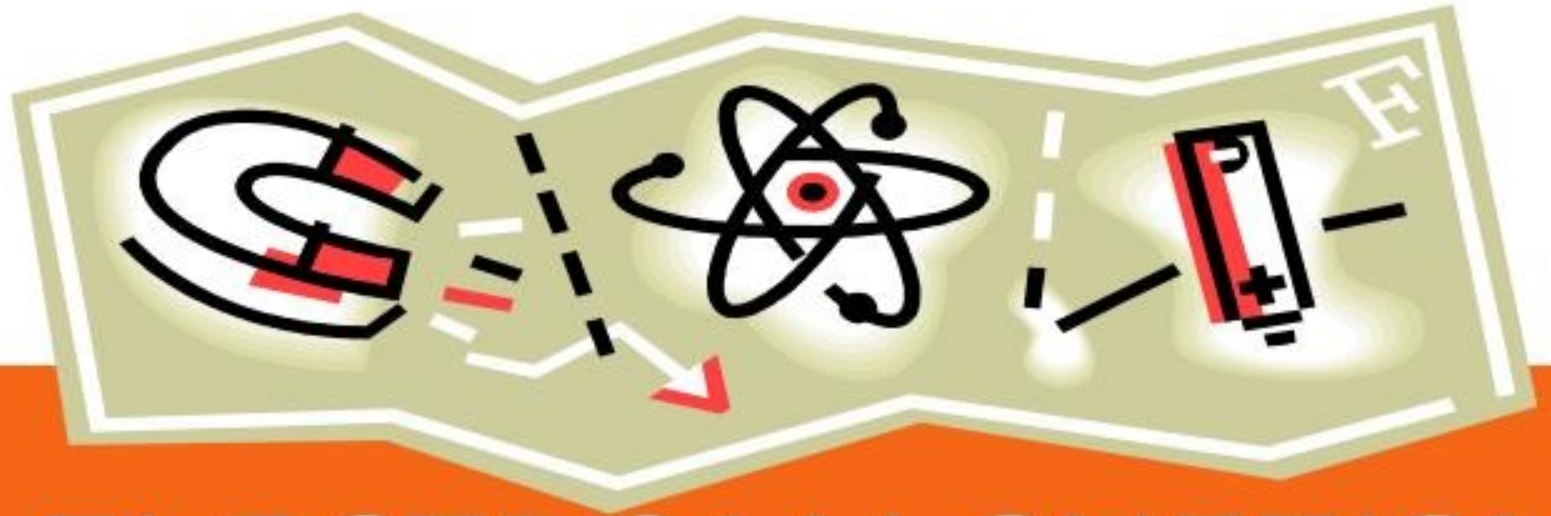
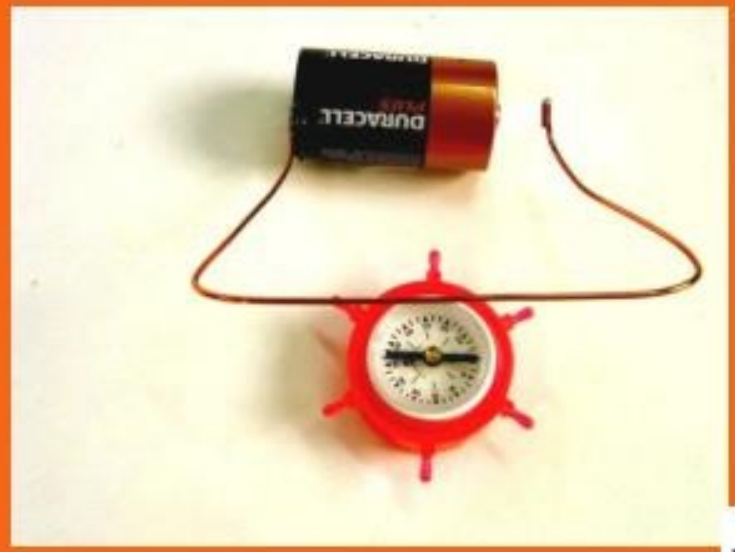


