



TREES THAT SPEAK

An Educator's Guide to accompany
the Hamilton Civic Museum's Actions
for a Changing Climate Exhibition

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LAND ACKNOWLEDGEMENT

The City of Hamilton is situated upon the traditional territories of the Erie, Neutral, Huron-Wendat, Haudenosaunee and Mississaugas.

This land is covered by the Dish With One Spoon Wampum Belt Covenant, which was an agreement between the Haudenosaunee and Anishinaabek to share and care for the resources around the Great Lakes. We further acknowledge that this land is covered by the Between the Lakes Purchase, 1792, between the Crown and the Mississaugas of the Credit First Nation. Today, the City of Hamilton is home to many Indigenous people from across Turtle Island (North America) and we recognize that we must do more to learn about the rich history of this land so that we can better understand our roles as residents, neighbours, partners, and caretakers.



INTRODUCTION TO THE EDUCATOR'S GUIDE

This educator's guide is designed to offer educators a Hamilton specific lens through which to integrate and investigate the topics of climate change, urban design, living history and civic participation in the classroom and non-traditional learning spaces.

Key strategies and outcomes include:

- 🌰 Outdoor and experiential learning with modifications for a variety of teaching environments.
- 🌰 Employing Slow Looking methods to foster empathy.
- 🌰 Providing space for learners to observe, reflect, communicate, and grow into advocates for trees and living landscapes in their communities.
- 🌰 Supporting learners in understanding their local urban forest and seeing themselves as an important part of the urban biome and ecosystem through specially created lessons and activities.

ABOUT THE VIRTUAL EXHIBITIONS



To What Degree? Canada in a Changing Climate

tells stories of climate change impacts across sectors in Canada, from agriculture to transportation, biodiversity to wildfires, cool roofs to urban forests, and diseases to electric vehicles. Using photographs from Ingenium Canada, learners will explore the power of photos to tell the story of how climate change is impacting Canada today. **To What Degree? Canada in a Changing Climate** is a travelling virtual exhibit on display at hamiltoncivilmuseums.ca from October 14, 2021 through February 14, 2023.



Monument Trees

Is the first part of a larger creative urban design and public art project, Building Conservation Networks, that identifies historic, monumental trees as key anchors in the ecological and cultural life of Hamilton. Through mapping the location of these pre-settlement trees across the city, including those at Dundurn National Historic Site and Auchmar Manor House, Lesia Mokrycke's project is laying the groundwork to create an ecologically resilient city that can withstand coming changes in the climate. For more information on this project, visit www.troposcape.com/trees



WHAT'S THE CONNECTION:

Climate Change, Monument Trees & Hamilton Civic Museums?

Trees are one of our most powerful partners in mitigating the impacts of climate change around the world and in our own backyards.

In 2019, Hamilton City Council declared a Climate Change Emergency and directed staff to identify and investigate actions to achieve net-zero carbon emissions by 2050. Investing in green infrastructure is one way the City of Hamilton is taking action, and the urban forest is an important part of Hamilton's green infrastructure.

Trees contribute to green infrastructure services in a number of ways:

Trees reduce stormwater runoff by capturing and storing rainfall in their canopy and releasing water into the atmosphere.

Trees draw moisture from the soil and ground surface, thereby increasing soil water storage potential.

Tree roots and leaf litter create soil conditions that promote the infiltration of rainwater into the soil as well as reduce erosion and sedimentation.

Trees help slow down and temporarily store runoff and reduce pollutants by taking up nutrients and other pollutants from soils and water through their roots.

The urban forest canopy lowers air temperatures and reduces the urban heat island effect through shading and evapotranspiration, which improves energy efficiency in building.

Mature trees also provide habitat for key species and send nutrients to other trees and plants through root networks. Like each of us, trees are strongest when supported by a tree family.








Hamilton's Civic Museums and heritage sites are home to some of the city's oldest trees. And like museums, mature trees are cultural anchors, landmarks, and have the capacity to reflect the City's past, present and future.

CURRICULUM CONNECTIONS



The lessons and activities in this learning resource are divided into two sections: The first geared towards students in JK - grade 5, the second for students in grades 6-8.

