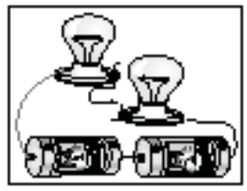
4th Grade Physical Science Vocabulary

Electricity and magnetism are related effects that have many useful applications in everyday life.

1.a Students know how to design and build simple *series* and *parallel* circuits by using *components* such as wires, batteries, and bulbs.

1. Circuit: a circular pathway or loop through which electrical current travels from the battery or energy source, through each component (lights, etc.) and back to the energy source again.

2. Simple series circuit: consists of two or three light bulbs wired together with a battery in a single loop or path. Any opening or break in the circuit can stop the flow of the electric current and none of the components (lights, etc.) will work. *"If one light goes out, they all go out!"*



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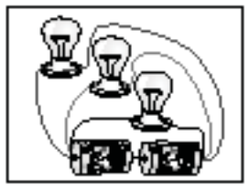

4. Resistance: a force, such as friction, that slows down or prevents motion. The *less* resistance in a circuit, the *greater* the amount of current that flows through it. *"Less resistance = higher current."*

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   The filament in a light bulb can cause resistance to the electrical current as it travels across it.

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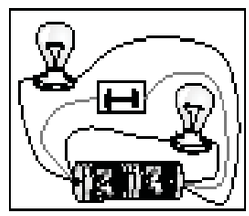
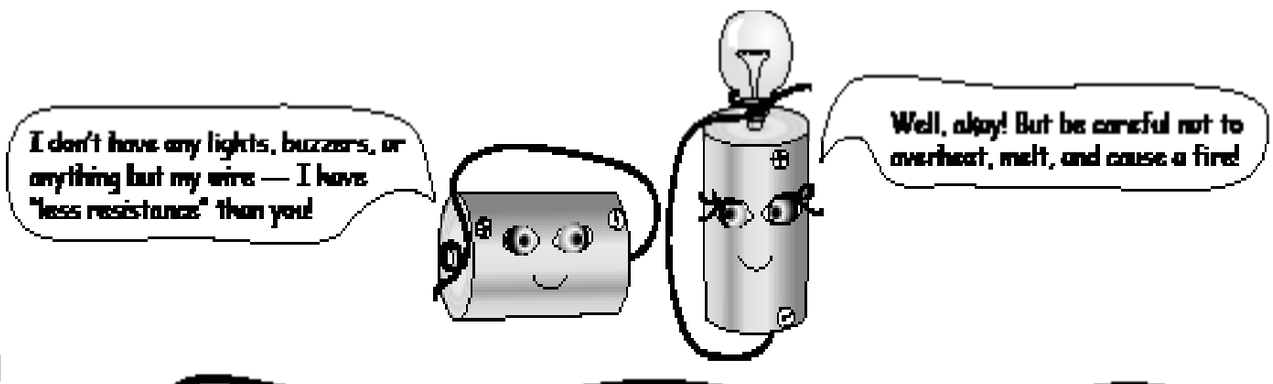
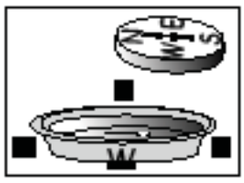




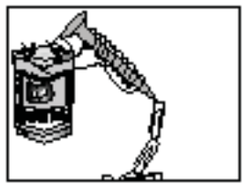
1.b Students know how to build a simple compass and use it to detect magnetic effects, including Earth's magnetic



Compass: a device that contains a magnetized needle that moves freely and is used to detect a magnet or magnetic field. The north end or pole of the magnet points toward the Earth's magnetic north pole or any other magnetic field that is closer or more powerful.

1.c Students know electric currents produce magnetic fields, and know how to build a simple electromagnet.

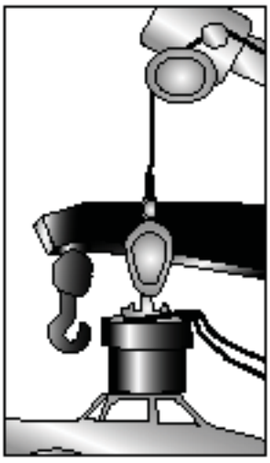
Whenever an electric current passes through a wire, a magnetic field always surrounds the wire. *"The stronger the electric current, the stronger the magnetic field."*



Electromagnet: a device that turns an iron rod, nail, or bolt into a magnet by wrapping an insulated wire that has an electric current running through it around the rod, nail, or bolt.

