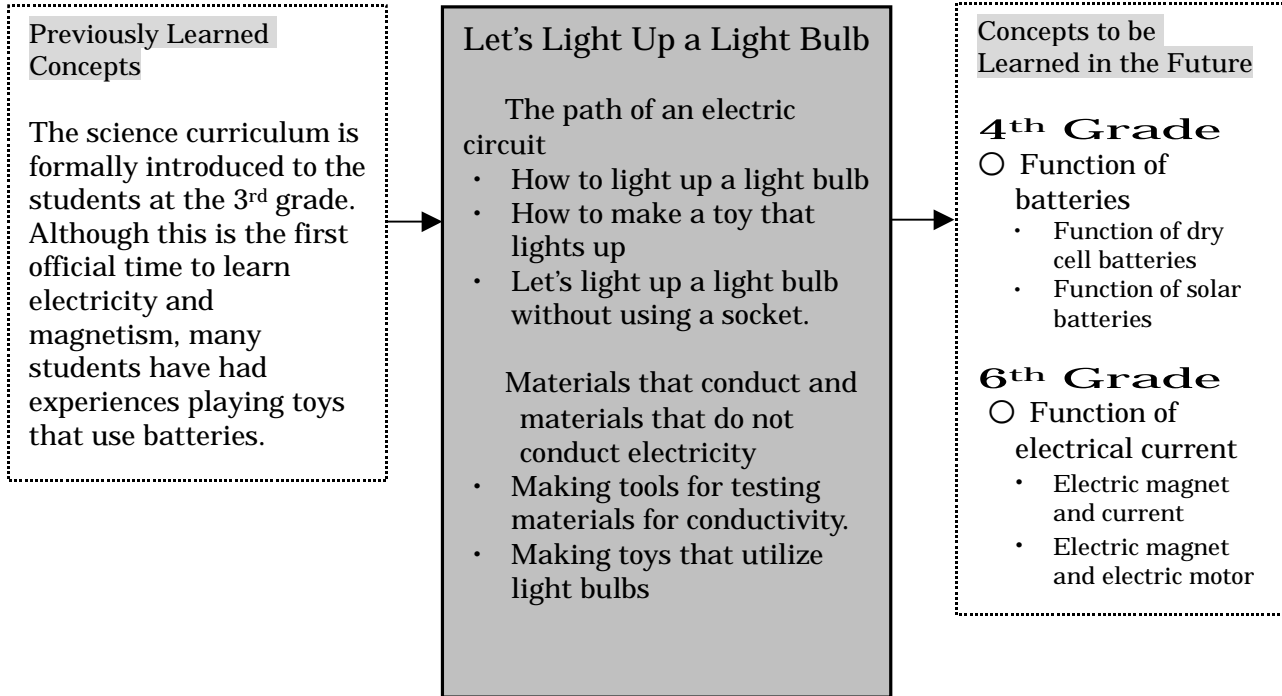


3rd Grade, Class B Science Lesson Plan

November 14, 2000 (Tuesday)
 2nd Period 3-B Classroom
 Instructor: Katsushi Kobayashi
 Number of Students: 17

1. Name of the Unit: Let's Light Up a Light Bulb!

2. Relationship of the Unit to the Curriculum



3. Instructional Plan

Let's Light Up a Light Bulb (Total: 7 lessons)

- How to light up a light bulb 1 lesson (this lesson)
- How to make a toy that lights up 2 lessons
- Making tools for testing materials for conductivity 1 lesson
- Materials that conduct and materials that do not conduct electricity 1 lesson
- Making toys that utilize light bulbs 2 lessons

4. Instruction of this Lesson

(1) Title: How to light up a light bulb

(2) Goal

- Be able to investigate enthusiastically the ways that the light lights up or does not lights up by connecting batteries, miniature light bulbs, and wires.
- Be able to think out many ways to connect batteries, miniature light bulbs, and wires.
- Be able to understand that if wires are connected from the anode (+) of the battery to the miniature light bulb to the cathode (-) of the battery, the light lights up.

(3) Relationship of the Lesson to the Goal of Science Education at the School

Science Education Goal:

“Not only to rear students’ minds to autonomously connect with surrounding nature and to love

nature, but also to foster their abilities to investigate problems in nature scientifically.”

