Question: Do Plants Need Sunlight to Grow ?

2nd Grade

**Big Idea:**

Why do plants need sunlight to grow?

Where do plants need to be placed to grow the most?

Let’s investigate by planting the same plant with different sunlight and water levels

Let’s be scientists/engineers by carrying out an experiment to answer our question.

**Tasks**

Students will plant a seed in four different controlled experiments and record the growth over two weeks. Students will plant four bean plants, in four jars, and test out different experiments with the plants. The first plant will get sunlight and water, the second will get sunlight and no water, the third will get water and no light, and the fourth will get no water and no light. AFter three weeks, students will evaluate how each plant did, or did not grow, and conclude whether plants need light and water to grow.

**Justification**

This lesson series integrates science through the plant investigation, engineering through the experiment, art through the modeling of the plants, and math through using abstract reasoning.

**Standards**

Social Studies:

SS.2.5 Describe food production and consumption long ago and today, including the roles of farmers, processors, distributors, weather, and land and water resources.

ELA/Literacy:

W.2.8Recall information from experiences or gather information from provided sources to answer a question

CCSS Mathematics:

MP.2   Reason abstractly and quantitatively.

NGSS Science Standards:

LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.

1. Disciplinary Core Ideas: Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2)
2. Science and Engineering Practices: Plants depend on water and light to grow. (2-LS2-1)

NGSS Science Standards:

Crosscutting Concepts:

Events have causes that generate observable patterns. (2-LS2-1)

Engaging Context: To engage the students, they will start off by collaborating with one another by using the strategy, “Think-Pair-Share.” The students will be asked to discuss with their partner what they think plants need to grow and why.

1. Measurable Objectives: The students will explain why plants need sunlight and where plants need to be placed in order to grow. Students will plant four bean plants, in four jars, and test out different experiments with the plants. The first plant will get sunlight and water, the second will get sunlight and no water, the third will get water and no light, and the fourth will get no water and no light. AFter three weeks, students will evaluate how each plant did, or did not grow, and conclude whether plants need light and water to grow.
2. Total Time: Five days throughout three weeks, students will plant on day one then observe and record twice a week for two weeks, once on Monday and once on Wednesday

**Day 1-Engage**

We will begin by reading some texts about plants and their properties, and how they grow. Students will use information in their textbooks to give them this background knowledge. If students do not have a science textbook, find expository texts online about the plant life cycle.

Next students will make a prediction about what will happen if a plant does not receive sunlight or water. Students will be writing this in their science journal, with sentence frames provided by the teacher. We will then make our four controlled experiments. These will include;

1. With Sunlight and water

2. Sunlight and no water

3. No sunlight and water

4. No sunlight and no water

**Description and Detailed Sequence of Activities:**

• Use a clean glass 12 oz jar

• Place some soil until the jar is half full,  and plant the bean seed in the soil

• Fill two of the planted jars with water

• Place one jar with water and one without water under sunlight, put the other two jars in a dark place; make sure all jars are labeled, the teacher will assist the students with labeling.

Students will draw a model of two plants in the dark, and the two in the sunlight in their science journal, the teacher will provide a handout that with boxes that the students may draw it in, then they can cut and glue it into their journal. The teacher will give direct instructions on how to conduct this as the students complete the activity.

**Day 2- Explore Through Investigation**

In a few days the seeds will begin to sprout. Observe how the roots grow down and the shoots grow up. The students will observe the plants every Monday and Friday for the next two weeks until the investigation is over. They will draw images of how the plant is growing using a handout and cutting and pasting it into their science journals as they did on day. Students will additionally be asked to respond to the following questions in their science journals.

1. Look at the plants and draw a picture of how each is growing
2. Compare the plants with and without water, and with and without sunlight and see how each plant is growing differently. Students will discuss with their groups and record what they discussed in their groups in their science journals.

**Day 3- Elaborate**

Continue to observe the different plants and record the growth of the different plants, as well as record and model the growth of the plants in the same way as they did on day 1 and 2 in which the teacher will provide a handout that with boxes that the students may draw it in, then they can cut and glue it into their journal. The teacher will give direct instructions on how to conduct this as the students complete the activity.

**Day 4-Explain**

Draw the last model of your plants, then record the growth of the four different plants in your science investigative journals. Which plant grew the most? How does sunlight affect plants? How does water affect plants?

**Day 5-Evaluate**

The class will conduct a discussion with groups which they will later share with the whole class. The groups will discuss the questions together, and then the teacher will pick on one student from each group at random to answer the question.

1. Review with students how sunlight and water affect plants
2. Discuss how each plant grew in its environment.
3. Ask students what type of environments would mimic how each plant grew.
4. Social Skills or Habits of Mind to Engage/Assess to Promote Student Motivation and Success
5. BSCS 5-E Framework

Engage:

 DIRECT INSTRUCTION: forming groups, assigning roles, describing roles and tasks

**Materials Manager/ Spy Tasks**:

Make sure your team receives and uses the materials without spilling; If the team has a question following Three Before ME  go to another team to answer your question [or see what they have learned]

**Checker's Tasks**:

Make sure the time limits are observed.  Help others complete their tasks. Let instructor know when your team has completed the lab

**Recorder's Tasks:**

Carefully observes \

**Encourager/Observer' s Tasks:**

Coach the team to persevere and stay together while sharing and turn-taking. Notice, identify and record occurrence of team members' social skills and habits of mind.

 ( Observer records individual performance)

EXPLORE:   We will use our inquiry skills of predicting (hypothesis testing) comparing and analyzing to: 6 groups of 4 students  (Number modified for class composition).

EXPLAIN:     As students complete the launch, inquiry, culminating activity they share…

 their prior knowledge, observations and questions about why the substances behave the way they do when dropped one-by-one from the eye dropper.

**EXTEND/ELABORATE**:  In small groups and in the final performance students have opportunities to extend their knowledge and to elaborate on their ideas.  The teacher provides mini-lessons as needed to scaffold student thinking and understanding.

**EVALUATE**

**Checklists and Rubrics** provided for student goal setting and self-assessment; Peer Assessment  (Team Performance Rubric) [Rate Your Mates]  Content Assessment (poster)

1. Materials (per group)
* 4 jars
* Potting soil
* Bean seeds
* Water
* Box to put over plants in dark
* Science recording journal