

Motion in Space



Motion of the earth...

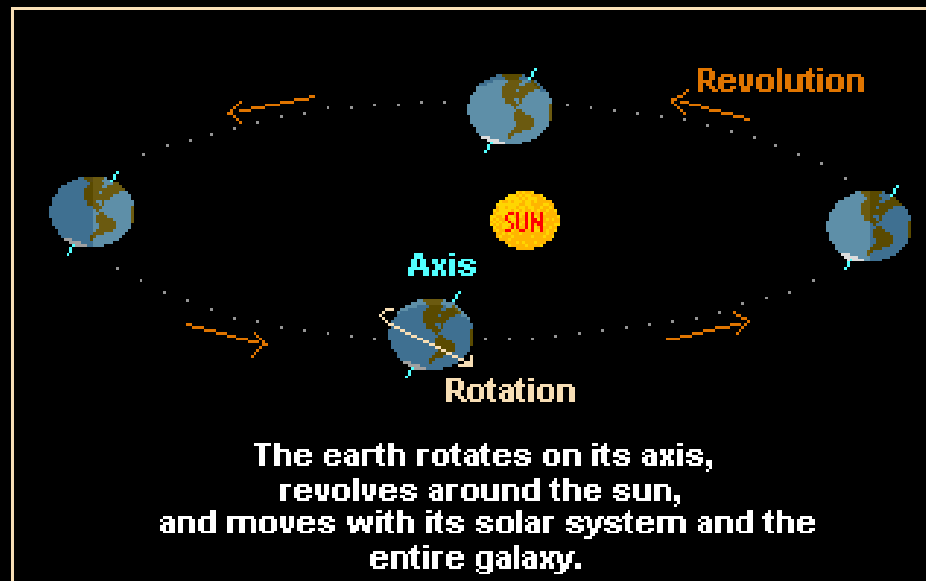
The earth has two major types of motion...

1. Rotation

- Spinning on its axis

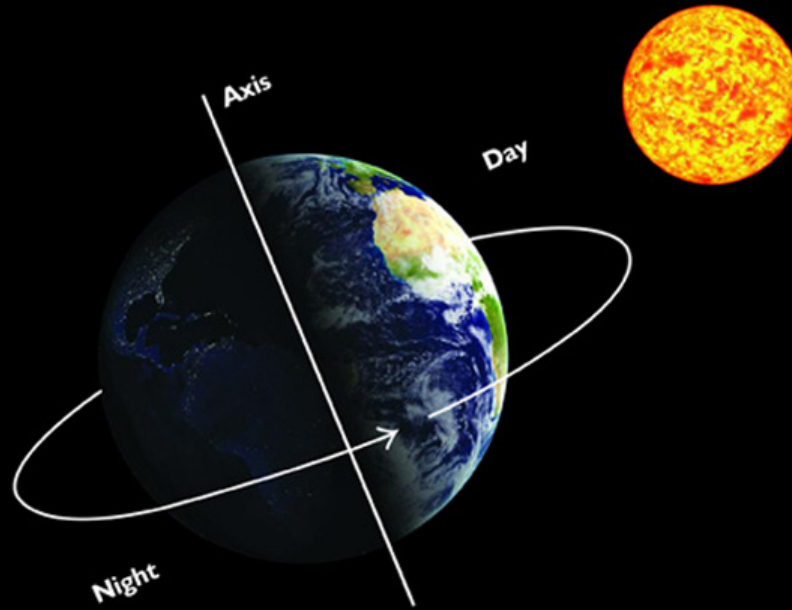
2. Revolution

- travelling around another body



Rotation of the earth

- The earth completes one rotation approximately every 24hrs, which is the cause of our days and nights
- Looking down at the north pole, the earth rotates counter-clockwise causing the sun to rise in the east and set in the west.

