

Expository  
Text

# EARTHQUAKES

by Elizabeth Doering

Mc  
Graw  
Hill

PAIRED  
READ

Glaciers

## STRATEGIES & SKILLS

### Comprehension

**Strategy:** Reread

**Skill:** Cause and Effect

### Phonics

*r*-controlled vowels /ûr/

*er, ir, ur, or*

### Vocabulary Strategy

Sentence Clues

### Vocabulary

active, earth, explode,  
island, local, properties,  
solid, steep

### Content Standards

#### Science

Earth and Space Science

Word count: 493\*\*

**Photography Credit:** Cover Reynold Mainse\*/Design Pics/CORBIS

\*\*The total word count is based on words in the running text and headings only. Numerals and words in captions, labels, diagrams, charts, and sidebars are not included.



## Essential Question

How does the earth change?

# EARTHQUAKES

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READ**

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**STEM**

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## Chapter 1

# What Are Earthquakes?

Picture this. You are home. You feel the house start to shake. Glasses rattle. So do dishes. A hanging lamp sways. It could be an earthquake.

There was a big earthquake in San Francisco, California, in 1989.



Roger Ressmeyer/Corbis



**China was hit hard by an earthquake in 2010.**

Big earthquakes are big news. There were earthquakes long ago too. But we do not know a lot about them.

There was an earthquake in Virginia in August 2011. Millions of people felt it. Buildings shook from Washington, D.C., to New York City.



The map shows the effects of the quake.

### **Understanding the Map**

The star shows the center of the quake. The circles show where people felt it.



In March 2011, a strong earthquake hit Japan. It moved Japan's main island 8 feet (2.4 meters).

**Japan has many earthquakes.**



Earthquakes often happen near places called fault lines. California has many. The San Andreas fault is in California. It is active. Strong earthquakes happen near there.

**This is what the San Andreas fault looks like from the air.**







**The Mississippi River is over 2,300 miles long.**

Big earthquakes hit the Mississippi River in 1811 and 1812. They caused huge waves. Landslides formed on steep hills. It looked like the mighty Mississippi was flowing the wrong way!

**STOP AND CHECK**

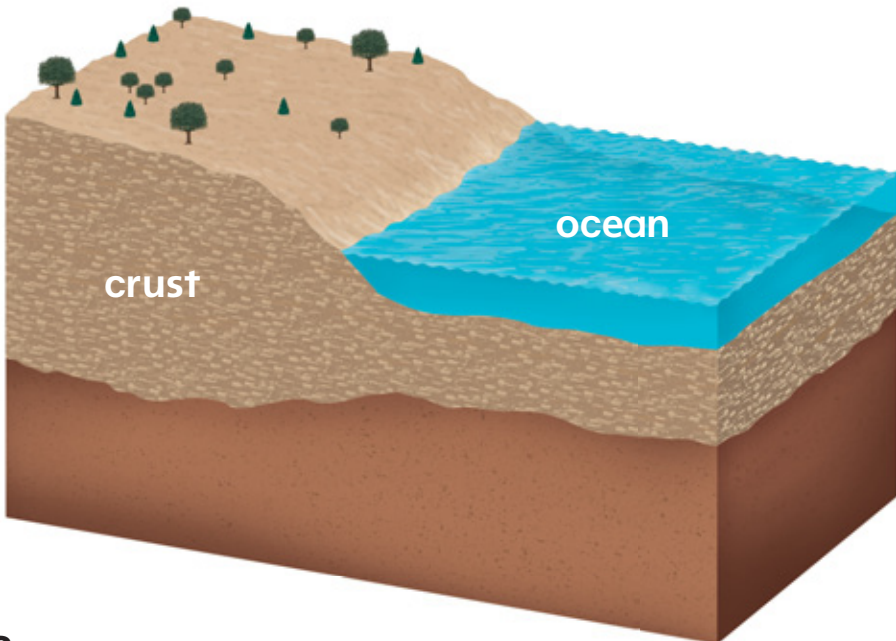
What have you learned about earthquakes so far?

