Traditional: 08-02
Themed: 05-03

Static Phun Lab Preview

Station #1: Magic Wands—Dancing Fur & Magic Cans

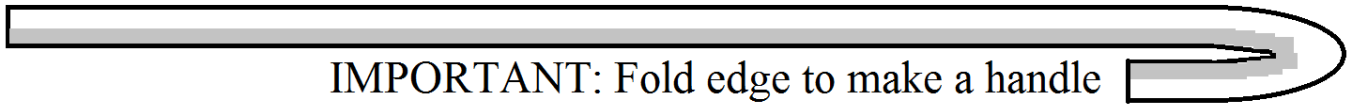
- Hint: “Furry things like to lose electrons”: Rub a PVC pipe against rabbit fur and what kind of charge does the PVC pipe get?
- If the Aluminum can is neutral, why is it attracted to the negative PVC pipe?

Station #2: Pith Ball Fun—Feel the Force Around You

- Pith ball: Styrofoam ball + thin metal surface
- Would a negative PVC pipe be attracted or repelled to ball?
- PVC pipe rubbed against Pith ball: What kind of charge does Pith ball acquire? Are two negative objects attracted or repelled?
- What caused the behavior of the Pith ball to change by 180°?

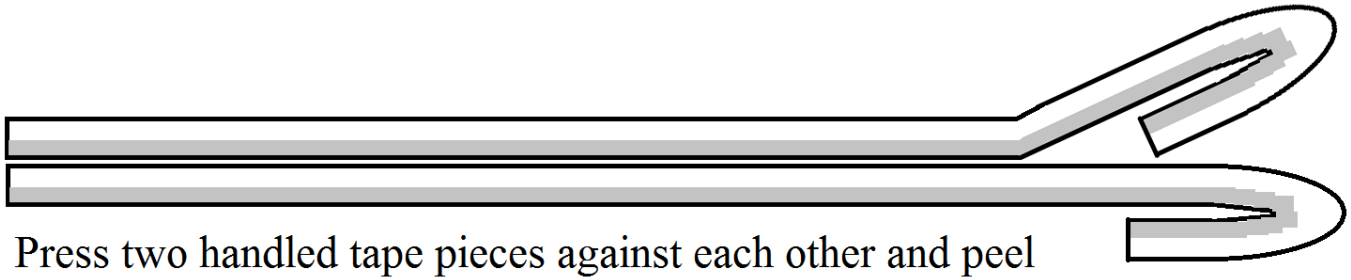
Station #3: Scotch Tape Fun & Funky Curls

(Piece of Scotch tape)



IMPORTANT: Fold edge to make a handle
Really hard to peel from table

Note: Typically, instructors that spend large amounts of time unpeeling tape from tables are not in the mood to be generous with with lab points...just sayin'



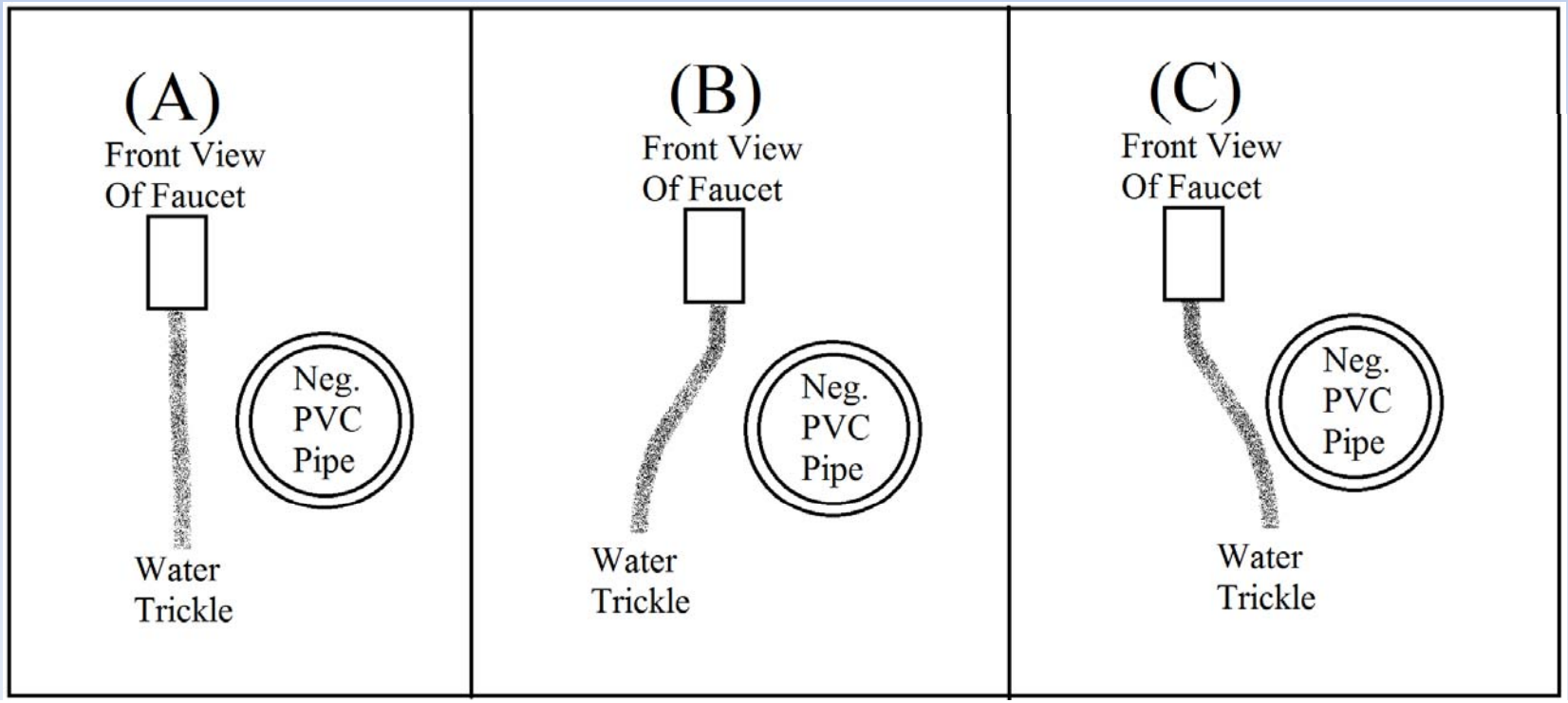
Press two handled tape pieces against each other and peel quickly. Peeling quickly is like rubbing vigorously and some electrons are "rubbed" off. Which surface do these free electrons prefer? How could you possibly tell using only the equipment you have (PVC pipe and fur)?

