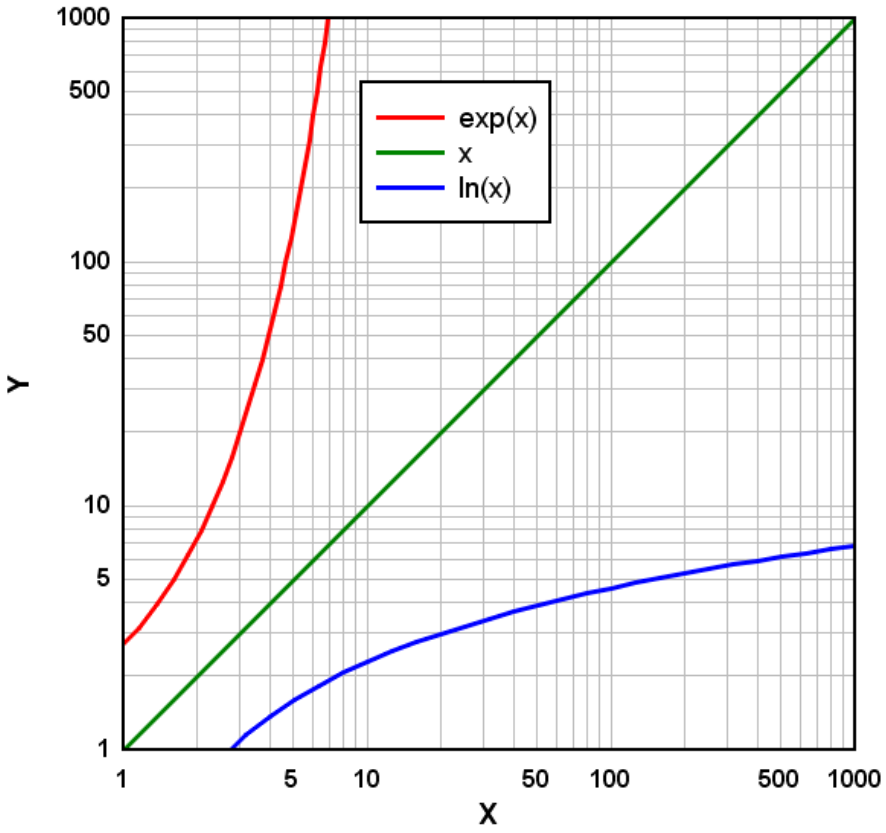
Section 12: Earthquake Magnitude



Formula:

$d=10^{(m-n)}$

Where,

d = Difference between two Magnitudes (Richters)

m = Maximum Magnitude (Richters)

n = Minimum Magnitude (Richters)

Section 12 Question: What factors would you look at to measure the size of an earthquake?

What Do You See?
http://elearning.niu.edu/simulations/images/S_portfolio/Mercalli/Mercalli_Scale.swf

What Do You Think?
How would you describe the following?

- *A small earthquake*
- *A medium earthquake*
- *A large earthquake*

What Do You Think Now?