The electric current running through the wire causes it to become a "temporary magnet" with a North and South Pole. It can be turned on and off.

1.d Students know the role of electromagnets in the construction of electric motors, electric generators, and simple devices such as doorbells and earphones.



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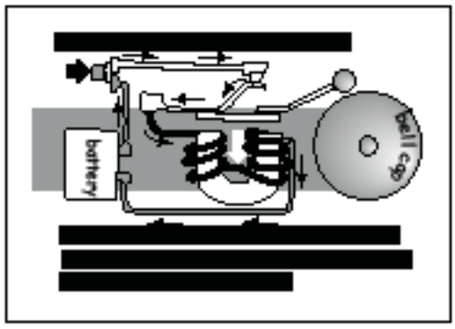

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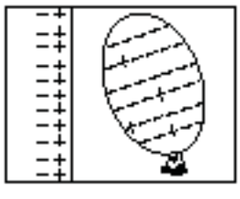

Static electricity: the gain or loss of negative electrical charges (electrons) on an object.

Rule: "*Unlike* charges *attract* each other — *like* charges *repel* each other.

Examples:

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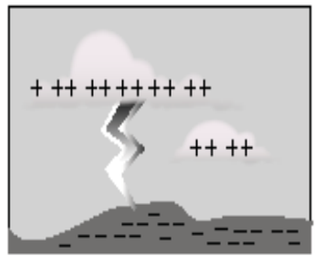

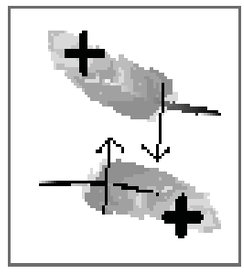

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<u>Unlike poles:</u> attract each other

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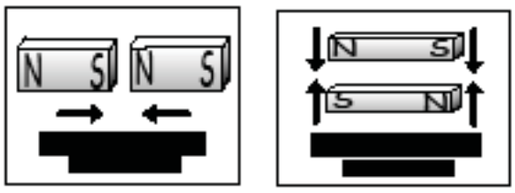

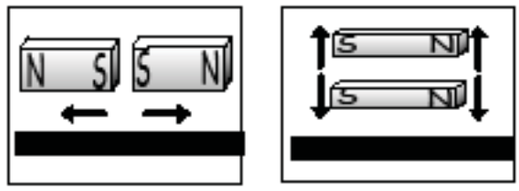

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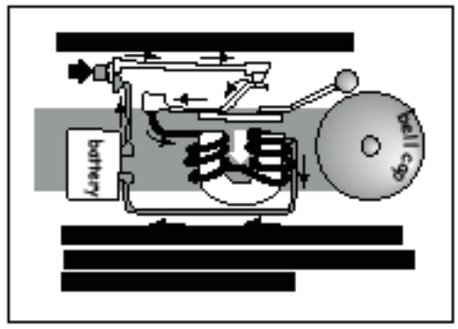

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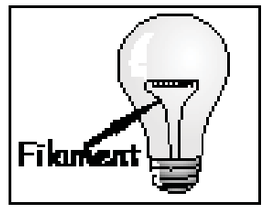

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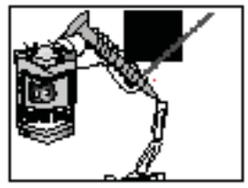

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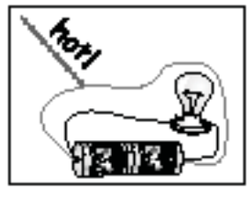

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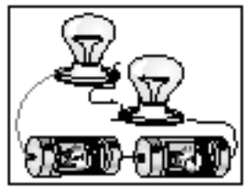

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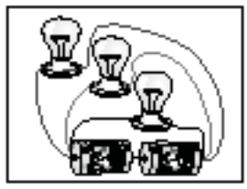

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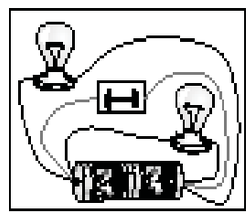

