SUCCESSION!

This game will help students explore what happens after a disturbance and how different trees with different adaptations compete for resources.

Set up:

Materials: game boards (attached), game pieces (cut out from special rules page, encourage kids to color them in), dice

Put students in groups of 5 (or as close to 5 as possible) and give each student a different tree game board (repeats or omissions in groups are okay but 5 different trees is ideal). Give each group a special rules sheet (attached). Explain that a major forest fire has gone through an area and wiped out all trees there. Students represent their tree and the goal is to grow to a full-sized tree. Have students read the special rules as well as any notes on their own boards.

Game play:

Students take turns rolling a dice and moving their game piece up the tree to symbolize growth.

Whenever a tree moves backwards, all other trees move ahead two spaces, taking advantage of the resources freed up by the trees that are damaged.

Special tree properties and science behind them:

   Chestnut: Students playing as a chestnut can begin growing immediately and will start at ground level and will always return to this spot when disturbed. This is because chestnuts are able to remain alive underground even after a disturbance and then begin growing out of the stump. They need to watch out for the red squares which indicate infection by the chestnut blight which will kill the above-ground portion of the tree. If a student lands on one of these squares they must return to the start.

   Pine: Students playing as a pine can begin growing immediately but will have to start from a seed below ground level. Pine trees can have serotinous cones which only open after a fire. The fire that begins the game will open the cones and start the growth process. Pine trees are fire resistant and will survive in minor fires (see below). The blue square on this board denote winter time in which the deciduous trees will drop their leaves but evergreens can continue acquiring resources, if a student lands on this square, he/she rolls again.

   Hemlock: Students playing as a hemlock will not fare as well as the pine in the initial fire will have to wait until seeds are dispersed to the disturbed area to begin growing (roll of 5 or 6). Hemlock seeds disperse by wind but do not have adaptations like the maple. Whenever hemlock is not the largest tree they can move an extra space every role due to the fact that it is shade tolerant and will do well in the understory. The blue squares on this board mean the same as on the pine board, students roll again if they land on this square.
Maple: Students playing as a maple will also have to wait until seeds are dispersed into the disturbed area to begin growing (roll of 4 or higher). Maple seeds are specially adapted “helicopters” that catch the air and allow seeds to be dispersed further/faster.

Oak: Students playing as oak are dispersed even faster than maples because they are dispersed by animals, especially squirrels, and can began growing with a role of 3 or higher. Oak trees are also fire resistant and very sturdy so they will not succumb to wind storms or minor fires (see below). Since oak trees are slow growing, subtract 1 from every roll

Disturbances:

If a six is rolled, there will be a wind storm, damaging the largest trees (whoever is in the lead or tied for the lead), causing them to go back 6 spaces. This occurs because larger trees are more subject to wind damage due to their increased exposure and lower flexibility. Trees not in the lead take advantage of the light and other resources freed up by the damage to the larger trees and move ahead 6 spaces

Two rolls of six in a row will cause a minor fire resulting in all trees to return to the start unless they are fire tolerant (oak, pine)

Post-game discussion:

• Talk about the different conditions for starting and why they might be the way they are. How does this relate to trees recolonizing an area in real life?
• Talk about the different adaptations that each tree has and discuss how they fit in different environments and disturbance regimes.
• Talk about why trees moved forward whenever another tree moved backwards.
• Did the same species win in each group?
• What would happen if minor fire events occurred more often (this can be tested by making a fire occur every time a 5 is rolled)
• What if there were no disturbances at all?
• There is no best tree! All have advantages and disadvantages and fit certain ecosystems better than others.

Total time: ~30 minutes
You must roll a 5 or a 6 to start.
Start right away!
You must roll a 4 or higher to start.
You must roll a 3 or higher to start

You grow slowly but are very sturdy
- Subtract 1 from every roll
- No damage from wind storms and fires

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Special Rules!

• When a 6 is rolled there is a wind storm which damages whatever tree or trees are the largest—All trees that are in the lead go back 6 spaces (except for oaks—stay where you are!)

• If a 6 is rolled twice in a row there is a minor fire killing all trees that aren’t adapted to survive fire—Everyone except pine and oak go back to the start

• Whenever trees move backwards, all other trees move ahead 2 spaces, taking advantage of resources freed up by the trees that are damaged

Oh no! you were infected by Chestnut Blight! Go back to start!

It’s winter time, good thing you’re an evergreen! Other trees have dropped their leaves but not you! Roll again!

Game Pieces: