Student Notes: Unit 2- The Earth in Space

Part 3 – Earth in Space

How did the Earth Form?

- After the solar system was formed, the objects that began to accrete third closest to the sun became known as our Earth.
- These materials were made up of silicon, iron, magnesium and small amounts of radioactive elements.
- During this time Earth was a very violent place. It was continually bombarded with asteroids and other material and began to gradually cool.

How was the Moon formed?

- Approximately 4.5 billion years ago, a large planet named Theia collided with Earth sending 70% of Earth's surface material into space.
- This material including the remains from Theia began to orbit around the mass that was still left of Earth and accreted into a solid mass called Earth's Moon.
- This process is referred to as the impact theory.
- Due to the impact from Theia, the Earth Earth's north pole was tilted 23.5^{o}C in the direction the planet Theia was going.
- Today we can see many craters and mountains on the moon which we see as dark and light areas which have been formed by meteoroids impacting it.
- The moon orbits the Earth in an elliptical path.
- We are able to see the moon because it reflects the light from the sun. We do however only see one side of the moon as it rotates with us.
- The moon is the only place in space that humans have been able to travel to.

What happened after the Impact that formed the moon?

- Again, the materials began to cool and layer according to their densities.
    - highly dense elements fall to the center
    - less dense elements formed the outside layers
- The layers that were formed are called: Inner Core, Outer Core, Mantle and Crust.

Earth's Continued Heat:

- It took earth 150 million years to cool and form all of its layers.
- Although the Earth cooled, it's core is still an extremely hot place. The reasons why this is so are:
    - frictional heat eat from when the planet accreted
    - friction heat caused by denser materials moving to the center, and less dense materials moving outward
    - core's expansion

- decay of radioactive materials

Convection Currents:

- The impact creating the moon caused earth's mantle to begin vigorous convection currents (cycling of materials with different density levels) called mantle convection.
- Mantle convection causes the transfer of the inner heat (called geothermal energy) to the outer, cooler core of the mantle sending this material inward.
- It is believed that convection currents are the reason for crustal movement, volcanoes, earth quakes, geysers and the rock cycle.