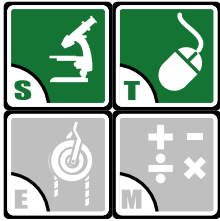


# Seismologist

Career Files teach about important jobs in science and how science is used in other jobs. Careers with the **STEM** symbol focus on Science, Technology, Engineering, or Math.



When Earth shakes, rattles, and rolls, you might run and hide. But that's when seismologists go to work.

A seismologist is a scientist

who studies earthquakes and other geological activity relating to the formation or movement of Earth's shifting crust.

Earthquakes occur when tectonic plates slide past, pull apart from, or collide with one another. Tectonic plates are large regions of Earth's rocky outer shell. These plates are always on the move. As tectonic plates move, they can become wedged together. When the plates free themselves—*kaboom!* A massive amount of energy is rapidly released. That energy produces vibrations, called *seismic waves*, that can shake the ground for hundreds and even thousands of miles.

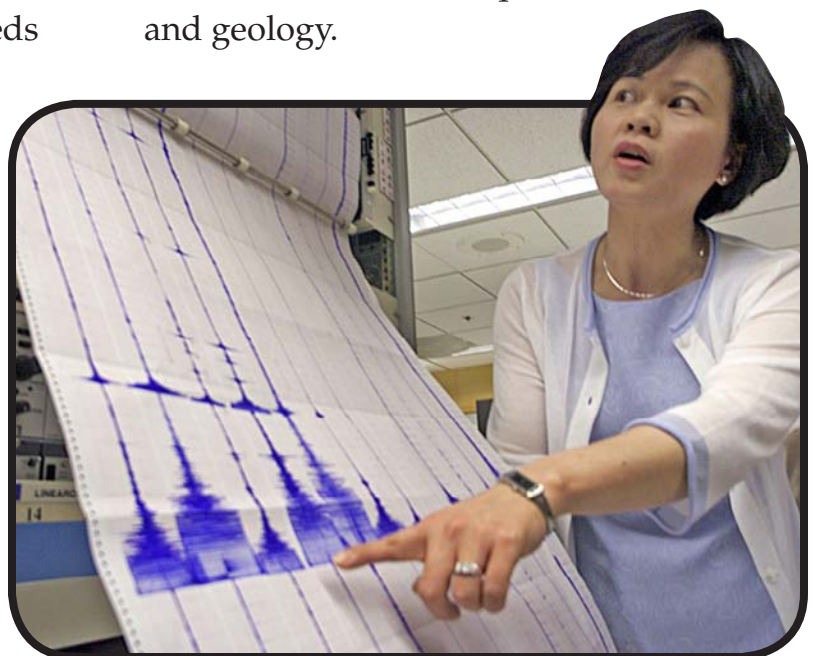
The job of seismologists is not only to study how and when earthquakes occur, but also to predict where an earthquake is going to shake. Seismologists study rocks and other geological formations, hoping to understand and predict the next tremor.

A seismologist studying a record of seismic waves (right) that occur along fault lines, such as the San Andreas fault (above)



They usually focus their attention on fault lines. Faults are cracks in Earth's crust, in which the ground on one or both sides has moved. Seismologists interpret data they collect and make maps showing the location of fault lines.

To become a seismologist, a person must go to college. He or she needs to take many science classes, including geology and physics. Most seismologists continue their education after college to learn even more about earthquakes and geology.



# Volcanologist

Career Files teach about important jobs in science and how science is used in other jobs. Careers with the **STEM** symbol focus on Science, Technology, Engineering, or Math.



When Earth blows its top, a volcanologist is usually nearby. A volcanologist is a scientist who studies volcanoes.

The volcanologist's job is to understand how and why volcanoes erupt. He or she also tries to predict eruptions so people living near a volcano have time to get out of the way.

Volcanoes are places where *magma*—a type of molten rock—and gases from deep inside Earth force their way to the surface. When magma reaches Earth's surface, it's called *lava*.



A volcanologist working near an active volcano



Krakatau volcano in Indonesia actively erupting

Volcanologists (or *vulcanologists*) have plenty of work to do. Earth has hundreds of volcanoes. Some are active, meaning they have erupted recently. Others are *dormant*, meaning they haven't erupted in centuries.

Because volcanoes usually start giving off smoke before they erupt, volcanologists often race to the area to begin their work. They collect all types of data, such as how much gas is coming out of the volcano and how much seismic activity is occurring. Sometimes a volcanologist even crawls into the smoking crater of a volcano to collect rock and gas samples.

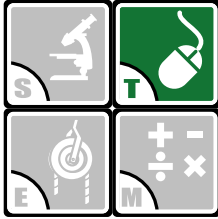
Volcanologists use many types of measuring devices to study volcanoes. They use a special type of thermometer—one that won't melt under extreme heat—to see how hot the lava flows are.

Volcanologists must go to college, and many continue their education after college. A volcanologist must have an interest in geology, physics, and other sciences.



# Land Surveyor

Career Files teach about important jobs in science and how science is used in other jobs. Careers with the **STEM** symbol focus on Science, Technology, Engineering, or Math.



Did you know that when he was a teenager, George Washington was a land surveyor? He measured and charted the unexplored Virginia wilderness.

Land surveyors gather information about the size and characteristics of a piece of land. Their goal is to determine the exact location and measurements of a *parcel*, or section, of land. They must also point out the *contour*, or shape, of the land.



A young George Washington working as a land surveyor before he became president of the U.S.



A land surveyor using a transit to take measurements

To gather this information, land surveyors use special equipment, such as a *transit*—a device that measures horizontal and vertical angles—and an *altimeter*, which measures altitude.

Surveyors then translate this information into maps and charts. They also research land deeds and other records to obtain data needed for their work.

Unlike George Washington, today's surveyors use high-tech, computerized instruments that can record and store thousands of measurements. Surveyors even use GPS (Global Positioning System) devices, which link to satellites orbiting high above Earth, to determine precise locations on the land.

To become a land surveyor, a person must graduate from college. Some states require that a surveyor get a special certificate before he or she starts working.