

Earthquakes in Ohio? Earthquake Risk in the U.S.

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Grade Level 4-5
Duration 1 class period

National Standards

Element 1: The World in Spatial Terms

1. How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information

Element 3: Physical Systems

7. The physical processes that shape the patterns of Earth's surface.

AZ Standards

MATHEMATICS

Number and Operations—Fractions

4.NF.C.6 Use decimal notation for fractions with denominators 10 (tenths) or 100 (hundredths) and locate these decimals on a number line.

4.NF.C.7. Compare two decimals to hundredths by reasoning about their size. Understand that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$.

Standards for Mathematical Practice

4.MP.7 and 5.MP.7 Look for and make use of structure. Mathematically proficient students use structure and patterns to assist in making connections among mathematical ideas or concepts when making sense of mathematics. Students recognize and apply general mathematical rules to complex situations. They are able to compose and decompose mathematical ideas and notations into familiar relationships. Mathematically proficient students manage their own progress, stepping back for an overview and shifting perspective when needed.

Arizona Social Science Standards

Geography

The use of geographic representations and tools help individuals understand their world.

4.G1.1 Use and construct maps and graphs to represent changes in the Americas over time.

Key concepts include but are not limited to human and physical features of the Americas, trade and exploration routes, the location of civilizations and societies in the Americas including indigenous peoples, and settlement patterns including the development of the Southern, Middle, and New England Colonies

5.G1.1 Use and construct maps and graphs to represent changes in the United States.

Key concepts include but are not limited to physical and human features of the United States, the regions of the United States and their characteristics, geographic location of major events, the growth of the United States through territorial expansion, demographic changes, and the states and their capitals

Human-environment interactions are essential aspects of human life in all societies.

5.G2.1 Describe how natural and human-caused changes to habitats or climate can impact our world.

Global interconnections and spatial patterns are a necessary part of geographic reasoning.

5G4.1 Describe how economic activities, natural phenomena, and human-made events in one place or region are impacted by interactions with nearby and distant places or regions.

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Overview

This lesson uses different maps to help students understand where earthquakes have occurred and how we can generalize trends to predict risk areas where earthquakes are likely to occur again.

Purpose

In this lesson students will gain a better understanding of how data and data mapping allow us to make predictions and create trends of occurrence.

Materials

- Teacher Directions
- Lab Sheet and Answer Key
- Rubric for Grading Lab Sheet
- Choropleth Map Showing Risk of U.S. Earthquake Activity
<https://www.sciencemag.org/news/2014/07/new-map-fingers-future-hot-spots-us-earthquakes>
- Seismicity of the United States 1977-1991 map
https://geoalliance.asu.edu/sites/default/files/maps/US_seismicity.pdf
- Earthquake Facts
- Calculators (optional)

Objectives

The student will be able to:

1. Identify a relationship between data and mapping.
2. Organize information from a map into a table.
3. Determine trends pertaining to earthquakes in the United States, regions, and/or individual states.

4. Communicate trends using rational numbers.

Procedures

Students should have experience with fractions and converting fractions to percentages.

1. Use the Teacher Directions to discuss earthquakes and discuss the maps in general.
2. Have the students complete the Lab sheet
3. Use the Earthquake Fact sheet at the end for closure.

Assessment

Geography Assessment: Use Rubric for Grading Lab Sheet to score student work. Grade questions 1, 2, and 5 for geography. Mastery is 75% or higher.

Math Assessment: Use Rubric for Grading Lab Sheet to score student work. Grade questions 3 and 4 for math. Mastery is considered 100%.

Extension

Students can research current data for their state to see if earthquake norms are increasing or decreasing.

Sources

A special thanks to Kay McClain, Vanderbilt University

U.S. Geological Survey website
Earthquake Lists, Maps and Statistics
<https://earthquake.usgs.gov/earthquakes/browse/>