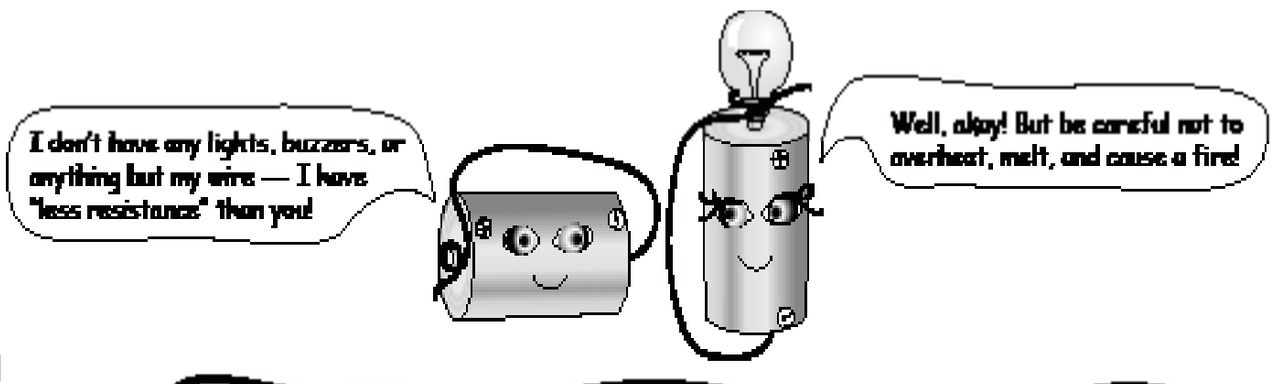

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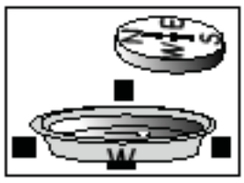

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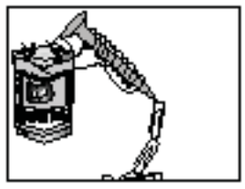

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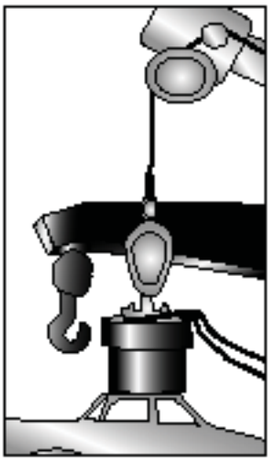

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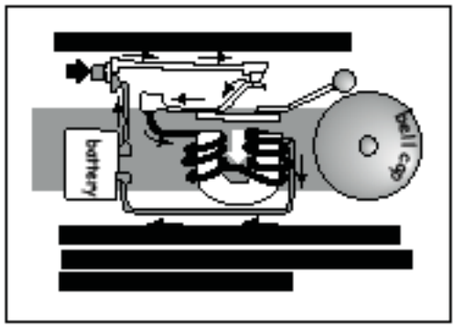

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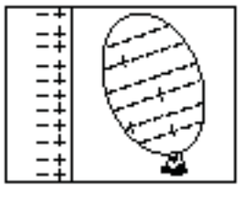

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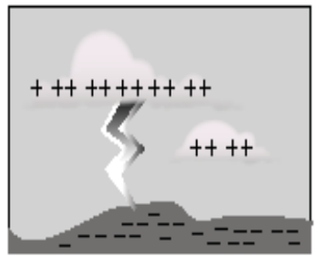

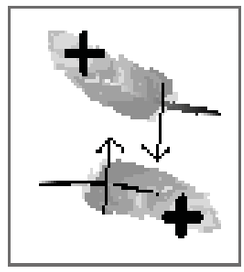

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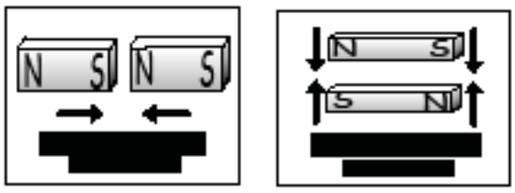

