

Lesson One: How Does Your Garden Grow? (50 min)

Driving Question: How do the land and weather in our state help plants grow?
Can we grow healthy food using just water and nutrients?

Vocabulary:

hydroponic, nutrients, roots, leaves, soil, irrigation

Materials:

- Large paper or poster board
- Card stock
- Assembled Aquatree® Garden

Resources:

- **Aquatree® User Guide**
- **Seed to Salad Lab Book**
- **How Does My Garden Grow Puzzle Game**

Background Knowledge:

The Aquatree® hydroponic garden system utilizes water and nutrients to grow plants without soil. By using balanced nutrient solutions and LED light, the plants receive everything they need to grow. The garden uses LED lights that mimic natural sunlight to help plants grow, providing the right kind of energy for photosynthesis. The roots are suspended in a nutrient solution, which provides them with essential nutrients. Growing without soil prevents problems caused by soil-borne diseases and pests. The controlled environment enables plants to thrive regardless of external factors such as weather or season.

Prior to today's lesson, familiarize yourself with the hydroponic garden and how it works using the Aquatree® User Guide. Assemble the garden (<https://youtu.be/myHKC6dfVpQ>) and place it in a safe place indoors where your students will be able to observe the plant growth easily. Students will measure the growth of the plants over the next nine days and document the measurements and observations in their **Seed to Salad Lab Book**. Decide whether you want your students to measure using customary or metric units and draw your graph accordingly. Discuss the results each day.

Plant the Seed (warm-up):

1. Review with your students what plants need to grow by playing the **How Does My Garden Grow Puzzle Game**. (Print and cut out puzzle pieces prior to class.)
2. Allow the kids time to fit the puzzle pieces together.
3. Using the puzzle image, have students discuss what plants **“need”** to grow: light, water, and nutrients (students may say soil). If your students have learned about photosynthesis, their answers will be more in-depth.

Grow Time (lesson):

1. Write the driving question on the board: **How do the land and weather in our state help plants grow? Can we grow healthy food using just water and nutrients?**
 - a. Note: Search for the natural features, resources and weather conditions of the state in which you live and their impact on growing different crops.
2. Write the word “hydroponic” on the board. Ask students what they think the word means. Underline “hydro” and ask them if they can think of any other words that are similar to help them determine the meaning. The root word “hydro” means water and the root “ponos” means work or labor.
3. Next explain that hydroponic is a way of growing plants without soil, using water with nutrients added.
4. Gather students around the Aquatree® Garden. Explain that the Aquatree® is a hydroponic garden. Ask students what they think each part is and what its function may be. What does each part represent if the plant were to be grown outside in soil? Be sure to explain what all parts and functions of the garden are and how it works as you go.
 - a. Tray and MicroLid represent the soil
 - b. Grow Light represents the Sun
 - c. The water is the water and nutrients
5. Have your students brainstorm why having an indoor, hydroponic garden might be advantageous. Have students share their ideas and compile a list on the board. This list will be used for later discussion.
6. Explain to students that over the next nine days they will be growing microgreens in the Aquatree® Garden, observing, and recording how much they grow. Show students the growth chart on the wall and let them know they will be hosting a tasting lab for family, friends and neighbors to have the opportunity to taste what they grew.

Food for Thought (reflection/assessment):

1. Give each student a copy of the **Seed to Salad Lab Book**. Be sure students put their name on the front and have them turn to the compare and contrast Venn diagram on pg. 2. Students should write or draw the similarities and differences between growing plants in soil or in a hydroponic garden.
2. When students finish, they can draw themselves as a scientist on the cover page of their Lab Book.

Optional extension:

Have students put the garden together if you feel it is something they can do safely without causing damage to the unit.