Celestial Magnetic Fields

The Dynamo Theory

-Dynamo theory describes the process through which motion of a conductive body in the presence of a magnetic field acts to regenerate that magnetic field.
-The Earth's molten outer core circulates due to:
    Convection currents
    Earth's rotation (Coriolis Effect)
-This electrically conducting iron moves in the presence of Earth's magnetic field.
-Electric currents are induced, and the magnetic field is regenerated.
-The Magnetic field flips approximately every 200,000 years, but it has been 750,000 years since its last flip.

The Sun

-"Magnetic field causes most of what we see in the corona because of its interaction with the solar atmosphere (plasma)."
-Magnetic Flux and Magnetic Field Lines are conserved.
-The sun switches its magnetic poles every 11 years.
-Sunspots are areas of extremely dense magnetic field lines.

The Planets' Magnetospheres

-Jupiter's magnetic field is huge and causes strong radio wave emissions
-Saturn's rotation axis and magnetic axis are the same (axisymmetric)
-Uranus has a strange magnetosphere with a corkscrewing magneto-tail caused by a 39° difference between the rotation axis and magnetic axis
-Very little is known about Uranus's and Neptune's magnetic field due to their distance from Earth.
-Earth's magnetic field affects experiments on earth along with a lot more!

Life

-Magnetic Field protects us from the solar wind.
-The Solar Wind would strip our atmosphere of important elements like hydrogen and oxygen. (ingredients for water).
-Mars and Venus have a weak magnetic field and therefore could not produce or sustain life.

Magnetospheres and Auroras

-Reactions between charged particles from the solar wind and atoms in the earth's atmosphere give rise to light emissions which form colored light displays called auroras.
-Magnetosphere: area of space controlled by a planet's magnetic field.
-Interplanetary magnetic field: this is the Sun's magnetic field which is carried over to other planets through the solar wind
-The shape of the Magnetosphere is affected by the solar wind, which compresses the magnetosphere on the day side and creates a tail on the night side, overall creating a bullet shape.