

Lights On...Lights Off

2nd Grade

Text Connections: *Quirkles: Ellie Electricity* by Creative 3
How Ben Franklin Stole the Lightning, by Rosalyn Schanzer



Design Challenge Summary

Challenge: What will the students be required to do?

One night, you hear the storm-warning sirens sound the alarm. The electricity goes off in your house. You are with a friend and you both grab your flashlights. Suddenly, you bump into each other in the dark and your flashlights crash to the floor and break into several pieces. You must work with your group to build a working flashlight from the pieces that you collect off the floor.

Standards: What standards are addressed?

Science:

NS.1.2.1 Communicate observations orally, in writing and in graphic organizers

NS.1.2.2 Develop questions that guide scientific inquiry

NS.1.2.3 Conduct scientific investigations as individually and in teams

NS.1.2.4 Estimate and measure length...

NS.1.2.5 Collect measurable empirical evidence in teams and as individuals

NS.1.2.6 Make predictions in teams and as individuals based upon empirical evidence

NS.1.2.7 Use age-appropriate equipment and tools in scientific investigations

NS.1.2.8 Apply lab safety rules as they relate to specific science lab activities

P.S.7.2.3 Demonstrate methods of using electricity to produce light, heat, and sound.

Math:

Mathematical Practice Standards

Make sense of problems and persevere in solving them

Other:

W.2.2 Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points and provide a concluding statement or section

W.2.3 Write narratives in which they recount a well-elaborated event or short sequence of events, include details to describe actions, thoughts and feelings, use temporal words to signal event order, and provide a sense of closure See Extension

W.2.7 Participate in shared research and writing projects

SL.2.1 Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups

SL.2.3 Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information or deepen understanding of a topic or issue

SL.2.4 Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences

SL.2.6 Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification

GT Process Skills:

Divergent/Creative Thinking

Convergent/Logical or Analytical Thinking

Visual/Spatial Thinking

Evaluative/Scientific Thinking

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<p>Result: What will students know, value, and be able to do as a result of the lesson? What's the big idea?</p> <p>Know and apply the engineering design loop process. Demonstrate ability to modify designs based on observations and predictions. Work collaboratively on solving a problem.</p>
<p>Assessment: What evidence will be used to determine student learning?</p> <p>Did they (what the challenge required)? Did they follow the design loop process? Did they work collaboratively?</p>
<p>Prior Knowledge/Experiences: What prior content knowledge and skills will the students need?</p> <p>Experience with the Engineering Design Loop process Connections to the Mathematical Practices Investigations/inquiry in Science Experiences with learning about Ben Franklin and his discoveries with lightning, use of predictions to determine how a bulb can light using a wire, bulb, and battery</p>
<p>Summary/Connections: How will this design challenge connect with new/future learning, other content areas, real world experiences, etc.?</p> <p>This lesson will help students develop problem solving skills and collaboration skills that are essential in succeeding in the 21st century. It will allow student the opportunity to transfer and apply skills from various content areas within one task.</p> <p>As a summary activity, you could engage students in: W.2.2 Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points and provide a concluding statement or section</p> <p>Extensions: Students will write an informative/explanatory "how to" steps used to build the their working flashlight.</p>
<p>Materials/Equipment/Preparation: What materials and equipment will students need to successfully complete this design challenge?</p> <p>Each group will need electricity bags with alligator clips, bulbs, bulb holders, batteries, battery holders with fahnestock clips, paper clips, pencil, and note-book paper. They will also receive the items that were picked up from the floor: chalk, eraser, piece of yarn, penny, paper clip, packing peanut, binder clip, nail, washer, brad, marble small piece of foil, small piece of plastic mesh, small piece of metal mesh.</p>

ADDITIONAL INFORMATION

Lesson 1: Ellie Electricity introduction and jumping paper

Lesson 2: Brain Pop <https://www.brainpop.com/science/energy/staticelectricity/>

Static electricity exploration with Static Bags and labsheet (DWshare, REACH).

Vocabulary: conductors, insulators, circuits, proton, electron, neutron, positive charge, negative charge, attract, repel

Lesson 3: **REACH Enrichment-STEM**, Lights On...Lights Off

Lesson 4: How Ben Franklin Stole the Lightning,

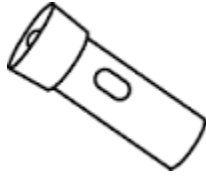
Animated Hero Classics: Benjamin Franklin <https://youtu.be/00mjkElyE6Y>,

Lightening PowerPoint (DW share, REACH) and building a series circuit.

Lesson 5: Floating Orb (we can hold this until colder weather; may have to teach out of sequence)

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Lights On...Lights Off REACH STEM Lesson Plan



A	<p>Access Prior Knowledge:</p> <ul style="list-style-type: none">• Have you ever experienced the electricity going out in your house?
G	<p>Goal:</p> <ul style="list-style-type: none">• Student will work with a small group to build a working flashlight from the pieces collected off the floor.
N	<p>New Information:</p> <ul style="list-style-type: none">• Discuss what makes connections.
A	<p>Application:</p> <ul style="list-style-type: none">• Student will work with a small group to create a complete circuit to light a bulb.• Students will debrief what materials made good connections and those that didn't.• NOTE: Engineering Design Loop, Steps #5 + #6
G	<p>Generalize the Goal:</p> <ul style="list-style-type: none">• Student will draw and label a sketch of their working flashlight.

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Group Supplies:

2 Battery holders with Fahnestock clips
2 Bulb Holders with Fahnestock clips
2 Bulbs
4 Alligator clips/wires
2 Batteries
Paperclips
Pencil
Note-book paper

Miscellaneous Materials from the Floor:

chalk, eraser, piece of yarn, penny,
paper clip, packing peanut, binder clip,
nail, washer, brad, marble,
small piece of foil,
small piece of plastic mesh,
small piece of metal mesh

