

Earthquakes


as you read

What You'll Learn

- **Explain** how earthquakes are caused by a buildup of strain in Earth's crust.
- **Compare and contrast** primary, secondary, and surface waves.
- **Recognize** earthquake hazards and how to prepare for them.

Why It's Important

Studying earthquakes will help you learn where they might occur and how you can prepare for their hazards.

 **Review Vocabulary**
energy: the ability to cause change

New Vocabulary

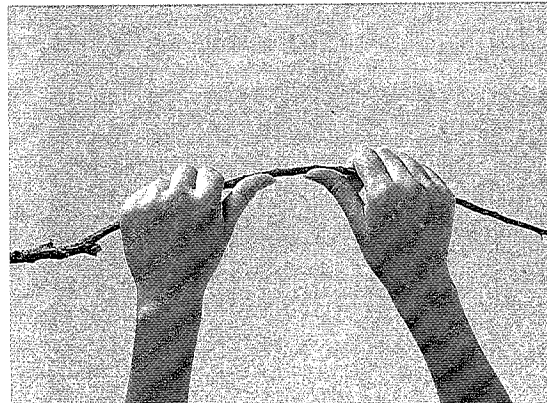
- earthquake
- fault
- seismic wave
- focus
- epicenter
- seismograph
- magnitude
- tsunami
- seismic safe

What causes earthquakes?

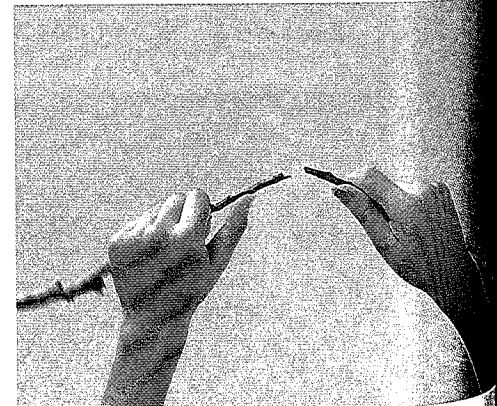
If you've gone for a walk in the woods lately, maybe you picked up a stick along the way. If so, did you try to bend or break it? If you've ever bent a stick slowly, you might have noticed that it changes shape but usually springs back to normal form when you stop bending it. If you continue to bend the stick, you can do it for only so long before it changes permanently. When this elastic limit is passed, the stick may break, as shown in **Figure 1**. When the stick snaps, you can feel vibrations in the stick.

Elastic Rebound As hard as they seem, rocks act in much the same way when forces push or pull on them. If enough force is applied, rocks become strained, which means they change shape. They may even break, and the ends of the broken pieces may snap back. This snapping back is called elastic rebound.

Rocks usually change shape, or deform, slowly over long periods of time. As they are strained, potential energy builds up in them. This energy is released suddenly by the action of rocks breaking and moving. Such breaking, and the movement that follows, causes vibrations that move through rock or other earth materials. If they are large enough, these vibrations are felt as **earthquakes**.



When a stick is bent, potential energy is stored in the stick.



The energy is released as vibrations when the stick breaks.

Figure 1 A stick can bend only so far before it breaks.