

## Marine Science: Locating Points on Globes- Latitude and Longitude

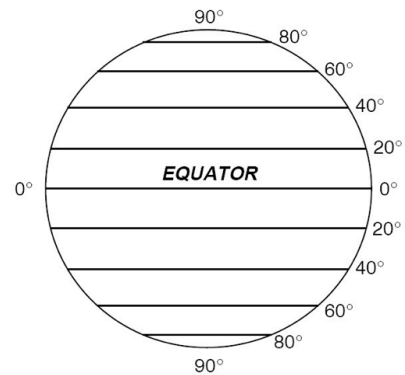
Name: \_\_\_\_\_

**Background:** Because our planet is a sphere, we need *two types of imaginary reference lines* to locate positions or points on the Earth and to make accurate globes, maps, and charts of the Earth.

These lines are called **parallels of latitude** and **meridians of longitude**. Two of the imaginary reference lines, the equator and the prime meridian are called *primary reference lines*.

The **equator** is an imaginary reference line drawn around the Earth halfway between the north and south poles.

The Earth rotates daily about another imaginary line called **an axis**. The north and south poles are the two imaginary points where the axis enters and exits from the Earth.



The half of the Earth to the North of the equator is the **Northern Hemisphere**; the half to the south is the **Southern Hemisphere**; thus *hemisphere* means “*half-sphere*”.

### Parallels of Latitude

**Latitude** is the distance measured in degrees from **0 degrees to 90 degrees** North or South of the equator. Parallels of latitude are imaginary reference lines that form complete circles around the Earth parallel to the equator and to each other.

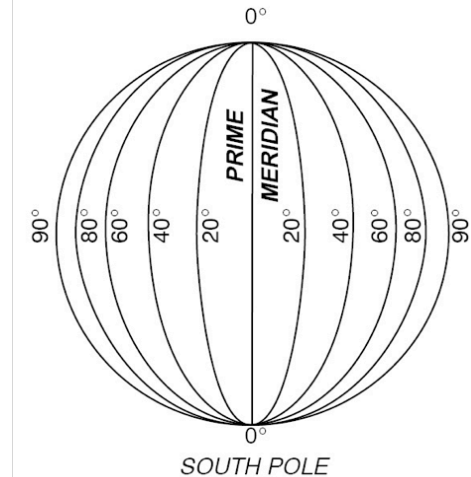
The latitudinal distance from the equator to either or the Earth’s poles is **90 degrees**. Degrees of Latitude are measure from an imaginary point at the center of the Earth. **The equator is 0 degrees; the poles are 90 degrees from the equator.**

Except for positions located right on the equator (0 degrees), degrees of latitude are always labeled to tell whether they are **North or South of the Equator**. Any parallel of latitude is described by the number of degrees it is North (N) or South (S) of the equator. Honolulu, Hawaii, for example, is on the 21 degree N. Sydney, Australia, is on the 34 degrees S parallel.

## Meridians of Longitude

Meridians of Longitude are imaginary half-circles passing from the North Pole to the South Pole. They are sometimes called **Lines of Longitude**. By international agreement, the 0 degrees meridian (*also called the Prime Meridian*) is drawn through Greenwich, England. The Prime Meridian is sometimes labeled on maps as the Greenwich Meridian.

Meridians are numbered East and West from the Prime Meridian. East and West longitude meet at the 180 degrees Meridian, which runs through the Pacific Ocean. *Thus, most of the United States (including Hawaii) lies in west Longitude.*



## International Date Line

The International Date Line is an imaginary line running mostly *along the 180 Meridian*. Events immediately to the right and left of the date line are 24 hours apart. *For example, if it is 12 noon on Monday, July 1, on the left side of the international data line, it is 12 noon on Sunday, June 30, on the right side.*

## Location

The lines of latitude and longitude form a global grid system. Any point on the globe can be located exactly by specifying its latitude and longitude. This system is essential for ships at sea that cannot locate their positions using landmarks or coastal navigational aids such as buoys or channel markers. So, that a point on the globe can be located more exactly, *degrees are further subdivided into minutes and minutes into seconds. Here minutes and seconds do not refer to time but to parts of a degree of an angle.*

**1 degree= 60 minutes**

**1 minute= 60 seconds**

The latitude and longitude readings of a place are called its **spherical coordinates**. For example, to state the coordinates of a specific harbor in Honolulu, you would say, *“latitude 21 degrees, 19 minutes, and 39 seconds North; longitude 157 degrees, 07 minutes, and 30 seconds West”*

Both marine and air navigators use **latitude and longitude to specific location**. They also use the nautical mile as their unit of length or distance. Navigators describe the speeds of ships and airplanes, and meteorologists describe wind speeds, **in knots**.

**A nautical mile is 1 minute of an arc** measured along a meridian of longitude or along the equator. These terms have the following values:

**1 nautical mile= 1.85 km (1.15 miles)**

**1 knot= 1 nautical mile per hour**

Define the following on your website (WHILE explaining how you completed your globe)

- \* **Circle, circumference, diameter, radius, parallel**
- \* **Directions (North, South, East and West)**
- \* **Hemisphere (Northern and Southern, Eastern and Western)**
- \* **Parallel of Latitude**
- \* **Meridian of Longitude**
- \* **Pole (North and South)**
- \* **Reference Lines**
- \* **Primary Reference Lines**
- \* **Location**
- \* **International Date Line**