

LESSON: Greenhouse Growing

LEARNING OBJECTIVES:

- Recall and explain the 4 main parts to growing a plant
- Understand and explain what a greenhouse is and why they are important to the food system
- Define and give examples of agriculture

LEVEL:



MATERIALS:

- Activity Sheet: Level 4 - Greenhouse Growing Crossword
- Activity Sheet: Level 4 - Greenhouse Growing Matching Sheet
- PowerPoint: Level 4 - Greenhouse Growing
- Quiz: Level 4 - Greenhouse Growing
- YouTube Video: I Want to Know Where this Comes From!

LESSON:

Starter: The purpose is to introduce the idea of growing methods in agriculture, specifically in greenhouse farming, the basic needs of a plant, and to bring students together to have them start talking and thinking about these topics.

Section 1: Where Does Food Come From? An Introduction to Agriculture

*Ask Class: Where does food come from? *listen to response, build an answer together, recap and compare with the following**

Almost all food comes from a farm. Farms can grow or produce different foods, such as: vegetables, fruits, meat, eggs, and even dairy! (*Dairy - examples: milk, cheese, yogurt*)

A word we use to describe the process of growing food or farming is *agriculture*. Agriculture is very important to provide everyone with fresh, nutritious, and healthy food.

Agricultural sectors must follow set food safety rules in order to keep us safe.

This is a main reason why a lot of people may have never visited a farm before. Farms risk a lot when people come to visit because people can carry things on them, such as dirt or bugs, that can be harmful to the products they produce.

If you get the chance to visit a farm, you will probably have to go through a process called *biosecurity* (*Biosecurity* - protective measures to prevent humans, plants, or animals from getting sick or catching disease). Examples of biosecurity measures could be: gloves, a protective suit, and/or boot covers.

Ask Class: Have you ever been to a farm? What was your experience like? What products come from those farms?

There are all kinds of farms: cows for milk and beef, chickens for eggs, even flowers for flower shops! Today we are going to focus on how we grow our fruits and vegetables! Specifically, how Nature Fresh Farms (NFF) grows their fruit and vegetables in a **greenhouse**.

Section 2: What is a Greenhouse?

*Ask Class: Does anyone know what a greenhouse is? *listen to response, build an answer together, recap and compare with the following**

A greenhouse is a large building made for growing plants. Usually, greenhouses are all controlled by a computer which monitors the environment inside.

Everything in the greenhouse is cared for by very talented experts to make sure that the plants are growing perfectly. Some examples of things monitored are: temperature, humidity, air quality (CO₂), and water.

Each greenhouse is slightly different, but let's take a look at how Nature Fresh Farms grows their products - Tomatoes, Peppers, and Cucumbers - in their greenhouses!

Fun Fact: all three products from Nature Fresh Farms - Tomatoes, Peppers, and Cucumbers - are actually fruits! They are listed in the fruit category because of how the fruit grows on a plant - fruit has seeds! But it is also okay to call them vegetables because we usually cook them with foods in that category.

Section 3: The Key to Growing Produce

While Tomatoes, Peppers, and Cucumbers are different fruits and vegetables, they are all grown in the greenhouse the same way! There are **4 main parts** to growing these products. They are:

1. **A Base**
2. **Food**
3. **Support**
4. **Environment**

Base:

NFF uses a planter box to grow their products. Inside the planter box, is something different than soil.

*Ask Class: Can anyone guess what growing medium they use to grow their products in? *listen to response, build an answer together, recap and compare with the following**

NFF uses ground up coconut husks (which is the outside of a coconut ground up into little fibers) to grow their products in. Coconut fiber is a great growing medium (*growing medium* - something to grow plants in) because it helps to hold on to minerals, but also allows the extra water to drain out. This way, the roots of the plant are not sitting in water and rotting. A healthy base is important to support the roots of a plant.

Food:

Plant food is actually quite similar to what humans need! Just like humans, plants need lots of water, minerals, and sunshine to be healthy. In the greenhouse, drippers (*drippers- plastic tubes which deliver water directly to a plant's roots*) are used to feed the plants water and healthy minerals, such as calcium and iron. The water is filtered through an *irrigation system (irrigation system* - a system that allows water to flow and be distributed to where it is needed) and is carried through the building, ending up at the drippers, which are placed in the planter box. Plants are watered throughout the day and the amount of water varies depending on the heat and humidity in the greenhouse.

Fun Fact: NFF uses a closed loop water system! This means that all the extra water that drains out of the planter box gets recycled! This way, there is no water waste.

Sunshine is very important for plants! The greenhouse uses special glass to allow the sun's rays into the greenhouse and to the plant's leaves for energy. This helps with the process called *photosynthesis (which helps convert sunlight into energy for the plant)*.

Support:

Plants need support in order to grow tall. Fruit and vegetables are often heavy which weighs the plants stems down. To help the plants grow in the right direction, strings and clips are attached to the plants and used for support. These strings are wrapped around the plants and strung up to the top of the greenhouse which help the plants to grow tall.

This process is called *vertical growing*.

Ask Class: Why might Vertical Growing be important?

Vertical growing allows the plants to grow upwards instead of outwards, producing more fruits and vegetables.

***Fun Fact:** The plants in the greenhouse can grow REALLY big! Tomato plants can grow up to 50 feet!*

Another very important support used at Nature Fresh Farms to help the plants to grow is the farmers! Farmers are people who work in the greenhouse and monitor the plants everyday. They can recognize small details on plants and use their tools to help support the plants' needs.

***Fun Fact:** Plants go through a pruning process, which is when farmers cut off certain stems to change the direction that the plant will grow. This way they can guide the plant to grow in a certain direction.*

Environment:

Plants need the perfect environment to be happy and grow. Plants like warmer areas with lots of natural light. The greenhouse provides plants with everything they need by having the temperature monitored and regulated - using ventilation (*ventilation* - large windows allowing air in) and a heating system to adjust the temperature.

Temperature control in the greenhouse works in **three ways:**

1. **Natural Heat:** energy from the sun which comes into the insulated greenhouse. There are energy screens installed at the top of the greenhouse which helps to hold in the heat during the colder months.
2. **Biomass:** recycled local, clean, shredded wood burns in a large furnace. The burning produces heat which is used to heat up water. This hot water can then be pumped through pipes in the greenhouse which can help to heat the greenhouse. This process is only used in the cooler months and is shut off during the summer.
3. **Natural Gas:** similar to biomass, clean natural gas can also be used to heat up water. This hot water can then be pumped through pipes in the greenhouse which can help to heat the greenhouse. Natural gas also creates CO₂ which is added into the greenhouse to help the plants to grow.

Having a controlled climate is a huge benefit of greenhouse growing, as it produces fresh, perfect fruits and vegetables year-round.

By being inside, plants are also protected from many things like certain pests, wind, and harsh storms.

Section 4: Importance of the Greenhouse

The greenhouse allows us to grow lots of fresh produce throughout the year, no matter what the weather is outside. It also provides the area with lots of different jobs which is great for families and communities. Overall, greenhouses offer many benefits, one major benefit being growing more fresh produce in a smaller area.

**Educators Note: For further facilitation, use the assigned quiz to recap the key concepts and to test knowledge learned from this lesson.*

REFLECTION NOTES: