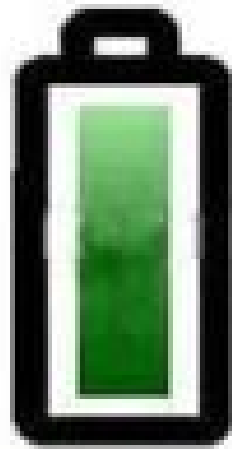
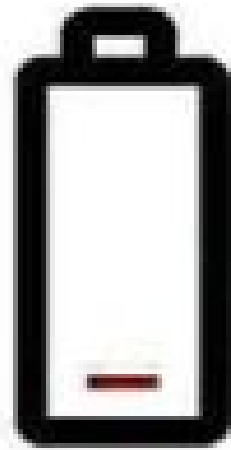


Sources of Potential Difference

Cell phone battery



when I don't
really need it

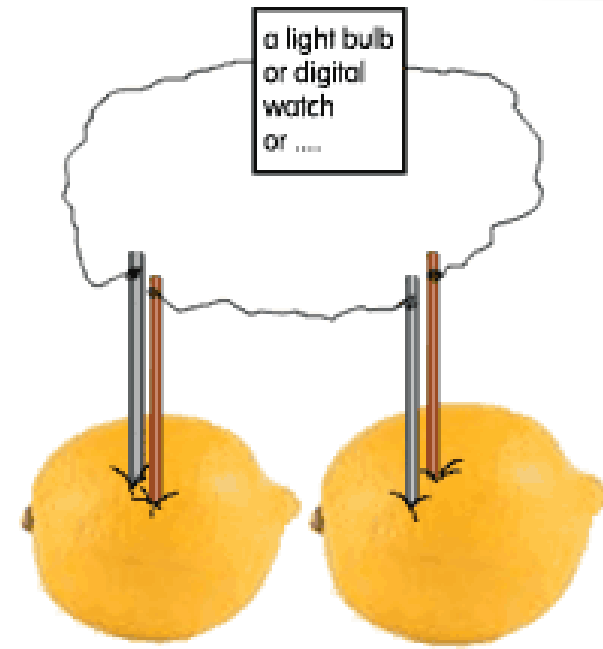
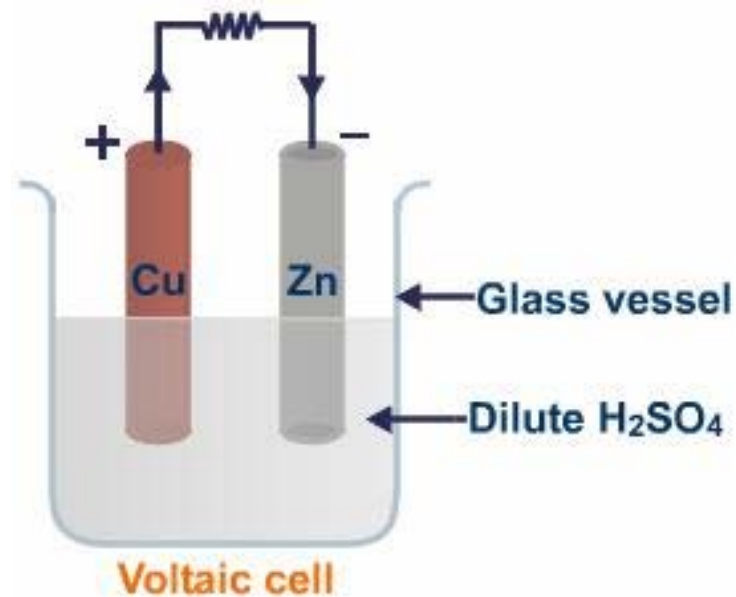


when I really
need it

S1-3-13 Identify the five sources of electrical energy and some associated technologies.
Include: chemical, photo, thermal, electromagnetic, piezo.

