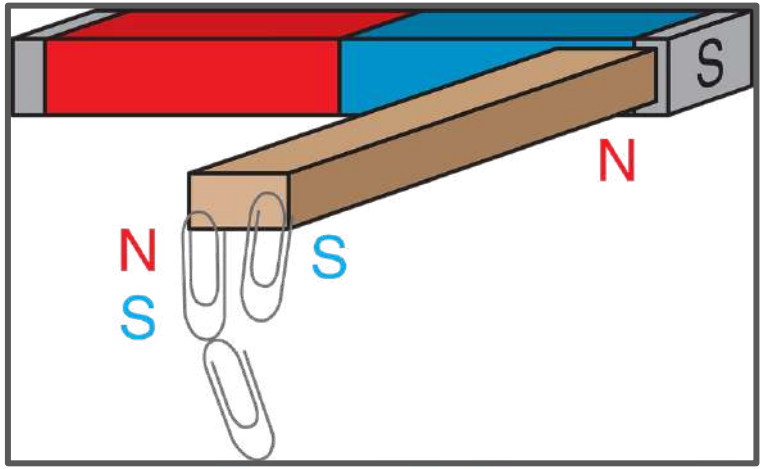
Standard:

4.P.1.1 Explain how magnets interact with all things made of iron and with other magnets to produce motion without touching them.



I Can Statement(s):

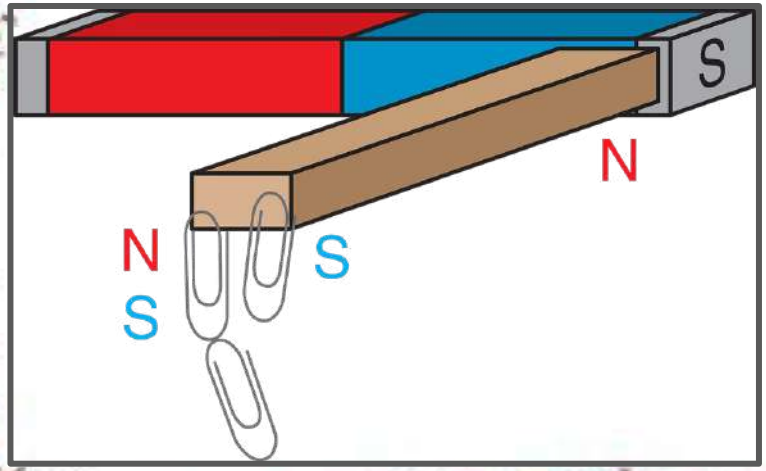
I can explain how magnets interact with all things made of iron.

I can explain how magnets interact with other magnets to produce motion without touching them.

BROADUS LEARNINGS

Essential Question(s):

- What is the physical property that allows an object to be attracted to a magnet?
- How are magnets used in everyday life?
- In what everyday objects can magnets be found?



BROADUS LEARNINGS

MAGNETISM

[a force that pulls objects across a distance.]

magnetic:	NON-MAGNETIC:
paperclips	aluminum
steel	keys
iron	coins
nickel	copper
staples	silver
cobalt	

Not All Metals Are Magnetic

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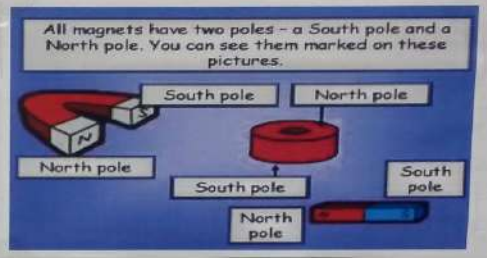
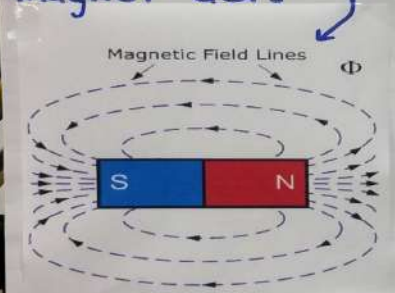
Magnets and Electromagnets Vocab./Diagrams

magnet - object that attracts things made of iron or steel

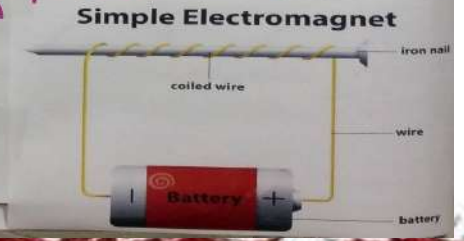
magnetic poles - ends of a magnet (one is the North pole, the other South)



magnetic field - space around a magnet where the force of the magnet acts



electromagnet - arrangement of wire wrapped around a core that electricity will be passed through



Lodestone

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Vocabulary:	Definition:
magnet	A piece of metal that attracts objects with iron in it.
magnetism	a natural force that can cause some things to move without touching them.
repel	To cause something to move away.
attract	To cause something to move closer.
force	A push or pull that causes an object to move, stop, or change directions.

