



# WHAT IS ELECTRICITY?

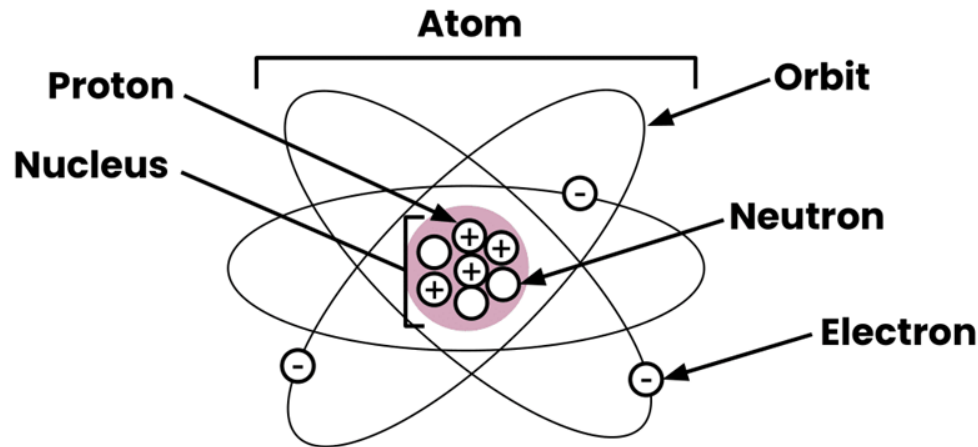
# WHAT IS ELECTRICITY?

- **Electricity** is a form of energy that results from charged particles, which can be carried by wires.
- The smallest particles that exist are atoms.
  - **Atoms** consist of a nucleus, protons, neutrons, and electrons.



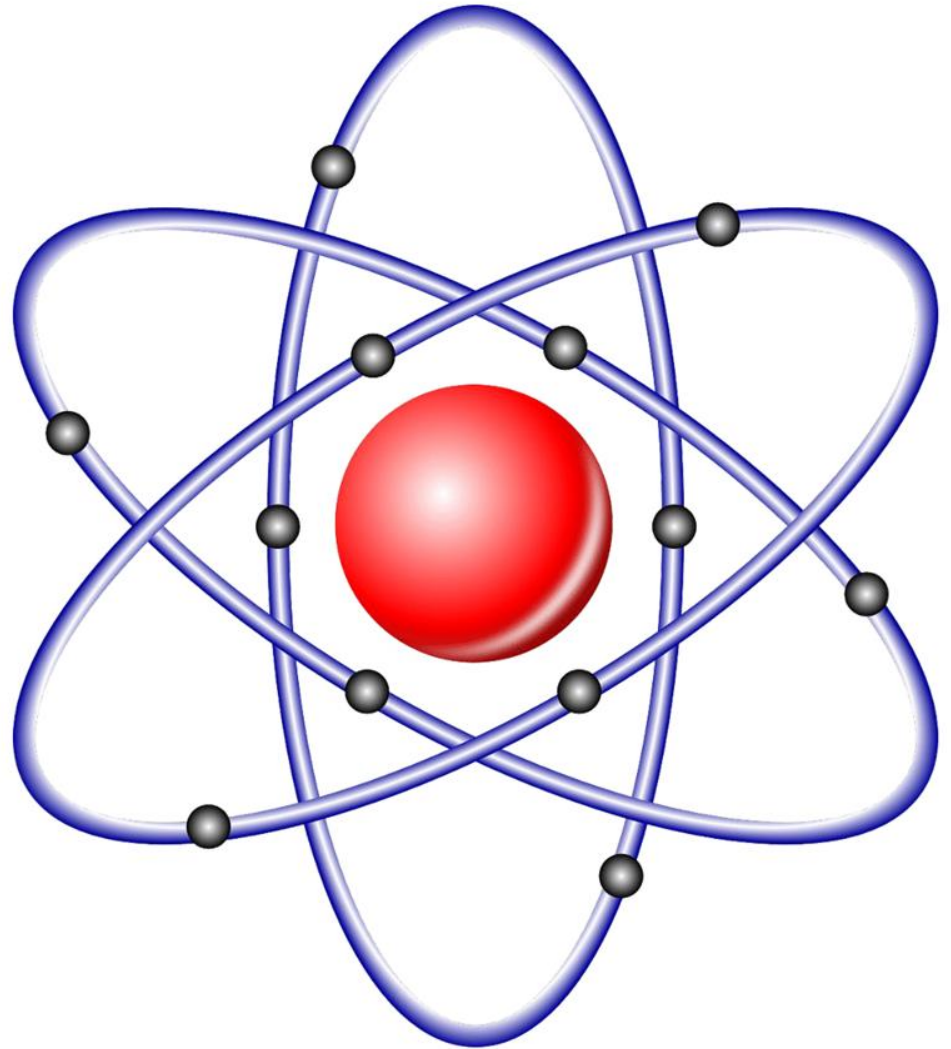
# WHAT IS ELECTRICITY?