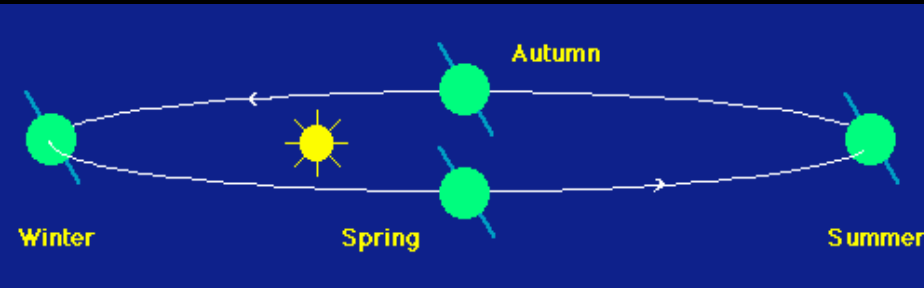
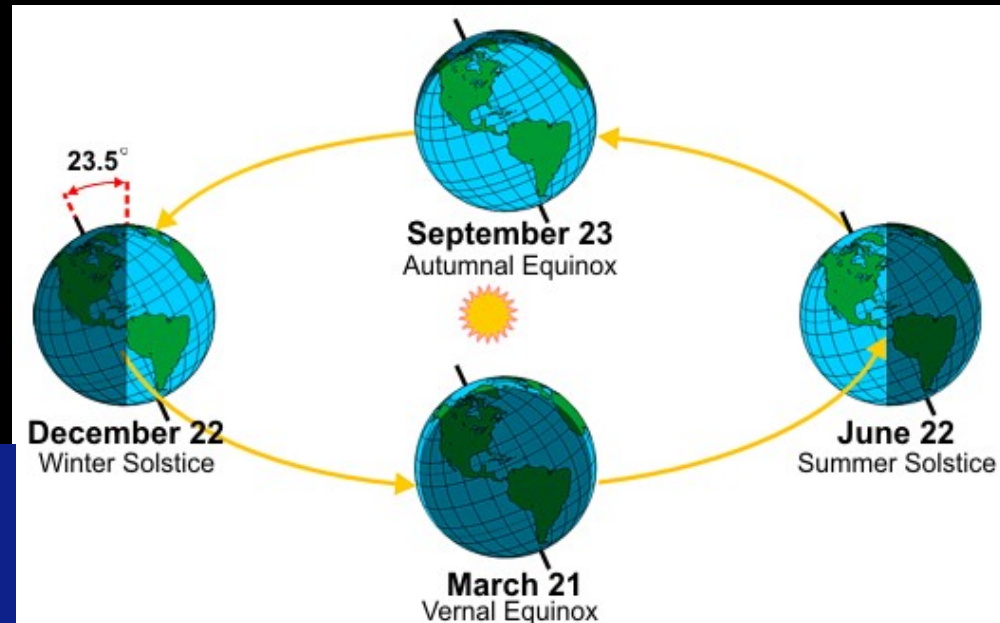


[Rotation Video](#)

Revolution of the earth

- The earth completes one revolution around the sun approximately every 365 and $\frac{1}{4}$ days.
- The tilt of the axis and the revolution of the earth around the sun is what causes our seasons

Veritasium Seasons



- Note: the earth is actually closer to the sun in the winter, but we are tilted away!

Retrograde motion...

- We said earlier that mars, jupiter and saturn all look like they move backwards at some time...we call this type of motion RETROGRADE MOTION!
- We now know that mars is not travelling in loops (epicycles) as ptolemy explained...its because mars' orbit is further out than earths...

[Retrograde motion](#)

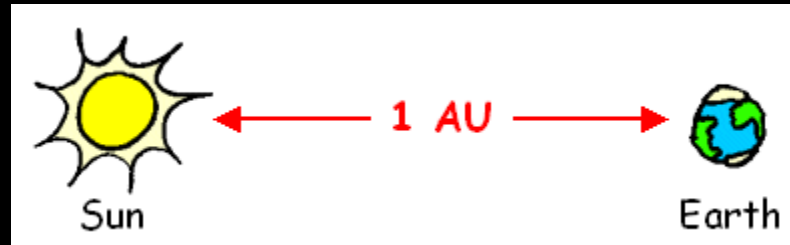
[Retrograde motion applett](#)

Measurements in Space...

Since space is sooooo huge, we have to come up with different units of measurements to measure how far objects are:

Astronomical Units (AU):

- Is the distance from the earth to the sun.
- 1AU = 149,597,870,700 metres (149,597,870 Km)



Light Years:

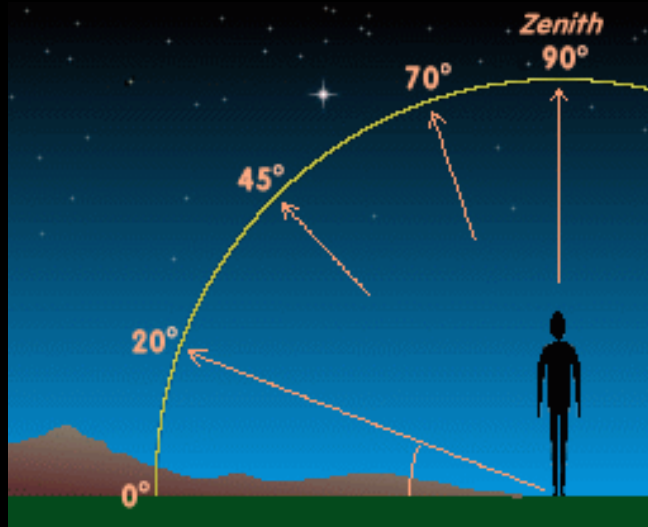
- How far light travels in 1 year (speed of light is about 300,000 km/s)
- 1 light year \approx 10 trillion kilometers
- It takes about 8min for light to go from the sun to earth.

Measurements in Space...

To locate objects in the sky (planets, stars, satellites) we need to use 2 other measurements:

1. **Altitude:**

- the angular distance of a heavenly body above the horizon.
- It is the angle your head is tilted at when looking at an object in the sky.
- The horizon is considered zero degrees and directly above you is considered 90 degrees (zenith)



Measurements in Space...

2. Azimuth:

- Is the side to side direction you are looking.
- Directly north is considered zero or 360 degrees, and south is considered 180 degrees