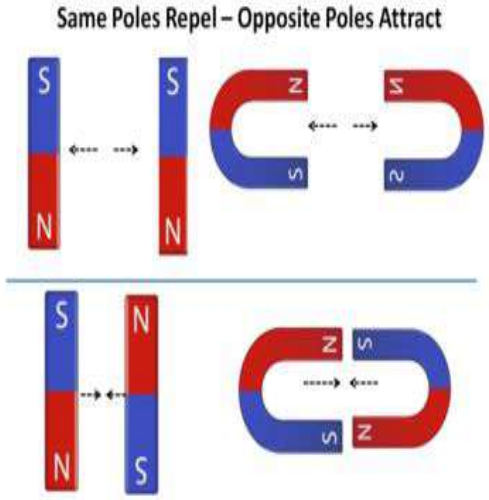
Key Concept 1:

Magnets are attracted to some metals, but not all of them.

Some metals can be pulled toward magnets when the magnets come close enough:

- ➔ Iron
- ➔ Cobalt
- ➔ nickel

An object pulled that is pulled toward a magnet is "attracted to" the magnet.



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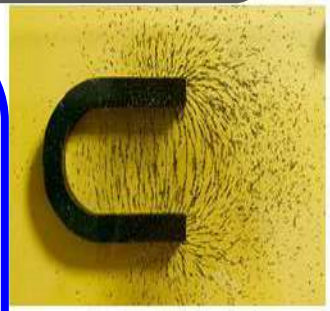
Objects Affected by Magnets

Objects that have iron and will be attracted to magnets include:

- iron filings (tiny pieces of iron) and other magnets.

Example of steel objects which is a mixture that contains iron are:

- paperclips, staples, and cans,



Iron filings and paper clips both contain iron metal, so they can both be attracted to magnets.

Objects Affected by Magnets

Some metals are non-magnetic.

- Copper and aluminum
- Other materials, like paper, fabric, plastic, glass, and wood, are also not attracted to magnets.

Key Concept 1:

Magnets are attracted to some metals, but not all of them.

Magnetic

Nails, screws, paper clips, needles, safety pins

Not-Magnetic

Aluminum foil, copper penny, wood, plastic

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Key Concept 2:

Magnets are used in many ways, such as holding small objects to a refrigerator or lifting objects.

<u>Magnets are used in a variety of ways, depending on their:</u>

- ➔ Size
- ➔ Shape
- ➔ Strength: A stronger magnet will attract a magnetized object more than a weaker magnet will. And a magnet that is close by will attract the object more strongly than a magnet that is held farther away.

Key Concept 3:

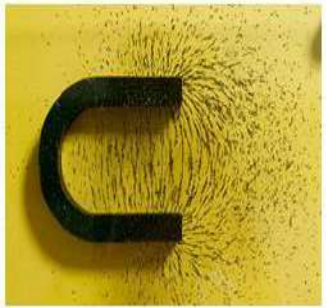
Magnets are also used in everyday objects like doorbells, phone, speakers, compasses, and devices with electric motors.

One thing to be aware of is that computers, credit cards, videotapes, radios, cameras, cell phones, and any other object that stores information can be damaged when it comes in contact with the force of a magnet.

BROADUS LEARNINGS

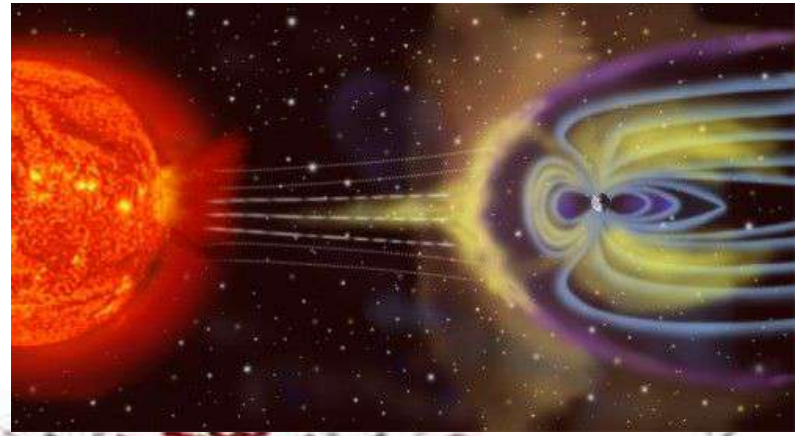
- A permanent magnet is always magnetized.
  - A magnet is a permanent magnet.