The activities are connected to science, geography, social science, and language arts.

Key themes of the actives include:

-  Climate change
-  Science and science communication
-  Civic participation
-  Environmental citizenship
-  Nature and living things
-  Our local community
-  Local history and heritage

Specifically, the activities and lessons outlined in this guide will:

-  Encourage learners to explore and understand the reasons why urban trees and green spaces play an important role in localized climate change mitigation
-  Aid learners in identifying and recognizing the importance of Monument Trees and the role they play in our ecosystem

- Support learners in understanding the effects of human impacts on urban forests, green spaces, and specifically elder urban trees.

Kindergarten

Demonstrate an awareness of the natural and built environment through hands-on investigations, observations, questions, and representations of their findings.

Describe, sort, classify, build, and compare two-dimensional shapes and three-dimensional figures, and describe the location and movement of objects through investigation.

Communicate their thoughts and feelings, and their theories and ideas, through various art forms.

Demonstrate an understanding of the natural world and the need to care for and respect the environment

Historical thinking concepts addressed:
Establish historical significance.

Grade 1

Science: Needs and Characteristics of Living Things, Daily & Seasonal Changes.

Social Studies: People and Environments; The Local Community.

Grade 3

Science: Growth and Changes in Plants.

Visual Arts: Creating and Presenting; Reflecting, Responding, Analyzing.

Grade 4

Science: Habitats and Communities.

Visual Arts: Creating and Presenting; Reflecting, Responding, Analyzing

Grade 6

Language: Reading, Writing, Media Literacy.

Science: Biodiversity.

Social Studies: Heritage and Identity; Communities in Canada, Past and Present.

Visual Arts: Creating and Presenting; Reflecting, Responding, Analyzing

Grade 7

Language: Reading, Writing, Media Literacy.

Geography: Physical Patterns in a Changing World - Natural Resources around the World: Use and Sustainability

Visual Arts: Creating and Presenting; Reflecting, Responding, Analyzing

Grade 8

Language: Reading, Writing, Media Literacy.

Geography: Global Settlement: Patterns and Sustainability - Economic Development and Quality of Life.

Visual Arts: Creating and Presenting; Reflecting, Responding, Analyzing



SUGGESTED ACTIVITIES

JK - Grade 5



ACTIVITY 1: Tree Scavenger Hunt





ACTIVITY 1:

TREE SCAVENGER HUNT

Lesson Overview:

Using their senses, learners will work together on an outdoor nature-based scavenger hunt. They will explore an outdoor space searching for specific tree focused items and then communicate how they made their choices. Inside, they will think critically about their impact on urban natural spaces and how they can navigate these spaces respectfully and with care.

Learning Outcomes:



-  Students will demonstrate an awareness of the natural and built environment through hands-on investigations, observations, questions and communications and sharing their findings.
-  Students will demonstrate an understanding of the natural world and the need to care for and respect the environment through an introduction to Leave no Trace principals and actively observing and seeking out differences and similarities among trees.

Lesson Sequence (doing the activity):

- 1** Introduce students to the idea that they will be going outside together to do a Tree Scavenger Hunt. Explain how they can explore nature and go on an adventure without leaving any trace.

What does leave no trace mean? There are important guidelines that students should think about: **Leave** what you find (and if you decide to collect specimens or samples, talk about using gentle hands and causing the least disruption to living things). **Respect** wildlife and all living things big and small, like big tall trees or tiny ants and beetles. It is important to be considerate of others (Allow exploration. Look closely at the things they are most interested in; slowing down and looking closely helps to foster deeper learning and connections with nature).

- 2** Read the Tree Scavenger Hunt list out loud to your students. Decide in advance if you want your students to:

-  Find each item in sequence, or not.
-  Work together and identify each item as a group or check off their own copy of the Tree Scavenger Hunt.

Specific Curriculum Connections:

Grade 1

Science: Needs and Characteristics of Living Things, Daily & Seasonal Changes.

Social Studies: People and Environments: The Local Community.

Grade 3

Science: Growth and Changes in Plants.

Grade 4

Science: Habitats and Communities.

