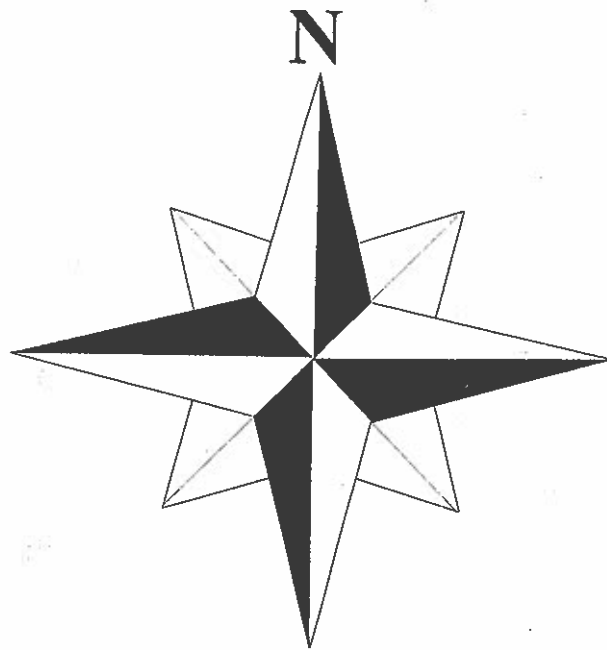


# Earth Dimensions

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## Unit 1

Classification: organize or group items with similar properties  
Models and Dimensions of Earth - 2

Observation: interaction of our senses w/ environment

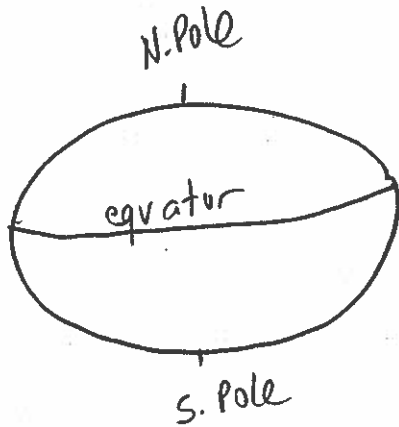
5 senses

Inference: interpretation of an observation

6th sense? balance

**II. Shape of Earth**

- A. oblate sphere - flattened sphere
- 1. flattened @ poles
- 2. bulge @ equator
- 3. Diagram of an oblate sphere



|| 91  
NOT TO SCALE

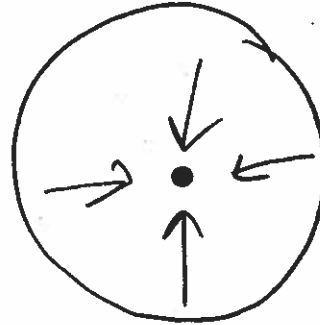
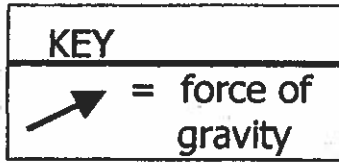
4. Earth's equatorial circumference is greater (distance around is greater @ equator) than its polar circumference.

a. Equatorial circumference - 24,900 miles

b. Polar circumference - 24,860 miles

B. Causes of Earth's Shape

1. Gravity - an inward pulling force. This force pulls inward equally in all directions and causes earth to be spherical.



2. Centrifugal force - an apparent outward force caused by the spinning (or rotating) of earth on its axis. This force causes earth to bulge.

a. The faster the rotational speed, the greater the centrifugal force.

b. (1) How long does it take each location to make one complete rotation?

X 24 hours  
Y 24 hours

(2) Which location, X or Y, travels a greater distance to make one complete rotation?

X

(3) At which location, X or Y, is the rotational speed greater?

X

(4) At which location, X or Y, is centrifugal force greater?

X

c. Therefore, the greater centrifugal force causes earth to bulge at the

equator.



