

Grade: 5

Topic: PrePreserve

Class Title: What Seeds Need

Class Overview: Students will identify what primary factors affect the growth of vegetation.

Learning Objectives:

- Design an experiment
- Identify variables
- Observe reactions and interpret data
- Develop creative problem solving skills
- Have fun!

School Standards:

- ✓ 5-LS1-1 Support an argument that plants get the materials they need for growth chiefly from air and water.
- ✓ CCSS.MATH.CONTENT.5.NBT.A.4 Use place value understanding to round decimals to any place.

Agenda:

Background

- Share with your students that they will be part of a year-round program to be part of a teaching garden at the Springs Preserve. Have your students define garden. What is the first thing that comes to mind? Possible answers may include plants, soil, and vegetables.
- With the exception of some rock gardens or Zen gardens, almost all gardens contain plants. Brainstorm with your students what elements are required for plants to grow. How can the students test the accuracy of these elements?

Activity

- Provide each student, or group of students, with a rinsed-out yogurt container. Poke two to three holes in the bottom of the containers and place them atop a small paper plate or bowl. Fill the containers with soil and water until damp. If water leaks out the holes from the bottom, stop watering. Plant a lima bean, or other quick growing seed, into each container. Have each student wrap on container with aluminum foil creating a dark tunnel over their container. Place the containers in a sunny window ledge. Use your Springs Preserve Journals to track the progress of the plants.

- This test was designed to prove that plants need light to grow. Challenge your students to design a test that will prove another element they suspect plants need such as water or soil.

Materials/logistics:

- Yogurt cups or other small containers
- Topsoil
- Water
- Small plates or bowls
- Aluminum foil
- Springs Preserve Journals

Grade: 5

Topic: Garden Science

Class Title: Starch Surprise

Class Overview: Students will apply scientific method to determine the level of starch in various vegetables.

Learning Objectives:

- Identify the difference between a physical change and a chemical change
- Observe reactions and interpret data
- Develop creative problem solving skills
- Have fun!

School Standards:

- ✓ S5P1. Obtain, evaluate, and communicate information to explain the differences between a physical change and a chemical change.
- ✓ CCSS.MATH.CONTENT.5.G.B.4 Classify two-dimensional figures in a hierarchy based on properties.

Agenda:

Background

- Chemical reactions happen when bonds between atoms are made or broken, irreversibly changing a substance's chemical composition. Physical changes are changes in form that do not affect a substance's composition.
- Plants produce starch as a way of storing energy until it is needed. They will store more starches towards the end of a season, to use as an energy boost when it is time to grow again. Pure starch is white, flavorless, and odorless. Ask your students how we test for starch if we cannot see, smell, or taste it?
- The chemical iodine will indicate how much (if any) starch is present in a sample. Iodine turns brown or black in the presence of starch.

Activity

- Provide each student with a slice of potato and a q-tip coated with iodine.
- Begin by touching the iodine to the edge of the potato. Observe what happens.
- Next swab the center of the potato. Is the reaction the same?
- Discussion: The center of the potato is mostly stored water which does not process starch, so the iodine would have stayed purple near the

center. The skin of the potato holds the most nutrients, so the closer the swab is to the edge of the potato the stronger reaction there may be.

- Repeat the experiment with an apple. As plants ripen, the starch is converted to sugar, so the ripe apple should contain very little reaction.
- Experiment with other fruit or vegetable sources. Have the students make hypotheses about which samples will contain the highest amounts of starch.
- Discuss the results with your students. Of the samples tested, what did the ones containing high amounts of starch have in common? What does that tell us about how plants use or store starch? If we tested the whole plant, where would we be most likely to find starch? As the iodine reacts to the starch are the students witnessing a chemical or physical reaction? Allow them to present arguments explaining their choice.

Materials/logistics:

- Potatoes, pre-sliced
- Carrots, pre-sliced
- Apples, pre-sliced
- Q-tips
- Iodine
- Recording sheets

Grade: 5

Topic: STEM for Stems

Class Title: Garden in Gear

Class Overview: Students will define machines, identify garden tools, and design a machine.

Learning Objectives:

- Define machine
- Identify a complex and simple machine
- Develop creative problem solving skills
- Have fun!

School Standards:

- ✓ 5-ETSI Define a simple problem reflecting a need or want that includes specified criteria for success.

Agenda:

Background

- Begin by breaking the students into small groups of five or so. Give each group a construction paper and ask them to write one question on each side
 - What is a machine?
 - Why do people use machines?
- Give each group 4 minutes to write as many answers as they can for each side of the paper. Discuss as a group the best answers, and decide as a class on a definition of machine.
- Machines are categorized as simple or complex. Often complex machines are made from combinations of simple machines. For example, a tractor is made of axles, wheels, and levers.
- Create a list of machines that could be used in the garden. Why were these machines invented? How did the invention of these machines change things culturally or economically?

Activity

- Provide each student with a photograph of a machine, preferably one that is garden or agriculture related. Examples might include tractors, reapers, winnowing machine, threshing machine, jackhammer, etc. First, have their student use their picture to fill out the machine section of their Springs Preserve Journal.

- Next, give each student a blank sheet of paper. Each student should begin by trying to draw their machine on the paper. However, whenever you announce “pass” they should pass their paper to another classmate (and receive a paper from another classmate.) Continue drawing the original machine on the new drawing. By the time the paper returns, the student will have a completely made up machine. Have the student color their machine in, give it a name, make up what it is used for, add background, etc.
- Play Simple Machine 20 Questions with the class. Give each selected student a photo of a simple machine from the garden (trowel, hoe, lawn mower, leaf blower) and have the rest of the class attempt to identify it using yes or no questions.

Materials/logistics:

- Pictures of machines
- Blank paper
- Springs Preserve Journal

Grade: 5

Topic: PostPreserve

Title: We Can Save the World

Class Overview: Students will identify the correlations between gardens and the communities they support.

Learning Objectives:

- Define community
- Identify a three communities
- Develop ties between gardens and science
- Have fun!

School Standards:

- ✓ 5-ESS3-1 Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environments.
- ✓ CCSS.ELA-LITERACY.W.5.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

Agenda:

Background

- Begin by playing the game of two truths and a lie with your class. The object of this game is to state three facts about yourself. Two of the facts should be true, and one a lie. Have the students write their facts on separate index cards before playing. As each student shares his or her facts, retain the two true index cards. Once you have all the students’ true facts, work as a class to try and categorize them. There will most likely be many similarities.
- Work with your students to define the word “community.” Ask what makes a community? Can a person be part of more than one community? Does this class count as a community?

Activity

- Use your Springs Preserve Journals to focus on communities that you have interacted with as part of your garden project. What kind of science does each community use? How does each community protect the earth’s resources?
- Provide each student with a blank sheet of paper and demonstrate how to fold it to create a tri-fold pamphlet. The students will be creating a brochure to invite other communities to visit the garden.

- One flap must feature facts about natural resources in the garden
- One flap must highlight why gardens benefit the community
- One flap must demonstrate either why you should visit the Springs Preserve Garden or why you should plant a garden of your own.

Materials/logistics:

- Index cards
- Blank paper
- Coloring supplies
- Springs Preserve Journal