# EARTH AS A PLANET

**By**

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**LEARNING OBJECTIVES:** To acquire knowledge about the exact shape and size of the Earth, develop understanding about the evidences which prove that the earth is spherical and not flat, it's unique features and the life-giving cycles.

**CONTENT:**

- The shape of the earth,
- evidences that the earth is spherical in shape,
- earth as the home of the mankind and life-giving cycles
- hemispheres – northern and southern, eastern and western

## Introduction

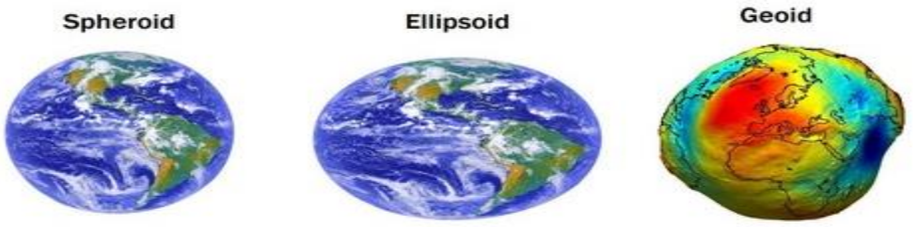
Earth is a small planet in the vastness of space. It is one of the eight planets of the Solar System. The solar system consists of the sun at the centre and eight major planets (asteroids) orbiting around the sun. The earth is also referred to as blue planet because of the abundance of water on the planet. Over 71% of the earth's surface is comprised of water producing a vivid blue colour when viewed from space.

## The shape of the Earth:

People in ancient times had the misconception that Earth's shape was like a flat table and feared to venture far into the sea. They thought that after reaching the steep edge of the table, they would slip down into the ocean. Aryabhatta, the $5^{th}$ century Indian astronomer and mathematician, believed in the round shape of the earth. He said that the earth was spherical in shape and rotated on its axis. In the $6^{th}$ century, Greek philosopher Pythagoras said the same thing. (Kindly refer to the additional resources you tube videos)

**Proofs of the Earth's shape:**

- The Bedford Level Experiment
- Sighting/sinking of a ship
- Pole star
- Satellite pictures
- Lunar Eclipse
- Circular Horizon
- Sunrise and sunset
- Circumnavigation
- The earth as a heavenly body
  (Kindly refer to the additional resources you tube video for evidences)




**Earth an Oblate Spheroid:**

Earth's shape is described as an **oblate spheroid.**Although the Earth appears to be a perfect sphere, it is not so. The measurements of the earth at the equator and poles show that it has a slight bulge at the equator while it is slightly flattened at the poles. The diameter at the equator is 12,756 km while its polar diameter is 12,714km. This difference in diameter is due to the centrifugal force of earth's rotation at a great speed which forms a bulge at the equator and a compression at the poles. Thus, the word used to describe the shape of the Earth is **'oblate spheroid'**. The shape of the earth is also described as **Geoid**, which means **earth shaped**.

**Earth as the home of humankind/ Conditions favorable for life on Earth:**

- **Distance from the Sun:** Our Earth is the third planet with respect to its distance from the Sun. It is neither too close like Mercury and Venus nor too far like Uranus and Neptune. Hence, it receives just the right amount of heat necessary for life.

- **Temperature:** The Earth is the third planet from the sun. It has an average temperature of 17 degree celcius which is suitable for life to exist. Though Venus is the second planet from the sun but it is hotter than Mercury. This is because the atmosphere around Venus is mainly composed of carbon dioxide which produces Greenhouse effect on the surface of Venus.

- **Atmosphere:** Although other planets have atmospheres, they are either too thin or too dense, full of poisonous gases thus making it impossible for life to exist. The earth's atmosphere is made up of life supporting gases like nitrogen, oxygen and carbon dioxide and acts as a blanket preventing us from the harmful ultraviolet rays of the Sun, and retains the heat radiated from the Earth's surface.

- **Water:** Besides its favourable atmosphere, Earth's water cycle is its most unique feature. Life cannot exist without water. Distribution of water is responsible for moderating the climate and surface condition of the earth.

- **Solid crust/ Lithosphere:** The layer of solid rocks is known as Lithosphere. This layer provides soil and various nutrients necessary for the growth of plants and thus, helps in supporting other life forms.

- **Biosphere:** The narrow realm of contact and interaction between the atmosphere, lithosphere and hydrosphere is known as Biosphere. It is the zone that supports life on earth. Within the biosphere, life is found chiefly in two forms- the plant life and the animal life.

- **Life-Giving cycles:** All life cycles are maintained by the energy from the Sun. The various life-giving cycles balance the factors necessary for life.

    - **Nutrition cycle:** Shows interdependence of all living things on Earth. It operates through the food chain and other processes like photosynthesis, transpiration and respiration.