C. Evidence of Earth's Shape

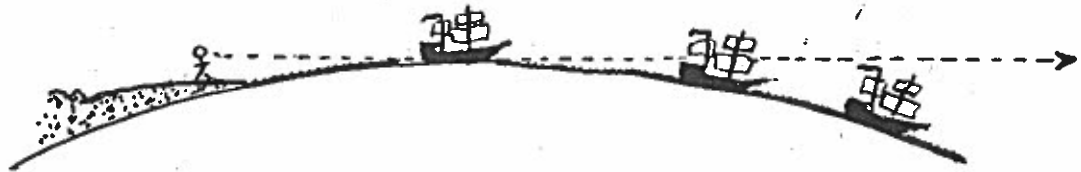
1. Photographs from space reveal that Earth is almost \_\_\_\_\_.

a perfect sphere



Best proof of Earth's shape: photos from space

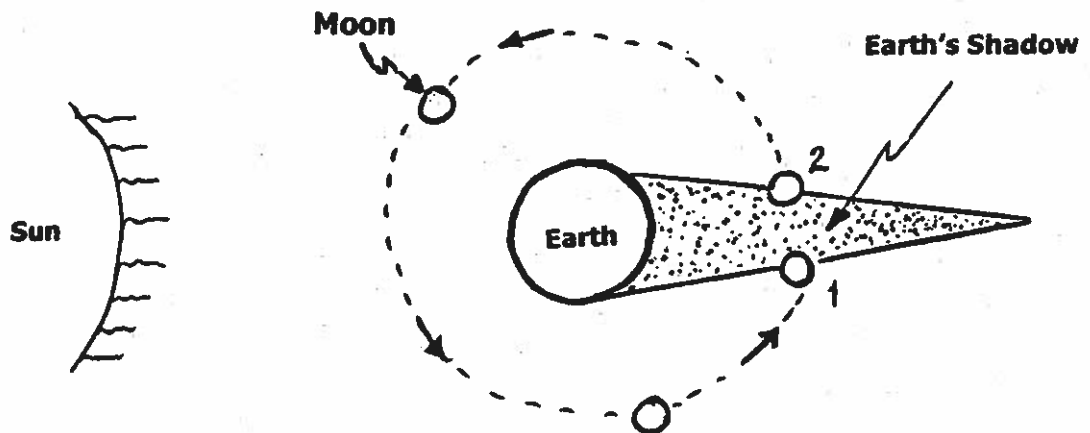
2. Observations of ships on the horizon



The gradual "appearance" or "disappearance" of a ship over the horizon is evidence that earth's surface is curved.

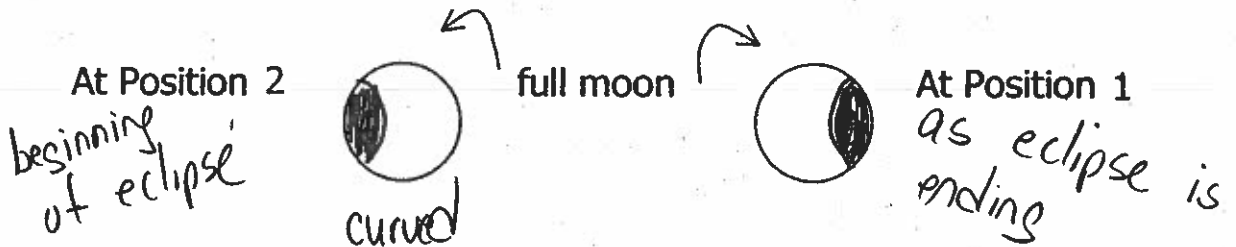
3. Observations of an Eclipse of the Moon (as viewed from Earth)

a. As viewed from space:



As the moon orbits Earth, and travels from position 1 to position 2, it passes through Earth's round shadow

