

# Part 6 Magnetism

Name: \_\_\_\_\_

## Part 6 Lesson 1

Magnetism: The \_\_\_\_\_ produced by a magnetic field.  
Electric charges in motion.

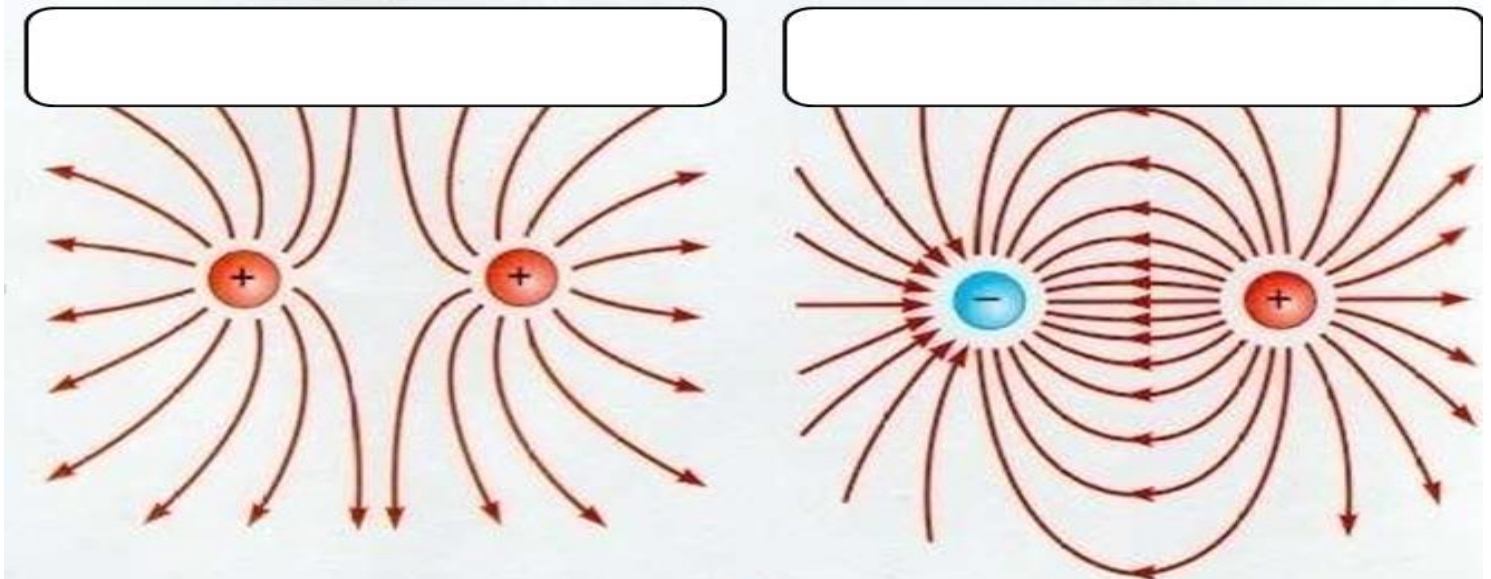
A magnet is an object or a device that gives off an external \_\_\_\_\_.

Create an external magnetic field around the magnet below.



Opposite charges \_\_\_\_\_. The Same forces \_\_\_\_\_.

What happens to like and opposite charges?



Magnet: An object that is surrounded by a \_\_\_\_\_ and that has the property, either natural or induced, of attracting iron or steel.

What is this? How does it work?



### Part 6 Lesson 2 Earth's EM Field, Compass

The spinning inner cores of solid and liquid \_\_\_\_\_ creates a giant electromagnetic field around our planet.

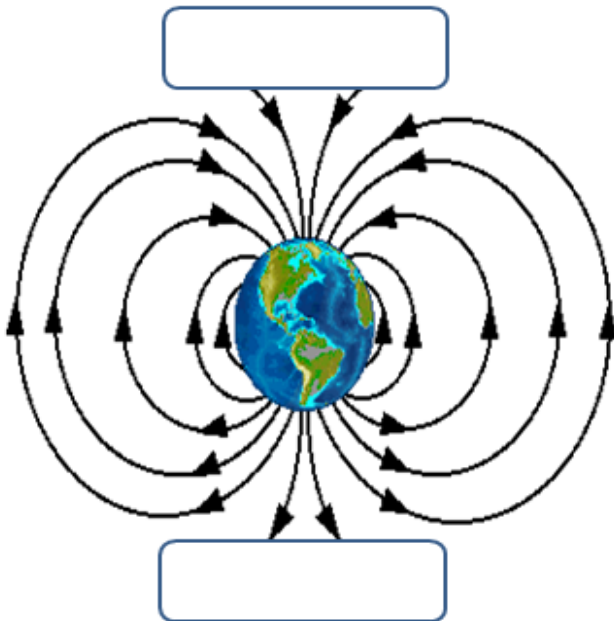
Earth's magnetic field, also known as the \_\_\_\_\_ field, is the magnetic field that extends from the Earth's interior out into space.

Electromagnetic field protects the earth from charged particles.

