



BEAN IN A JAR

OVERVIEW

Campers will learn about biology, growth, and the factors necessary for plant growth in the environment!

TOPIC AREA(S)

Biology

GRADE LEVEL

Grades 3-4

QUESTIONS PRIOR TO THE LESSON/GETTING EXCITED

- What makes something a plant?
- What do plants need to grow?
- What is photosynthesis?
- What is a greenhouse?

BACKGROUND INFORMATION FOR INSTRUCTORS (INCLUDE QUESTIONS W/ ANSWERS)

What makes something a plant?

- Plants make their own food through photosynthesis
- Plants have a surface layer (the cuticle) that protects their cells and prevents them from drying out
- Plant cells have cell walls! These are unique to plants and are not present in our own cells
- Plants can reproduce with spores (much like fungi) or by producing young (much like us - using sex cells and recombination)

What do plants need to grow?

- light! - they need this to supply energy for photosynthesis, this is from the sun
- air! - plants take CO₂ and convert it into oxygen, part of why they are so important to us!
- water! - plants need water for photosynthesis and to keep their cells stiff and healthy!
- soil to provide a growth substrate and nutrients! - plants need nutrients just like us! they require many different vitamins and minerals in order to grow strong and healthy (these include nitrogen, calcium, potassium, etc.). the soil provides space for the plants to grow their roots and provide support for the entire structure
- and space! - plants need to have enough space to grow their roots and shoots! much like if we were stuck in a small space, we would eventually become too cramped up - plants feel the same way and this will stop them from growing!

What is photosynthesis?

- photosynthesis - the process by which plants make their own food



- many plants are stationary to some extent and cannot get up to get their own food like we can - this is why they must create their own!
- plants use chlorophyll in their leaves to capture the sun's energy as "photons"
- this energy splits water molecules into hydrogen and oxygen - this is why plants release oxygen!
- The plant uses the remaining hydrogen and CO₂ from the air to create sugars for the plant to "eat" to give it energy!
- This is unique to plants! humans cannot photosynthesize

What is a greenhouse?

- a greenhouse is a controlled environment used to grow plants of varying types
- plants of any season can be grown here, the conditions can be altered to whatever they need to be
- often, these structures contain a clear glass roof - this allows for the sun to reach the plants, providing the warmth and energy that they need!
- greenhouses allow us to control the temperature, humidity, amount of sun, and amount of water/nutrients plants get

Fun Facts!

- The fastest growing woody plant in the world is bamboo. Bamboo can grow up to 35 inches in just one day!
- Tomatoes and avocados are considered fruits.
- Fungi (mushrooms) and algae (seaweed) are not considered plants, but are part of their own kingdoms.
- There are nearly 600 different species of carnivorous plants that actually eat insects and small animals.
- The largest flower in the world is the rafflesia which can grow to over three feet in diameter.

Here's a good video:

<https://www.youtube.com/watch?v=dUBIQ1fTRzI>



RELEVANCE TO THE CURRICULUM			
Grade 1 and 2	Grade 3 and 4	Grade 5 and 6	Grade 7 and 8
<ul style="list-style-type: none"> € Needs & Characteristics of Living Things € Growth and Changes in Animals € Materials, Objects and Everyday Structures € Movement € Energy in Our Lives € Properties of Liquids and Solids € Daily and Seasonal Changes € Air and Water in the Environment 	<ul style="list-style-type: none"> € Growth and Changes in Plants € Habitats and Communities € Strong and Stable Structures € Pulleys and Gears € Forces Causing Movement € Light and Sound € Soils in the Environment € Rocks and Minerals 	<ul style="list-style-type: none"> € Human Organ Systems € Biodiversity € Forces Acting on Structures and Mechanisms € Flight € Properties of and Changes in Matter € Electricity and Electrical Devices € Conservation of Energy and Resources € Space 	<ul style="list-style-type: none"> € Interactions in the Environment € Cells € Form and Function € Systems in Action € Pure Substances and Mixtures € Fluids € Heat in the Environment € Water Systems

MATERIALS (SPECIFY WHETHER PER CAMPER, GROUP OR CLASS)

Materials Per Camper:

- an empty glass jar
- cotton balls
- a dry bean - can be whatever you have at home!
- water and a sunny place for the plant to grow

SAFETY CONSIDERATIONS

Be careful with the glass! Make sure it doesn't break.

PROCEDURE

Step 1: Begin by wetting several cotton balls and placing them into a jar. You want the cotton balls to be wet but not too saturated.

Step 2: Wedge a bean between the cotton balls and the glass of the jar so that the camper can easily observe the bean growing.

Step 3: It is now time to watch & observe! Place the jar in a sunny place in your home.

Step 4: Have the camper predict what will happen to the bean, and then observe the jar over the next several days.

Tip: Add a few drops of water to the cotton balls as needed!



REFERENCES

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<https://kids.britannica.com/students/article/greenhouse/274656>

<https://photosynthesiseducation.com/photosynthesis-for-kids/>

<https://biggreen.org/wp-content/uploads/2018/06/K-2-Plant-Needs.pdf>

<https://www.growingajeweledrose.com/2016/03/grow-magic-beanstalk.html>