



LIFE CYCLE OF PLANTS AND THEIR USES

Grade Level	2nd	Subject Science	Plant life cycle and erosion
<p>Objective(s): The student will identify the stages in the life cycle of a flowering plant. They will construct and interpret models/diagrams of plant life cycles. The student will collect this data on a weekly basis. He/she will also observe, describe, and compare how plants can benefit people, animals, and our earth. The student will identify how plants can reduce erosion.</p>		<p>SOL Addressed: 2.1 a, g, h, j, k, l The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which</p> <ul style="list-style-type: none"> ○ a - observations and predictions are made and questions are formed ○ g - conditions that influence a change are identified and inferences are made ○ h - data are collected and recorded ○ j - conclusions are drawn ○ k - observations and data are communicated ○ l - simple physical models are designed and constructed to clarify explanations <p>2.4b The student will investigate and understand that plants undergo a series of orderly changes as they mature and grow. 2.8d The student will realize that plants reduce erosion 2.7b The student will investigate and understand that weather can cause weathering and erosion of land surfaces.</p> <p>Common Core Standards: NGSS2-LS2-1 The student will plan and conduct an investigation to determine if plants need sunlight and water to grow. NGSS2-ESS2-1 The student will compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.</p>	
<p>Materials Needed Per Class of 30</p>	<ul style="list-style-type: none"> • Soil enough to fill the cups and six aluminum lasagna sized pans • 30 seeds (flower or sedum) • 30 cups • 12 aluminum lasagna pans • soil with grass already growing (enough for six lasagna pans) • plant journals • pitchers with water • fans (small hand held ones are fine) • computer with Internet to show CEED site • pictures of erosion 		

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<p>Prior Knowledge</p>	<p>Prior Knowledge: Students should know what a cycle is. They should, also, know what plants need in order to grow and survive.</p>	
<p>Ways to differentiate this lesson plan</p>	<ul style="list-style-type: none"> • EXTENSION for Higher Level Learner - Students can research the different types of green roofs (extensive, semi-intensive and intensive). They can put together a slide show or poster to share the data with the class. • MODIFICATIONS - The students can work in small groups and record their information as a group or the students could complete the assignments independently. 	
<p>Introduction/ Anticipatory Set</p>	<p>Anticipatory Set: Use questioning to see what the students already know about cycles, plants, and what they need to survive.</p> <p>Questions to ask students:</p> <ul style="list-style-type: none"> • What is a cycle? • What are some things that happen in a cycle? • What shape do we think of when we think of a cycle? Why? • What do plants need to grow and survive? 	<p>Introduction:</p> <p>The students will review what they already know about plants.</p> <p>As a class they will create a list of things they would like to learn about plants.</p>
<p>Guided Practice</p>	<p>Students will need to be placed into groups of 4 or 5 people. All groups will have a set of supplies for each of the independent activities.</p> <p>The independent activities may take several days to complete and data will need to be collected over a long period of time.</p> <p>Explain to students or have a handout showing them what tasks need to be completed.</p>	

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<p style="text-align: center;">Independent Practice</p>	<ol style="list-style-type: none"> 1- Each student will place soil in their cups, plant flower seeds or sedum (this is the plant that is grown on part of the roof of the CEED building), and water them. They will record in their plant journal what the seeds look like and what they think will happen. They will record what they need to do to help their plant survive. The students will decide where to place their plant in the room so it will grow best. They will, also, be responsible for watering their plant (enough but not too much) and looking at the different plants to see which ones grow best and why. They will observe their plant and record the changes on a weekly basis in their plant journals. 2- The students in their groups will place a sweet potato in a clear (see through) jar with half of the potato in water. They will predict what they think will happen to the sweet potato and we will make a bar graph to record the data. The students will then observe the sweet potato on a weekly basis and record the changes in their plant journal weekly. 3- The students in their groups will make a list of the benefits of plants for humans, animals, and our earth. They will share their answers with the class and together we will create a chart and discuss their answers. 4- The students will look at how plants prevent erosion. Students in their groups will demonstrate erosion caused by wind and rain. They will have two pans. One with plain soil and one with soil that has grass growing. They will use a fan to show wind erosion of the plain soil and a pitcher with water to show erosion by rain or running water. They will repeat the process on the soil with grass. They will see how planting grass, trees, shrubs, etc. can prevent erosion from occurring. They will think of other things that could help prevent erosion of the plain soil. 5- Students will see how plants can be used on buildings to help capture precipitation, absorb heat, and filter pollutants and carbon dioxide from the air. Go to the CEED homepage and click on the HOW IT WORKS tab. Scroll down to OVERHANGS AND GREEN ROOF. Click on the TV and allow the students to watch the short video. The page , also, contains some good information on how plants are used at the CEED building. There are lots of great pictures on the internet to show the students the different styles of green roofs.
<p style="text-align: center;">Closure (Summary of Lesson)</p>	<p>Look back at their original predictions for the experiments and discuss with the group what predictions they made originally and what actually happened.</p> <p>Ask students what they learned throughout this process.</p> <p>Discuss with students the following:</p> <p>What are the benefits of plants for our earth, people, and animals?</p> <p>What are the series of orderly changes that a plant goes through as it matures and grows?</p> <p>What is erosion, what causes it, and how can it be prevented?</p>
<p style="text-align: center;">CEED Building Application/ Sensor Data</p>	<p>Students will use the CEED website to better understand how plants can be used on rooftops and what the benefits of doing that is.</p> <p>Students will see how plants can be used on buildings to help capture precipitation, absorb heat, and filter pollutants and carbon dioxide from the air. Go to the CEED homepage and click on the HOW IT WORKS tab. Scroll down to OVERHANGS AND GREEN ROOF. Click on the TV and allow the students to watch the short video. The page , also, contains some good information on how plants are used at the CEED building.</p>

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Assessment	<p>Students completed data charts, plant journals, and graphs can be assessed.</p> <p>Students could construct and label a plant life cycle model.</p> <p>Students could write an essay about erosion, its causes, and how it can be prevented.</p> <p>Students could make a list of how plants benefit people, animals, and our earth.</p>
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