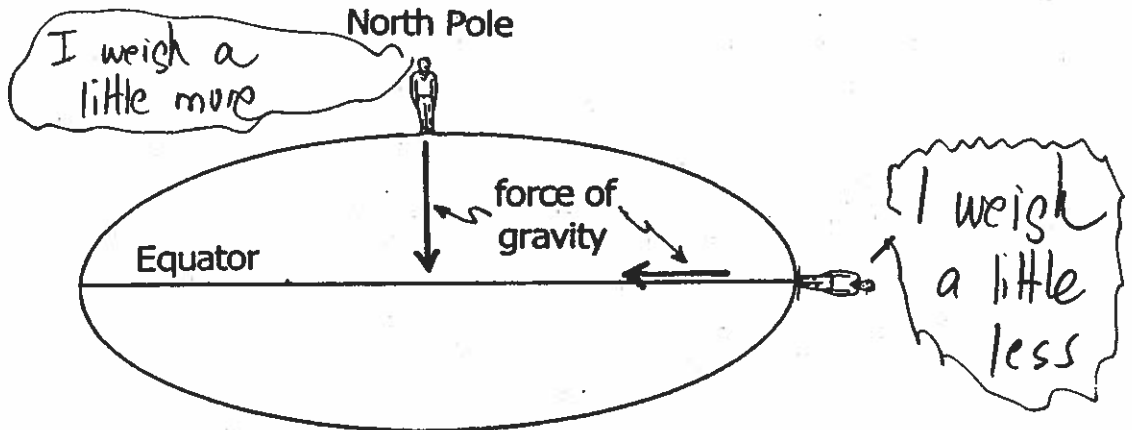
b. As viewed from Earth:



c. Earth's shadow on the moon (full moon) during a lunar eclipse provides evidence that Earth is spherical.

4. Measurement of Gravity

a.



b. The shorter the distance between two objects, the greater the gravitational force. Therefore a person or object that is closer to the center of Earth (the center of gravity) would weigh more than when the person or object is farther from the center of gravity.

c. (1) If Earth is an "oblate spheroid", where on the surface of Earth would a person be closer to the center of Earth?

at the poles

(2) Where on the surface of Earth would a person weigh the most?

at the poles

d. Under what circumstance would a person weigh the same everywhere on Earth?

If Earth were a perfect sphere

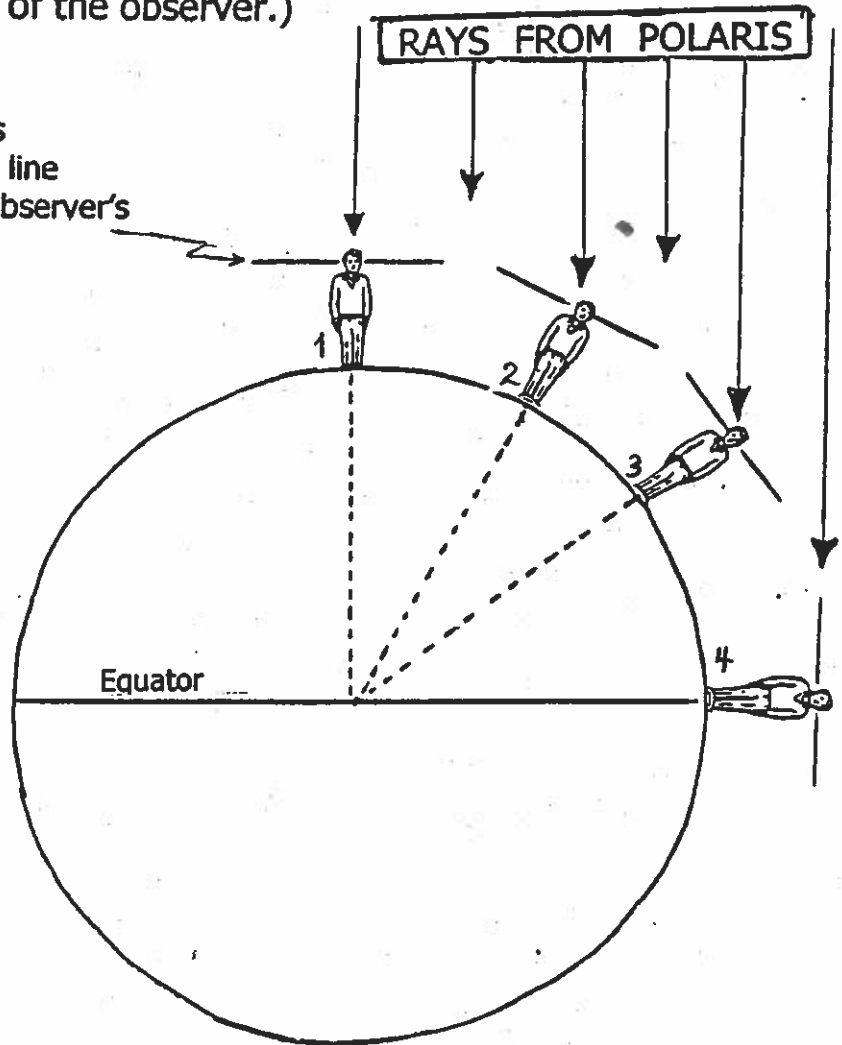
5. Observation of the <sup>or</sup>North Star, Polaris -

