

Latitude, Longitude, and Google Earth

A geographic coordinate system can be used to define a location on earth. The most common system uses latitude and longitude. Both latitude and longitude are measured in degrees symbolized with ($^{\circ}$). Degrees of latitude and longitude are divided into 60 minutes and are symbolized with ($'$). Minutes are divided into 60 seconds and are symbolized with ($''$). For example: $134^{\circ} 45' 53''$. Lines of latitude are circles that run parallel to the equator. They are also called "parallels". The equator is at 0 degrees' latitude. The poles are at 90 degrees north or south of the equator.

Lines of longitude extend from the North Pole to the South Pole. They are also called "meridians". A line that runs through Greenwich, England is the internationally accepted line of 0-degree longitude, or Prime Meridian. Lines of longitude extend east or west of the Prime Meridian up to 180 degrees to the Antemeridian. The Antemeridian is the location of the International Date Line.

The equator was a logical feature to use for 0° latitude. However, deciding where 0° was more challenging. Early mapmakers often would use a prime meridian that went through locations other than Greenwich, England. Mapmakers would use Washington, D.C., Mecca, Paris, Rome, Kyoto and others as the Prime Meridian that caused a lot of confusion. In 1884, at the International Meridian Conference, Greenwich, England was selected as the official Prime Meridian. Specifically, the Prime Meridian passed through the cross hairs of the Airy's Transit Circle at the Royal Observatory in Greenwich, England. It was referred to as the Airy Meridian. However, the Prime Meridian used in Google Earth does not pass through the Observatory. Instead it is about 100 meters to the east. The reason is because Google Earth and GPS's use the more current WGS84 datum. WGS84 is an acronym for World Geodetic Survey of 1984 and the term "datum" is the reference from which measurements are made. The WGS84 datum uses Earth's center of mass for the coordinate origin and does not rely on a physical location, which can move with plate tectonics. The WGS84 datum has become the standard for cartography and navigation.

1. Use Google Earth on the iPads to find the following locations in degrees, minutes and seconds:

- a. Maple Point Middle School:
- b. Statue of Liberty:
- c. Royal Observatory Greenwich
- d. Grand Canyon National Park

2. Find 4 historic places, buildings, sites, etc., find the location and have another student search for these places and tell you the degrees, minutes, and seconds to find its location.

1. _____
2. _____
3. _____
4. _____

3. Google Earth...Plot one hurricane using the plot points on p.9 (Erika 2015 or Sandy 2012).

4. **SHORT ANSWER:** Explain the grid system that Google Earth uses to pinpoint exact location. Identify 2 examples of how this grid system works.