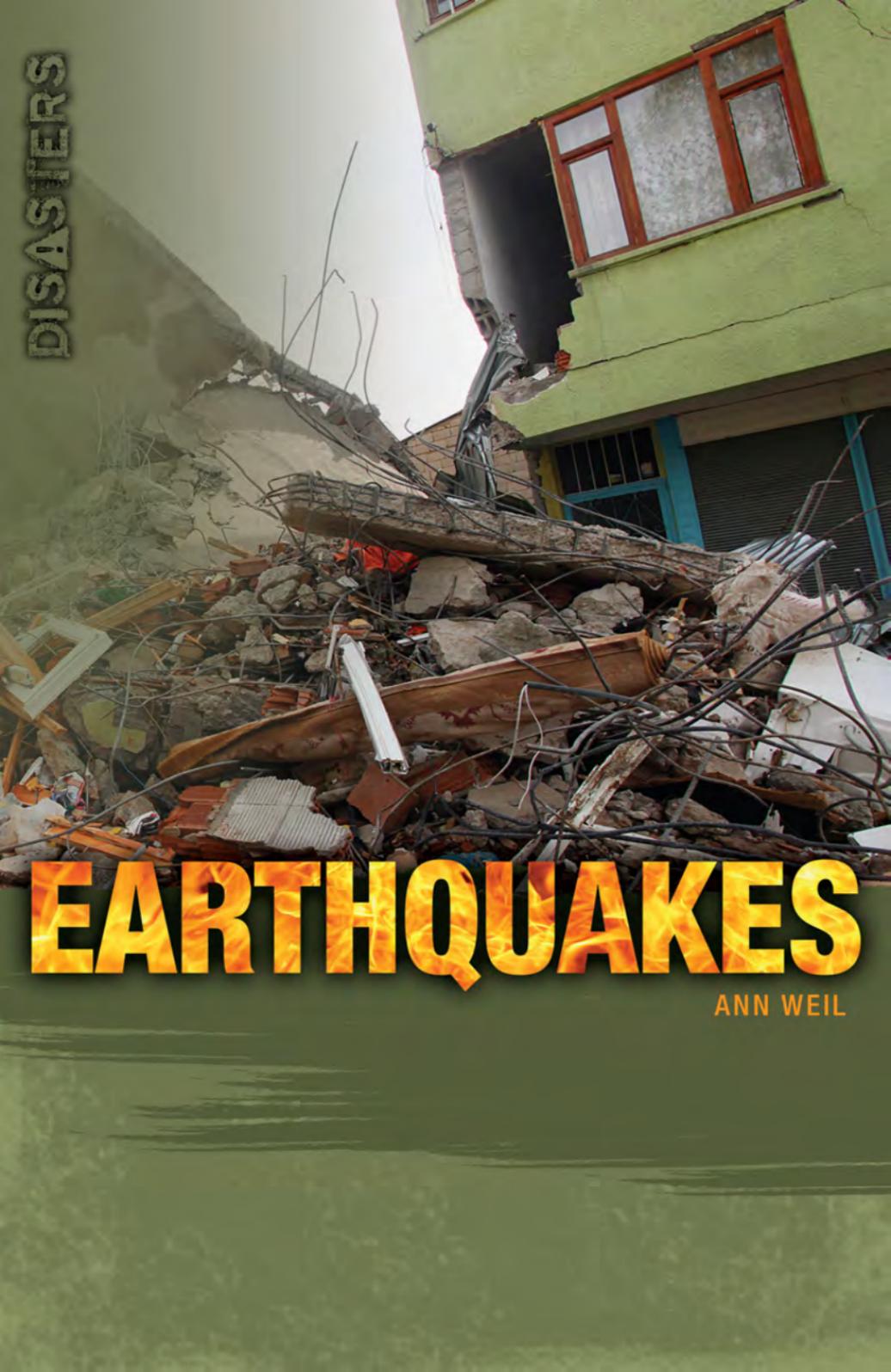


DISASTERS

A photograph showing the aftermath of an earthquake. In the foreground, there is a large, chaotic pile of rubble consisting of broken concrete, twisted metal rebar, and splintered wood. In the background, a two-story building with light green walls and red window frames is partially destroyed. A window on the upper floor is missing, and the structure appears to be leaning. The sky is overcast and grey.

# EARTHQUAKES

ANN WEIL

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## CHAPTER 1 | Introduction

# DATAFILE

### Timeline

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#### 1811, 1812

Earthquakes cause the Mississippi River to flow upstream.

