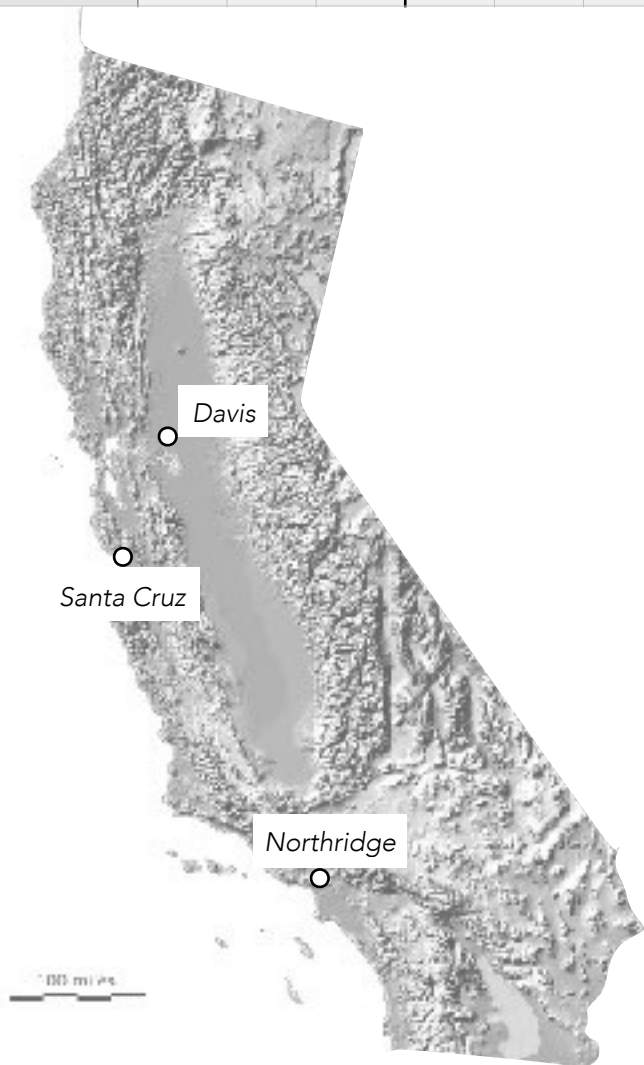
Deductive Reasoning: Determining the Earthquake Epicenter

Seismologists determine the epicenter (the point on the Earth's surface directly above the focus of a seismic event) of an earthquake by deductive reasoning. Earthquakes propagate p-waves (primary waves) and s-waves (secondary waves) that can be measured on seismographs distant from the epicenter. Since the speeds of p- and s-waves are known, seismologists can use the time difference between when the signals are received to deduce their distance from the epicenter: $d = \Delta t \times 9.3 \text{ km/s}$

The table below records the time difference between the p wave and s wave for five hypothetical earthquakes. Determine the distance to the epicenter from each of the three stations in kilometers (km), and using the scale on the map below the table, determine the scaled distance in millimeters (mm) for the map. Using a ruler, set your compass for the appropriate radii from each seismograph location, and draw circles. Deduce the epicenter by looking for the place where the three circles intersect. Locate the cities closest to these epicenters.

Earthquake →	1			2			3			4			5		
↓ seismograph	s	km	mm	s	km	mm	s	km	mm	s	km	mm	s	km	mm
Davis	57			12			11			35			32		
Santa Cruz	43			16			10			50			19		
Northridge	4			62			57			90			24		