It also creates the \_\_\_\_\_ (Northern Lights)

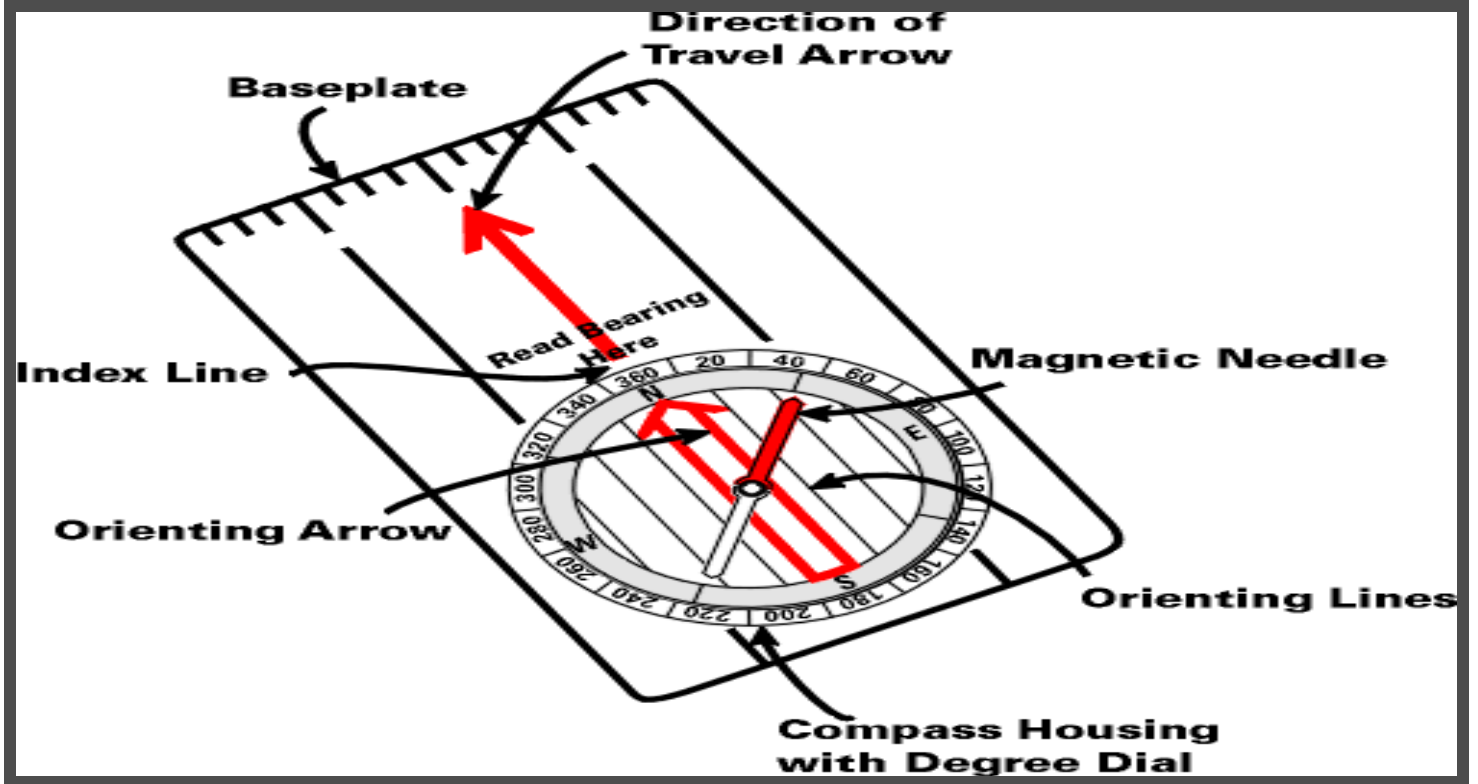
Spread iron filings all around the planet below or do on a paper plate and then you can draw what you see here.

From below, the page place a magnet beneath the earth and record the magnetic field that is created with the iron filings. – Note: Don't get iron filings in your eye.



Please label the two poles. What creates this magnetic field. Why is it important?