a. The altitude of Polaris changes as an observer moves north or south (in the Northern Hemisphere); this is because Earth is spherical, and its surface is curved.

(Altitude is the height, measured in degrees that a heavenly body is above the horizon of the observer.)

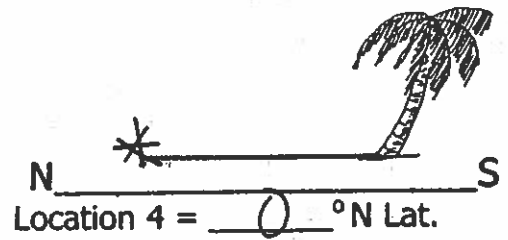
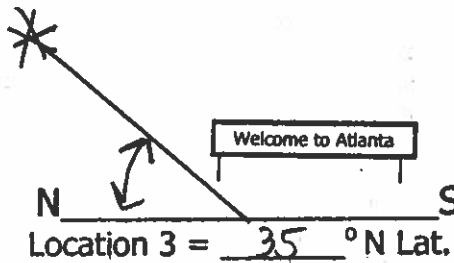
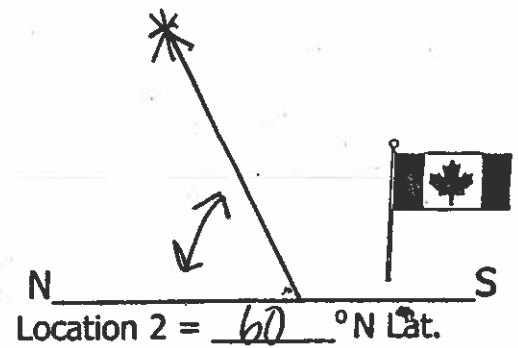
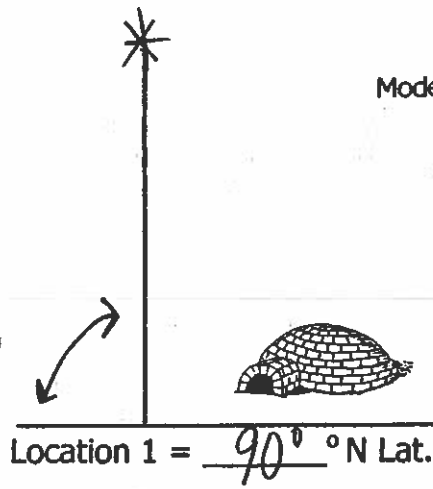
b.

The horizon is shown by the line through the observer's line of vision.