ELECTROMAGNETISM

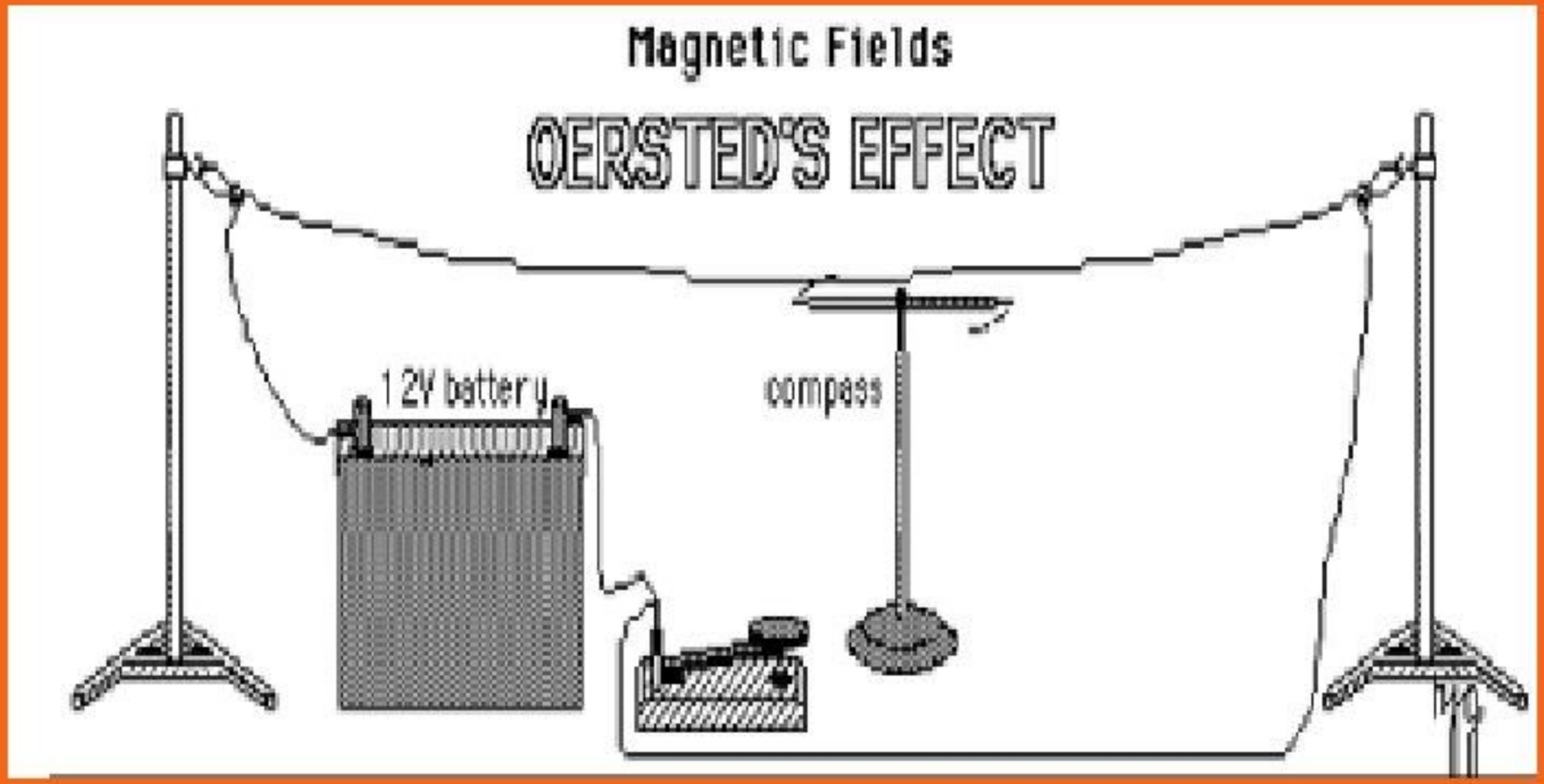
--the relationship b/w electricity and magnetism

Is there a relationship between electricity and magnetism? Let's see what I discovered!!!