Station #3: Scotch Tape Fun & Funky Curls

- What does Triboelectric series teach us when two different materials rub against each other?
- Could you use the information from this part of the lab to place “sticky tape” and “smooth tape” correctly in a Triboelectric series?

Station #4: Bending Water, Balloon Fun, & Picking Up (paper) Bits

- Bring negatively charged PVC pipe near water
- Will it attract, repel, neither? (Pic. A, B or C correct?)
- IMPORTANT: Damp fur won't charge up pipe! Keep fur DRY! (for next group)



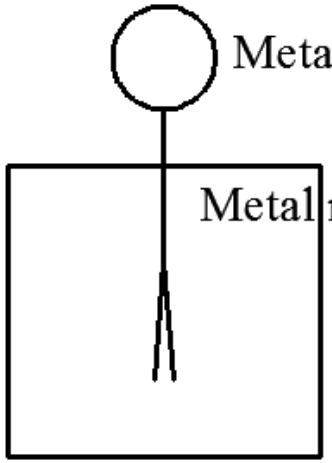
Station #4: Bending Water, Balloon Fun, & Picking Up (paper) Bits

- Is faucet water charged? Can it be polarized?
- When a neutral object (water) is near a charged object (PVC pipe), what force is felt?
- Why did we use a very thin gauge aluminum can? Why would we use a trickle of water? How are these two questions related?

Station #5: The Mighty Electroscope: I See Charges - How it works

- Electroscope can be either
  1. Neutral, un-polarized (no E field nearby)
  2. Neutral, polarized (E field nearby)
  3. Charged (positive or negative)

Electroscope



Metal bulb (huge source/sink for electrons)

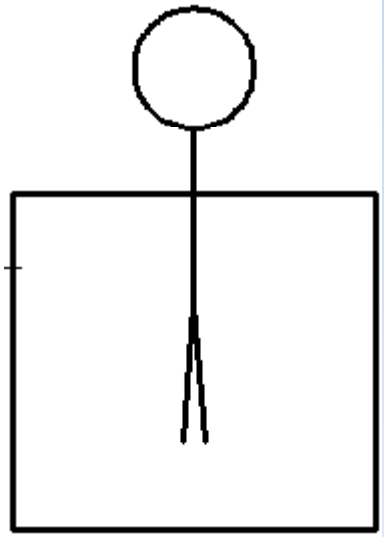
Metal rod connects foil leaves to metal bulb (conductive)

Box insulates electrically & from air

Thin foil leaves weigh little. Even tiny charge is enough to overcome gravity.
Leaves have tendency to "stick" together, unrelated to static charge.

