

Matter & Energy

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Types of Energy

- There are eight types of energy
 - Electrical energy
 - Light energy
 - Sound energy
 - Kinetic energy
 - Thermal energy
 - Gravitational energy
 - Elastic energy
 - Chemical energy

Energy can exist in different forms.

Look at the list of energy forms below and try to find examples of each.

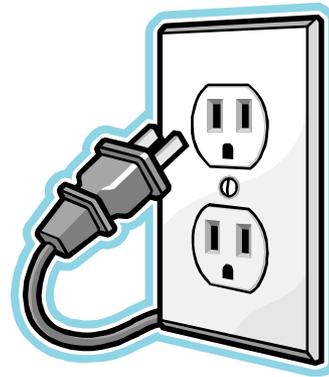
Energy type	Examples
Thermal	
Light	
Sound	
Elastic	
Gravitational	
Kinetic	
Electrical	
Chemical	
Nuclear	

Here are some answers:

Energy type	Examples
Thermal	hot water, a hot radiator
Light	light bulbs, Bunsen flame
Sound	talking, TV, radio
Elastic	a door closer, clockwork toys
Gravitational	a book on a high shelf, a flying ball
Kinetic	anything that is moving
Electrical	anything electrical
Chemical	food, batteries, burning things
Nuclear	nuclear bombs, and power stations

Electrical Energy

- Current flow of electrons
- Easily converted into other forms



Light Energy

- Anything LUMINOUS



Sound Energy

- Anything NOISY



Kinetic (Movement) Energy

- Anything that MOVES



Thermal (Heat) Energy

- Anything with a temperature above **ABSOLUTE ZERO** has heat energy. The hotter something is the more heat energy it has



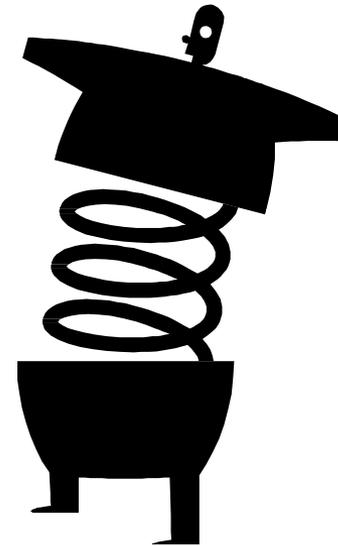
Gravitational Potential Energy

- Anything that is **ABOVE THE GROUND** has potential energy



Elastic Energy

- Anything **STRETCHED** elastic energy
 - Rubber bands
 - Springs
 - Knicker elastic



Chemical Energy

- Anything with **STORED ENERGY** which can be released by chemical reactions
 - Food
 - Fuels
 - Batteries



Energy can be changed from one form to another.

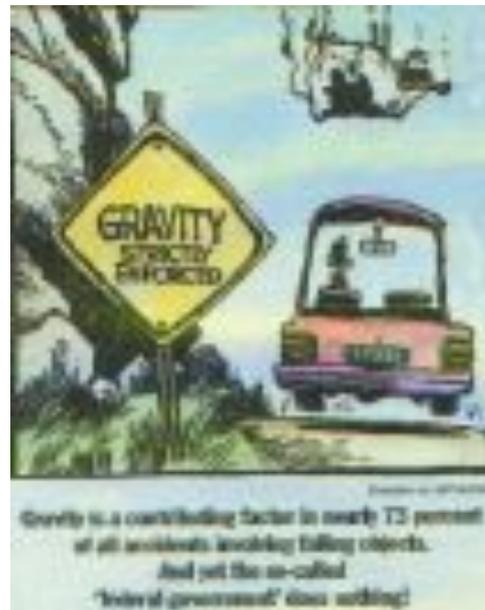
Examples:

Chemical energy in food is converted to thermal energy and kinetic energy by our bodies.

Gravitational energy in a ball is converted to kinetic energy when it falls to the ground.