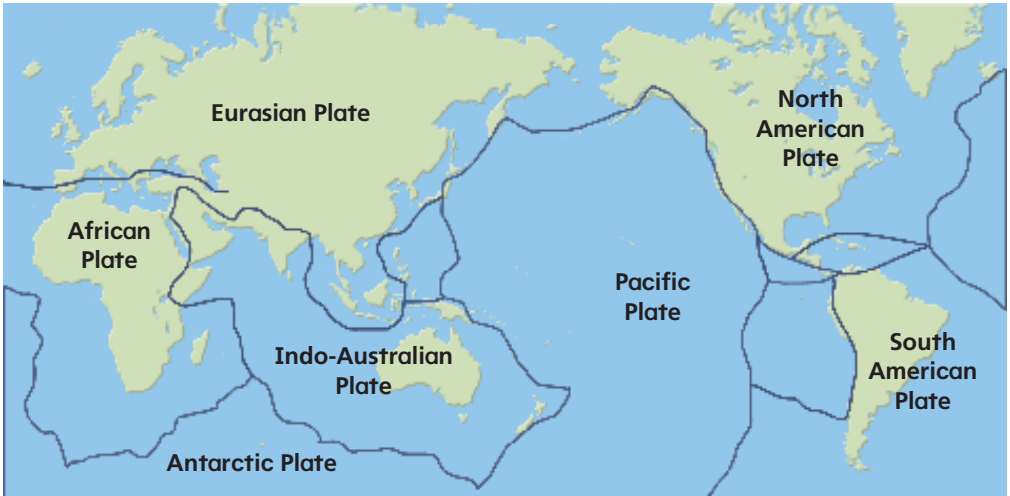
## Chapter 2

# What Causes Earthquakes?

Earth's surface is called the crust. It has interesting properties. It feels like one solid piece. But it is made up of broken pieces called plates.

This diagram shows the Earth's crust on land and under the oceans.





More earthquakes happen where two plates meet. The lines show the outlines of the plates.

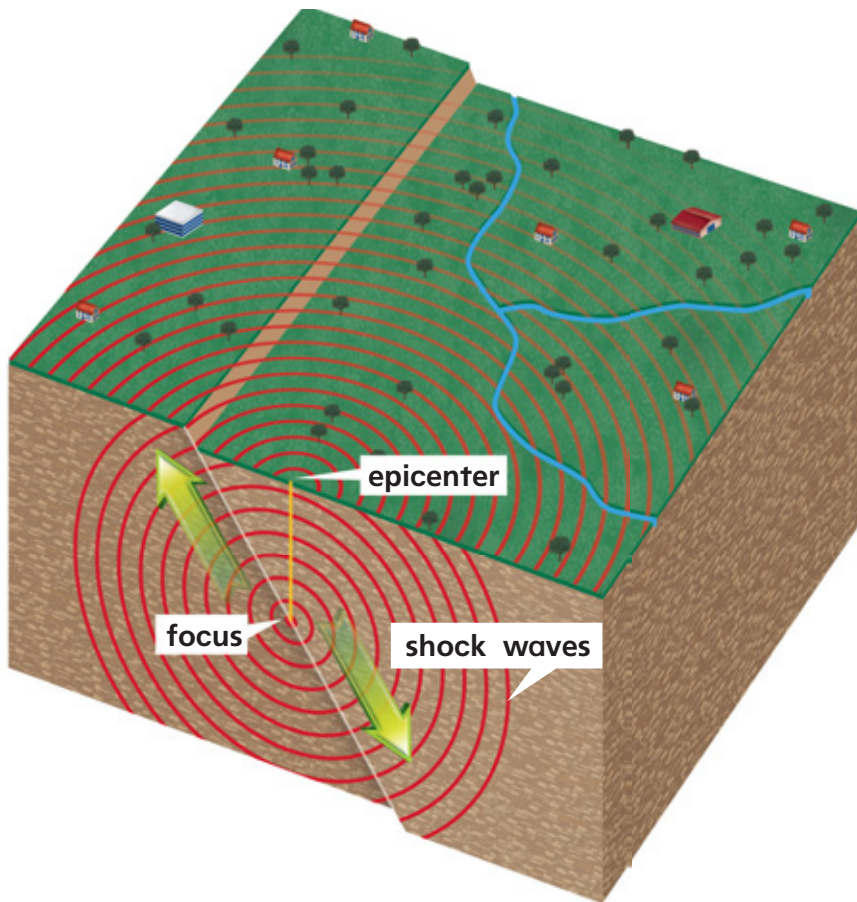
## Plates

We can't feel it. But these plates move. They move slowly. They slide. They pull away from each other. That can make chunks of rock explode. This causes shock waves.