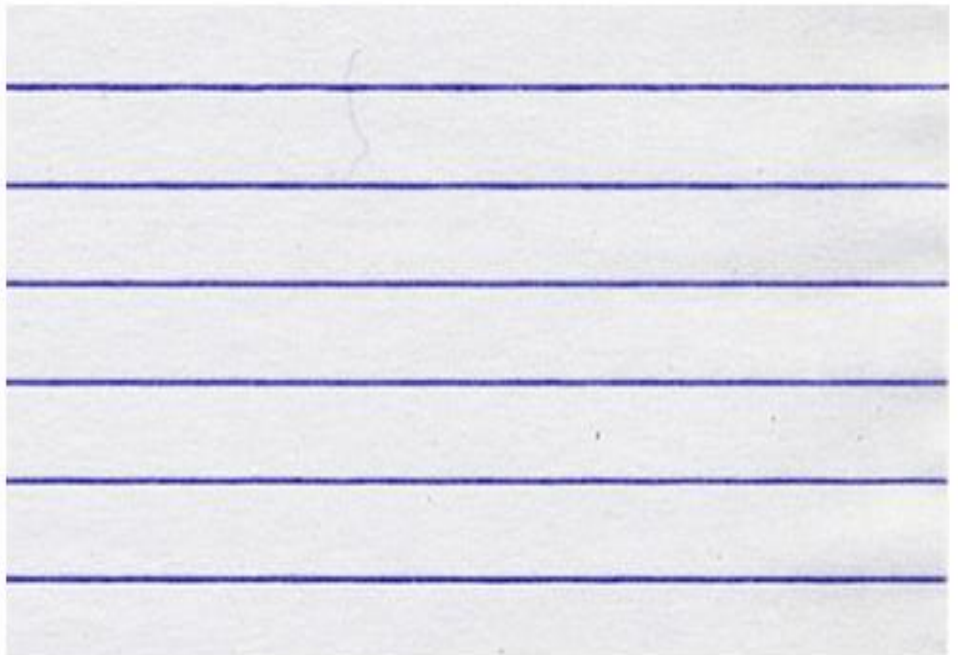
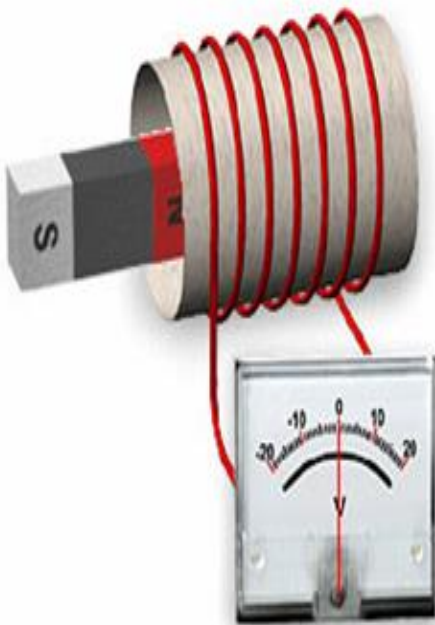
Compass: A navigational instrument for determining direction relative to the earth's magnetic poles.



### Part 6 Lesson 3

Faraday's Law: The \_\_\_\_\_ of a magnetic field can create voltage.

Which law is represented here? How does it work?





An electric motor uses the \_\_\_\_\_ and \_\_\_\_\_ properties of magnets to create motion.

Electric motors use a \_\_\_\_\_ magnet and \_\_\_\_\_ magnet.

- The permanent magnetic has a north and south Pole.
- The temporary magnet is a special magnet called an electromagnet. It is created by passing an electric current through a wire.

Describe the simple electric motor below? How does it work?



Electromagnets: By running \_\_\_\_\_ through a wire, you can create a magnetic field.

Size of battery	Number of paper clips collected		
AA	Trial _____	Trial _____	Trial _____
D	Trial _____	Trial _____	Trial _____

Use the nail below and create an electromagnet.

