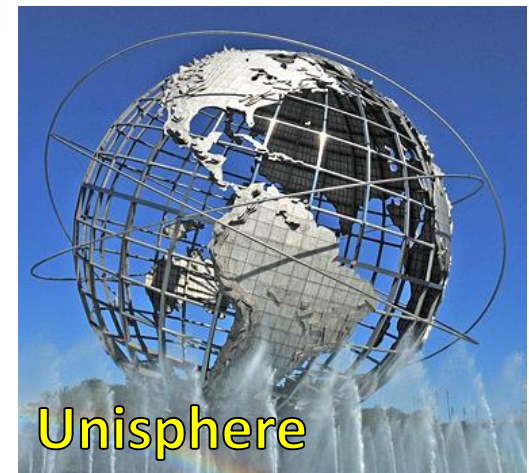


# The Globe

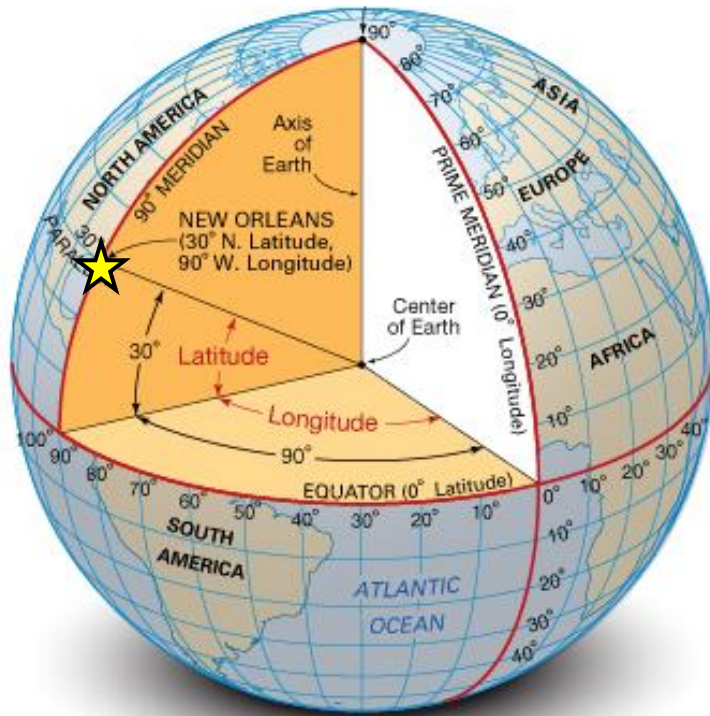
The Globe is a three-dimensional scale model of Earth (also called **geographical globe** or **terrestrial globe**).

- 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°



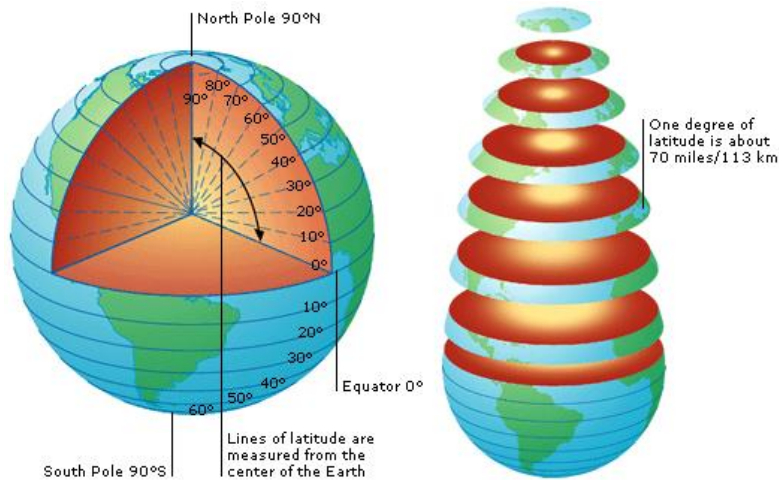
Washington DC, N39° W77°



# Latitude and Longitude

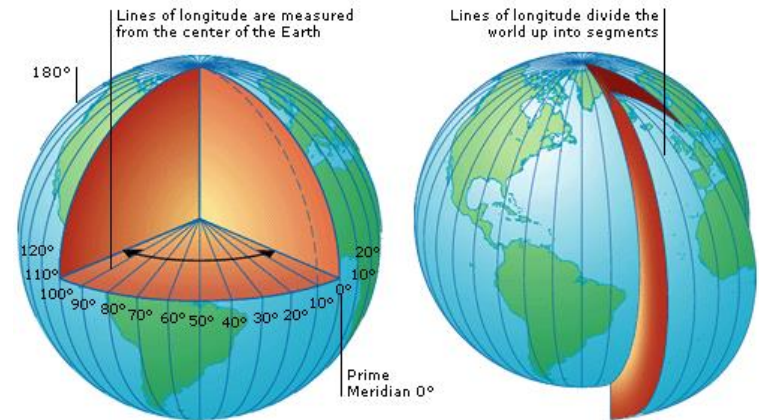
Latitude and longitude are measured in degrees ( $^{\circ}$ ) with submultiples of minutes ( $'$ ) and seconds ( $''$ ).

