Welcome Back!!

- Please take out a pencil and a notebook.
- In your notes, draw a picture of what is happening when you rub a balloon on your hair.

Static Electricity

This Week

- M: Static Electricity Intro.
- T: Static Electricity Activity.
- W: Intro to Electrical Circuits.
- R: Resistance and Ohms Law.
- F: Circuits in Series and Parallel.

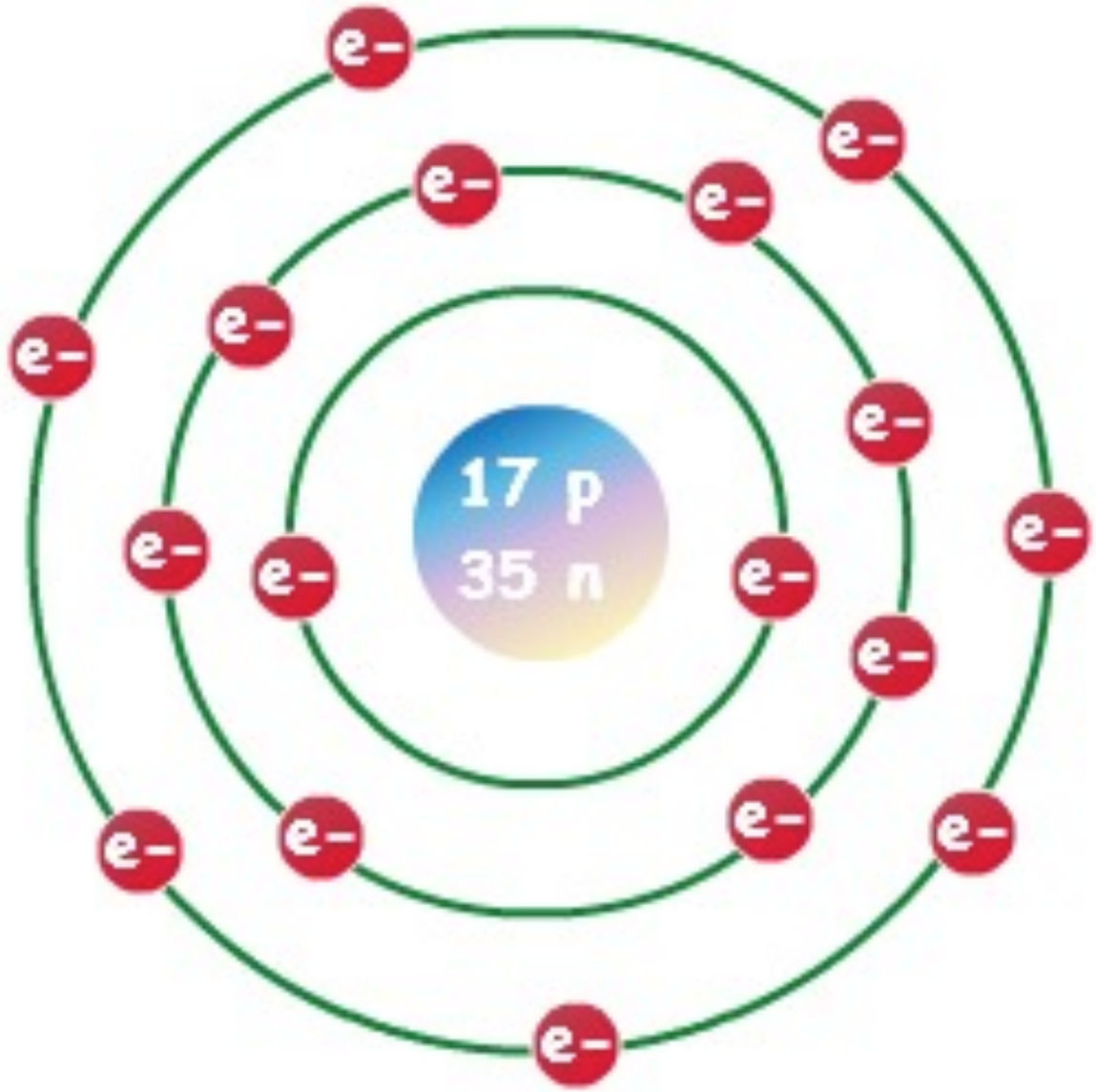
Today

- Basic Terminology and Concepts
- Methods of Charging
- Electrical Force
- Electrical Fields