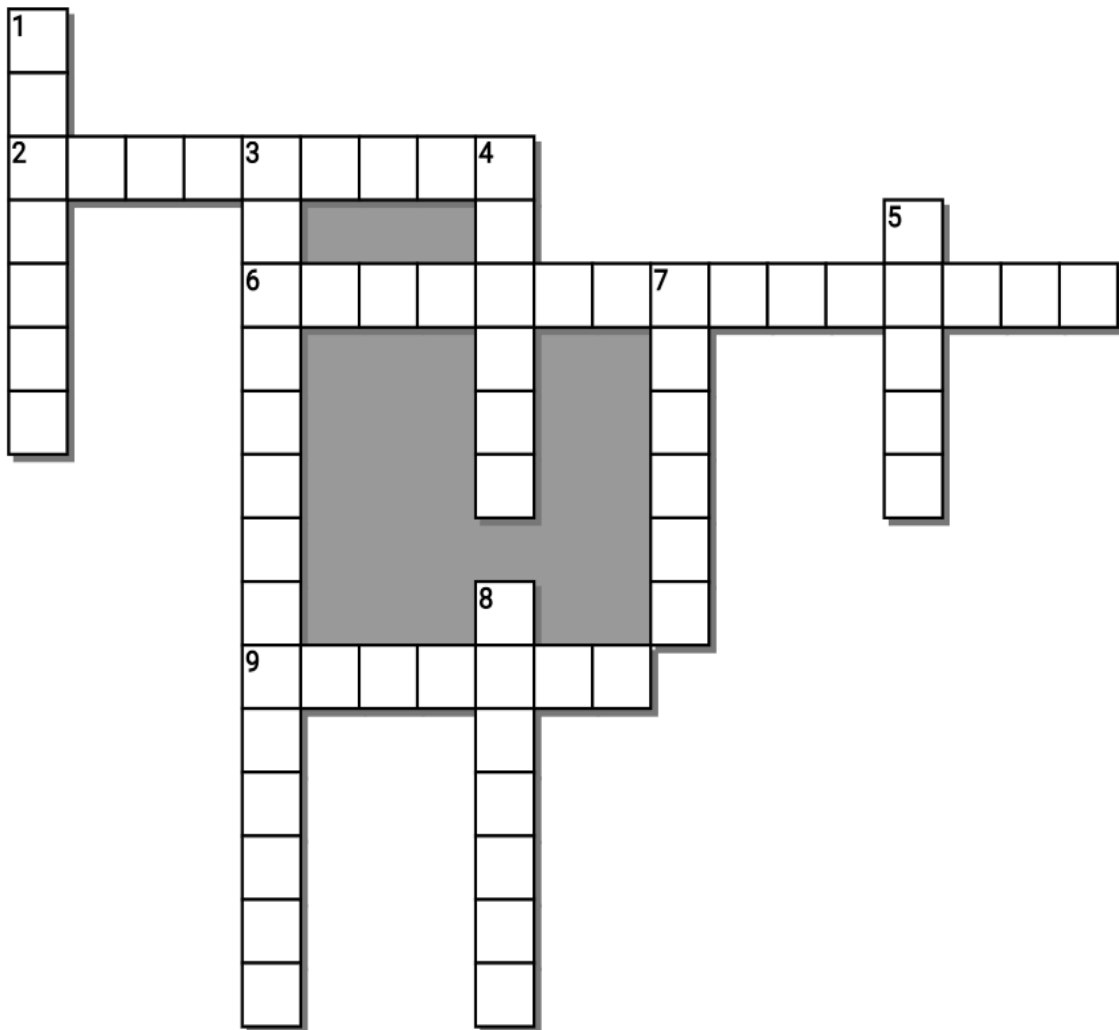


Part 6 Magnetism Quiz 1-10 + Bonus

Score=

1)	6)
2)	7)
3)	8)
4)	9)
5)	10)

Bonus: \_\_\_\_\_



### Across

2. The force produced by a magnetic field.  
 6. The spinning inner cores of solid and liquid Iron creates a giant \_\_\_\_\_ field.  
 9. Opposite charges \_\_\_\_\_

### Down

1. A navigational instrument for determining direction relative to the earth's magnetic poles.  
 3. These can be created by running electric current through a wire, you can create a magnetic field.  
 4. An electric motor uses the attraction and repelling properties of magnets to create \_\_\_\_\_.  
 5. The same charges \_\_\_\_\_  
 7. An object or a device that gives off an external magnetic field  
 8. \_\_\_\_\_'s Law: The changing of a magnetic field can create voltage.

# Part 6 Magnetism

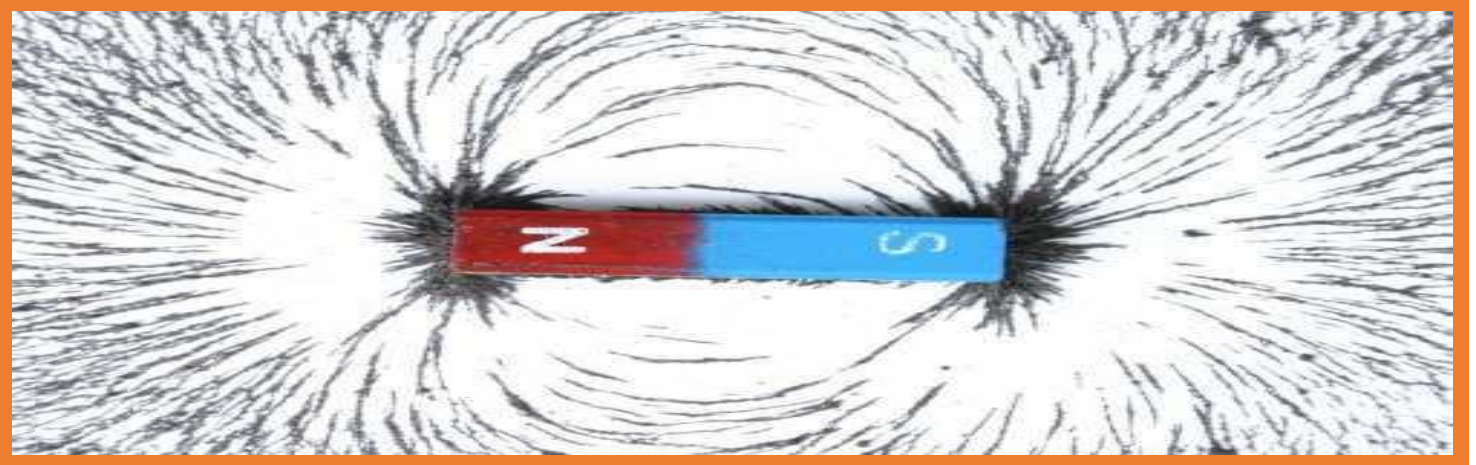
Name:

## Part 6 Lesson 1

Magnetism: The **force** produced by a magnetic field.  
Electric charges in motion.

A magnet is an object or a device that gives off an external **magnetic field**.

