

Energy Transformation Lab



Lab Response Page

- You will fill in the blanks with the energy form that matches that object.
- Use thermal instead of heat and radiant instead of light.
- You may double check your energy forms by using your journal
- You must finish the lab today!

Expectations

- There are 15 stations
- You will move independently through these stations.
- Please wait your turn, some stations may take longer than others.
- Remember, if you are not on task, I may ask you to sit down and you will lose points on the lab grade.

Two stations

- On two stations, we will do these as a class.
- This is how we will start the lab
- First the microwave and then the wind turbine.
- You **WILL NOT** touch these after we have completed them!

A night landscape featuring a city skyline with numerous lights at the bottom. A bright purple lightning bolt strikes vertically down the center of the frame from a dark, stormy sky. The text is overlaid on the upper and middle portions of the image.

Energy Transformation Lab

Let's examine each station a little more closely!!

Grading the Lab

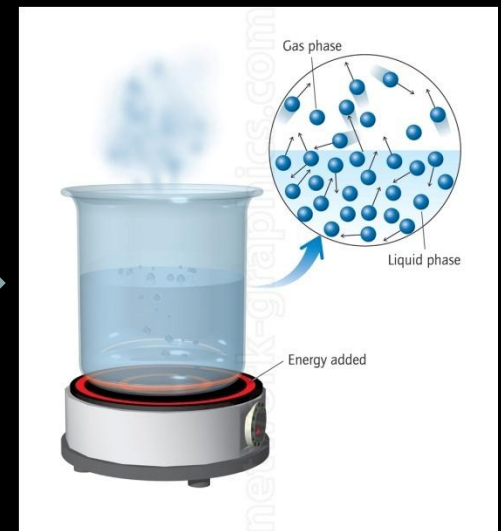
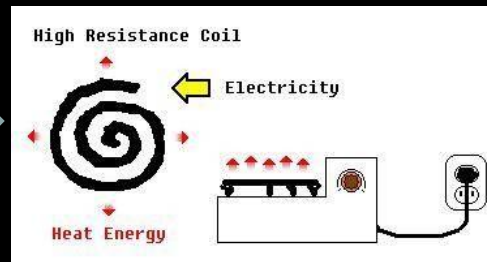
- Make sure your name is on your lab response page.
- You need a red pen and to trade with a neighbor.
- Each blank is worth 1 question.
- When we are finished, write how many that student missed at the top of the page.
- Make sure that lab page is given to Mrs. Thomas!

Hot plate



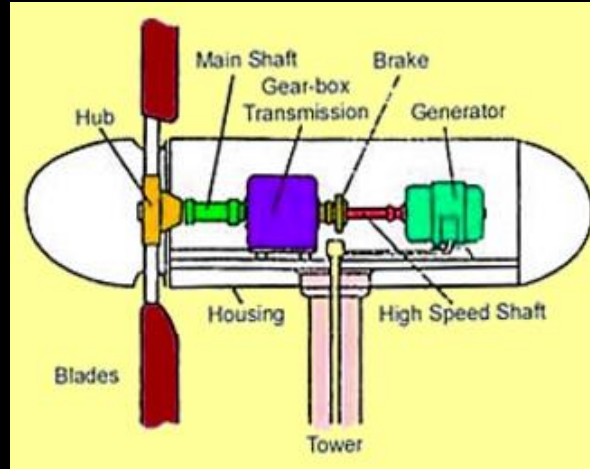
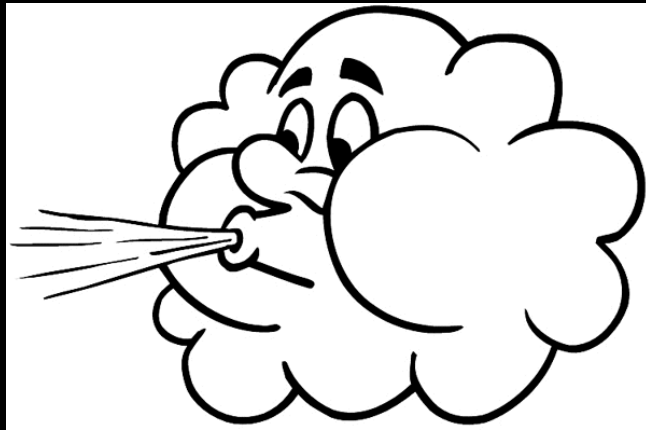
A hot plate transforms electrical energy into heat (thermal energy). This energy is then transferred to the object on it (a beaker usually) by conduction.