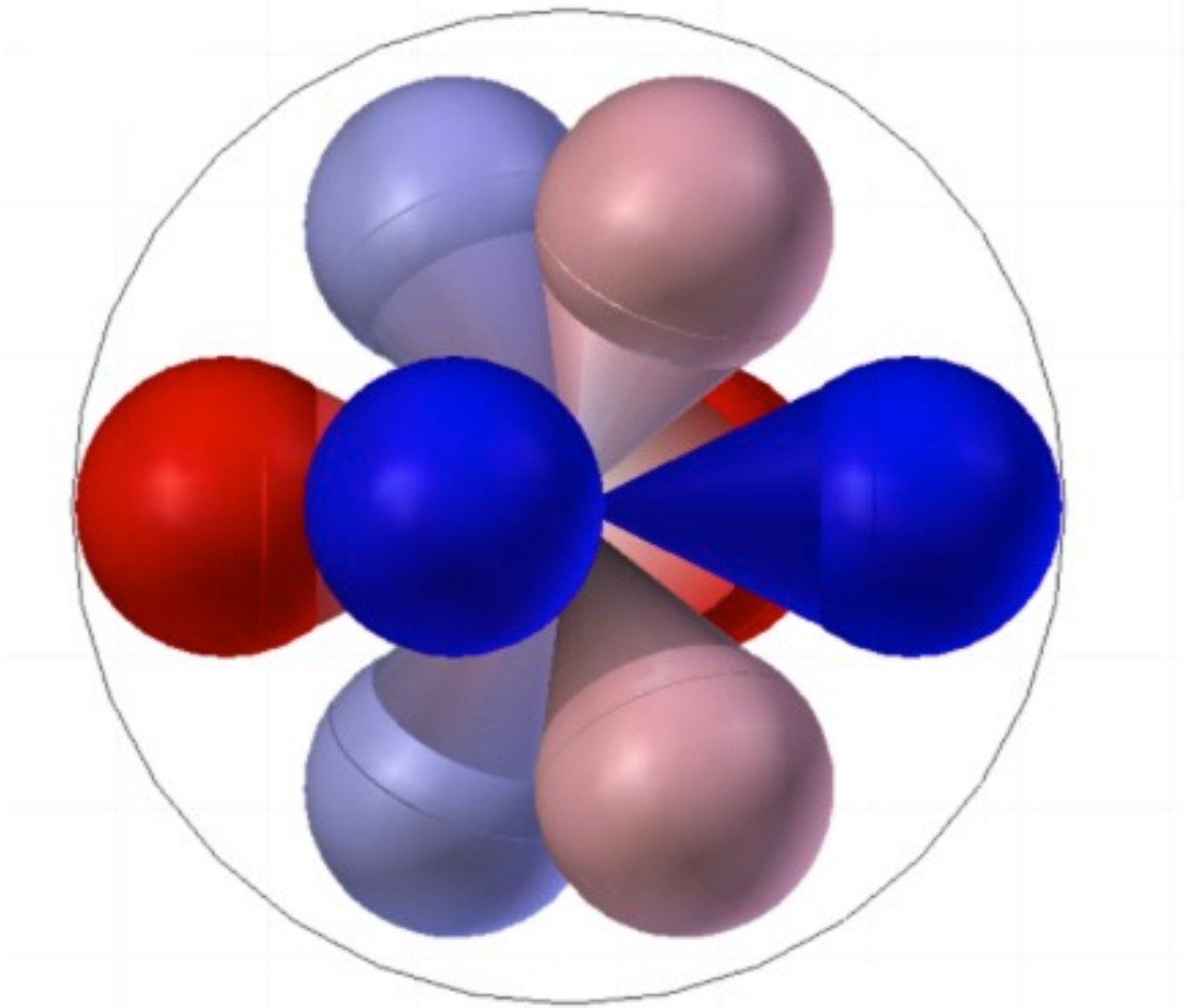
Nature of Charges

- Atomic structure and charged particles.

- Protons:
- Neutrons:
- Electrons:



Bohr Model



Quantum Mechanical Model

Werner Heisenberg

Nature of Electrons

- Very small (negligible) mass when compared to protons and neutrons.
- Negative charge
- We can know the location of an electron or the direction and speed of its movement, but not both.

Searching for Electrons

Charge Migration

- Electrons are weakly bonded to the nucleus of an atom.
- They are always moving and can be removed with relative ease.
- When the number of protons and electrons are not equal in an atom, if has a **net** charge.

