

Static Electricity

5E Lesson

The 5E model is a scientifically proven method to improve student engagement and learning in your classroom

- ✓ Engagement
- ✓ Exploration
- ✓ Explanation
- ✓ Elaborate
- ✓ Evaluate



Complete Teacher Instructions

Static Electricity 5E Lesson

Grades 7-10	Static Electricity	C
Lesson Objective: Students will: - Investigate, through inquiry, various aspects of static electricity - Demonstrate an understanding of the principles of static electricity - Conduct investigations into the transfer of static electric charge - Learn what creates static electricity as well as the laws of static electricity - Use the principles of static electricity to explain common static electricity phenomena such as lightning - Be able to utilize the electrostatic series - Apply what they've learned to industrial and commercial applications such as pollution reduction		
Possible Student Misconceptions: - Static and current electricity are unrelated - Static electricity isn't dangerous - Uncharged objects have no electrons		
Materials: 1 device (smartphone, Chromebook, laptop, tablet, or computer) - A means of projecting a PowerPoint presentation - Internet access 1 pack of balloons 5 empty aluminum cans (coke, Pepsi, etc.)		
Teacher Notes: - All videos can be accessed directly from the PowerPoint. To retrieve them, click on the video icon while in slideshow mode and it will automatically open for you. If they don't open, right-click the image and select Edit Hyperlink or something similar. - I've created a video walkthrough if needed. It can be accessed here - https://youtu.be/oCIKIP9SaDQ - I don't believe in long lessons. If you feel your students are bored, stop the PowerPoint and give them a 5-minute break. If you need more resources, I recommend my video collection here - http://www.teachmeanthysics.com are tons of brain-break videos to choose from all grouped by topic.		

Static Electricity – 5E Lesson

Engagement Phase - Have your students compete in the Aluminum Can Race - All the instructions are located in - "Engagement - Aluminum Can Race"	Duration: 45-60 min Teacher Role: Facilitate learning and guide understanding Goals: - Connect student experiences - Create interest - Ask questions - Understand the importance of the lesson
Exploration Phase Exploration – Lab Station Activity - In groups of 2-3, have your students complete <i>Exploration – Lab Station Activity</i>. Once they're done, they will submit their passport to you. Teacher Notes: - The complete instructions for my Lab Station activity can be found in the <i>START HERE – Instructions</i> file.	Duration: 1 hour Teacher Role: Facilitate learning and guide understanding Goals: - Students receive experience with static electricity - Students use creative thinking - Students make observations, results, and make connections
Explanation Phase Explanation – Static Electricity Lessons - There are three lessons. All are found in the folder – "Explanation – Static Electricity Lessons" - All three will appear in the Evaluate quiz - These lessons are designed to be completed over three - four days - There are many embedded videos and plenty of opportunity to engage, interact and check for your students' understanding throughout the lessons - Lesson 1 – Static Electricity - lesson covers the following topics: - Atom review - Charged Objects - Laws of electric charges - Electrostatic Series - Sparks and Lightning - Lesson 2 - Charging By Friction, Contact and Induction – lesson covers the following topics - Friction	Duration: 2-4 hours Teacher Role: Evaluate student concepts by presenting material found in presentation.

- Contact - Induction - Lesson 3 - Charging By Friction, Contact and Induction – lesson covers the following topics - Grounding - Dangers of static build up - Reducing pollution - Painting - Lightning and Tesla Coils Teacher Notes: - All videos can be accessed directly from the PowerPoint. To retrieve them, click on the video icon while in slideshow mode and it will automatically open for you. If they don't open, right-click the image and select Edit Hyperlink or something similar. - I've created a video walkthrough if needed. It can be accessed here - https://youtu.be/oCIKIP9SaDQ - I have also enclosed a .PDF version of both the teacher and student versions	Goals - Students develop understanding of the content - Observations and experiences are discussed and critiqued - Students develop vocabulary - Students are able to connect the content presented to previous experiences
Elaborate Phase Elaborate – Scavenger Hunt Activity Your students will complete – <i>Elaborate - Scavenger Hunt Activity</i> . This activity will require your students to move beyond what was covered directly in the lessons and allow them to demonstrate why learning about our solar system is so applicable and important.	Duration: 1 hour Teacher Role: Facilitate learning and keep students focused Goal Students use their newly obtained knowledge to propose solutions and extend their learning to new situations
Teacher Notes: - Students will work in groups of two or three - Each group will only require a single device (smartphone, tablet, Chromebook, laptop, etc.).	
Evaluate Phase Static Electricity quiz Have your students complete - <i>Evaluate – Static Electricity - Quiz</i>	Duration: 30 min. Teacher Role: Distribute and collect evaluation Goal Students are given the opportunity to demonstrate their understanding and evaluate their own progress
Teacher Notes: - It's sometimes best to have the students peer evaluate - Placing students in small groups and having them exchange papers to mark will accomplish two things - Provide immediate feedback on the quiz they just completed - Significantly reduce your marking time - Peer evaluation is not needed, only suggested when appropriate	

Each phase is clearly described

Three Complete Lessons

Static Electricity Puzzles

Start by drawing what you know
4 balls



- a) Pith ball #3 is negatively charged
- b) Pith ball #4 attracts all the other pith balls
- c) Pith balls #1 and #2 repel each other
- d) Pith ball #3 attracts all other pith balls

← Make sure your students are on track

Student copies with blanks

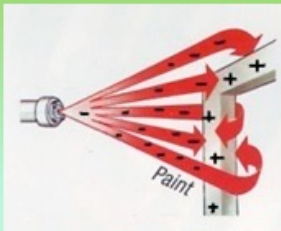
Videos embedded right into your slideshow

Processes

• Electrostatic Spray Painting

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- The object to be painted is either neutral or oppositely charged
- The paint is attracted to the object
- Paint goes on evenly and very little is lost



Electrostatics (Static Electricity)

1. Atom review
2. Charged Objects
3. Laws of electric charges
4. Electrostatic Series
5. Sparks and Lightning



Charging by: Friction, Contact and Induction

1. Friction
2. Contact
3. Induction



Material	Strength of field on Electrons
Glass	Weak
Human hair	
Nylon	
Wood	
Fur	
Silk	
Carbon	
Tyrene (a clear plastic)	
Rubber balloons	
Polyester	
Foam	
Grocery bags (low density polyethylene)	
Ebonite (a hard form of rubber)	Strong

Static Electricity Applications

1. Grounding
2. Dangers of static buildup
3. Reducing pollution
4. Painting
5. Lightning and Tesla Coils



Engaging Activities including my Lab Station and Scavenger Hunt Activities

Static Electricity Lab Station Activity



7 Lab Station Activities to get your kids out of their seats and engaged in their learning

Device-Based Scavenger Hunt Static Electricity



Includes

- 5 Unique Locations
- Online form submission
- Answer Key

Works on all smartphones, tablets, Chromebooks and laptops

- 100% Digital
- Simulations
- Quizzes
- Videos
- Games
- Word Scramble
- and more



Get away from tired practices and unengaged students



Provide a Scientifically-Proven means of instruction



Incorporate Technology and Increase Collaboration

