GOULD LAKE OUTDOOR CENTRE
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Grade Tree

Recommendations: For students in Grade 3. Adult supervision is recommended. Can be done indoors or outside.

Purpose: Students will learn about the growth cycle of a coniferous tree with hands on learning to collect, germinate, and grow a Coniferous *(cone bearing)* sapling and hopefully plant a tree.

Click Here or on the picture below for a quick overview.

Materials:

- Pine, Cedar, Fir or Spruce cone(s) or seeds
- Soil or Moss
- A tray or pot to start your seeds
- A workspace where you can spill a little soil and clean up
- Spray bottle or something that lets you add a small amount of water.
- Camera, paper and pen or a device for recording the progress of your tree.

How it Works:

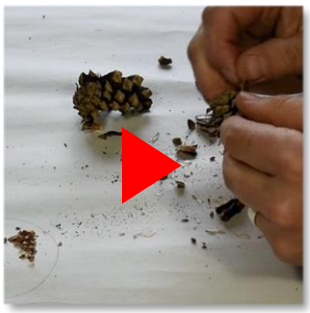
Students will gather open cones and then germinate and observe the life cycle of a tree as it forms roots, a stem *(trunk),* and needles as they care for it. The process can be recorded with notes or even photos as it goes.

Step 1: Gather some coniferous *(evergreen)* cones. It's best if they are open but not decomposing. "*Hey, did you know that conifers have male and female cones, the ones we want to collect are female. They have the seeds and are the "normal" ones you probably recognize. Male cones produce pollen and don't usually open and fall from the tree. Some male cones don't have the hard, scaly petals and look more like corn on the cob, don't eat it though! Pollen is transferred from the male to female cones on the wind. Pretty cool hey?"*


Step 2: You have a couple options here; you can remove the seeds from the cone, or you can germinate the seed right in the cone.

For Seeds: Bring the cones to your work area and then remove the hard, scaly petals from the cone to carefully collect the small (look like very thin pieces of brown paper) seeds inside. Place the seeds in a small plastic bag and put it in your freezer. Freezing your seeds tricks them into thinking it is winter, when they warm up, thinking its spring, they will be ready to sprout! This step might not be necessary if you gather seeds in the spring after they have already spent a real winter outside.



OR

For Cones: Bring the cones to your work area and carefully look in between the scaly petals of the cone to see if you can see any seeds. They will be small and, in most cases, look like very thin pieces of brown paper. Chances are if your cone looks fresh there will be at least a few seeds in there. Use a few cones, worst case, you grow too many trees! Put the cone(s) in a plastic bag and pop it in the freezer for a few days. Freezing your seeds tricks them into thinking it is winter, when they warm up, thinking its spring, they will be ready to sprout! This step might not be necessary if you gather cones in the spring after they have already spent a real winter outside.

Step 3: Take your seeds/cones out of the freezer and bring them to your workstation, let them warm up on their own.

For Seeds: Fill your tray or pot with soil, it should be moist but not wet or muddy at all. (potting soil or garden soil will work great) without packing the soil down, sprinkle your seeds evenly across the surface of the soil. You can tap the edge of the tray/pot to let the seeds settle in but don't bury them. They like being on the surface!




OR

For Cones: Fill your tray or pot with moss, the moss should be at the top edge of your container so add some soil before putting the moss in if need be. Next, place your cone(s) on the moss. Give the cones a bit of space so they are not touching each other, and sunlight can get between them.




Step 4: With the spray bottle, spray the seeds/cones with a gentle mist. Don't overdo it. Spray bottles are fun, and it's easy to get carried away but your seeds/cones don't want too much water at this point.

Step 5: After you have given them a quick misting, place the tray or pot in a sunny warm window.

Step 6: Now for the hard part, waiting… It's going to take your seeds a few weeks to germinate, maybe even a month! There's no for sure way to know when they are going to wake up and start growing. Every day or two, check in on them and give them a very quick mist of water…if they look wet from last time don't water them.

Step 7: When you check on them, record the dates and times along with what you observe. Make notes of things like the weather, if it was cool or warm, if you watered them. Anything you can think of. And of course, when you see them starting to grow!

Step 8: Once your trees have germinated and started to grow, continue to water them with a small amount of water every day or two. Once the trees are a few inches high you can gently remove them from the tray or cones and plant them in their own pots!



Step 9: Keep on growing! You can treat your trees like house plants now, watering them when the soil dries out, potting them in bigger pots as they outgrow the ones they are in. They won't be ready to go outside for months so get to know them!

Step 10: Now that you have small trees it's time to decide what you want to do with them. You could research where your species of tree likes to live and then find a good spot to plant it outside or you can continue to grow it indoors and trim it and shape occasionally to be a beautiful tiny tree. Many Conifers make excellent Bonsai trees, a Japanese art form where you trim and care for the tree so it looks like a smaller version of a big tree you would find in the forest. Click here for more info on Bonsai

Conclusion: Growing trees and other plants really can be a very rewarding and satisfying hobby and it can also be quite frustrating. It requires a lot of dedication and patience. Imagine being a farmer, responsible for making sure they grow enough food to feed thousands of people. That would be so stressful to make sure you do it right but also an amazing accomplishment to be proud of if your planning, patience and hard work is successful. The skills you practice and learn with this activity are some of the same skills professional growers use in forestry, agriculture and nurseries.