**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°N, South Pole is 90°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 (-)**.



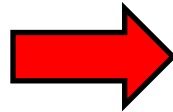
The **elevation** of a geographic location is its height above (or below) a fixed reference point, most commonly the Earth's sea level.

- 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.



# From Globe to Map

- A map is a graphic representation of geographic information on a flat surface.
- **Transferring** information from the spherical, or ball-shaped, surface of Earth onto a flat piece of paper is called **projection**.



A globe, a spherical model of Earth, **accurately represents** the shapes and locations of the continents.

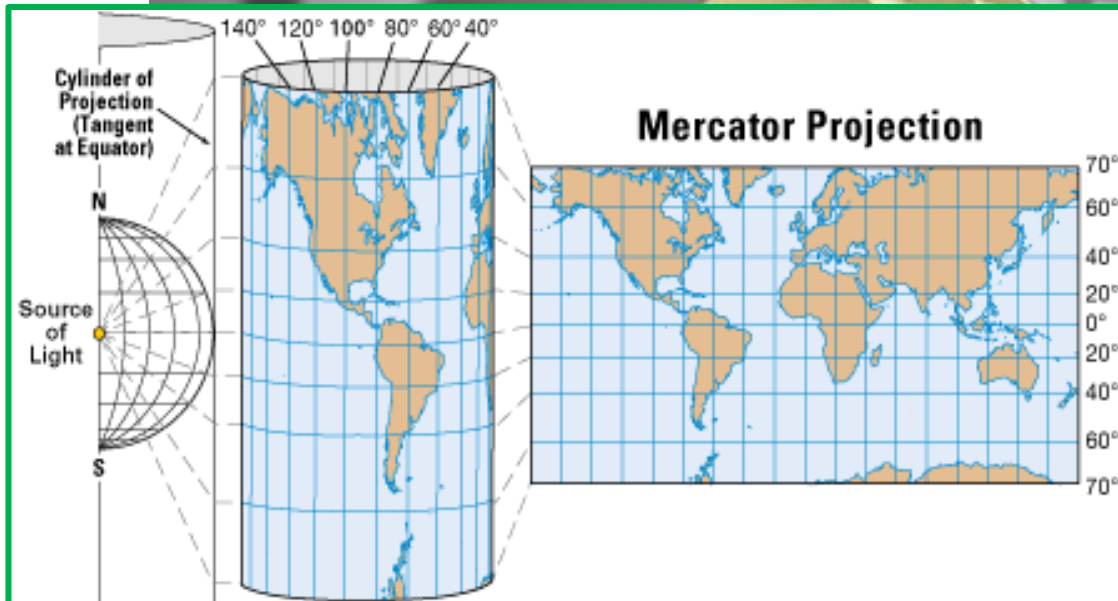
**What about**  
a map?

**How do you...**

**(UN)WRAP IT?**

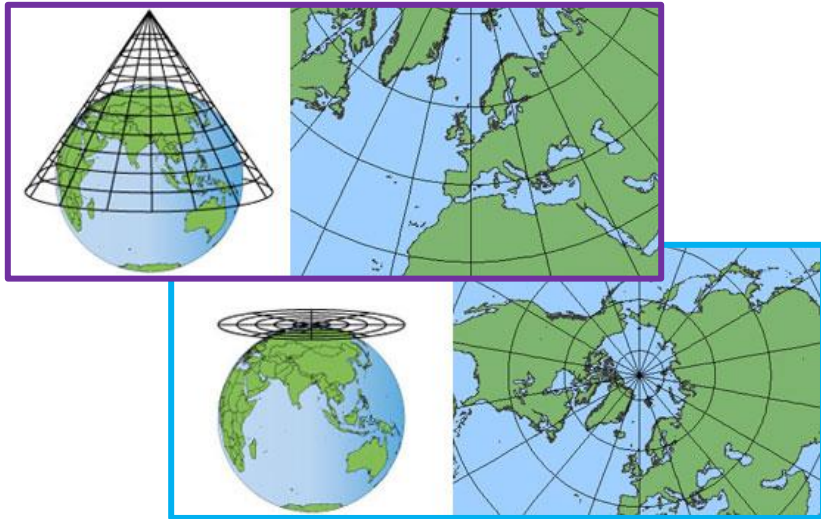
# Map Projections

Projection is a **major challenge** for cartographers. Every map has some sort of distortion: it can retain **either the correct sizes of landmasses or the correct shapes of very small areas, but not both.**

