

Earth Science

Chapter 12 - Earthquakes

Section 3 – Earthquakes and Society

E.Q.: *Describe the relationship between tsunamis and earthquakes and the methods for forecasting quakes.*

STANDARDS:

SES2. Students will understand how plate tectonics creates certain geologic features, materials, and hazards.

- a. Distinguish among types of plate tectonic settings produced by plates diverging, converging, and sliding past each other.**
- b. Relate modern and ancient geologic features to each kind of plate tectonic setting.**
- c. Relate certain geologic hazards to specific plate tectonic settings.**

Objectives:

- Discuss the relationship between earthquakes and tsunamis.**
- Describe two possible effects of a major earthquake on buildings.**
- List three safety techniques to prevent injury caused by earthquake activity.**
- Identify four methods scientists use to forecast earthquake risks.**

Earthquakes and Society

- Most earthquake injuries result from the collapse of buildings and other structures or from falling objects and flying glass.**
- Other dangers include landslides, explosions caused by broken electric and gas lines, and floodwaters released from collapsing dams.**

Tsunamis

tsunami - a giant ocean wave that forms after a volcanic eruption, submarine earthquake, or landslide

- A tsunami may begin to form when the ocean floor suddenly crops or rises because of faulting associated with undersea earthquakes.
- A tsunami may also be triggered by an underwater landslide caused by an earthquake.

Destruction to Buildings and Property

- Most buildings are not designed to withstand the swaying motion caused by earthquakes.
- A building constructed on loose soil and rock is much more likely to be damaged during an earthquake than a building constructed on solid ground is.

Earthquake Safety

- People who live near active faults should be ready to follow a few simple earthquake safety rules to help prevent death, injury, and property damage.

Before an Earthquake

- Be prepared. Keep an adequate supply of food, water, batteries, flashlights and a radio.
- Prepare an earthquake plan and discuss it with your family.
- Learn how to turn off the gas, water, and electricity in your home.

During an Earthquake

- Protect yourself from falling debris by standing in a doorway or crouching under a desk or a table.
- Stay away from windows, heavy furniture, and other objects that might topple over.
- If you are in a car, stop in a place that is away from tall buildings, tunnels, power lines, or bridges and wait until the tremors cease.

After an Earthquake

- **Be cautious.**
- **Check for fire and other hazards.**
- **Always wear shoes when walking near broken glass.**
- **Avoid downed power lines and objects touched by downed wires.**

Earthquake Warnings and Forecasts

- **Scientists study past earthquakes to help them predict where future earthquakes are most likely to occur.**
- **Using records of past earthquakes, scientists are able to make approximate forecasts of future earthquake risks.**
- **There is currently no reliable way to predict exactly when or where an earthquake will occur.**

Seismic Gaps

Seismic gap - an area along a fault where relatively few earthquakes have occurred recently but where strong earthquakes are known to have occurred in the past

- **Some scientists think that seismic gaps are likely locations of future earthquakes.**
- **Several seismic gaps that exist along the San Andreas Fault zone may be sites of major earthquakes in the future.**

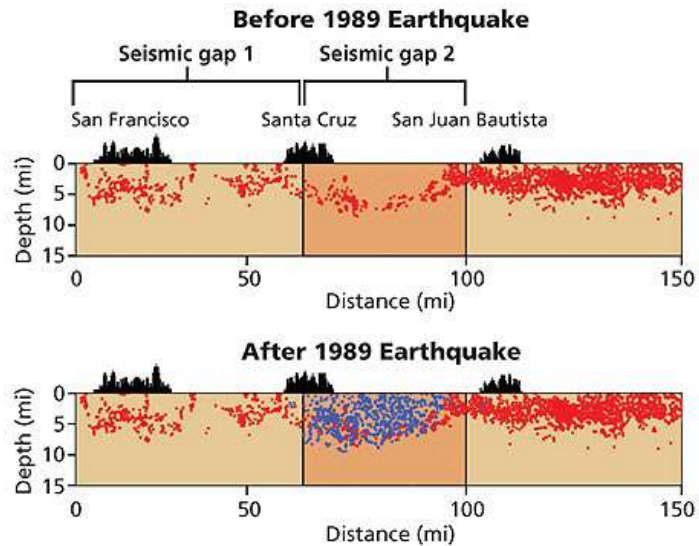
Reading Check

Why do scientists think that seismic gaps are areas where future earthquakes are likely to occur?

Scientists think that stress on a fault builds up to a critical point and is then released as an earthquake.

Seismic gaps are areas in which no earthquakes have happened in a long period of time and thus are likely to be under a high amount of stress.

The diagram below shows how seismic gaps help predict earthquakes.



Foreshocks

- **Some earthquakes are preceded by little earthquakes called *foreshocks* that can occur from a few seconds to a few weeks before the main earthquake.**
- **Only one earthquake has been successfully predicted using foreshocks.**

Changes in Rocks

- **Scientists use sensors to detect slight tilting of the ground cause by stress that builds up in fault zones.**
- **When cracks in rock are filled with water, the magnetic and electrical properties of the rock change.**
- **Scientists also monitor natural gas seepage from rocks that are strained or fractured from seismic activity.**
- **In the future scientists may be able to use these signals to help predict earthquakes.**

Reliability of Earthquake Forecasts

- **Not all earthquakes have foreshocks or other precursors, which makes precise earthquake prediction mostly unreliable.**

- **Scientists continue to study seismic activity so that they may one day make accurate forecasts and save more lives.**

Maps in Action