- An **electrical charge** is produced when an atom gains or loses an electron.
  - An atom is ordinarily uncharged, but can gain or lose electrons through friction or rubbing together (static electricity).

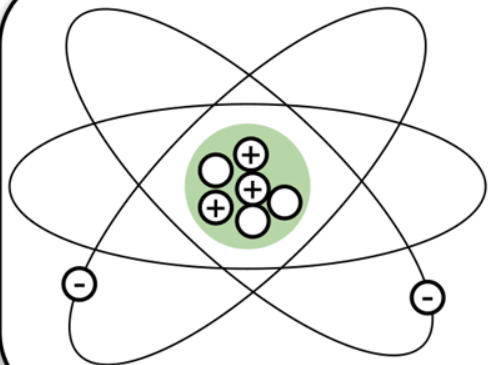




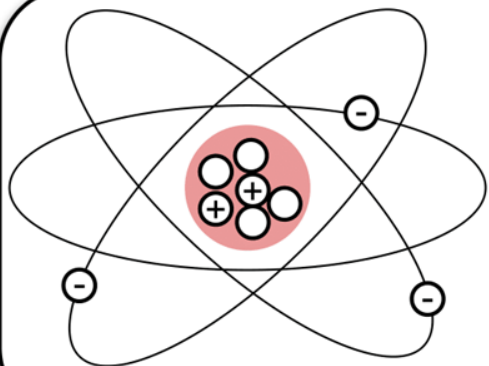
How can you tell if an atom has a positive or negative charge?



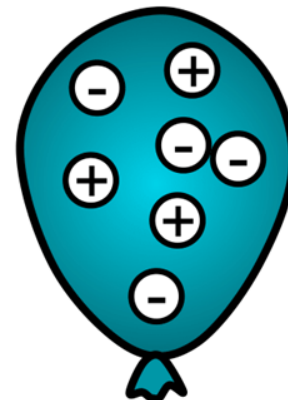
# WHAT IS ELECTRICITY?



A **positive** charge is created when there are more protons than electrons.



A **negative** charge is created when there are more electrons than protons.