OBSERVER	LATITUDE	ALTITUDE OF POLARIS
1	90°	90°
2	60°	60°
3	35°	35°
4	0°	0°

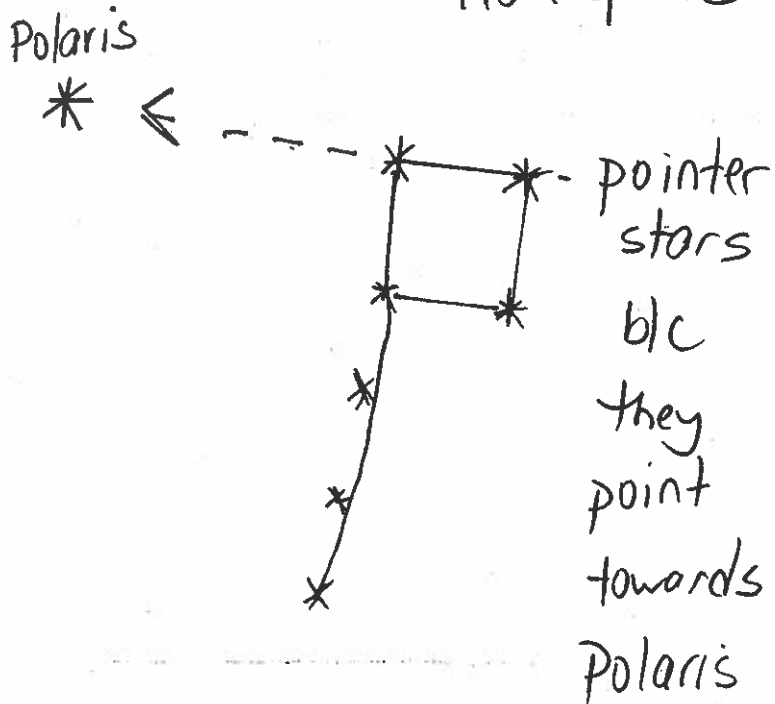
c.



d. Summary: The altitude of Polaris above the horizon is equal to the latitude

e. Locating the North Star of the observer in the Northern Hemisphere

Polaris is one star in the Little Dipper constellation



IV. Latitude and Longitude

A. Latitude - angular distance North or South of the equator; originally determined by positions of stars in the sky

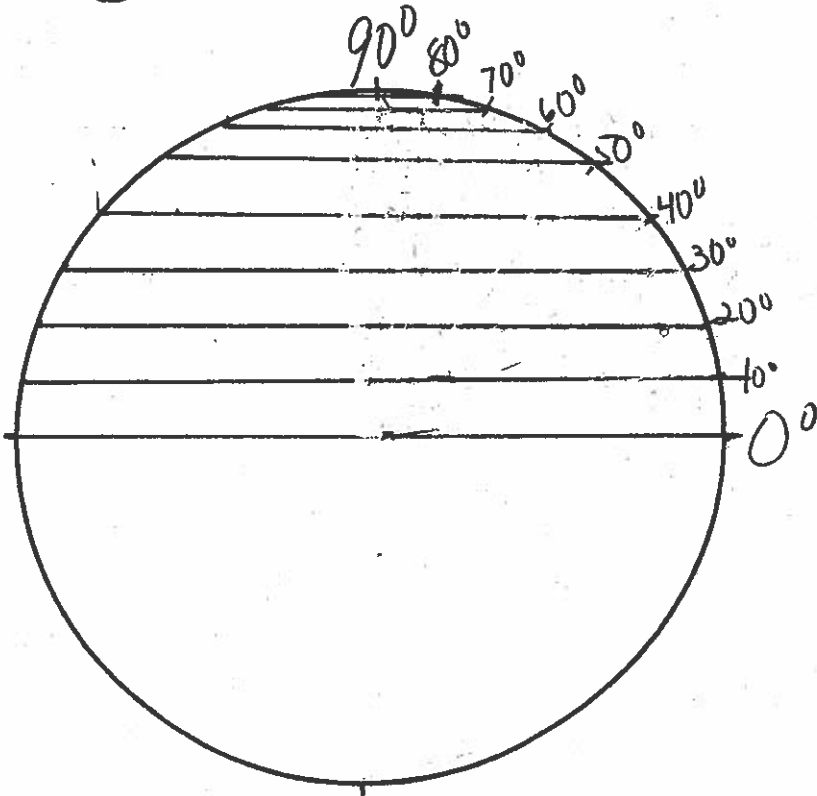
1. Parallels - lines used to measure latitude they run parallel to the equator

2. Equator -  $0^\circ$  lat; divides Earth into Northern & Southern hemisphere

3. North/South Pole -  $90^\circ$  lat; maximum latitude in either hemisphere

4. Arctic  $\odot$  begins @  $66\frac{1}{2}^\circ$ N,

rungs  
of  
a  
ladder  
(latter)