Resources:

If you have any questions or are having trouble finding seeds/cones, please email me at mcshanese@limestone.on.ca (Shawn McShane) and I will try and help you out! I'll even try to mail some seeds if you can't find any!

Here's a great tree ID resource: https://www.ontario.ca/environment-and-energy/tree-atlas

Below are some curriculum documents. I have marked some criteria, prompts and questions you can apply to this activity if you would like to tie it into the Grade 3 curriculum.

SCIENCE

Elementary Science and Technology Curriculum Overview				
	Understanding Life Systems	Understanding Structures and Mechanisms	Understanding Matter and Energy	Understanding Earth and Space Systems
Grade 1	Needs and Characteristics of Living Things	Materials, Objects, and Everyday Structures	Energy in Our Lives	Daily and Seasonal Changes
Grade 2	Growth and Changes in Animals	Movement	Properties of Liquids and Solids	Air and Water in the Environment
Grade 3	Growth and Changes in Plants	Strong and Stable Structures	Forces Causing Movement	Soils in the Environment
Grade 4	Habitats and Communities	Pulleys and Gears	Light and Sound	Rocks and Minerals
Grade 5	Human Organ Systems	Forces Acting on Structures and Mechanisms	Properties of and Changes in Matter	Conservation of Energy and Resources
Grade 6	Biodiversity	Flight	Electricity and Electrical Devices	Space
Grade 7	Interactions in the Environment	Form and Function	Pure Substances and Mixtures	Heat in the Environment
Grade 8	Cells	Systems in Action	Fluids	Water Systems
Grade 9 and 10 Science Curriculum Overview				
	Biology	Physics	Chemistry	Earth and Space Science
Grade 9 Academic	Sustainable Ecosystems	The Characteristics of Electricity	Atoms, Elements, and Compounds	The Study of the Universe
Grade 9 Applied	Sustainable Ecosystems and Human Activity	Electrical Applications	Exploring Matter	Space Exploration
Grade 10 Academic	Tissues, Organs, and Systems of Living Things	Light and Geometric Optics	Chemical Reactions	Climate Change
Grade 10 Applied	Human Tissues, Organs, and Systems	Light and Applications of Optics	Chemical Reactions and Their Practical Applications	Earth's Dynamic Climate

GRADE 3 | UNDERSTANDING LIFE SYSTEMS
GROWTH AND CHANGES IN PLANTS

OVERVIEW

Growth and Changes in Plants focuses on the characteristics and requirements of plants and the ways in which plants grow. Students will observe and investigate a wide variety of local plants, from trees and mosses in their natural environment to flowers and vegetables grown at school or on farms, and will consider the impact of human activity on plants and their habitats. Students will also learn about the importance of plants as sources of oxygen, food, and shelter, and the need for humans to protect plants and their habitats.

In preparation for working with plants, it is important that students be able to identify practices that ensure their personal safety and the safety of others and to demonstrate an understanding of the importance of these practices. This includes knowing why they should not taste any part of a plant unless directed to do so by a teacher, and why they should wash their hands after handling plants or parts of plants.

This topic also provides opportunities for connecting to the Grade 3 social studies topic Canada and World Connections: Urban and Rural Communities. As students look at similarities and differences between regions, they can consider the kinds of plants that help to make a location unique. They can also consider the need to protect farmlands as plant habitats and as producers of food for living things. Connections can also be made with the Grade 3 social studies topic Heritage and Citizenship: Early Settlements in Upper Canada, as students look at the types of plants that were used both by Aboriginal people and the settlers, plants that were native to the area, and plants that were introduced by the settlers. Connections can also be made with another Grade 3 science and technology topic, Understanding Earth and Space Systems: Soils in the Environment.

Fundamental Concepts	Big Ideas
Systems and Interactions Sustainability and Stewardship	Plants have distinct characteristics. *(Overall expectations 2 and 3)* There are similarities and differences among various types of plants. *(Overall expectation 2)* Plants are the primary source of food for humans. *(Overall expectation 1)* Humans need to protect plants and their habitats. *(Overall expectation 1)* Plants are important to the planet. *(Overall expectation 1)*

OVERALL EXPECTATIONS

By the end of Grade 3, students will:

1. assess ways in which plants have an impact on society and the environment, and ways in which human activity has an impact on plants and plant habitats;
2. investigate similarities and differences in the characteristics of various plants, and ways in which the characteristics of plants relate to the environment in which they grow;
3. demonstrate an understanding that plants grow and change and have distinct characteristics.