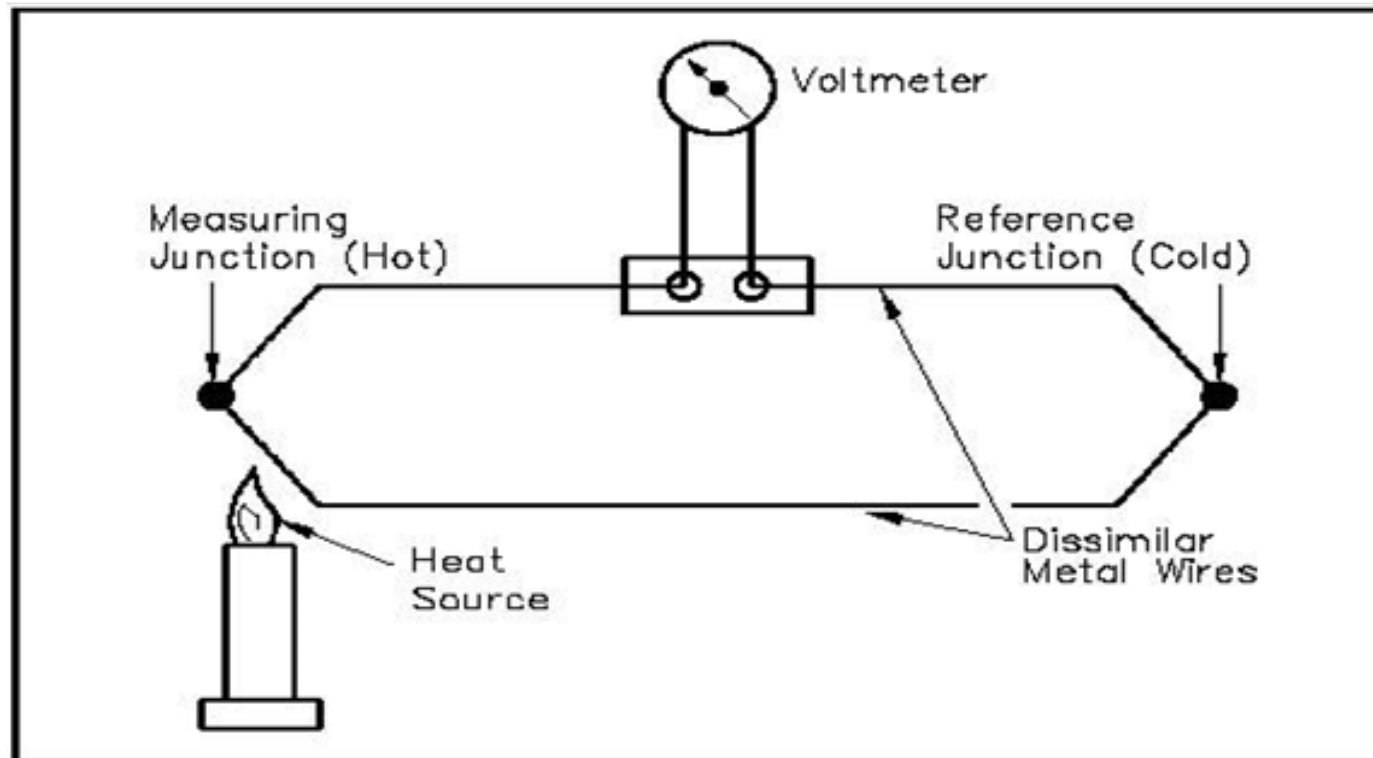
1. Chemical Potential Difference

- Caused by a **CHEMICAL REACTION** between an **ELECTROLYTE** and two **DIFFERENT ELECTRODES**.
- When we connect a wire between the **TERMINALS**, a **CURRENT** is produced.



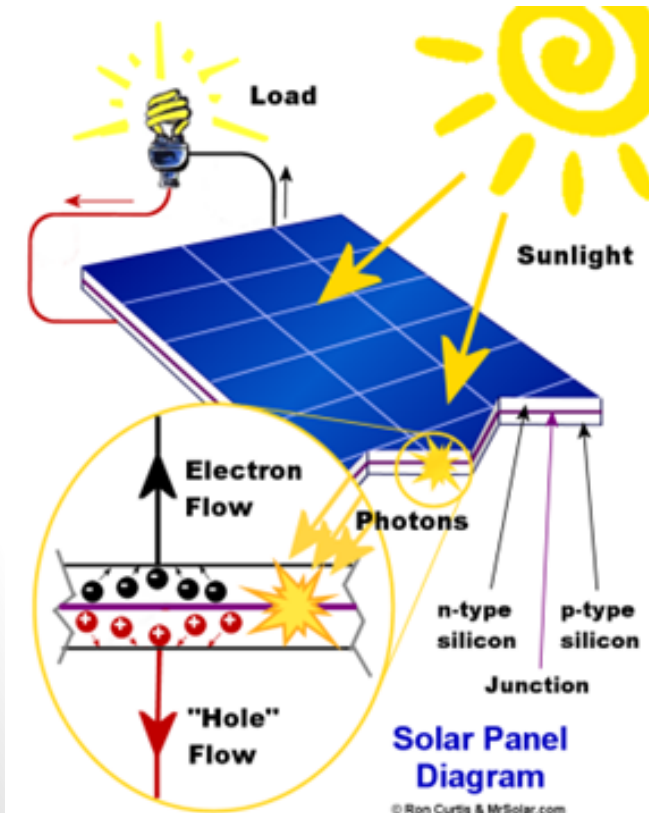
2. Thermal Potential Difference:

