Scotch Tape – It’s Electric!(?)

Tape is notorious for sticking to the wrong things, to you, even to itself. But have you noticed that it’s not always the sticky sides that are doing the “sticking”?   
What makes tape wiggle all over the place, anyways?

When tape adhesive sticks to surfaces, it’s forming a bond with the molecules on the top. When it’s pulled away, often times it steals some of the electrons from the molecules it was bonding with.

**Part I: Tape; the Great Electron Thief**

* Stick two pieces of tape to your desk. Peel them off. Hold them back-to-back. Record this as **Observation I** in your Google Doc.

Scotch tape adhesive has a very high *electron affinity* – it is very likely to steal electrons from surrounding materials when they are in close contact.

* Stick the sticky side of a piece of tape to the back side of the second piece. Pull them apart. Hold them back-to-back. Record this as **Observation II** in your Google Doc.

The electron affinity of the adhesive side is so high that it can steal electrons from the non-adhesive side of another piece of tape, even – leaving that piece with a net positive charge!

* Charge your pieces of tape, by sticking them to each other, or by sticking them to a surface. Hold them back-to-back and make sure there is evidence of a charge being exerted. Now, breathe on your piece of tape a few times. Record this as **Observation III** in your Google Doc.

Water molecules also have a high electron affinity. When they are present in the air, they will slowly absorb excess electrons from the surrounding surfaces.  **Part II: The Perfect Heist**

* With your group, find a way to quantify how many electrons the tape “steals”. How will the two strips of tape interact when they have stolen a lot of electrons? How about when they have only stolen a few? What measurements can you take the quantify this? Record this on your Google Doc under **“Procedure for measuring electrons”**
* Move around the room, experimenting with your tape on five different surfaces.
  + *Only* pick surfaces where the surface will not come off with the tape   
    (IE, not paper).
  + Record each surface and record some observations –they can be anything of note that may be helpful later on.
* Use your method of quantifying electron affinity to rank the five surfaces you encountered in terms of electron affinity – IE, create a Triboelectric Series for the surfaces you encountered.

**Part III: Reflection**

* Complete your Google Doc by referring to the notes you took and reflecting on the accuracy of your Triboelectric Series.
  + Which placements are you most sure about? Why?
  + Which placements are you less sure about? Why?
  + Where did you encounter sources of error? What effect do you think this had?