Kindergarten

Demonstrate awareness of the natural and built environment through hands-on investigations, observations, questions, and representations of their findings.


Show an understanding of the natural world and the need to care for and respect the environment.

Materials

copy of Tree Scavenger Hunt, clipboard, pencil & eraser

Time Consideration

30 - 45 minutes (flexible), in pairs or as a classroom

-  Complete the activity as fast as they can or take time to observe and hypothesize about what the relationship or reasoning might be between trees and each of the items.

3 When the Scavenger Hunt is completed, engage students in reflective questions such as:



What do you know now that you did not know before we started today's Tree Scavenger Hunt?



What was your favourite part of this adventure?

How did you leave no trace on this adventure? Why is important to leave no trace when exploring outdoors?



What surprised you today?



What parts of the scavenger hunt do you want to learn more about? Or do you have new questions about the living and non-living things that we explored today in the urban forest?

SAFETY TIP:

Before taking your class outdoors, do a site check of the school grounds or the intended route. For additional quick tips to help teacher's feel comfortable and confident about extending learning into outdoor spaces, check out the Know Before You Go Checklist for Teachers in the Key Terms & Resources section of this learning resource.



This list of 15 items appear on the Tree Scavenger Hunt sheet. Where appropriate, links provide additional resources and facts to incorporate into their lesson:



A. Smooth bark ([Link](#))



F. With toothed leaves



K. With keys ([Link](#))



B. Rough bark



G. With heart-shaped leaves ([Link](#))



L. That has a bird in it ([Link](#)) or ([Link](#))



C. Peeling bark ([Link](#))



H. With leaves that aren't green



M. That has an insect on it ([Link](#)) or just an ant also works



D. With needles ([Link](#))



I. With cones ([Link](#))



N. That has a hole made by an animal ([Link](#))



E. With scale-like leaves ([Link](#))



J. With seed pods ([Link](#))



O. A tree with dead leaves

ACTIVITY 2: The Many Ways to Know a Tree



ACTIVITY 2: THE MANY WAYS TO KNOW A TREE

Oxford Dictionary defines trees as “a woody perennial plant, typically having a single stem or trunk growing to a considerable height and bearing lateral branches at some distance from the ground.”. But that is just one way to understand a tree. The following mini activities offer a variety of approaches for identifying and getting to know the trees on your school property, at a neighbourhood park or across your community.

Each of the following mini activities are designed to stand alone or be used as a series to allow substantial flexibility by educators in varying contexts.

2.A CREATING A SIMPLE DICHOTOMOUS KEY

Lesson Overview:

This activity encourages students to examine closely the structures and characteristics of different tree parts in order to identify and categorize.

Learning Outcomes:

- Through hands on investigations, questions, observations and representations, students will demonstrate an awareness of the natural and built environment.
- Students will use the principles of slow looking to observe the many details of living trees as a whole and as separate parts, using these observations to complete a dichotomous key and engage in discussion with the rest of the class.

Lesson Sequence (doing the activity):

- 1 Introduce the concept of Slow Looking as a method for observing the many details of living trees as whole and as separate parts, and as a means of fostering empathy for living things by slowing down and taking time with each tree part (leaves, seeds, etc.). Use these prompts throughout the activity to encourage students to slow down and look closely:
 - Identify a selection of gathered tree parts that are just for gently taking apart. What are the different components and how do you think they function together?

Specific Curriculum Connections:

Grade 6


Science: Biodiversity


Materials:

plain paper (up to 5 pages),
hard surface such as a table
top or clipboards for outdoor
use, Dichotomous Key
Samples and Classifying
Trees Resource Sheet


Time Consideration:


One period / 45 minutes


 Invite students to change their vantage point and look at the same item more than once, but from a different physical position or from an imagined other (e.g. what might these leaves look like to an ant or a snail? What would they notice? How would they interact with it?).


 Have students work together to build upon each others observations and ideas. Pass around one tree part and have each student share something they noticed about it. Student's cannot repeat a word, but they can elaborate on something that has been said. Allow space for students to ask one another about their word or descriptive choices.

2 Two information sheets will provide students with scientific language and descriptions to classify trees in different way.

