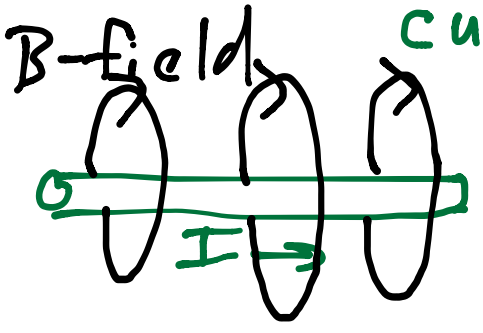
Electromagnetism Notes

1. Moving Charges (current) create magnetic fields around their wires.

- The 1st Right Hand Rule describes the B-field around a wire.
  - Hold your thumb up and curl your fingers like you're holding a racquet.
  - Your thumb points in the direction of the current and your fingers curl with the B-field



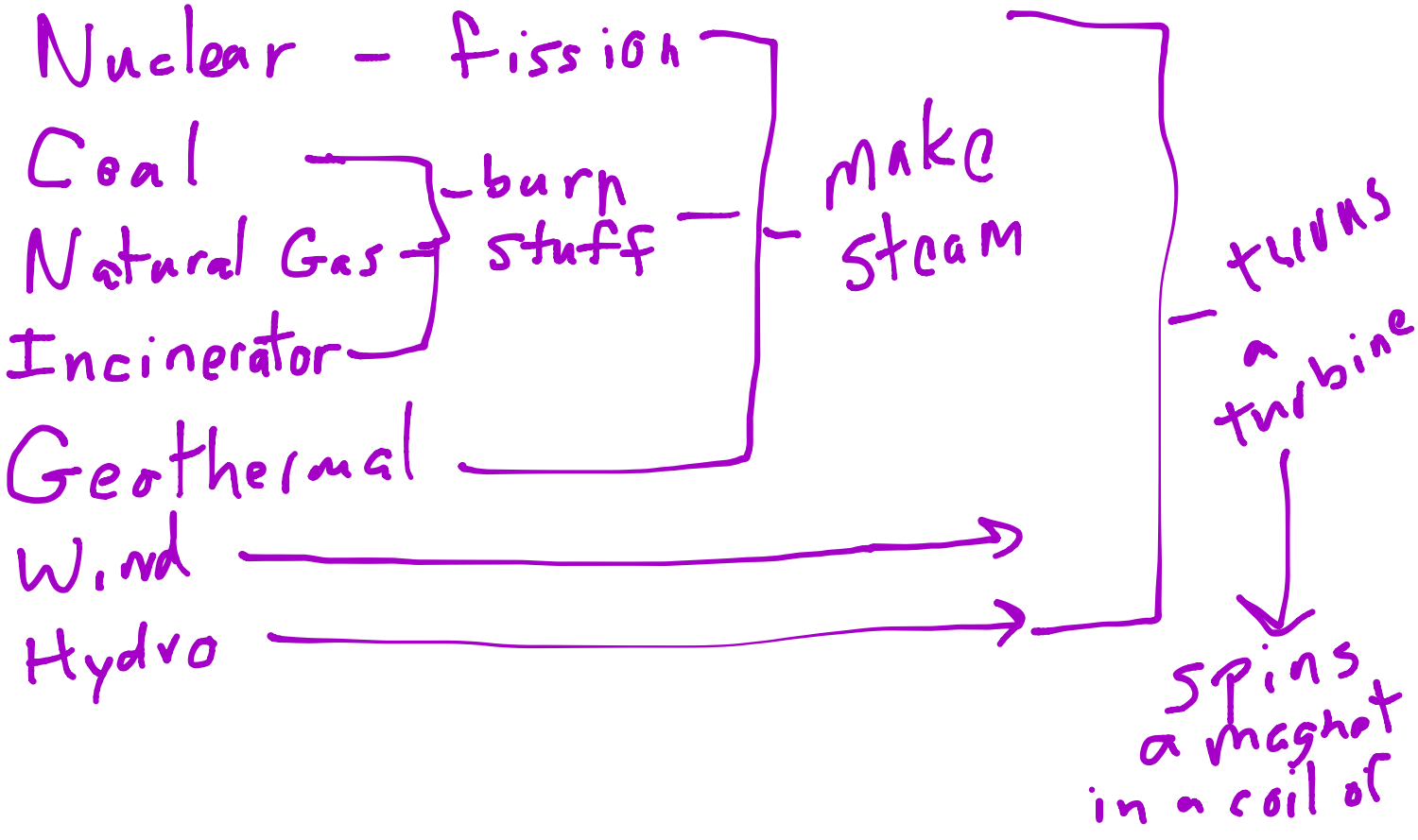
2. Changing Magnetic Fields cause currents to flow.

- a moving magnet will make current flow through a wire.

This is how generators work:

An outside force spins a magnet inside a coil of wire, which causes a current to flow back and forth.