    - **Carbon cycle:** Maintains carbon dioxide in the atmosphere. Any imbalance of carbon heats up the Earth and leads to global warming.

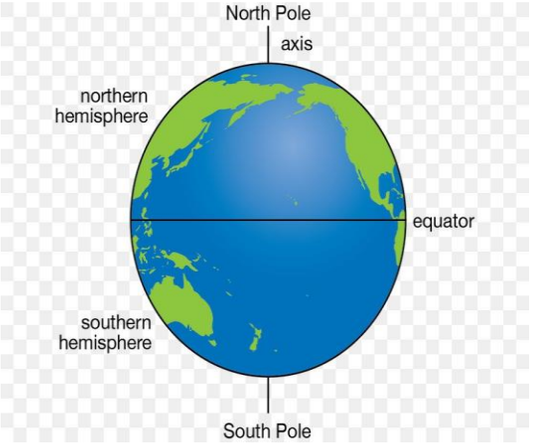
    - **Nitrogen cycle:** Earth's atmosphere contains 78% nitrogen. It is very essential for plant growth. Nitrogen is absorbed by soil and plant for

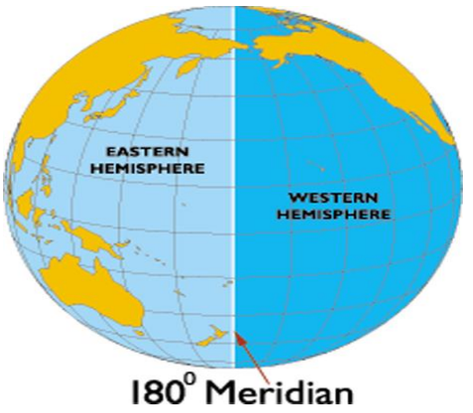
their growth. It is released in the atmosphere by the decomposition of dead animals in the form of ammonia.

- **Oxygen cycle:** Oxygen not only supports life but also helps a great deal in maintaining ecological balance. Man inhales oxygen and exhales carbon dioxide which is taken in by the plants. Thus, it is very important to conserve our forest cover to sustain life on earth.

**Hemispheres –**

Equator is an imaginary line joining the North Pole and South Pole by axis.
The earth is divided into almost two equal parts by equator.
The part above the equator is called northern hemisphere .
The part below the equator is called southern hemisphere.



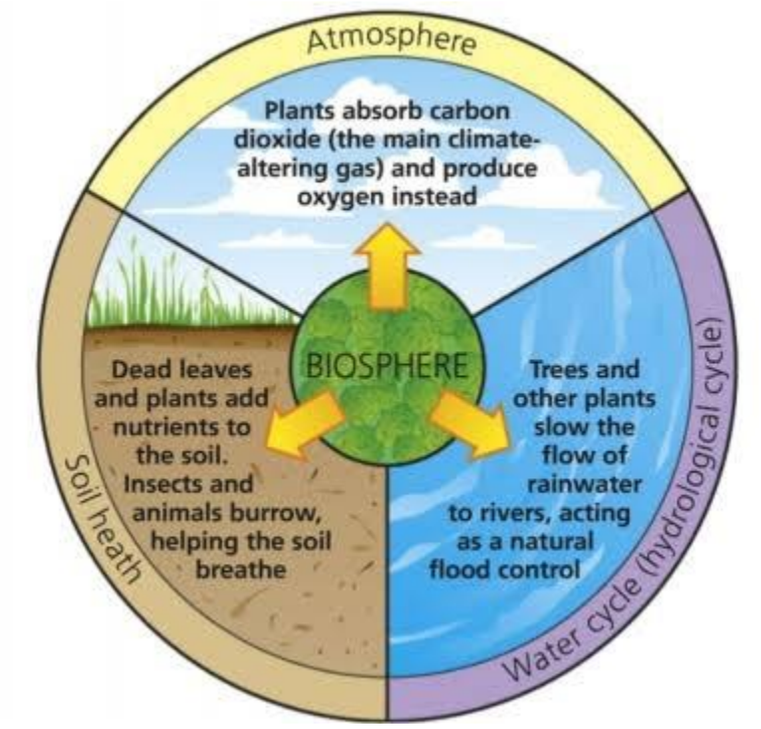




The prime meridian is the imaginary line that divides Earth into two equal parts: the Eastern Hemisphere and the Western Hemisphere. The prime meridian is also used as the basis for the world's time zones.

**ADDITIONAL RESOURCES:**

**http://youtu.be/xVMFOvxaxW8**

**https://www.youtube.com/watch?v=kUXlGsxsrKM**


Atmosphere
Plants absorb carbon dioxide (the main climate-altering gas) and produce oxygen instead
BIOSPHERE
Dead leaves and plants add nutrients to the soil. Insects and animals burrow, helping the soil breathe
Trees and other plants slow the flow of rainwater to rivers, acting as a natural flood control
Soil heath
Water cycle (hydrological cycle)