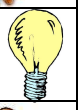
Fast Facts #9 Energy

Name _____Block____

Energy is the ability to cause changes in matter and involves either motion or position.

Form of Energy	Properties of Energy	Sources of Energy
Heat/Thermal Energy	the transfer of thermal energy, the total energy of the particles that makeup an object (the faster the particles move, the higher the temperature and the more energy it has)	the sun, electricity, material that is burning, 
Solar (Light) Energy	the sun provides heat and light energy for Earth, green plants use solar energy for photosynthesis to produce sugar, solar cells convert solar energy to electrical energy, most of our energy comes from the sun	from the sun  
Chemical Energy	stored in particles of matter, can be released when these particles react to form new substances	batteries, sugar/food 
Mechanical Energy	energy due to the motion of an object or from the object being in a position where it can be set in motion	machines, falling water, a human arm or leg 
Electrical Energy	energy flowing in an electric circuit	battery, generator, solar cells, fuels, or hydroelectric generators 

Mechanical Energy Can be Potential or Kinetic	
Mechanical Potential Energy (energy that is stored or energy of position)	a stretched rubber band, water stored behind a dam, a book sitting on a shelf
Mechanical Kinetic Energy (energy due to its motion)	the kinetic energy increases as an object moves faster, a car has kinetic energy, the faster the car moves, the more kinetic energy it has

a) Potential energy

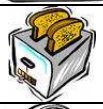
(b) Kinetic energy

According to the Law of Conservation of Energy, energy can not be created or destroyed. It can be transformed from one form into another, but the total amount of energy never changes.

Mechanical Energy can be transformed between the two types of mechanical energy (potential and kinetic).		
Potential to Kinetic Mechanical Energy Transformations	Water behind a dam has **potential** energy because the water is stored behind the dam. →	Water **flows** over the dam and now has **kinetic** energy because it is **moving** as it flows over the dam.
	A rubber band is stretched, the kinetic energy becomes **potential** energy. →	When the rubber band is released, the potential energy is transformed into **kinetic** energy as the rubber band **moves**.
	As a book is lifted to a high shelf, the kinetic energy is transformed into **potential** energy. →	If the book **falls** off the shelf, the potential energy is transformed into **kinetic** energy.

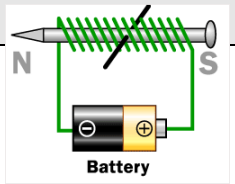
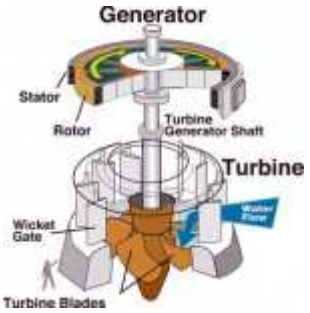
Mechanical Energy can be transformed into other kinds of energy.	
When a book falls from a shelf, the **kinetic mechanical energy** is transformed into……	other forms of energy such as **sound** and **heat**.
When water falls over a dam, it can be used to power a generator. The **kinetic mechanical energy** is transformed into…..	**electrical** energy.
The water behind the dam is there because energy from the sun (solar) evaporated water and deposited it at a higher elevation so it could flow down hill thus the **solar energy** was transformed to ……	to **potential mechanical** energy.

Transformations may occur between any of the types of energy, but the energy is never lost. It is always around in some form.	
Green plants transform the sun's energy (**solar**) into…..	food which is a form of **chemical** energy.
Animals use chemical energy from food to move. The **chemical** energy is transformed into……	**mechanical** energy.
Carbon-based fuels (wood, natural gas, petroleum or coal) from the bodies of plants and animals are burned and the **chemical** fuel is transformed into…..	**heat** energy.
Heat energy from fuels can be transformed into…..	**electrical** energy at a power plant.
In an electric circuit the **electrical** energy can be transformed into many different types of energy such as……	**mechanical, sound, heat, or light.**

