

The round Earth

The Earth is round. It is roughly in the shape of a sphere. See Fig. 1 for a photograph of the Earth. This photo is called "the Blue Marble." It was taken on December 7, 1972, by the crew of the Apollo 17 spacecraft on the way to the Moon at a distance of about 29,000 kilometers from the Earth. On the upper left part of the photo, you can clearly see the African continent, and near the center of the photo, you can see Madagascar, the big island nation located near the East coast of Africa. On the very upper part of the photo, you see the Arabian Peninsula.



Fig. 1. The Blue Marble

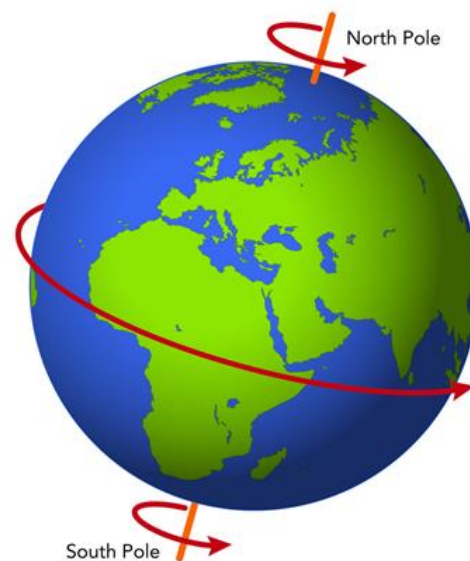


Fig. 2. The rotating Earth

An important fact about the Earth is that it rotates itself. See Fig. 2. The arrows denote the rotation direction. We have day and night because of the rotation of the Earth. During the day, you can see the Sun. During the night, you cannot see the Sun. It's because, during the day, your town is on the side which the Sun is shining. But, as the Earth rotates, your town moves to the side which the Sun is not shining, so it becomes the night. Notice also that the Sun is shining on certain part of the world while it is not shining on certain part of the world at the same time. This means that even though it may be a night at your place, it is a day at some other parts of the world. In other words, there are time differences between different locations on the Earth. For example, when it is at 9 pm at night in Korea, it is 1 pm in France. Notice also that the Earth rotates from the West to the East. This means that the Sun moves from the East to the West, when seen on the Earth. This also implies that the Sun rises in the East, and sets in the West.

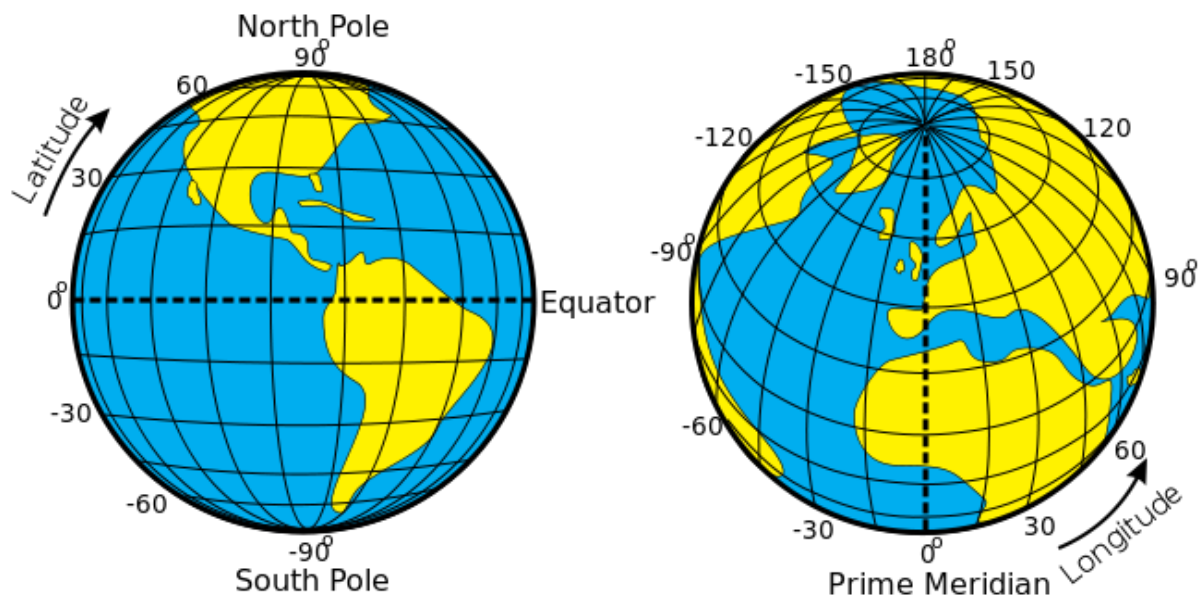


Fig. 3: Latitude and longitude

Now, suppose you are at a certain point on the Earth. Then, how can you denote your position? You could say something like you are 150 km south of Seoul, but what if you are somewhere in the Pacific Ocean where there is neither city nor island nearby?

