

Name: _____ Date: _____

Lab Mercalli Scale

Purpose: Earthquake hazards – prevention, mitigation and early warning techniques, construction methods and civil planning.

Using the Mercalli Scale to Locate an Epicenter

Earthquakes are classified using two different scales. The Richter scale is a measure of the energy released during the earthquake. The Mercalli scale is a measure of the amount of damage done by the earthquake. Scientists record responses from many people who experience the earthquake and assign a value from I (1) to XII (12). These numbers are plotted on a map and used to locate the epicenter of the earthquake. This method is based on the idea that the area closest to the epicenter will suffer the most damage.

Strategy

In this experiment, you will:

- read simulated reports of earthquake experiences and assign Modified Mercalli Scale Values to these reports.
- plot these values on a map and locate the epicenter of the earthquake.

Materials

- list of earthquake experiences from various cities (Table 2)
- map of the region where the earthquake occurred
- Modified Mercalli Scale (Table 1)
- colored pencils

Procedure

1. Read the Modified Mercalli Scale in Table 1 so you become familiar with the descriptions.
2. Read the list of experiences from the various cities in Table 2. Assign a Mercalli value to each of the descriptions. Then write this value on the map next to the corresponding city.
3. Use colored pencils to draw lines that connect cities having the same Mercalli value.
4. Use the pattern you have drawn to estimate where the epicenter is located.

Questions and Conclusions

1. What cities were nearest to the epicenter of the earthquake? How did you

determine this? _____

2. Approximately how wide was the zone with a rating of V?

3. What are some possible sources of error when using the Modified Mercalli Scale to locate the epicenter of an earthquake? _____

Data and Observations

Table 1 Modified Mercalli Scale

I.	(1)	Earth movement is not felt by people.
II.	(2)	A few people may notice movement if they are sitting still. Hanging objects may sway.
III.	(3)	Felt noticeably indoors, especially on upper floors. May not be recognized as an earthquake.
IV.	(4)	During the day, felt indoors by many people, outdoors by few. At night, some are awakened. Dishes, windows, and doors rattle.
V.	(5)	Felt by almost everyone. Sleeping people are awakened. Some windows are broken and plaster cracked. Some unstable objects are overturned. Bells ring.
VI.	(6)	Felt by everyone. Many people are frightened and run outdoors. Some heavy furniture is moved and some plaster may fall. Overall damage is slight.
VII.	(7)	People run outdoors. Earth movement is noticed by people driving cars. Damage is slight in well-built buildings and considerable in poorly built structures. Some chimneys are broken.
VIII.	(8)	Damage is slight in well-designed buildings and extreme in poorly built structures. Chimneys and walls may fall.
IX.	(9)	Damage is considerable in well-designed buildings. Buildings shift from their foundations and partly collapse. Ground may crack and underground pipes are broken.
X.	(10)	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. Ground is badly cracked.
XI.	(11)	Few, if any, structures remain standing. Broad open cracks in the ground.
XII.	(12)	Complete destruction. Waves are seen on the ground surface.

Table 2 Earthquake Observations and Data

___	Ashland	Hanging lamps swayed.
___	Bear Creek	People outdoors did not notice anything.
___	Burneville	Felt by people sitting at dinner.
___	Cedar Pass	Families sitting at dinner noticed the dishes rattling.
___	Dodge	Dishes, windows, and doors rattled.
___	Emeryville	Not felt.
___	Falls	Felt by nearly everybody. A few windows were broken.
___	Forks	Big windows in stores downtown were broken.
___	Grants Plain	Church bells rang all over town. Plaster walls developed cracks. Candlesticks fell off the mantle.
___	Greenburg	Not much damage but felt by everyone.
___	Hillsdale	Some plaster ceilings fell. Many people were scared.
___	Kempoe	Felt by some people on upper floors, some windows rattled.
___	Leeds	Noticed by many people working late in tall buildings.
___	Oakdale	Felt by a few people.
___	Peterson	Felt by almost everyone. Some plaster ceilings fell down.
___	Red Hills	People indoors watching television noticed the vibrations.
___	River Glen	Felt by almost everybody in town.
___	Sandpoint	Many windows were broken, some people were scared.
___	Split Rock	Poorly built structures were badly damaged. A few drivers noticed their cars moving strangely for a moment.
___	Travis City	Almost everyone felt it. Church bells rang.
___	Tucker	Books fell off the shelves in the main library and some windows were broken.
___	Vernon	Dishes in the cupboard rattled. Felt by people indoors.
___	Victor	Most people were alarmed and ran outside. Chimneys were broken.
___	Vista	Felt by people in upper floors of tall buildings.
___	Wells	Noticed by people on the third floor. Some windows rattled.
___	Westbury	Some people noticed the vibration but thought it was a freight train.
___	Wheatfield	People sitting at the dinner table noticed doors and windows rattling.
___	Yalco	Many people ran outside. Many windows were broken.

Figure 1