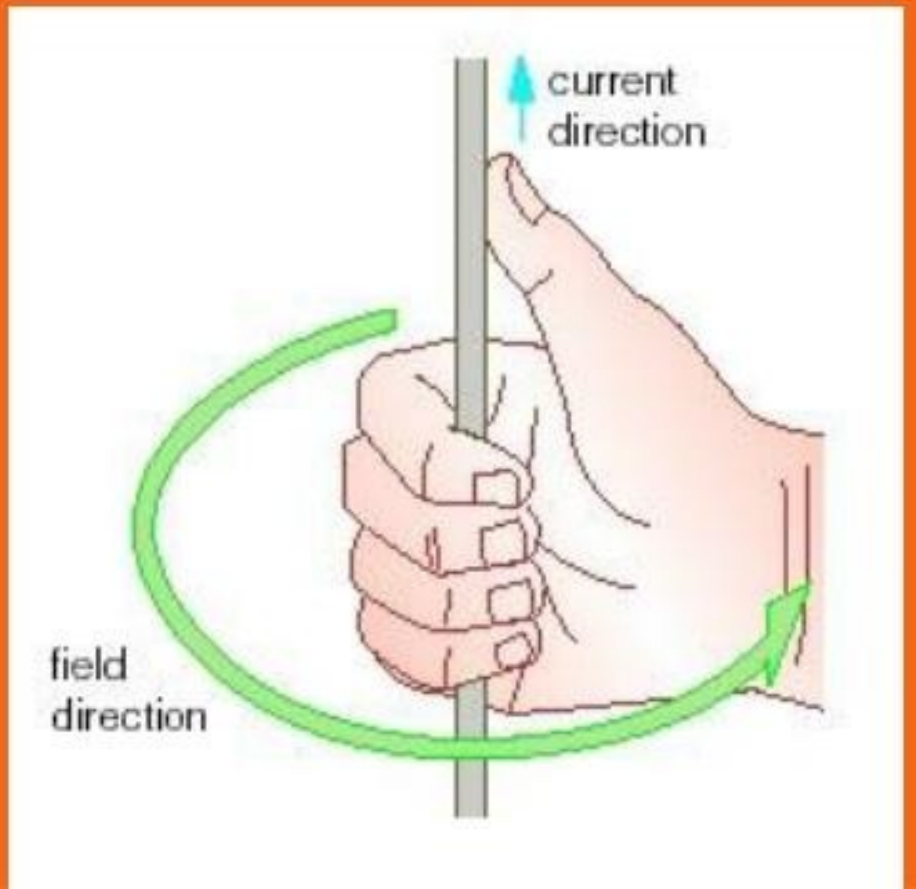
Hans Christian Oersted

OERSTED'S LAW

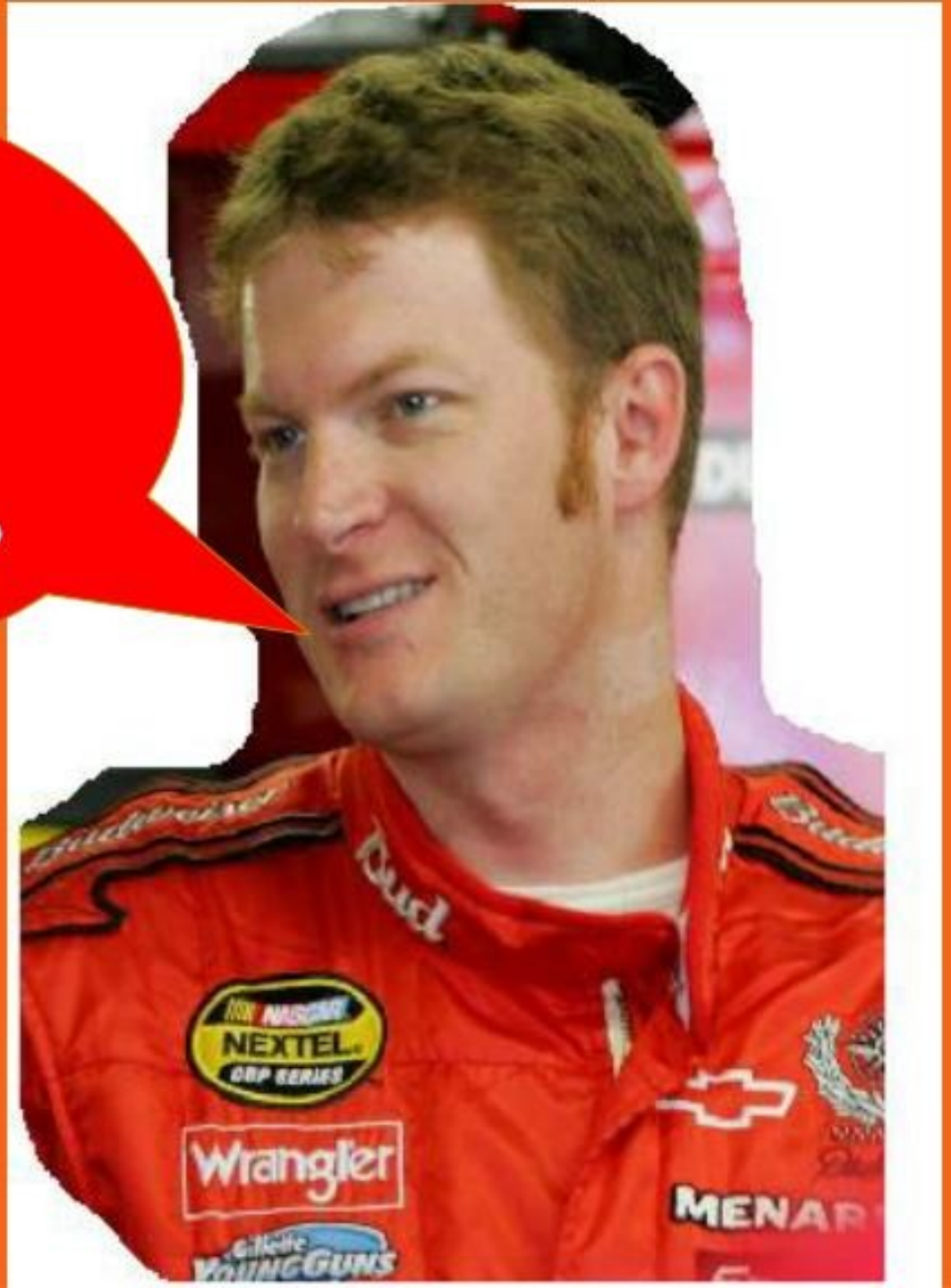


RIGHT HAND RULE

- The direction of the current determines the direction of the magnetic field.



Can anything affect the strength of a magnetic field?

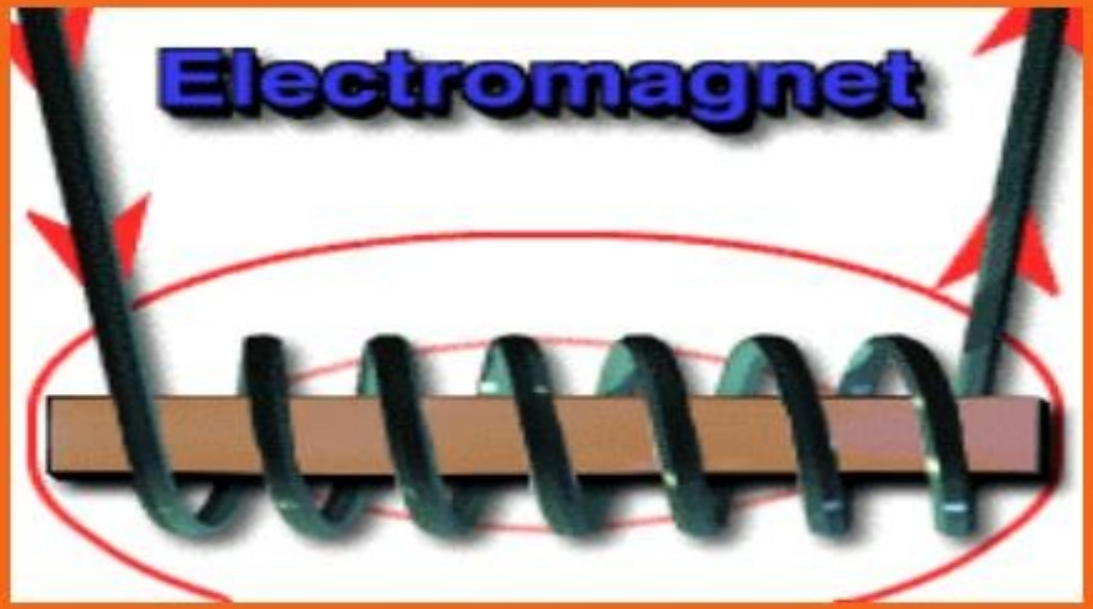


2 THINGS AFFECT THE STRENGTH OF A MAGNETIC FIELD:

- Amount of current
  - Increase current = increase strength
  - Decrease current = decrease strength

