Direction

North, South, East and West denotes parts of the world that are also used to signify cardinal (compass) direction (heading) with respect to geographic coordinate system. Sense of geographic space and direction is one of the essential life skills.

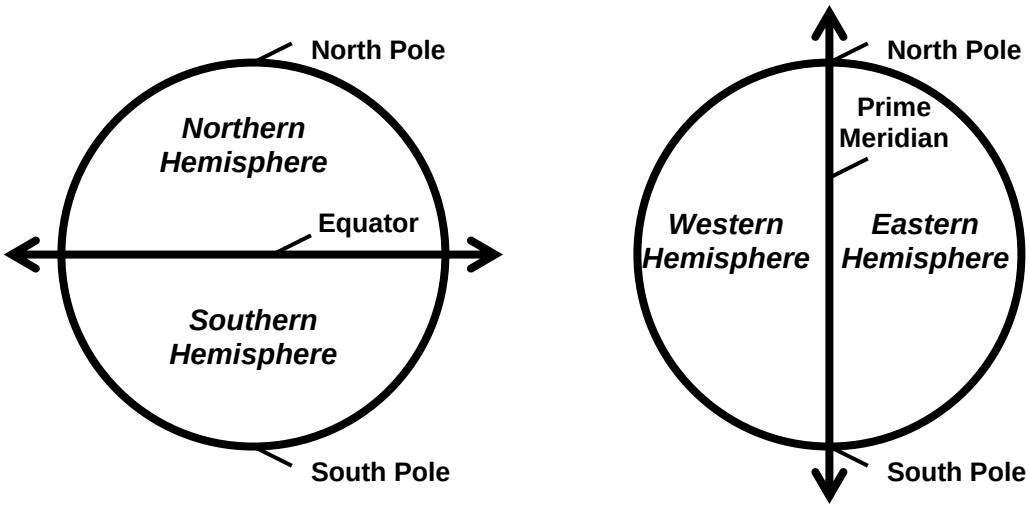
Explorer's Guide

Before You Start

In a classroom setting, assume that each of four walls can be associated with four parts of the world. Label each wall accordingly following the clockwise order: North, East, South, and West. Select a volunteer who should leave the room while the other explorers hide a small object. When the volunteer returns, each explorer, one at a time, provides the volunteer with directional guidance according to the denoted names of the four walls. After receiving a new guidance, the volunteer should make any number of steps in the direction provided. This continues until the object is located. The exercise can be repeated several times. What words would you consider appropriate to indicate direction to an object hidden in a corner of the room? Use a compass to find the actual North, East, South and West.

Learning by Doing

1. Using the globe, locate the Equator and the Prime Meridian. While the Equator is used to split our world into the Northern and Southern hemispheres, Prime Meridian divides the globe into Eastern and Western hemispheres (see the figure below).



2. Name at least one country in each of the four combinations of hemispheres:
   a. Northern and western: _____
   b. Northern and eastern: _____
   c. Southern and western: _____
   d. Southern and eastern: _____

3. In each pair below, circle the hemisphere where your hometown is located:
   a. Northern or southern
   b. Eastern or western

4. Using the map of the USA, locate your state. Name those states that have common border to the:
   a. North _____
   b. East _____
   c. South _____
   d. West _____

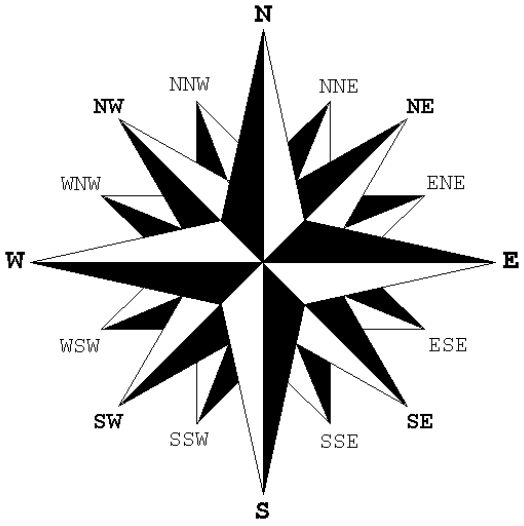
5. Using the maps of the USA (or just your memory), complete the following table:

	North / South	East / West	
New York is located to the		and	with respect to California
Colorado is located to the		and	with respect to Florida
Texas is located to the		and	with respect to Washington
Ohio is located to the		and	with respect to Arizona

