

Energy

What are potential and kinetic energy?



First some review...

- ✦ What is energy?
- ✦ Write down as many forms of energy as you can think of.

Energy...

- ✦ A property of all matter
- ✦ Usable power/the ability to do work

What is Mechanical Energy?

- Energy due to a object's motion (kinetic) or position (potential).

The bowling ball has mechanical energy.

When the ball strikes the pins, mechanical energy is transferred to the pins!



Examples of Mechanical Energy



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- ✦ Skiing downhill (kinetic)
- ✦ Rollercoaster at the top of a hill (potential)
- ✦ Rocket launch (kinetic)

What is Electromagnetic Energy?



- Light energy

- Includes energy from gamma rays, xrays, ultraviolet rays, visible light, infrared rays, microwave and radio bands



Examples of Electromagnetic Energy



○ Microwave ovens

○ Lights

○ Cell phones

○ X-ray machines



What is Electrical Energy?

- Energy caused by the movement of electrons
- Easily transported through power lines and converted into other forms of energy



What is Chemical Energy?



- **Energy that is available for release from chemical reactions.**

The chemical bonds in a matchstick store energy that is transformed into thermal energy when the match is struck.

Examples of Chemical Energy



- **Fossil fuels**
- **Batteries**
- **Food**

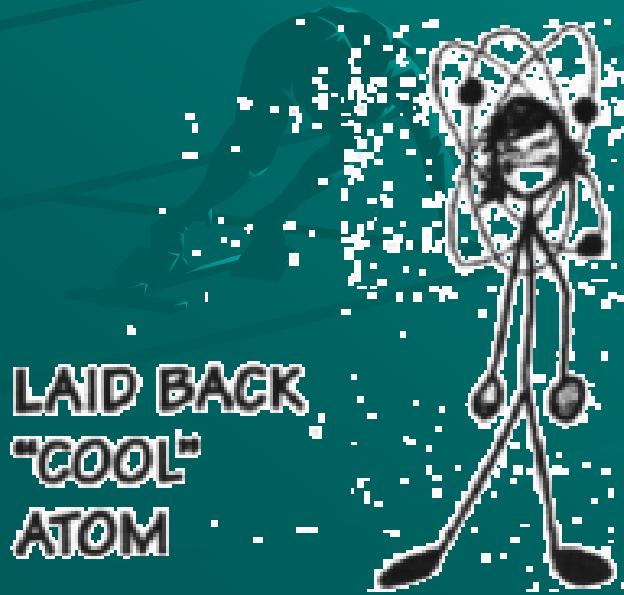


What is Thermal Energy?



EXCITED
"HOT"
ATOM

- Heat energy
- The heat energy of an object determines how active its atoms are.

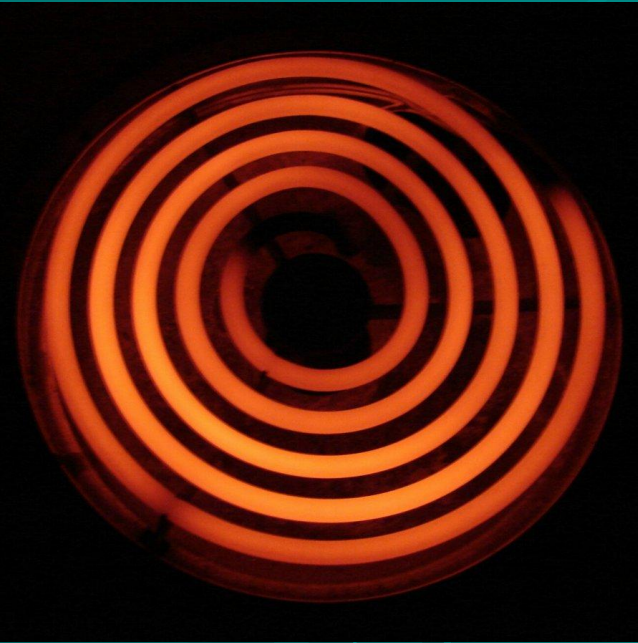


LAI D BACK
"COOL"
ATOM

A hot object is one whose atoms and molecules are excited and show rapid movement.