#### 1935

Charles Richter invents the Richter Scale to measure the power of earthquakes.

### Where is the Pacific Ring of Fire?





### **Did You Know?**

Earthquakes can destroy entire cities. They also cause tsunamis and fires, which destroy as much, and sometimes more, as the earthquake itself.

### **Key Terms**

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**Pacific Ring of Fire**—a band around the Pacific Ocean where two tectonic plates (part of the Earth's crust) meet

**Richter Scale**—a scale used to measure the strength of earthquakes

**shock waves**—energy that travels underground, but causes earthquakes at the surface

**tsunami**—huge waves created by an earthquake or volcano underwater

## CHAPTER 1 | Introduction

You hear a rumbling louder than thunder. The ground begins to shake. It's an earthquake!

Earthquakes can be deadly. Many last a minute or less. But in those few seconds entire cities can crumble. Buildings and bridges collapse. People are crushed or buried alive.

Millions have died in earthquakes. Even after an earthquake stops, the damage may continue. Fires break out. These fires can destroy even more than the earthquake itself.

Some earthquakes happen underwater. These can cause big ocean waves called tsunamis.

Tsunamis are huge walls of water. They crash down on land with tremendous force. Tsunamis caused by earthquakes kill many thousands of people all over the world.

Tsunami are giant waves that hit the shore. Some are as tall as a ten-story building. Tsunami are not very big when they are out at sea. But, out in the ocean, they travel faster than a speeding bullet.

Near land, they suck up all the water near the shore. Then they crash down. They can smash and wash away buildings. People are crushed and swept out to sea.

## **Why Do Earthquakes Happen?**

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The top layer of our planet is called the crust. It seems solid to us. In fact it's broken into giant pieces. These pieces are called tectonic plates.

Plates are always moving. They move very slowly. Sometimes plates slide past each other. Sometimes they push against each other. In some places, plates pull away from each other.

All this movement creates pressure underground. The pressure builds up. It causes huge chunks of rock to break. It's as if a bomb has exploded underground.

An enormous amount of energy is released. Some of this energy is in the form of shock waves. Shock waves travel through the ground. Some of them reach the surface. When they do, they can cause tremendous damage.

Severe earthquakes can lift huge stones off the ground. The ground can shake so much that buildings tumble down like a house of cards.

Highways crack open. Cars may be swallowed up. It's impossible to stand or run during a bad earthquake. People become helpless. Earthquakes are one of our deadliest natural disasters.

## **The Pacific Ring of Fire**

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Most earthquakes happen near where two plates meet. Most of the world's earthquakes occur in a band around the Pacific Ocean. This band is called the Pacific Ring of Fire.

Parts of California are on the Pacific Ring of Fire. So is Japan. There are many cities along the Pacific Ring of Fire. When an earthquake hits a big city, it can be a disaster.

## **Measuring Earthquakes**

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There are millions of earthquakes each year. Most of these are very mild. Only about 100,000 can be felt. Fortunately, only a small fraction of earthquakes cause disasters. Only about 100 cause any damage at all.

There are different ways to measure earthquakes. Scientists use a machine called a seismograph to detect earthquakes. It also measures and records the strength of earthquakes.

The Richter Scale is based on these measurements. Charles Richter developed the Richter Scale in the 1930s.

It is the most commonly used scale to rank and measure earthquakes.

The Richter Scale goes from 0 to 9. Serious earthquakes usually measure more than 7.0 on the Richter Scale. Earthquakes less than 5.0 rarely cause any damage.

Each number on the scale represents ten times the power of the previous one. So, an earthquake that measures 8.0 on the Richter Scale is ten times more powerful than one that measures 7.0.

Another way to measure earthquakes is to ask people what they felt and saw during an earthquake. The Mercalli Scale is based on what people see and say. It describes how much damage an earthquake causes.

## **The Mercalli Scale:**

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1. Most people don't feel the earthquake.
2. A few people notice shaking.
3. People indoors think a truck has passed by outside. Hanging objects may swing. People may not realize that it is an earthquake.
4. Windows, dishes, and glasses rattle. People inside may feel a jolt as if something has hit the house. Parked cars rock.
5. Doors swing open and shut. Buildings shake. Liquid slops out of glasses.
6. Everyone feels it. Plaster cracks. Things fall off shelves. Windows break. Trees sway.