- A temporary magnet is an object that contains iron which will hold a magnetic charge for a short amount of time.
  - When a magnet touches a large paper clip, the large paper clip can temporarily take on magnetic properties.

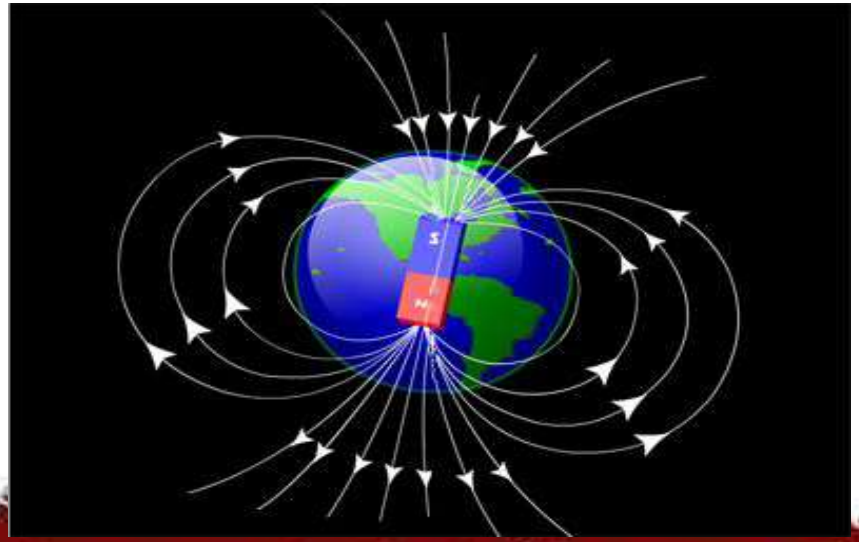


BROADUS LEARNINGS

- Both Earth's inner and outer core are metal
  - Outer core remains liquid; constantly moving
    - Moving metal generates a magnetic field around the planet.
      - Magnetic field makes a compass point to north or south.
      - Protects the planet from the Sun's harmful rays.
  - Pressure keeps the inner core solid.

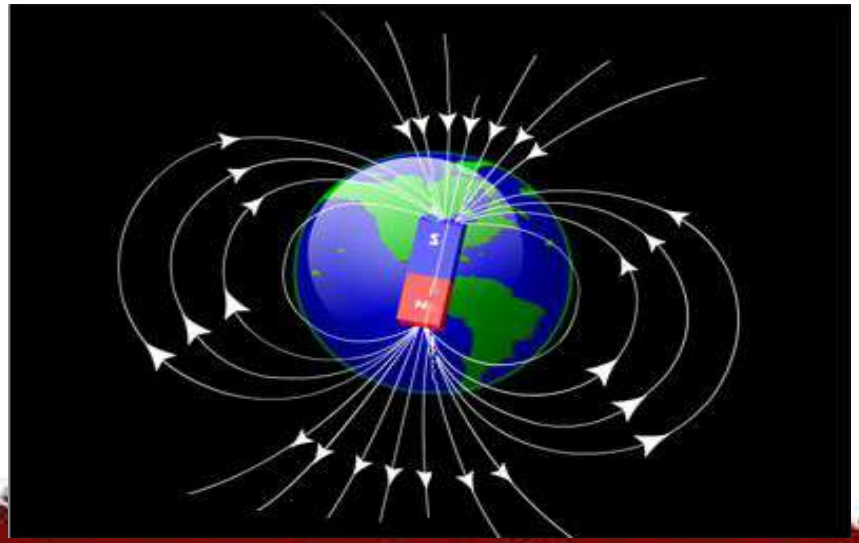


- Heat and the Earth's spin keep the outer core moving.
  - Movement causes electrical currents in the core, which is mostly iron.
    - Electrical currents create a magnetic field that extends into space.
- The magnetic field is tilted slightly from the Earth's axis.



Sometimes the magnetic field is stronger than at other times.

- Sometimes the magnetic field's alignment moves from the Earth's spin axis.
- The magnetic North Pole keeps moving.
  - As of right now, the magnetic North Pole is very close to the Earth's axis. One hundred years ago, it was in Arctic Canada.
- The magnetic South Pole also moves.



BROADUS LEARNINGS

Magnetosphere

- The magnetic force that extends into space.
  - Acts like a shield
  - Protects the Earth from harmful gases and charged particles that would destroy the atmosphere.