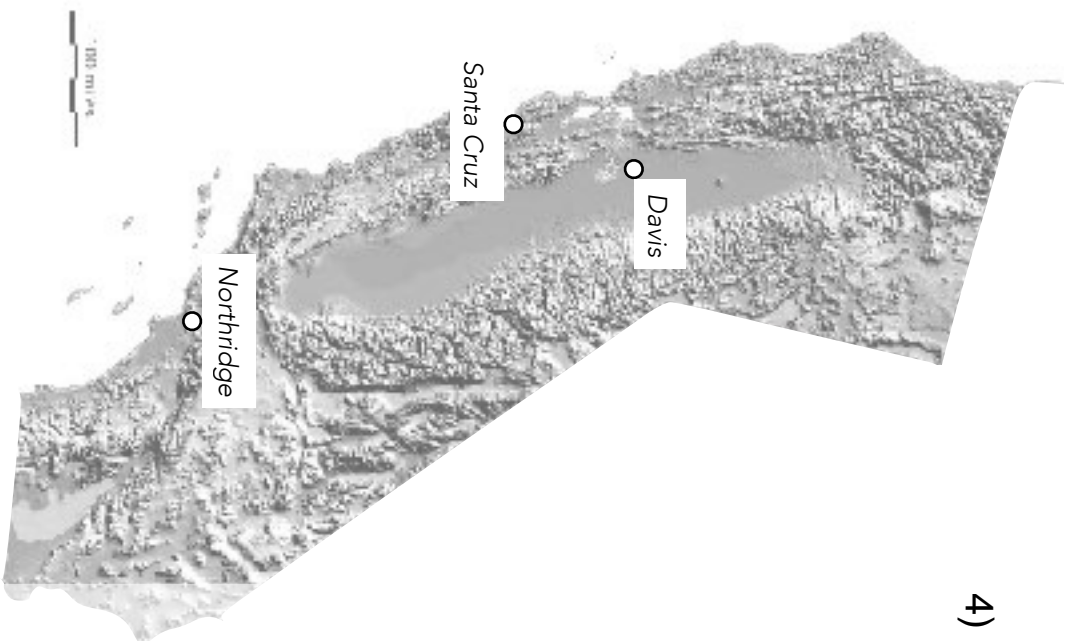
1)



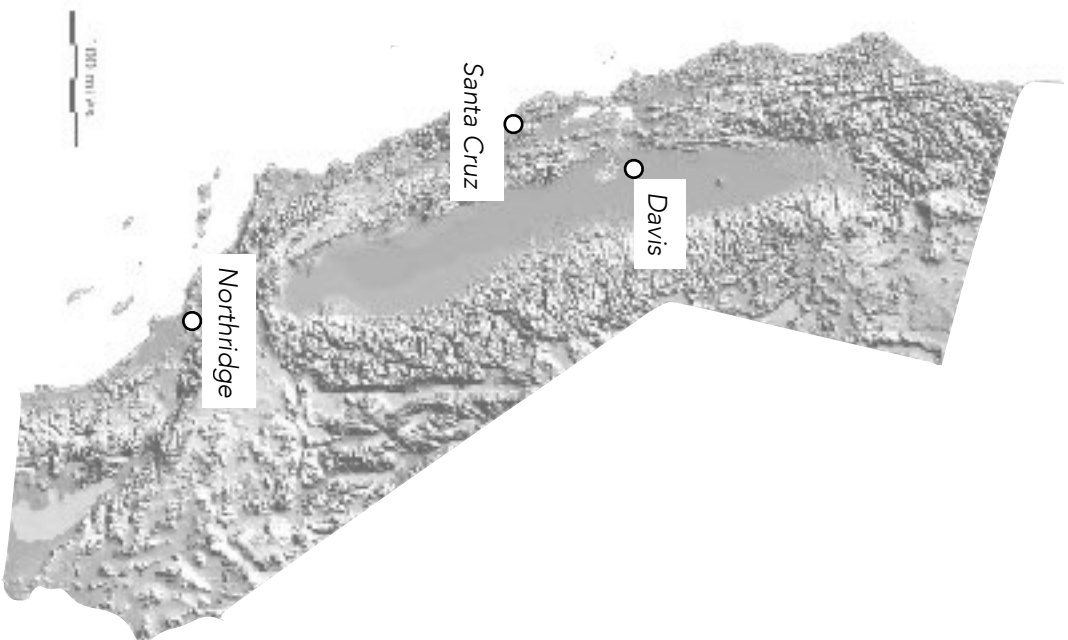
2)



3)



4)



5)

