



10-12 PLTW Engineering

10-12/Magnetism

April 9, 2020

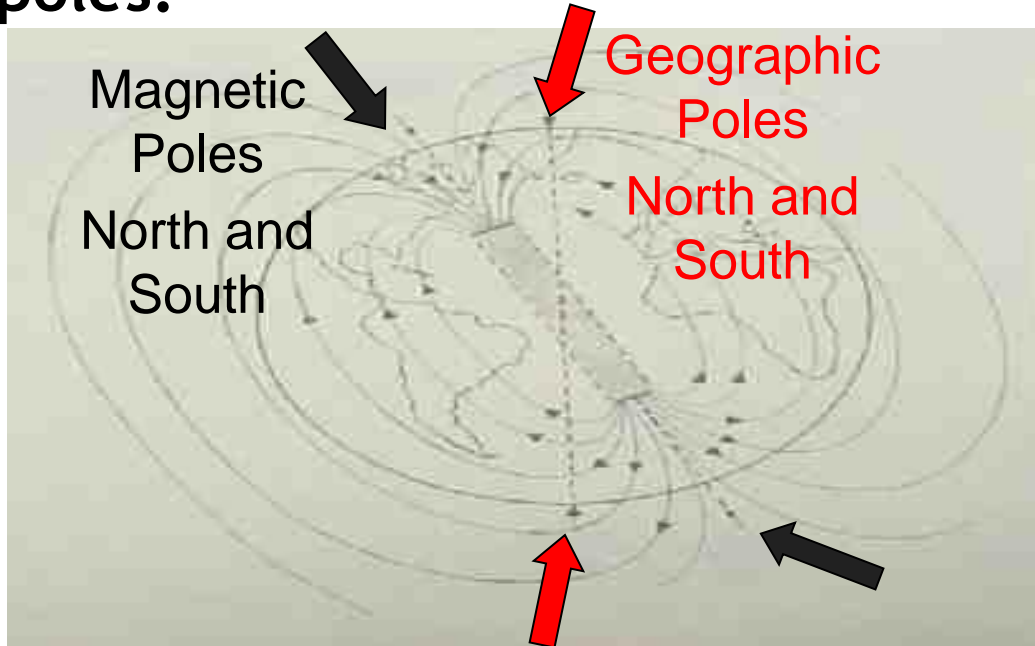


10-12 Digital Electronics
Lesson: 4/9/2020

Objective/Learning Target:
Students will be able to explain how magnets work

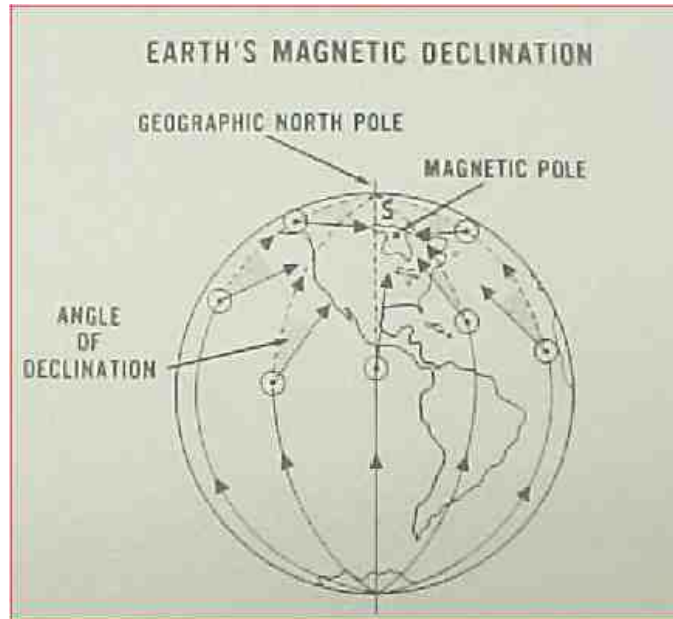
Magnetism

The Magnetic poles of the earth are similar to the Geographic poles.



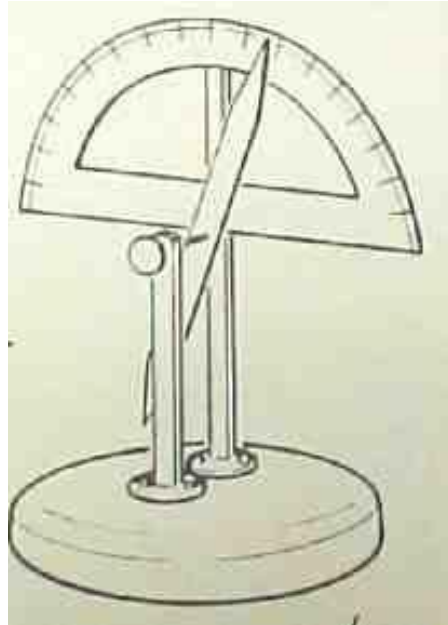
Magnetic Declination

On this diagram you can see the Geographic North Pole in relation to the Magnetic north pole and the Angle of Declination.