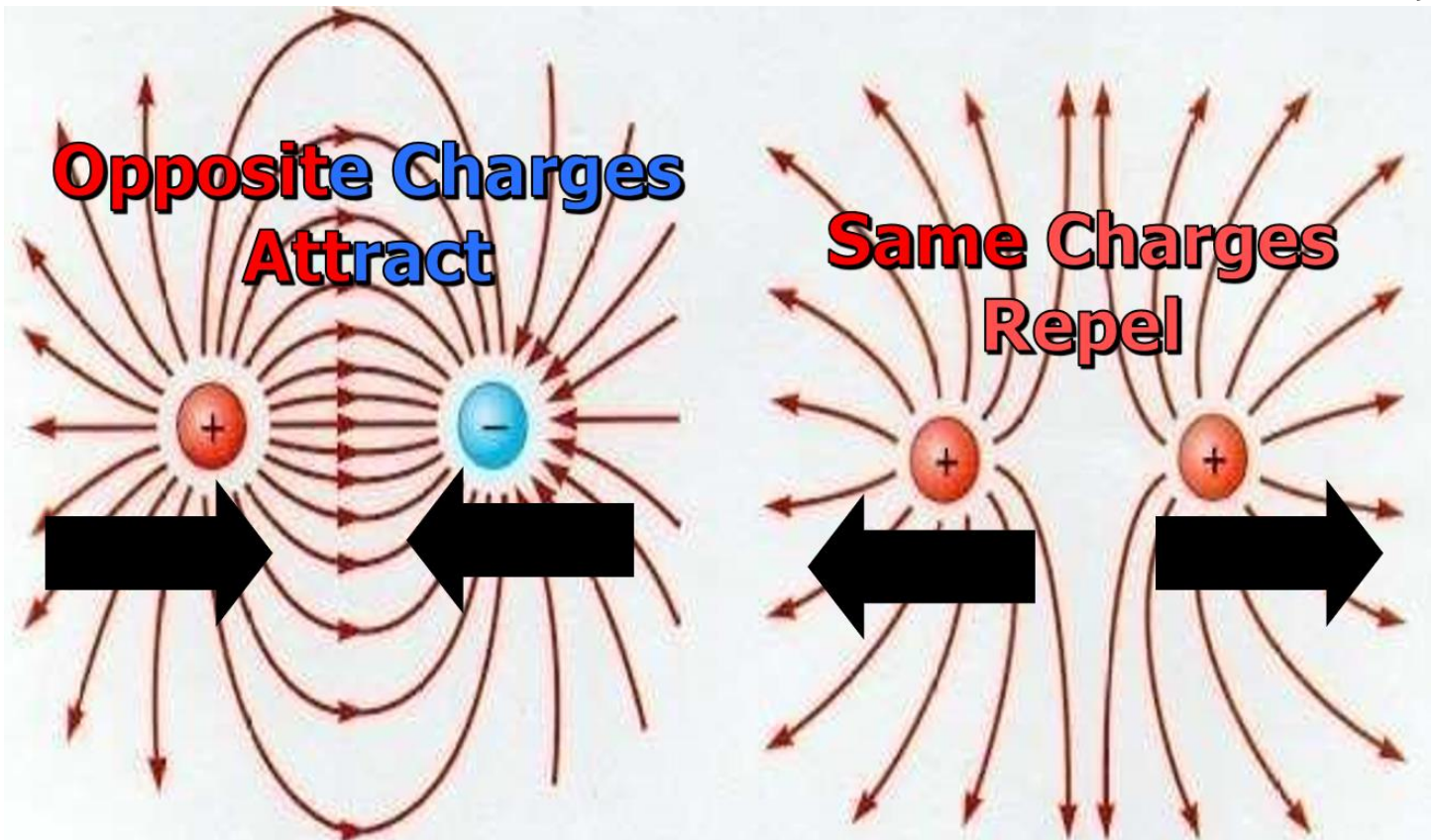
Create an external magnetic field around the magnet below.



Opposite charges **attract**. The Same forces **repel**.

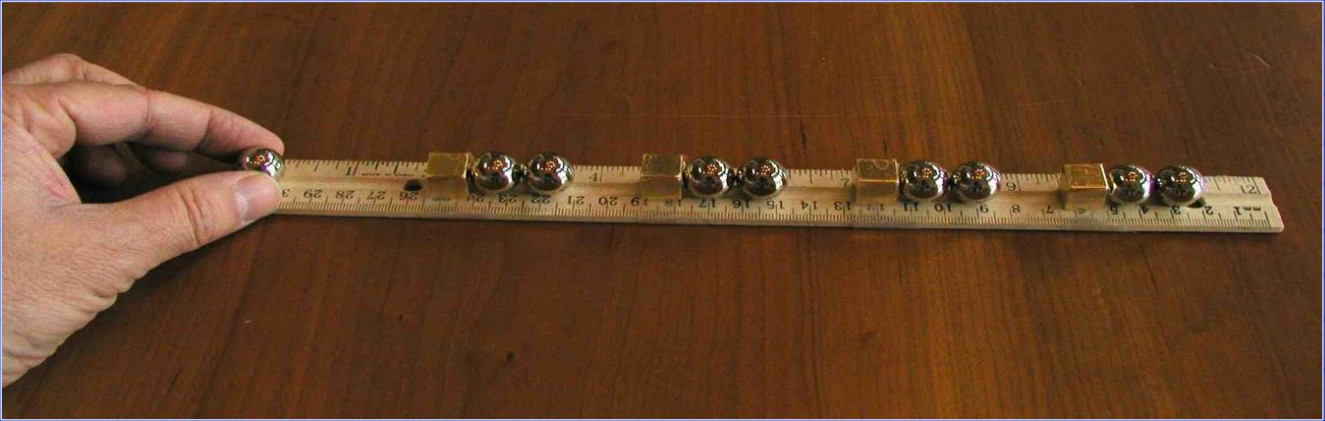
What happens to like and opposite charges?





Magnet: An object that is surrounded by a **magnetic field** and that has the property, either natural or induced, of attracting iron or steel.

What is this? How does it work?



### Magnetic Linear Accelerator.

- 1.) Energy from one ball gets transferred to the next, and the next. (Law Conservation of Energy).
- 2.) Potential energy is stored up between the first ball and the first magnet.
- 3.) Potential energy gets converted to kinetic energy.
- 4.) There's enough kinetic energy from the first ball to send the far ball flying off. (Try it with one steel ball bearing for an epic fail)
- 5.) As the next ball gets drawn to the second magnet, the attractive force causes it to accelerate and hit the next magnet and ball bearings at a higher velocity. The velocity increases as more magnets are added and each step.

