

# Intermountain West Earthquakes

## Activity Packet

written for 7-12 grades  
easily adaptable for 4-6 grades

Developed and provided by  
Earthquake Education Services  
University of Utah Seismograph Stations  
705 Browning Bldg.  
Salt Lake City, Utah 84112  
801-581-6201

Activities use database of newspaper articles  
available in hardcopy or on the Internet  
Web site—<http://www.seis.utah.edu>

Project funded by U.S. Geological Survey under the  
National Earthquake Hazards Reduction Program (NEHRP)

# INTERMOUNTAIN WEST EARTHQUAKES

## Activity Packet

written for secondary students, but the basic activities and some follow-up activities are also appropriate for upper elementary

### INTRODUCTORY ACTIVITY

**MEASURING SIZE OF A UTAH EARTHQUAKE—**The Intensity Method using the Modified Mercalli Intensity (MMI) Scale [available in separate packet]. This activity focuses on the 1901 Southern Utah earthquake. Students determine the level of damage (MMI) in each town using data they find in excerpts from newspaper articles. This activity will provide students with experience at recognizing relevant data and analyzing data. It will also develop student understanding of the effects one Utah earthquake had on numerous communities throughout the state. The database of 1901 newspaper article excerpts is interesting, without being overwhelming, so should whet the appetite for the use of the complete database in the activities that follow.

### BASIC ACTIVITIES to learn about earthquakes from newspaper accounts

#### 1. RETRIEVE RELEVANT DATA FROM NEWSPAPER ARTICLES. (Choose approach you prefer)

##### A. Oral and/or Written Reports - cooperative groups are recommended.

A list of suggested topics/questions is attached. Select one earthquake and divide the question topics among the groups. OR—assign each group a different earthquake and have each address the same question topic (or all questions). After reports are given, facilitate a whole class discussion of the data and summation of what has been learned.

##### B. Be a Scientist - individual or cooperative groups.

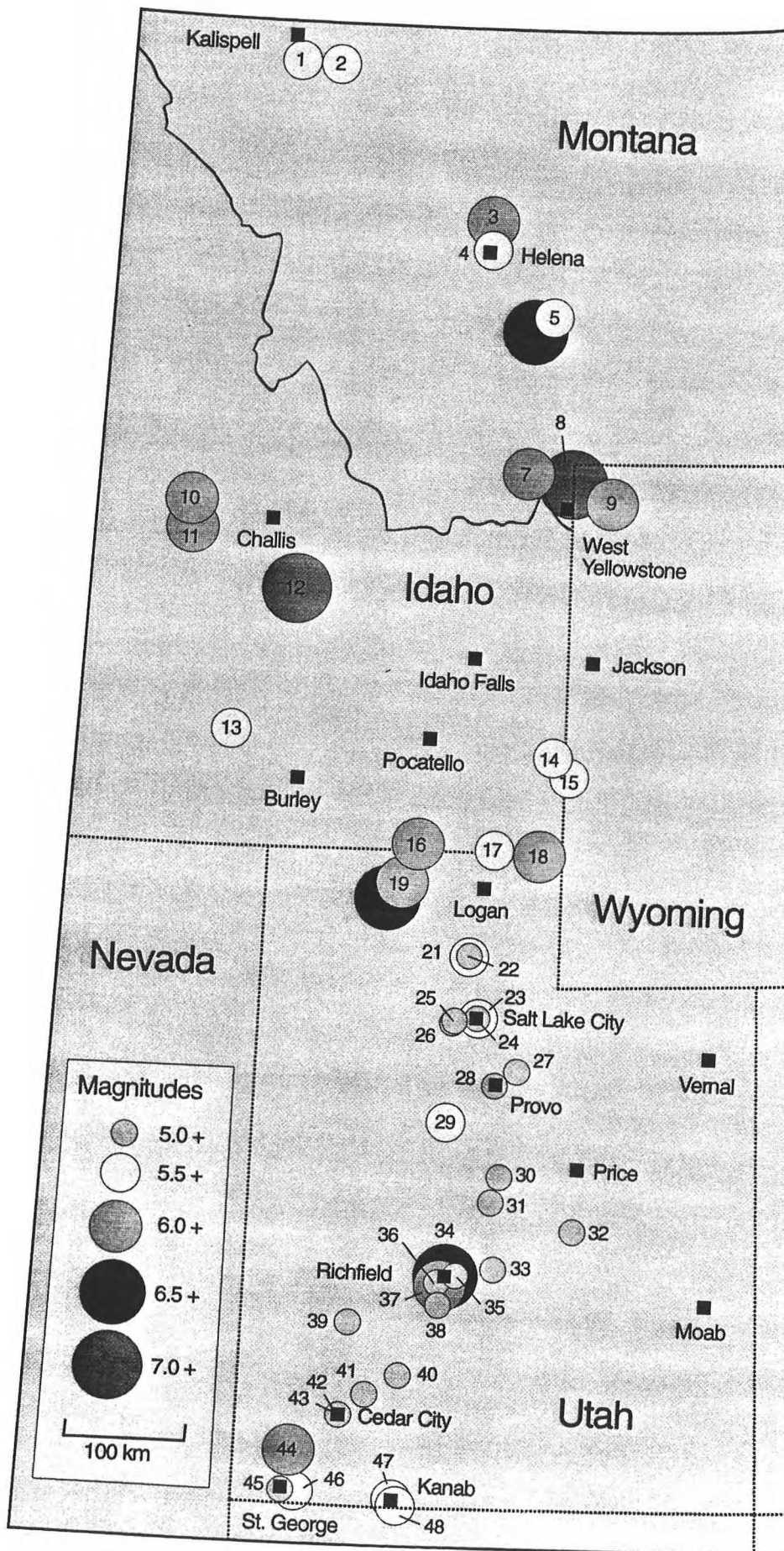
Invite students to think about moderate to large earthquakes in the Intermountain West. What do they sound like? Feel like? How long do they last? How far away are they felt? What changes take place on the Earth's surface? When do aftershocks occur? How many aftershocks occur?

