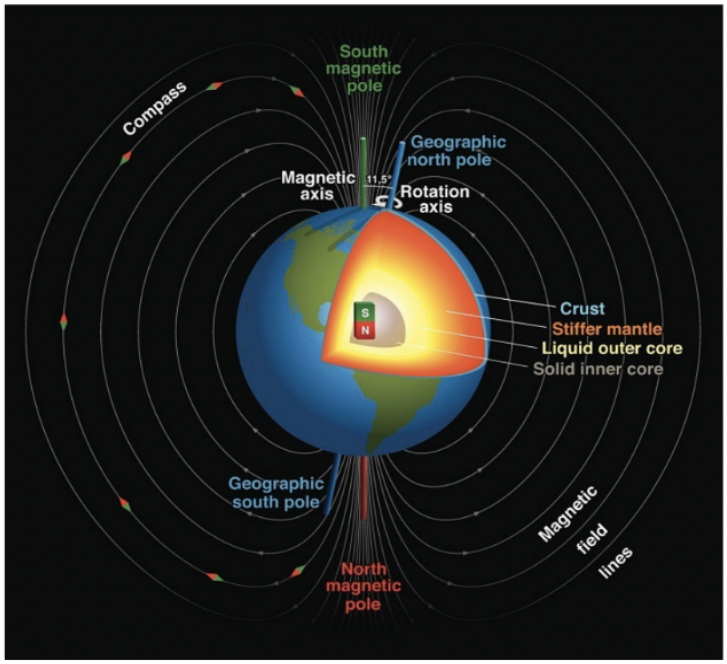
CAS PY 106

In-Class Note

1. Earth's magnetic field



a.

   b. Like the human body, the Earth has equivalent of a bloodstream under its skin

   c. Stream of motion lava generates the Earth's magnetic field

   d. South pole of a magnet attracts north pole of a compass

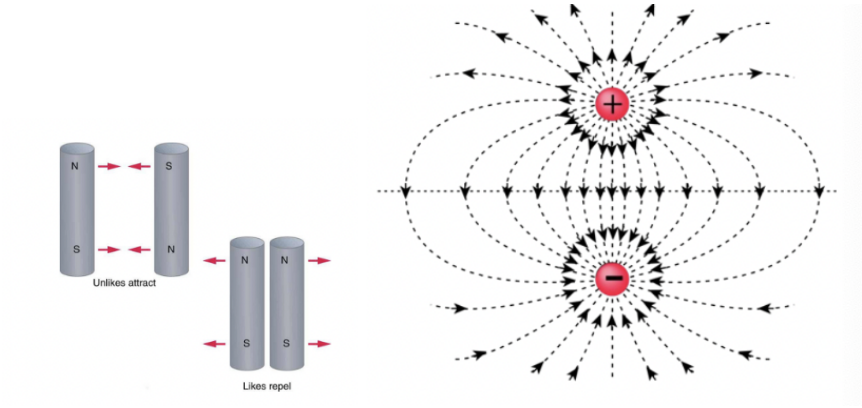
   e. Compass points to geographic north on Earth

   f. South magnetic pole is near Earth's geographic north pole

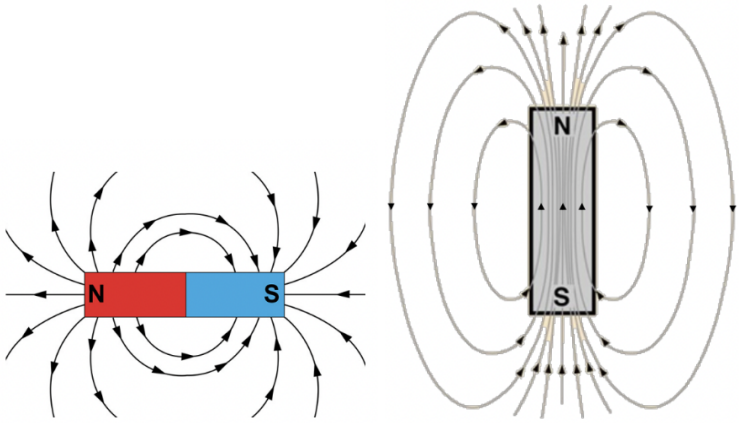
2. Magnetic field lines

   a. Magnetic field lines indicate magnetic force, both magnitude and direction

3. Magnetic field vs Electric field

a. 