 Classifying Trees Resource Sheet - each section will contain the two or more options within a category of classification. There are both terms and/or illustrations included to demonstrate the concept.

 The Dichotomous Key Samples - include three examples to illustrate how the Key can be used.

 A dichotomous key can be used to help identify different tree species. It is essentially a flow chart, taking you through a series of questions that examine characteristics of the tree and eventually leading you to the answer.

 A dichotomous key is a tool that allows the user to determine the identity of items in the natural world. For this activity, we are focusing in on trees. Keys consist of a series of choices that lead the user to the correct name of a given item. "Dichotomous" means, "divided into two parts." The two parts of the key are called couplets.


A true dichotomous key always splits to two options, though you can be flexible and allow them to present more than two options in some steps of the key.

The important piece is that someone could follow the key and use it to correctly identify one of the specific trees from your chosen tree list. Depending on the specific trees chosen students may need to look at details not mentioned on the Classifying Trees resource page, such as if two different species of maple tree are

FUN TIP:


Use your smart phone for a fun and educational way to identify trees.

For simple instructions about using these Apps, see the Resources section of this Learning Guide:

 **Seek** - available for Android and iPhone

 **Google Lens** - available for Android and iPhone

 **LeafSnap** - available only for iPhone

 **vTree** - available for Android and iPhone



included. Encourage them to make observations about the differences in the leaf shape or size, bark texture, fruit shape or size, etc.

It is possible to do this without knowing what each tree species is, simply giving them a letter label as a placeholder. However, it is preferred that the class identify the exact tree species. Students can use the characteristics they have observed to help them identify the tree species using a field guide or use an app such as Seek to identify the species from photos.

- 3 Have the class look at 1-3 objects, in this case they can be parts of a tree such as a fallen leaf, a part of a branch, a tree seed or pod (key), a piece of fallen bark, etc. Alternately, you could use 1-3 images. Go around and have students each say one thing they notice about the object(s). They can't repeat, but they can add on to what a classmate has said.

Reflect on what students have picked up on: What's the same or different? Can they explain why they noticed that detail? What questions do they have?

Take the Learning Outdoors

Choose 5-10 different trees around your schoolyard (the fewer trees you use the simpler the activity). Have students use the Classifying Trees resource page to make observations about the characteristics of each of the trees. They will then take this information and use it to create a dichotomous key for those 5-10 tree species.

When students have completed their keys they can swap and test them out.

- 4 At the end of the activity, ask students if they noticed details about these trees for the first time? If yes, what did they notice? Why do think they noticed these details this time? Concluding comments could introduce the concept that every tree, just like humans, is unique and has its own set of characteristics.

INDOOR OPTION:

This activity can also be done even if there are not any trees nearby for students to observe.

Instead they can choose their trees from the Monument Tree Project www.troposcape.com/trees.

This web resource features a list of the 42 native tree species that reflect Hamilton's ancient forests. This resource can be used to research further information about each species characteristics in order to build their tree key.





This is even true of different trees that are the same variety (collecting keys from different trees is one way to demonstrate this). Although each tree is different and unique, they need the same things that we humans need to survive: water, sun, nutrients, family (trees that grow together in “families” typically live healthier longer lives) and care.



Maybe next time you pass the trees we looked at today, you will remember that they are not so different from you and I.

2.B LEAF, KEY & BARK RUBBINGS

Lesson Overview:

Rubbings are one way that we can document the size, texture and shape of a tree’s leaves, bark and keys (i.e.: seed babies). Use rubbings to classify, compare and become more familiar with obvious and more subtle differences and similarities between trees. This activity is also an opportunity to demonstrate how to gather respectfully and mindfully fallen leaf and key samples from the ground (rather than by removing living leaves).

Learning Outcomes:



Students will create rubbings using a variety of tree parts as a means to exploring different forms of recording and observing similarities and differences among tree species and trees of varying stages of maturity.



They will use the rubbings to discuss and hypothesize the reasons for their observed variations.



Students will gain an understanding of respectful interactions with living organisms within their immediate community. This includes how and when to glean or gather fallen tree parts in order to minimize their impact on the urban forest and ecosystem.