Tell students that although we don't know what will happen in future earthquakes, we can learn from the experience of historic earthquakes in our region. Provide the newspaper article database for several moderate to large earthquakes in this region. Ask students to select one of the questions discussed, to form their own hypotheses, and to search the articles for data to support or disprove the hypothesis.

#### 2. DETERMINE MODIFIED MERCALLI INTENSITY (damage level).

Using the data for one earthquake, determine the level of damage (Modified Mercalli Intensity) for each town mentioned. Which town suffered the highest level of damage? What was its MMI?





# Earthquakes researched for this project

1. 1945 Flathead Lake, MT M 5.5
2. 1952 Big Fork, MT M 5.5
3. 1935 Helena, MT (series) M 6 1/4
4. 1928 Helena, MT M 5 1/2
5. 1929 Lombard, MT M 5.6
6. 1925 Clarkston Valley, MT M 6 3/4
7. 1947 Virginia City, MT M 6 1/4
8. 1959 Hebgen Lake, MT (series) M 7.5
9. 1975 Yellowstone Park, WY M 6.1
10. 1945 Central Idaho M 6.0
11. 1944 Central Idaho M 6.1
12. 1983 Borah Peak, ID (series) M 7.3
13. 1905 Shoshone, ID M 5 1/2
14. 1994 Draney Peak, ID M 5.9
15. 1930 Grover, WY M 5.8
16. 1975 Pocatello Valley, ID M 6.0
17. 1962 Cache Valley, UT M 5.7
18. 1884 Bear River, ID M 6.3
19. 1909 Hansel Valley, UT M 6 ±
20. 1934 Hansel Valley, UT (series) M 6.6
21. 1914 Ogden, UT M 5 1/2
22. 1894 Ogden, UT M 5.0
23. 1910 Salt Lake City, UT M 5 1/2
24. 1949 Salt Lake City, UT M 5.0
25. 1943 Magna, UT M 5.0
26. 1962 Magna, UT M 5.2
27. 1958 Wallburg, UT M 5.0
28. 1915 Provo, UT M 5.0
29. 1900 Eureka, UT M 5 1/2
30. 1876 Moroni, UT M 5.0
31. 1961 Ephraim, UT M 5.0
32. 1988 San Rafael Swell, UT M 5.3
33. 1989 S. Wasatch Plateau, UT M 5.4
34. 1901 Southern Utah M 6 1/2
35. 1945 Glenwood, UT M 5.0
36. 1910 Elsinore, UT (series) M 5.0
37. 1921 Elsinore, UT (series) M 6 ±
38. 1967 Marysvale, UT M 5.2
39. 1908 Milford, UT M 5.0
40. 1959 Panguitch, UT M 5.0
41. 1933 Parowan, UT M 5.0
42. 1942 Cedar City, UT M 5.0
43. 1942 Cedar City, UT M 5.0
44. 1902 Pine Valley, UT (series) M 6 ±
45. 1992 St. George, UT M 5.8
46. 1891 St. George, UT M 5.0
47. 1887 Kanab, UT M 5.7
48. 1959 Southwest Utah M 5.7