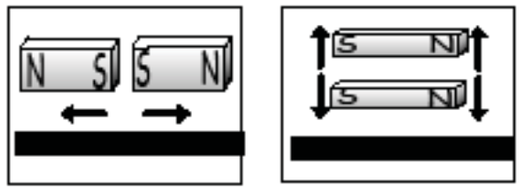

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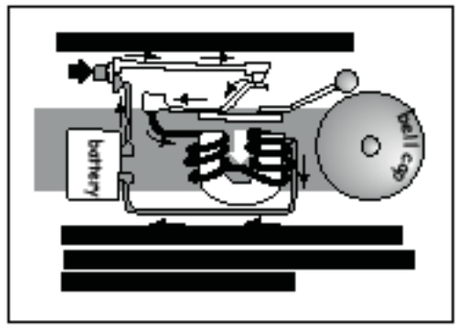

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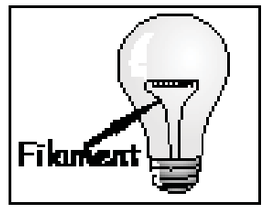

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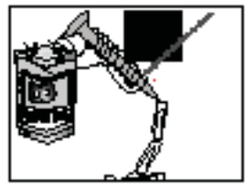

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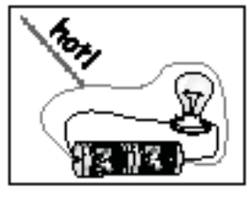

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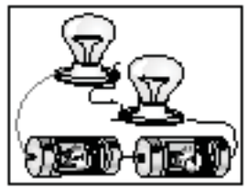

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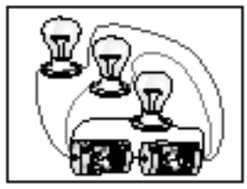

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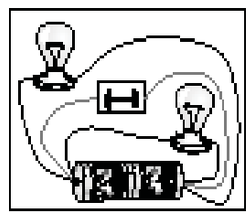

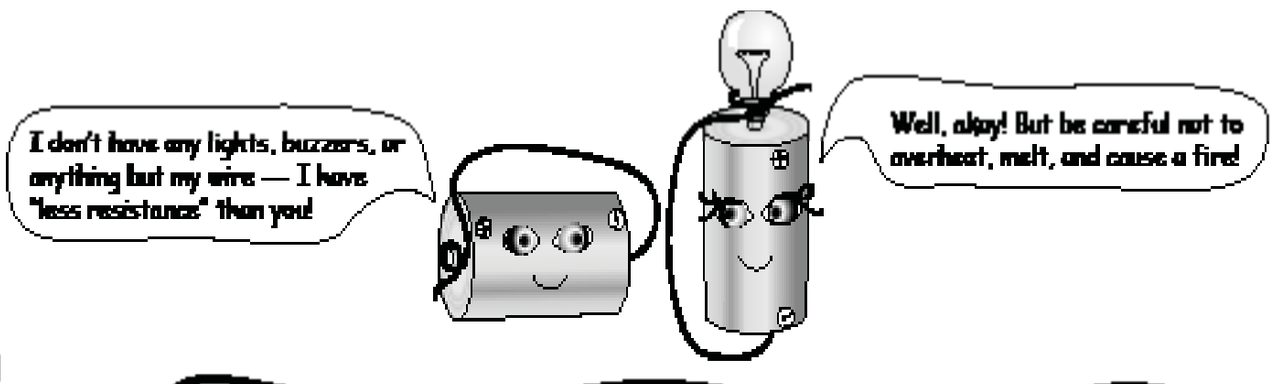

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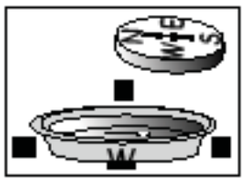

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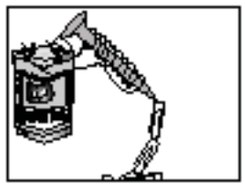
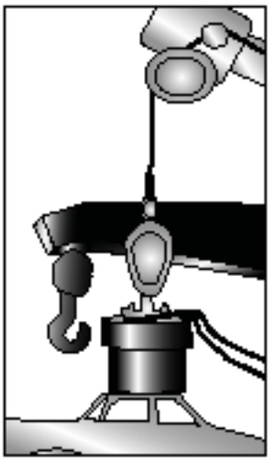


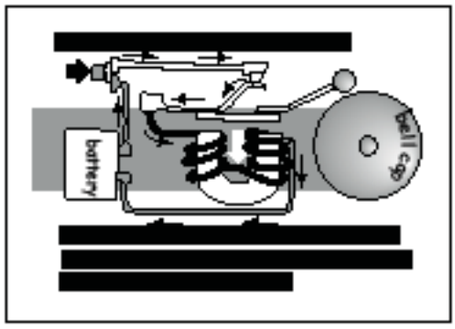
Electromagnet: a device that turns an iron rod, nail, or bolt into a magnet by wrapping an insulated wire that has an electric current running through it around the rod, nail, or bolt.

