PLANT COMPETITION

Lesson By: Joseph Urban
Grade Level: Fifth

Focus: This lesson will focus on plants and specific adaptations they might have for available sunlight and water.

Objectives:

1. Students will be able to define adaptation.
2. Students will be able to understand how much competition plants are in with each other in order to gain enough sunlight and water.
3. Students will know the difference between shade-tolerance and wet-tolerant.

Standards:

SC 5.4.4 2000
Explain that in any particular environment, some kinds of plants and animals survive well, some do not survive as well, and some cannot survive at all.
SC 5.4.7 2000
Explain that living things, such as plants and animals, differ in their characteristics, and that sometimes these differences can give members of these groups (plants and animals) an advantage in surviving and reproducing.

Background:

Trees are more similar to animals than you might think. Just like animals, trees need to basic things to survive and those are food and water. They get water from the surface and suck it up into their root system for the whole tree to use. They get food by using photosynthesis where they convert the sun's energy into sugars. Because of their need for sunlight, trees can be really competitive and will try to outgrow each other and spread their branches farther apart to get as much sunlight as necessary. Sometimes that can make other trees not have room to grow so they can't get sunlight. Some tree species have developed special features called adaptations so that they can still get food but be in the shade at the same time. Also, just like animals, water can be a problem too because it could drown the tree making it lose oxygen. Some trees also have adaptations to be in areas where there's a lot of water and areas with little water.

For more background information on shade-tolerance and wet-tolerance go to [https://utextension.tennessee.edu/publications/Documents/SP656.pdf]. They also have a list of trees with those adaptations that will be used later in on in the lesson.

Materials:

1. Grassy Area
2. Coins

Procedures: (40 Minutes Total)

Part 1 [15 Minutes]

1. Start off the activity with a hike in the forested area.

2. Ask the students why they think tress grow so tall and big. Explain to them that is there way to get as much sunlight as possible.
3. Observe different trees and how their canopies are shaped.
4. After doing the forest hike, go back to the grassy area.
5. Instruct the students that today they will act like trees and compete with each other. Discuss with the students that trees, similar to animals, will need the following to survive: water and sunlight.
6. Get the children into ordered rows and make they are one-arm length distance from one another. That will allow the arms to overlap.
7. Tell the students to squat down in frog position and inform them that they are saplings meaning they are just about to grow up into huge trees but first they need water.
8. In this activity water will be represented by coins. Actual money doesn't need to be used but something tangible for the students to grab and take.
9. Drop on down as many coins as desired and tell the students that they can't run and pick it up. Like trees, they have to stand perfectly still and only use their arms to reach out and grab the coins. They can do anything with their arms or body as long as their feet are in the same spot.
10. Instruct the students that they have five stages in order to grow from a sapling to a big tree. The students will get a chance to grow bigger if they collected enough water (coins) to grow. The number of coins needed to grow will vary on how many coins the instructor threw out initially. Make sure that it is a number that not every student will have but at least the majority of students will have.
11. If one of the students has the required amount of coins they will grow up. Remember they have five stages so they have to inch up slowly before becoming full height.
12. If students do not have enough coin to grow tell them they will have to wait until the next round of coins until they will have a chance to grow.
13. The last round should have a majority of the students will have grown to full height but not all of them. After that round is over instruct the students to spread their arms out as far as they can. This will represent their own canopy.
14. The object of the game is for each student to have their own canopy. Since arms overlap, students need to find creative ways in spreading out their arms without coming in contact with someone else's. Remember that the trees can spread out in whatever fashion they want, they just can't move their trunk.
15. If one or both of the student's arms can't move or can't reach to the top like the other students, then that limb or limbs is dead. That means they can't use them to make leaves and gather energy.
16. Explain to the student that even if the limb or they are dead, it is still important because it provides good habitat for wildlife.

Part 2 [15 Minutes]

17. Next explain to the students the concept of adaptation and that trees have special adaptations for gathering sunlight.
18. Make each student draw from a name of a tree from the list given below. This can be done in many ways, whichever one the instructor prefers.
19. Tell the student to remember the name of their tree.
20. Repeat the game found in Part 1.

21. Finally read off the names of the trees and state whether or not they are shade-tolerant. That means they can still gather energy even if there's not much sunlight. Those trees that are under the canopy and are shade-tolerant are not dead.

Part 3 [10 Minutes]

22. For the next round explain to students that different trees like a different amount of moisture. Some can handle drier climates while some can handle lots of rain.
23. For this round whatever trees the students were in Part 2, they will be that tree for this round.
24. In this round the game will only have one round.
25. Sprinkle the coins so that deliberately there will be a lot of coins in one area and very few in another.
26. Let the students still collect the coins just like usual.
27. When finished, read off the trees again and state whether or not they have an adaptation for wetter or drier climates.
28. When finished ask students why do you think trees have these adaptations. Then ask do you think it's hard to be a tree after all.

Evaluation:

1. Teachers and instructors can evaluate by observing if the students are participating in the activities.
2. Instruct the students to complete a journal entry about their tree, what adaptations it has, and what those adaptations mean.