Simply Shocking: An Introduction to Electricity

Grade Level: First Grade
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Roscoe Wilson Elementary Magnet School, Lubbock, TX
Length of Unit: Five Days

I. ABSTRACT
This unit introduces the basic principles of electricity and electrical safety rules as found in the First Grade section of the Core Knowledge Sequence. The study will include a brief overview of Thomas Edison and his contribution to electricity. Students will understand basic parts of simple electrical circuits such as batteries, wire, bulb, buzzer, and switch. Students will demonstrate their comprehension of concepts through participating in learning stations. Teacher will evaluate their comprehension through observation reflected in a flip book, worksheets, and a rubric.

II. OVERVIEW
A. Concept Objectives
1. The student will develop an awareness of classroom and field investigation following home and school electrical safety procedures. (TEKS Science 1.1)
2. The student will understand that systems have parts and are composed of objects. (TEKS Science 1.6)
3. The student will recognize how Thomas Edison helped to shape our community, state, and nation. (TEKS History 1.1)

B. Content
1. Introduction to Electricity (p. 38)
   • Static electricity
   • Basic parts of simple electric circuits
   • Conductive and nonconductive materials
   • Safety rules for electricity
2. Science Biographies (p. 39)
   • Thomas Edison

C. Skill Objectives
1. The student will demonstrate safe practices during classroom and field investigations (TEKS Science 1.1)
2. The student will plan and conduct simple descriptive investigations (TEKS Science 1.2 [B])
3. The student will construct reasonable explanations about investigations (TEKS Science 1.2 [D])
4. The student will communicate explanations about investigations (TEKS Science 1.2 [E])
5. The student will make decisions using information (TEKS Science 1.3 [A])
6. The student will explain a problem in his/her own words and identify a task and solution related to the problem (TEKS Science 1.3 [C])
7. The student will manipulate objects such as toys or construction sets so that the parts are separated from the whole which may result in the part of the whole not working (TEKS Science 1.6 [C])
8. The student will identify parts that, when put together, can do things they cannot do by themselves, such as toys or construction sets working with batteries (TEKS Science 1.6 [D])
9. The student will identify historic figures such as Thomas Edison who has exhibited a love of individualism and inventiveness. (TEKS History 1.1 [B])

III. BACKGROUND KNOWLEDGE
A. For Teachers

B. For Students
1. Review Introduction to Magnetism (K)

IV. RESOURCES

V. LESSONS
Lesson One: Thomas Edison/Safety Rules for Electricity
A. Daily Objectives
1. Concept Objectives
   a. The student will recognize how Thomas Edison helped to shape our community, state, and nation. (TEKS History 1.1)
   b. The student will develop an awareness of classroom and field investigation following home and school electrical safety procedures. (TEKS Science 1.1)

2. Lesson Content
   a. Science Biographies (p. 39)
      • Thomas Edison
      b. Introduction to Electricity (p. 38)
      • Safety rules for electricity

3. Skill Objectives
   a. The student will identify historic figures such as Thomas Edison who has exhibited a love of individualism and inventiveness. (TEKS History 1.1 [B])
   b. The student will demonstrate safe practices during classroom and field investigations (TEKS Science 1.1)

B. Materials
1. Always Inventing: The True Story of Thomas Alva Edison by Frank Murphy
2. Safety Rules worksheet (Appendix A)
3. Paper
4. Pencils
C. Key Vocabulary
1. Electricity – energy caused by the movement of electrons through matter.
2. Inventor – one who comes up with, or creates something new.

D. Procedures/Activities
1. The teacher will read *Always Inventing: The True Story of Thomas Alva Edison*.
2. The teacher and students will discuss things that Thomas Edison invented.
3. The teacher and students will discuss things that use electricity.
4. The students will write: Thomas Edison invented ____________________.
   Students will fill in the blank with one of the items that Edison invented.
5. The students will make a poster showing things that use electricity. Students will fold paper into fourths and draw at least four pictures.
6. The teacher will read *An Introduction to the Shocking Facts* on page 299 of *What Your First Grader Needs to Know*.
7. The students will complete Safety Rules worksheet and make into a flipbook. (Appendix A)

E. Assessment/Evaluation
The teacher will evaluate through observation of student participation in discussions and on completion of the safety rules flip book.

Lesson Two: Simple Electric Circuits

A. Daily Objectives

1. Concept Objective
   a. The student will understand that systems have parts and are composed of objects. (TEKS Science 1.6)

2. Lesson Content
   a. Introduction to Electricity (p. 38)
   - Basic parts of simple electric circuits

3. Skill Objectives
   a. The student will plan and conduct simple descriptive investigations (TEKS Science 1.2 [B])
   b. The student will construct reasonable explanations about investigations (TEKS Science 1.2 [D])
   c. The student will communicate explanations about investigations (TEKS Science 1.2 [E])
   d. The student will make decisions using information (TEKS Science 1.3 [A])
   e. The student will make decisions using information (TEKS Science 1.3 [A])
   f. The student will manipulate objects such as toys or construction sets so that the parts are separated from the whole which may result in the part of the whole not working (TEKS Science 1.6 [C])
   g. The student will identify parts that, when put together, can do things they cannot do by themselves, such as toys or construction sets working with batteries (TEKS Science 1.6 [D])

B. Materials
1. Construction paper
2. Yarn  
3. Brads (1 for each student)  
4. Crayons  
5. Glue  
6. Scissors  
7. Instructions to game (Appendix B-1)  
8. Simple Electric Circuit worksheet (Appendix B-2)  
9. Student Experiment Rubric (Appendix E)  

C. **Key Vocabulary**  
1. Circuit – the closed path followed by an electric current  
2. Simple – made of only one part or thing  
3. Switch – a device that opens and closes an electrical circuit.

D. **Procedures/Activities**  
1. The teacher will read page 300-301 of *What Your First Grader Needs to Know*.  
2. The teacher will draw a picture on the board like the one on page 301 and discuss what happens when a switch is “on” and what happens when a switch is “off”.  
3. The students will play “The Charged-Up Circuit Game”. (Appendix B-1)  
4. The students will construct a simple electric circuit using construction paper, yarn, brads, and worksheet. (Appendix B-2)  

E. **Assessment/Evaluation**  
The teacher will evaluate through observation of game, use of the Student Experiment Rubric (Appendix E), and on completion of the student’s simple electric circuit.

**Lesson Three: Magnets/Conductors and Insulators**

A. **Daily Objectives**  
1. Concept Objective  
a. The student will understand that systems have parts and are composed of objects. (TEKS Science 1.6)  

2. Lesson Content  
a. **Introduction to Electricity** (p. 38)  
   • Conductive and non-conductive materials  

3. Skill Objectives  
a. The student will plan and conduct simple descriptive investigations (TEKS Science 1.2 [B])  
b. The student will construct reasonable explanations about investigations (TEKS Science 1.2 [D])  
c. The student will communicate explanations about investigations (TEKS Science 1.2 [E])  
d. The student will make decisions using information (TEKS Science 1.3 [A])  
e. The student will explain a problem in his/her own words and identify a task and solution related to the problem (TEKS Science 1.3 [C])  
f. The student will manipulate objects such as toys or construction sets so that the parts are separated from the whole which may result in the part of the whole not working (TEKS Science 1.6 [C])
g. The student will identify parts that, when put together, can do things they cannot do by themselves, such as toys or construction sets working with batteries (TEKS Science 1.6 [D])

B. Materials
1. Various magnets
2. Paper clips
3. Cotton balls
4. Pencils
5. Crayons
6. Thumb tacks
7. Coins
8. Safety pins
9. Buttons
10. Magnetic and Electrical worksheet (Appendix C)
11. Electrical circuit tester (can be purchased at any hobby or electronic store or follow directions on building an electrical circuit tester on page 302 of What Your First Grader Needs to Know. This experiment will require your time and assistance prior to class presentation.)
12. Student Experiment Rubric (Appendix E)

C. Key Vocabulary
1. Conductor – anything that carries or allows passage of heat, electricity, or sound.
2. Current – the flow of electricity in a wire or other conductor.
3. Insulator – a material that reduces or stops the movement of heat, electricity, or sound.
4. Magnet – an object that has the power to pull items made of iron toward itself.

D. Procedures/Activities
1. The teacher will ask students what magnets are used for.
2. The teacher will ask students what kinds of things magnets are attracted to.
3. The teacher will divide students into small groups and give each group several objects to test. Students will predict which objects the magnets will attract and which objects the magnets will not attract and divide the objects into two separate groups.
4. The students will test the objects and separate again as necessary.
5. The students will draw conclusions about what kinds of objects are attracted to magnets.
6. The student will complete the magnetic portion of worksheet (Appendix C).
7. The teacher will discuss the meaning of conductor, insulator, and current.
8. The student will predict which objects are conductors and which ones are insulators. Have students make two separate piles with the objects.
9. The student will test the objects to see if they are a conductor or an insulator by using the simple electrical system and record answers on electrical portion of worksheet. (Appendix C) If the electrical current flows through the object the light will come on and the object is a conductor. If the electrical current does not flow through the object the light will not come on and the object is an insulator.
10. The student will draw conclusions about objects that are conductors and insulators.
11. The student will compare the results of the magnetic test with the results of the electrical test.

