

# LATITUDE AND LONGITUDE

## Introduction to Coordinate Systems on Earth

This exercise is an introduction to a standardized coordinate system used throughout the world for centuries, Latitude and Longitude. While there are many coordinate systems that have been developed for a variety of mapping and geographic purposes, the great majority of maps produced for public use still rely on the traditional Latitude and Longitude system.

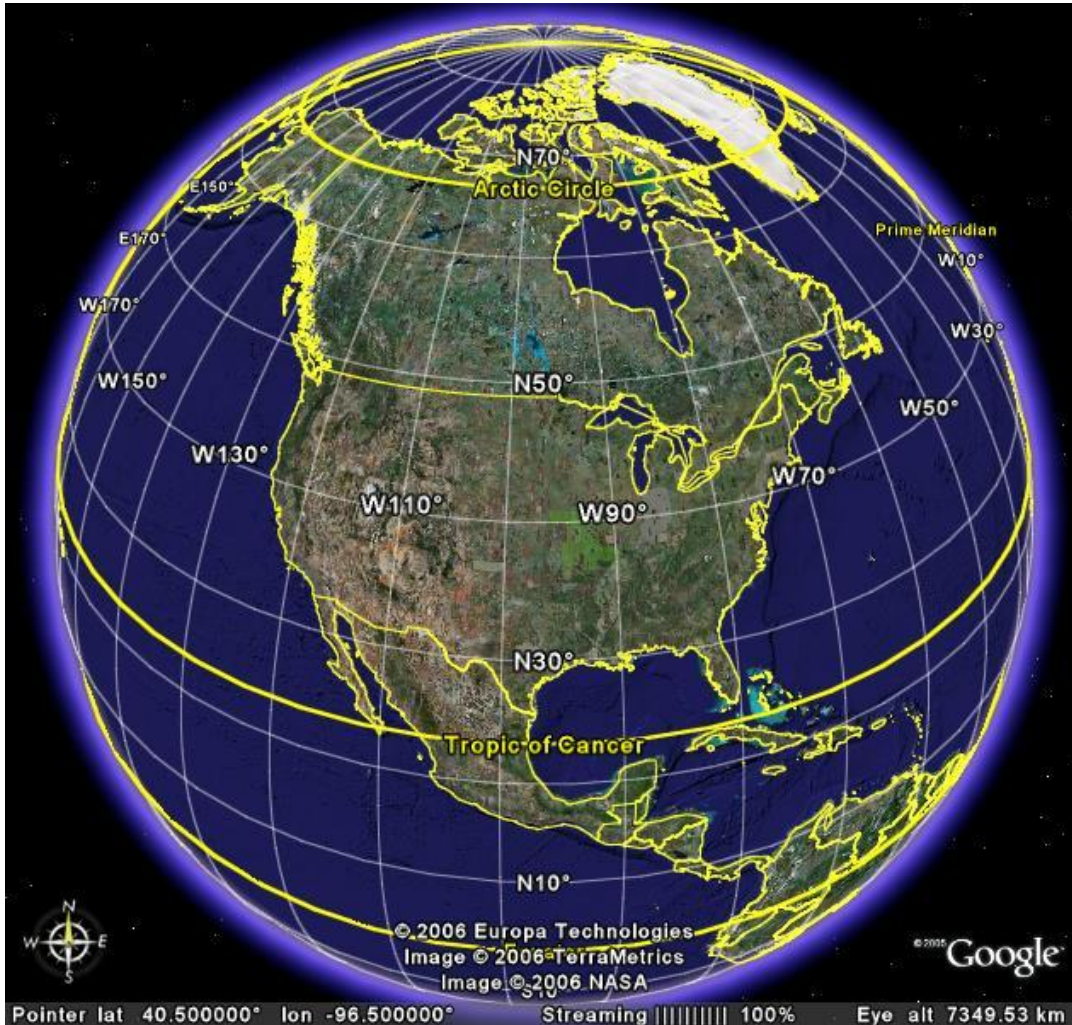


Fig. 1. Google Earth display of Earth with overlaid latitude/longitude grid.