Specific Curriculum Connections:

Kindergarten

Demonstrate an awareness of the natural and built environment through hands-on investigations, observations, questions, and representations of their findings.

Communicate their thoughts and feelings, and their theories and ideas, through various art forms.

Demonstrate an understanding of the natural world and the need to care for and respect the environment

Grade 1

Science: Needs and Characteristics of Living Things.

Social Studies: People and Environments; The Local Community.

Grade 3

Science: Growth and Changes in Plants.

Grade 6

Science: Biodiversity

Materials

paper, hard surface such as a tabletop or clipboards (for outdoor use), crayons (with paper removed), Classifying Trees Resource Sheet (optional)

Time Consideration

One 30 - 45 minutes (flexible)

Lesson Sequence (doing the activity):

Begin with a discussion inside the classroom: Why do trees have leaves, bark and seeds or pods (i.e.: keys)? Are these parts the same for all trees in this neighbourhood? Why are there differences between trees?



Refer to Activity 1: Scavenger Hunt to review some of the leave no traces principals of exploring nature respectfully and with care.

- 1** Gather a variety of leaves and keys from the ground. Ensure the leaf is dry so that it does not cause the paper to rip.
- 2** Place the leaf between the hard surface and the paper, then use the crayon to rub along the paper so that the leaf imprint appears. This works best if you can use the side of the crayon, which is why it is helpful to have crayons with the paper removed.
- 3** If you are gathering leaves from the ground you can bring them inside and use a table as your hard surface, but a clipboard allows you to do the rubbings outside.

Science Focus:

Create a collection of leaf rubbings from many trees, documenting what tree species they are from if possible. Make observations about details of the leaf such as general shape, toothed vs smooth edges, size, etc. The Sorting Leaves activity can also be done using leaf rubbings instead of fresh leaves.

Artistic focus:

Try creating a collage of leaf, key or bark rubbings all on one page. For tree bark, place the paper directly onto the tree trunk to do a bark rubbing.

Take the learning further:

To introduce Slow Learning principals into this activity, ask learners to make rubbings from the same tree parts more than once (perhaps with different coloured crayon).

Ask them to compare the two. What do they notice that is the same or different? Why do they think that is? By returning to the same parts, students begin to slow down, deepen observations, and notice details that they may have missed the first time. For additional Slow Learning prompts, see Creating a Simple Dichotomous Key activity.

For additional resources, The Royal Botanical Gardens has a wide selection of nature based tools including this printable Leaf Rubbings Activity Page ([LINK](#))






Specific Curriculum Connections:

2.C EXAMINING SEEDS

Lesson Overview

This activity can be a great way to include trees in your learning about Growth & Changes in Plants as well as biodiversity, as it can get students looking at differences between trees without requiring them to identify tree species.

Learning Outcomes:





-  Identify biodiversity in local environments and in urban landscapes
-  Contribute to a discussion about why diversity is important among trees of the same and different species.
-  Through close looking, observation and discussion, begin to identify tree species based on their unique seeds or pods (keys).

Lesson Sequence (doing the activity):

All trees produce seeds, though there are many differences in the size, shape, and dispersal method. Some trees have naked seeds (called gymnosperms), whereas other trees have their seeds contained in the fruit of the tree.

- 1** Collect a variety of tree seeds from around your school or neighbourhood to examine more closely. Make sure you have at least one maple key, one round fruit (such as a walnut), and one seed pod.

Discussion Questions:

-  How do you think the seeds are dispersed?
-  Do you think any animals eat this seed?
-  How do you think this seed becomes a new tree?
-  Are there other trees that have similar seeds?

Kindergarten

Demonstrate an awareness of the natural and built environment through hands-on investigations, observations, questions, and representations of their findings.

Describe, sort, classify, build, and compare 2D shapes and 3D figures, and describe the location and movement of objects, through investigation.

Demonstrate an understanding of the natural world and the need to care for and respect the environment.

Grade 1

Science: Needs and Characteristics of Living Things.

Social Studies: People and Environments; The Local Community.

Grade 3

Science: Growth and Changes in Plants.