SPECIFIC EXPECTATIONS

1. Relating Science and Technology to Society and the Environment

By the end of Grade 3, students will:

1.1 assess ways in which plants are important to humans and other living things, taking different points of view into consideration *(e.g., the point of view of home builders, gardeners, nursery owners, vegetarians)*, and suggest ways in which humans can protect plants

Sample prompts: Plants provide oxygen and food that other living things need to survive. Plants use and store carbon dioxide, helping reduce the amount of this greenhouse gas in the atmosphere. Trees reduce humans' energy use in summer by providing cooling shade. Leaves, twigs, and branches of trees and shrubs block erosion-causing rainfall. Grass and shrubs prevent soil from washing away. Roots, leaves, and trunks provide homes for wildlife. Aboriginal people use plants for many medicines.

1.2 assess the impact of different human activities on plants, and list personal actions they can engage in to minimize harmful effects and enhance good effects

Sample prompts: When humans provide common house plants and blooming potted plants with an appropriate environment, they help fight pollution indoors. When humans plant trees, they benefit the environment in many different ways. When humans fill in wetlands to build houses, they destroy an important habitat that supports many plants. When humans pick wildflowers or dig them up to replant in their home gardens, they harm a natural habitat that supports many living things. When humans plant non-native plants and trees that need pesticides and/or a lot of water to survive, they drive out native plants and trees that are adapted to our climate and that provide habitat and food for native birds, butterflies, and mammals.

2. Developing Investigation and Communication Skills

By the end of Grade 3, students will:

2.1 follow established safety procedures during science and technology investigations *(e.g., avoid touching eyes when handling plants; never taste any part of a plant unless instructed to do so by the teacher)*

2.2 observe and compare the parts of a variety of plants *(e.g., roots of grass, carrot, dandelion; stem of cactus, carnation, tree; leaves of geranium, spider plant, pine tree)*

2.3 germinate seeds and record similarities and differences as seedlings develop *(e.g., plant quick-growing seeds – nasturtium, morning glory, sunflower, tomato, beet, or radish seeds – in peat pellets to observe growth)*

2.4 investigate ways in which a variety of plants adapt and/or react to their environment, including changes in their environment, using a variety of methods *(e.g., read a variety of non-fiction texts; interview plant experts; view DVDs or CD-ROMs)*

2.5 use scientific inquiry/experimentation skills (see page 12), and knowledge acquired from previous investigations, to investigate a variety of ways in which plants meet their basic needs

Sample guiding questions: How do plants meet their need for air, water, light, warmth, and space? What are different ways in which we can help plants meet their needs?

2.6 use appropriate science and technology vocabulary, including *stem, leaf, root, pistil, stamen, flower, adaptation,* and *germination,* in oral and written communication

2.7 use a variety of forms *(e.g., oral, written, graphic, multimedia)* to communicate with different audiences and for a variety of purposes *(e.g., make illustrated entries in a personal science journal to describe plant characteristics and adaptations to harsh environments)*

3. Understanding Basic Concepts

By the end of Grade 3, students will:

3.1 describe the basic needs of plants, including air, water, light, warmth, and space

3.2 identify the major parts of plants, including root, stem, flower, stamen, pistil, leaf, seed, and fruit, and describe how each contributes to the plant's survival within the plant's environment *(e.g., the roots soak up food and water for the plant; the stem carries water and food to the rest of the plant; the leaves make food for the plant with help from the sun; the flowers grow fruit and seeds for new plants)*

3.3 describe the changes that different plants undergo in their life cycles *(e.g., some plants grow from bulbs to flowers, and when the flowers die off the bulb produces little bulbs that will bloom the next year; some plants grow from germination of a seed to the production of a fruit containing seeds that are then scattered by humans, animals, or the wind so that new plants can grow)*

3.4 describe how most plants get energy to live directly from the sun *(e.g., plants turn the energy from the sun into food for themselves)* and how plants help other living things to get energy from the sun *(e.g., Other living things, which cannot "eat" sunshine, eat the plants to get the energy. They also get energy when they eat the animals that eat the plants.)*

3.5 describe ways in which humans from various cultures, including Aboriginal people, use plants for food, shelter, medicine, and clothing *(e.g., food – from rice plants; houses for shelter – from the wood of trees; medicines – from herbs; clothing – from cotton plants)*

3.6 describe ways in which plants and animals depend on each other *(e.g., plants provide food for energy; animals help disperse pollen and seeds, and provide manure that fertilizes the soil in which plants grow; plants need the carbon dioxide that animals breathe out, and animals need the oxygen that plants release into the air)*

3.7 describe the different ways in which plants are grown for food *(e.g., on farms, in orchards, greenhouses, home gardens)*, and explain the advantages and disadvantages of locally grown and organically produced food, including environmental benefits

3.8 identify examples of environmental conditions that may threaten plant and animal survival *(e.g., extreme heat and cold; floods and/or droughts; changes in habitat because of human activities such as construction, use of gas-powered personal watercraft on lakes)*

More information can be found here; http://www.edu.gov.on.ca/eng/curriculum/