



TEACHERS AND RESEARCHERS EXPLORING AND COLLABORATING

PolarTREC Lesson Resource

Amanda Ruland

Fire and Carbon in Siberian Forests

PolarTREC Expedition Page

<https://www.polartrec.com/expeditions/fire-and-carbon-in-siberian-forests>



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Overview

Scientists in Siberia are seeing trends of more severe and widespread wildfires. By observing and measuring larch forests, they are trying to understand how the forests are changing. What do these trees need to survive? Are they getting what they need? Students will plant lodgepole pine seeds providing some with all the necessary components for survival and others missing one crucial need (water, soil, sunlight).

Timeframe: 3 weeks

Objective

Students will conduct an experiment, observing and recording patterns of growth to determine what all plants need to survive.

Key Terms

- Seed
- Seedling
- Soil
- Water
- Air
- Sunlight
- Room
- Photosynthesis
- Root
- Shoot/Stem
- Sprouted
- Leaf/Needle
- Conifer
- Deciduous tree
- Temperature
- Germination
- Minerals

Instructional Procedures

1. Pre-assessment: Give students a piece of paper. Have students draw and label a picture of what plants need to grow big and strong.
2. Read “The Tiny Seed” by Eric Carle for enjoyment.
3. Close read “The Tiny Seed”, ask guiding questions.
 - a. Did all the seeds turn into flowers?
 - b. What happened to some of the seeds?
 - c. What did the seed that turned into the flower have that the other seeds did not?

Resource Details

Region

Arctic

Completion Time

More than a week

Grade

Elementary and Up

Permission

Download and Share

Expeditions

Fire and Carbon in Siberian Forests

Related Members

Amanda Ruland

Jennie DeMarco

Materials

Book: “The Tiny Seed” by Eric Carle

Book: “A Seed is the Start” by Melissa Stewart

4-12 lodgepole pine seeds (or any tree seed)

Potting soil

Cups for planting seeds in

Topic

Organisms and Their Environments

4. Watch "How does a seed become a plant?" on Youtube.
5. Say, "We are going to conduct an experiment. We are going to give one cup of seeds everything it needs to grow, but we are going to take one thing away from the other seeds."
6. In their science journals, students should divide their page into quadrants.
7. Demonstrate a sheet of chart paper on how to divide the page into 4 quadrants.
8. Say, "What do you think will happen if a seed gets sunlight, water, and soil?" Give students ample time to draw their predictions in the first quadrant.
9. In the next box have students draw what they think a plant will look like with water and soil but no sunlight.
10. In the third quadrant have students predict what will happen if the plant has sunlight and soil, but no water.
11. In the last quadrant have students predict what will happen if the seed gets sunlight and water, but no soil (sand will be in place of the soil).
12. Set up the experiment: as a class plant the same number of seeds in 4 different cups. Label each cup with a picture of the sun, water, and soil.

Cross out the picture of what will be taken away on each cup. Don't forget to cut small holes into the bottom of each cup and put them in a tin pan to catch water.

- Cup #1 contains 3 seeds, nutrient-rich soil, water, set on the window sill in direct sunlight (do not cross anything off).
 - Cup #2 contains: 3 seeds, nutrient-rich soil, water, but is set in a dark cupboard (cross out the sun).
 - Cup #3 contains 3 seeds, nutrient-rich soil, set on the window sill in direct sunlight, but no water (cross out the water droplet).
 - Cup #4 contains: 3 seeds, water, set on the windowsill, but is planted in the sand (cross out the soil).
13. Every day have students divide a page in their journal into 4 quadrants and visit each cup. Students should draw a picture of what they see including labels such as color and height.
 14. Have students take pictures as the plants grow.
 15. After several weeks to one month come back together as a group. Compare data from your predictions page to what actually happened.
 16. Have a discussion. Ask: "Which seeds grew the best?" "Why?"

Assessment:

Students will draw and label a diagram of a plant demonstrating what plants need to be healthy.

Extension

Go into the field and observe/record which seedlings are growing successfully. Are they in a shaded area? Sunny? What does the soil look like?

Differentiated Instruction

- Students who struggle with fine motor skills can describe what plants need to grow.
- Students can use manipulatives to model what a plant needs to grow (i.e. create a picture with pattern blocks including the sun, soil, and rain).

Transferability

This lesson is easily adapted for older students by incorporating more real-world scientific data sets. Students can read about scientific studies conducted in Siberia and analyze/interpret data to see what factors are most effecting larch growth in the Siberian Arctic.

Resources

For further background on larch forests of Siberia read:

<https://blogs.agu.org/geospace/2014/12/16/growing-forests-fire/>

Author/Credits

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