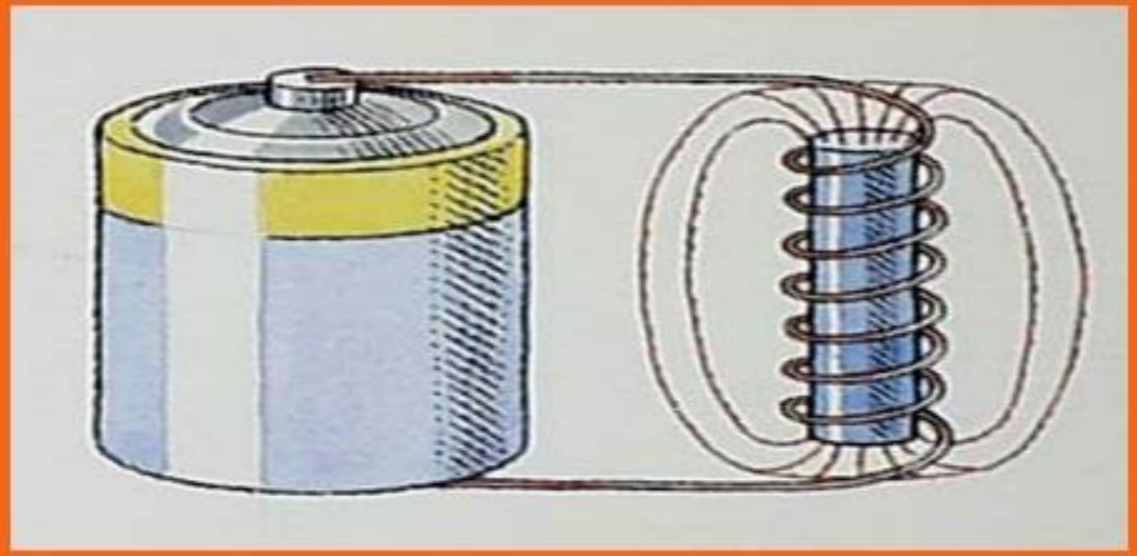
- # of coils of wire
  - More turns of wire = more strength
  - Less turns of wire = less strength

If you take an iron core and insert it into a coil of current carrying wire, you have a temporary magnet called an electromagnet!!



STRENGTH OF AN ELECTROMAGNET

- 2 things affect the strength of an electromagnet(same 2 things that affect the strength of a magnetic field):
  1. Amount of Current
  2. # of turns of wire(# of coils)



WHAT HAPPENS TO THE STRENGTH OF AN ELECTROMAGNET IF THE CURRENT THROUGH THE WIRE INCREASES FROM 4 A TO 9 A?

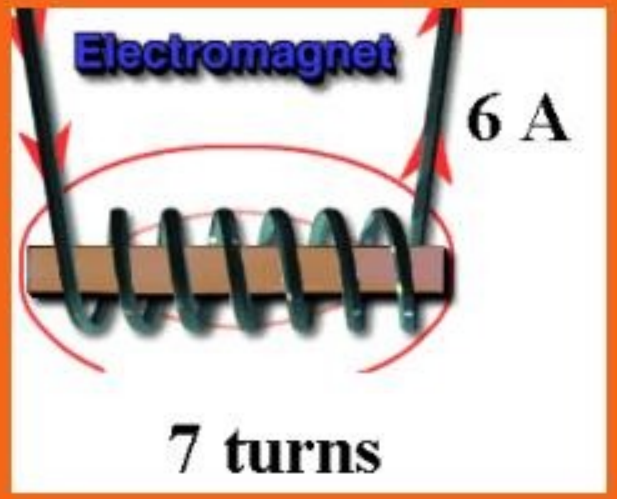
A. Remains the same

B. Increases

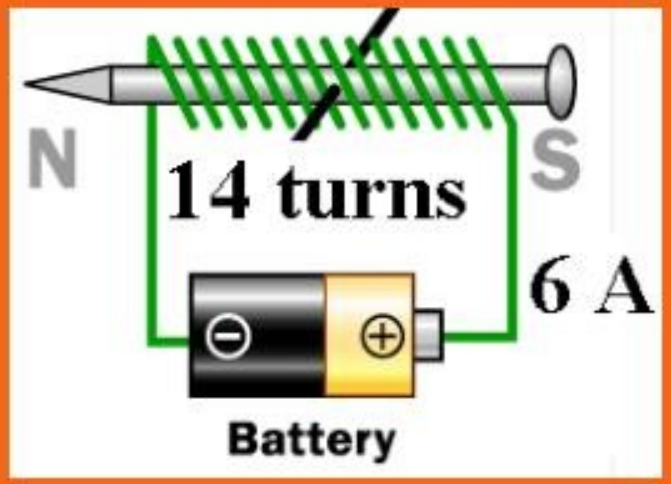
C. Decreases

WHICH ELECTROMAGNET WILL BE THE STRONGEST?