In Google Earth, you can toggle the latitude/longitude grid on/off from the menu bar at the top of the page. Move your cursor to the 'View' option on the menu bar and click it. Locate the Lat/Lon Grid option and click it. You will see the latitude/longitude grid appear on the Earth image in Google Earth. Clicking on the Lat/Lon Grid option again will turn off the grid. Alternatively, you can toggle the latitude/longitude grid by simultaneously using the 'ctrl + L' keys on your keyboard.

In the latitude/longitude system, the nearly spherical Earth is divided into a grid composed of parallels of latitude (North-South grid lines) and meridians of longitude (East-West grid lines). The equator serves as the reference line for latitude and was arbitrarily assigned a value of 0 degrees centuries ago. Latitude is then measured in degrees north or south from the equator.

1. What is the angular distance from the South Pole to the North Pole?
2. What is the angular distance from the Equator to the South Pole?

3. What is the angular distance from the Equator to the North Pole?

Longitude is measured in degrees east or west from the Prime Meridian (rotate the Google Earth globe to locate the Prime Meridian). Note that the Prime Meridian is the meridian of longitude passing through the Greenwich Observatory in Greenwich, England. In 1884, this meridian was arbitrarily chosen as the ‘zero meridian’ for the world. Not only is the Prime Meridian the east-west origin of the global longitude grid, it is also the point of origin for the global system of time keeping – each new day begins on the Prime Meridian. This time is known as 0000 hours Greenwich Mean Time, corresponding to midnight at the Greenwich Observatory, and Greenwich Mean Time is often abbreviated as GMT.

Note on the Google Earth latitude/longitude grid that several grid lines are indicated in yellow. These are 1) the Prime Meridian, 2) the Equator, 3) the Tropic of Cancer, 4) the Tropic of Capricorn, 5) the Arctic Circle, and 6) the Antarctic Circle.

4. At what latitude is the Tropic of Cancer and what is its significance?

5. At what latitude is the Tropic of Capricorn and what is its significance?

6. At what latitude is the Arctic Circle and what is its significance?

7. At what latitude is the Antarctic Circle and what is its significance?

Compile a table showing the approximate latitude and longitude of the following locations. Enter the location name into the query bar of Google Earth, then record the latitude/longitude displayed in the Google Earth window for each site.

<b>LOCATION</b>	<b>LATITUDE</b>	<b>LONGITUDE</b>
Your college/university		
Your home town (list in space below)		
The Forbidden City		
The Taj Mahal		
The Eiffel Tower		
The Sydney Opera House		
The Pyramids of Giza		
The Parthenon		
CN Tower		
Big Ben		

## Crack the Code

### Your Mission

Crack the code to find out where the thieves are taking the loot.

### Briefing

Crafty robbers broke into the Royal Geographical Society in London and stole armfuls of priceless maps. Finding them would be hopeless, except that they dropped a scrap of paper with some odd scribbles on it.

The thieves who broke into the Royal Geographical Society left behind this code. (As a bonus clue, we've added the number of letters in each city's name.)

First letters from each place-name read.

Spell out the town and come with speed.

LATITUDE	LONGITUDE	LETTERS
40° 58' N	5° 39' W	(9) _____
21° 18' N	157° 51' W	(8) _____
36° 52' S	174° 46' E	(8) _____
1° 17' S	36° 49' E	(7) _____
6° 48' N	58° 10' W	(10) _____
21° 2' N	105° 51' E	(5) _____
16° 51' N	99° 55' W	(8) _____
41° 1' N	28° 58' E	(8) _____

KEY: ° represents degrees of latitude or longitude.

' represents minutes (out of 60) within a degree.

Those dastardly crooks are heading to . . .

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