

The lesson is intended to address the different in growth rates exhibited by plants by the amount of water they receive and the amount of sunshine they receive. The lesson will incorporate observation, writing, use of technology, group work and individual work. Standard 4.

The students will be broken into groups. There will be a control group; this group will have plants that receive consistent water and sunshine. The second group will receive consistent water, but little sunshine. The third group will receive consistent sunshine, but little water. The last group will receive little sunshine and little water. The experiment is to last for four weeks.

The groups will start of with a small plant, which they must transplant into the provided containers. The plant container will be marked with the group number and will have the amount of water and sunshine the plant is to receive each day written on the container. They will measure the height of the plant with the provided rulers, the diameter of the plant, the length of the largest and smallest leaf and write an observation of the health of the plant. All students have observation notebooks.

Each group member will enter the corresponding height, diameter and leaf measurements of their plant into their observation notebook. The data will be added to their calculators using four lists. Height being one list, diameter being a second list, length of the largest leaf being the third and the fourth list will be length of the smallest leaf, they will save the data. Daily the students will check on their plant and give it the amount of water and sunlight determined for their group. Weekly, on Fridays, the students will measure the height of their plant, the diameter, and the length of the largest and smallest leaf. They will also write an observation as to the health of their plant. Each student will add this data to their observation notebook, and then add the data to the data from the previous week into their calculator. Each week they will produce a line

graph, using their calculators, of their observations to see how each component of the experiment has changed. They reproduce the graphs into their notebook. The students will also use their calculators and the stored information to get a rate of growth for each component of the plant that we are studying. They will enter this information into their observation notebook. This will continue for the second, third and fourth weeks. The teacher will also keep a record of the students data stored into her calculator. She will put up graphs on the overhead each Friday so the students can see how each groups plant is doing and discussions can ensue.

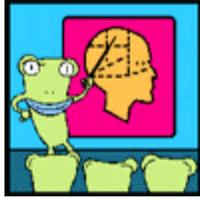
The fourth Friday, the students will proceed as they have each Friday before. Upon completion, I will again show the graphs of each group individually so we can have a discussion. I will then put up each groups data so we can see how the data compares from group to group. The students will then, using Microsoft Excel, enter the data of all the groups and produce histograms for each segment. For example, they will have the height data for the control group, group 1, group 2, group 3 and group 4. Using the histogram they can see the difference in growth for each group. The students will also produce a graph to compare the rate of growth information for each plant. Using this data each group will answer a set of questions.

1. Which plant did the best and which did the worse? Base this information on what you see in your graphs.
  
2. Which factor did you think was most detrimental to the plant less water or less sunshine? Base your answer on what you see in your graphs. Why?
  
3. a. What part of the plant seemed the most affected in each different group? For example in the group with consistent sunshine, but little water, what part of the plant exhibited the least growth height, diameter or length of leaves? Do this for all groups.

- b. Why do you think that is? Do this for all groups.
4. Do you think that if you began to give the plants in our other groups the same amount of sunshine and water as in our control group they would recover? Why or why not.
5. Based on the data collected, the graphs we looked at and your experience through the experiment, what can you conclude about the growth of plants?

The list of questions, the observation notebook, and the excel graphs must be submitted to the teacher for a grade.

## *Plant Growth Experiment*



Name: \_\_\_\_\_

Teacher: Ms. Merkl

Date : \_\_\_\_\_

Title of Work: \_\_\_\_\_

	<b>Criteria</b>				<b>Points</b>
	1	2	3	4	
<b>All steps of the experiment carried out as participating group member.</b>	Steps of the experiment not carried out as participated group member.	Steps of the experiment sometimes carried out as participating group member.	Steps of the experiment carried out as participating group member.	Steps of the experiment carried out as a group member.	—
<b>Observation notebook adequately prepared and all requested information documented neatly.</b>	Observation notebook not prepared and requested information not documented.	Observation notebook not adequately prepared and not all requested information documented.	Observation notebook adequately prepared and all requested information documented.	Observation notebook adequately prepared and all requested information documented neatly.	—
<b>Participated in class discussions and group discussions.</b>	Did not participate in class or group discussions.	Participated minimally in either class or group discussions but not both.	Participated in both class and group discussions.	Participated in both class and group discussions actively.	—
<b>Used technology appropriately.</b>	Did not use the technology.	Did not use the technology as instructed, but did use technology. Did not use it to make observations or answer questions.	Used the technology, but did not use it effectively to make observations or answer questions.	Used the technology and used it effectively to make observations and answer questions.	—
<b>Written assignment and graphs handed in on time and completed satisfactorily.</b>	Assignment not handed in.	Assignment handed in late and/or not done satisfactorily.	Assignment handed in on time and done satisfactorily.	Assignment handed in on time and done beyond satisfaction.	—
				<b>Total----&gt;</b>	—

**Teacher Comments:**

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