A



B

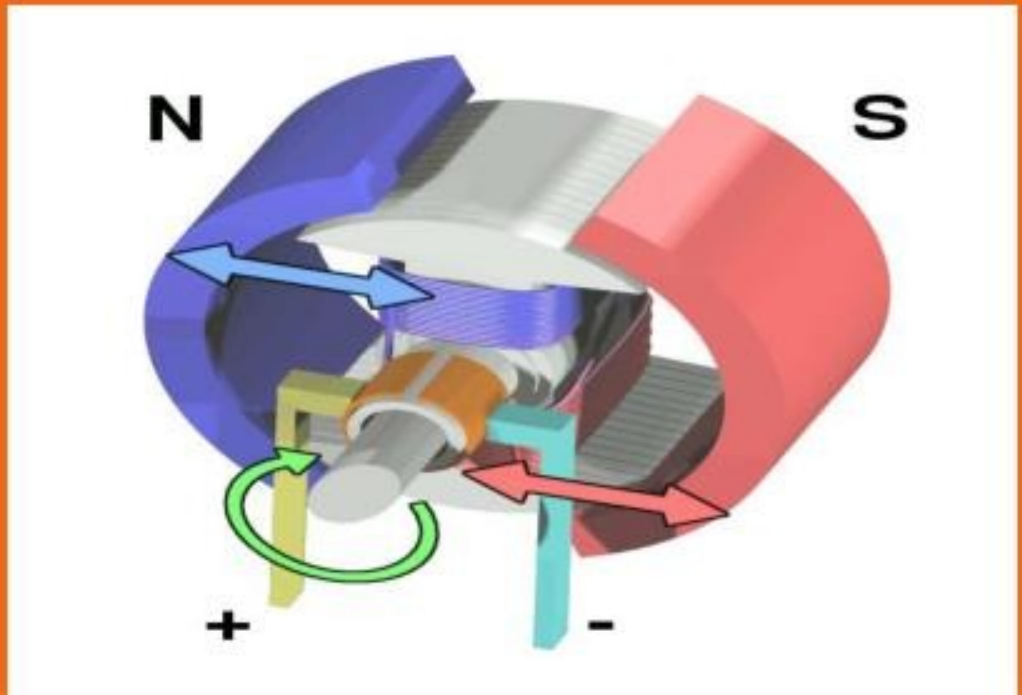


USES OF ELECTROMAGNETS

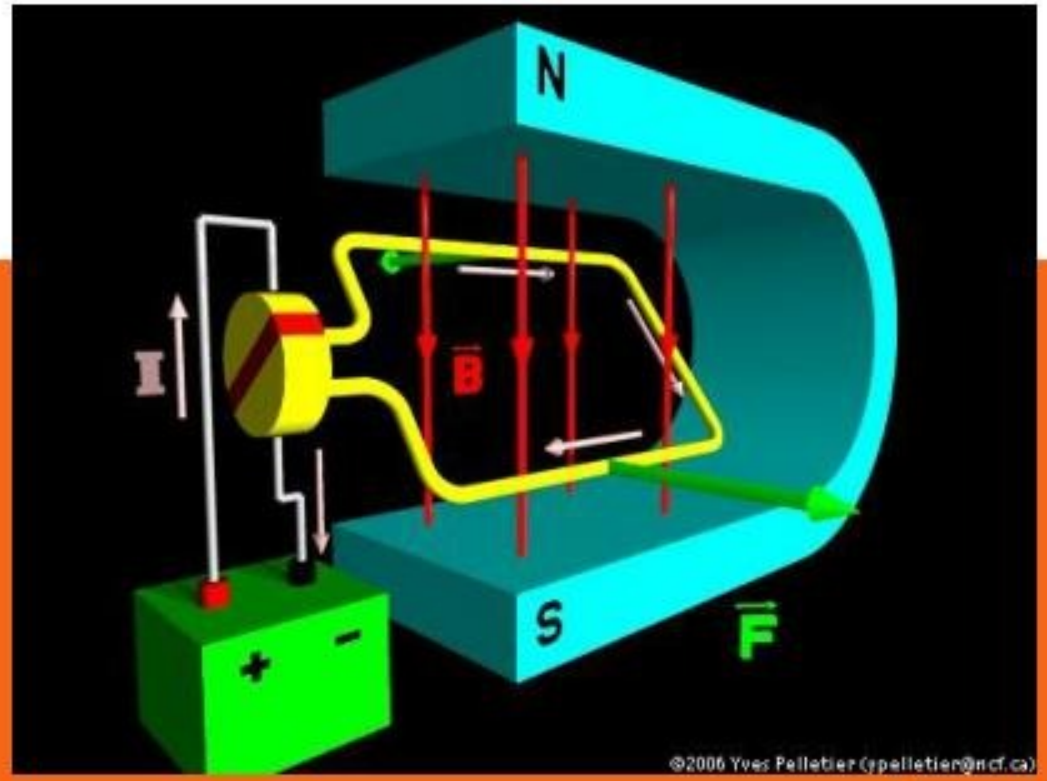
- Electric Meters: because of their ability to detect current(only work when there is one), electromagnets are used in a variety of electric meters.
  1. Ammeter—measures current
     - Wired in series
  2. Voltmeter—measures voltage
     - Wired in parallel
  3. Galvonometer—"detects" current

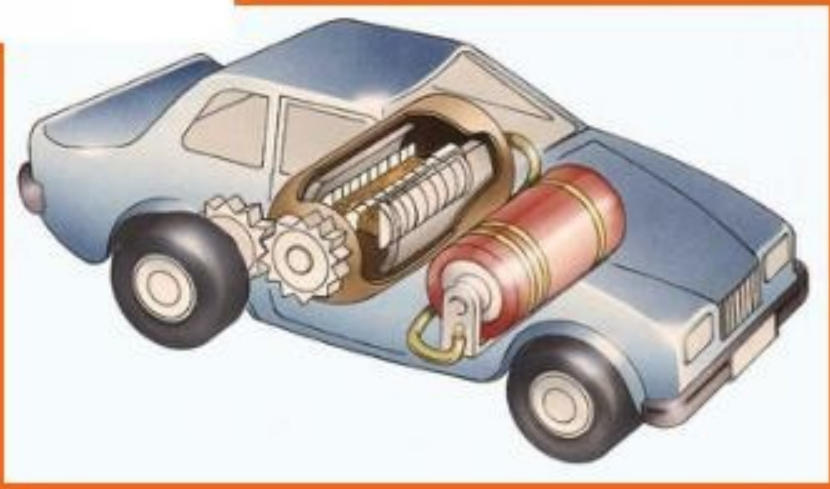
USES OF ELECTROMAGNETS(CONT.)

- Motors
  - Use electromagnets to convert electrical energy into mechanical energy
  - An electromagnet turns inside a permanent magnet



MOTORS





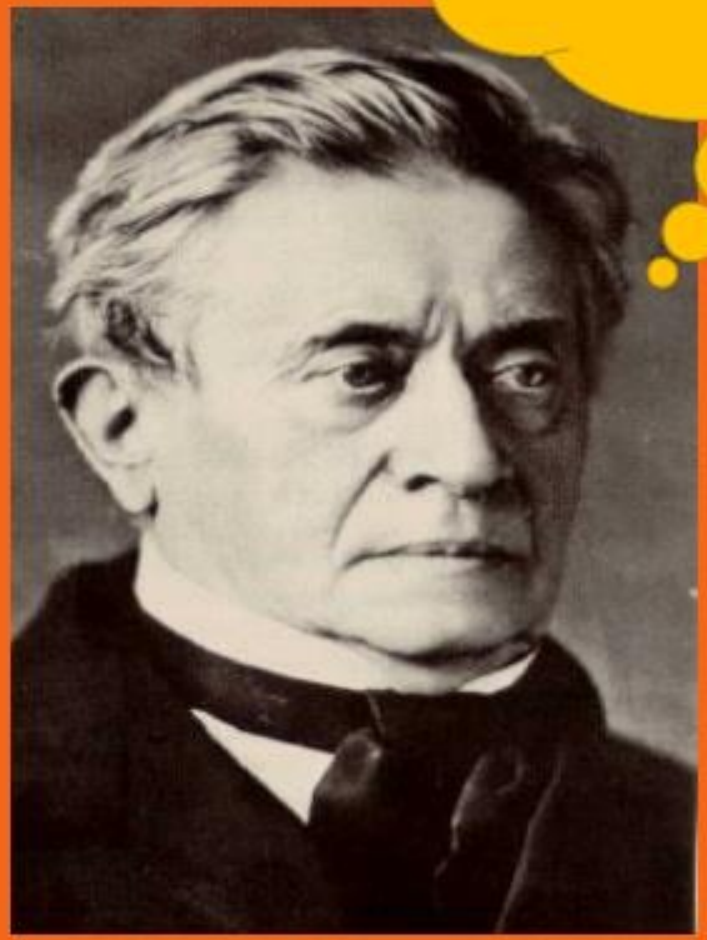
If current moving through a wire produces a magnetic field, I wonder……

….What would happen if we move a wire through a magnetic field

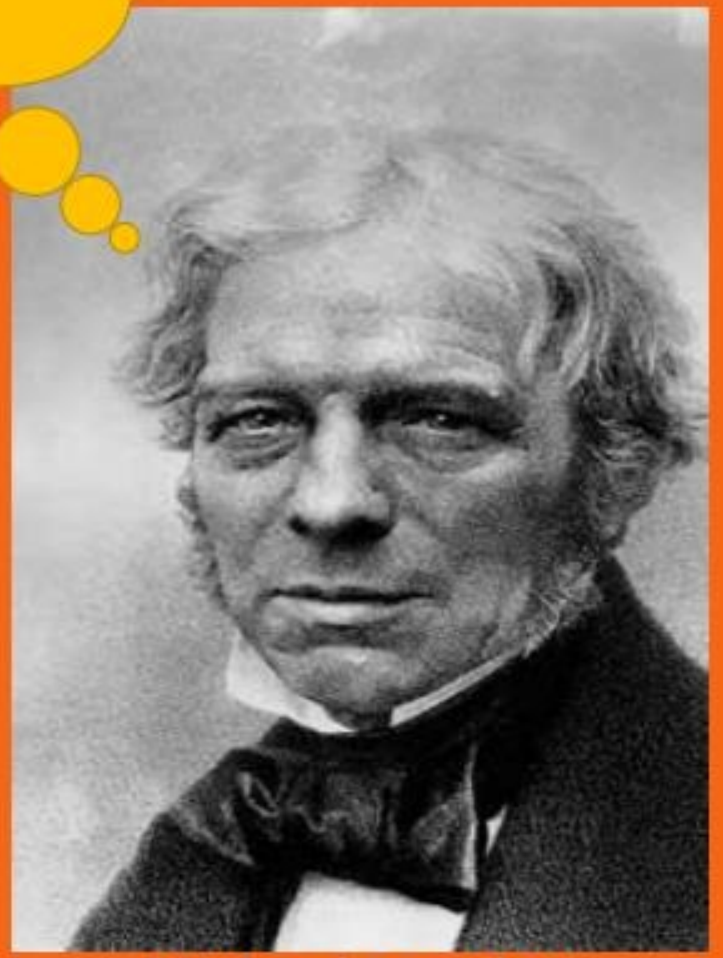
I bet it has never been tested. Let's try it!!!

I'll try anything once!!

Haven't we already done that?



