Ready, Set, GROW!

Outdoor Wonders and Learning™

Students interpret the different effects an environment can have on a growing plant with this fun and slightly competitive game—while learning about

Elaborate/Apply

Supplemental Reading

Temperate Forests
By Peter Benoit

Plants and Tree Ecosystems: From Wetlands to Forests
By Left Brain Kids

Hungry Plants
By Mary Batten

The Wild Trees: A Story of Passion and Daring
By Richard Preston

Grade Levels:

3, 4, 5

Curriculum Correlation:

NCSCS – Science
3.L.2.2
4.L.1.1
5.L.2.3
NCSCS – Mathematics
3.MD.3
4.NF.4, 4.NF.6
5.OA.3

Materials:

Four to six colors (yellow, green, blue, orange, red, black/brown) of popsicle sticks, counting chips or cubes - at least 2 per student of each color; paper plates; markers; rulers with inches and centimeters.

Duration:

30 minutes

Location:

Classroom for introduction and extension; Outdoor Study Area for activity

Procedure:

1. Ask the students: Have you ever seen the inside of a tree? Draw a large cross section of a tree on the board. Each ring represents a year of growth for that tree. Ask the students: How might you explain the different sizes of the rings? (Wider rings mean the tree grew more and narrow rings mean the tree grew less) To follow up, ask the students: Can you explain what makes you think that? Review the requirements that a plant/tree need for growth (sunlight, air/carbon dioxide, soil, water, and space). Ask the students: How can we use what we just learned/discussed to answer the questions about the different sized rings? The differences in the size of the rings represent how well the tree was able to get its resources for survival.
2. Give each student a paper plate and a marker and have them make a dot roughly the size of their marker cap in the middle. Then take them outside to play the game. Explain that each student is going to be a "tree" trying to collect as many resources as they can for growth. The main resources will be represented by the colored popsicle sticks/counting chips - yellow for sunlight, green for nutrients from the soil, blue for water, orange for air.
3. Arrange the students in a grid pattern, equally spaced about three feet apart. Tell them that their feet are their roots and must remain planted in one spot. If their feet move they will be disqualified for this round. They will only be able to pick up their resources using their branches (arms).
4. Randomly distribute the four main colors of resources around the grid of students.
5. Using the signal "Ready, Set, Grow!", give the students 10 seconds to gather what they can. Once the time is up, have them count how many they got of each color. The students will then draw a ring on their paper plate to represent that year of growth using the following assigned values:

Ready, Set, GROW!

(adapted from Project Learning Tree's Every Tree for Itself)

Outdoor Wonders and Learning™

A. Multiples of any one color, but not a full set with each color equals a poor growth year. Students will draw a ring 0.5 cm (1/8 in) from the center dot on the plate. *Ex. Blue, blue, yellow, green*

B. One of each of the colors equals an average growth year. Students will draw a ring 1 cm (1/4 in) from the center dot on the plate. *Ex. Yellow, green, blue, orange*

C. Multiples of any two colors and a full set with each color equals a superior growth year. Students will draw a ring 1.5 cm (3/4 in) from the center dot on the plate. *Ex. Yellow, green, green, blue, blue, orange*

Discuss why there are different growth rates when different amounts of resources are collected. When trees lack certain requirements they grow less, and when they receive too much of some requirements they can become stressed and are unable to grow as well.

6. Now have the students stand in groups of 3-5. Gather the colored resources and spread them around the "trees" again. Play another 10 second round so they can gather what they can. Compare what they collected in this round to the last round and have them draw their growth ring according to the assigned values. Did they collect more or less resources in this round? What conclusion can they reach about trees that grow close together? (The lack of space is a **limiting factor**. It is causing limited growth for the trees and increasing competition between the species.)
7. Complete a few more rounds and compare the results each time. Variations in each round can include the following:

   Use fewer water resources, representing drought; Use fewer nutrient resources, representing poor soil quality; Add a new color (red for forest fire, black/brown for negative insect infestation or positive pollinator population) but don't tell the students what it's for. After the round is complete and their data is collected, tell them what the color represents. How did this affect the "trees"?
8. Ask the students: What helped you learn about how plants and trees grow? What surprised you?

Variation:

Have the students study a local tree and how it gets the things it needs to survive, i.e. Maple trees can grow in varying soil types, Flowering Dogwoods don't need large amounts of sunlight, Tuliptrees need a lot of sunlight, etc. Then when they play the game have them collect their resources in a way that represents the tree they studied.

Extension:

After the students have played a few rounds of the game, have them graph the results of the growth of the whole "forest" as if each round represents a year. Each round/year can display the number of trees with poor growth, the number with average growth, and the number with superior growth.

Learning Targets:

1. Explain how environmental conditions, and changes in those conditions, can be beneficial or harmful to a plant's growth and survival.
2. Analyze data collected and draw conclusions based on what was learned.