- A potential difference can be created when you have a difference in TEMPERATURE. We can transform HEAT ENERGY into ELECTRICAL energy by using a THERMOCOUPLE.
- A THERMOCOUPLE is constructed with TWO WIRES of DIFFERENT MATERIALS attached at the ends (JUNCTIONS). When the junctions are at different TEMPERATURES, a POTENTIAL DIFFERENCE is created



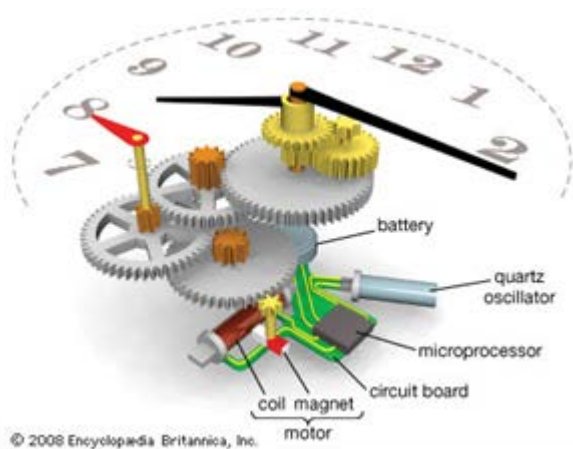
3. Photoelectric Potential Difference:

- A special “cell” called a **PHOTOVOLTAIC CELL** (**SOLAR CELL**) converts **SOLAR ENERGY** into **ELECTRICAL ENERGY**.
- When **LIGHT** hits the cell, it “**EXCITES**” **ELECTRONS**, and they begin to **MOVE** between two materials, causing a **POTENTIAL DIFFERENCE**.
- Solar cells are used in **CALCULATORS**, **CARS**, **SATELLITES**, etc.

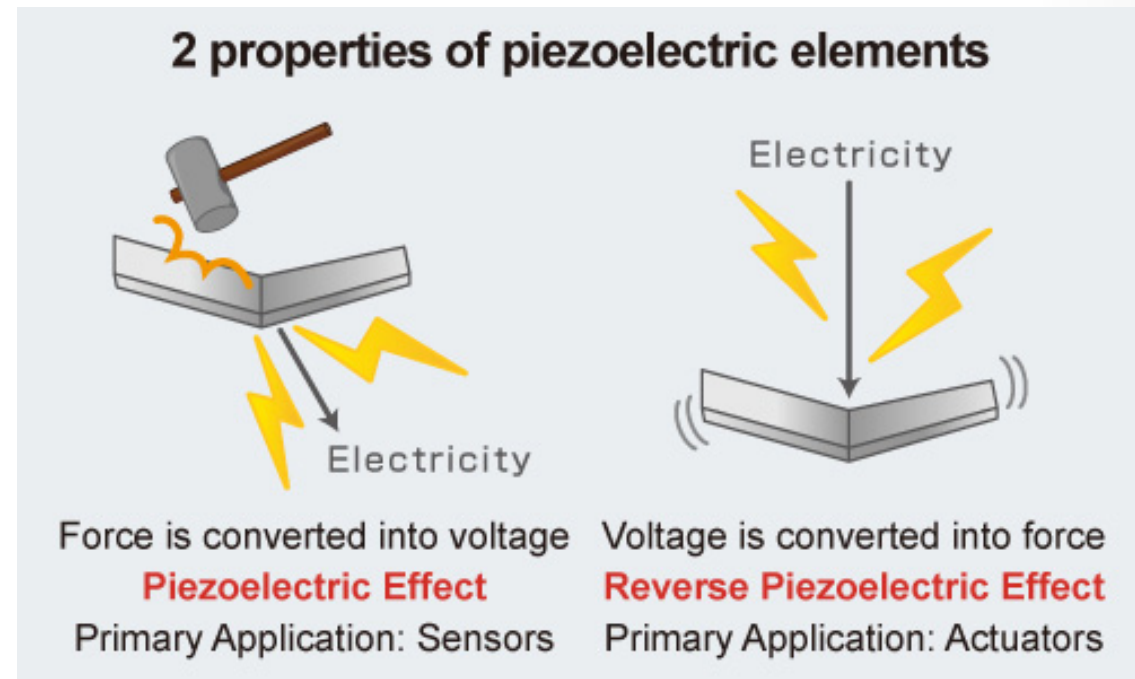


4. Piezoelectric Potential Difference:

- Certain **CRYSTALS** (**QUARTZ**) will produce a small amount of electrical energy when put under **PRESSURE** → **PIEZOELECTRIC EFFECT**.
- More **PRESSURE** = More **ENERGY** → If there is enough energy, a **SPARK** will be produced (Used in **BBQ LIGHTERS**.)
- When **ELECTRICAL** energy is **APPLIED** to this type of **CRYSTAL**, it **VIBRATES**. This is how **QUARTZ WATCHES** keep time.

