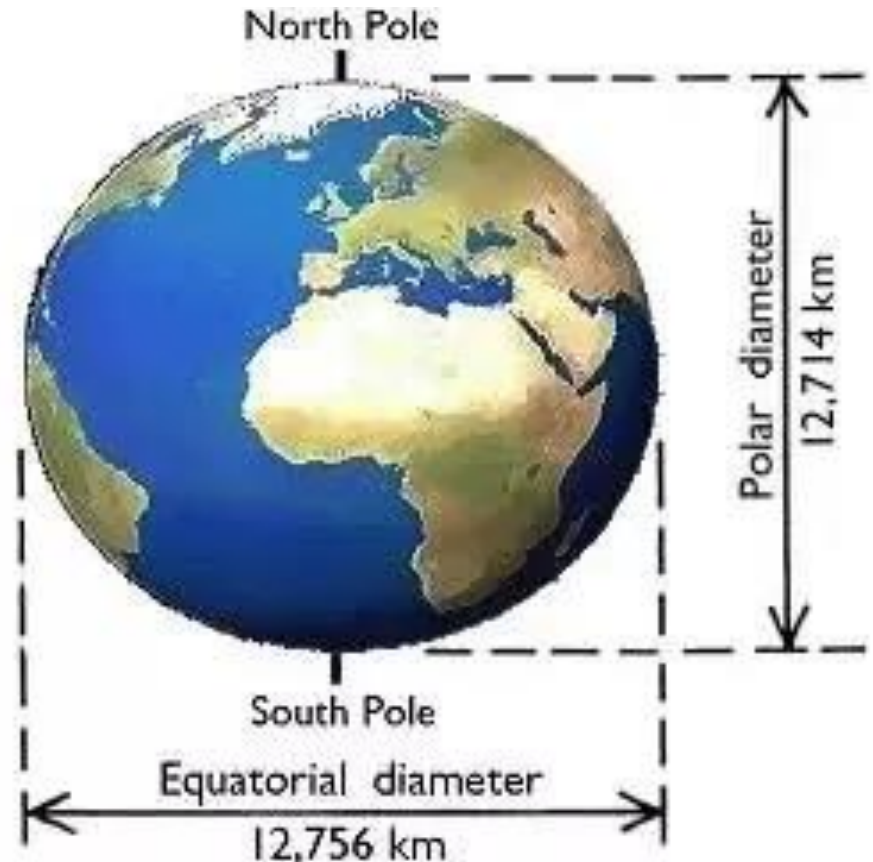


# Earth Shape and Size

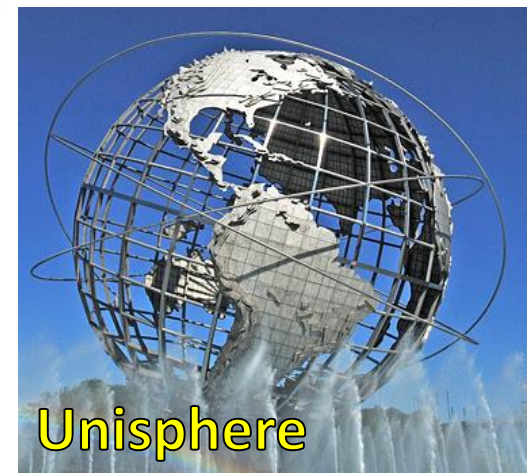
- Earth shape can be described as an *oblate spheroid* which is a sphere slightly flattened along the axis from pole to pole such that there is a bulge around the middle resulting from the planet's rotation.
- The Earth's diameter at the equator is just about **0.33%** (42 km or 27 miles) larger than its pole-to-pole diameter.
- Still, Earth is so close to a spherical shape that from any (far) point in space it looks exactly like a perfect sphere with a **mean radius of 6371.0 km (3959 miles)**!



# The Globe

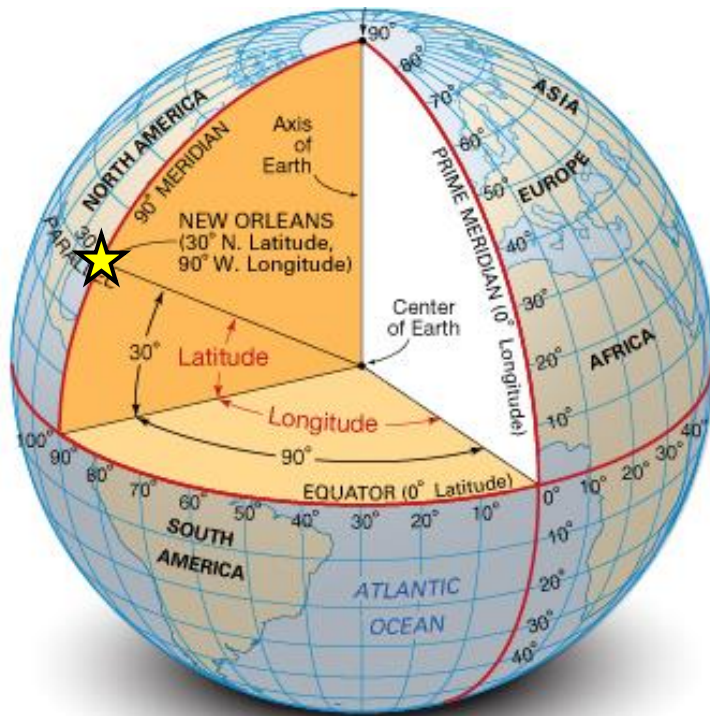
The Globe is a three-dimensional scale model of Earth (also called **geographical globe** or **terrestrial globe**).

