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## INTRODUCTION

The earth — our home — is a majestic place with a wide variety of things to see and do. Some parts of it are breathtakingly beautiful, other parts less so, but all of the earth is our home.

The Bible tells us that God has given the earth to man as the place where he is to live. A few people have gone to the moon, but that is still part of the earth's system. Someday someone may possibly go into deep space, but the earth is our home. This is where we were born and where we live. God has given it to us to care for and use wisely, for man's good and God's glory.

While we all enjoy the earth as our home, it is also necessary to study it and understand it fully. Scientists observe the earth to learn more about it. Engineers use its materials and farmers make their livelihood from the earth. How can we best gather this information?

Any kind of science, including earth science, is limited to what we can observe. Scientists use their five senses — sight, smell, taste, hearing, and touch — and apply their minds to understand this information.

Sometimes the most interesting thing we can learn about something is its history. How did the earth get this way? What happened in the past before there were people to make observations, to make it the way it is in the present?

Obviously, scientists can't get in a time machine and return to the past to observe the earth in its earlier days. They can only interpret the rocks and fossils and river systems and mountains and all things that exist in the present, and try to discern what

the past was like. There are only two basic ways of thinking about the unobserved past, uniformity and catastrophe, and by understanding them we can understand why scientists often disagree. By comparing the two, we can choose which one makes more sense.

The principle of uniformity has a slogan: "The present is the key to the past." By claiming that past processes have been no different from those possible today, some scientists choose to believe that everything happened by gradual processes operating slowly over very long periods of time. For example, the Colorado River carved out the Grand Canyon slowly over 70 million years, they say.

The principle of catastrophe sees evidence that rapid, highly energetic events operated over short periods of time and did much geologic work rapidly. In this view, the Grand Canyon was carved out quickly by huge volumes of water rushing rapidly over the ground. Throughout this book we'll be comparing these two views of earth history, and see which one is better.



# PLANET EARTH

Our study of the earth must start with its place in the solar system. It is one of nine planets circling the sun. The inner four planets, including the earth, are solid. The next four planets are much larger than the earth and made entirely of gas. They have no solid material. The outermost planet, Pluto, is solid once again.

Scientists have sent up probes to Venus and Mars, our nearest neighbors, and found them to be most inhospitable to life. The others are even worse. Mercury is much too close to the sun; it would be too hot to support life. The outer planets are so far from the sun that their temperatures are extremely

low. Only the earth is capable of supporting life.

As it revolves around the sun, earth has a slight tilt, giving us the seasons throughout the year. As it rotates on its axis, we have a day and night cycle, each 24 hours.

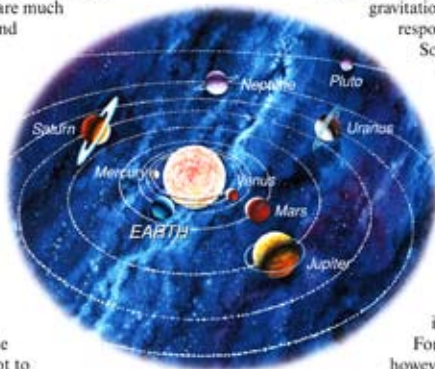
While many of the planets have moons, their moons are quite small when compared to the planets they circle. Our moon, however, is almost one-quarter the size of the earth and its gravitational pull on the earth is responsible for the daily tides.

So many things about the earth make us recognize that it was designed for life — our life — by a wise and powerful God.

The earth is a sphere, rather ball-shaped. Actually, it is a little bit pear-shaped with its diameter at the equator a little larger than its diameter at the poles.

For practical purposes, however, we can consider it a sphere, with an average radius of 3,963 miles (6,368 km).

As far as we know, no other planet in the solar system contains water. Necessary for life, the earth has it in abundance, stored primarily in the oceans, which are far deeper, on average, than the continents are high. If the earth's solid material were completely smooth, water would form a worldwide ocean approximately 8,500 feet (2,591 m) deep!



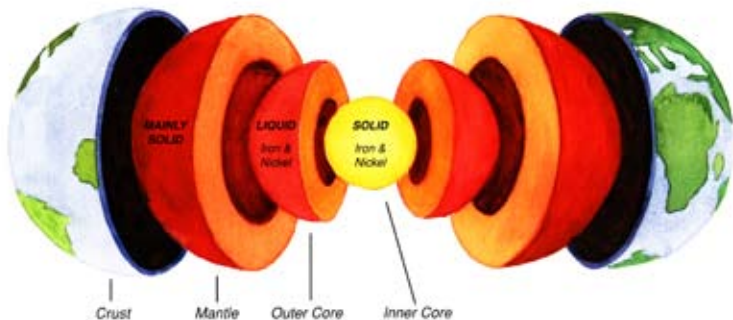
*The earth is the third planet from the sun (above). Along with the other three closest planets, it is made up of solid material. The outer planets such as Saturn (left) are composed entirely of gases, except Pluto.*



## Inside the Earth

On the surface of the earth we see soil, rock, and water, all surrounded by atmosphere. These things comprise only the thin outer skin of the earth. The rest is quite different.

crust, located in the bottom of the Pacific Ocean, but these efforts have not yet been successful. The lower parts of the crust differ from the upper parts, but still we have not directly observed anything other than the crust of the earth.



No one has actually drilled deep inside the earth, but by studying the way energy waves travel through the earth, we have a pretty good idea of what is deep inside.

The earth is divided into three main zones. The crust of the earth is the thin outer skin. On the crust are continents and oceans. In some places the crust is at a lower elevation than others, but the difference is very slight compared to the overall size. In fact, if the earth were the size of an orange, and you could hold it in your hand, you would not be able to feel the difference between the highest mountain and the deepest ocean basin.

Efforts have been made to drill through the thinnest part of the

*The interior of the earth is made up of four main sections. The crust is very thin and consists of the continents and oceans. The mantle is the largest at 1,900 miles (3,000 km) thick. The outer core is so hot that it is molten liquid, while the inner core is under so much pressure that it is solid.*



*The invisible magnetic field around the earth is a result of the earth having an iron core, in much the same way that an iron bar magnet produces a magnetic field.*

**R**ocks firmly anchored to the ground and rocks floating through space fascinate us. Jewelry, houses, and roads are just some of the ways we use what has been made from geologic processes to advance civilization. Whether scrambling over a rocky beach, or gazing at spectacular meteor showers, we can't get enough of geology!

## *The Geology Book will teach you*

- What really carved the Grand Canyon.
- How thick the Earth's crust is.
- Why the Earth is unique for life.
- The varied features of the Earth's surface — from plains to peaks.
- How sedimentary deposition occurs through water, wind, and ice.
- Effects of erosion.
- Ways in which sediments become sedimentary rock.
- Fossilization and the age of the dinosaurs.
- The powerful effects of volcanic activity.
- Continental drift theory.
- Radioisotope and carbon dating.
- Geologic processes of the past.

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**O**ur planet is a most suitable home. Its practical benefits are also enhanced by the sheer beauty of rolling hills, solitary plains, churning seas and rivers, and majestic mountains — all set in place by processes that are relevant to today's entire population of this spinning rock we call home.

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