

Chapter Eleven Science: Interactions of Matter and Energy Study Guide

Lesson Seven

Static Electricity-when electrons move from one place to another and cause a buildup of separated positive and negative charges

-Opposite charges attraction; similar charges repel

Induced Charge-the static charge that results in a second object

Static Electricity

1)the copier has a charged, rolling drum with a light-sensitive coating

2)the machine casts an image onto the drum. When light strikes the drum, charges are removed except where an image is present.

3)tiny black particles are attracted to charges on the drum. The induced charges on the particles make them stick to the parts of the drum where an image is present.

4)the black particles are transferred to a piece of paper

5)a heater melts the particles into a permanent image

Conductor-electrons move through easily

Insulator-does not allow electrons to move through easily

Grounding Wire-connects metal case to the ground through household wiring. This will allow the case to share the charge with the ground preventing danger.

Lightning Production-produced by static electricity.

-water droplets are carried up to cooler regions in the air and begin freezing

-the water, ice, and motion gives the lower part of the cloud a negative charge

-ground below acquires a positive charge

-the ground and cloud are attracted to each other because they have opposite charges

Lesson Eight

Circuit-a path along which charged particles can travel

Current-a flow of charged particles moving through a circuit

Resistor-opposes the flow of electrons

-grows warmer and resists current

-are added to control a current

Short Circuit-a very conductive path that bypasses less conductive parts of a circuit

-dangerous because it offers little opposition to current

-wire heats greatly and can start fires

Series Circuit-only one path for the electric current

-the flow of charges is the same at any point

Parallel Circuit-circuit with more than one path for current

-electrons are set into motion in each path, causing current

-each path feels the same crowding of charges

-the current in each path of a parallel circuit depends on the strength of its resistor

-paths with a stronger resistor carry less current

Open Circuit-a circuit that is not complete

Closed Circuit-complete path

Switch-device used to open and close a circuit

Lesson Nine

Poles-all magnets have a north and south pole
-north poles are attracted to south poles
-like poles repel each other

Electromagnets-devices made magnetic by an electric current

Magnetic Field-the area around a magnet in which other magnets can feel attraction to represent magnetic fields around magnets

Lesson Ten

Wet Cells-a device that produces a current in a solution
-use chemical reactions to produce electric current
-charged particles always continue to move in the same direction
-also known as a direct current

Voltage-the difference in the amount of potential, or stored, energy between the plates, or ends of the cell
-describes the amount of energy the cell provides to move charged particles from the negative end, through the circuit, to the positive end.

Ammeter-device that measures the amount of current

Ampere-unit used for measuring current

Dry Cells-electric current produced by cells containing a moist conducting paste instead of a solution
-chemical reactions between the paste and the plates crowd electrons on one plate and remove electrons from the other

Generator-uses mechanical energy from machines to make electricity
(examples-hand crank, steam-driven wheel, or a gasoline motor)
-the current changes directions

Alternating Current-change in the direction of the current that occurs during each turn of the loop

Transformers-devices that increase or decrease the voltage of the current for various applications
-Step-up Transformers-increase voltage
-Step-down Transformers-decrease voltage

From Generator to Home

- distances
- 1)generators at power plants get energy from fossil fuels, nuclear reactors, wind, or running water
 - 2)a transformer increases the voltage of the electricity. High-voltage current travels great distances with the least possible waste along the way
 - 3)dangerous high-voltage wires are often high above the ground
 - 4)power-distributing stations, transformers lower the voltage
 - 5)a smaller transformer outside a home lowers the voltage even more
 - 6)current enters a home

Uses for Electrical Energy at Home

Mechanical Energy-used in motorized devices such as blenders, electric fans, and power tools
Heat-devices with coils such as portable heaters, electric blankets, and hair dryers

Sound-changes in current cause an electromagnet to move a diaphragm back and forth producing sound waves. Examples include radios, televisions, and stereos

Light-closing of a switch

-Incandescent bulbs-contain a thin, metal wire, or filament that acts as a resistor. Current heats it to about 2,500 degrees F. At this temperature atoms in the filament give off heat and visible light. Only about 12% of the energy is light. The rest is wasted.

-Fluorescent bulbs-produce much more light than heat. A series of collisions causes gas inside the glass to produce invisible light. The fluorescent coating on the inside of the glass glows white. The coating of the bulb determines how much light you see.

How much electricity do you use?

Power= voltage x current

Watts=voltage x amps

Power=120 volts x 0.5 amps =60 watts

Amount of electric energy used in a household depends on how much energy used by all electrical appliances and the total time they are used.

Energy=power x time

Kilowatt-hours=kilowatts x hours

Cost-find out how much power costs by multiplying the amount by the cost

Thermal Pollution-hot water released into rivers or lakes