Activity 5. Sticky, flappy plastic

Learning Intentions
Students get to think, observe and learn about the difference between insulators and conductors and how charged particles (electrons and protons) function to generate static electricity.

Before the activity
You will be observing static electricity in action. You need to think about how charged particles repel or attract each and how insulators or conducting materials will affect their action.

Hypothesis
Observe each step of the activity and try to predict what will happen to the two strips of plastic and why.

Materials

- Flexible plastic sheet such as an overhead project sheet
- Bulldog clip or similar
- Pencil (or pen, piece of wood)
- Metal nail
- Your finger

Teacher Notes	Teaching Notes: Running the activity
Get students to predict outcomes in each step of the following demonstration. Can students explain their observation once you run your fingers down the plastic strips? Why do the two pieces of plastic repel each other? Using what students know about how charges attract and repel, what ideas do they have to explain their observation? Get students to predict what will happen when you place the pen/pencil, metal nail and your finger between the repelling strips of plastic. ***What is happening?*** When you run your finger down the plastic strip, electrons are being ripped off your fingers and onto the plastic. This makes the plastic strips more negative or with an overall negative charge. Because both bits of plastic are negative, they will repel each other and be sticking out like bird wings as	**Method** Cut two strips (about 1cm by 10cm) of flexible plastic. Place one strip on top of the other and secure one of the narrow ends with a bulldog clip (or peg). Hold the bulldog clip with the two sheets of plastic. With your thumb and pointer/index finger, run them down each side of the strips of plastic – from top to bottom. Observe what happens to the bits of plastic. Run your finger down the strips again (to charge it up again) Now try placing different items between the two bits of repelled plastic - the pen/pencil, metal nail, your finger. What is happening and why?

they try to get as far apart from each other as possible. If you put an insulator such as plastic pen between the two repelling strips of plastic, nothing should happen. The two plastic strips will continue to repel each other because the plastic is a good insulator. As an insulator the electrons are stuck tightly to their atoms and can't easily move. The insulator remains neutral ensuring the repelling force between the plastic strips remains. If your stick a conductor such as a nail or your finger between the two plastic strips, the strips should close over the conducting object. That is, they will be attracted to the nail/finger. Why? Because the electrons in conductors are more mobile they will be repelled by electrons on the plastic strip, and they will move along the nail or finger to get away from the electrons in the plastic strip. That leaves your nail or finger as an overall positive conductor in the middle of the plastic strip. Negative and positive attract. The negative plastic strip will be attracted to the now positive conductor (nail, finger).	