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PINEMAP Spring 2016
Lesson Plan

Battle of the Trees

SOLS: BIO.2.d; BIO.8.a; BIO8.b; BIO.8.c; BIO.8.d; BIO.8; LS.6.a; LS.7.a
Project Learning Tree: Every Tree for Itself; Activity 27
Subject: 6-9th Grade Science

Goal: To foster a deeper understanding of trees as living creatures in a complex ecosystem.

Student Objectives:

- Students will understand nutrient and water cycling within a forest ecosystem.
- Students will discover the effects of natural events and human activities on a forest ecosystem.
- Students will understand the capture and storage of energy through the process of photosynthesis and respiration.
- Students will investigate interactions among members of a population relating to competition and adaptations.

Materials Needed:

- Paper Plates
- Markers/Pens
- Tree Cookies/Cross Section of Tree
- Foam Balls: red, blue, yellow, green, black, purple, etc.
- Computer with PowerPoint

Lesson Plan (50 minutes):

I. Motivation (5 minutes)
   a. What is the first word that comes to mind when you think of trees?
      i. I think of *competition* because trees are in constant battle.
   b. Begin class discussion and make a table of their ideas on the board:
      i. What do humans need to survive? VS. What do trees need to survive?
      ii. What happens to a tree if it doesn't get enough of these things?
      iii. *Transition: How can we tell if a tree didn't meet all of its requirements?

II. Lesson Procedure (45 minutes)
   a. Tree Chips (7 minutes)
      i. Pass out a tree cookie to each student or gather around a cross-section of a tree.
         1. How old was this tree when it was cut down?
         2. Discuss tree growth and how a big ring would represent a big growth year for the tree.
            a. A small ring would tell us that the tree was lacking a requirement such as sunlight, water, etc.
      ii. *Transition: "Now, we are going to see just how hard it is to be a tree!"

b. Every Tree for Itself Activity (35 minutes)
    i. Pass out paper plates and instruct the students to draw three small tree rings on their plate.
    ii. Clear the room and ask the students to spread out and stand on their paper plate. "Imagine that you are a young tree in a forest."
    iii. Explain the game: "The object of this game is to gather as many colored balls as you can."
        1. Students must keep both feet on their plate as they are rooted in the soil.
        2. Blue represents water, yellow represents sun, green represents nitrogen, and purple represents phosphorous.
    iv. Year One
        1. Equally distribute the colored balls on the floor around the students so they are about 1-2 feet apart.
        2. Begin the first round by having the student trees reach with their arms to gather the requirements
        3. Have the students record the number of requirements acquired on their paper plate.
            a. Students may draw a ring to represent their growth year.
            b. Did any trees lack a particular requirement?
            c. What might happen to a real tree that lacked water that year (may grow slowly or die)?
            d. Is there such a thing as too much water, sunlight, or nutrients?
    v. Year Two (Competition)
        1. Ask the student trees to move to one half of the room.
        2. Distribute balls. Begin round. Record results.
            a. Ask the students to with the least amount of requirements to act out their best tree death.
            b. Why did more trees die this year?
            c. When a forester plants pine trees, how can he or she plant them in order to prevent trees from dying?
    vi. Year Three (Drought)
        1. Ask the students to spread out again to avoid competition.
        2. Distribute balls, but less blue than prior rounds. Begin round. Record results.
            a. What happens to trees during a drought year?
            b. Explain that the stoma closes at night and during times of drought.
                i. This is an adaptation. What is an adaptation?
            c. Do you think that some trees need more water than others?
                i. Joshua tree vs. American Sycamore
    vii. Year Four (Disease)

1. Distribute balls, but this round includes black to represent disease. Begin round. Record results.
2. Just like humans, trees can get diseases that can make them sick or even kill them.
    a. Do you know of any tree diseases or pests?
    b. Do humans cause any of these diseases?
    c. What can we do to help trees with a disease?

viii. Year Five (Fire)
1. Distribute balls, but this round includes red to represent fire. Begin round. Record results.
2. Is fire always a bad thing for trees?
    a. Explain how fire can help trees to grow, sow their seeds, and reduce competition.
3. How far do you think trees can spread their roots?

ix. Conclusion (3 minutes)
1. Return desks and collect materials
2. How are trees similar to humans? How are they different?
3. Why would humans want to maximize tree growth?
4. Thank the students and the teacher for their time.

c. Enrichment
i. Use PowerPoint to show pictures of trees with cool battle weapons (adaptations)
1. How do adaptations develop? (Natural selection, genetics)
2. Example trees: Longleaf pine, bald cypress, Siberian elm, strangler fig, White Oak, etc.

ii. Invite the students to participate in an Arbor Day service project with tree planting at their school in April.

d. Assessment
i. Survey the teachers after every lesson to receive feedback.
ii. Continuously ask questions and engage the students throughout the lesson to gauge understanding.
iii. Invite the students to participate in an Arbor Day service project with tree planting at their school.