Transfer of Energy

- Gravitational to Kinetic



Transfer of Energy

- Sound to Electrical



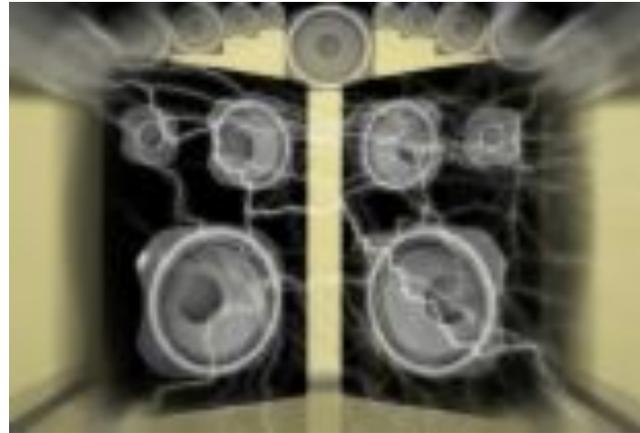
Transfer of Energy

- Light to Electrical



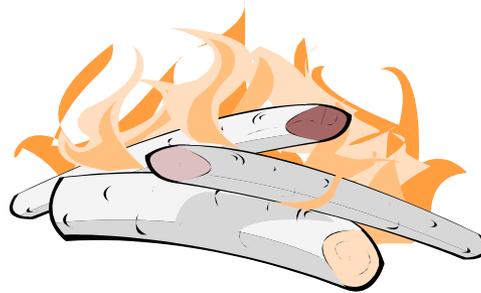
Transfer of Energy

- Electrical to Sound



Transfer of Energy

- Chemical to Heat or Light



Transfer of Energy

- Kinetic to Electrical



Transfer of Energy

- Chemical to Heat, Kinetic or Chemical



Transfer of Energy

- Electrical to Heat or Light



Transfer of Energy

- Chemical to Electrical to Heat and Light



Suggest the energy transfer for the devices below:

A match burning	chemical to <u>heat</u> and light
A portable torch	chemical to heat and <u>light</u>
A microphone	sound to electrical
A radio	electrical to <u>sound</u> and heat
A TV	electrical to <u>sound</u> and <u>light</u> and heat
A catapult	elastic to <u>kinetic</u> and heat
A mobile phone	chemical to <u>sound</u> and <u>microwaves</u> (EM radiation) and heat
A car	chemical to <u>kinetic</u> & sound & heat

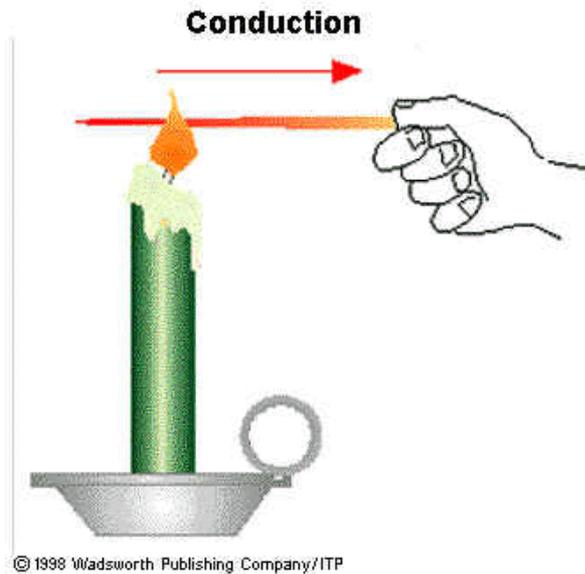
In all these transfers, energy is conserved.
Energy cannot be destroyed or created.

Transfer of Energy

- Heat is transferred only if there is a Temperature Difference
 - Transferred in three distinct ways

Transfer of Energy

- Conduction of Heat
 - Vibrating particles pass on extra vibration energy to neighboring particles



Transfer of Energy

- Convection of Heat
 - Heated stuff moves in bulk to a cooler region and takes the heat with it



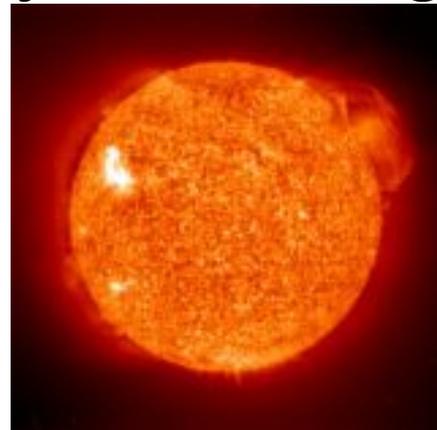
Transfer of Energy

- Radiation of Heat
 - All hot objects radiate heat to the surroundings by invisible heat waves.
 - This heat can travel across a vacuum



Energy Resources

- The sun is the source of all these energy resources.
- The sun's energy reaches Earth and is converted into many forms which we then convert to supply our energy demands



Energy Transfer Chains

- Sun energy to Light energy to Photosynthesis to Dead Plants to **FOSSIL FUELS**



Photo credit:
American Coal Foundation

Energy Transfer Chain

- Sun energy to Light energy to Plants to Photosynthesis to BIOMASS



Energy Transfer Chain

- Sun energy to Energy heating the atmosphere causing WIND



Energy Transfer Chain

- Sun energy to Energy heating the atmosphere causing WIND to causing WAVES



Energy Transfer Chains

- Sun energy to heating the earth which causes **CHEMICAL REACTIONS** used in making **CHEMICAL BATTERIES**