Station #5: The Mighty Electroscope: Neutral, un-polarized

- Foil leaves pulled straight down by gravity
- Leaves are vertical



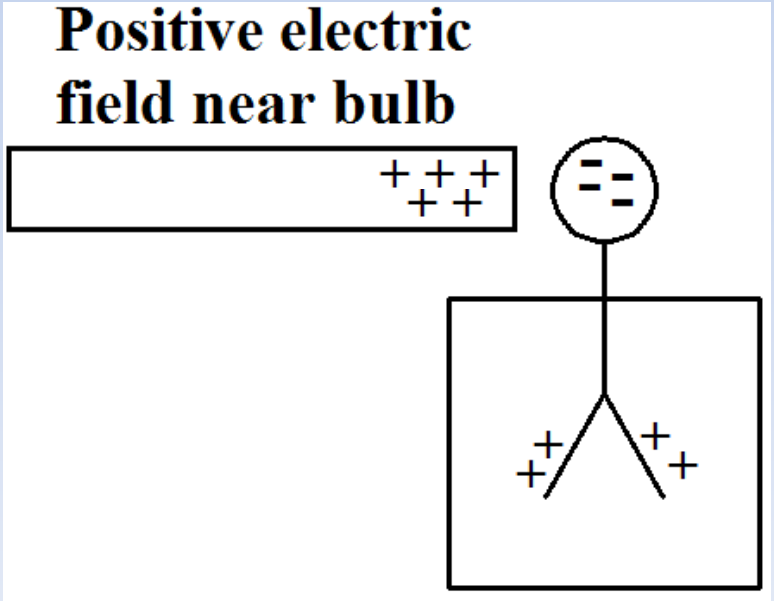
Station #5: The Mighty Electroscope: Neutral, polarized

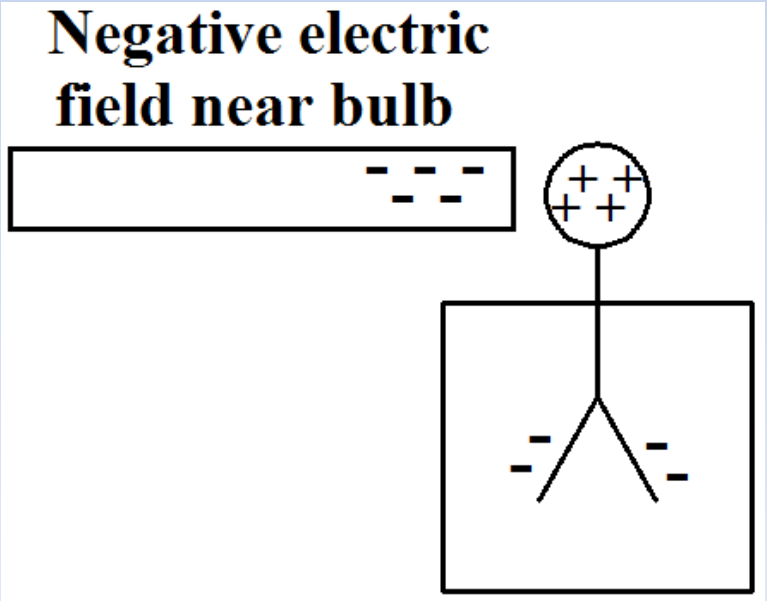
Positive charge near bulb:

- Electrons attracted toward bulb
- Abandoned leaves are positive
- Like charges repel
- Light-weight foil defies gravity

Negative charge near bulb:

- Electrons flee bulb
- Leaf end becomes negative
- Like charges repel
- Light-weight foil defies gravity

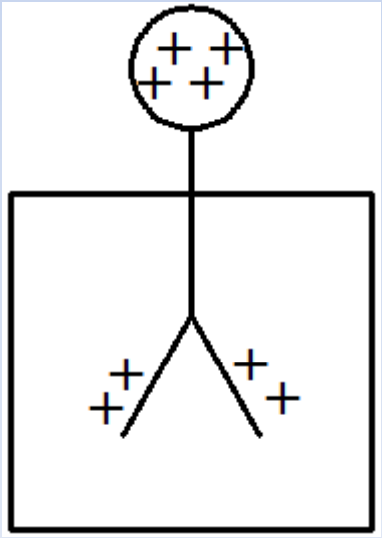




Station #5: The Mighty Electroscope: Charged positive or negative

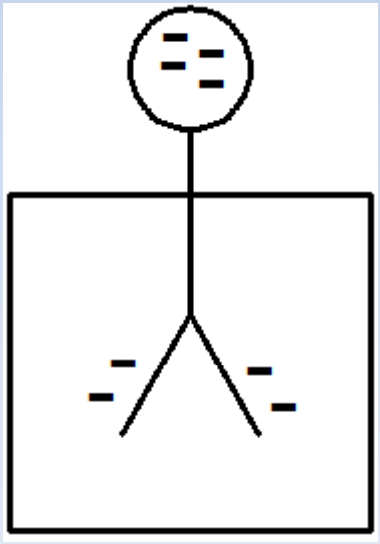
Positively charged electroscope:

- •No outside charges (Electric field) nearby
- •Bulb and leaves are “equally” negative
- •Like charges repel and light-weight foil defies gravity



Negatively charged electroscope:

- •No outside charges (Electric field) nearby
- •Bulb and leaves are “equally” negative
- •Like charges repel and light-weight foil defies gravity



Station #5: The Mighty Electroscope: The Always Tricky "Charging by induction"

- You will charge by induction in 4 steps
  a) Polarize electroscope
  b) Ground the polarized electrosope: electrons can get farther away than bottoms of leaves!
  c) Finger is removed, the electrons are now castaways
  d) Electric field is gone, but castaway electrons have no way to return home (they flowed INTO YOU through your finger) – Electroscope is positively charged!