- The earliest known example of the terrestrial globe was constructed by **Crates of Mallus** (who lived on the territory of modern-day Turkey) in the **mid-2<sup>nd</sup> century BC**.
- The oldest surviving terrestrial globe is the **Erdapfel** (“earth apple”), created in **1492** by Martin Behaim in Nuremberg, Germany. Overlaid with a meticulously painted map, it shows an enlarged Eurasian continent, an oversized Japan and an empty ocean between Europe and Asia.
- The world’s largest geographical globe is the **Unisphere** in Queens, New York (12-story high!).



# Coordinates on the Globe

- Every location on Earth's surface can be specified by a set of numbers and letters using a geographic coordinate system.
- A common choice of coordinates is **latitude** and **longitude**, forming the *grid system*, and **elevation**.



New Orleans, N30° W90°

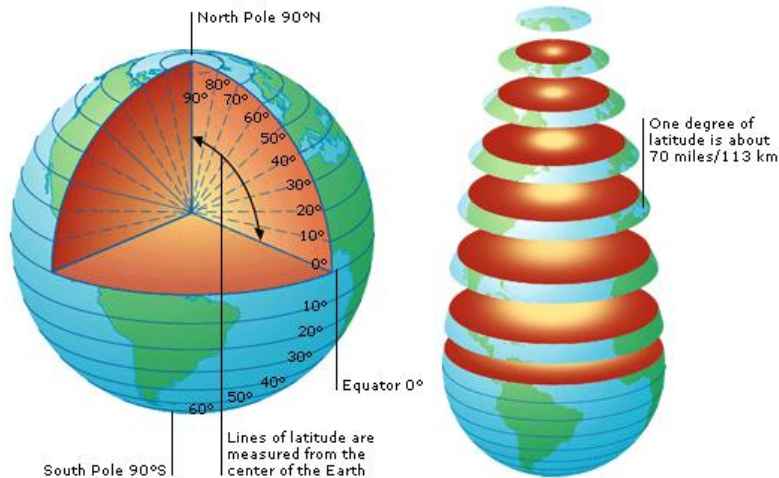


Washington DC, N39° W77°

# Latitude and Longitude

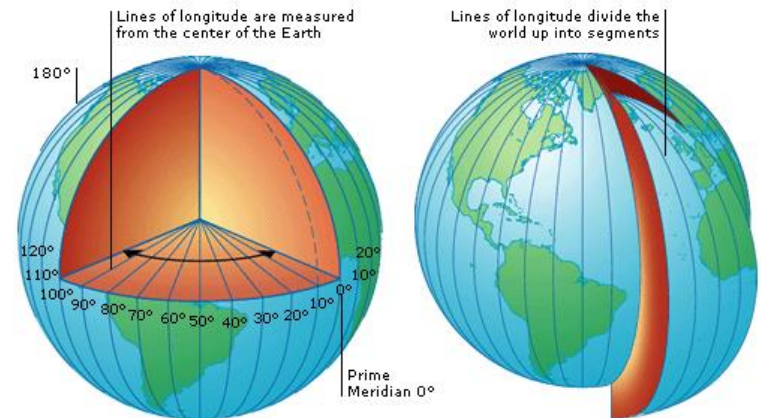
Latitude and longitude are measured in degrees ( $^{\circ}$ ) with submultiples of minutes ( $'$ ) and seconds ( $''$ ).

**Latitude** lines (**parallels**) run horizontally. They are parallel to and an equal distance from each other.



Zero degrees latitude is at the **Equator**. The latitude directions are **North (+)** and **South (-)**. North Pole is  $90^{\circ}\text{N}$ , South Pole is  $90^{\circ}\text{S}$ . Each degree of latitude corresponds to approximately 70 miles (113 km).

**Longitude** lines (**meridians**) run vertically, perpendicular to the Equator. They meet at the Poles and are spaced widest at the Equator.



Zero degrees longitude is called the **Prime Meridian** (goes through Royal Observatory, Greenwich, UK). The longitude directions are **East (+)** and **West (-)**.



The **elevation** of a geographic location is its height above (or below) a fixed reference point, most commonly the Earth's sea level.

- The term “**elevation**” is mainly used when referring to points on the Earth's surface.
- “Altitude” is used for points above the surface (an aircraft in flight or a spacecraft in orbit).
- “**Depth**” is used for points below the surface.