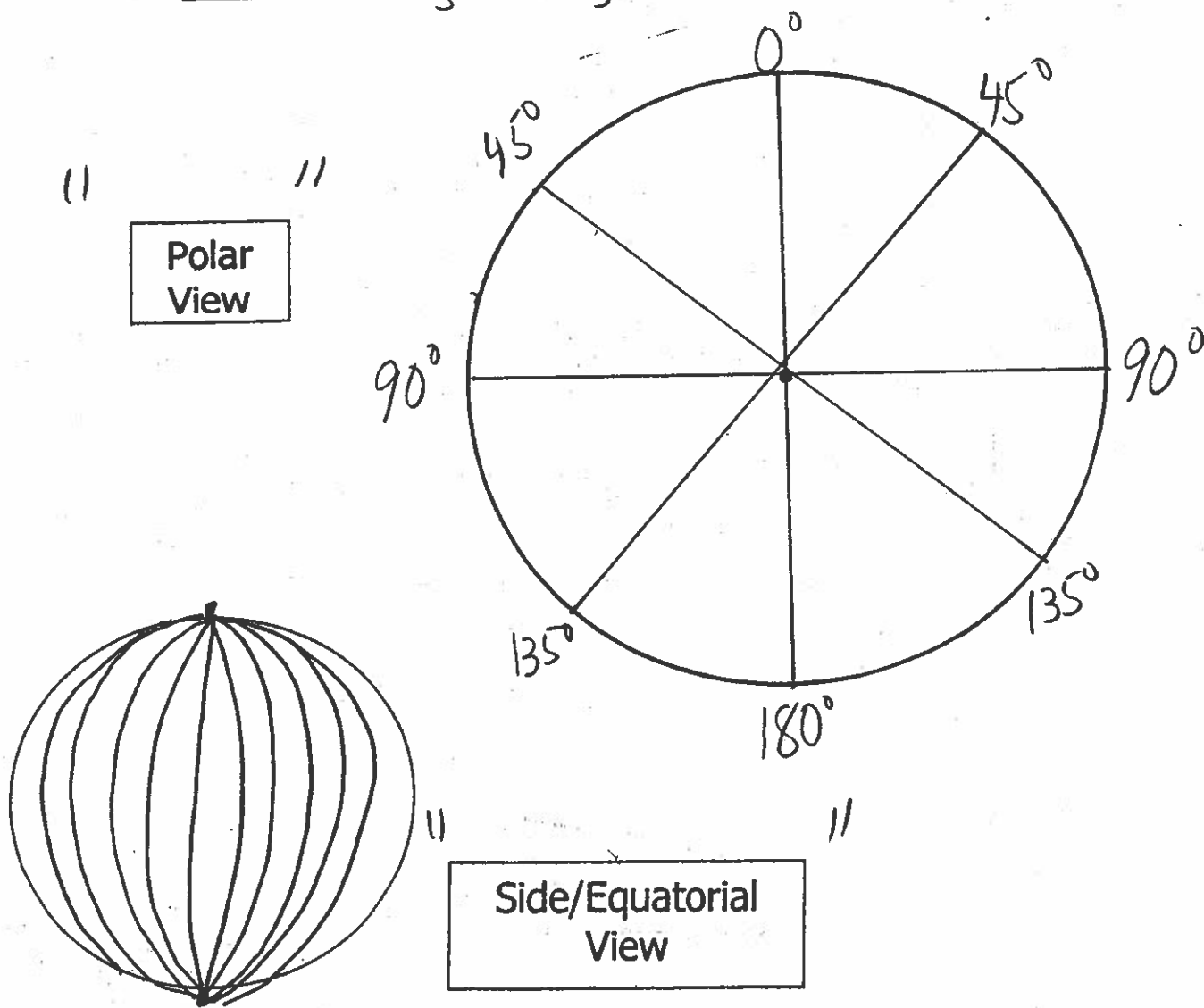


B. Longitude - angular distance east or west of the Prime Meridian; determined by E's position as it rotates relative to the Sun