### Part 6 Lesson 2 Earth's EM Field, Compass

The spinning inner cores of solid and liquid **iron** creates a giant electromagnetic field around our planet.

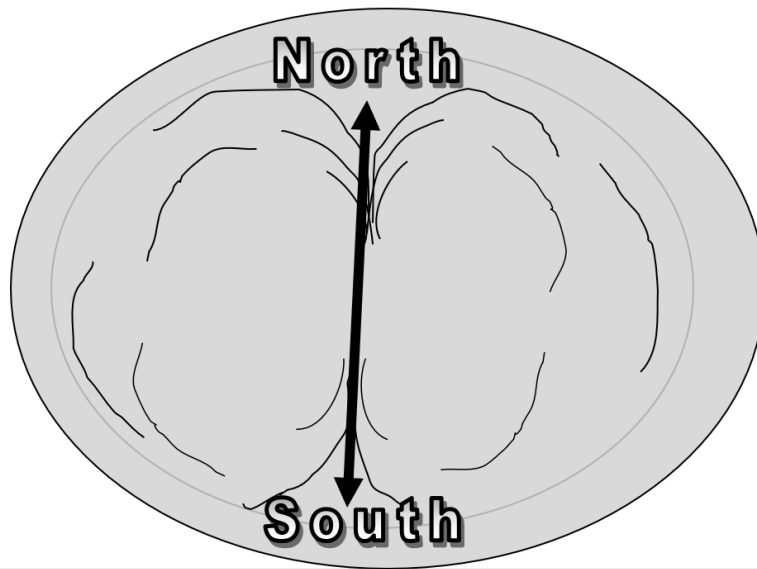
Earth's magnetic field, also known as the **Electromagnetic** field, is the magnetic field that extends from the Earth's interior out into space.

Electromagnetic field protects the earth from charged particles.

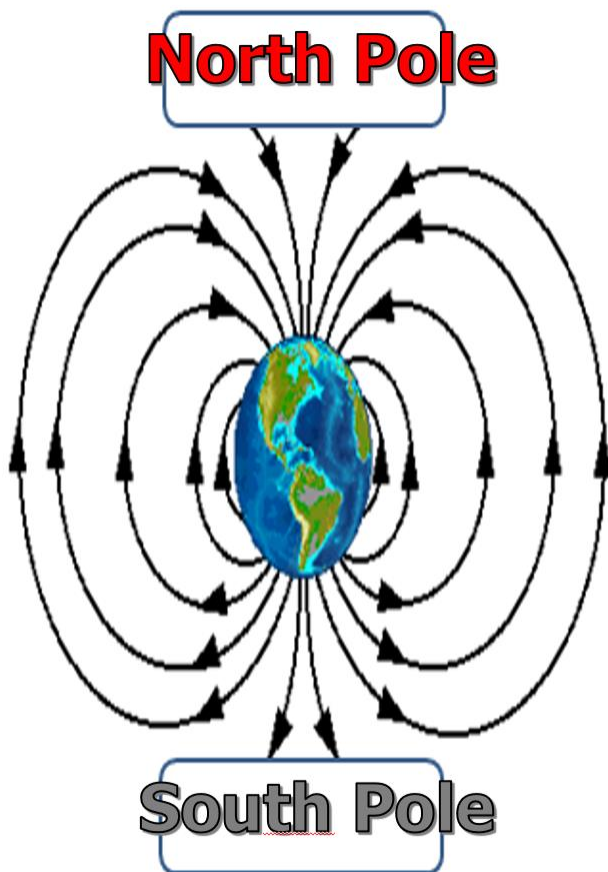
It also creates the **aurora borealis** (Northern Lights)

Spread iron filings all around the planet below or do on a paper plate and then you can draw what you see here.

From below, the page place a magnet beneath the earth and record the magnetic field that is created with the iron filings. – Note: Don't get iron filings in your