# Shock Waves

Shock waves begin deep underground. They start at a place called the focus. Then they move through the ground. Some reach the surface. This causes an earthquake.



**Shock waves can move through solid rock.**

Imagine if you traveled from the focus straight up to Earth's surface. You would be at the earthquake's epicenter. That is where people feel it most.

Earthquakes happen underwater too. This can cause huge waves called tsunami.

**Giant tsunami can cause lots of damage.**



**STOP AND CHECK**

What causes earthquakes?

# Tsunami

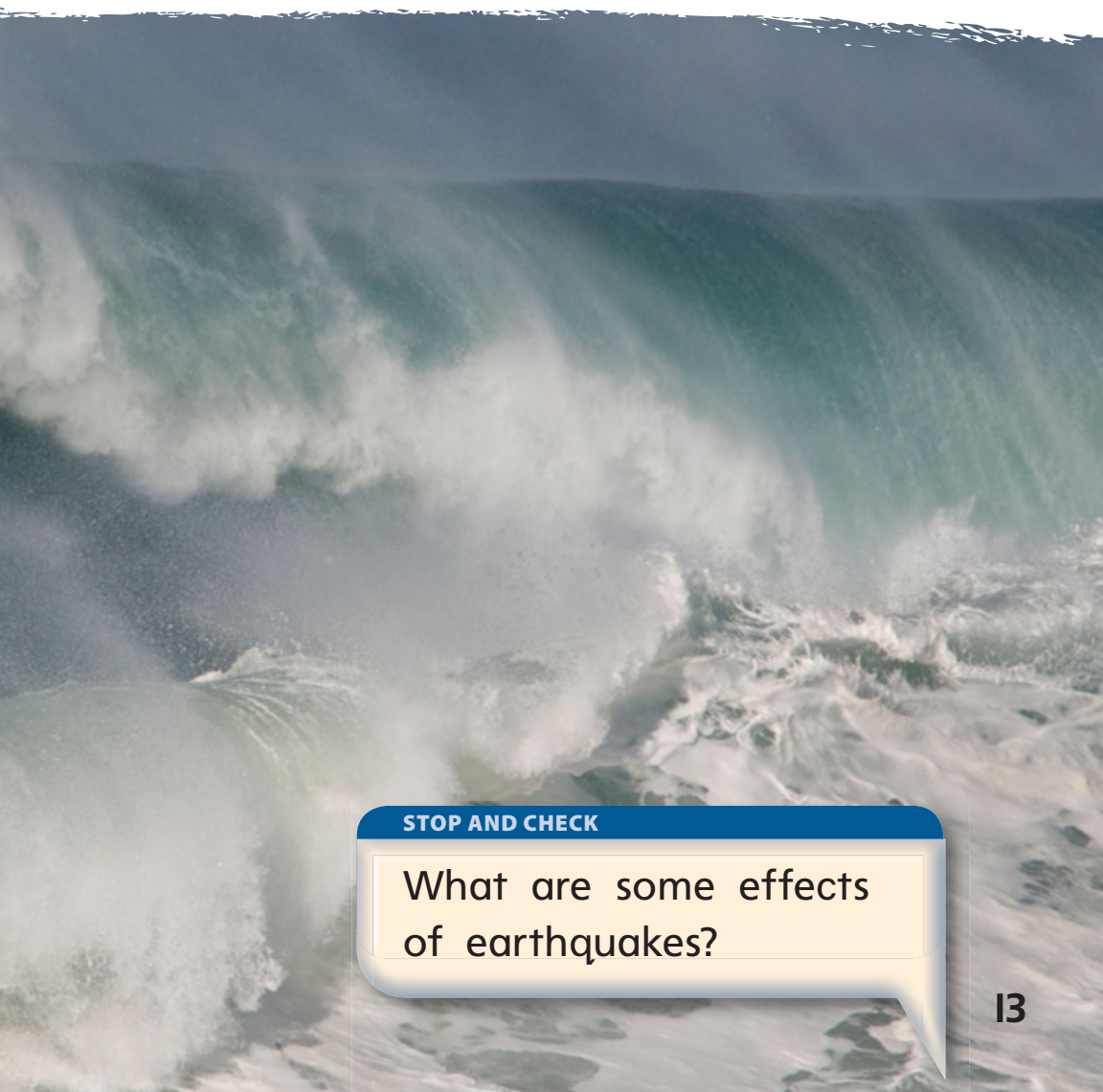
Tsunami are giant ocean waves. Some are as tall as a ten-story building when they hit shore. These waves are very powerful. They are dangerous.