The energy transformation is:



Wind Turbine (with light bulb)

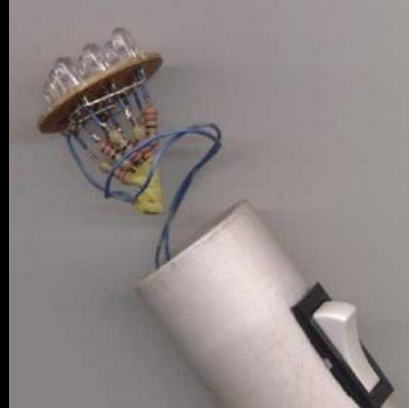
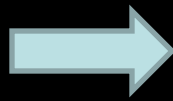
- Energy transformation is:



Wind(mechanical) → turbine spins(mechanical)
→ electrical → radiant

Flashlight

Energy transformation is:



Chemical

Electrical

Radiant

Desk Lamp

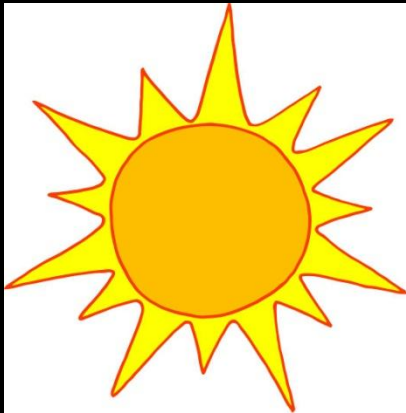
- Energy transformation:



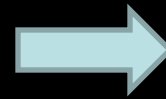
- Electrical  Radiant

Solar calculator

- A solar powered calculator uses solar cells as its power supply.
- That solar panel on the calculator recharges the batteries. What happened in our lab???



or

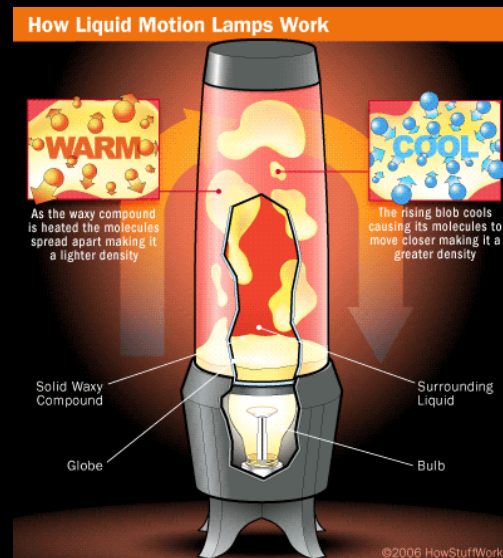


Radiant

Electrical

Lava lamp

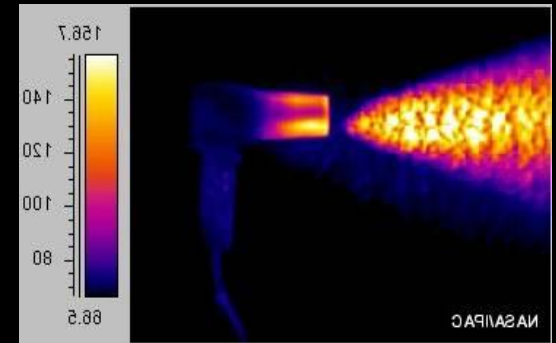
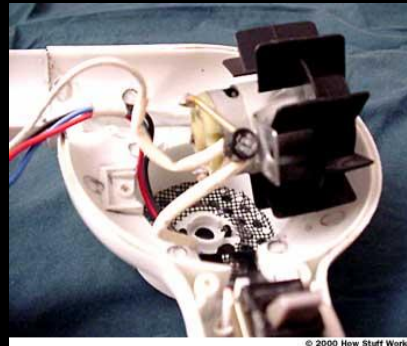
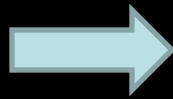
- Lava lamps are made of two liquids, colored wax in colored water. The light bulb heats up and the liquids change densities as they warm up. As heated liquid cools, it falls back down. It is reheated by the bulb and the cycle continues.