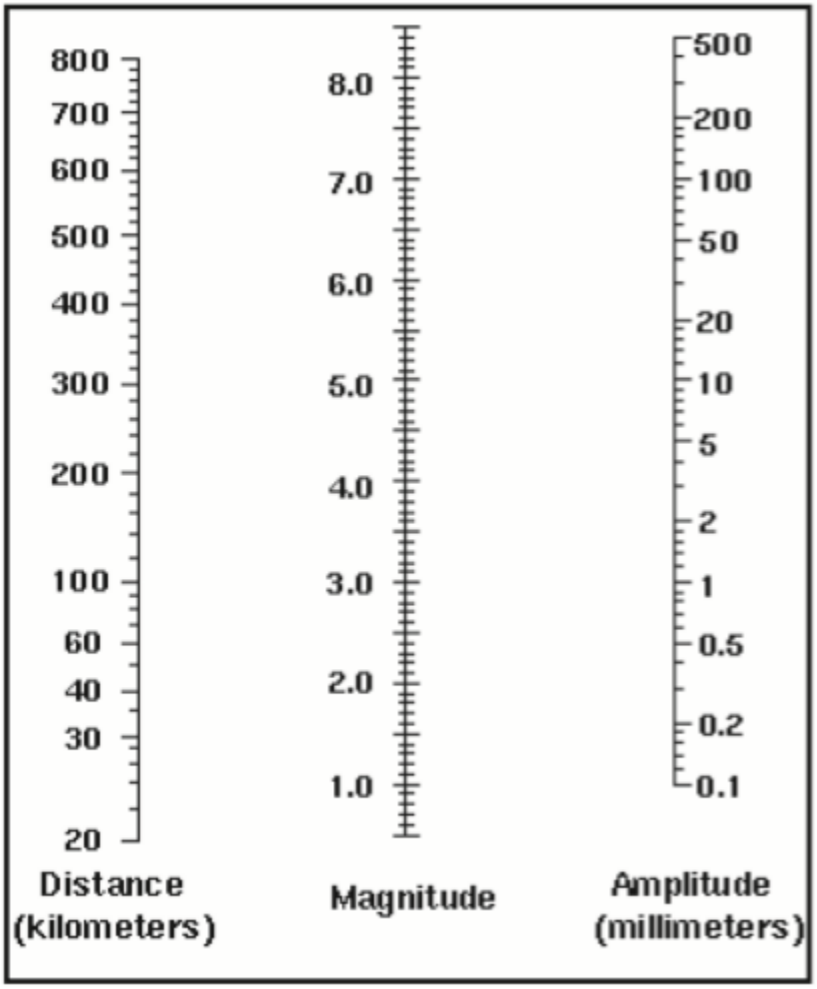
Focus Question A: How is earthquake damage measured by scientists?
Explore:
Explain:

Map:


Syracuse
Detroit
New York
Cleveland
Philadelphia
Pittsburgh
Baltimore
Indianapolis
Washington, D.C.
Roanoke
Richmond
Winston-Salem
Atlanta
Charleston
0
400 km