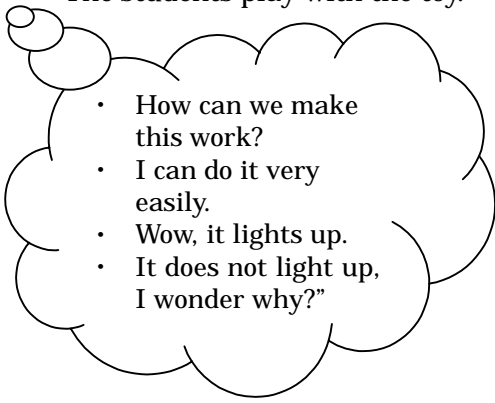
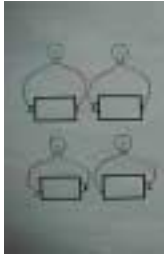
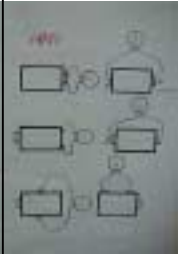
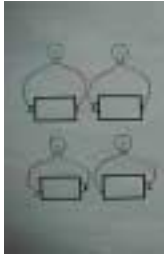
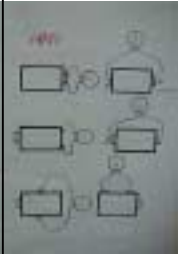
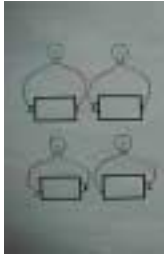
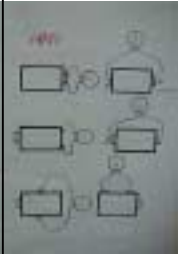
Although this will be the first time for the students to formally learn about electricity, they already have had experiences playing with toys or using flashlights that use batteries and miniature light bulbs. However, they do not have much experience in their lives thinking about and experimenting with the actual connections that make light bulbs light up. In addition they have very limited experience learning about what materials conduct electricity and what materials do not.

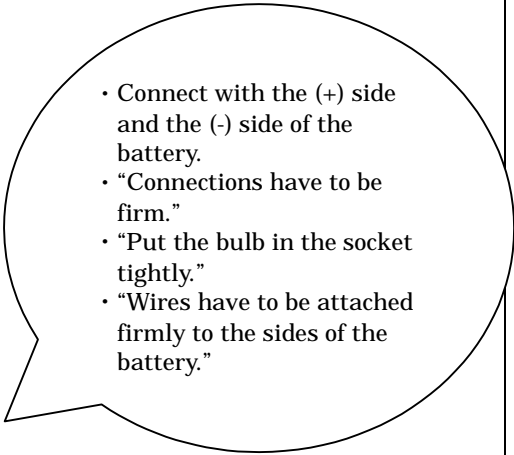
In this lesson, the children will become familiar with materials such as batteries, wires, and light bulbs by actually making an electrical path on their own. I will try to promote students’ interest in experimentation by creating an environment in which the students can compare what worked and what did not work to light up the bulb. I would like to foster students’ ability to observe and think about electricity and electric circuit through fun activities.

As an extended activity to foster students’ interest in learning, the students will make toys that use batteries and light bulbs. This activity is placed at the end of this unit and is based on all the knowledge they have gained in this unit.

(4) Learning Process

Steps	Activity of the Students	Teacher's Support and Points to Remember	Evaluation View Point
Intro- duction (10)	<div data-bbox="267 877 1258 970" style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;">Let's light up a light bulb using batteries and wires.</p> </div> <p>The students get ideas about what they are going to learn in this lesson by looking at the toy that the teacher made.</p> <p>The students talk about the toy.</p> <div data-bbox="267 1239 738 1507" style="border: 1px solid black; border-radius: 50%; padding: 10px; margin-top: 10px;"> <ul style="list-style-type: none"> • That is a battery. • That is a light bulb. • That is called a "wire." </div>	<ul style="list-style-type: none"> • The teacher shows the toy he made. • He motivates students by explaining today's topic: "We are going to learn about electricity (batteries and light bulbs)." • The teacher shows batteries, wires and light bulbs. • The teacher ask the students to present their observations to the class. 	