- electrical → radiant and thermal → convection

Hair Dryer

Energy Transformation is:



Electrical

Mechanical

Thermal

Fan

- Electricity comes to the fan and powers the motor. The motor is what turns the fan blades.
- The energy transformation is:



Electrical



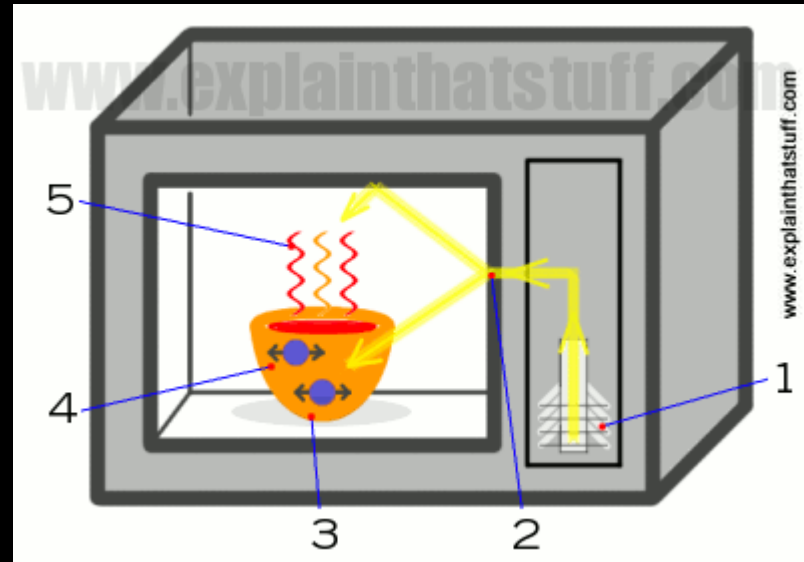
mechanical



mechanical (wind)

Microwave

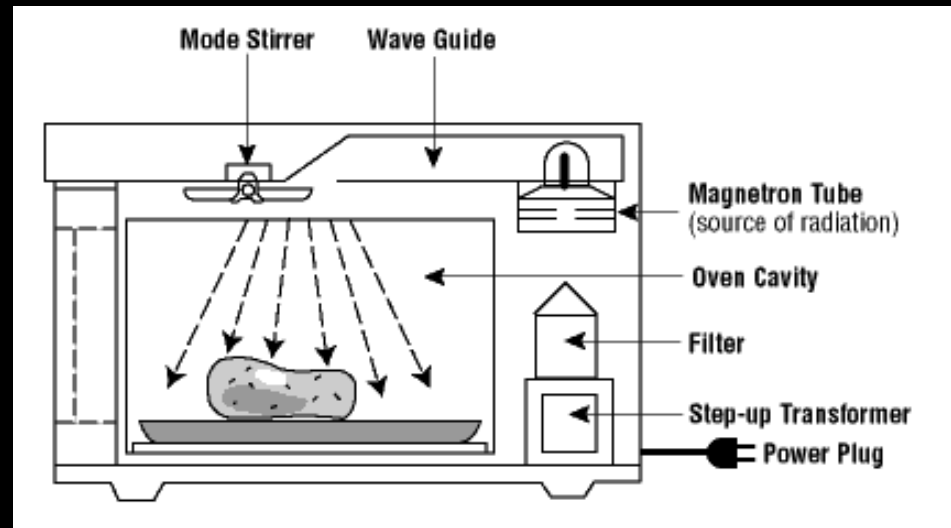
- The energy transformation is:



