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3/27/19

## **PBL Science Lesson: Kindergarten Plants' Needs**

**Big Idea:** Students will learn about what plants need to grow through class discussion, “planting” lima beans in a bag, and watching/recording the changes they see occur over a number of days. Students will use prediction, observation, and draw conclusions.

**NGSS Standard(s):** K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals and the places they live.

**I. Formation of Groups:** Students will be asked to work with their pre-assigned pair at the table group they normally sit in for all pair sharing and partner work. Group work will be done with their assigned table groups of which there are four.

**II. Role Assignments:** Beginning with the Materials Manager all roles are assigned to the right (clockwise)

**Materials Manager:** Gathers the materials for the project including enough bags and lima beans for each student, paper towels, and a spray bottle with water.

**Timekeeper:** They will keep track of time and let the group know when there are 10 and 2 minutes left before cleaning up for snack.

**Encourager:** The encourager will help to keep their group on track and encourage diligent work throughout the investigation.

**Recorder:** The recorder will come up with a drawing based on their group’s predictions. Students will give the recorder input and they will do their best to synthesize the ideas into one picture.

**Reporter:** This student will share out their groups predictions of what the bean will look after a week has passed. They will tell the whole class what the group’s ideas were.

### **III. Task**

Engage:

Hook- Did you know that you can grow a seed without dirt? Have students discuss how they think this could be possible. Ask students to share some ideas and confirm their good ideas. Tell them that through this lesson they will be able to grow something without dirt.

To engage the students in learning about plants and their needs to survive, I will present them with a poster sized KWL chart. I will ask the class what they think plants need to grow and thrive. They will think-pair-share in order to generate ideas. Then, I will call on quiet students to share what they know about plants and put the information in the “know” column of the chart. Students will then be asked what they want to learn more about regarding plants. They will think-pair-share again in order to generate ideas of things they do not yet know. I will call on quiet students to share what they want to know about plants and put the

information in the “want to know” column of the chart. We will put away our chart/poster for later in the lesson.

Explore: I will tell the students that we will be exploring the need for seeds to sprout and what conditions are necessary to do so.

I will hold up a bag and explain that we will be “planting” seeds in a bag. The paper towel will be our soil. (Direct instruction)

1. Fold the paper towel in quarters, and then spray it with water until moist.
2. Put the paper towel in the bag.
3. Hold up the lima bean and explain that it is the seed.
4. Place three beans spread out on the paper towel in the bag.
5. Use a hole punch in the bottom corner of the bag to allow for oxygen to get in. (Ask students why they think I may be putting a hole in the bag)
6. Ask students where the best place in the classroom might be to put the bag with seeds (The window. Why? Because the seeds will receive sunlight there.)

I will then have the students repeat the process I just showed during direct instruction on their own.

When they are finished we will tape their planted seeds in a bag up onto to the window and return to the carpet for a story.

Explain: After returning to the carpet we will read *How and Why Seeds Travel* by Elaine Pascoe.

We will discuss the stages of plants and how food comes from plants as we read the story. There will be an ongoing discussion about the changes we see every few days in our beans.

Extend: Students will fill out a new observation sheet every few days recording the changes they see and drawing a new picture. They will create a cover page and conclusion to the investigation that will be bound and taken home to look through with their caretaker.

Evaluate: Record in a science journal what they did today while exploring the needs of a seed. Students will draw a scientific picture of the beans in the window of how they look realistically. They will then explain the steps they went through in order to “plant” the seed found in the explore section of the lesson.

#### **IV. Time Limits:**

Engage (5 minutes)  
Explore (15 minutes)  
Explain (10 minutes)  
Extend (10 minutes)  
Evaluate (10 minutes)

#### **V. Social Skills and or Habits of Mind to Engage/Assess:**

-Attentive Listening- Students will actively listen during direct instruction in order to correctly plant their lima bean. They also need to practice active listening during think-pair-share.

**Commented [SFB1]:** I suggest that you have plant study booklets for each student.  
[https://drive.google.com/file/d/0B\\_gYCGzVzuz3R2VmbW15Znp5N28/view](https://drive.google.com/file/d/0B_gYCGzVzuz3R2VmbW15Znp5N28/view)

- Flexibility in Thinking- Students will also practice flexible thinking by making predictions and having their predictions challenged by their scientific observations.
- Perseverance- Students will show perseverance throughout this lesson by continuing to make scientific observations as the plant grows and by completing all tasks.
- Team Work- Students will work in small groups to help each other build their small greenhouse within the plastic bag after watching my example. If they have questions, I will direct them to a friend to ask before coming to the teacher.

**VI. Level of Voice:**

Students should maintain a level 2 voice on a scale of 1-5. This means that they should be talking with a small voice that someone cannot hear across the classroom but slightly louder than a whisper. I will give clear expectation of noise level before releasing students to their investigation.

**VII. Processing--Questions for groups and individual reflections:**

- What did you learn from this segment?
- what does a plant need to grow?
- Is it possible to start growing something without dirt?
- Was there anything you didn't like about the experiment?
- What was the most interesting thing you learned while observing your lima bean sprout?
- What more do you want to learn about plants?

**VIII. Assessment Content:**

Criteria	1- Needs Improvement	2- At Standard	3- Outstanding
Made predictions	Does not attempt to make predictions	Makes a prediction with no basis	Makes a prediction using prior knowledge
Completed Observations in Journal	Does not make any observations	Makes one or two observations	Makes two observations
Conclusion	Does not create a conclusion	Creates a conclusion without using what was learned	Creates a conclusion using what was learned

**Commented [SFB2]:** It is helpful to use a voice level poster – take a look at this search result and select one.  
[https://images.search.yahoo.com/search/images;\\_ylt=Aw9DulanJ1cFeAAwUVXNvoA;\\_ylu=X3oDMTEyMTR2OXYzBGNvbG8DZ3ExBHBvcwMxBH20aWQDQY4OTfhMQRzZWMDc2M-?p=voice+level+poster&fr=mcafee](https://images.search.yahoo.com/search/images;_ylt=Aw9DulanJ1cFeAAwUVXNvoA;_ylu=X3oDMTEyMTR2OXYzBGNvbG8DZ3ExBHBvcwMxBH20aWQDQY4OTfhMQRzZWMDc2M-?p=voice+level+poster&fr=mcafee)

**Commented [SFB3]:** Great inclusion. You may want to use images to promote understanding.

### Collaboration Self-Assessment

Action	Not yet	sometimes	Most of the time	Always
I listened to others' ideas				
I solved conflicts reasonably				
I helped with the investigation and participated in conversation				
I did my best work				
I completed all assignments				

**Commented [SFB4]:** This language is a bit complex for young children. I suggest using images along with this or simplifying the language.

**VIII. Encouraging Energizer:** Varied: Team selected from what has been introduced to the class previously.