eye. \_\_\_\_\_

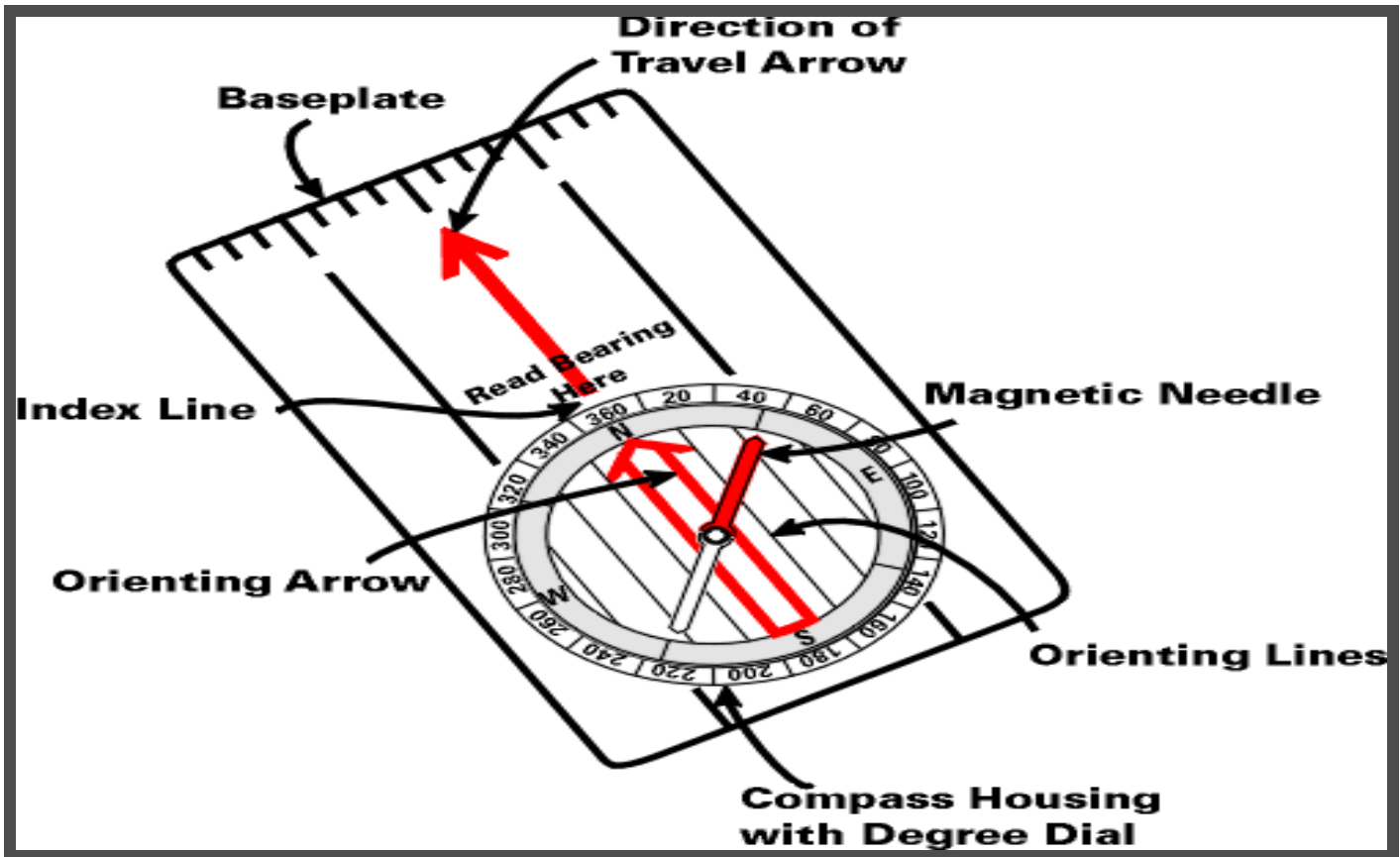


Please label the two poles. What creates this magnetic field. Why is it important?

The poles are generated by the motion of molten iron in Earth's core, the magnetic field protects our planet from cosmic radiation and from the charged particles emitted by our Sun

Compass: A navigational instrument for determining **direction** relative to the earth's magnetic poles.





### Part 6 Lesson 3

Faraday's Law: The **changing** of a magnetic field can create voltage.

Which law is represented here? How does it work?



Electromagnetic induction is the process by which a current can be induced to flow due to a changing magnetic field.

An electric motor uses the **attracting** and **repelling** properties of magnets to create motion.


Electric motors use a **permanent** magnet and **temporary** magnet.

- The permanent magnetic has a north and south Pole.

- The temporary magnet is a special magnet called an electromagnet. It is created by passing an electric current through a wire.

Describe the simple electric motor below? How does it work?

It works on the principal of Faraday's Law of electromagnetic induction. A current-carrying conductor generates a magnetic field; when this is placed in between the poles of a strong magnet, it generates rotational motion.

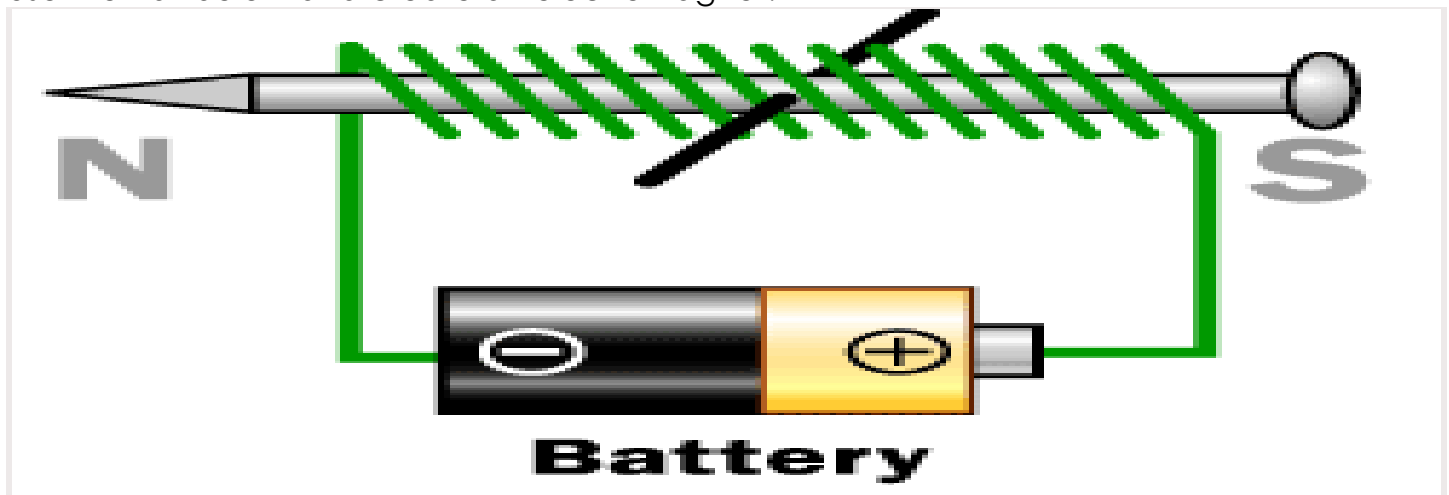


This force depends on the direction of the magnetic field. Because the wire is stripped on one side, it alternates the current from on to off every 1/2 rotation. Halfway through the spin, the ring gets current and receives a boost.

