

Strand: 8.3	Standard: 8.3.1	Episode 2	Big Idea: When given the right resources, plants grow.
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Title: Jack and the Beanstalk	Time: 2-3 weeks 1 period for setup and 1 period for data analysis and about 5 minutes every day for data collection.	CCCs: <u>Cause and effect</u> <u>Matter and energy</u>	Practices: Plan and carrying out an investigation Analyzing and interpreting data Construct explanation
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Summary of episode:

Students will brainstorm where the mass of a plant comes from and what plants need to grow. They will then design and run an experiments on growing plants to determine what is necessary for plants to grow. They will return to at the end of this standard to form the final conclusions about plants and how they grow.

Gather:

Ask students to brainstorm where they think the mass of a plant comes from. After making a list ask them which of the things they have identified are required for a plant to grow. Have them decide if the items they have listed are needed. As a class, discuss what data would need to be collected to determine if those things are necessary for a plant to grow and how could you tell where a plant gets the matter needed to grow (gain mass). Based on the questions that were created during episode 1, students will identify various variables that are needed and that affect plant growth and **plan and carry out an investigation** to test one of those variables. In your class, guide your students to create experiments that would test the main variables of matter and energy affecting photosynthesis and growth: CO₂, light and water. Make sure each one is tested by multiple groups. Some students should be growing the plants in soil while others could chose another method (in a bag to control carbon dioxide, in paper towels to show the mass didn't come from the soil, cup of marbles, etc.).

Students should collect the data that would be necessary to show the plants growth in each of the variables. Through at least one of the experiment it is hope that they would determine that plant's mass increased but the soil's mass did not change. For example they could measure the mass of the plant at the beginning of the experiment and at the end of the experiment since the purpose is to show that the mass of the soil hasn't changed and the mass of the plant has.

Have the students run the experiments and collect plant growth data.

Reason: (come back to this after the 2 weeks of plant growth)

Students will **analyze and interpret the data** they have collected. Give students time to write conclusions on their experiments and **construct explanations** that answer their research questions.

Communicate:

Have students share their experiment conclusions with the class. Discuss the results as a class and solidify the findings from each of the experiments. Discuss as a class observations about the mass of the plants and where the mass came from.

Optional: have students watch the following [video](#) that helps solidify the idea of where the mass of a plant comes from.

As an exit ticket and assessment Have students individually and as an exit ticket write 2 sentences explaining the following

1: What are the necessary things for plants to grow (sunlight, water and carbon dioxide)?

2: Where does the mass of a plant come from (water and carbon dioxide)?

Assessment:

The 2 sentences the students write at the end should help the teacher understand how far the students are understanding the idea of photosynthesis and what items are necessary for photosynthesis as well as where the mass for the growth of a plant comes from. Look for students understanding that the molecules are rearranging to become the molecules used in the plant.

Materials, resources, handouts, etc:

https://www.youtube.com/watch?v=2KZb2_vcNTg

Materials for plant experiments: plant seeds (beans), containers (open and closed), soil, water, light sources, etc., and other supplies as determined by the students.

Scales to measure plant mass