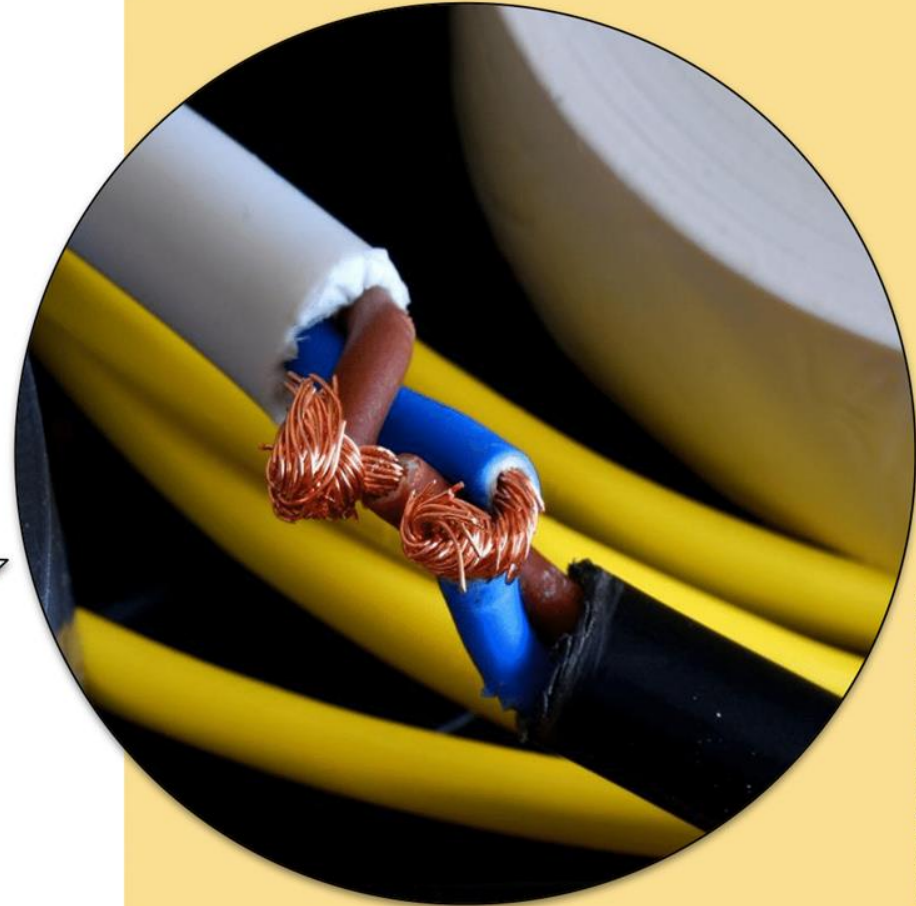


Does this balloon have a negative or positive charge?

# WHAT IS ELECTRICITY?

- Electrical charges can also be moved in a stream or path through conductive materials (current electricity).

What conductive material is in this wire?



# WHAT IS ELECTRICITY?

- Humans have discovered how to create electricity from atoms by forcing electrons to move from atom to atom.
- **Electrical energy** is the movement of electrons through a conductor (any material that can carry electricity).





What  
examples of  
conductive  
materials can  
you think of?



# WHAT IS ELECTRICITY?

- There are also forms of electrical energy that occur naturally:
  - Static electricity
  - Lightning

Have you seen/  
experienced static  
electricity?



# WHAT IS ELECTRICITY?

- **Static electricity** occurs when an object is charged with electrons.

## **Examples:**

- When clothes stick together after being in the dryer
- Lightning is a build up of static electricity, when electrons are discharged from a cloud.