Figure 1

## EARTHQUAKES RECOMMENDED FOR STUDENT STUDY

A complete list of all earthquakes researched can be found in Figure 1 (see next page). However, some of the earthquakes have very little data. They would be of particular interest if they occurred in your specific area or if you are researching a specific question.

Listed below are the earthquakes for which we have a significant amount of interesting data that will enhance student learning.

<u>EARTHQUAKE</u>	<u>DATE/TIME</u>	<u>MAGNITUDE</u>
1901 Southern Utah	Nov. 13th; 9:39 p.m.	6 ½
1902 Pine Valley, UT	Nov. 17th; 12:50 p.m.	6
1910 Salt Lake City, UT	May 22nd; 7:28 a.m.	5 ½
1921 Elsinore, UT series	Sep. 29th; 7:12 a.m.	6
1925 Clarkston Valley, MT	Jun. 27th; 6:21 p.m.	6 ¾
1934 Hansel Valley, UT	Mar. 12th; 8:05 a.m.	6.6
1935 Helena, MT series	Oct. 18th; 9:48 p.m.	6 ¼
1959 Hebgen Lake, MT	Aug. 17th; 11:37 p.m.	7.5
1962 Cache Valley, UT	Aug. 30th; 6:35 a.m.	5.7
1962 Magna, UT	Sep. 5th; 9:05 a.m.	5.2
1975 Pocatello Valley, UT	Mar. 27th; 7:31 p.m.	6.0
1983 Borah Peak, ID	Oct. 28th; 8:06 a.m.	7.3

## REPORT TOPICS/QUESTIONS for Basic Activities

(What can be learned about earthquakes from newspaper articles )

### EARTHQUAKE

Describe the earthquake.

What did it feel like? Sound like? How long did it last?

Did people realize immediately that they were experiencing an earthquake? If not, what did they think it was?

Describe any aftershocks. How many? Over how much time? What did they feel like? Sound like? How long did they last?

Was the earthquake magnitude (Richter Scale) reported? What scientific explanations were given about the earthquake?

### PEOPLE

Describe how people felt during the earthquake. During aftershocks. After the earthquake.

What did people do during the earthquake?

Was anyone injured or killed? Were there any near misses? Did any injuries occur because people did not duck and cover during the earthquake?

Did the earthquake have any effect on peoples' daily lives? Were there any changes in routine after the earthquake?

Did any funny things happen during the earthquake?

What were people doing at the time the earthquake struck?

What did people do immediately after the earthquake?

### DAMAGE

In what towns was the earthquake felt? Which town(s) seem to have the most damage? How would you rate the Modified Mercalli Intensity for each town? (See activity: Measuring Size of a Utah Earthquake for copy of Modified Mercalli Scale.)

What happened to buildings? Make a list of the types of damage reported. (e.g., chimneys fell, windows broke, etc.)

Make a list of specific buildings that were damaged and their locations. If the articles provide enough information, map the damage locations.

## Report Topics/Questions (Cont'd)

What happened to furnishings in buildings?

What changes did the earthquake cause to the surface of the Earth? Any landslides? Rockfalls?  
New fault scarps? Changes in water flow? (Springs, rivers, wells.)

What, if anything, happened to roads? Airports? Electricity? Telephones? Gas lines?

## ECONOMICS

Did the earthquake have any effect on businesses? Industry?

Were buildings damaged? Did any have to close, even temporarily?

Were there any estimates of repair costs given?

Were homes damaged? If so, did owners make repairs themselves or hire others?

Were schools, government buildings, churches damaged? Who pays for their repair?

Were there any benefits from the earthquake?