Electromagnets: By running electric current through a wire, you can create a magnetic field.

Size of battery	Number of paper clips collected		
AA	Trial _____	Trial _____	Trial _____
D	Trial _____	Trial _____	Trial _____

Use the nail below and create an electromagnet.



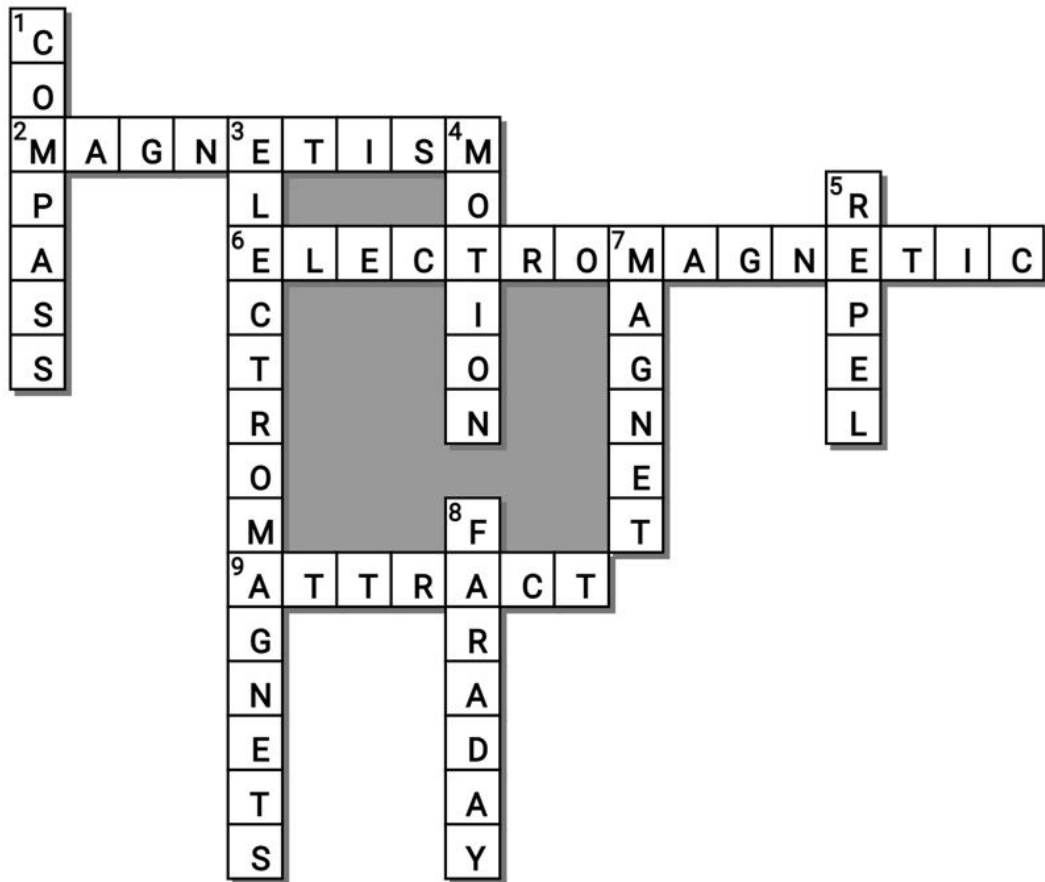
## Part 6 Magnetism Quiz 1-10 + Bonus

Score=

1) Magnet	6) Compass
2) Opposite Charges Attract Same Charges Repel	7) Faraday's Law
3) The Second rock is magnetized. Electric Fields are produced by the motion of electrical charges	8) Electromagnet
4) Neodymium Magnets	9) Current and the word Loop
5) Electromagnetic Field	10) Letter D.) Ferrofluid

Bonus: Magneto





**Across**

- 2. The force produced by a magnetic field.
- 6. The spinning inner cores of solid and liquid Iron creates a giant \_\_\_\_\_ field.
- 9. Opposite charges \_\_\_\_\_

**Down**

- 1. A navigational instrument for determining direction relative to the earth's magnetic poles.
- 3. These can be created by running electric current through a wire, you can create a magnetic field.
- 4. An electric motor uses the attraction and repelling properties of magnets to create \_\_\_\_\_.
- 5. The same charges \_\_\_\_\_
- 7. An object or a device that gives off an external magnetic field
- 8. \_\_\_\_\_'s Law: The changing of a magnetic field can create voltage.

**Possible Answers**

ATTRACT, COMPASS, ELECTROMAGNETS, FARADAY, MAGNET, MAGNETISM, REPEL, ELECTROMAGNETIC, MOTION