The electric current running through the wire causes it to become a "temporary magnet" with a North and South Pole. It can be turned on and off.

1.d Students know the role of electromagnets in the construction of electric motors, electric generators, and simple devices such as doorbells and earphones.

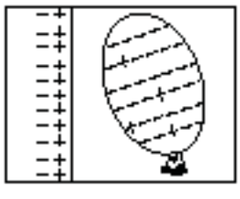


An electromagnet is a magnet that can be turned on and off. When an electromagnet is turned "on," it can move a nearby magnet toward it, thus causing many objects with magnets in them to move or turn around.



Many devices such as doorbells, motors and generators work when these two magnetic fields:

1.e Students know electrically charged objects attract or repel each other.



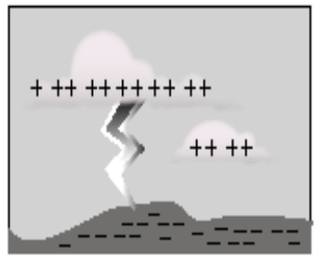
Static electricity: the gain or loss of negative electrical charges (electrons) on an object.

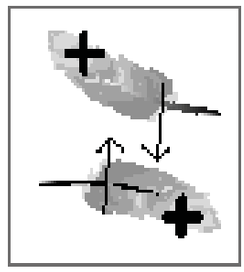
Rule: "*Unlike* charges *attract* each other — *like* charges *repel* each other.

Examples:

a <u>negatively</u> charged object will attract a <u>positively</u> charged object.

<u>Two negatively charged</u> or two <u>positively charged</u> objects will repel or push each other away.

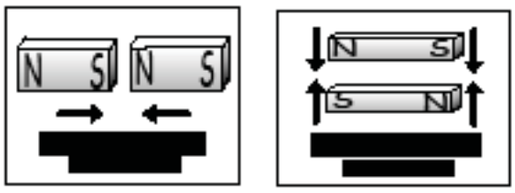


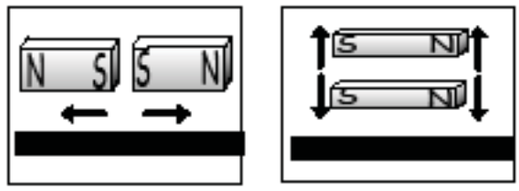


1.f Students know that magnets have two poles (north and south) and that *like* poles *repel* each other, while *unlike* poles *attract* each other.

<u>Unlike poles:</u> attract each other

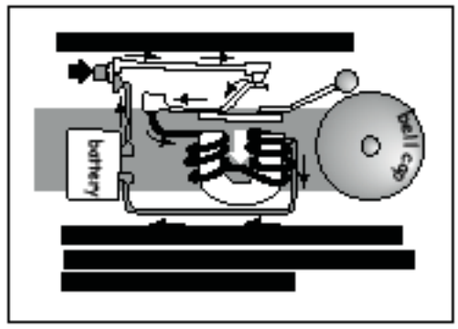
<u>Like poles:</u> repel or push away each other.



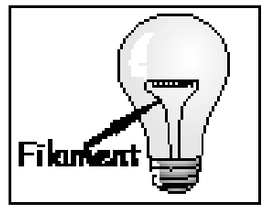


1.g Students know electrical energy can be converted to heat light, and motion.

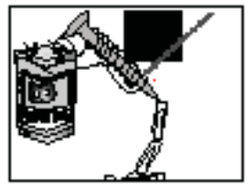
1. <u>Motion:</u> an electromagnet can affect other magnets in objects and make them move or turn as in an electric motor or doorbell.



2. <u>Filament:</u> a thin piece of wire inside a light bulb that glows and gives off light as electricity passes through it.



3. <u>Heat:</u> heat can be created when light bulbs, electromagnets, or wires hear up as high levels of electric current pass through them.



4. <u>Fuses and circuit breakers:</u> are safety devices to keep wires from overheating or melting due to a large amount of electrical current passing through them.