Plant in a Jar

Lesson Overview

Students will demonstrate their understanding of plant processes by making observations and creating a model. They should have some knowledge of how to collect and record qualitative and quantitative data.

Standards Addressed

SC 2005 6-2.7 Summarize the processes required for plant survival (including photosynthesis, respiration, and transpiration).

SC 2014 6.L.5B.2 Analyze and interpret data to explain how the processes of photosynthesis, respiration, and transpiration work together to meet the needs of plants.

Disciplinary Literacy Best Practices

POE Probe (Predict, Observe and Explain)
Think, Ink, Pair, Share (Pairing Strategy of "sole mate")
Pairs Squared
Paint the Picture

Lesson Plan

Time Required – Initially 20-30 minutes and two additional 30-45 minute segments for follow up, with intermittent (weekly) check-ins on the progress of the plant in a jar.

Disciplinary Vocabulary: photosynthesis, respiration, transpiration, autotroph, leaves, sun, roots, water cycle, condensation, evaporation, oxygen, sugar, carbon dioxide, qualitative, quantitative

Materials Needed:

- Clear jar with a lid (at least one)
- Ivy plant
- Well-saturated potting soil
- Duct tape (Used to seal lid onto the jar)
- Well-lit area for placing jar (such as a window sill)
- Science notebook (or other recording area) for each student
- (1) Pencil per student
- Plain art paper or printer paper
- Colors (markers, crayons, etc.)
- Rulers (available for students to use for data collection)

NOTE Prior to the lesson, place the Ivy plant in the jar using the well-saturated potting soil and tape the lid to the jar using the duct tape. This jar should sit in the same place (such as a window sill) throughout the plant unit. Do not open the jar!

Assessment: Student illustrations from Paint the Picture and models of plant processes; records of data collection in notebooks; student dialogue

Engage

- This activity was used as an introduction to the plant unit and should occur during a part of one class period and will last approximately 20-30 minutes.
- Students are introduced to the ivy plant already planted in the jar. As the name Predict, Explain, Observe Probe suggests, students are asked to make a prediction about what will happen to the plant since the lid is sealed with duct tape. Students record their initial predictions in their notebooks, as well as, write an explanation of their prediction. In other words, why are they predicting that they think the plant will die in 2 days or why do they think it will die in a week, etc. Lastly, students are also asked to draw an illustration of their observations, both quantitative and qualitative, and record in their science notebooks.
- Students then share with their group and/or whole class their predictions about the Plant in a Jar. Inform students that they will continue to make further observations, predictions and explanations throughout the plant unit.

Explore

- Students explore the Plant in a Jar approximately once per week during the plant unit. During the check in, students will observe the plant, record those observations in their notebooks (qualitative and quantitative), make a new or adjusted prediction and write an explanation for their prediction. Students should dialogue about what they are noticing about the Plant in Jar and why they think they are seeing such results.
- **Please Note: Between observations, students have been introduced to the plant processes and are able to add the illustrations of photosynthesis, transpiration and respiration to their models.

Explain

- At the end of the plant unit (or even longer if you wish to leave the plant in a jar for extended time), students return to the plant-in-a-jar and again record their observations, make an explanation and make a new prediction based on their observations. Students are asked to revise or add to their illustrations in order to explain their predictions. This time, students are advised to NOT dialogue about what they are noticing about the Plant in a Jar. Instead, they are instructed to quietly observe and record in their notebooks. This becomes part of a THINK, INK, PAIR, SHARE. After students have had adequate time to Think and Ink, pair students – in a random way so that they have an opportunity to dialogue with someone not in their home group. A great way to pair is by “sole mates” which means students find someone who is wearing shoes that are similar to their own shoes in some way. Once students pair, they discuss not only what they are noticing now but also, how does it compare to their original prediction. Providing approximately 4 minutes for the pairs to dialogue, then announce

Pairs Squared – one pair will pair up with another pair nearby and continue dialogue. What are they noticing now, why do they think it's happened that way and how does that compare to their original prediction?

Extend

- This part will begin after the Think, Ink, Pair, Share but may flow into the next day in order to give students ample time to produce a final product for "publishing". Students are informed that now they will bring everything together that they have learned from this Plant in a Jar into one place and "Paint the Picture". For this, they will use plain art paper or printer paper, pencil, markers or crayons. They will need to create an illustration of the final Plant in a Jar, including plant processes that have kept the plant alive and growing throughout the time it has been sealed in the jar. As a teacher, be looking for, not only a correct illustration, but also arrows and vocabulary words that would show (with minimal words) how the plant is continuing to survive.

Teacher Reflections and Biographical Information

Although this was a great introduction to the plant unit, I think it would be a wonderful activity to start off the school year. Of course, students will think it will die and will be very specific with the number of weeks. I think it will have more of an impact if I start the school year off and revisit it, months later instead of weeks later. We can discuss and make observations throughout the school year. We can make connections when we study the water cycle and the weather unit. However, the plant unit is studied the last nine weeks of the school year and they will be better able to make the connections between the plant processes and their ability to survive if studied throughout the year.

A couple of suggestions for the jar: make sure to choose a jar that has a smooth surface. One of mine had a "ribbed" surface and made it difficult to view inside. Also, make sure there is plenty of room in the jar for the Ivy plant to grow.

Lesson Author:

This lesson was adapted from the University of South Carolina's STEP into the New Science Standards lesson, "Using Models to Assess Students' Prior Knowledge and Participate in Science Practices" and used by DeDee Quinn, 6th and 7th grade science teacher, Middle School of Pacolet, Spartanburg School District Three.