Every Tree for Itself Guide

This is a presentation that uses classroom participation and a few items that are easily made or obtained. I recommend you watch the video once yourself to be prepared to run the activity.

Pauses while watching the video with your class:
In this presentation there are many places for you to pause and allow for participation, whether for set up, or allowing students to answer questions. I will timestamp the points to pause for you here.

1:20 Create a forest floor space (depending on your class size clear floor space).
2:15 Place resources on the forest floor and ensure students have planted themselves.
3:10 Allow students to grab resources and stand up.
3:30 Allow students to respond to my question, I will provide answers.
4:05 Allow students to grab additional resources.
4:25 Allow students to respond to my question, I will provide answers.
4:45 Remove additional resources if necessary.
5:05 Determine which student with a unique item (green chip) is #1, #2, #3.
6:50 "Cut trees down".
6:57 Allow students to grab resources.
7:20 Allow students to respond to my question, I will provide answers.
8:00 Allow students to respond to my question, I will provide answers.
8:35 "Cut trees down".
8:55 Allow students to grab resources
10:00 Allow students to respond to my question, I will provide answers.

CLASS ACTIVITY
Rules:

1) Students must be quiet unless prompted.
2) There is no resource sharing amongst the students.
3) Once they have planted themselves, they cannot move from that spot.

Materials:
You will need four unique items (four different colors of poker chips or 3" x 3" squares of construction paper). We used a bunch of red, blue, and white chips, and only three green chips. These items represent resources. Base the amount you need on your class size but make sure you only have three green chips or squares of paper.

Red – Sunlight (used in photosynthesis to create "energy" for the tree).
Blue – Water (used by the tree to allow physical processes to occur).
White – Nutrients (feeds the tree, very much like food for humans).
Green – Pests (but we call those "special items" to start so that kids are excited to grab them).

There is no requirement on a number for each resource except for only having three green items. The trick is to have enough resources for everyone to get some, but not enough to last multiple rounds without shortages. The goal of each student is to grab at least one of each resource each round; this will not always happen.

It is okay to put down too many resources and remove some yourself as the game goes on to illustrate our point that some years the resources are plentiful, and other years there isn't as much.

Lessons Learned:
We are looking to teach a few concepts:

1) Trees need resources to live and grow. Without any of the three main resources a tree would die.
2) Trees experience competition with each other, which limits their individual ability to grow.
3) Death of a tree is not always a negative thing; it can provide many positive results.
4) Trees provide benefits to the forest and earth at all life stages.
5) Trees have lots of uses.
6) Forests grow up, develop purpose, and changes over time.

Doing the Activity:

1. Have students stand about three feet apart. Remind them that since they're trees, they can't move or talk.
2. Equally distribute the colored squares (or poker chips) on the floor around the students. Try to get the squares 1-2 feet apart.
3. Tell students that they'll be playing a game called "Every Tree for Itself." The object of the game is for the "trees" to gather as many squares as they can without moving from their spot. Explain that each colored square represents a tree requirement – red represents sunlight, blue represents water, white represents nutrients (nitrogen, oxygen, or carbon dioxide), and green represents something special. Make appropriate adjustments if you use poker chips.
4. Give a signal to start the first round. Have student trees reach to gather their requirements, reminding them that their feet can't move. Allow student trees to gather these requirements for one 30-second round. (They can either collect all types of requirements at once or one type of requirement each round.) What color(s) did each student get? Use the following questions to discuss the results of the first round:
    - How many requirements did each tree get?
    - Do any trees lack a particular requirement?
    - What might happen to a real tree that lacked one of its requirements? (It might grow slowly or eventually die. Point out to the students, though, that different species of trees have different requirements.)
    - Is there such a thing as too much water, sunlight, or nutrients? (Yes, every species has optimum levels beyond which the tree becomes stressed.)
5. Now 10 years have gone by and the trees are 10 years old. Have students stand in place and gather the colored squares again (there won't be as many for them to draw from this time). Compare the results of this round with those of the first. In most cases, students will notice that each tree gathered fewer requirements. Ask if they can reach any conclusions about trees that grow close to each other. (Such trees compete for requirements. Often they don't grow as well as trees that are more widely separated from one another.)
6. Ask the students with the green squares to show them to you.
7. Now tell the first student with a green square why they're special.
    - The first green square is infested by mountain pine beetles. They found that tree because it smells good. They landed on this tree, laid eggs in it, the eggs hatched, and then began to feed on the tree. That tree will only be able to survive for 1-2 years with this infestation.

When it dies, the beetles will spread to other trees and we can't have that. This tree will need to be cut down (the student drops their squares and sits down in that spot).

8. Select a few random trees to be cut down – somebody needed them to become fence posts (those students drop their squares and sit down in place).
9. Now another 10 years have gone by, and the remaining trees are 20 years old. Now that they're bigger, what benefits can they provide? (They're big enough to be used to build log cabins or telephone poles, or make lots of paper.)
10. These trees need more resources, so have the students pick up some of the resources, reminding them that their feet can't move.
    - How many requirements did each tree get?
    - Do any trees lack a particular requirement?
    - What might happen to a real tree that lacked one of its requirements? (It might grow slowly or eventually die. Point out to the students, though, that different species of trees have different requirements.)
    - Is there such a thing as too much water, sunlight, or nutrients? (Yes, every species has optimum levels beyond which the tree becomes stressed.)
11. Now explain about the second green square – this tree is infested by Ips beetles. This beetle doesn't immediately kill the tree like the mountain pine beetle does. It only attacks sick trees that haven't had enough sunlight, water, or nutrients. That tree may be allowed to stand for now.
12. The third green square has a fungus. Fungus feeds on dead and decaying matter, so it's dying from the inside out. We just had a tremendous wind storm and this tree has fallen over (the student drops their squares and sits down in place). But now this tree has a different purpose. What might that be? (It is replenishing resources for other trees and becoming a home for animals and bugs.)
13. Meanwhile, the Ips beetle tree has also died but hasn't fallen over. It's a standing dead tree. (This student drops their squares and continues to stand but no longer gathers resources.) What purpose does this tree now serve? (Wildlife habitat for birds, squirrels, owls, woodpeckers.)
14. Somebody needed lumber to build a log cabin, so remove some more of the trees (have those students drop their resources and sit in place). Ask students how foresters might use their knowledge of competition in caring for a stand of trees. (Foresters plant trees a certain distance apart so the trees will be able to get enough nutrients. The distance varies depending on the species of the tree. Foresters also thin young stands of trees).
15. The trees now left standing are more than 30 years old. They're between 30-40 feet tall, so they're absolutely huge. They grow pine cones. What are pine cones really? (Seeds) So what is the purpose of these huge trees now? (They replenish the forest and baby trees start to grow). The students should spread their arms and drop all their resources, which now also represent seeds.
16. The only problem now is that these big monster trees take all the resources from the baby trees, so they need to be removed so the baby trees can have enough sunlight, nutrients, and water to grow. (The remaining students sit in place.)
17. Try several more rounds, comparing the results each time. Here are suggestions for additional rounds:
    - Have all of the students stand closer together.
    - Put students closer together, but have only half of the class participate.
    - Use fewer water squares (representing a drought).
    - Use fewer sunlight squares (representing lack of sunlight for young trees because of overcrowding).
    - Use fewer nutrient squares (representing poor quality soil).