FOREST LEARNING

Teacher

Every Tree for Itself

Teachers Notes:

Try this active simulation to give your students an understanding of the conditions that trees need to live and grow and to help your students learn that trees often must compete for their needs.

Objective:

- Students will simulate how trees compete for their essential needs.
- Students will describe how varying amounts of light, water, and nutrients affect a tree's growth.

Levels:

Kinder – Year 5 – Every Tree for Itself Junior Worksheet
Year 6 – Year 8 – Every Tree for Itself Senior Worksheet

Time Considerations:

Preparation: 10 minutes
Activity: 50 minutes + for Junior Activity
45-50 Minutes for Senior Activity

Subject:

Science, Maths

Concepts:

- The Earth's atmosphere, water, soil, climate, and geology vary from region to region, thus creating a wide diversity of biological communities.
- Organisms are interdependent; they all depend on non-living components of the Earth.
- Altering the environment affect all life forms – including humans – and the interrelationships that links them.

Skills:
Determining causes and effects, Identifying relationships and patterns, Predicting and Interpreting.

Material:
A4 paper or paper plates – one per students, pieces of blue, yellow, green, red, and black paper or, blue, yellow, green, red, and black Unifix cubes, tree trunk or branch cross sections/ tree cookies, butcher's paper.

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Assessment Opportunities:

- Have students draw a cross-section of a tree that shows 10 years growth and varying growing conditions for each of the years. Students then list the conditions that are represented in the rings drawn, such as drought, competition with other trees, fire, cool spring and summer, insect infestation, abundance or lack of basic needs, forest thinning, animal damage and so on.
- Have students write a story or create a skit from the perspective of a tree, describing 10 years in the tree's life. Have them detail events that affect the tree both positively and negatively.
- Help students use tree data gathered in one of the round of the simulation to write a one-paragraph description of the conditions their tree experienced.

Background:

What do trees need to they can grow? Some of their needs are the same as those of people and other animals. For example, trees need air, and plenty of water and food. But while people and animals eat the tree's food, trees get food in a different way. They produce it in their leaves from carbon dioxide and water using energy from the sun. And just as people and animals need certain vitamins for growth, trees need mineral nutrients, such as nitrogen and phosphorus, which they get from the soil.

If trees do not get enough water, sunlight or nutrients, they may grow slowly or die. Growth rings show this graphically. In general, wide ring indicate good conditions for growth (plenty of water, sunshine and nutrients) while narrow ring often indicate less favourable conditions for growth (drought, insect damage, lack of nutrients, competition).

Getting Ready:

Cut two 7.6cm x 7.6cm squares out of blue, yellow and green construction paper for each student. Alternatively, you might like to use Unifix cubes to save time, they work much better than paper if you're doing the activity outdoors and are easier to clean up, re-use and collect at the end of the activity. You will also need chart paper to write on and one paper plate or A4 piece of paper for each student. You will also need tree cookies to engage students, a picture is attached below for reference, and this is also the tree cookie used on the worksheet.

1. **Engage:**

   Begin with a class discussion about how do we find out how old things are?
   How old is grandma?
   How old is your dog?
   How old is that banana?
   Ask students how long think that trees have been in existence. How would they go about finding out?
   Hold up a cross section of a tree, ask if anyone know what it is.

2. **Explore:**

1. Pass out cross-sections from several trunks or branches (tree cookies) and have the students examine the growth rings.
2. Ask students if they can find anything on the tree cookies that gives them clues about the life/age of that particular tree.

3. **Explain:**

1. Explain that each year a tree adds a layer of growth between the older wood and bark, therefore creating a new ring. This is how you can find out how old a tree is and what its life has been like in a particular year.
2. Explain to students that they are going to play a game called "Every Tree For Itself". Have students, who will be the "trees" stand about a metre away from each other in an open space and place a paper plate or 1 white A4 paper between their feet.
3. Scatter blue, yellow and green Unifix cubes around the students. The object of the game is for the "trees" to gather as many Unifix cubes on their plate as they can. Explain that each coloured Unifix represents a tree requirement; blue represents water, yellow represents sunlight, and green represents a nutrient such as nitrogen. Ensure that you equally distribute the coloured squares on the floor and that they are about 30-60cms apart.
4. To begin the game, student trees must reach with their branches (arms) to gather their requirements. Explain to students that their feet are their roots and must remain besides the paper plate at all times. They are not allowed to slide their plate along the floor or step away from it; they will be disqualified for doing so. Have students collate and record the requirements they were about to gather. Use the following questions to discuss the results.
    - How many requirements did each tree get?
    - Do any trees lack particular requirements?
    - What might happen if a real tree lacked one of its requirements? (It might grow slowly, or eventually die)
    - Is there such thing as too much water, sunlight, nutrients? (Yes, every species has optimum levels beyond which the tree becomes stressed)

4. **Elaborate:**

1. Have students stand with their paper plates again in groups of three to five. Collect all of the Unfix from the students distribute them around the floor again. Play another round and have students record their results.
2. Compare and record these 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 new conclusions about trees that grow close together. (Such trees often compete for requirements and don't grow as well as others that are widely separated.)

3. Ask if any trees "died" because they couldn't get a particular requirement. (You can allow trees to fall down or look tired and droopy if they haven't received their vital requirements.)
4. You may play several rounds of this game with varying results in order to promote deep, rich discussion;
    - Use fewer blue Unifix cubes to represent drought
    - Use fewer yellow Unifix cubes to represent lack of sunlight for young trees because of overcrowding
    - Use fewer green Unifix cubes to represent poor soil quality
    - Add a new Unifix cube, but don't tell the students what it represents. After playing a round with the new colour, tell them that red represents fire and black represents insect infestation. Ask how would this new element affect the trees?
5. If time permits, after each round of the game, have students draw a "ring" on a piece of paper to represent how much their tree grew that year based on the requirements it got.

5. **Evaluate:**

Ask students how we might use their newfound knowledge of drought, competition, abundance or lack of basic needs in caring for a stand of trees.
Use the worksheets provided to keep evidence of learning and comprehension of the activity.

Further resource available through Forest Learning

Tree Seeds – Mountain Ash Tree Seeds. Contact Forest Learning for further enquiries.

Activity about Wood Properties and different species of trees in Australia.
http://forestlearning.edu.au/find-a-resource/article/16/wood-properties.html

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Basic Tree Cookie