Magnetism is the force of attraction or repulsion of magnetic fields.		
Form of Energy Produced		**How is the Energy produced from an Electric Circuit?**
Light		**Light** can be produced in an electric circuit if a **light bulb** is added to the circuit. Sometimes **chemical** energy from a battery is transformed into **electrical** energy in the circuit which is transformed into **light** and **heat** in the light bulb.
Sound		**Sound** can be produced in an electric circuit if a **buzzer, bell, radio, or TV** is added to the circuit. The transformation in this case might be **chemical** energy in a battery being transformed into **electrical** energy in a circuit which is transformed into **sound** energy by the buzzer.
Heat		**Heat** can be produced in an electric circuit if a **toaster, stove, or heater** is added to the circuit. This transformation might be that the **chemical** energy at the power plant is transformed into **heat** energy which is transformed into **mechanical** energy to turn a generator.
Mechanical Motion		**Mechanical Motion** can be produced in an electric circuit if a **fan, motor, or generator** is added. This transformation might be that a chemical energy in a battery is transformed into electrical energy in a circuit which is transformed into energy of mechanical motion by the fan or motor.

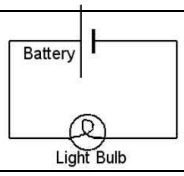
Surrounding a magnet is a **magnetic field** that applies a force, a push or pull, without actually touching an object.

- an electric current flowing through a wire wrapped around an iron core forms a **magnet**
- a coil of spinning wire around a magnet or a magnet spinning around a coil of wire can form an **electric current**

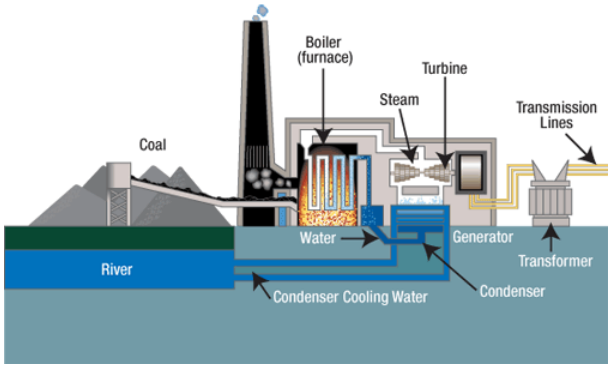
Devices	How Magnetism and Electricity are Interrelated	
Electromagnets	A wire in an electric circuit is wrapped around an iron core. The magnet loses its magnetism if the electric current stops flowing.	
Generators	When a coil of wire wrapped around an iron core is rotated near a magnet, it produces an electric current. **Generators** at power plants produce electric current for our homes. A generator contains coils of wire that are stationary, and rotating magnets are rotated by **turbines**. **Turbines** are large wheels that rotate when pushed by water, wind, or steam. **Mechanical** energy is changed into **electrical** energy by a generator. Small generators can be gasoline powered.	
Simple Electric Motors	An **electric motor** changes **electrical** energy to **mechanical** energy. It contains an **electromagnet** that rotates between the poles of a magnet. The coil of the electromagnet is connected to a battery or other source of electric current. When an electric current flows through the wire in the electromagnet, a magnetic field id produced in the coil. Like poles of a magnet repel and unlike poles attract. This causes the coil to rotate and thus changes electrical energy to mechanical energy. This rotating coil of wire can be attached to a shaft and a blade in an electric fan.	

Electrical Energy can be transformed into other forms of energy in a circuit.

An **electric circuit** contains: a source of energy, a conductor of electrical energy (wire) connected to the energy source, and a device that transforms the electrical current. All these components must be connected in a complete, unbroken path in order for energy transformations to occur. The electrical energy in circuits may come from: stored chemical energy from a battery, light energy from a solar cell.



A **generator** in a circuit can change **mechanical** motion into **electrical** energy. The transformation in this case might be that **chemical** energy from the fuel at a power plant is transformed into **heat** energy which is transformed into **mechanical** energy to turn a **generator**. The **generator** transforms the **mechanical** energy into **electrical** energy. This is the source of energy in **electrical outlets**.



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