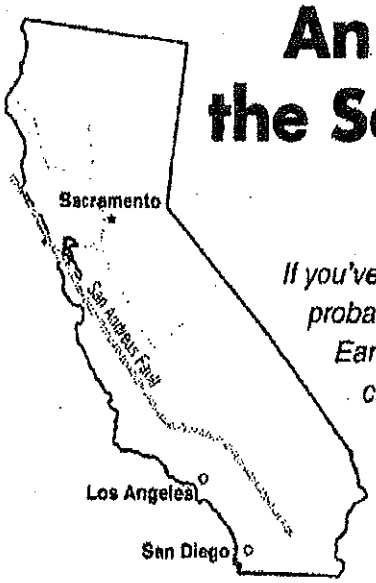
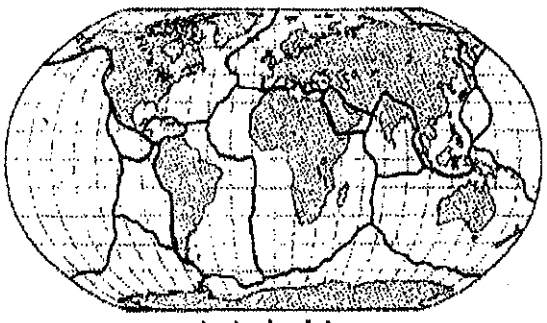
An Inside Look at the San Andreas Fault



If you've ever lived in or visited California, you've probably heard of the San Andreas Fault. Earthquakes along the San Andreas Fault have created some of California's best scenery and worst trouble. In order to understand how these "big shakes" happen, you need to know a bit about what lies far beneath your feet.

Earth's crust is made up of solid sections of rock called tectonic plates that float and slide on Earth's molten mantle. Sometimes one plate's edge slides under another plate. Deep trenches on the ocean floors are proof of this kind of movement. Sometimes two plates collide, making mountains. Sometimes plates slide past each other. Movements of tectonic plates cause faults, or large breaks, in the crust.



tectonic plates

The San Andreas Fault is in western California. It is more than 650 miles (1,046 km) long and 10 miles (16 km) deep. It extends from north of San Francisco southward to San Bernardino. It is the boundary of two of the Earth's moving plates, the Pacific plate on the west and the North American plate on the east.

These two plates creep at the slow rate of a few centimeters a year. They have moved only 350 miles (563 km) in the past 20 million years. As they move, they slide against each other. At some places along the fault, this slide is slow and continuous. This even, steady creep does not cause earthquakes. At other points along the fault, the rocks of the plates get caught on one another as they slide. For one hundred or more years at a time, these "locked" sections do not move at all. Over time, pressure builds up in these areas.

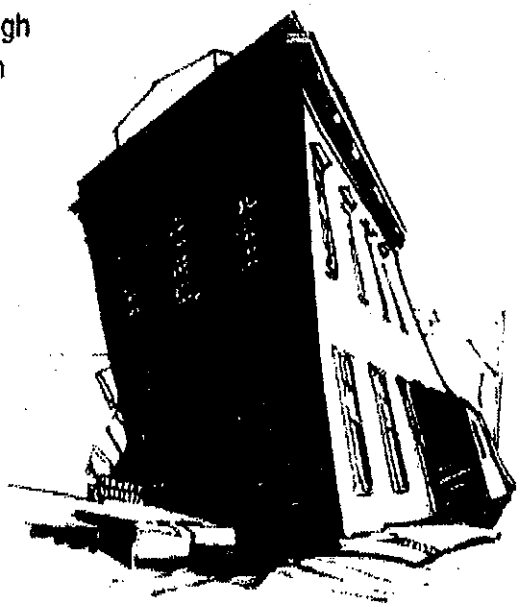
Then the strain is released in a single lurch. When this happens, Earth's crust snaps into a new position. This sudden "faulting" causes vibrations that are felt as earthquakes. The first vibration waves produce a "thud." The next set of waves make the ground roll and sway.

