



Making maps has changed. One change comes from photography. Now we can take pictures of landforms from airplanes and satellites. Another change came with computers. Computers can make maps quickly. The same maps would take someone hundreds of hours to draw by hand.

← During the early 1800s, Lewis and Clark traveled the Northwest with Shoshone guides, making maps as they explored.

↓ August 24, 2002
New Orleans, Louisiana



Before and After

The greatest change in mapmaking came in 1972. Satellites were sent into space to look at Earth's surface. They sent information back to Earth. Computers use the information to make maps quickly and accurately. The effects of storms and earthquakes can be seen in "before and after" pictures.

↓ September 2, 2005
New Orleans, Louisiana



Have you ever tried to draw a map of your neighborhood? To do it, you'll need to look at all the streets and houses. Then you'll need to note the locations of parks, schools, and other public places. When you know where everything is, you can grab some paper and pencils and start drawing. Imagine how long that takes! Now, imagine if you tried to draw your whole city. What if you tried to draw your whole country?

For hundreds of years, mapmakers gathered information and drew maps by hand. Explorers made maps from what they saw themselves or heard from travelers. It took a long time to draw these maps. No one knew how correct they were.



Earthquakes and Volcanoes

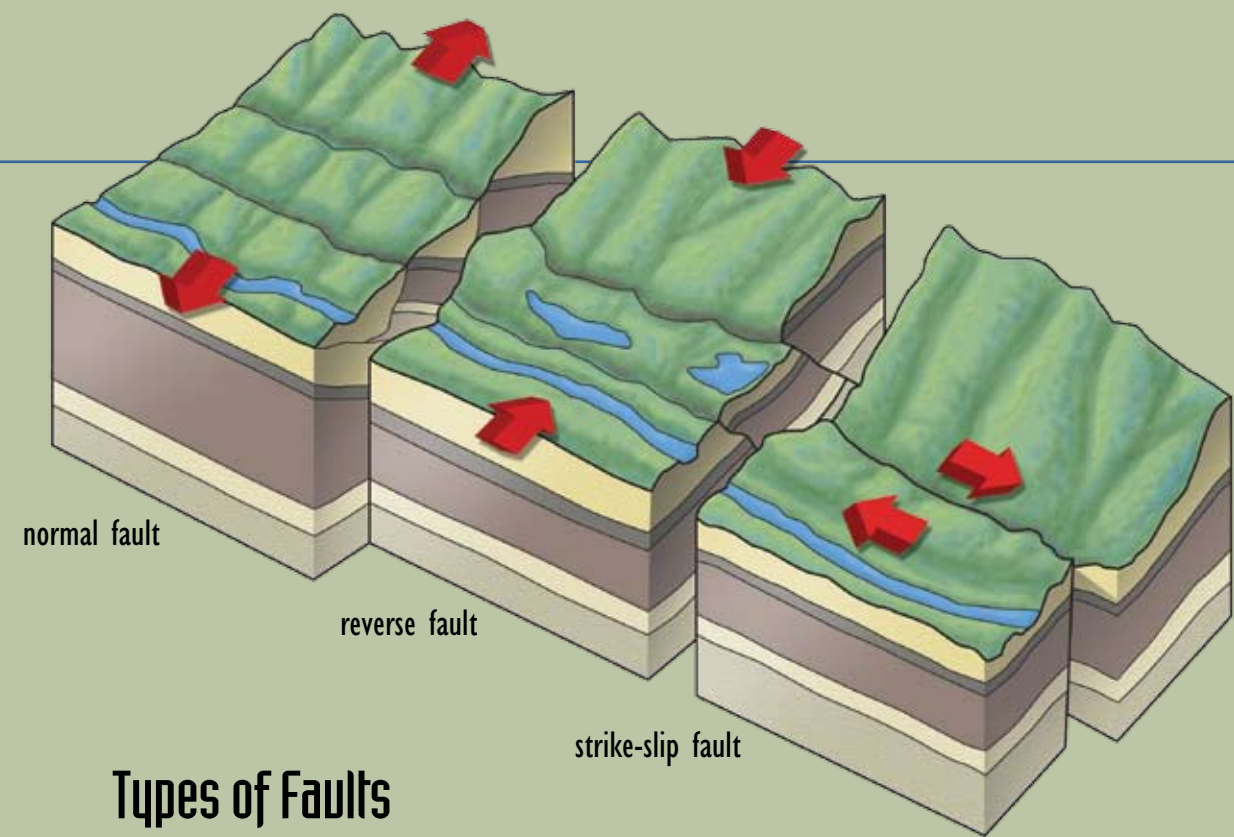
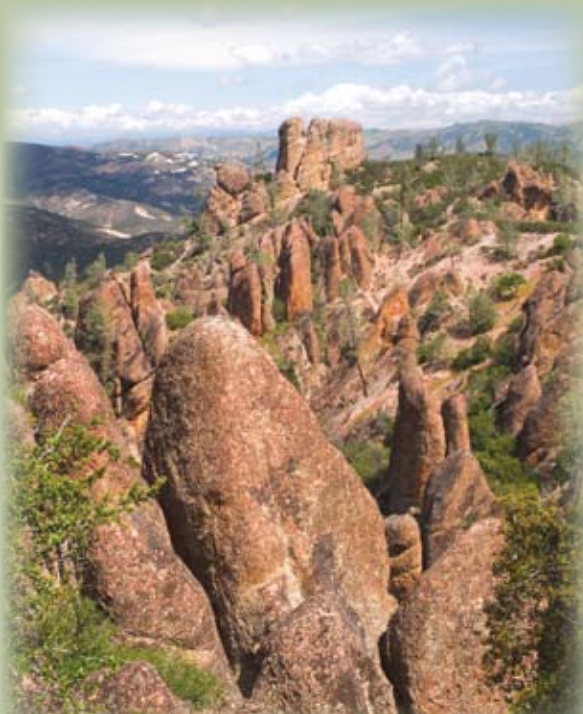
Earthquakes

If you live in certain parts of the world, you are very familiar with earthquakes. There's nothing quite like getting caught up in all the shaking and rolling that goes on when the earth makes a big shift. Have you ever felt an earthquake? An earthquake causes Earth's surface to move and shift. A large earthquake can change the land in seconds.

The outer shell of Earth's **crust** is not one piece. As the pieces of the crust move, stress builds between them. The rock breaks when too much stress builds in one section of the crust. This creates a **fault**. In an earthquake, there is movement at the fault line. This movement can change or create landforms.

↓ Bryce National Park, Utah

↓ Big Bend National Park, Texas



Types of Faults

There are three main types of faults. A normal fault happens when the fault line in the earth runs at an angle to the surface. The stress from an earthquake pushes out, away from the fault line. This causes one section of rock to drop below another section. The Rio Grande valley in New Mexico is an example of a normal fault.

A reverse fault also happens when the fault line is at an angle. But in this case, the stress from an earthquake pushes in toward the fault line. This causes one section of rock to move up and over another section. An example of a reverse fault can be found at Glacier National Park. (A reverse fault is also called a thrust fault.)

A strike slip fault happens when the sections of rock on each side of the fault slip past each other sideways. There is little or no up-and-down movement. San Andreas Fault in California is an example of a strike-slip fault.