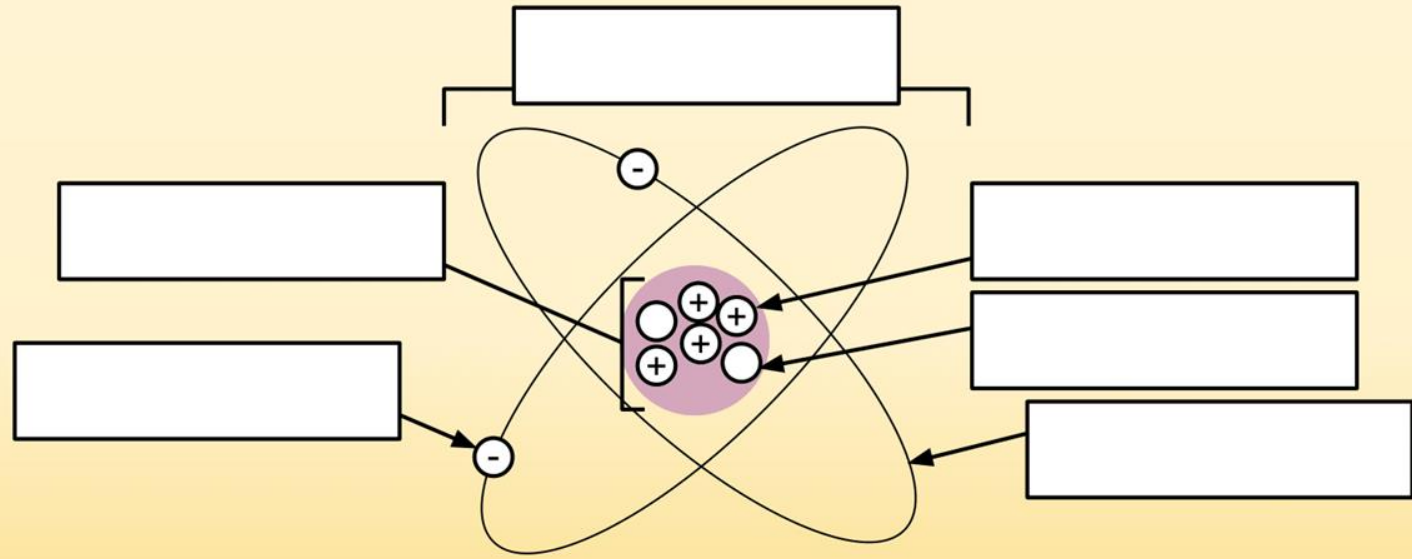
# WHAT IS ELECTRICITY?



- Lightning is a giant static electricity shock.
- The average lightning bolt contains one million **joules** (J) of energy.
  - This is more than enough energy to power a light bulb for over six months!



Drag and drop the text to label the atom below.



Word Bank		
Proton	Orbit	Electron
Nucleus	Neutron	Atom



Think about it!

Define each of the key words below.

Proton	
Nucleus	
Orbit	
Electron	
Neutron	
Atom	

# WHAT IS ELECTRICITY?



- **Electricity** is used to power houses, lights, and electronics.
- Electricity travels through wires to get to your house through the electrical transmission and distribution system, also called the **power grid**.

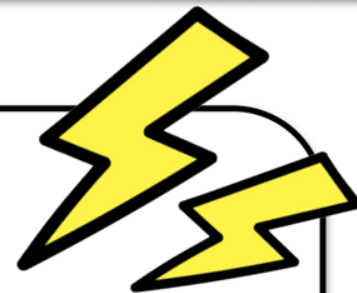
# WHAT IS ELECTRICITY?



- Electricity is a secondary source of energy, which means it is made from a primary source of energy, such as:
  - Petroleum
  - Natural gas
  - Wind power
  - Solar energy
  - Hydroelectric power
  - Geothermal power

# WHAT IS ELECTRICITY?

## ACTIVITY



Divide into 6 equal groups:

Solar	Wind	Hydropower
Nuclear	Geothermal	Tidal Power

- In your groups, research the science behind each form of energy generation and describe at least one pro and con of each source of energy. When you are finished, you will present your findings to your class.

# ELECTRICAL GENERATION



- **Electricity generation** is the process of generating electric power from sources of primary energy.
- One way electricity is generated is in facilities from steam, water, and fossil fuels.
  - When fossil fuels are burned, they heat large boilers of water to generate steam to spin turbines.

# ELECTRICAL GENERATION



- **Turbines** are linked to **generators** which are equipped with **electromagnets**.
  - When the electromagnets rotate rapidly, electrons begin to flow, making an **electrical current**.
- The current is passed along high voltage lines to power stations where the electricity is diverted into small lines to be distributed to different townships.



# ELECTRICAL GENERATION

**Coal-fired  
power station diagram**