- Electrical \longrightarrow Radiant \longrightarrow Thermal

How a microwave oven works

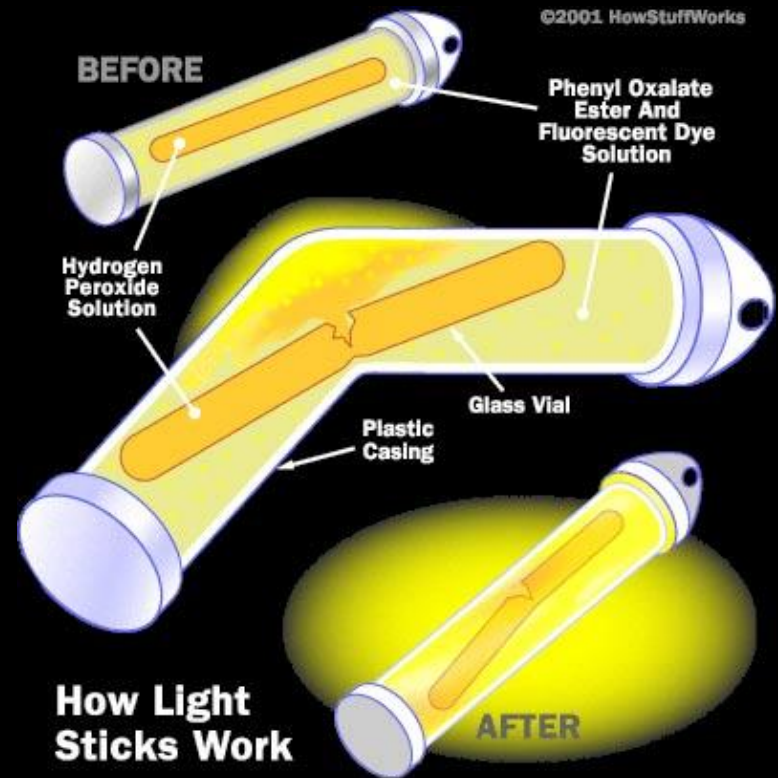
- In a microwave oven, food is cooked by exposing it to microwave radiation. The source of the radiation in a microwave oven is the magnetron tube.
- The microwave energy from the magnetron is transferred to the oven. A mode stirrer spreads the microwave energy throughout the oven.
- The microwave radiation produces heat inside the food in the oven. Heat is produced when the water molecules in the food vibrate from the microwave radiation. The movement of the molecules produce friction which causes heat. This heat cooks or warms up the food.



What is a glow stick made of?

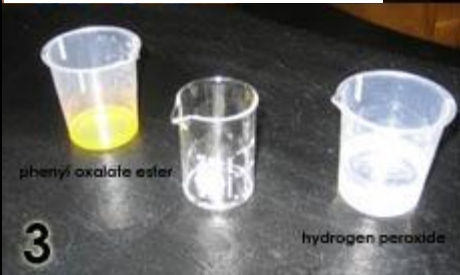
When you bend the plastic stick, the glass vial snaps open, and the two solutions flow together.

The chemicals immediately react to one another, and the atoms begin emitting light. The particular dye used in the chemical solution gives the light a distinctive color.



Glow stick

Energy Transformation is:



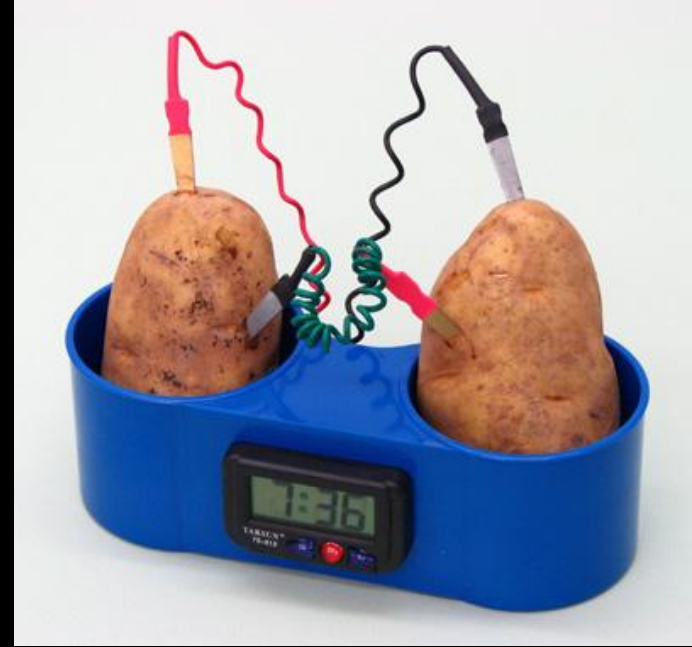
Chemical



Radiant

Potato Clock

- Energy Transformation is:



- The potato is used as the battery to make the clock run. A battery is a type of electrochemical cell that converts chemical energy into electrical energy.