Conductors and Insulators

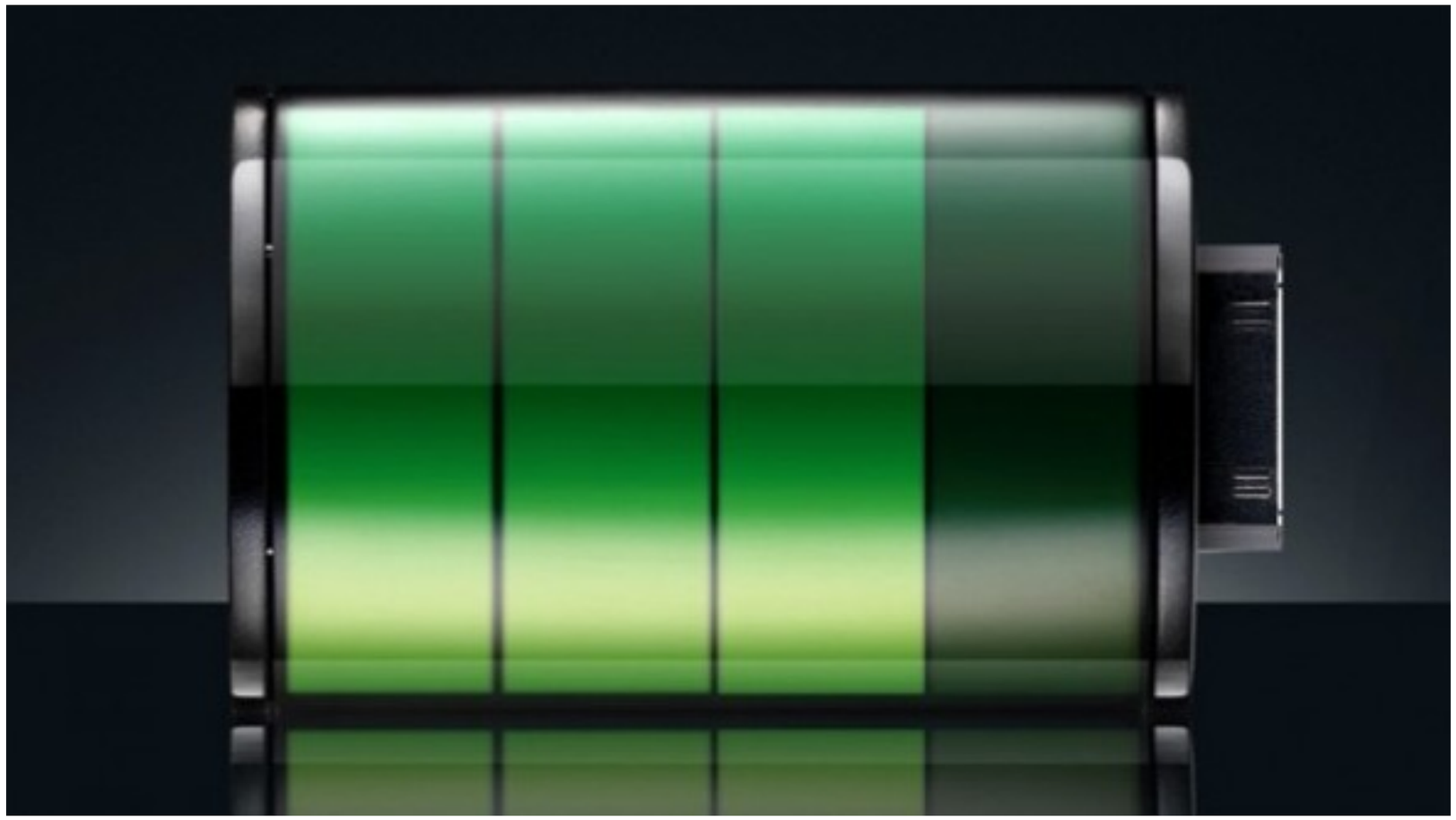
- Some objects are better than others at holding onto or giving away electrons.

- Conductors: materials that move charge easily. (ex: metals)
- Insulators: materials that impede the free flow of electrons. (ex: rubber)

Electric Vocabulary

Charged Particles

- Electrically Neutral: equal charges and distribution of charge.
- Electrically Positive: More protons than electrons.
- Electrically Negative: More electrons than protons.



Charging

Flow of Electrons

- Introduction of energy can persuade electrons to leave the atom.
- These electrons have to go somewhere.
- Take residence in the orbitals of other atoms.

Friction Charging

- Rub 2 different materials together.
- One material has a higher electron affinity (electronegativity).
- This material will tend to take electrons from the other material.

