ESS 102 – Week 5: Due February 9

Reading

Chapters 6.4 to 7

Lab Work 5 (if cloudy) or Complete Telescope Run work (if sunny)

(1) What is the magnitude of the Earth’s magnetic field in the classroom? Varying the direction of the magnetic field sensor, determine the direction of the magnetic field.

(2) Record the orientation of the magnetic field from the bar magnets. What happens to the iron filings on the bottom of the cube? Is the force generated by the magnet strong enough to counteract gravity? Use the magnetic field sensor to record the strength of the magnetic field from the bar magnet. How much stronger is it than the Earth’s magnetic field?

(3) What happens when current flows through the wire hanging between 2 magnets? What happens when the direction of the current flow is switched? Explain what is happening.

(4) Explain how a metal ring is launched into the air, and describe the performance of the three different rings.

(5) Using what you just learned about currents generating magnetic fields and vice versa, predict what will happen when each of the three metal combs (solid, closed grating, and open grating) are swung between the magnets. Record what actually happens. Explain the behavior of each metal comb.

(6) Build the electric motor shown on the last page.

Problem Set

Using your text books and the class notes in a couple of paragraphs describe

(1) The difference between the photosphere, chromosphere, and corona?

(2) The difference between a coronal hole and a coronal loop?

(3) The characteristics of a coronal mass ejection?

(4) The characteristics of the heliosphere
Computer Lab

Break up into groups of about 3 – 4 people and spend about 20 minutes to rough out a couple of paragraphs for your short story, using the definition of terms required for the writing project.

The TA will then ask for a member of the group to put part of it on the board to see whether it meets the required criterion.

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**Build Your Own Electric Motor**

- Take a length of coated .5mm diameter wire and wrap into a coil
- Using a razor or scissor: scrape the coating off 1/2 of the ends *
- Tape bent paperclips to ends of 1.5V battery using electrical tape
- Place small magnet on top of battery
- Give coil a little spin and watch it go!

Drawing the magnetic field generated by the magnet and the coil, explain how the electric motor works.