Chemical (Potato)  Electrical

Clapper Toy

The energy transformation is:



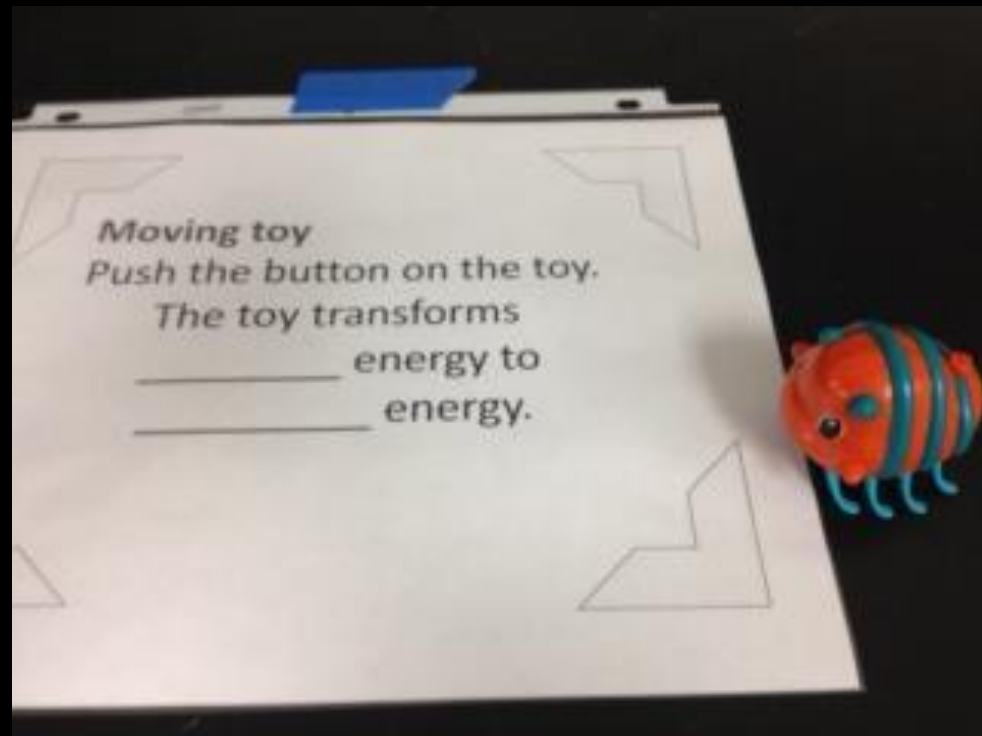
Mechanical (you move it)  mechanical (sound)

Question:

Why is sound energy considered mechanical energy?

Moving Toy

- Energy transformation:



- Mechanical \longrightarrow chemical (battery) \longrightarrow mechanical (it moves)

CD player

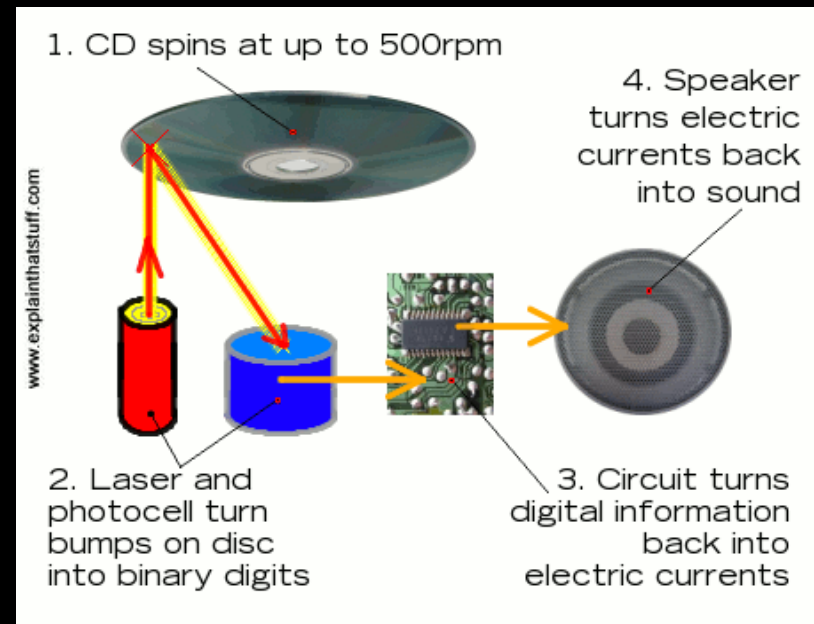
- Sound energy is mechanical energy – but why?
- Sound is vibrating air, which means matter in motion – which is mechanical energy!

Electrical → mechanical → mechanical(sound)



How it really works - CD player

- There is one other step in a CD player that a lot of people don't know about – lasers!



- So the real energy transformation includes lasers. Here it is: electrical \rightarrow mechanical (disc spins) \rightarrow radiant (laser) \rightarrow mechanical (sound)

Radiometer

- Energy transformation:



- Radiant  Mechanical