

Due Wednesday

Magnificent  
Maggie

## Magnetism and Electricity

LT: Identify the relationship between the magnetic field and electricity.

### By its self

- Magnets are attracted to metal but not all metals
- Not attracted to fire or aluminum foil, or wood
- When sitting on wood or something its not attracted to it has no push or pull
- Pull is stronger when its closer to metal or another magnet

(238-241)

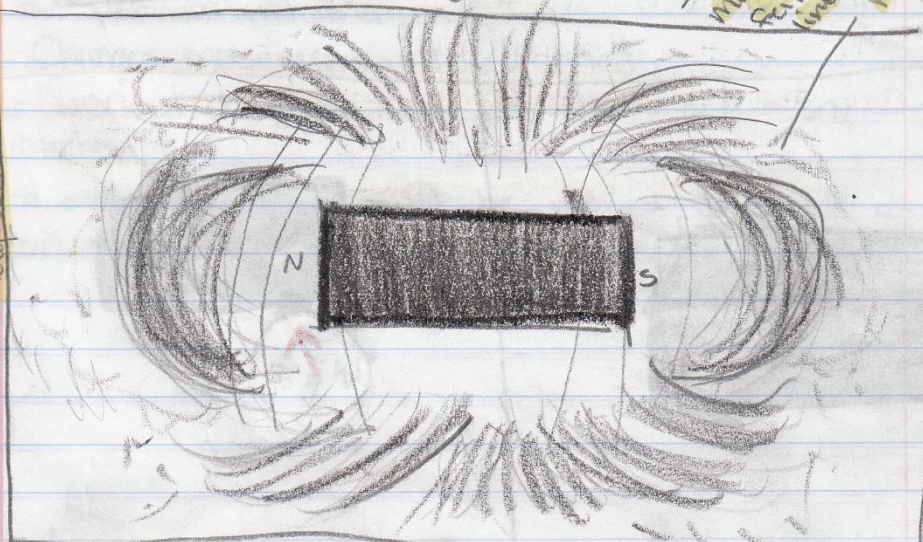
### With another magnet

- Pull is super strong on one side
- Push is super strong on other side
- When magnet is flipped ends stick
- Sticks on some chalkboards

### Magnetic Field

- Invisible
- Strong
- Depends on direction of magnet
- Can go through objects

(mag)  
This shows the magnetic field of this magnet



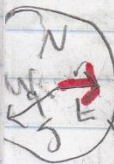
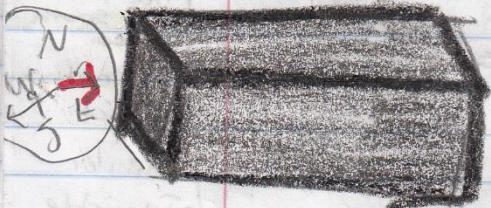
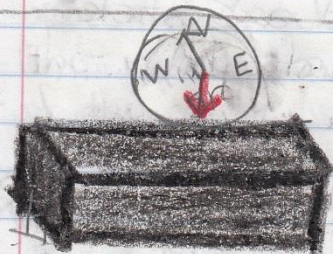
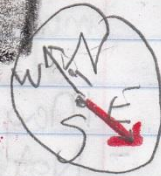
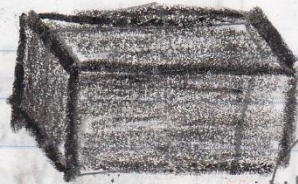
- Shows magnetic field lines