Whimshurst Machine

Induction Charging

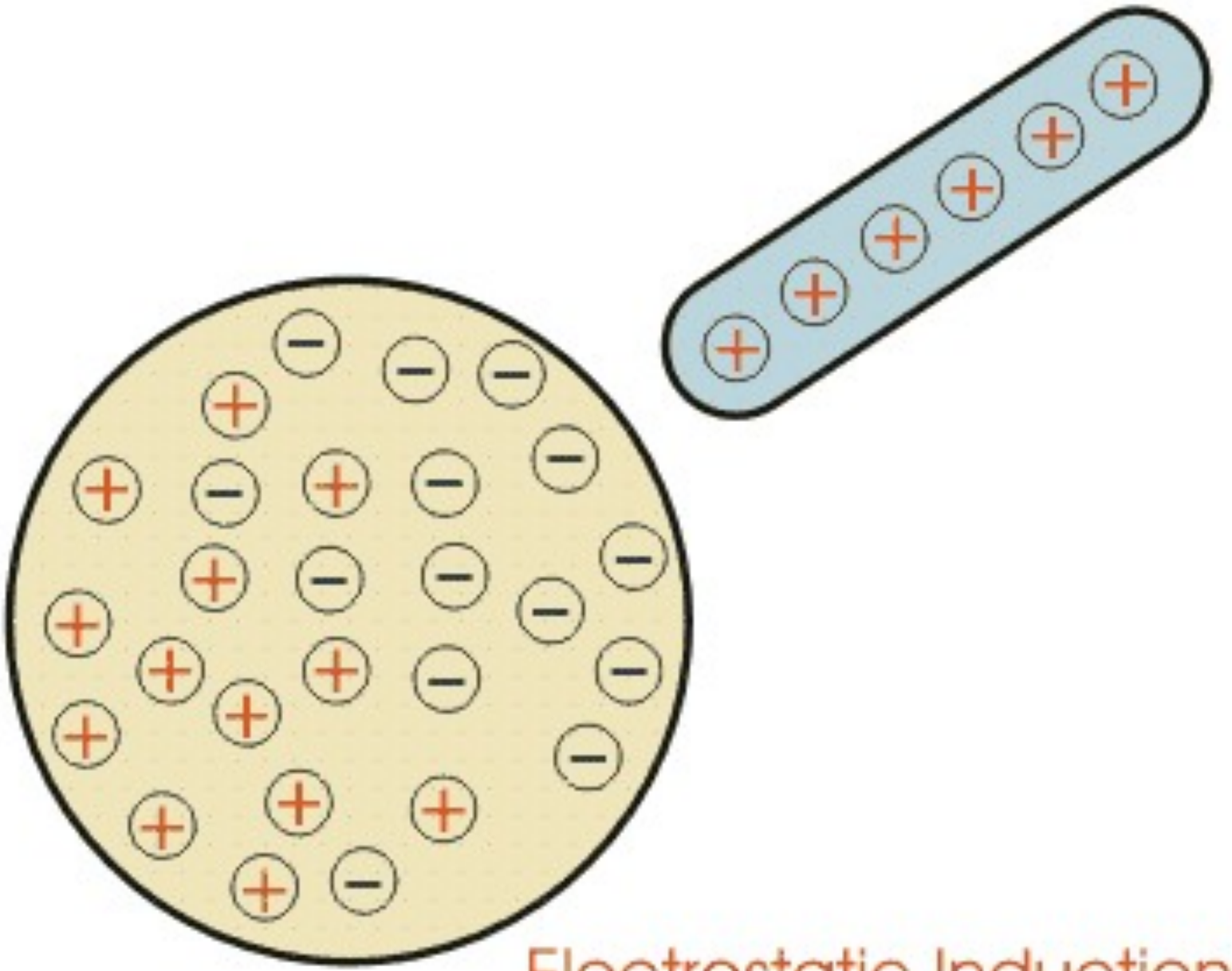
- Charging an object without actually touching it.
- A charged object (A) is placed close to a neutral object (B).
- This causes a charge migration in the neutral object (B).
- If the neutral (B) object can pass some charge to another object(C), the once neutral object (B) is now charged.

Attraction and Repulsion

- Like charges repel one another.
- Opposites attract.