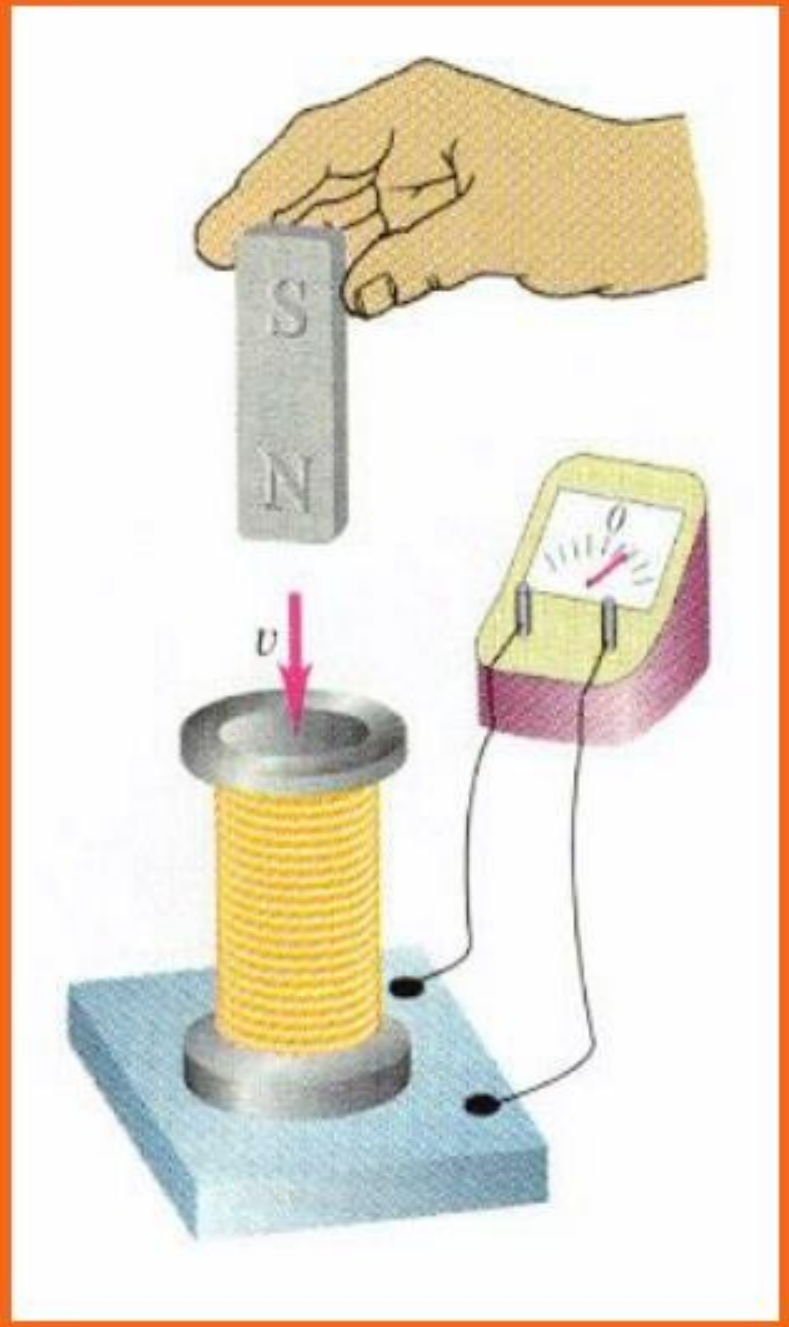
Joseph Henry



Michael Faraday

Faraday and Henry discovered that moving a wire through a magnetic field, or moving a magnetic field through a coil of wire "induced" a current on the wire!!

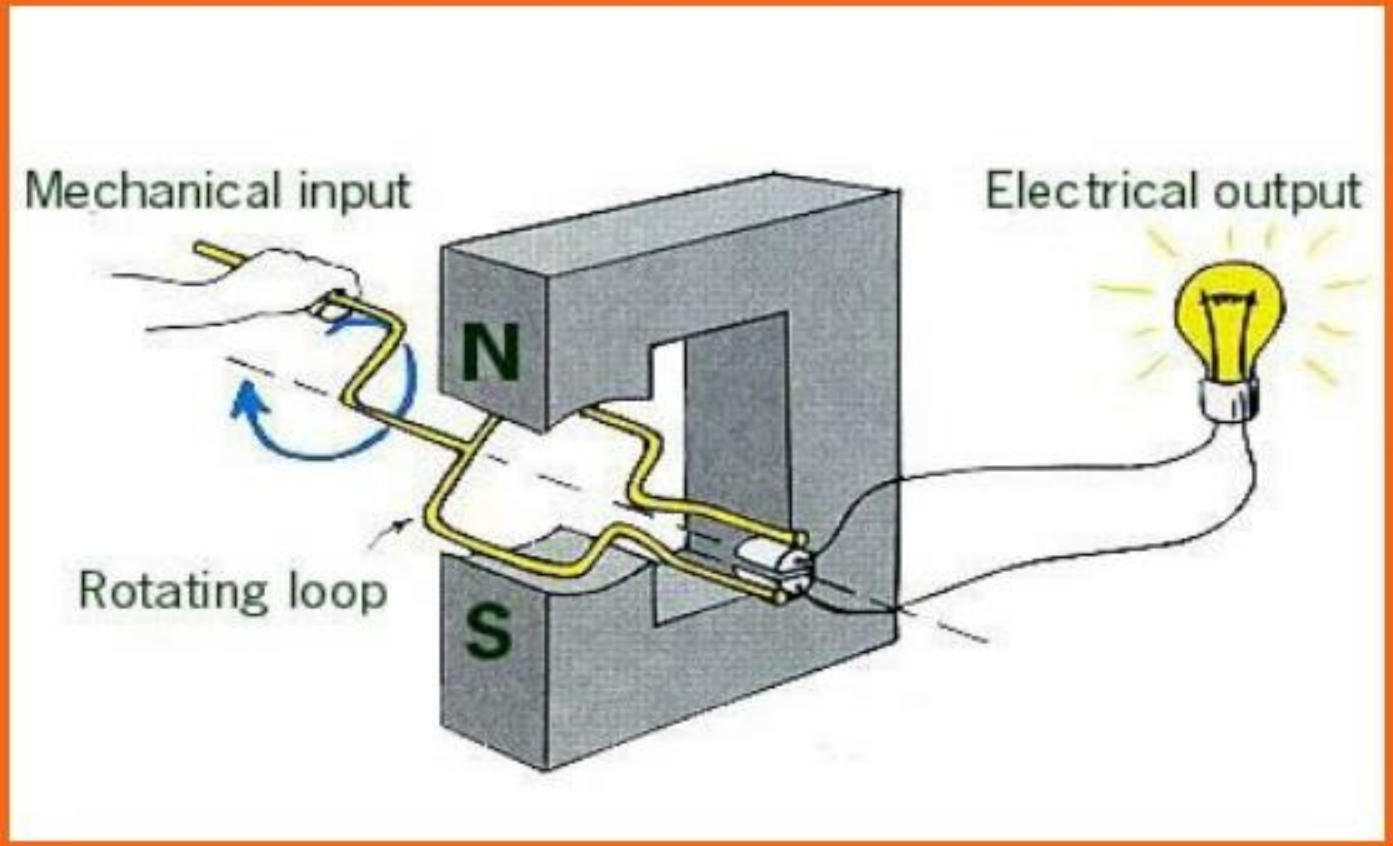
<u>Electromagnetic Induction</u>— process in which moving a wire through a magnetic field produces a current on the wire.



