

Grade: 4

Topic: PrePreserve

Class Title: Amazing Adaptations

Class Overview: Students will identify different adaptations plants use as survival strategies, and weigh the pros and cons of each.

Learning Objectives:

- Define adaptation
- Compare and contrast adaptation strategies
- Identify strategies for survival specific to the desert
- Understand historic challenges of desert gardening through hands on experience
- Have fun!

School Standards:

- ✓ 4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction
- ✓ CCSS.ELA-LITERACY.W.4.3 Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences

Agenda:

Background

- What is an adaptation? An adaptation is a change in which an organism or species becomes better suited for its environment. Ask your students to imagine it is raining outside. How would you adapt? Examples may include using an umbrella or rain boots.
- Brainstorm as a group a list of plant adaptations. Try and identify at least one adaptation per part of the plant.

Activity

- In a large flat area where students can safely run, use cones or similar makers to lay out a “race course.”
- You will be doing a series of races to demonstrate how different adaptations assist plants in competing for available resources.
- Race 1: Have one student simply run the lap of the race course. How does speed benefit a plant? What are some plants that grow quickly? Some

examples are bamboo, which is why it makes such a great sustainable material source, and kudzu which can grow 60 feet in a season.

- Race 2: Have two students race at the same time. What does this strategy have to do with plants? Answers may include plants competing for resources such as sunlight or water. The plant that gets higher faster will block sunlight from the other plants.
- Race 3: Have two students race in opposite directions. Can two plants have the same objective, but deploy different tactics? Answers might include cactus and poison ivy which each use defensive tactics to avoid getting eaten. There are many possible answers.
- Race 4: Send four students in one direction, and one student in another. The student that finishes first wins for their entire species. Is competition between plants always fair? What are some strategies that plants use to rig the competition in their favor? Answers may include acorns which contain heavy tannins which prevent other plants from growing in the soil.
- Race 5: Have one student lie down and “sleep” while the other student gets a head start. “Wake up” the first student and have him or her complete the race. Why do plants go dormant? How does this help or harm their survival strategies?

Materials/logistics:

- Cones
- Springs Preserve Journal

Grade: 4

Topic: Garden Science

Class Title: Pollination Party

Class Overview: Students will discover the importance of pollination in the life cycle of a plant.

Learning Objectives:

- Identify the difference between a pollinator and a pollinizer
- Define pollination
- Create connections between the parts of the plants and the role each part plays
- Develop creative problem solving skills
- Have fun!

School Standards:

- ✓ 4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction

Agenda:

Background

- Review the parts of a plant, and specifically the parts of a flower with your students. In order for a plant to produce its seeds, pollen from the anther must make its way to the stamen. Some plants are able to fertilize themselves, but others must receive pollen from another plant of the same species. This is called cross pollination. Brainstorm with your class some ways that cross pollination can occur. Answers might include through wind or by an insect.
- A pollinizer is a plant that provides pollen for another plant. A pollinator is an animal or insect that provides pollen for a plant. Even plants that are able to self-pollinate will create bigger, stronger fruit if their pollen comes from another plant.
- The most well-known pollinators are bees.

Activity

- The students will be participating in a bee pollination race. Remind the students that the role of the worker bee is to find nectar and direct other bees to that location. Bees communicate entirely through dance.

- Divide the students into small groups (size depending on your class and available space.) Give one “scout” from each group written directions to where a reward (of your choice) is hidden. Do not allow the other students to watch the scout seek the reward. The scout must return and enact directions to the rest of their group using only the medium of dance.
- Review the parts of a map with your students, and have them draw the information about the location of the treats in their Springs Preserve Journal.

Materials/logistics:

- Treats/rewards
- Written directions
- Springs Preserve Journal

Grade: 4

Topic: STEM for Stems

Class Title: Weather Machines

Class Overview: Students will develop their own tools to make predictions about the weather over a period of time.

Learning Objectives:

- Identify tools for weather prediction
- Record and track measurements over a period of time
- Make predictions based on available data
- Have fun!

