

## The Life of a Plant in a Jar: Part 1

*Are we too human-centered in our approach to science?*

**Photosynthesis, synthesis, and respiration** are three life processes of plants. Because photosynthesis is so obviously important to all life on Earth (including humans!), our curriculum often emphasizes it. This neglects two life processes that are equally important: **synthesis** and **respiration**.

Our next series of emails will show that **synthesis** and **respiration** are as important to life on Earth as **photosynthesis**.

The STC curriculum emphasizes these ideas about how plants interact with their environment:

- Plants use carbon dioxide from the air
- Plants add oxygen to the air
- Plants use minerals and water from their environment
- Plants add food for animals to their environment

### **What do the New York State standards have to say about how plants interact with their environment?**

#### Elementary Science Core Curriculum, Standard 4 Living Environment

##### Major Understandings

- 1.1b Plants require air, water, nutrients, and light in order to live and thrive.
- 1.2a Living things grow, take in nutrients, breathe, reproduce, eliminate waste, and die.
- 6.1a Green plants are producers because they provide the basic food supply for themselves and animals.
- 6.2a Plants manufacture food by utilizing air, water, and energy from the Sun.

#### Intermediate Science Core Curriculum, Standard 4 Living Environment

##### Major Understandings

- 5.1d The methods for obtaining nutrients vary among organisms. Producers, such as green plants, use light energy to make their food. Consumers, such as animals, take in energy-rich foods.

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- 6.2a Photosynthesis is carried on by green plants and other organisms containing chlorophyll. In this process, the Sun's energy is converted into and stored as chemical energy in the form of a sugar. The quantity of sugar molecules increases in green plants during photosynthesis in the presence of sunlight.
- 6.2b The major source of atmospheric oxygen is photosynthesis. Carbon dioxide is removed from the atmosphere and oxygen is released during photosynthesis.
- 6.2c Green plants are the producers of food which is used directly or indirectly by consumers.



To focus our thinking about plants and their interactions with the environment, we will create a system. The system consists of a green plant in potting soil within a closed jar. Light and heat energy can be exchanged between the inside of the jar and its external environment. However, no matter, gases, liquids, or solids can enter or exit the jar.

Can a plant survive, that is, continue to live and grow confined in the jar? The answer to this question is “yes.” Many elementary teachers have their students create plant-in-a-jar systems. If the plant is healthy and there are no insects, molds, or fungi in the jar that attack the plant, and the plant gets enough light, the plant will live and grow for long periods of time. One teacher told us her plant lived for over two years.

How is this possible? If the plant is using carbon dioxide from the air, why doesn't the plant use up all the carbon dioxide, stop photosynthesizing, stop growing, and die?

*Next week we will look at one of the pieces of this puzzle...*

The complete series of The Life of a Plant in a Jar can be found at [www.crsep.org](http://www.crsep.org)

February 26, 2003  
 March 05, 2003  
 March 12, 2003  
 March 19, 2003

The Life of a Plant in a Jar Part 1  
 The Life of a Plant in a Jar Part 2 The Atmosphere  
 The Life of a Plant in a Jar Part 3 Respiration  
 The Life of a Plant in a Jar Part 4 Synthesis

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