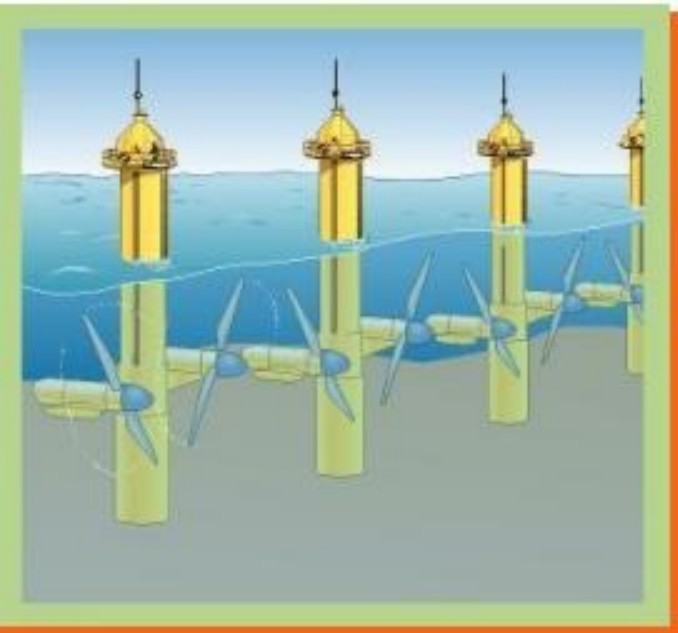
….PRODUCES A CURRENT ON A WIRE.

"DID WE JUST "CREATE" ELECTRICITY"

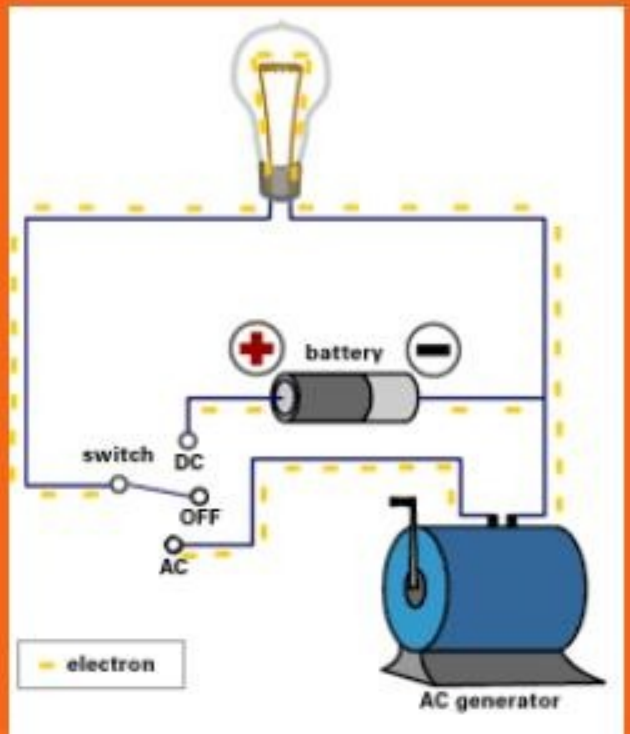
- Generators—use electromagnets to convert mechanical energy into electrical energy.

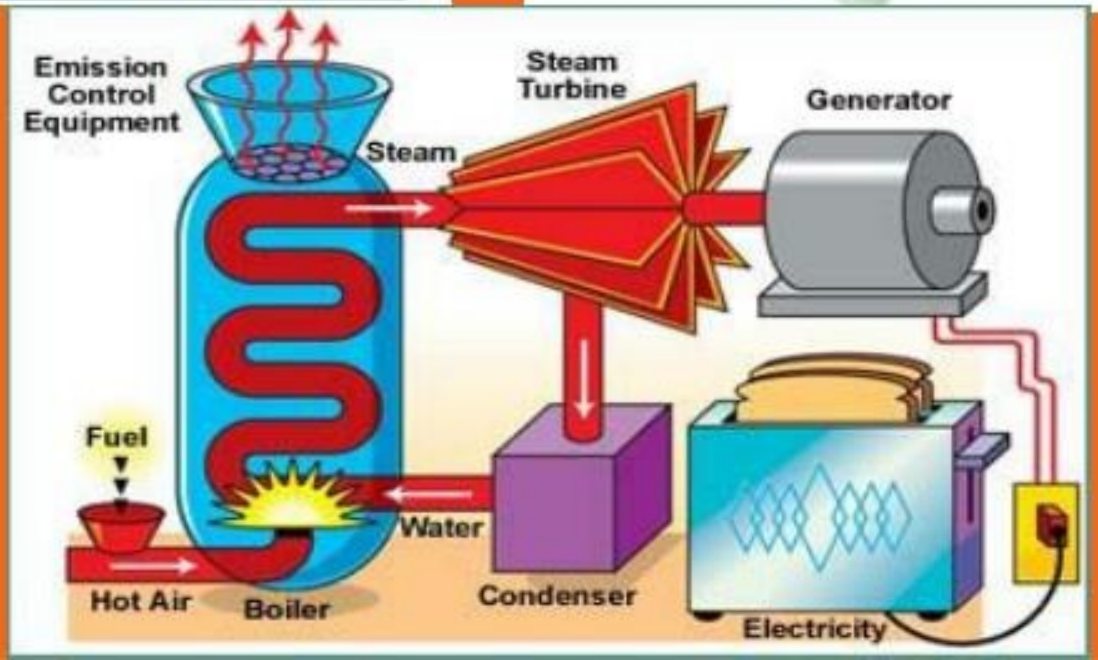


GENERATORS




PowerMate
DIESEL GENERATOR


battery
switch
DC
OFF
AC
electron
AC generator


Emission Control Equipment
Steam Turbine
Generator
Steam
Fuel
Water
Hot Air
Boiler
Condenser
Electricity

Transformers

Are you talking about me?

ALTERNATING VS. DIRECT CURRENT

Alternating Current

- Current alternates, one direction, then the other.

Plug it in, Plug it in!!

Direct Current

- Current only goes in one direction.