	<p>The students play with the toy.</p>  <ul style="list-style-type: none"> • How can we make this work? • I can do it very easily. • Wow, it lights up. • It does not light up, I wonder why?" <ul style="list-style-type: none"> • Try to turn the light on and off. • Try to turn it in different ways. 	<ul style="list-style-type: none"> • Pair up the students. • Prepare enough batteries, light bulbs, and wires for each pair. • Tell the students they can talk to each other about their work. • Help any students who are struggling. Also talk to the students who are already finished and give them some suggestions. For example, <p style="text-align: center;">↓</p> <ul style="list-style-type: none"> • What will happen if you connect the battery in the reverse direction? • What will happen if you loosen the bulb from the socket? <p style="text-align: center;">(Walk around the classroom)</p>	<p>Were the students motivated to figure out how they can light up the bulb?</p>				
<p>Development 1 (15)</p>	<p>Problem:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Let's make a path that lights up the bulb and one that does not.</p> </div> <p>The Students to make various connections that light up or do not light up.</p> <p>Fill out the work sheet with the various paths tried.</p> <p>Anticipated students' connecting examples.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; border-right: 1px solid black; padding: 5px;">Light up</th> <th style="padding: 5px;">Not light up</th> </tr> </thead> <tbody> <tr> <td style="border-right: 1px solid black; text-align: center;">  </td> <td style="text-align: center;">  </td> </tr> </tbody> </table>	Light up	Not light up			<ul style="list-style-type: none"> • Suggest to the students to connect the wires to different parts of the battery. • Encourage groups to try a variety of connections. (Walk around the classroom) • Pictures of batteries should be drawn on the work sheet. • Pictures of wires should be drawn using a red or a black colored pencil. • Encourage students to try many connections including the ones that do not light up the bulbs. Unconnected (i.e., loose wires) paths should be included. 	<p>Were the students trying hard to find many different ways to work out the paths?</p> <p>Were the students able to write down many different ways to connect bulbs, batteries, and wires on the work sheet?</p>
Light up	Not light up						
							

<p>Development 2 (20)</p>	<p>Present to the class which connection lights up and which ones do not.</p> <p>Discuss paths that work.</p>  <ul style="list-style-type: none"> • Connect with the (+) side and the (-) side of the battery. • “Connections have to be firm.” • “Put the bulb in the socket tightly.” • “Wires have to be attached firmly to the sides of the battery.” 	<ul style="list-style-type: none"> • Prepare models or displays of batteries, light bulbs and wires and demonstrate the students’ presented ideas on the blackboard. • Include students’ ideas even if the idea is just using different colored wires with the same path. • The students continue to present their ideas. Make sure the students understand the names of the parts of the battery and how the electricity passes through the circuit they created. 	<p>Were the students motivated to do presentation?</p> <p>Were the students able to listen to classmates’ presentation?</p> <p>Could the students understand the proper names for the part of the battery?</p>
<p>Conclusion (5)</p>	<p>Summarize the facts about electric circuits.</p> <ul style="list-style-type: none"> • (+ or -) side of a battery wire a light bulb wire (- or +) side of a battery • Go over the diagram of a circuit on the work sheet. Ask the students to use colored pencils to trace the circuit. • Summarize the points on the worksheet. 	<ul style="list-style-type: none"> • When electricity runs through the circuit and turns on the light bulb, the path looks like a “ring” or “circle.” • Ask the students to trace the successful circuit on the worksheet using colored pencils. <p>(Walk around the classroom)</p>	<p>Were the students able to understand that if the + side of a battery, a miniature light bulb, and – side of the battery are connected and form a “ring (circle),” the light bulb will light up.</p>

(5) Evaluation

Were the students able to investigate enthusiastically the connections of batteries and light bulbs and what lights up and does not lights up? (interest, desire, attitudes),(skills, expression)

Were the students able to think about many different ways to connect batteries and light bulbs? (thinking)

Were the students able to understand that a light bulb lights up when the (+) side of a battery, a bulb, and the (-) side of a battery are connected in a circle. (knowledge, understanding).