**Historic Earthquakes in Kansas Activity**

Before seismometers were installed, Kansas relied on citizens to report earthquakes to the Geological Survey. This gave us historical data on earthquake locations and strength across the state.

Review these historical accounts of earthquakes in Kansas. Then, use the Modified Mercalli Scale on the following page (using the roman numerals) to determine the strength of these earthquakes at the location they were felt. If you’re not sure, add a question mark after your rating.

*April 24 1867, 2:30 PM*People reported: furniture moving, dishes falling, people falling over, some plaster broke off and fell, people quite frightened and running to the streets, some windows breaking, one chimney reported falling.
EARTHQUAKE RATING:

*November 8 1875, 5:00 AM*People reported: Nearly everyone waking up, rattling dishes, buildings quiver, doors swinging open.
EARTHQUAKE RATING:

*May 19 1881, 9:00 AM*People reported: Slight shock felt by several people, sleeping people weren’t awakened.
EARTHQUAKE RATING:

*November 8 1928, 8:15 AM*People reported: Windows shaking, dishes rattling, objects didn’t fall over.
EARTHQUAKE RATING:

*December 7 1929, 2:02 AM*People reported: beds shaking, many people waking, windows rattling, no major damage reported.
EARTHQUAKE RATING:

*August 9, 1931, 1:07 AM*People reported: houses shaking violently, dishes and small items falling and breaking, pictures were thrown off of walls, people fled to streets, furniture overturn, it felt as though beds were lifted and then dropped.
EARTHQUAKE RATING:



**Activity 2: Isoseismal Lines**

Seismometers are incredibly accurate in determining the earthquake’s epicenter. However, earthquakes have occurred long before the invention and use of these instruments. Traditionally, when we are locating the epicenter, we use eyewitness accounts from various areas affected by the earthquake. Imagine for a moment you throw a rock into a pond, the ripples are strongest at the impact and diminish as they spread out. Likewise, witnesses who report a strong quake are more likely to be closer to the epicenter than those who report a weak one.

This is an earthquake that occurred on January 7, 1906. Determine, as best as you can, what the Modified Mercalli intensity was for each location then write that number on the map provided using the alphabetical labels. Then, connect the largest MM ratings together and move down the scale until all the MM ratings are connected.

|  |  |  |  |
| --- | --- | --- | --- |
| **Locality** | **MapLabel** | **AssignedMMIntensity** | **Earthquake Effects** |
| Abilene, KS | A |  | Rattled dishesMovement plainly perceptibleWater in glasses showed motion |
| Alma, KS | B |  | Walls rocked, floors weavedWindows rattled, chinaware jumpedPeople felt weak in the kneesLow rumbling sound preceded shock |
| Auburn, KS | C |  | Stove lids rattledHouses shook |
| Blue Rapids, KS | D |  | Many people felt trembling or rockingLeaves swayed on house plantsNot severe |
| Cleburne, KS | E |  | Some dishes brokenSome people very much disturbed, thinking an explosion had occurred |
| Emporia, KS | F |  | Many people frightened, several ran outdoorsDishes rattled, houses shookMore severe four mi. north of town, lighter to the east, hardly felt south of EmporiaNo damage reported |
| Hope, KS | G |  | Buildings trembledDoors slammed shut in houses |
| Junction City, KS | H |  | Panic--people fled to streetsArticles shaken from shelves and tablesWindows rattledPlaster knocked from walls |
| Kansas City, MO | I |  | Shook chandeliersRattled dishesNot severe enough to cause alarm |
| Lawrence, KS  | J |  | "No doubt about shaking here, although severer to the west"Did not cause alarm |
| Lincoln, NE | K |  | Shook globes and chandelier fastenings distinctly felt although no damage was reported |
| Manhattan, KS | L |  | Walls crackedPeople rushed from homes in frenzied fearBrick chimneys dislodged from school, depot, housesDishes thrown together on tablesHouses rocked and swayedShelf contents shaken to floorPersons in the dining room of the Gilett Hotel rushed out into streetsLateral motion followed by vertical movementAftershock 20 minutes laterVase, lamp or bottle broken in every houseTremor preceded by rumbling sound |
| St. Joseph, MO | M |  | Rattled dishes and tinwareDetached pictures from wallFrightened small childrenNo serious damageTables did freakish stunts, floors swayed, dishes dancedPlates on racks attached to wall fell to floor |
| Seneca, KS | N |  | Jarred windowsRattled dishes  |
| Topeka, KS | O |  | Roaring sound followed by the shockShook houses, windows, doors, dishesGlass lamps shakenMan awakenedChina thrown from pantry shelvesBaby fell from loungeSlight shock resulting in curious inquiries at telephone officePeople filled the streets |
| Wamego, KS | P |  | Plaster shaken from ceilingsThings tumbled about generallyPictures shaken from wallsBottles shaken from shelves"The amount of damage will be considerable" |
| Westmoreland, KS | Q |  | Plastering jarred off courthouse in places |
| White Cloud, KS | R |  | Felt, but "not very severe" |
| Wichita, KS | S |  | Slight shock felt |
| Woodbine, KS | T |  | Dishes rattled in cupboards |

Map of reported earthquake incidents on January 7, 1906



What was the largest reported Modified Mercalli number for the earthquake?

Where is the epicenter of the earthquake?

What trends do you notice for earthquake’s strength across the region?

**Activity 3: Historical vs Measured Earthquakes in Kansas**

Below is a list of historical earthquakes in Kansas from 1867 to 1961. After 1961, earthquakes were reported by seismometers.



In the course of 94 years, how many earthquakes were reported?

How many of them were I? II? III? IV? V?
VI? VII? VIII?

What do you notice? Why do you think some earthquakes are more reported than others?

Historically, a majority of the population of the state lives in the northeastern section and we have a big population in Sedwick county where Wichita is located. In western Kansas, the population is more rural and spread out. Based on this information, what kind of bias do we see when people report earthquakes?

Let’s now look at a map of earthquakes in Kansas recorded by KGS seismometers from 1977 to 1989. The chart represents number and strength of earthquakes recorded during this 12 year timespan.





In the course of 12 years, how many earthquakes were recorded?
What was the average number of earthquakes reported per year?

Circle hotspots on the map where earthquake occurrence is more frequent.

What do you notice about this map compared to earthquakes reported by people? Why do you think it’s different?