Grade 4

Science: Habitats and Communities.

Grade 6

Science: Biodiversity.

Materials

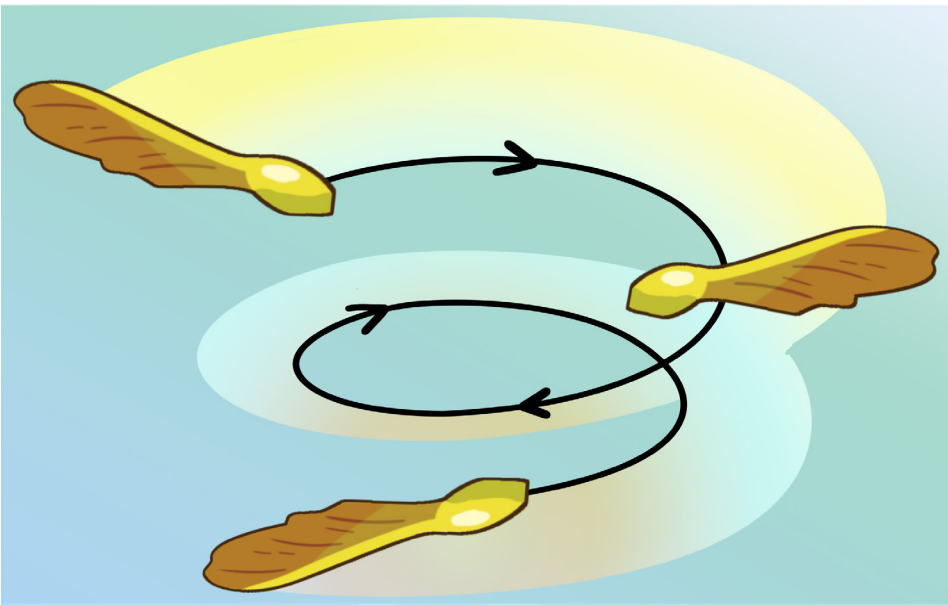
A variety of collected tree seeds, Classifying Trees Resource Sheet (optional)

Time Consideration

One 30 - 45 minutes (flexible)



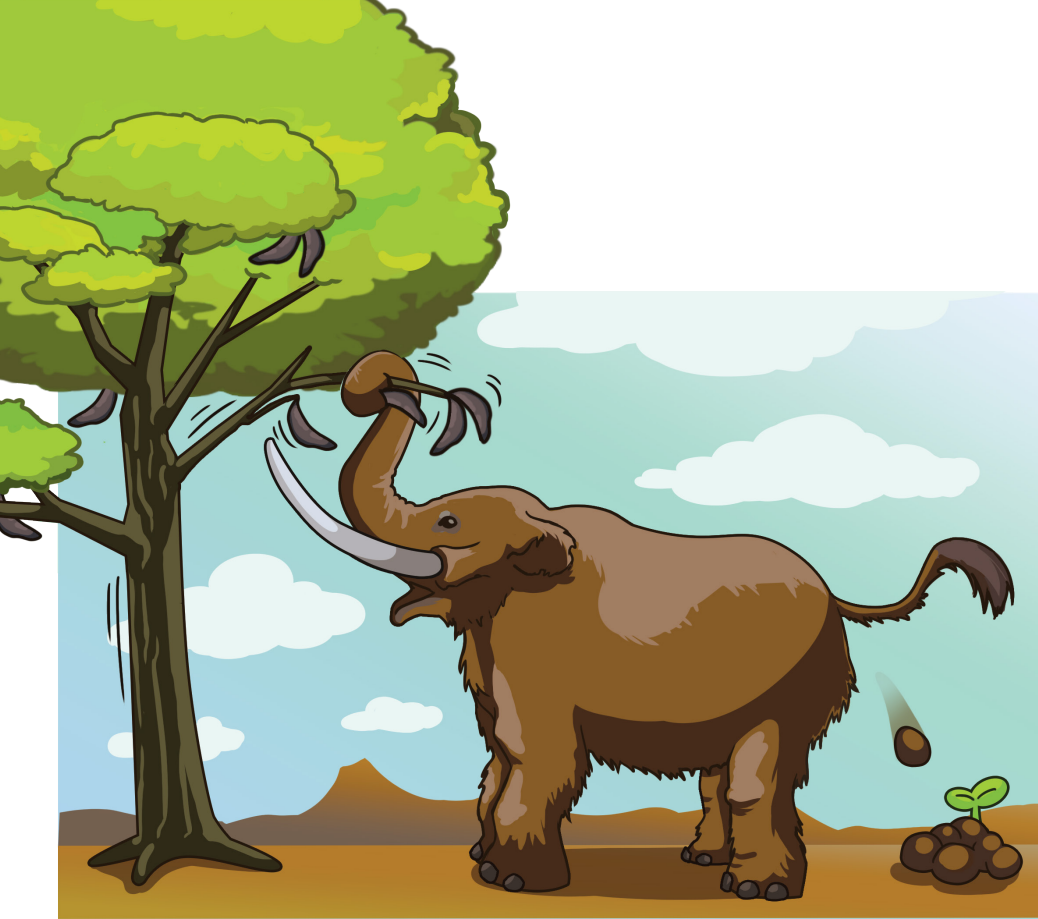
Coniferous trees, such as pine trees, protect their seeds within cones. This keeps the seeds safe from cold, wind, and hungry animals. When it is warm and dry enough for the seeds to germinate, they will open to release their seeds. Even when they are no longer on the tree you can still observe the cones opening and closing! For an extreme example investigate the Jack Pine.



