

Lesson Preparation – Sticky Static (<1 hour active time)

Materials (for 24 students) :

Balloon (1 per classroom)

Rice Krispie Cereal (1/4 cup per group)

Plate of Plexiglass (1 ft by 1 ft, 1 per group)

Mini Boxes of Cereal (Or something similar in size to hold up plexiglass, 2-4 per group)

Wool Fabric (1-2 scraps per group)

Sticky Static Worksheet

Balloons and Static Electricity PhET Simulation

Before Lesson:

1. Download the Balloons and Static Electricity PhET simulation from <https://phet.colorado.edu/en/simulations/category/new> or ensure access from the internet. Familiarize yourself with the various tools and functions of the simulation.

Lesson Plan – Sticky Static (45 min)

Opening (15 Min)

Have a student read the title on the worksheet aloud.

Ask students what static is. In what kind of situations have they experienced static? *Students may refer to their hair sticking up or getting ‘shocked’; both of these situations result from the forces that govern static.*

Blow up the balloon and illustrate the effects of static to the class; rub the balloon on a wool scrap and either use it to raise your hair (or a student’s) or to stick the balloon to the wall. Have the students speculate as to what is occurring.

Introduce the student to the Atom, using the diagram on their worksheet to illustrate the three components, the proton (positively charged, can’t move), neutron (no charge, can’t move), and the electron (negative, can move). Highlight that the electron is special because it can move from atom to atom, and atom make-up everything in the physical world.

Tell the students that static is a result of these ‘excited electrons’ that like to move around, and today we are going to explore what they do.

Simulation (10 min)

Bring up the PhET simulation and use it to explain the movement of electrons in static. Rub the balloon on the wool sweatshirt (wool has very loose electrons), and watch the electrons jump to the balloon. Ask the students where there are more negative charges (on the balloon), and where there are more positive charges (on the sweater). Tell students that pluses and minuses like to be matched up. Have the students predict what will happen when you release the balloon.

Use the various functions of the simulation as desired to illustrate the concept.

Exploration (15 min)

Demonstrate the set-up to the students, and have them fill out the “Question” and “Hypothesis” sections on their worksheet. *What will happen to the rice krispies when I rub the wool on the plexiglass? I think the rice krispies will jump up and down.*

Hand out one handful of Rice Krispie treats per group, along with one plexiglass sheet, 1-2 wool scraps, and 2-4 miniboxes of cereal. Set the plexiglass on top of the mini boxes and put the rice krispie below the plexiglass.

Have the students rub the top of the plexiglass with the wool in a circular motion and have them observe what happens. If it doesn’t seem to work, try flipping the plexiglass or rubbing in a different pattern.

Closing (5 min)

Have the students fill out the “observation” box on their worksheet.

Gather students and have them respond to some questions.

What happened to the rice krispies? *They jumped up off the table towards the plexiglass and then dropped back down.*

What do you think the wool was doing to the plexiglass? What was negatively charged and what was positive? *The wool was giving the plexiglass electrons, making the wool positive and the plexiglass negative.*

Why did the rice krispies jump up? *All the negatives in the plexiglass pushed away the negatives in the rice krispie pieces, making them positive. Because the pieces are so small, the positive wanting to be with the negative in the plexiglass lifts the rice krispie up, until it touches the plexiglass and all the negative electrons go into the rice krispie.*

Finish by allowing students to ask any remaining questions, and encourage discussion about what other kinds of things they would like to learn about static or electrons.