



Geoscientists study... ROCKS

Have you ever experienced an earthquake? Do you live near a volcano? Do you like rocks and minerals? If you answered "yes" to any of these questions then the geoscientists who study the solid part of the Earth would interest you. They want to know how our planet formed, how it works, where it contains resources, and how it is likely to change in the future. Answers to these and many other questions are written in the rocks that form Earth's solid body.



Did you know?

The plates on the Earth move between 0.4 and 4 inches a year.

Some geoscientists examine the origins of the spectacular features of our planet, including; mountain ranges, deep ocean valleys, volcanoes, and great faults.

Because of their investigations, we know that Earth's rigid outer shell, the lithosphere, is divided into big pieces called tectonic plates. These tectonic plates move very slowly, about as fast as your fingernails grow. They float on hotter, softer rocks in the mantle and where tectonic plates spread apart, new lithosphere is created. Where they collide, mountain ranges such as the Himalayas may form. Volcanoes and earthquakes are concentrated near the edges of tectonic plates, where they pull apart or get pushed under one another. Earthquakes can also occur where tectonic plates slide past each other along faults such as the San Andreas. What monstrous force is able to move tectonic plates? The force is gravity. What do we call these geoscientists? **Solid Earth Geophysicists and Structural Geologists**



Did you know?

In 1923, a Tokyo earthquake destroyed 575,000 homes and killed 142,800 people.

Some geoscientists study energy released by earthquakes and other sources (like nuclear explosions). This energy travels through Earth as sound waves. By recording these sound waves at places

distant from the earthquake, geoscientists are able to image the interior of Earth.

Most earthquakes occur at boundaries where tectonic plates interact. The plates do not move smoothly; occasionally they get stuck, deform, and then suddenly break apart resulting in earthquakes. Some of these geoscientists work to understand the causes of earthquakes so that loss of life and property may one day be avoided. They work closely with construction engineers to make buildings stronger in earthquake-prone areas where many people - including you - may live. Other geoscientists are employed by the energy industry and use sound waves passing through the lithosphere to look for oil and natural gas, providing the fossil fuels that power modern civilization. What do we call these geoscientists? **Seismologists**



Did you know?

Large explosive eruptions can shoot ash to heights of 25 miles (40 km).

Some geoscientists study volcanoes. Volcanoes erupt when molten rock from deep within Earth's mantle moves to the surface. This molten rock is called magma when it is in the ground and lava when it is on the surface. Scientists who study active volcanoes visit them before, during, and after eruptions in order to collect gases, lava, and ash for analysis. They also examine older, dormant volcanoes. They want to understand how volcanoes form, and when and why they erupt. What do we call these geoscientists?

Volcanologists



There are many other solid Earth geoscientists:



Some geoscientists examine rocks formed in or on Earth's crust, as well as those brought up from deep in Earth's interior. To figure out how these rocks formed, they may cut a very thin slice of rock in a laboratory and examine it with a microscope. They determine what minerals a rock contains and the conditions of heat and pressure under which they formed. This tells the geoscientists where the rock came from. We call these geoscientists - **Petrologists and Geochemists**

Some geoscientists measure small changes in the shape and motions of Earth. They set up observation points on Earth's surface and then measure the exact positions of these points using satellites. These measurements are so accurate that they can monitor the very slow movement of Earth's tectonic plates. They team up with mapmakers to produce maps. We call these geoscientists - **Geodesists**





Some geoscientists measure Earth's magnetic field, which originates deep within the planet and extends into outer space. When rocks are formed, the crystals inside may line up with Earth's magnetic field, like a lot of compass needles. Such rocks record a long history of Earth's magnetism. This record shows how the continents have moved and how Earth's magnetic field has fluctuated and even reversed direction. We call these geoscientists - **Geomagnetists**

Some geoscientists explore for and develop resources such as coal and oil. Many even search for precious metals like gold! They also study mineral deposits and find environmentally safe ways to dispose of waste materials from mining activities. We call these geoscientists - **Economic Geologists**



Some geoscientists apply geologic data, techniques, and principles to study phenomena that affect structures such as bridges, buildings, airports, and dams. We call these geoscientists - **Engineering Geologists**

Some geoscientists study how soils are involved in plant growth, and how they impact human activities. They also investigate how land resources can be used and restored. We call these geoscientists - **Soil Scientists**