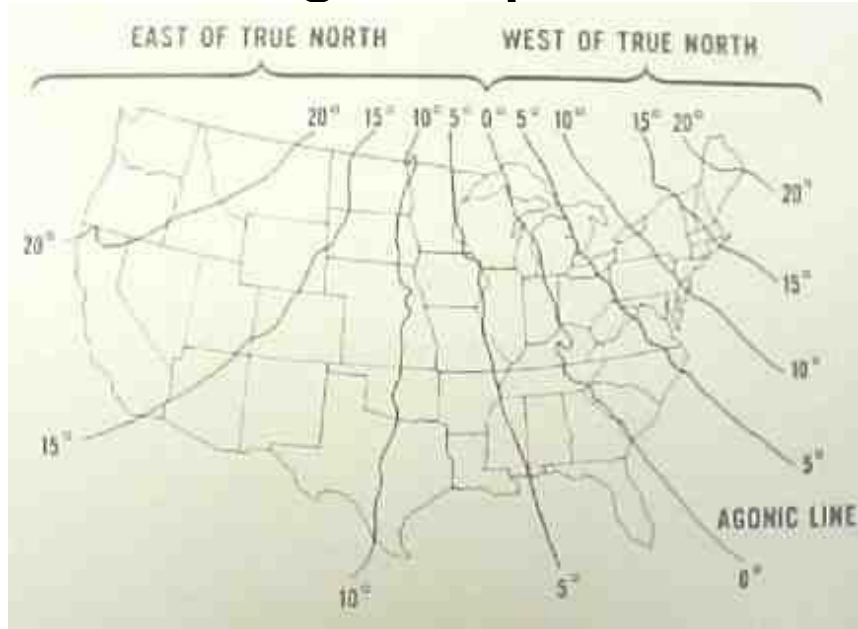
Magnetic North

In the diagram below you see a device called an Inclinator. This device is the basis for the analog compass.



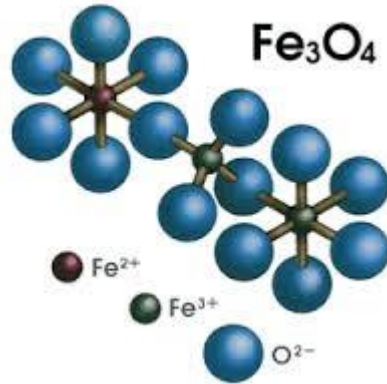
Magnetic North

In the diagram below you see how the inclinometer points to true north based on the magnetic poles of the earth



Naturally Occurring Magnets

Magnetite is a material that is formed in the earth. Another name for it is Iron Oxide or Lodestone.

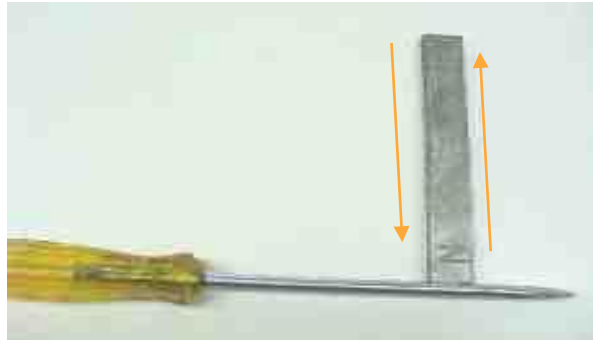


Human Made Magnets

One way a magnet can be made is stroking an item made from a ferrous metal (containing iron) across another magnetic item repeatedly.



