

## *Plant Enhancing Materials*

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We below, certify that this grant proposal is a true and accurate representation of the research intentions of the student.

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STARR Grant Application

## Introduction

This year, we will be experimenting and finding the best way to grow plants. Plant growth time is fairly lengthy now, and we want to speed up the process. For example, for the average tomato plant to grow, it takes about 70-75 days. For pole beans, it takes about 60 to 90 days. We want to see what materials will speed this process up. From our research, we have found that carbonated water is said to speed up growing times. Products such as miracle gro have also been said to help speed up and strengthen the plant.

The hypothesis we have been lead to is that some liquids or materials might help plants grow faster than just plain water. Some liquids that we will be using are coffee, gatorade, green tea, and waters with different pH (potential hydrogen) levels. Also, we will be using a light strip on one plant to see the effects of that. We think this because certain chemicals such as pH or elements within these materials might help (or hurt) the growth of plants. From our research, we learned that plants that receive higher levels of pH in their environment will grow better.

We are investigating this because we have been curious about this for a while. Now we have an opportunity to investigate this we decided to do so. Also, how fast things grow just seems interesting and we want to know what will make a plant grow faster. We hope to learn what materials and why these things will help the plants grow faster. There have been many other researchers to do these types of experiments. People should care about this because if there actually is something that can make plants grow faster, scientists can develop it and make a new product. In the real world, people have been getting tired of waiting for their plants to grow. If there is indeed a way to speed up this process we want to figure it out.

## Review of Literature:

- “The Effect Of Carbonated Water on Green Plants.” *The Effect Of Carbonated Water on Green Plants*. Accessed September 24, 2015. <http://spot.colorado.edu/~basey/ldanzell.html>.

This source gave us inspiration to test the effects of carbonated water on our plants. In this short article Lindsay Danzell and Jessica Greenberg used Helxine soleirolii plants. We will be using Wisconsin fast plants. We want to test if the Carbonated Water also affects our plants in a positive way also.

- “Does Coffee Affect Plant Growth?” *Coffee Detective*. Accessed September 24, 2015. <http://www.coffeedetective.com/does-coffee-affect-plant-growth.html>.

This website made by Hashem Hijjawi gave us the idea to “water” our plants with coffee. It doesn’t say what type of plant it works on, so we want to test if it would work with ours. This website claims that it significantly improves plant growth, so we thought we should test it.

- Snow, Andrea. “Is Green Tea Good For Plants?” *EHow*. Demand Media. Accessed September 24, 2015. [http://www.ehow.com/facts\\_7873060\\_green-tea-good-plants.html](http://www.ehow.com/facts_7873060_green-tea-good-plants.html).

This article says that green tea has benefits for plants. We want to compare these to the benefits of other substances / liquids. We will try to water some of our plants with green tea.

- “Soil PH: What It Means.” *Soil PH: What It Means*. Accessed September 24, 2015. <http://www.esf.edu/pubprog/brochure/soilph/soilph.htm>

This source taught us about the benefits from alkaline or acidic soil. We thought that we could apply this to the liquids we water our plants with. We think that less acidic liquids will help the plants grow more than the acidic plants.

- “Infoplease.” *Infoplease*. Infoplease. Accessed September 24, 2015. <http://www.infoplease.com/cig/science-fair-projects/does-ph-water-affect-growth-bean-plants.html>

This website gave us an idea for a test. We will use different bottled waters with different pH levels to water plants. We will see if this has any effect on the plants.

## Procedure:

1. Plant the seeds in separate pots. The seeds we will be using are standard Wisconsin Fast Plant seeds. Our plants will be placed on a window sill about 2 inches apart from each other and at a depth of one inch.
2. Water each set of plants with a certain liquid (coconut water, blue gatorade, green tea, etc. *see budget*) A different liquid will be used for each set of plants.
3. We will be collecting data every two days. The data we will collect will be how tall the plant is. We will measure how tall the plant is every other day and we will average our heights at the end of the six week growing time we will allow.
4. Our data will be put in a table showing how tall each plant is and how much of a difference there was from the previous day.
5. We will form a conclusion based on how tall each plant is. If a plant is taller than another plant that has the same amount of time to grow but been watered with a different liquid, then we will

know that whatever liquid is being used to water that plant does indeed speed up the process of growing. We will be observing how tall the plant grows and how fast it grows. A smaller height would mean that the liquid being used to water does not help the plant grow. A taller height would mean the liquid does help.

### Budget Proposal:

Item	Cost/Unit	Quantity	Total Cost	Provided by	Vendor
Instant Coffee	4.89	2	9.78	Grant	Hyvee
Gatorade Mix	4.99	1	4.99	Grant	Hyvee
Green Tea	3.49	1	3.49	Grant	Hyvee
Fiji Water	9.99	3	29.97	Grant	Hyvee
Aquafina Water	5.99	2	12.98	Grant	Hyvee
Smart Water	1.99	6	11.94	Grant	Hyvee
Dasani Water	5.99	2	12.98	Grant	Hyvee
Tap Water	n/a	n/a	n/a	student	n/a
Lamp	n/a	1	n/a	student	n/a
Carbonated Water	n/a	n/a	n/a	student	n/a
Orange Juice	5.49	1	5.49	Grant	Hyvee
Coconut Water	10.00	2	20.00	Grant	Hyvee
Wisconsin Fast Plants	n/a	n/a	n/a	school	n/a
pH test strips	8.69	1	8.69	Grant	Amazon
<b><u>Total needed from Grant</u></b>			<b><u>\$95.39</u></b>	Grant	

**We request \$95.39 from IJAS for our research project.**