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The Earth: Our Sweet Home

by Advay Tripathi

Introduction

Earth, the third planet from the Sun, is an awesome planet. It is the only planet in our solar system that supports life because 70% of Earth's surface is covered with water, an essential element for all living beings to survive. Like Mercury, Venus, and Mars, Earth is one of the rocky planets. However, Earth is unique because it can sustain life. Earth has many landforms like lakes, rivers, oceans, canyons, valleys, mountains, and more. The Earth's atmosphere is mainly made up of nitrogen gas and has plenty of oxygen for us to breathe.

When was Earth formed?

Earth was formed roughly 4.6 billion years ago, 9.2 billion years after the Big Bang. In swirling clouds of gas and dust called the solar nebula, small pieces of dust collided with each other and merged into a molten planet. The planet eventually cooled into four layers: crust, mantle, outer core, and inner core. These four layers provide evidence that Earth was once a molten planet. Since Earth was formed, the surface has changed greatly over time. Most of the change is from weathering (breaking down), erosion (moving sediment), and deposition (the placing of sediment). An example of these processes is the Grand Canyon. Weathering and erosion from the river made the landform. Deposition also makes sand dunes and islands by stacking sediment on top of each other. Some landforms take millions of years to form, and some take only hours.

Physical Features

* **Size**: 7,926 miles (12,756 kilometers) in diameter.

* **Surface**: 70% of the Earth's surface is covered by water, while 30% is land. The water is in the form of oceans, lakes, Rivers, and streams. The land is divided into seven continents.

* **Structure**: Earth has four layers: the inner core, outer core, mantle, and crust. To understand the Earth, one must travel 3977 miles (6,400 kilometers) beneath it. Earth's layers are important because each layer has unique properties, including the generation of the magnetic field.

(A) Inner Core: The hottest layer of the Earth is the inner core. It is a solid, hot, dense sphere that is primarily made up of iron and nickel. Its radius is roughly 758 miles (1220 kilometers). The temperature here is around 5,400 degrees Celsius (9,800 degrees Fahrenheit. That's almost as hot as the surface of the Sun.

(B) Outer Core: The Outer Core is the second hottest layer. The temperature is around 4,500 degrees Celsius (8,100 degrees Fahrenheit). Its radius is roughly 2165 miles (3483 kilometers). This layer is also made of nickel and iron, but in a liquid form.

(C) Mantle: The next layer of Earth is the mantle, which is the planet's thickest layer, making up about 84% of its volume and 67% of its mass. This layer extends roughly 2,900 kilometers (1,800 miles) deep and is between the crust and the outer core.

(D) Crust: The crust is about 25 to 70 kilometers, or 15 to 44 miles, thick. It is the layer where we live, including the continental and oceanic crust. All the tectonic plates are part of the crust.

* **Atmosphere**: Like a jacket that covers our body, the atmosphere is like a jacket that covers Earth. It keeps us warm, gives us oxygen to breathe, and is where all the weather happens. The atmosphere extends up to a few hundred miles above the Earth's surface. The atmosphere gets thinner as it moves away from the surface.

The Earth's atmosphere has five primary layers: the troposphere, stratosphere, mesosphere, thermosphere, ionosphere, and exosphere.

(1) Troposphere: The troposphere is the innermost layer in the atmosphere. The troposphere is between 5 and 9 miles (8 and 14 kilometers) thick, depending on where we live on Earth. It is made up of 78% nitrogen, 21% oxygen, and 1% argon, water vapor, and carbon dioxide.

(2) Stratosphere: The stratosphere is 22 miles (35 kilometers) thick. It is the second layer in the atmosphere. The stratosphere contains the very important ozone layer that protects us from ultraviolet radiation (UV) from the Sun.

(3) Mesosphere: The Mesosphere is 22 miles (35 kilometers) thick. The mesosphere protects us from meteors.

(4) Thermosphere: The thermosphere is 319 miles (513 kilometers) thick. The temperature in this layer can reach up to 4,500 degrees Fahrenheit. The thermosphere is where the International Space Station is located as it orbits the sun. Many satellites are also present in this layer as they orbit the Earth.

(5) Ionosphere: The Ionosphere overlaps the mesosphere, thermosphere, and exosphere. It is a very active part of the atmosphere. Auroras happen in the ionosphere due to the Earth's and the sun's magnetic fields.

(6) Exosphere: The exosphere is the outermost layer of the Earth's atmosphere. It's 6,200 miles (10,000) miles thick. This layer separates the rest of the atmosphere from outer space. The exosphere has gases like hydrogen and helium. There is no air to breathe, and it's very cold.

* **Moon**: Earth has one moon, and it's also a natural satellite that influences tides and stabilizes Earth's axis.

Earth's Rotation and Orbit

Earth rotates on its axis and orbits the Sun. Rotation means the Earth spinning on its axis like a top. It takes 24 hours to complete one rotation. Orbit is the path that Earth takes to travel around the Sun. It takes about 365.25 days to complete a full orbit.

Rotation

The Earth rotates on its axis, an imaginary line passing through the north and south poles. It rotates from west to east; that's why the sun rises from the east and sets in the west. The Earth takes 24 hours to complete one rotation, which is called a day. The cycle of day and night is caused by the Earth's rotation. The speed of the rotation varies by latitude. At the equator, the rotation is the fastest

Orbit

The Earth orbits around the Sun in an elliptical path. It takes Earth around 365.25 days to complete an orbit. The orbital speed of the Earth varies slightly throughout the year. The Earth travels slightly faster when closer to the Sun. The Earth is tilted on its axis at an angle of 23.5 degrees.

Facts about the Earth

- Earth isn't perfectly round. It is an oblate spheroid.
- The scientists who study changes to Earth are called geologists.
- Earth is the only planet in our solar system that supports life.
- Libya is the hottest place on Earth. The temperature was recorded at 136 degrees Fahrenheit (58 degrees Celsius).
- The coldest place on Earth is Antarctica. The temperature was recorded at - 128 degrees Fahrenheit (- 89 degrees Celsius).
- The highest point on Earth is Mount Everest.
- The deepest point on Earth is the Mariana Trench.
- The lowest point on Earth is in Antarctica.
- The longest mountain range (Mid-Ocean Ridge) is underwater.
- The largest living structure on Earth is the Coral Reefs.
- The gravity on Earth is uneven.
- The Earth is a big magnet with a pole at each end.
- Earth is also an electrical planet with approximately 6000 flashes of lightning every minute.
- In the past, the Earth wasn't divided into continents, it was one giant land mass or supercontinent. The giant continent was called Pangaea.
- Every planet in the solar system is named after a god or goddess from Greek or Roman mythology, except for the Earth. Earth means "the ground" in Old English and German.

The Future of Earth

The future of Earth is a complex topic with both short-term and long-term implications. In the near future (decades to centuries), Earth will undergo various climate changes related to rising sea levels, extreme weather events, and ecosystem disruptions. More frequent and intense heat waves, droughts, and floods are projected. Continuous population growth and the impacts of human activities on the environment, including pollution and deforestation, will have long-term consequences.

Longer term (millions to billions of years), the sun's increasing luminosity will make Earth uninhabitable, and ultimately, the planet Earth will be absorbed by the Sun. Over millions of years, Earth's tectonic plates will continue to reshape the surface of Earth, leading to the formation of supercontinents and changing ocean basins.

We should save the Earth as it is our sweet home and the only planet that supports life.