

County Implementation Award Program (CIAP) Math and Science Lesson

Unit Title: Ecosystems
Lesson Title: Do Plants Need Light to Live?
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Grade Level: Grade 2
Time Frame: 1.5 hours plus several 15-minute observation/follow up opportunities
<p>Targeted Standard(s)</p> <p>NGSS:2-LS2-1 Plan and conduct an investigation to determine if plants need light and water to grow.</p> <p>CCSS.Math.Content.2.MD.A.1: Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.</p> <p>CCSS.Math.Content.2.MD.A.3: Measure to determine how much longer one object is than another, expressing the length difference in terms of standard-length measurement.</p> <p>MP3 Construct viable arguments and critique the reasoning of others</p> <p>MP2 Reason Abstractly and Quantitatively</p> <p>MP4 Model with Mathematics</p> <p>MP5 Use appropriate tools strategically</p> <p>CCSS.ELA.Literacy. 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>Short Description of Targeted Phenomenon: Take students outside to look at plants that are and are not thriving on campus. Alternatively, show students photos of plants growing in different locations with and without full sunlight. Or plants growing video https://www.youtube.com/watch?v=jyRw597JBVg</p> <p>Plants without light will not thrive compared to plants receiving light.</p>
<p style="text-align: center;">Three Dimensions of NGSS</p> <p>Science & Engineering Practice/s (SEP): (2-LS2-1) Plan and conduct an investigation collaboratively to produce data to serves as a basis for evidence to answer the question; Do plants need water to grow?</p> <p>Crosscutting Concept/s (CCC): (2-LS2 –1) Cause and effect – Events have causes that generate observable patterns.</p> <p>Disciplinary Core Idea/s (DCI) (2-LS2-1) Plants depend on water and light to grow.</p> <p>ETS1.B Designs can be conveyed through the sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people.</p>

<p>Language Supports: transmit (light) or block (light) - demonstration of different materials that transmit various degrees of light.</p>	
<p>Materials Needed: shoe boxes, plastic pots, toilet paper tubes, soil, x-acto knife/scissors, felt, burlap, cardboards, black plastic bags, saran wrap (clear and colored), or plastic sleeves (clear and colored), wax paper, light cloth, tape, rulers, and access to digital cameras (such as Flip Grid, Seesaw, or iMovie) 2 small potted plants per group of 4 students.</p>	
<p>Objective(s):</p> <ol style="list-style-type: none"> 1. Students will work in groups of 4 to design 2 containers for exploring how much and what type of light a plant might need to continue to grow well. 2. They will vary the amount or type of light each of the two plants receive and compare their results to make a conclusion. 3. Students will measure the growth of each of their plants using inches and centimeters. 4. Students will record their results/findings using a digital camera and record a statement about their results. 	
<p>How Math and Science concepts/skills/practices were integrated in this lesson: Students are measuring the growth of their plants which is determined by the amount and type of light the plants receive.</p>	
<p>Possible Challenges /Misconceptions: The absence of light promotes growth. If students block all the light some plants may grow tall initially to reach light.</p>	
<p>Formative Assessment: Students will design two containers: One which allows light in, and one that blocks or alters the type of light the plant receives. Students will have made and recorded their observations in their science journal at the end of one and two weeks.</p>	
<p>Lesson Opening</p>	
<p>Teacher Actions:</p> <ol style="list-style-type: none"> 1) Show students a dead plant. Have students predict what made the plant die. Ask what could have been done to keep the plant alive. 2) Chart students' ideas on chart paper or electronically. Leave space between each idea to add new ideas from then next step 3) Ask how someone might change or control each of the ideas mentioned on the chart. Record students' ideas on the chart paper/electronic chart. 	<p>Student Actions:</p> <ol style="list-style-type: none"> 1) Students may suggest watering it and hopefully, giving it sunshine, (fertilizing it, and putting it in the ground might also be suggested). 3) Students may make suggestions about watering ideas, how to fertilize, or give ideas of where to plant a plant in a garden.
<p>Lesson Introduction</p>	
<p>Teacher Actions: Let students know they will be exploring the effects of light on plant growth.</p>	<p>Student Actions</p>

<p>Show them the plants they will be using for their exploration.</p> <p>1.) Then have students look at the light filtering/blocking materials to observe how the materials block or transmit light. They may go to the window or hold the materials up to the light. Introduce them to the concept of transmitting and blocking light. Have students sort for transmitting materials and blocking materials. Have students discuss what type of light and how much light might a plant need to survive? Would all plants need the same amount and type?</p>	<p>1.) Students will sort the light filtering materials by their ability to filter light and block light.</p>
<p>Body of Lesson</p>	
<p>Teacher Actions:</p> <p>1) Inform students that they are to design a method of blocking or filtering the light for one of the two plants their group will receive. They are to record their designs in their Science Journal. Have students measure the height of each of their plants and record it on the recording sheet provided or in their Science Journal.</p> <p>2) Next have students explore the rest of the materials to determine what materials they will use to set up their exploration. They will then draw up a plan for their light blocking/filtering portion of the exploration.</p> <p>3) Allow students time to create their coverings for their plants. 5.) Demonstrate how students will photograph and record their observations in their Science Journals or their <u>Do Plants Need Light to Grow? Recording sheet</u> (see below in "Other Resources")</p> <p>4) Allow students to place their plants in a place that allows light to reach the plants.</p> <p>5) After 5 days to a week, have students remove the coverings from their plants to record their observations of their plants. They should re-measure their plants and record them on the <u>Do Plants Need Light</u> record sheet (see below in "Other Resources"). Have students take photos of their plants with a digital camera as part of their data.</p>	<p>Student Actions</p> <p>1) Students will use rulers to measure their plants' heights and widths. They will record their sketches for their designs in their science journal. They will take pictures of their plants as a record of starting data.</p> <p>2) Students will explore the materials and then create a plan for blocking or filtering light for their second plant. They will need to decide if they want to block the light to the plant completely or partially.</p> <p>3) Students will work in groups of 4 to create a covering for their Plant B. They will record their plants' appearances and measurements of their plants.</p> <p>4) Students should find a sunny area to place both of their plants.</p> <p>5) Students will record their observations and measure the growth of each of their plants. They will record their observations of the plants' appearances. Students will also take a picture of their plants as a means of recording data.</p> <p>6) Students will discuss their observations of their plants and how they have changed.</p>

<p>6) Lead students in a discussion about their findings so far.</p> <p>7) Repeat step 5 in another 5- 7 days.</p>	
Lesson Closure	
<p>Teacher Actions: Allow students to present their data (including their photographs of their plants) to the rest of the class.</p> <p>Lead the discussion to address the influence of light and the lack of light on their plants.</p> <p>Big idea: Do plants need light to grow. How did limiting, blocking, or changing the type of light affect the plants? What other factors could have been and influence on the growth of your plants? What might you have done differently for your exploration? How might your results have changed if your exploration had been longer? Shorter?</p>	<p>Student Actions</p> <p>Students will present their data to the class and discuss their observations of their plants and how they have changed.</p>
<p>Summative Assessment: Students will write a short response to the question; Do Plants Need Light to Survive? that states an idea of plants needing light to live and uses their data and observations as evidence.</p>	
<p>Other Teaching Resources:</p>	
<p>Lab Safety: Adults should use the x-acto knife to cut out the students' designs if needed.</p>	
<p>Extensions (if any): ?</p>	

Do Plants Need Light to Survive?

Group Members:

Label each of your plants with the Plant A or Plant B labels. Be sure to include your group name on your labels. Record the height and width of your plants in the table below.

Date	Plant A height	
	Plant A width	
Appearance		
	Plant B height	
	Plant B width	
Appearance		
Date	Plant A height	Growth
	Plant A width	Growth
Appearance		
	Plant B height	Growth
	Plant B width	Growth
Appearance		
Date	Plant A height	Growth
	Plant A width	Growth
Appearance		
	Total Growth of Plant A	
	Plant B Height	Growth
	Plant B width	Growth
Appearance		
	Total Growth of Plant B	