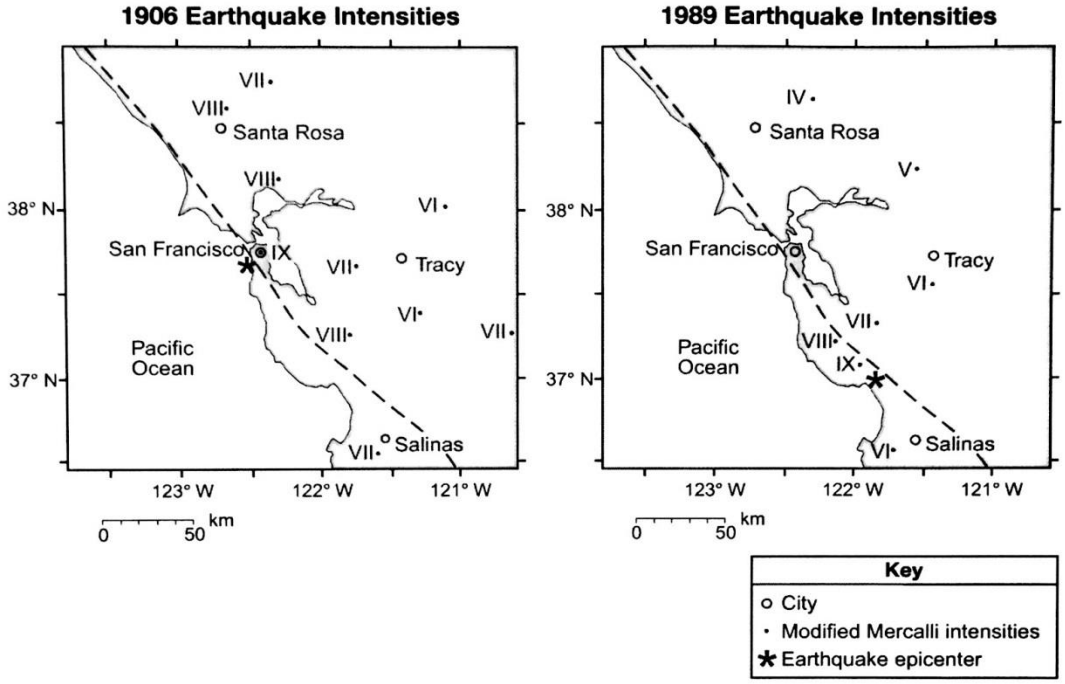
Expand: The Richter Scale

Use your seismograms and distance calculations in section 11 to determine the magnitude of the earthquake!



Regents Practice: Mercalli Scale

Base your answers to questions 83 through 85 on the maps and table below and on your knowledge of Earth science. The maps show earthquake intensities (IV to IX), according to the table of the Modified Mercalli Intensity Scale, for the 1906 and 1989 earthquakes at several locations in California. The asterisk (*) on each map is the location of each epicenter. The dashed line represents the location of a major fault.



Modified Mercalli Intensity Scale

Level of Intensity	IV	V	VI	VII	VIII	IX
Perceived shaking	light	moderate	strong	very strong	severe	violent
Observed damage	none	very light	light	moderate	moderate to heavy	heavy

83 Name the major fault along which both of these earthquakes occurred and identify the type of plate tectonic boundary that is located along this fault. [1]

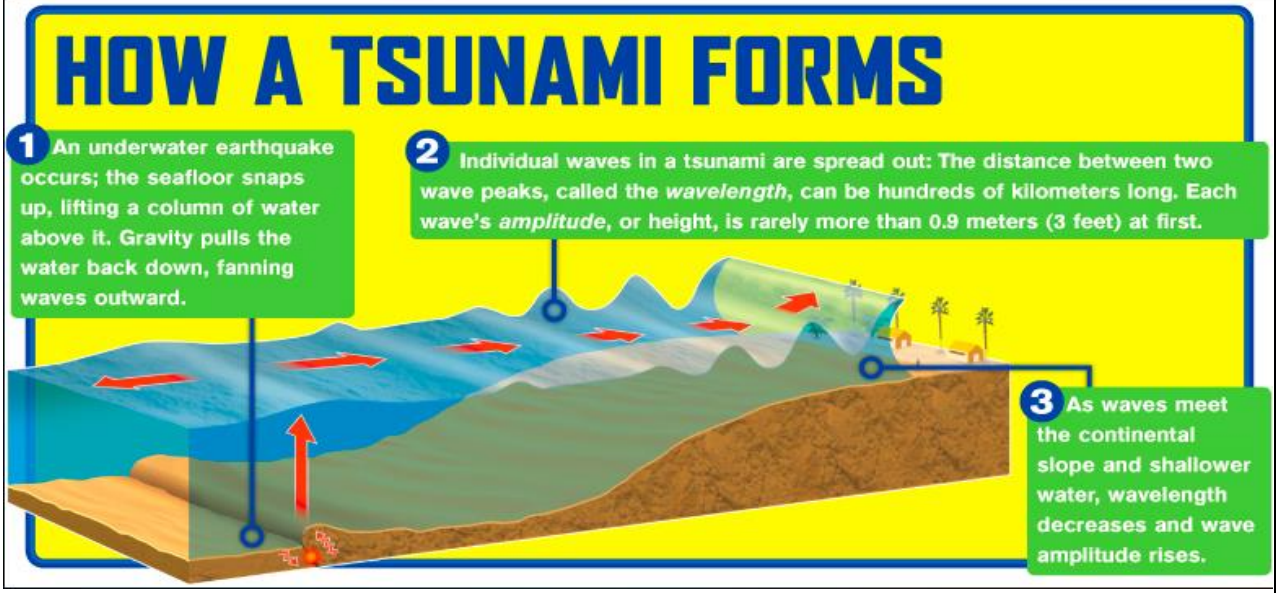
84 Based on the Modified Mercalli Intensity Scale, identify the perceived shaking and the observed damage that occurred in the San Francisco area during the 1906 earthquake. [1]

