

Objectives:

- To learn about various natural disasters.
- To learn about the basic scientific process of each type of natural disaster.
- To learn about specific effects of each type of natural disaster.
- To learn how the scientific method is used to study natural disasters.
- To learn how natural disasters are measured.
- To learn about how human beings may cause or make a potential disaster worse.
- To learn about methods for predicting, warning, and mitigating the effects of natural disasters.

Outcomes to demonstrate mastery of issues are very flexible:

- Written report.
- Group presentation.
- Website creation.
- Use as a historical research project.
- Some disasters may lead to a science fair project.
- Use as part of a unit in a science class.
- Use as part of a civics class.
- Research appropriate jobs as part of career education.

Time: At least one period, can be extended as desired.

Materials:

- Paper
- Pencils

A list of suggested research terms and websites is appended.

Procedure:

Have class break into groups of 3 or 4 participants. After each step, the groups will report their results to the class.

- 1. Pre-Quiz**
Discuss.
- 2. Have you experienced a natural disaster or are you a first responder?**
Discuss.
- 3. Disaster vs. Risk**
Discuss.
- 4. Prediction vs. Forecast**
Discuss.
- 5. Preparation/Mitigation vs. Recovery**
Discuss.
- 6. List likely Nevada and region disasters**
 - a. Define region.
 - b. Groups discuss and list likely disasters on sheet of paper.

7. **What are the specific hazardous effects of each natural disaster on list?**
 - a. Each group selects one natural disaster and works on it.
 - b. Determine for each, do you watch, duck, or run? Why?
8. **How do we know what to do?**
9. **Community vulnerabilities and assets.**
 - a. List what community areas are likely to be most impacted.
 - b. List what community assets should be available to help.
10. **How can this topic area be extended to use across the curriculum?**

Each group brainstorms and lists possible assignments/in class projects.
11. **Additional In-Class Activities**

In Class Activities

Earthquakes:

Slinky Races.

Materials:

2 metal slinkies.

Procedure:

Slinky 1: 1 participant holds the end of one slinky.

Another participant stretches the slinky on table or on the floor.

Slinky 2: Repeat with another slinky, parallel to and pulled out to the same length as the first. A 5th participant will be the Referee and will judge the winner.

Slinky 1: At one end, gather up loops so the slinky is stretched tight.

Slinky 2: At the same end as Slinky 1, do not gather up loops.

Referee will be in position at the other end of the slinkies.

Referee says, "Ready, set, go"

On "Go:"

Slinky 1: Release all loops but the first so a pulse of loops moves quickly to far end of slinky.

Slinky 2: Holding slinky flat on table or floor, make a whipping motion so a curved wave proceeds the length of the slinky.

Which got to the far end of the slinky first?

Slinky 1 mimics 'P wave,' the primary or compressional wave in an earthquake, the quickest earthquake wave to move through the earth from the epicenter. The wave pulses forward in the direction of the wave's travel.

Slinky 2 mimics the 'S wave,' the secondary or sine wave that moves perpendicular to the direction of travel.

(Waves that move through the earth are called "Body waves.")

The difference in arrival times between P and S waves, like the difference between seeing lightning and hearing the slower sound waves of thunder, allow us to calculate the distance to the earthquake.

Earthquake Preparedness 1.

Practice "Duck, Cover, and Hold."

Earthquake Preparedness 2.

Materials:

Pencil
Graph paper
Ruler.

Procedure.

Break into groups.

Each group draws a map of the room. Drawing it to scale is unnecessary for this exercise. Mark on the map various earthquake hazards in the room.

Each group reports their findings to the class, with suggestions to mitigate the hazard.

Warnings for Disasters

Materials:

- Pencils
- Paper
- Colored pencils or safe markers

Procedure:

Create a **watch** or **warning** poster for the disaster of your choice.

Examples:

- What to do in tornado watch.
- What to do in tornado warning.
- What to do if tsunami warning sirens sound.
- What to do in hurricane watch.
- What to do in hurricane warning.

Variants:

- Create a website.
- Create a TV commercial.