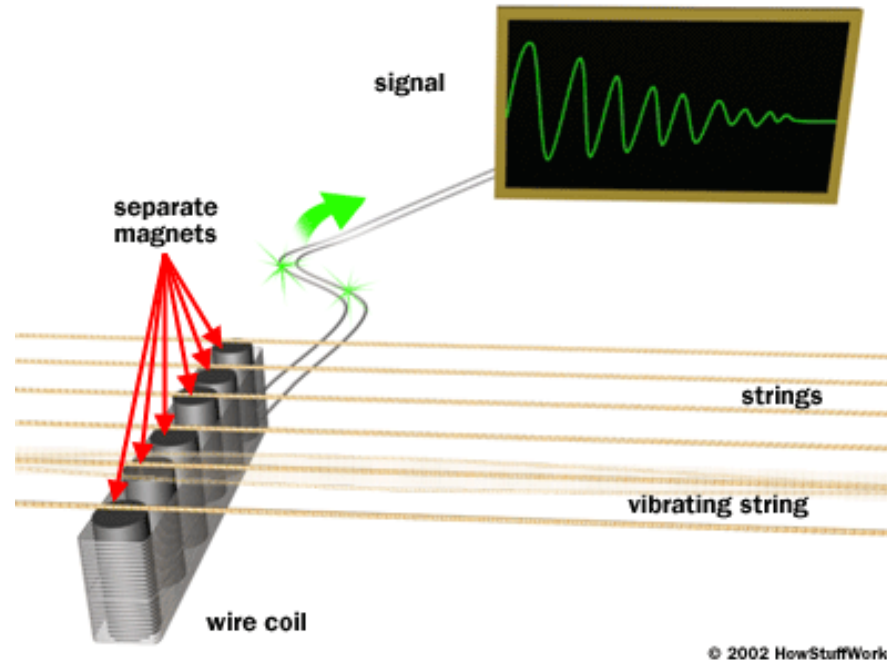
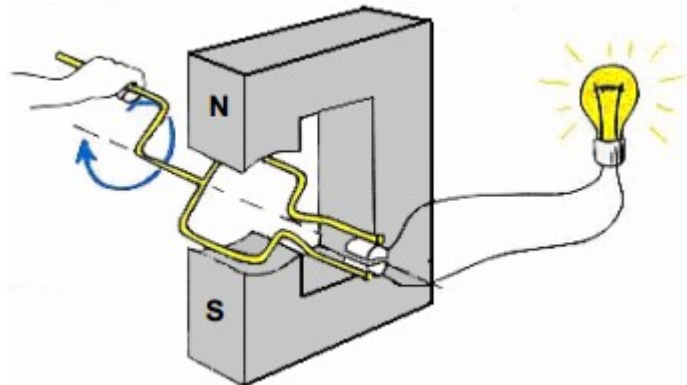
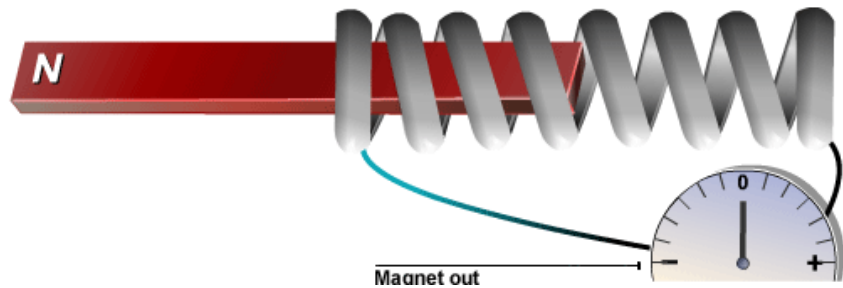


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5. Electromagnetic Potential Difference:

- A **MAGNET** can also be used to produce an electrical **CURRENT**. This is called **ELECTROMAGNETIC INDUCTION**.
- Moving a magnet through a **CONDUCTING COIL** forces **ELECTRONS** to **MOVE**, causing a **POTENTIAL DIFFERENCE**.



How a guitar pickup works