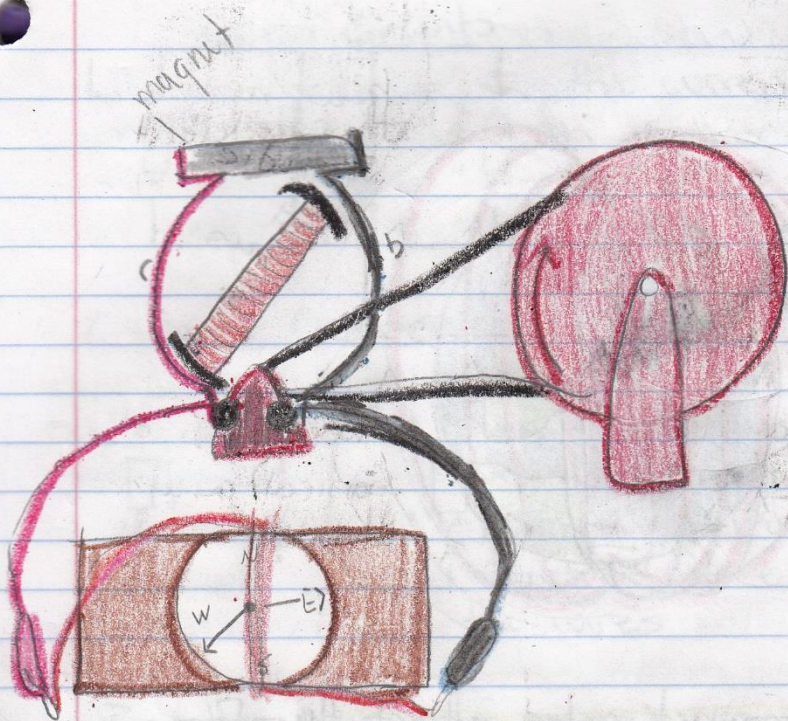
(mag.)  
Pattern of iron filings represent the magnetic field lines

- The opposite ends are the North and South poles
- Opposites attract
- Similar
- Invisible magnetic field, a few cm out.

- magnets attract and repel each other

-one side of the magnet attracts the red arrow of the compass and one end of the magnet attracts the red arrow.



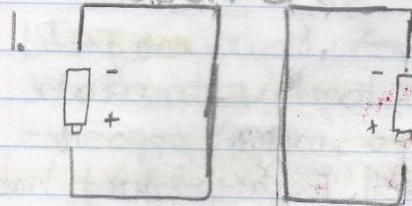


- This contraption is a mechanical generator.
- When generating electricity a magnetic field forms around the wire.
- Uses an electromagnet.
- The current in the coil changes direction every time the end of the coil passes the poles of the permanent magnet.
- Changes movement into electricity.
- Current changes twice in the coil every rotation.
- A magnetic field must be moved through a coil of wires to generate electricity.



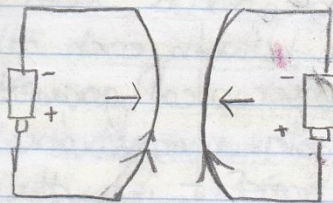
- Opposite magnet poles attract, therefore the North pole of a compass is attracted to the South magnetic pole of Earth.
- Magnetism measured in rocks show that Earth's poles have moved place 150 times over the past seventy million years.
- A compass will always align with Earth's magnetic field lines.
- As of now the South magnetic pole is located in Canada.

## Open Circuits



The current flows in neither of the wires.

## 2. Same Currents



Current flows in a similar direction in both wires. There is an attractive force between the wires.

In the diagram of opened circuits there are no attractive forces between the two. But in the circuits with the same currents there is evidence of a magnetic force. These two diagrams represent that the magnetic force is only present in two wires that both have a flowing current. They attract because of the magnetic field produced around the wires.

## Summary

In this lab we explored how magnetic fields and electricity work together to create electrical currents. With a magnet, opposites attract, and same sides repel. Every magnet has a North pole and a South pole, so when a North and South Pole are close they have a strong attraction. A South pole and a South pole would have a strong resistance between each other. When using the hand crank (mechanical) generator, the wires inside spin past the magnet and gain electric currents the transfer into the wires connected to the compass. The wires with flowing electric currents have a magnetic field around them. When it comes to poles, Earth has a North and South magnetic poles. When using a compass, its hands will always align with Earth's magnetic field lines and the North pole of a compass will attract to Earth's South magnetic pole (opposites attract). One thing showing that magnetism and electricity work together is open circuits and closed circuits with the same current. In two open circuits there is no flowing current, but in two closed circuits with the same current there is evidence of magnetic force. The two circuits that have the same current show a magnetic force when they attract to each other. This is because of the magnetic fields around each wire. Each example shows that with electricity comes magnetism and with magnetism comes electricity. Both magnetism and electricity work together for a larger task. A magnet has many qualities, it has a magnetic field that extends a few cm. away, it is only attracted to some metals, each side affects which arrow points where on a compass, the pattern of the field depend on the magnetic field lines (from the poles), and the field must be moved

through a coil of wires to generate electricity.