

STRUCTURE OF THE MOON

The Moon, has a diameter half that of the Earth's core and it rotates around the Earth, as all the planets rotate around the Sun, under the force of gravity.

QUESTIONS FOR THOUGHT & FURTHER DISCUSSION

1. Which layer of the earth's interior is liquid?
2. Which layer produces the earth's magnetic field?
3. What portion of the earth's volume is occupied by the mantle?
4. What has been the most useful method for determining the structure of the earth's interior?
5. The Mohorovicic discontinuity lies at the boundary of what two layers?

GLOSSARY

Crust – The crust of the Earth is composed of a great variety of igneous, metamorphic, and sedimentary rocks. The crust is only a few tens of kilometers thick.

Mantle – The region between the core and the crust is called the mantle. Earth's Mantle extends to a depth of approximately 1,800 miles and is made of a thick solid rocky substance that represents about 85% of the total weight and mass of the Earth, making it the thickest layer of the Earth.

Inner Core - The Earth has a solid inner core, made mostly of iron and nickel.

Outer Core – The Inner Core is surrounded by a liquid outer core, also mostly iron and nickel.

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Earth Science Series

Interior of the Earth – Geology & Landforms

KG1179DVD
Teachers Guide

PROGRAM OVERVIEW

This program teaches students what is beneath the earth as they explore the earth down to the core. Using data from seismic readings and deep well sampling this program explains the crust, the mantle, the Moho layer, the outer and inner core of the earth. An ideal program as an introduction to the earth and geology.

The planet Earth is made up of three main shells: the very thin, brittle crust, the mantle and the core. The mantle and core are each divided into two parts. Although the core and mantle are about equal in thickness, the core actually forms only 15 percent of the Earth's volume, whereas the mantle occupies 84 percent. The crust makes up the remaining 1 percent.

THE CRUST

The first layer consists of about 10 miles of rock and loose materials, scientists call the crust. Underneath the continents, the crust is almost three times as thick, as it is under the oceans.

The crust of the Earth is composed of a great variety of igneous, metamorphic, and sedimentary rocks. The crust is underlain by the mantle. The upper part of the mantle is composed mostly of peridotite, a rock denser than rocks common in the overlying crust.

The boundary between the crust and mantle is conventionally placed at the Mohorovičić discontinuity, a boundary defined by a contrast in seismic velocity. The crust occupies less than 1% of Earth's volume.

Because the crust is accessible to us, its geology has been extensively studied and therefore much more is known about its structure and composition than about the structure and composition of the mantle and core. Within the crust, intricate patterns are created when rocks are redistributed and deposited in layers through the geologic processes of eruption and intrusion of lava, erosion and consolidation of rock particles and solidification and recrystallization of porous rock.

By the large-scale process of plate tectonics, about 12 plates, which contain combinations of continents and ocean basins, have moved around on the Earth's surface through much of geologic time. The edges of the plates are marked by concentrations of earthquakes and volcanoes. Collisions of plates can produce mountains like the Himalayas, the tallest range in the world. The plates include the crust and part of the upper mantle, and they move over a hot, yielding upper mantle zone at very slow rates (a few centimeters per year), slower than the rate at which fingernails grow. The crust is much thinner under the oceans than under continents.

THE MANTLE

Our knowledge of the upper mantle, including the tectonic plates, is derived from analyses of earthquake waves, heat flow, magnetic, and gravity studies; and laboratory experiments on rocks and minerals.

Between 100 and 200 kilometers below the Earth's surface, the temperature of the rock is near the melting point. Molten rock erupted by some volcanoes originates in this region of the mantle. This zone of extremely yielding rock has a slightly lower velocity of earthquake waves and is presumed to be the layer on which the tectonic plates ride. Two main zones are distinguished in the upper mantle: the inner asthenosphere composed of plastic flowing rock about 200 km thick and the lowermost part of the lithosphere composed of rigid rock about 50 to 120 km thick.

THE OUTER CORE

The Earth's outer core extends to a depth of around 3000 miles beneath the surface. It is believed that this outer core is made up of superheated liquid molten lava. This lava is believed to be mostly iron, and nickel.

THE INNER CORE

The inner core extends another 900 miles inward towards the center of the Earth. It is believed that this inner core is a solid ball of mostly iron, and nickel.