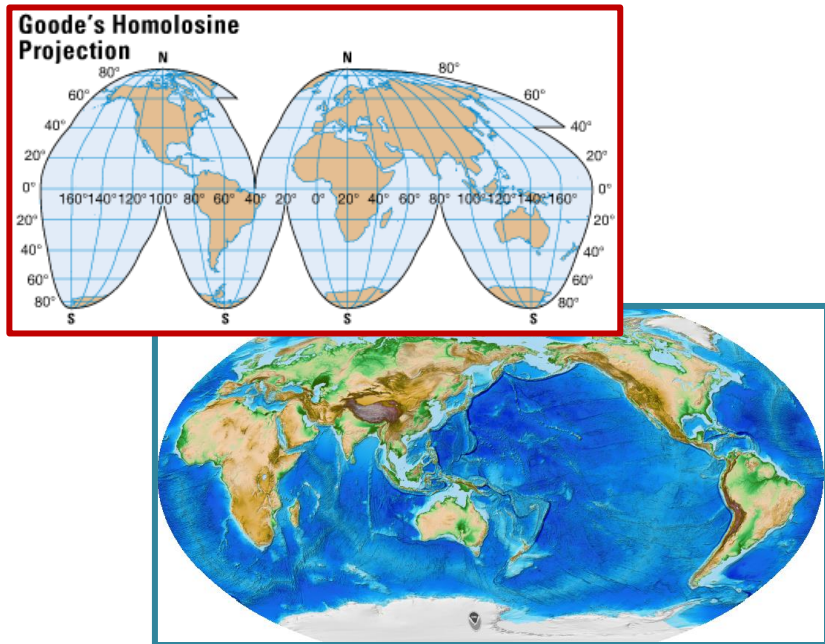


- **Cylindrical** (Mercator): projection onto a *tube* that is wrapped around the globe and touches it along one line, most often the Equator (the regions **near the Equator** are the **most accurate**, regions **near the poles** are the **most distorted**).

# More Map Projections



- **Conical**: projection on a flattened cone, with curved lines of latitude and straight meridians (great for mapping mid-latitudes, for example the US Map).
- **Planar**: projection onto a plane with a single point of contact (most accurate at that point; often used for maps of one of the poles).
- **Interrupted**: "orange-peel map" equal-area projection (preserves area measure, generally distorting shapes).
- **Winkel-Tripel**: compromise projection; it minimizes all three kinds of distortion - area, direction and distance.









# Types of Maps



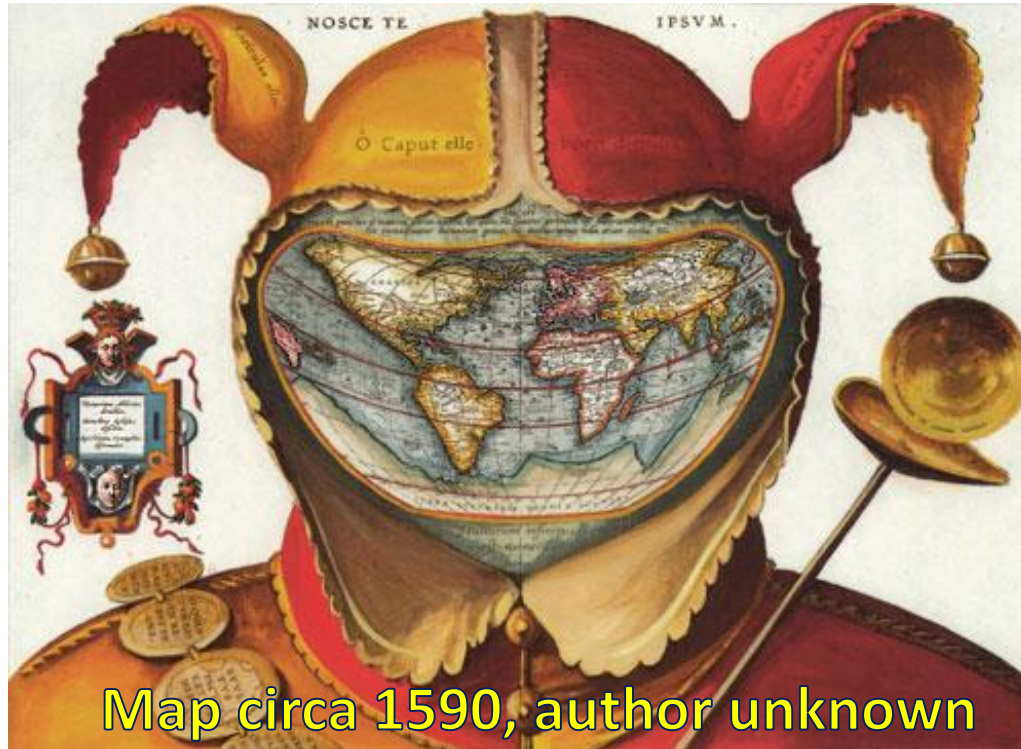
Physical



Political

# The Fool's Cap World Map

Are maps realistic representations of the actual world?



**Not  
really!**

A map can display **only** a *few selected features*, usually in *highly symbolic styles*.

All maps are **estimations, generalizations, and interpretations** of true geographic conditions, made according to certain basic **assumptions** which are not always true or verifiable.