The ridges and valleys of the San Andreas Fault can be seen easily from the air. From the ground its features are less striking. People travel, live, and do business within the fault zone without knowing it. Yet, if they look closely at the landscape, they can tell they are in the zone. Streams make sudden right turns when they cross the fault line. In some spots along the fault, the vegetation and terrain look different on one side of the fault than on the other. High, narrow ridges surrounding deep, still ponds are another sign of the fault zone. In some places along the fault, observers can even see offset fences, roads, and rows of trees moved by earlier earthquakes.

The San Andreas Fault was discovered in 1893 when geologist Andrew Lawson took a close look at the landscape. He found signs of earth movement all along the way from San Diego to San Francisco. Lawson defined the borders of a fault. He named it the San Andreas because its features were most clear around San Andreas Lake.

Thousands of tiny earthquakes occur along the San Andreas Fault each year. Two of the strongest earthquakes in recent history occurred in 1857 and 1906. The 1857 earthquake struck Southern California. No towns were located near the center of the quake so little damage was done to buildings or people.

The 1906 earthquake caused more damage. It occurred in San Francisco where many people lived and worked. The shaking of the quake knocked down buildings. It also broke power lines and overturned wood stoves, causing fires. The fires spread quickly through the wooden structures of the city. More than 700 people died in the disaster. Thousands more were left homeless. Much of San Francisco had to be rebuilt from scratch.



Today we know how to construct buildings that are less likely to fall or burn in earthquakes. We know which kinds of soil are safe to build on. We even have instruments that help us predict when and where earthquakes might occur. Living in the San Andreas Fault zone is much safer today than it was in 1906.

Name _____

Questions about
An Inside Look at the San Andreas Fault

Fill in the bubble that best answers each question.

1. Which of these is **not** a land feature of the San Andreas Fault?
   - ○ sudden turns in streams
   - ○ deep, still ponds
   - ○ numerous purple wildflowers
   - ○ high, narrow cliffs

2. Why are some sections of the San Andreas Fault called "locked"?
   - ○ Geologists cannot do research on locked sections because they are in deep wilderness.
   - ○ Tourists cannot visit locked sections because no roads lead to them.
   - ○ Locked sections of the San Andreas Fault have fences around them.
   - ○ Locked sections of the fault do not move for a hundred or more years at a time.

3. Which movement listed is **not** a movement that tectonic plates experience?
   - ○ Plates collide.
   - ○ Plate edges slide under one another.
   - ○ Plates slide past each other.
   - ○ Plates creep at the rate of one mile per year.

4. What causes earthquakes?
   - ○ the steady, even creeping of tectonic plates sliding past each other
   - ○ locked sections of a fault moving suddenly and sending out vibrations
   - ○ heavy rock avalanches that send out vibrations
   - ○ unusually strong wave action in the world's major oceans

5. How many earthquakes occur in California each year?
   - ○ about five
   - ○ no more than one hundred
   - ○ thousands of major earthquakes
   - ○ thousands of tiny earthquakes

6. Why was the 1906 earthquake in Northern California more destructive than the 1857 earthquake in Southern California?
   - ○ The 1906 earthquake burst water lines causing a major flood to follow the earthquake.
   - ○ The Northern California earthquake occurred in an unpopulated area.
   - ○ The Southern California earthquake occurred in an unpopulated area.
   - ○ The 1857 earthquake did not last as long.

Part 2: Now, provide answers to the following questions. Use complete sentences!

1. What are some of the geologic features associated with the San Andreas Fault? Describe them!

2. What are some of the man-made features that show evidence of being built along the San Andreas Fault? Describe why/how have they been affected by the fault zone.

3. Why was the 1906 earthquake in northern California more destructive than the 1857 earthquake in southern California? BE specific.

4. How was the San Andreas Fault discovered?

5. How would your life be different if you lived along this unpredictable and dangerous fault zone?