School Standards:

- ✓ 4-ESS2-1 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
- ✓ 4-3-5-ETS-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Agenda:

Background

- Begin by asking the students how they chose what to wear today. Answers will include many variables, but hone in on aspects of the weather that affected clothing. How do students know what the weather is going to be on any given day? Again, results may vary, but the most likely factors are
 - By listening to the weather forecast
 - By seasonal reference (i.e. it is usually hot in in the summer)
 - By observation
- Repeated weather patterns over a period of time are known as a trend. For example, here in the desert it generally rains in August. We refer to this trend as monsoon season. A weather trend that persists for scopes of centuries is known as a climate.
- If the students gathered their information from a weather forecast, then how did that meteorologist gather his or her data? By using tools that measure changes in the atmosphere.

- Brainstorm how knowing the weather is important aside from getting dressed. Focus on garden and agricultural needs. Examples may include knowing when to plant, providing enough water for the plants, or protecting crops from frost.

Activity

- We will be creating three weather devices and using those devices to record the weather at a given time each day for a period of two weeks. Students may record their results in their Springs Preserve Journals.
 - Thermometer: Use a store bought thermometer outside to record temperature for the daily log. However, students can make their own thermometers by filling a clear 20-ounce plastic soda bottle with $\frac{1}{3}$ rubbing alcohol and adding a few drops of red food coloring. Insert a straw into the bottle and completely seal the top with non-permeable clay. As temperature rises, the red dye should rise up in the straw. Test by placing your hands around the bottle. If the red does not rise, your straw is most likely not sealed properly.
 - Wind Vane: Have each student cut a triangle, about five centimeters long from an old manila file folder. Also cut out the tail of an arrow from the same folder. The tail should be seven centimeters. Cut a notch into each end of a straw and insert the folder pieces into the notches to create the arrow. Using a straight pin, attach the center of the straw to the top of a pencil eraser. Leave enough room in the pin for the straw to spin. Sink the sharp end of the pencil into a lump of clay. Design a compass rose onto a paper plate. When you test your wind vane each day you must use a compass (or compass app on a smart phone) to orient the paper plate before testing your wind vane.
 - Rain gauge: Use a two-liter clear plastic bottle. Students may work in groups if you are unable to gather enough for each student. Cut off the top of the bottle about a quarter of the way down, and lay it inverted, like a funnel, within the other bottle. Cut as smoothly and evenly as possible. Use paper clips to secure the two halves together. With a ruler, mark even increments along the side of the bottle to measure the flow of water. Place the rain gauge partially buried in a given location so that it is unable to blow away or be mistaken for litter in a two-week period.
- Record and track your results in your Springs Preserve Journal.

Materials/logistics:

- Plastic bottles, 20 ounce and 2 liter
- Rubbing alcohol
- Food coloring
- Pencils
- File folders
- Straight pins
- Paper plates
- Clay
- Pencils (must have eraser)
- Thermometer
- Springs Preserve Journal

Grade: 4

Topic: PostPreserve

Title: Gardens of the Future

Class Overview: Students will review all the concepts they have learned throughout the program and develop signage to express those ideas to the public.

Learning Objectives:

- Identify benefits of a garden
- Write informational text supported by facts
- Have fun!

School Standards:

- ✓ CCSS.ELA-LITERACY.W.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
- ✓ CCSS.ELA-LITERACY.W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

Agenda:

Background

- Begin by reviewing all the garden lessons throughout the course of the year. Ask the students which activities were most memorable, and what facts were most surprising.
- Have your students consider all the reasons why gardens are important. Ask them how what we've learned about erosion, weather, and pollination are important to the whole community. How could these issues affect people in the future? Why is it important to teach the community what we have learned about gardens?

Activity

- Use your Springs Preserve Journal to begin drafting an informational sign. Provide each student with a 5x7 sheet of cardstock and art supplies to complete the design of their sign. Have them draft with pencil first and practice proof reading.
- Send your finished signs to the Springs Preserve 333 Valley View Road, Las Vegas NV 89107. Select signs will be displayed in the teaching garden for a limited time.

Materials/logistics:

- Cardstock
- Craft supplies
- Springs Preserve Journals