A cooler object's molecules and atoms will show less movement.

Examples of Thermal Energy

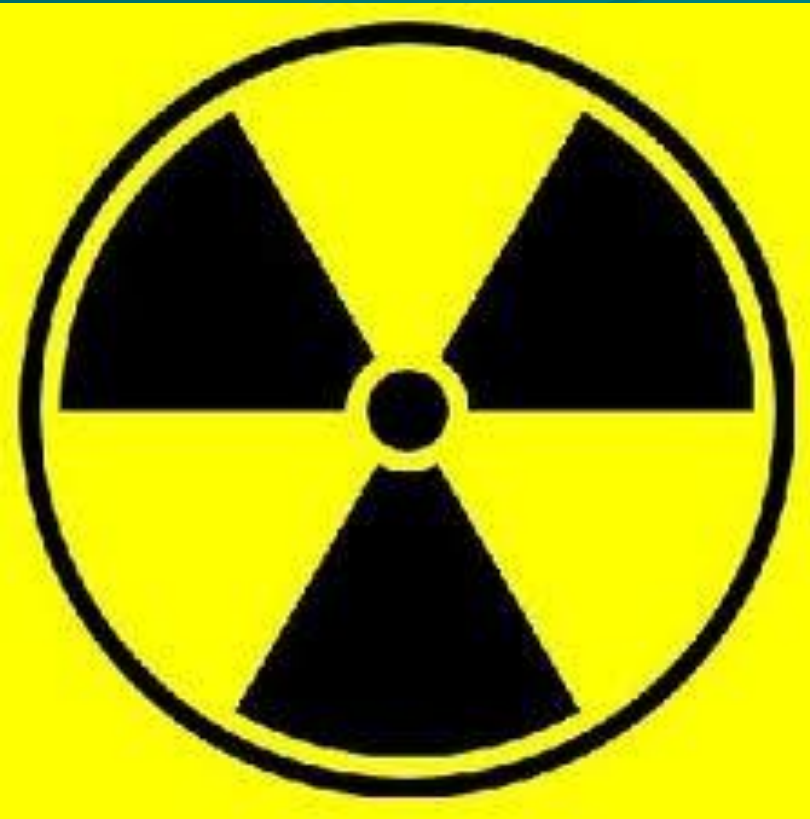


- Stove burner
- Geothermal springs
- Heat moves from warmer objects to cooler objects



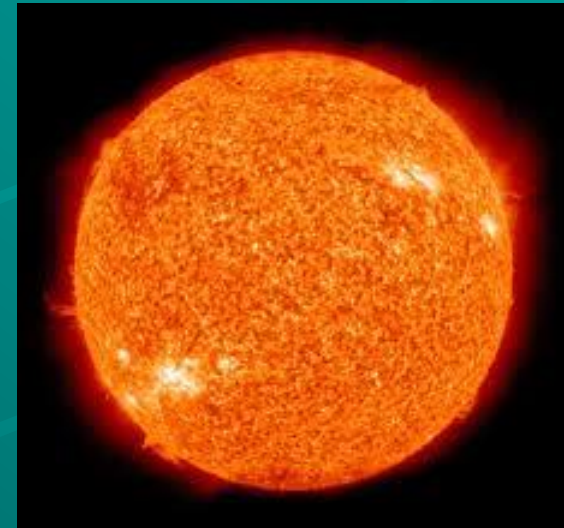
What is Nuclear Energy?

- **Atomic energy**
- **The energy in the nucleus of an atom; released during fusion (come together) or fission (split).**



Examples of Nuclear Energy?

- Nuclear Power Plants
- Atomic Weapons
- Sun



Energy Conservation

- ✦ Energy can never be lost or destroyed, only transformed into different forms.



- ✦ Ex: lighting a match...the mechanical energy of the burning match is transformed into light energy, heat energy, and sound energy

Energy Conservation

- ◆ Energy in a system can change from one form to another.
- ◆ System - a set of parts that are connected in some way.
- ◆ Ex: A car engine has many parts that changes and transfers energy from the gasoline tank to the wheels.



Types of Mechanical Energy

✦ Kinetic Energy: the energy of motion

- Kinetic comes from kinetos (Greek for 'moving')



✦ Potential Energy: stored energy because of position

- Potential comes from potencial (Old French for 'possible')



Definitions

- ✦ **Mechanical Energy:** the total kinetic and potential energy of an object
- ✦ Ex: a roller coaster at the top of a hill has no kinetic energy but a lot of potential energy
- ✦ Ex: a roller coaster in the middle of a hill has some kinetic energy because it is moving and some potential energy because it still has room to fall



A Roller Coaster

A roller coaster speeds along its track. It has kinetic energy because it is moving.

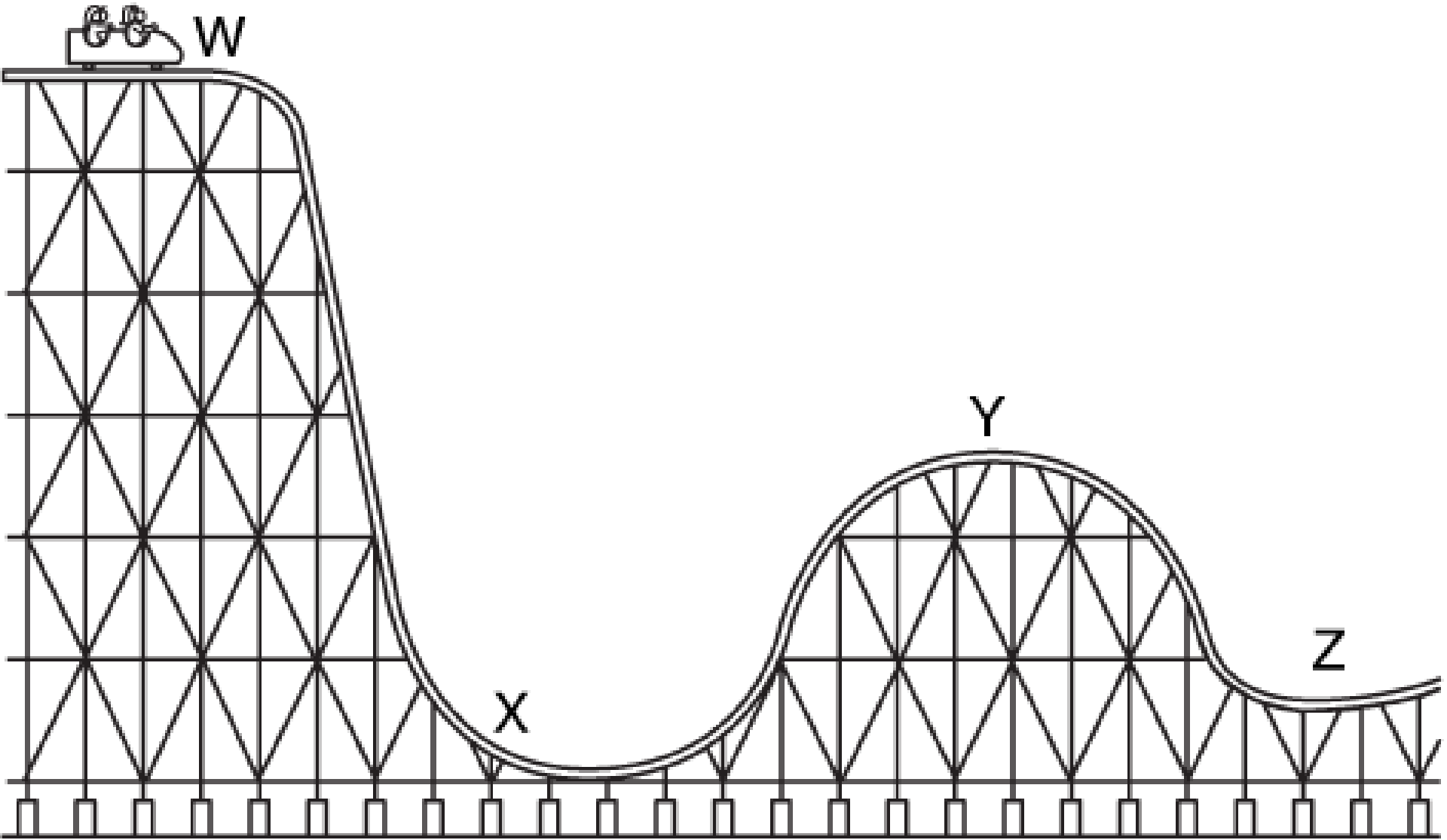




A Roller Coaster

As it slows to a stop at the top of a hill, it has potential energy because of where it is....it is above the ground and has somewhere to go.

Potential vs. Kinetic Energy



Kinetic or Potential Energy?



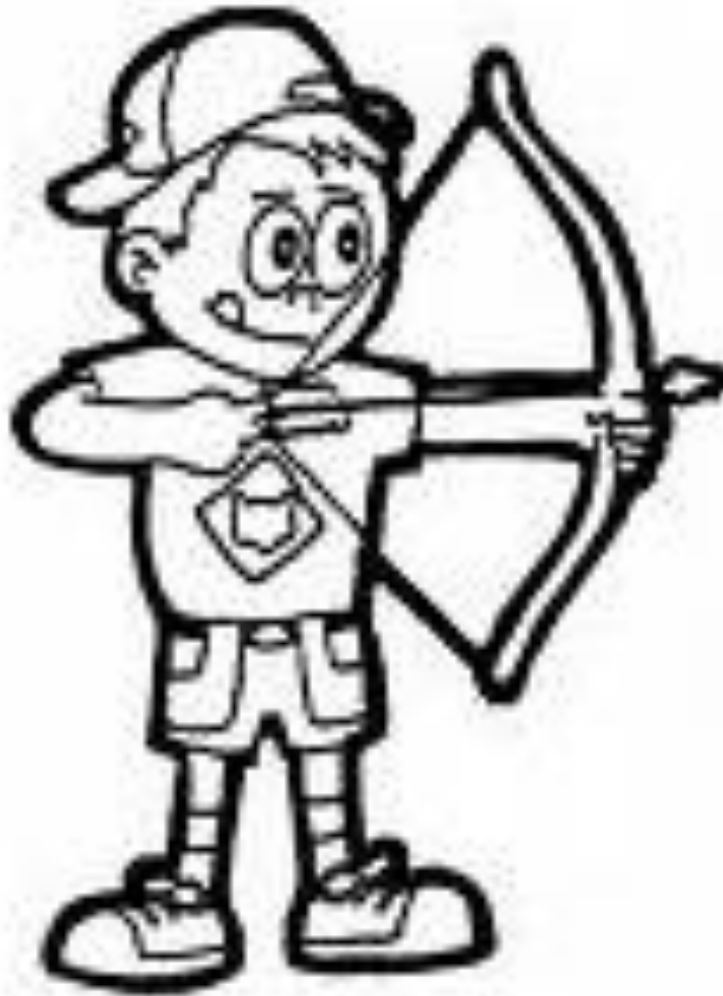
Kinetic or Potential Energy?



Kinetic or Potential Energy?



Kinetic or Potential Energy?



Potential vs. Kinetic Energy

✦ http://www.teachersdomain.org/asset/mck05_int_rollercoaster/