Power Plants



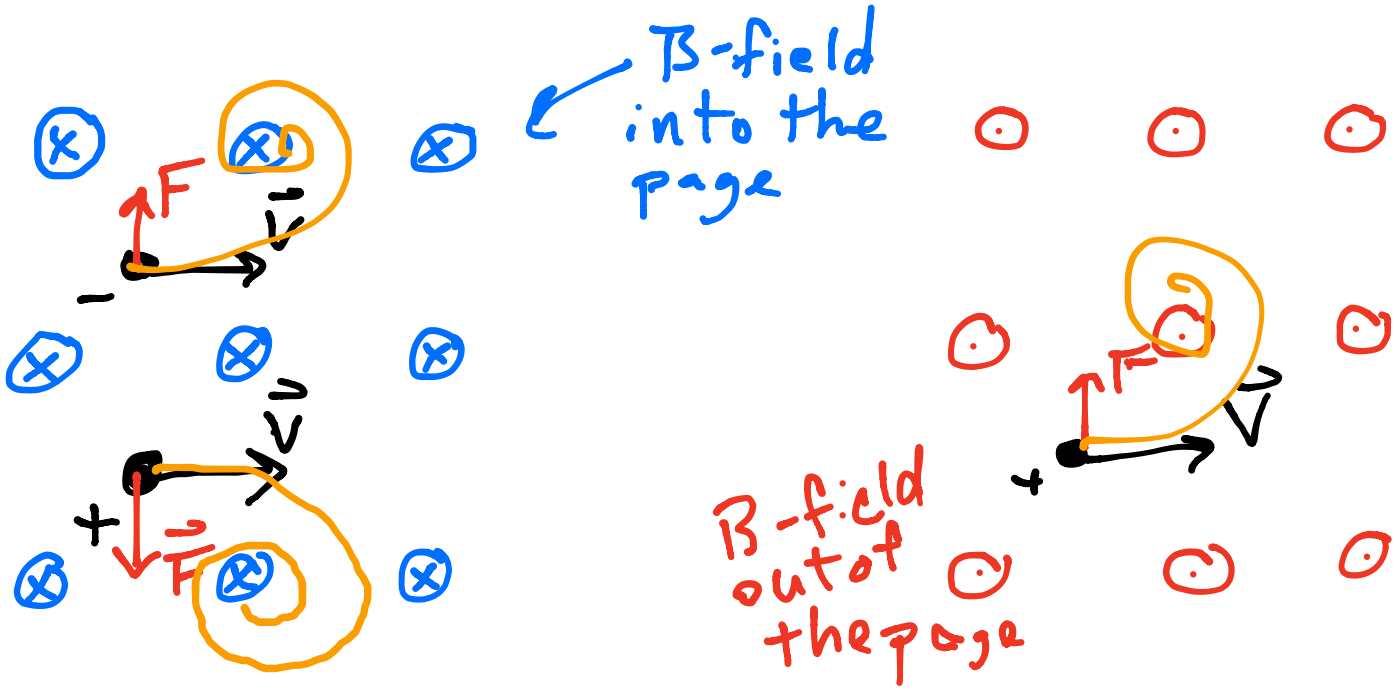
wire.

Moving charges in a magnetic field feel a force.

$$\vec{F} = q\vec{v}\vec{B}$$

We use the 2ND Right Hand Rule to find the direction of the $\vec{F}$ Force.

1. Hold your thumb, pointer, and middle finger ⊥ to each other.
2. Your thumB points in the direction of the B-field.
3. Your pointer points in the direction of motion.
4. Your middle finger points towards the $\vec{F}$.



$F = IlB$ Force on a wire.

Transformer - changes the amount of voltage from an input V to an output V.

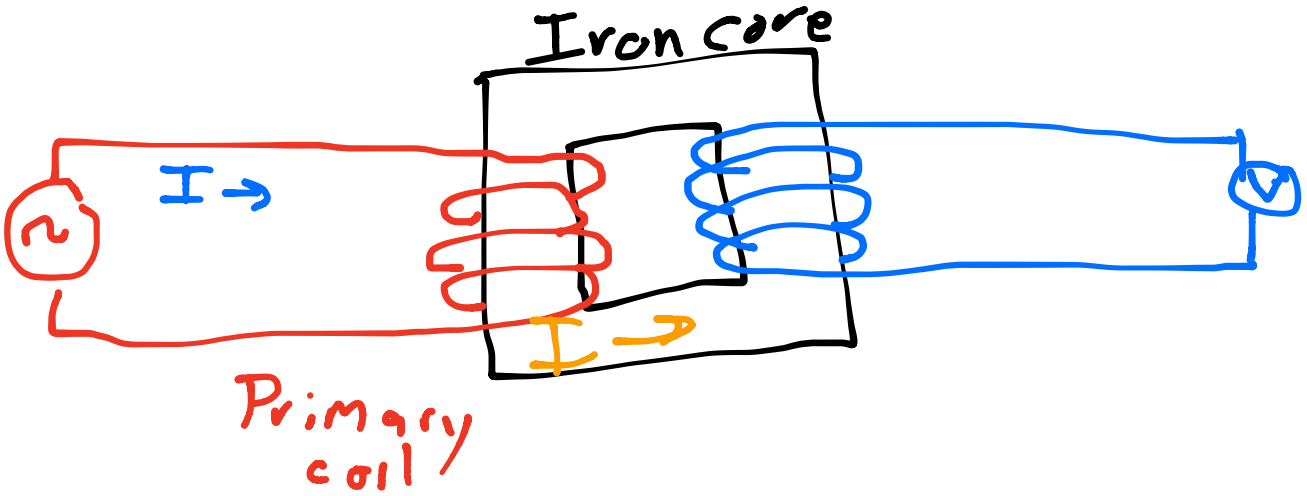
- used because AC current at high V and low I will lose less energy to heat.

Transformers have 3 parts:

Primary coil → input V and I

Secondary coil → output V and I.

Iron core



1. Current flows to the R through the primary coil, as I ↑, it makes a changing B-field around the coil.

2. The B-field from the primary coil makes a current in the core.

3. The current in the core makes a changing B-field in the core.

4. The changing B-field in the core makes currents flow through the secondary coil.

$$\frac{V_P}{n_P} = \frac{V_S}{n_S}$$

$$V_P I_P = V_S I_S$$