Non magnetic



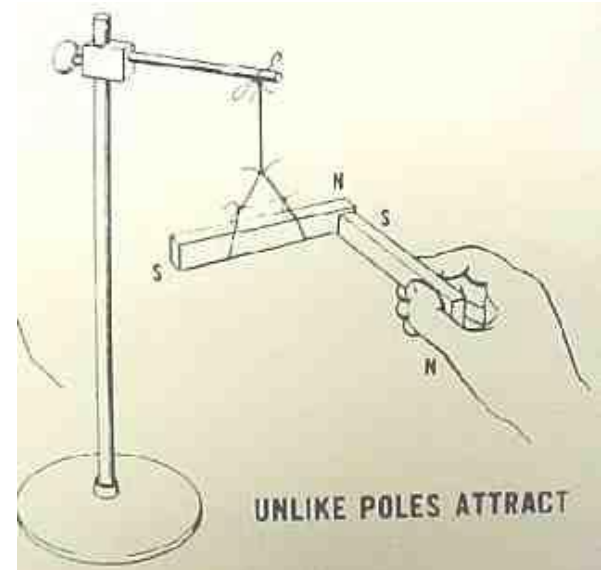
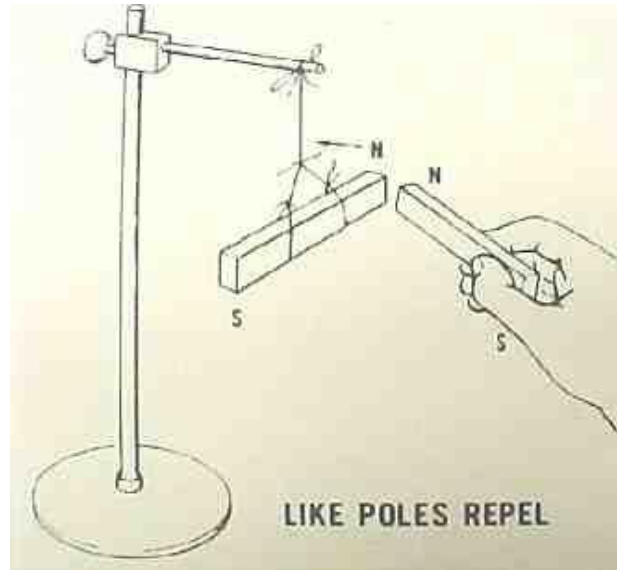
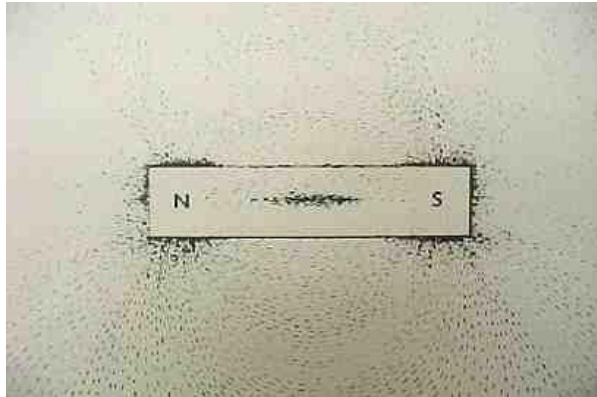
Stroking a magnet



Magnetic

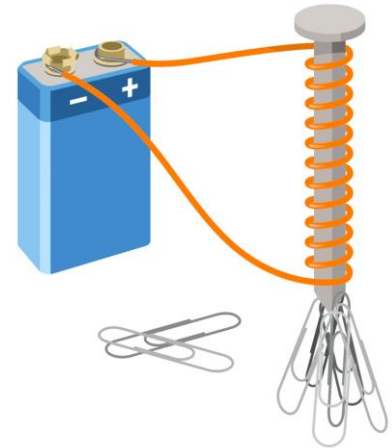
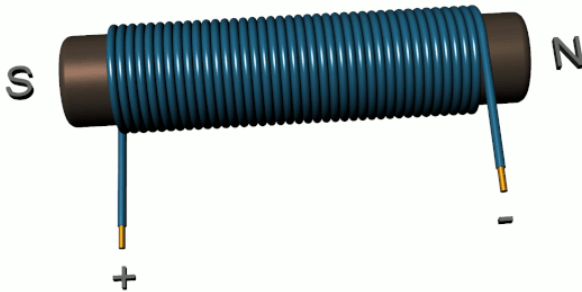
Poles of Physical Magnets

Magnets, just like the earth have 2 poles.



Human Made Magnets

A magnet can be made with wire wrapped around a cylinder and an electric current passing through the wire from even a small power source like a household battery. This is called an Electromagnet



Electromagnets

What determines the strength of an electromagnet?

- **First, the purity of the core the wire is wrapped around can determine how strong the magnet is**
- **Also, we can add more current (larger power source) to the system to make the magnet stronger**
- **Lastly, we can wrap the coil closer together, thus adding coils to make the make the magnet stronger**

Devices that use Electromagnets

Any device that uses an electric motor is using electromagnetism





Magnetic Questions

- 1. Name the 2 poles of a magnet.**
- 2. Explain 2 ways to make a magnet.**
- 3. Name 2 devices that use electromagnets.**
- 4. Name 2 materials can not be magnetic.**
- 5. Name 2 ways a magnet can be made stronger.**



Helpful Links

[NASA Guide to Magnetism](#)

[Naturally Occurring Magnets](#)