

Plant Growth Lab (a sample write-up)

QUESTION: Will warmer air temperature increase plant growth?

INTRODUCTION:

Pumpkins need about 90-100 days from when seeds are planted until ripe pumpkins can be harvested. The soil should be about 23°C for optimal growth. Plants can be started in pots inside and planted out after danger of frost has passed.

Like many plants, pumpkins do not grow well in cooler climates during the winter. Some plants, called annuals, freeze and die in freezing temperatures. We know light and carbon dioxide are needed for plant growth so photosynthesis can take place. Enzymes are proteins that can become denatured if the environmental temperature is too warm or too cold. Enzymes involved in photosynthesis and other cell processes work optimally at certain temperatures. All plants need water and specific minerals found in the soil to grow properly.

MATERIALS: 2 identical plants, in identical pots with same mass of soil

Water, same amount for each plant

Triple beam balance

Ruler

Thermometer

PROCEDURE:

1. Pot plants in identical pots equal masses of soil taken from the same bag.
2. Obtain the mass of each plant with pot and record in the Mass Before column of the data table.
3. Measure the height of each plant and record in Height Before column of the data table.
4. Count the number of leaves on each plant and record in # leaves before column of data table.
5. Place the control plant in the classroom window.
6. Place the experimental plant in the greenhouse.
7. Add the same amount of water to each plant's pot.
8. Measure and record the temperature of both the classroom and the greenhouse each day.
9. At the end of the week, measure the height, mass, and number of leaves on each plant and record in the After columns of the data table.

DATA TABLE 1:

	Mass before (g)	Mass after (g)	Height before (cm)	Height after (cm)	# leaves before	# leaves after
Experimental plant	50.10	62.25	14	18	5	10
Control plant	51.48	65.30	12	14	6	8

DATA TABLE 2:

	Temp Day 1 (°C)	Temp Day 2 (°C)	Temp Day 3 (°C)	Temp Day 4 (°C)	Temp Day 5 (°C)	Temp Day 6 (°C)	Temp Day 7 (°C)
Classroom	21.2	24.0	23.8	22.5	22.8	23.0	22.6
Greenhouse	35.0	34.5	34.8	35.2	34.5	34.8	35.2

CONCLUSION:

Claim: Pumpkin plant growth increases as the temperature increases.

Evidence: Our control group was growing at normal room temperature, while our experimental group was growing in a hot greenhouse for one week. Over the course of the week, we observed that the experimental plant was healthier looking, had more leaves, and grew taller than the control plant. The mass of the experimental plant increased from 50.10 g to 62.25 g, while the control plant increased from 51.48 g to 65.30 g. The experimental plant grew from 14 cm to 18 cm (increase of 4 cm), and the control plant grew from 12 cm to 14 cm (increase of 2 cm). The experimental plant got five new leaves and the control only got two new leaves.

Reasoning: Pumpkin plants are sensitive to the temperature of their surroundings. All plants grow best within a certain temperature range (some plants would actually grow better in at cool temperatures than warm temperatures). Maybe pumpkin plants originated in a habitat with a warm climate. Plants need energy to grow, and their energy comes from photosynthesis. Maybe pumpkin plants are able to do photosynthesis faster at warm temperatures, so they are able to grow more. I would have thought that the only factors influencing plant growth are water, sunlight, and soil nutrients, but this experiment illustrated that other factors can affect growth, too. I wonder if anything besides the temperature difference could affect the growth rate. Maybe there was more carbon dioxide in the greenhouse than the classroom. Maybe the glass window in the classroom filters out some kind of light that plants need, while the plastic greenhouse does not. There are some factors that we could not control, so I guess we don't know for sure that temperature was the ONLY difference. Other experimental error included taking the temperature of the classroom and greenhouse at different times between about 8 AM and noon each day. Temperatures might be expected to be cooler at earlier times. Also, the greenhouse is more dependent on the outdoor temperature than is the classroom. It is also likely that the soil in each pot held slightly different amounts of water. A more accurate idea of mass could probably be obtained by measuring the mass each day

CER in conclusion retrieved from and modified <http://www.gcisd-k12.org/cms/lib4/TX01000829/Centricity/Domain/2410/cerwriting.pdf>

The remainder of this work by Luann Christensen Lee is licensed under a Creative Commons Attribution-Non Commercial-ShareAlike 4.0 International License.