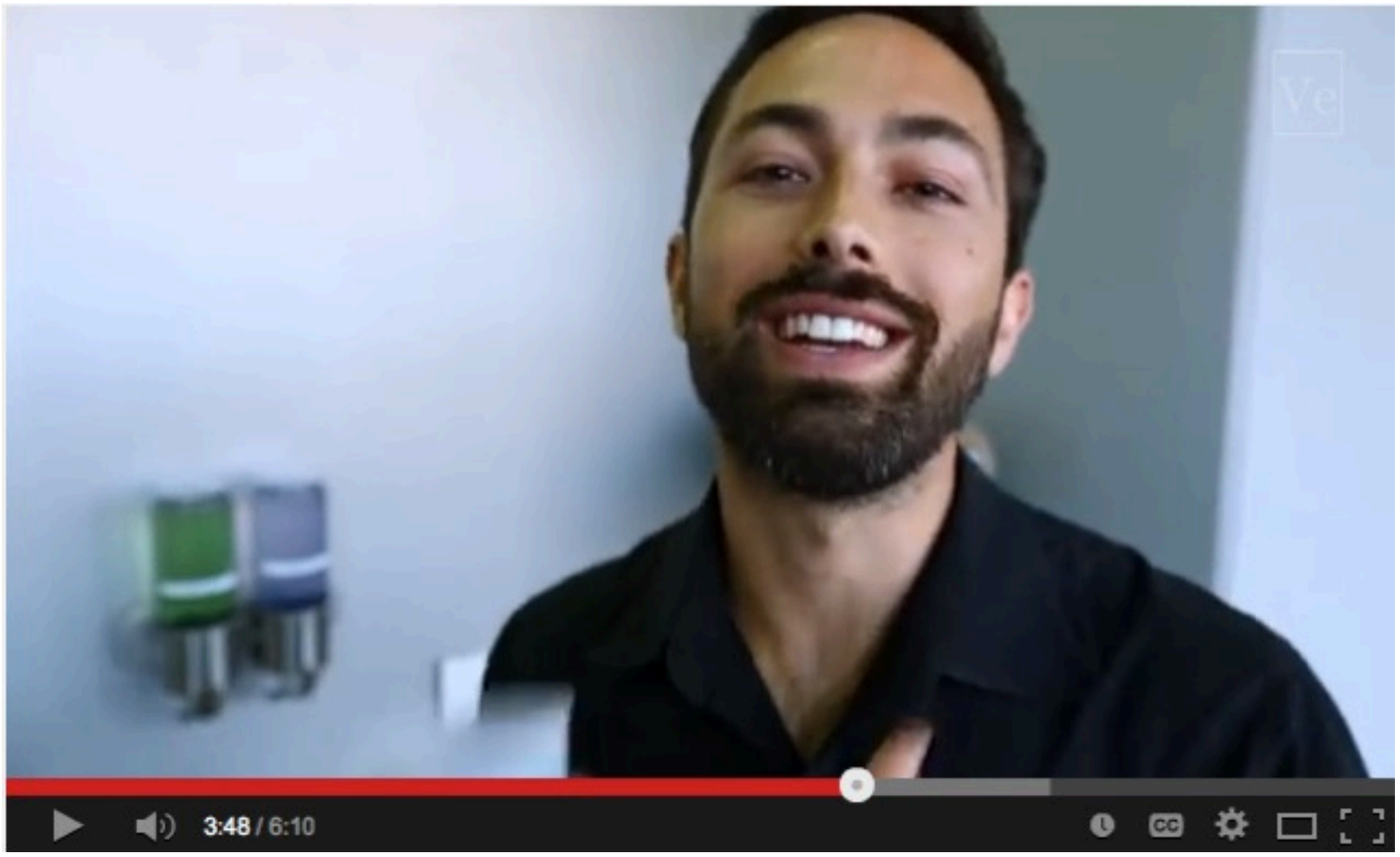
Polarization

- The migration of charges.
- Positive charges move away from negative charges.
- This requires some form of energy.



Electrostatic Induction

Induction



Physic Phenomena

CapitolTV's DISTRICT VOICES - District 5: Electric Sparks From Falling Water

Induction Charging

Conservation of Charge

- In an isolated system, the overall charge does not change.
- Charges can migrate within regions of objects and across objects.
- When charges migrate across objects, each object has an equal and opposite charge. Newton's 3rd law.

Ground-Removal of Charges

- Attaches an isolated system to a large amount of both positive and negative charges.
- Allows charged objects to gain or lose electrons as needed.
- Served as an almost unlimited supply or sink of electrons.

Electroscope

Conduction

- Think Conductors.
- Charging by contact. A charged object touches another object.
- The charge is passed to the second object.

Worksheet

- Answer all of the questions to the best of your ability.
- What you do not finish will be for homework.