

A Great Science Experiment Using Hydroponics!



Guess which tomato plant was grown using hydroponics?

*Our friend, **Shannon Wright**, could answer that question!*



We are glad that you have decided to use hydroponics as your science experiment! We will help guide you along with your experiment and give you some simple ideas. Make sure to read the other sections of the Atlantis Hydroponics web page to give you a sound understanding of hydroponics and the advantages of gardening without soil. Also check the **University of Arizona's Hydroponics** (<http://www.ag.arizona.edu/hydroponictomatoes/>) site for great additional background. Hydroponics is an easy inexpensive way to test many different variables in soil and hydroponic gardening. Let's get started!

What kind of experiment can I do with hydroponics?

The possibilities are endless! Here are just a few examples of questions to form a hypothesis about:

- Do plants grown hydroponically grow faster than those in soil?
- Does oxygenation of the water affect hydroponically grown plants?
- How does nutrient content affect plant growth?
- How does the pH of the nutrient solution affect plant growth?
- How does growth efficiency of hydroponics compare to growth efficiency of soil grown plants?



What types of plants can I use for my experiment?

Anything can be grown hydroponically, but for an experiment, you will need to consider two things:

1. duration of experiment, and
2. the light that is available.

Some plants we suggest are basil, lettuce, herbs and flowers of all types. The reason for this is that all of these plants will grow quickly, and they do not require the lighting that a fruiting plant (tomato, peppers, etc.) requires.

Now that you know a little more about hydroponics and some of the possibilities, let's get started! This basic outline will take you through all of the steps necessary for your successful experiment.

The Scientific Method

1. Observation
 - a) What do you want to learn?
2. Hypothesis
 - a) What do you think your test will result in?
 - b) Why do you think this?
3. Test
 - a) Set up experiment
 1. What kind of plant?
 2. How much nutrient?
 3. What is the air temperature?
 4. How much light?
 - b) Germination
 5. Soil
 6. Rockwool
 7. Paper towel
 - c) Take Notes



8. growth
 9. color
 10. produce
4. Results
- a) What is your conclusion?
 - b) Was your result the same as your prediction? Why or why not?

Let Atlantis Hydroponics help you fill in some of the blanks!

1. **Observation**

a) ***What do you want to learn?***

We want to learn what the difference is in plant growth between hydroponically grown plants and plants grown using soil.

2. **Hypothesis**

a) ***What do you think your test will result in?***

We believe the experiment will show hydroponically grown plants grow faster and produce more than plants grown in soil.

b) ***Why do you think this?***

We think this because hydroponics will allow for more oxygen to get to the roots of the plants which will allow the roots to absorb the nutrients more efficiently, which in turn will produce larger, healthier plants.

3. **Test**

a) ***Set up experiment***

You have several options:

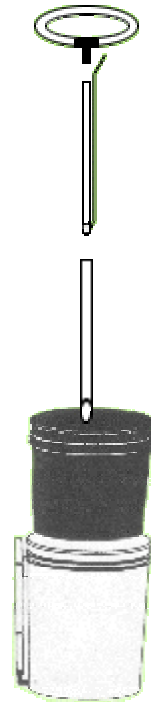
1) Atlantis Hydroponics offers a hydroponics experiment kit called the "Mini Hydro Harvest System." This is a perfect kit for a science fair project and includes: rockwool cubes; pH test kit and adjuster; hydroton (growing medium); air pump and air stone (for increased oxygen in the water); nutrients; hydroponic system for four plants



including water level indicator; two packs of seeds (two types of basil); and a copy of our science fair outline.

2) You can build your own system. You will need:

- One 5-gallon bucket and one 3-gallon bucket to fit inside.
- A small air pump and a container to hold suspended pots in water.
- A Drip Ring Assembly made of 1/4" tube connected in circular fashion to a "T" fitting.
- A Pumping Column made of two plastic tubes connected with an air inlet at the bottom.
- A Pumping Column Support Tube made of white PVC tube with bevel facing down.



Please note that all of the parts needed to make your own system can be purchased at Atlantis Hydroponics including tubes, fittings and connectors.

b) **Germination**

There are several different ways to germinate your seeds.

1. Soil - Place the seeds about 1/2" deep below the soil of the container that you will be using.
2. Rockwool - These are small one inch by one inch cubes which are specifically made for hydroponics. They have an air-friendly texture and work well keeping the seed covered and moist with water.
3. Paper towel - Place the seed inside the moistened paper towel. It is important to keep the paper towel moist while the seed is germinating.

It is important for the seeds to (1) remain moist and (2) have light. Fluorescent lights will do the trick once your seedlings have two or more leaves. Humidity and an 85°F temperature will also help your seeds to germinate.



Once your seedlings are four inches long, you may transport them into your hydroponic system. You may put the rockwool cubes directly into the net cup of *The House That Jack Built* system, and surround it with pebbles of hydroton. The seedlings started in soil may stay there for the control part of the experiment.

c) ***Take Notes***

Make daily notes about each plant from the beginning. Look for: height; color; produce; nutrients; pH; smell; and taste.

4. **Results**

a) ***What is your conclusion?***

We found that the basil grown hydroponically grew faster, had greener color, thicker stems, and tasted better than the basil grown in soil.

b) ***Was your result the same as your prediction? Why or why not?***

These findings are the same as our hypothesis, which proves that the increased oxygen to the roots of the basil allowed for the nutrients to be used more efficiently, which in turn, produced stronger and healthier plants.

We hope that this sample experiment has helped you decide how to do your own hydroponics experiment. The experiment outlined above is only one of the many possibilities that you can do. Let us know if there is more that we at Atlantis Hydroponics can do for you, and good luck!

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