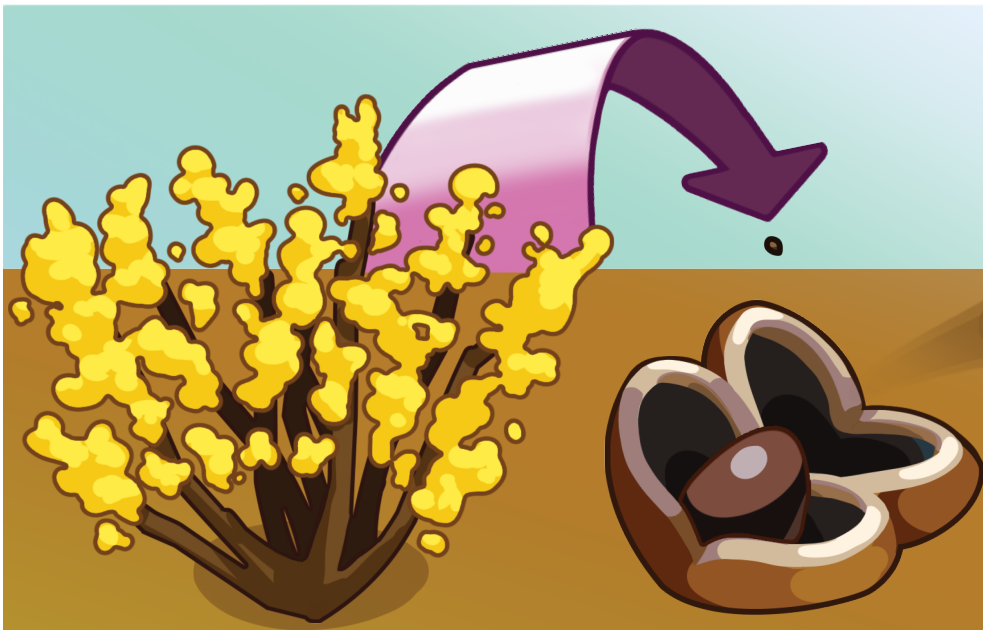
Maple keys are designed to fly through the air, allowing them to travel away from their parent tree to avoid competition.



Some trees, specifically nut-bearing trees, rely on animals burying their seeds and forgetting about them. For example, grey squirrels will bury acorns (which contain the seed of an oak tree) in caches to store food for later. But they always play it safe and take more than they will need, meaning some acorns will stay buried and be able to grow into new oak trees.