Tsunami waves start small. They stay small out at sea. Near land, they suck up water. They grow taller and wider. Then a huge wall of water crashes down on shore.

**This is what a tsunami looks like as it grows.**



**STOP AND CHECK**

What are some effects of earthquakes?

## Chapter 3

# How Strong Are Earthquakes?

Some earthquakes make buildings fall down. But most earthquakes are small. People do not even feel many local earthquakes.

**This machine, a seismograph, tells how strong an earthquake is.**





**This is a seismograph used in ancient China.**

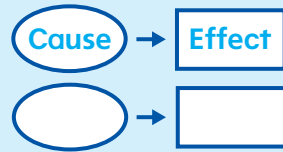
There will always be earthquakes.  
But people are safer now  
because we have learned a lot  
about earthquakes.



# Respond to Reading

## Summarize

Use the chart to help you summarize *Earthquakes*.



## Text Evidence

1. Is *Earthquakes* fiction or nonfiction? Explain. **Genre**
2. What can underwater earthquakes cause? **Cause and Effect**
3. What is the meaning of *sways* on page 2? **Sentence Clues**
4. Write about why earthquakes happen. **Write About Reading**

## Compare Texts

Read to find out how glaciers change Earth.

# Glaciers

Glaciers are sparkling masses of ice, snow, rock, and water. They form on snowy mountain tops. Snow piles up into heavy layers. New snow crushes the layers below. Ice then forms under the top layer. It starts sliding down. Now a glacier has formed.

Some glaciers look blue.

# Rivers of Ice

Glaciers do not stay still. They move. They flow like a river. A huge mass of moving ice can carve new landscapes.



**This glacier in Alaska is crumbling.**

Some glaciers are near the equator. It is hot at the equator. But the glaciers are up high in mountains. It is much cooler there.





The glacier on top of Mount Kilimanjaro in Tanzania, Africa, is melting.

## Melting Glaciers

Glaciers can melt. They seem to be melting faster now. That may be because Earth's temperatures have gotten a bit warmer. Three-quarters of all the world's fresh water is frozen inside glaciers. What if all that ice melted?



### Make Connections

How do earthquakes change Earth?

#### Essential Question

How are glaciers like tsunami?

#### Text to Text

# Focus on Science

**Purpose** To make a model of an earthquake

## What to Do

**Step 1**

Work outside with a group. Bring a pencil, a bake pan, two fabric pieces, wet soil, and toy trees or people.

.....

**Step 2**

Place fabric pieces in pan. Let ends hang out. Pat soil into pan. Make a path in the middle with your pencil.

.....

**Step 3**

Put toys on top. Pull fabric pieces in opposite directions.

**Conclusion** Describe the results.

# Thinkmark

## Text Structure

What does the diagram on page 8 show?

What machine does the author describe in Chapter 3?

## Vocabulary

What new words did you learn?

What clues helped you understand their meaning?

## Conclusions

What is the most important thing you learned in *Earthquakes*?

## Author's Purpose

Why do you think the author wrote *Earthquakes*?