



Classroom Teacher Preparation

Physics 7: The Force of Static Electricity

Description:

Students will conduct an experiment using pith balls to observe the presence of a force that is generated when different materials are rubbed onto plastic, glass and metal rods. They will explain how they think this phenomenon occurs using claims, evidence and reasoning.

Lesson Objectives – SWBAT (“Students Will Be Able To...”):

6th-8th

- Test various materials and collect data to make a claim about the presence or absence of a force acting on the materials
- Use observational data collected to support the claim

Disciplinary Core Idea (DCI)

PS2 Motion and Stability – Forces and Interactions

- (6th-8th) PS2.B Types of Interactions - Forces that act at a distance involve fields that can be mapped by their relative strength and effect on an object.

Science & Engineering Practice (SEP)

Constructing Explanations and Designing Solutions

- (6th-8th) Construct an explanation that includes qualitative or quantitative relationships between variables that predict(s) and/or describe(s) phenomena.

Crosscutting Concept (CCC)

Cause and Effect

- (6th-8th) Cause and effect relationships may be used to predict phenomena in natural or designed systems.

Preparation:

This lesson is an introduction to the concept of the force fields generated by static charges. The lesson focuses more on the forces and less on the mechanics of static electricity itself, so it would be helpful to introduce the concept of a static charge to students prior to the lesson so students have some background knowledge.

Room Set Up for Activities:

For the activity, students will work in pairs at their desks. This lesson works best on a cold, dry day. Humidity can make the exploration very difficult.

Safety:

No safety precautions for this lesson.



Related Modules:

This lesson may be taught as part of a sequence or group of related modules on static electricity. Modules include:

Physics 2: Electrical Conductivity – In this introduction to electrical conductors and insulators, students are challenged to build a simple circuit, test and classify various materials as conductors or insulators, and add a switch to the circuit.

Physics 9: Electromagnetism – Students build and test their own electromagnets, gaining an experiential understanding of how electromagnets work and how to modify the magnetic fields they produce.

Physics 19: Friction (6th-8th) – This lesson provides students with an introduction to the concept of friction and a chance to discover static and kinetic friction. Students explore the differences in frictional forces for different materials through experimentation.

For other module sequences and groups, look here: www.sciencefromscientists.org/sequences

Standards Covered:

Please click the following link to our website to review the standards covered by this lesson, listed by state: www.sciencefromscientists.org/standards/

Lessons are matched to both national NGSS and local state standards.

After Our Visit:

Students will experiment with bubbles and static electricity to observe how bubbles react to an electrically charged plastic bottle.

Access this Extension activity by visiting the Classroom Post found on our website at sciencefromscientists.org/cohorts. Use the name of your school/cohort and password to log in.

To help Evaluate, check out our Open Response questions online at sciencefromscientists.org/open-response-questions. They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

Additional Resources:

- What is Static Electricity? (3:38): <https://www.youtube.com/watch?v=yc2-363MIQs>
- Testing for Static Electricity (4:19): <http://mass.pbslearningmedia.org/resource/phy03.sci.phys.mfe.zele/testing-for-static-electricity/>
- SciShow Kids – “What causes thunder and lightning?” (3:37): https://www.youtube.com/watch?v=fEiVi9TB_RQ
- The Dangers of Electrostatic Electricity (4:30): <https://www.youtube.com/watch?v=XKAhx4NdJT8>