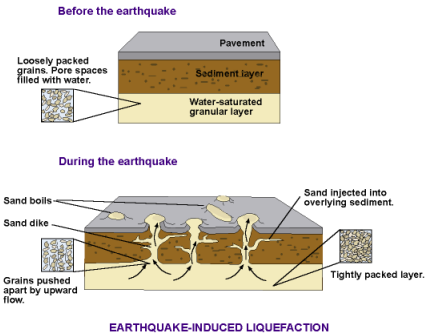
85 Explain why Santa Rosa experienced a lower Modified Mercalli intensity shaking than Salinas experienced during the 1989 earthquake. [1]

P.S./E. Sci.–Aug. '14 [23]

DIGGING DEEPER

Earthquake Effects	
• The main effect of earthquakes is the shaking of the ground. • A smaller magnitude earthquake with a longer duration can be more destructive than a short lived large magnitude earthquake. • Earthquake magnitude uses a logarithmic scale. This means the amplitude of a magnitude 6 earthquake is 10 times greater than a magnitude 5. • Fire is a secondary hazard in cities where fuel lines, power lines and tanks may rupture.	Compare and contrast the Modified Mercalli scale and the magnitude scale. What precautions can a person take to stay safe in an earthquake?
Landslides and Tsunamis	
• Earthquakes may also initiate landslides in regions where the surface is unstable. • The largest landslide observed by humans occurred in 1980 on Mt. St. Helens. • Tsunamis occur when large amounts of water in the ocean is displaced. • Tsunamis occur yearly in the Pacific Ocean and are capable of large scale destruction.	In what regions of the world are earthquakes the most deadly?



Local Bedrock and Earthquakes	
• Less solid materials like sand or mud can increase the amplitude of seismic waves and their destructive power. • Liquefaction occurs when water-saturated soil becomes unstable. • As particles shake and compact, ground water is forced upwards causing the soil particles to float allowing the ground to liquefy.	 What geographic conditions would you look for to build in a safe location?

Chapter 2, Section 12 E.B.C. Name:_____
Earthquake Magnitude Period:_____

Question (2)		
Claim 1 (2)		
A. Supporting Evidence (3)	B. Supporting Evidence (3)	
Claim 2 (2)		
A. Supporting Evidence (3)	B. Supporting Evidence (3)	
Analysis (6)		

	Claim *A statement or conclusion that answers the original question/problem.*	**Evidence** *Scientific data that supports the claim. The data needs to be appropriate and sufficient to support the claim.*	**Analysis** *A justification that connects the evidence to the claims. It shows why the data counts as evidence by using appropriate and sufficient scientific principles and vocabulary*.
0	Does not make a claim, or makes an inaccurate claim.	Does not provide evidence, or only provides inaccurate or vague evidence.	Does not provide an analysis, or only provides an irrelevant analysis.
1	Makes an accurate but vague or incomplete claim.	Provides vague evidence and does not include specific data.	Repeats evidence and links it to claim, but does not include specific scientific principles.
2	Makes accurate and complete claim.	Provides correct evidence but does not include specific data.	Connects all evidence to the claims using scientific principles or vocabulary but not both.
3		Provides correct evidence and includes specific data.	Connects all evidence to both claims using scientific principles and vocabulary.

CHECKING UP: Page 252, 1 through 8 (2 points each)

____
21

1.

2.

3.

4.

5.

6.

7.

8.

In a major earthquake, where in your school or community would you be safest? What places are prone to the greatest risks from the effects of an earthquake? Explain why you selected these locations. (5 points)