E. Assessment/Evaluation
Lesson Four: Static Electricity
A. Daily Objectives
1. Concept Objective
   a. The student will understand that systems have parts and are composed of objects. (TEKS Science 1.6)

2. Lesson Content
   a. Introduction to Electricity (p. 38)
      • Static Electricity

3. Skill Objectives
   a. The student will plan and conduct simple descriptive investigations (TEKS Science 1.2 [B])
   b. The student will construct reasonable explanations about investigations (TEKS Science 1.2 [D])
   c. The student will communicate explanations about investigations (TEKS Science 1.2 [E])
   d. The student will make decisions using information (TEKS Science 1.3 [A])
   e. The student will explain a problem in his/her own words and identify a task and solution related to the problem (TEKS Science 1.3 [C])

B. Materials
1. Static Electricity Stations (Appendix D-1, D-2)
2. Objects listed in Appendix D-1 and D-2
3. Student Experiment Rubric (Appendix E)

C. Key Vocabulary
1. Attract – to cause to come near.
2. Repel – to ward off or force back.
3. Static electricity – the electrical charges within an object.

D. Procedures/Activities
1. The teacher will explain the concept of static electricity.
2. The teacher will introduce the static electricity stations. (Appendix D-1 and D-2)
3. The teacher will divide the students into small groups.
4. The students will rotate to each station every ten minutes.

E. Assessment/Evaluation
The teacher will evaluate through observation and participation, using the Student Experiment Rubric (Appendix E).

Lesson Five: Static Electricity Races
A. Daily Objectives
1. Concept Objective
   a. The student will understand that systems have parts and are composed of objects. (TEKS Science 1.6)

2. Lesson Content
   a. Introduction to Electricity (p. 38)
      • Static Electricity
3. **Skill Objectives**
   a. The student will manipulate objects such as toys or construction sets so that the parts are separated from the whole which may result in the part of the whole not working (TEKS Science 1.6 [C])
   b. The student will identify parts that, when put together, can do things they cannot do by themselves, such as toys or construction sets working with batteries (TEKS Science 1.6 [D])

**B. Materials**
1. Empty soda can (one for each student)
2. Inflated balloon (one for each student)
3. Your hair

**C. Key Vocabulary**
1. None

**D. Procedures/Activities**
1. Put the can on its side on a table or the floor. Hold it with your finger until it stays still.
2. Rub the balloon back and forth on your hair really fast.
3. Hold the balloon about an inch in front of the can. The can will start to roll, even though you are not touching it.
4. Move the balloon away from the can – slowly – and the can will follow the balloon.
5. If you move the balloon to the other side of the can, the can will roll in the other direction.
6. How fast will the can roll? How far can you roll it before the can stops? Will it roll uphill?
7. Students will have races across the room or down the sidewalk.

**E. Assessment/Evaluation**
The teacher will evaluate through observation of the races and through oral question and answer.

**VI. CULMINATING ACTIVITY**
None

**VII. HANDOUTS/WORKSHEETS**
1. Appendix A – Electrical Safety Rules
2. Appendix B-1 – Charged-Up Circuit Game
3. Appendix B-2 – Simple Electric Circuit
4. Appendix C – Science Experiments
5. Appendix D-1 – Static Electricity Stations
6. Appendix D-2 – Static Electricity Stations (continued)
7. Appendix E – Student Experiment Rubric

**VIII. BIBLIOGRAPHY**


### Electrical Safety Rules Flip Book

Fold the paper in half and cut tabs into the middle. Glue safety rules on the front and draw a picture on the inside.

One copy of this page will be used for every two students.

<table>
<thead>
<tr>
<th>Electrical Safety Rules</th>
<th>Electrical Safety Rules</th>
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</thead>
<tbody>
<tr>
<td>Do not touch any electrical appliance when you are wet.</td>
<td>Do not touch any electrical appliance when you are wet.</td>
</tr>
<tr>
<td>Do not place objects on power cords.</td>
<td>Do not place objects on power cords.</td>
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<tr>
<td>Do not stick things into electrical outlets.</td>
<td>Do not stick things into electrical outlets.</td>
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<tr>
<td>Never place anything near or inside a lamp shade.</td>
<td>Never place anything near or inside a lamp shade.</td>
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<tr>
<td>Never fly a kite near overhead electrical wires.</td>
<td>Never fly a kite near overhead electrical wires.</td>
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<td>Do not pull an object (iron) by a power cord.</td>
<td>Do not pull an object (iron) by a power cord.</td>
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<tr>
<td>Do not play outside during an electrical storm.</td>
<td>Do not play outside during an electrical storm.</td>
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</tbody>
</table>
**Charged Up Circuit Game**

This will introduce the concept of simple electrical circuits.

**Materials:** Students

**Activity:**
1. Several students will stand in a line holding hands. The teacher will be at one end of the line. The child at the other end of the line will be standing next to a light switch. The student will flip the light switch on or off only when their hand is squeezed. The students will pass a squeeze down the line. When they feel one hand squeezed then they should squeeze the hand of the person next in line.

![Image of children passing a squeeze down a line](image)

2. Squeeze the hand of the child next to you. The child at the end of the line should flip the switch on. Discuss how this is how electricity works: energy is sent down the line then when it gets to the end of the line it is turned into light, heat, or sound.

3. While everyone releases hands the teacher walks over and tells two children not to hold hands. This will cause a break in the chain of held hands. The teacher will send the squeeze down the line but the child at the end of the line will never flip the switch to the on position. The chain/circuit is broken and the energy cannot reach the end to turn the light on.

4. Try this game a few times with several groups. When they catch on to the idea they can play it on their own.
Simple Electric Circuit
Cut out the light bulb, switch, and battery. Glue light bulb and battery on to construction paper. Connect the circuit with yarn and attach the switch with a brad.
### Appendix C

**’s Science Experiments

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Magnetic</th>
<th>Non-Magnetic</th>
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<td>1. Paper clips</td>
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<td>2. Cotton balls</td>
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<td>3. Pencil</td>
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<td>4. Crayon</td>
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<td>5. Thumb tack</td>
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<td>6. Penny</td>
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<td>7. Nickel</td>
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<td>8. Safety pins</td>
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<td>9. Metal button</td>
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<td>10. Plastic button</td>
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### Appendix C

**Conductor vs. Insulator**

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<thead>
<tr>
<th>Item Name</th>
<th>Conductor (+)</th>
<th>Insulator (-)</th>
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<tr>
<td>1. Paper clips</td>
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Static Electricity Stations
Prior to class--the teacher will set up the stations for class groups.

Station 1: Balloon with positive/negative charge
Materials:
- Heavy book
- Flannel cloth or piece of wool
- Tissue paper
- Ruler
- String
- Two balloons

Activity:
1. Tie the two balloons together. Attach one to each end of the string. Hang the balloons from the edge of a desk or table. The ruler is held down by a heavy book. The balloons should not be touching if they do not have a static charge.
2. A student will softly rub one balloon with the flannel cloth. The balloons should stick together since one has a static charge.
3. Gently rub the other balloon with the flannel cloth. The balloons should not stick together since they both have a static charge.
4. What will happen when you hold tissue paper between the two balloons? Both balloons will hold the paper because they are both charged with static electricity.

Station 2: Paper Hop
Materials:
- Rubber balloon
- Student with hair
- Paper that is cut into quarter-inch squares

Activity:
1. Blow up a rubber balloon. Rub the balloon on a student’s head of hair. The balloon is charged with static and ready to attract the paper.
2. Hold the balloon above the pile of cut paper. Lower the balloon toward the paper and have the paper hop on the balloon and watch some of the pieces hop off. Have fun!
**Station 3: Get the Pepper Out of the Salt**

Materials:
- Spoon of pepper
- Spoon of salt
- Small plastic comb
- Paper

Activity:
1. Place a piece of paper on a table or desk. Mix the pepper and salt on the piece of paper.
2. Comb your hair with 15 to 20 strokes. Then hold the comb over the pepper and salt. The comb should attract the pepper but not the salt. Pepper weighs less than salt. The static electricity is strong enough to lift the pepper but not the salt.

**Station 4: Static Cling!**

Materials:
- Sheer nylon stocking
- Lightweight plastic (plastic shopping bags)
- Small wall

Activity:
1. Hold the stocking against a smooth wall.
2. Rub the stocking (while against the wall) with the plastic. Stroke the stocking in one direction 15 times.
3. Let go of the stocking. The stocking should cling to the wall.

(Optional) **Station 5: Balloon/Can Static Electricity Activity**

Follow Activity/Procedures from yesterday. Play balloon and can races.
<table>
<thead>
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