Appendix

Reference materials can be found on the following websites:

- [Geohazards, Nevada Bureau of Mines and Geology](#)
- [National Weather Service Reno](#)
- [U.S. Geological Survey](#)
- [FEMA](#)
- [National Hurricane Center](#)
- [Storm Prediction Center](#)
- [The Weather Channel](#)
- [Red Cross](#)
- [NASA Center for Near Earth Object Studies](#)
- [U.S. Forest Service Wildland Fire](#)
- [TMCC Research Guide on Natural Disasters](#)
- [Washoe County Emergency Management](#)
- [Nevada Division of Emergency Management](#)
- [Flood Stage Crest Prediction](#)
- [USGS Flood Information](#)
- [Occupational Outlook Handbook](#)
- [MyHAZARDS -- Nevada](#)

Other Lesson Plans

- [Brain Pop Lesson Plan on Natural Disasters](#)
- [Teacher Vision Natural Resources](#)
- [PBS Natural Disasters](#)
- [Better Lesson High School](#)
- [Open Geography Education](#) (includes scientific method)
- [Natural Disasters Science Fair Projects](#)

Web searches using the following keywords will uncover many other sites. The most reliable sites will have the suffix: .org and .gov. Wikipedia is quite good on these topics, although you may wish to discourage your students from relying on it. Web imagery is also excellent, as are videos on YouTube (thanks to cell phones, no daylight disaster goes unrecorded).

- Earthquakes
- Volcanoes
- Floods
- Landslides
- Hurricanes
- Tornadoes
- Severe weather
- Sinkholes
- Storm surges
- Tsunami
- Rogue waves
- Drought
- Climate change
- Asteroid or comet impacts
- Fire
- Plate Tectonics

- Scientific method
- Subsidence
- Nor'easters

Guided Discussion for Various Disasters

Earthquakes

- Type of faults, what do we have in Nevada?
- Slinky Races: P-wave vs. S-wave.
- Locating an Earthquake.
- Causes.
- Primary effects.
- Linked effects.
- Mitigation? Do a classroom earthquake safety check.
- Earthquake safety: map the classroom as to hazards.
- Can human beings cause earthquakes or make their effects worse?
- What government or private agencies are involved in study, prediction, warning, and/or recovery?
- What scale(s) measure the size or effect of the earthquake?
- Name famous earthquakes. Write a report about one.
- Can they be predicted?
- Warnings.

Floods

- Flash flood vs. Downstream Flood
- Where do floods occur?
- Flood maps: Map the extent of a hundred-year flood.
- Causes.
- Primary effects.
- Linked effects.
- Name famous floods. Write a report about one.
- Can human beings cause floods or make their effects worse?
- Mitigation?
- Prediction?
- Flood safety.
- What government or private agencies are involved in study, prediction, warning, and/or recovery?
- How are floods measured?
- Warnings.

Volcanoes

- Types of volcanoes in or near Nevada?
- Baking soda/vinegar volcano model OK, just not for science fair experiment.
- Causes.
- Primary effects.
- Linked effects.
- Mitigation/preparation.
- What government or private agencies are involved in study, prediction, warning, and/or recovery?
- Name famous eruptions. Write a report about one.
- Can human beings cause eruptions or make them worse?
- Can eruptions be predicted?
- Is there a scale to measure the size of eruptions?
- Warnings.

Landslides

- Where do landslides occur?
- Include avalanches in discussion.
- Causes.
- Primary effects.
- Linked effects.
- Mitigation/preparation.
- What government or private agencies are involved in study, prediction, warning, and/or recovery?
- Name famous landslides. Write a report about one.
- Can human beings cause landslides or make them worse?
- Can landslides be predicted?
- Warnings.

Tsunami

- Where do tsunamis occur?
- Causes.
- Primary effects.
- Linked effects.
- Mitigation/preparation.
- Name famous tsunamis. Write a report about one.
- Can human beings cause tsunamis or make them worse?
- Can tsunamis be predicted?
- What government or private agencies are involved in study, prediction, warning, and/or recovery?
- Warnings.

Subsidence

- What is subsidence?
- Do we have a special type of subsidence in Nevada?
- Causes.
- Primary effects.
- Linked effects.
- Mitigation/preparation.
- Name areas especially prone to subsidence. Write a report about one.
- Can humans cause subsidence or make it worse?
- Can subsidence be predicted?
- What government or private agencies are involved in study, prediction, warning, and/or recovery?
- Warnings.

Severe Weather and Tornadoes

- Especially thunderstorms.
- Causes.
- Primary effects.
- Linked effects.
- Mitigation/preparation.
- Since most severe storms are not named, a specific event is hard to research. The worst tornadoes are discussed in news reports, magazines, and books.
- Can human beings make a specific storm worse?
- Prediction?
- Warnings.
- What scales or measurements describe the size or strength of storms?
- What government or private agencies are involved in study, prediction, warning, and/or recovery?

And so forth through the list of disasters.