## AID/RECOVERY

What aid, if any, was offered by local or national organizations? Government? Individuals?

List any safety measures that were put in place immediately after the earthquake.

What repairs were made to buildings? Were any torn down?

When were repairs made? (How long after the earthquake?)

## EXTENSION ACTIVITIES

### 1. Make a Connection to Your Own Life.

Review the time and day of week the earthquake occurred. What are you usually doing at that time/day? How might an earthquake affect you? What would you do to be safe?

### 2. Consider additional "WHAT IF..?" questions.

If this size earthquake were to **occur again in the same place (or in your own town)**, what do you think might happen?

Are the people any better prepared? Do they know that earthquakes can occur in their area?

Do they know what to do during an earthquake to be safe?

Do families, schools, businesses have emergency response plans?

Have old buildings been retrofitted to make them more resistant to ground shaking?

Are new buildings being designed and constructed to meet the Uniform Seismic Building Code?

Are houses being built to withstand ground shaking?

Is new construction being allowed on known fault scarps?

What could you do now to be better prepared?

### 3. DO SOMETHING to Prepare for an Earthquake.

A. Make your classroom (or bedroom or family room) more safe by moving heavy objects from high to low places.

B. Put on a **preparedness fair** using skits, posters, and reports, etc. to teach others (one classroom, one grade level, whole school, or parents) what to expect to happen in earthquakes and what to do to be safe.



## STUDENT RESEARCH

submit to Earthquake Education Services, University of Utah Seismograph Stations, for possible publication on World Wide Web

### USEFULNESS

Gathering new data about effects of past earthquakes in our own region will benefit many— the student researcher, historians, the community affected by the earthquake, and the scientific community.

Students—

- learn about local earthquakes while conducting the research.
- gain experience in historical research.
- gain experience in writing up research results.
- may have their research published on the University of Utah's World Wide Web site.

Historians—

- gain documentation of earthquake effects on local communities—people and specific buildings.

Earthquake Scientific Community (and thus the local community)—

- develop better understanding of how specific sites and structures on them respond to ground shaking
- use that data for potentially more effective emergency response planning
- use that data to make informed decisions about appropriate engineering design of new structures and land use planning.

### SUGGESTED RESEARCH PROJECTS

1. Contribute to the database of personal accounts of earthquake experiences in the Intermountain West states of Utah, Idaho, Wyoming, or Montana.

A. **ORAL HISTORIES.** Interview someone who experienced an earthquake in one of these states.

Tape record and transcribe your interview. Or, have the person write down the experience. Be sure to include as specific a location as possible (e.g.; second floor of a two story house at 155 E. Oliver St. in Salt Lake City, Utah; in a field 15 miles north of Ogden, Utah). Obtain copies of any photographs documenting earthquake effects or obtain permission for University of Utah Seismograph Stations to have the photo duplicated. (A simplified form is attached for recording essential data.)

B. **DO A LIBRARY SEARCH** for journals of people who were living in the area affected by a particular earthquake or search for town or county histories that might include descriptions of the earthquake. Potentially good library sources include Utah State Historical Society, universities such as Univ. of Utah, Utah State, Southern Utah Univ., Brigham Young Univ., and the LDS Church.

2. **OBTAIN MORE DATA ABOUT EARTHQUAKE EFFECTS ON BUILDINGS AND THE IMPACT OF THE EARTHQUAKE ON SPECIFIC COMMUNITIES.**

Use list of buildings damaged that you compiled from newspaper accounts. Research public records for information about what was done to repair the building, cost of repair, amount of time building was out of use. Is the building in use today?



**Individual Account of Earthquake Experience** submitted by \_\_\_\_\_

NAME \_\_\_\_\_ PHONE (day) \_\_\_\_\_

STREET \_\_\_\_\_ PHONE (evening) \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Date and Time of Earthquake \_\_\_\_\_

Where were you? City \_\_\_\_\_ State \_\_\_\_\_

If you were inside, describe building and specific room (e.g.; 2-story house in upstairs bedroom). If outside, describe location (e.g.; sidewalk in front of department store).

\_\_\_\_\_  
\_\_\_\_\_

What were you doing when the earthquake occurred? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

What happened? What did you see, hear, feel? What did you and those around you do?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

How did you feel? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Additional Information: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_