

Name _____

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Hydroponic Happenings

Ag in 10 Minutes a Day!

What does a plant need to grow? Seeds, space, sunlight, water, soil... What if we could grow plants without soil? That's what **hydroponics** is all about! It is a method of growing plants without using soil. Many farmers are using hydroponics today for a variety of reasons.



Image from [5 Benefits of Hydroponic Gardening and 5 Disadvantages | Yard Surfer](#)

What is the History of Hydroponics?

Although you may not have heard much about hydroponics, the techniques have been in use for many years. The Hanging Gardens of Babylon, created around 600 BC, were believed to be one of the first hydroponic systems. The gardens were built on a series of steps with water flowing consistently through to keep the plants growing. It is thought that water from the river was pulled along a chain to the top of the gardens, then flowed down along the steps. Historical records also indicate floating farms in the rivers of Mexico and China.

By the 1600s, scientists began to realize that it was not just the water that plants needed to grow. They began to understand that there were certain **nutrients** within the water that had come from the soil. By the 1860s, the nutrients needed to grow the plants were identified, and they began to use the term **nutriculture** as the method of growing plants by soaking their roots in a nutrient and water solution.

In the 1930s, William F. Gericke was working at the University of California, Berkley, conducting research on growing plants without soil. Most of his colleagues doubted him, until he grew a 25-foot-tall tomato plant using hydroponic methods! Gericke renamed this method hydroponics, from the roots hydro (water) and ponics (labor).

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Why Choose Hydroponics?

There are many reasons why hydroponics are a valuable resource for farmers. First, hydroponic systems use only a fraction of the water compared to traditional farming methods. This is especially important in areas of the world where water is scarce.

Another factor is space. Hydroponic gardens can be set up literally anywhere, indoors, or outdoors, allowing for fresh fruits and vegetables year-round, even in harsh climates. The yield for a hydroponic garden can be up to 8 times more produce per square foot of space. Plants can be grown horizontally or vertically to fit the available space.

Another advantage is that plants grown hydroponically do not suffer from disease, pests and weeds that soil-based plants do. This allows them to be grown organically without fertilizer or pesticides.

The main disadvantage of using hydroponic methods is system failure. A small mistake in the nutrient mixture, a broken pump, or a faulty light fixture could mean disaster. Since all the plants are connected to the same system, it is important to make sure that you do your research ahead of time and monitor everything closely.

There are many different types of hydroponic systems. The main idea is to saturate the roots of the plant with a nutrient solution, maintain a light source, and aeration. Some systems use gravel, rockwool, clay pebbles or open net pots to support the plants as they grow. Setting up a hydroponic system can be expensive and complicated, but they can also be quite simple. Many people start with a bucket or storage tote, a light source, and an aquarium pump. Easy plants to start with are leafy greens like lettuce, spinach and kale, herbs like cilantro or basil, or fruiting plants like tomatoes, peppers, and strawberries.

Imagine being able to enjoy fresh fruits and vegetables all year without ever having to leave home! As the world's population continues to grow, the space we have available to produce enough food continues to decline, Hydroponics is one of many possible ways to continue to maintain a healthy source of fresh food for generations to come.



Image from [beginners hydroponics-J-Wvnia.jpg \(500x375\)](#)



Image from [gardeningsteps.com - gardeningsteps Resources and Information](#)

Hydroponic Horticulture – Reading Passage

Directions: Read each question and fill in the best answer.

1. Which of the following does **Hydroponics NOT** use?

- A. Soil
- B. Seeds
- C. Water
- D. Nutrients

2. When was Hydroponic gardening first practiced, based on historic records?

- A. 1930
- B. 1860
- C. 1600
- D. 600 BC

3. What did Gericke grow to prove his theory?

- A. A 10-pound potato
- B. A 25-pound tomato
- C. A 25-pound pumpkin
- D. A 25-foot tomato plant

4. Which of the following are benefits of hydroponics?
Select ALL that apply.

- A. Need less space
- B. Need less water
- C. Produce less fruit
- D. Less healthy plants

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5. Which of the following can be disadvantages of hydroponics? Select ALL that apply.

- A. Cost
- B. Pump failure
- C. Too much space
- D. Incorrect nutrient mixture

6. What type of plants are easiest to start a hydroponic garden with?

- A. Potatoes
- B. Leafy greens
- C. Maple Trees
- D. Carrots

Extended Response: Use details from your own experience and information from the article in your response.

Compare and contrast traditional farming methods with hydroponic methods.

Hydroponics Facts

- **Plants grown hydroponically grow up to 50% faster than plants grown in soil**
- **Hydroponic plants produce fruit and vegetables up to twice as large as soil-based plants**
- **Hydroponics are constantly being researched on the International Space Station. There is no soil or sunlight in space, so they are looking at ways to provide fresh food to astronauts on extended missions.**

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A FUN SCIENCE EXPERIMENT – MAKE YOUR OWN HYDROPONIC SYSTEM

(WITH ADULT HELP!)

Materials:

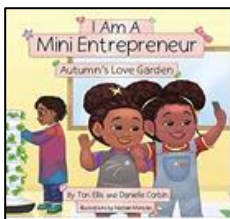
- 2 liter bottle
- growing medium (rockwool, perlite, coconut coir, gravel or clay beads)
- wicking material (a strip of an old towel or other cotton cloth)
- nutrient solution (garden or hardware store)
- aluminum foil
- seed or seedling

Procedures:

1. Cut a 2 liter bottle as shown.
2. Place the wick and growing medium in the top of the bottle. Make sure the wick is long enough to absorb water from the bottom.
3. Mix nutrient solution according to the package directions and add to the bottom to just below the opening, so the wick is immersed in the solution.
4. Place the top on the bottle and add the seed or seedling.
5. Keep in a sunny warm place. Wrap the bottom of the bottle with aluminum foil to prevent algae growth. The foil can be removed to check water level and root growth.



CHECK OUT THESE BOOKS

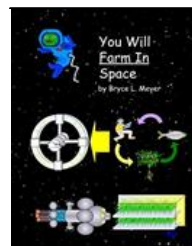


I AM A MINI ENTREPRENEUR:

AUTUMN'S LOVE GARDEN

BY TORI ELLIS

Autumn and her friends develop their Urban Hydroponic Garden.



YOU WILL FARM IN SPACE

BY BRYCE MEYER

Explains how food can be produced in space, and how water and waste products can be recycled.