You can denote your position by two angles. They are called "latitude," and "longitude." See Fig. 3. Latitude ranges from -90° to 90° , and the longitude ranges from -180° to 180° . You see that the North Pole is located at the latitude 90° , and the South Pole is located at the latitude -90° . The equator, where the rotation speed is greatest, is located at the latitude 0° . So, the latitude tells your position along the direction north and south. On the other hand, the longitude tells your position along the direction west and east.

Sometimes people use the letter N for a positive latitude and S for a negative latitude. For example, 80° N means the latitude 80° , and 70° S means latitude -70° . Of course, the letters N and S stand for the North and the South. Similarly, they use the letter W for a negative longitude and E for a positive longitude. For example, 130° E means the longitude 130° , and 170° W means longitude -170° . The part above the equator on the left figure of Fig.3 is called the "Northern hemisphere," and the part below the equator is called the "Southern hemisphere." You see that the latitude of any location on the Northern hemisphere is always positive and the latitude of any location on the Southern hemisphere is always negative. Furthermore, the seasons in the Southern hemisphere are the opposite of the ones in the Northern hemisphere. For example, when it is summer in France, a country in the Northern hemisphere, it is winter in Australia, a country in the Southern hemisphere. Similarly, when it is winter in France, it is summer in Australia. We will learn the reason why in our next article "Why does the season change?"

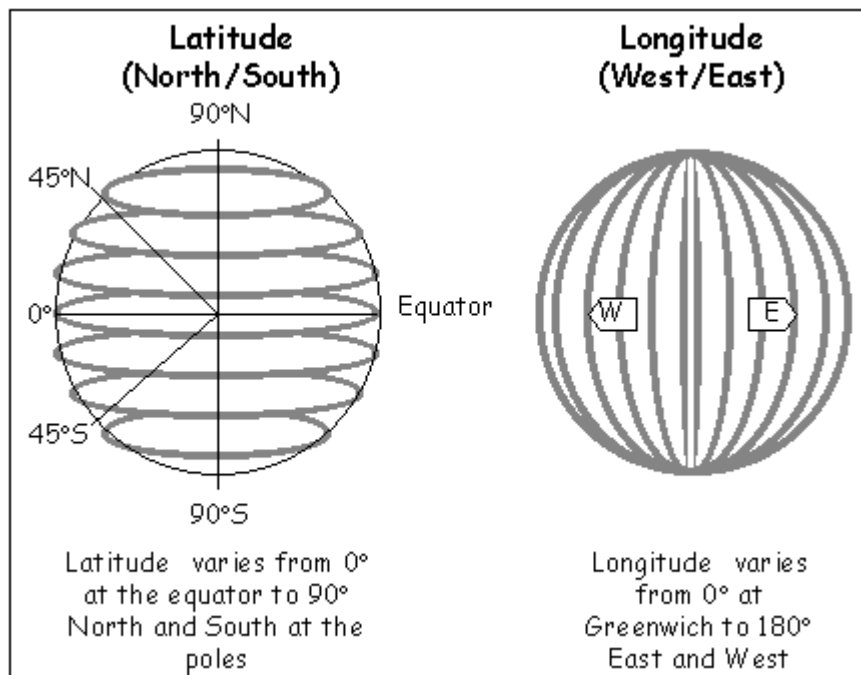


Fig. 4: Latitude lines and longitude lines

See Fig. 4. A line connecting the locations with the same latitude are called a "latitude line," and a line connecting the locations with the same longitude is called a "longitude line." On the left, the latitude lines are drawn by gray lines, and on the right, the longitude lines are drawn by gray lines. Greenwich is a district of London where the Royal Observatory, Greenwich is located. Many nations agreed in the 19th century to set the location of this observatory as the longitude 0°. Now, it's universally adopted.

Final comment. I mentioned that the Earth is roughly in the shape of a sphere. I said so because it is not exactly spherical. The distance from the center of the Earth to the equator is about 6378 km while the distance from the center of the Earth to the North Pole or the South pole is about 6357 km. So, we can say that the Earth is bulged around the equator by a tiny amount. This is due to the rotation of the Earth. If you rotate a thing, the thing tries to move away from the center of the rotation. This is called "centrifugal force." So, the centrifugal force causes the Earth to bulge around the equator.

Summary

- The Earth is round. It is almost spherical, being slightly bulged around the equator.
- The Earth rotates itself around the North Pole and the South Pole. That is the reason why we have day and night, and the Sun rises in the East and sets in the West. The rotating speed is greatest at the equator and zero at the North Pole and the South Pole.

- A location on the Earth can be denoted by two angles called "latitude" and "longitude." Latitude ranges from -90 degrees to 90 degrees, and tells you where the location is along the north and the south. Longitude ranges from -180 degrees to 180 degrees and tells you where the location is along the west and the east.

Fig. 1 is from

https://commons.wikimedia.org/wiki/File:The_Earth_seen_from_Apollo_17.jpg

Fig. 2 is from Siyavula education.

<https://www.flickr.com/photos/121935927@N06/13582191874>

Fig. 3 is from

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Fig. 4 is from

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