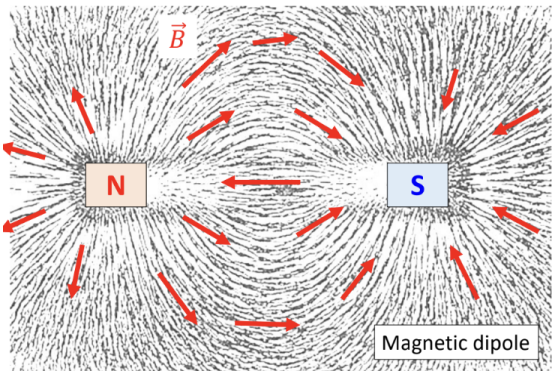
b. Similar to electric charges in terms of attractive and repulsive forces

c. 

d. Magnetic field lines look identical to electric field lines

e. Magnetic field lines form loops

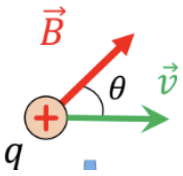
4. Magnetic field lines

a. 

b. Magnets have magnetic field lines

c. Magnetic field is indicated with B

5. Magnetic force - magnitude and direction

a. 

b. F = qvB*sin(theta)

c. Direction of magnetic force is found separately

d. In this case, it is toward you

6. Right Hand Rule

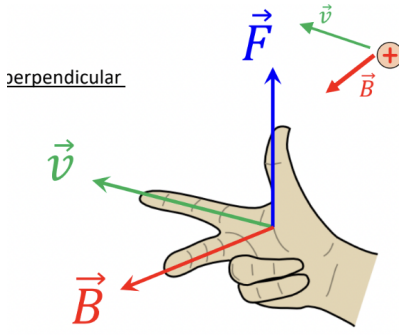
a. Raise your right hand

b. Point your index finger and thumb

c. Stick out your middle finger, but keep it perpendicular to your index finger and thumb

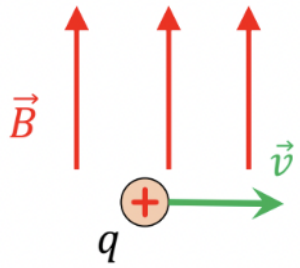
d. Your thumb is the force of direction

e. If charge is negative, force is opposite the direction of your thumb

f. 

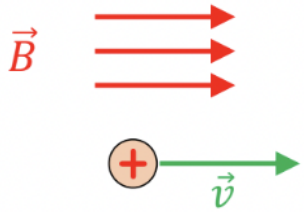
- Index finger is v
- Middle finger is B
- Thumb is F

7. Direction of magnetic field



a.

b. The direction of force is toward you (out of page)



c. ○

d. Force is zero

8. Special symbols

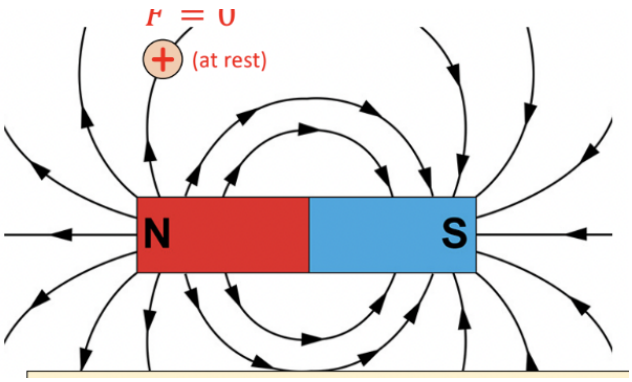
toward you
(out of the page/screen)

a.

away from you
(into the page/screen)

b.

9. Electric Charge in a magnetic field

a. 

b. What happens when a positive electric charge (is initially at rest) in magnetic field

c. Nothing → There is no force on the charge due to the magnetic field