1. Meridians - lines used for measuring longitude; they run north/south from Pole to Pole

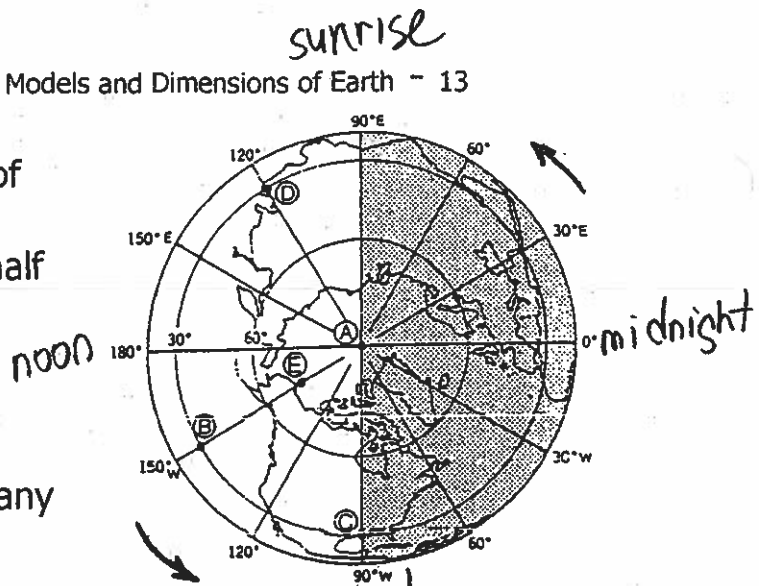
2. Prime Meridian -  $0^\circ$ ; divides Earth into Eastern & Western Hemispheres

3. International Date Line - the date changes here  $180^\circ$  longitude; maximum longitude



D. Earth's Time Zones

- As Earth rotates on its axis, half of earth is facing the sun and is experiencing daylight; the other half is in darkness and is experiencing night.



- When the sun is <sup>passes</sup> ~~directly~~ over a certain meridian, it is 12 noon at any location at or near that meridian.

3. Think:

Earth is a sphere /degrees in a circle =  $360^\circ$   
 Time / Hours to make one complete rotation =  $24 \text{ hours}$

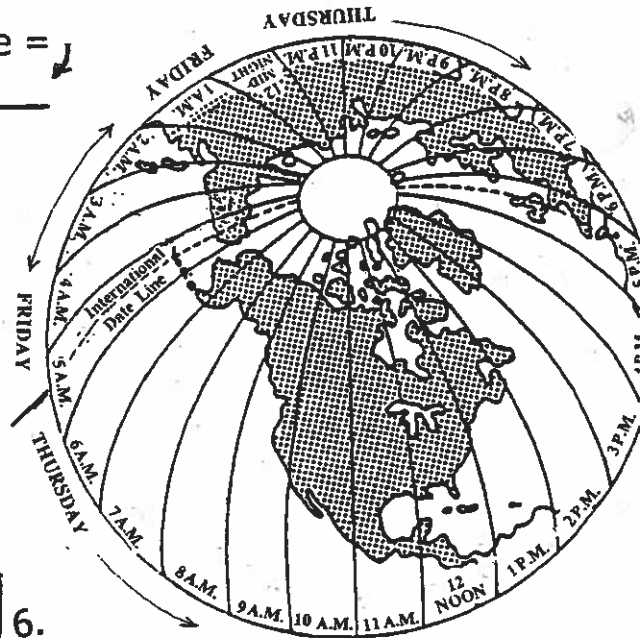
Earth's Rotational Speed  
 $15^\circ/\text{hour}$

- a. Number of time zones on Earth = 24

- b. Approximate width of each time zone =  $15^\circ$

- a. If it is Wednesday, and you cross the International Date Line going west, it would then be Thursday

- b. It is Tuesday, and you cross the International Date Line while traveling east, it would then be Monday



- a. How many time zones are there in the continental U.S.? 4

- b. Is it earlier or later in California that New York? earlier

- c. If it is 8:00 EST, what time is it in PST? 5:00

- d. It is 6:00 MST, what time is it in EST? 8:00