6. By combining the words representing four cardinal directions and associated heading (azimuth) values (see table and figure below[1]), repeat previous exercise by completing the following table:

Flying from:	Heading (words)	Heading (°)
California to New York		
Florida to Colorado		
Washington to Texas		
Arizona to Ohio		

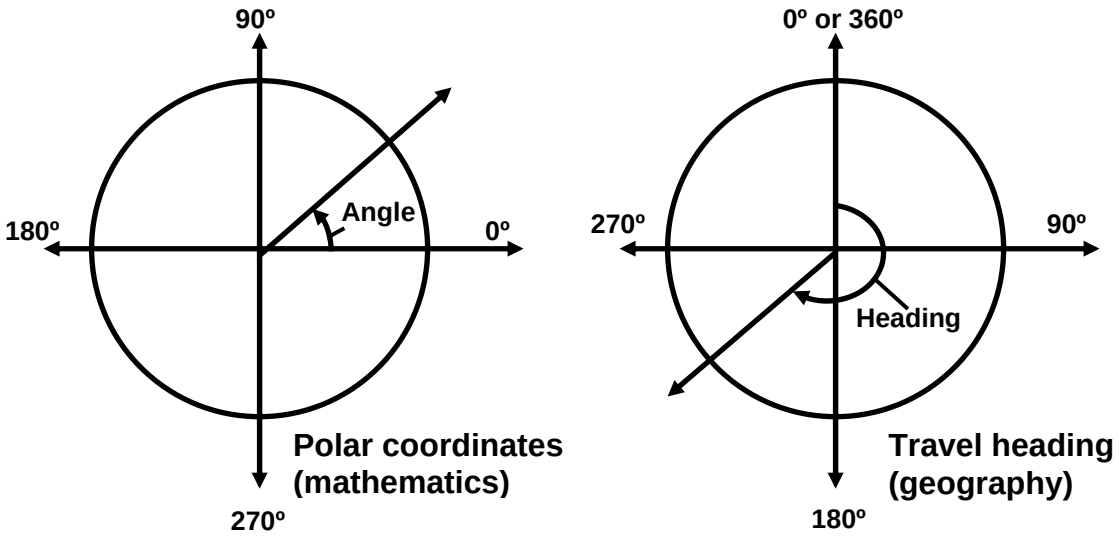
Heading (words)	Heading (°)
North (N)	0° or 360°
North North East (NNE)	22.5°
North East (NE)	45°
East North East (ENE)	67.5°
East (E)	90°
East South East (ESE)	112.5°
South East (SE)	135°
South South East (SSE)	157.5°
South (S)	180°
South South West (SSW)	202.5°
South West (SW)	225°
West South West (WSW)	247.5°
West (W)	270°
West North West (WNW)	292.5°
North West (NW)	315°
North North West (NNW)	337.5°



[1] http://en.wikipedia.org/wiki/Cardinal_direction

How Does It Work

In general, as with any polar coordinate system, direction can be expressed as a clockwise or counterclockwise angle between 0 and 360˚ with respect to a baseline. Mathematicians use the horizontal X axis to measure angle counterclockwise when using polar coordinates. In the contrary, when it comes to navigation, North (up on most geographic maps) represents zero heading which increases in clockwise direction (see figures below):



As mentioned above, in geography, the four cardinal directions are North, East, South and West. An intercardinal direction is one of the four intermediate compass directions located halfway between the cardinal directions as well as every 22.5˚.

Additional Challenge

What is the direction from home to school? What heading would you take to travel from your hometown to reach your favorite National Park?

Vocabulary

- ***Direction*** *or* ***Heading*** *is the information contained in the relative position of one point with respect to another point expressed in words (cardinal and intercardinal directions) or angular measurements (degrees).*
- ***Azimuth*** *represents angular measurement of direction or heading.*
- ***Polar coordinate system:*** *Two-dimensional coordinate system in which each point is determined by an angle and a distance.*
- ***Equator*** *is an imaginary line on the Earth's surface equidistant from the North Pole and South Pole. It thus divides the Earth into a Northern Hemisphere and a Southern Hemisphere.*
- ***Prime Meridian****, also known as the* ***Greenwich Meridian****, is an imagery line passing through both poles and the Royal Greenwich Observatory in London. It separates the earth into Eastern and Western Hemispheres.*

Interesting to Know

Some people use clock notation to indicate direction. For example, if they say 12 o'clock that means the same as straight ahead, 6 o'clock – directly behind, 3 o'clock – directly to the right and 9 o'clock – directly to the left.

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