Other trees rely on animals eating the whole fruit, allowing the seed to be passed through the animal's digestive system and pooped out. Not only does this help these seeds to be prepared for germination, but it also means that it's deposited in fertilizer! It is believed that mastodons once dispersed the seeds of the Kentucky Coffeetree this way. Some seed pods are not eaten by animals. Instead, seeds will ripen in the pods and bounce out when the dry air splits open the pods.



Witch hazel has a particularly entertaining way of dispersing its seeds. The tree's seeds are contained inside woody capsules that split and explode, launching the seed up to 30 feet!



To take this activity further and try planting and propagating some of the tree seeds (keys) that your students have gathered, check out this free resource: Seeds to Saplings Challenge ([LINK](#))







Specific Curriculum Connections:

2.D SORTING LEAVES

Lesson Overview:

This activity can be a great way to examine tree biodiversity, as it can get students looking at differences between trees without requiring them to identify tree species.

Learning Outcomes:

-  Students will observe and begin to identify leaves from a variety of trees in their immediate neighbourhood.
-  Students will sort leaves according to a variety of attributes outlined in the Classifying Trees Resources Sheet.
-  Students will discuss why there are similarities and differences between different tree leaves and discuss ways of organizing them into creative categories of their own.
-  Optional: Students will use simple simple tools to observe leaves close up (with a magnifying glass) and far up in the trees (with a pair of binoculars).

Lesson Sequence (doing the activity):

- 1** Collect a variety of leaves or have students collect them from around the schoolyard. The goal is to collect one leaf from each tree. Remind them to collect leaves that have already fallen to the ground so that they do not harm the tree.
- 2** Once they have their leaf collection, get them to spread out all their leaves and do some sorting. The Classifying Trees Resource Sheet is a useful resource.



- Are they broadleaf, needle-like or scale-like leaves?
- How many are simple leaves or compound leaves?
- How many have smooth edges or toothed edges?

Kindergarten

Demonstrate an awareness of the natural and built environment through hands-on investigations, observations, questions, and representations of their findings.

Describe, sort, classify, build, and compare 2D shapes and 3D figures, and describe the location and movement of objects, through investigation.

Demonstrate an understanding of the natural world and the need to care for and respect the environment.

Grade 1

Science: Needs and Characteristics of Living Things.

Social Studies: People and Environments; The Local Community.

Grade 3

Science: Growth and Changes in Plants.

Grade 6

Science: Biodiversity.

Materials

A variety of collected tree leaves, copies of the Classifying Trees Resource Sheet (optional), magnifying glass(s) and/or binocular(s) (optional)

Time Consideration

One 30 - 45 minutes (flexible)

Try sorting them by leaf shape. This is more interesting if you allow them to make their own categories and don't specify the number of groups; Students often come up with different groupings from one another which can lead to good discussion.

- 3** Do any of the leaves look similar to one another? Do you think any of the leaves are from the same or similar tree species? Species is defined as: A natural group of trees in the same genus made up of similar individuals. Red Maple is an example of a tree species.



SUGGESTED ACTIVITIES

Grades 6 - 8



ACTIVITY 3:

Dear Tree






ACTIVITY 3: DEAR TREE

Lesson Overview

Dear Tree is a storytelling activity that invites students to write a letter to a young adolescent tree in their neighbourhood (or to a tree that is meaningful to them). The students imagine that their letters will be found 100 years in the future by members of their community who continue to care for mature and Monument Trees that stand tall within the built environment. Letter writing is a stand-alone activity or can be used in conjunction with additional resources below, including mapping exercises. Letters can even be submitted to the Seed Teaching section of the Monument Tree Exhibition or to the Hamilton Civic Museums and shared through hamiltoncivilmuseums.ca, social media channels to inspire deep thinking and bold action on climate change and the protection of our urban forests.

Learning Outcomes:

-  Through writing a letter to a meaningful tree in their neighbourhood, students will demonstrate empathy and understanding of the important role trees play in our communities.
-  By sharing their letters with the class and engaging with the work of their peers, students will gain a greater understanding of the role of trees in our communities and be inspired to protect these important resources.
-  Key themes and concepts include: Communications/Creative & Persuasive Writing, Climate Change (adaptation and mitigation), Community Learning, Environmental Citizenship/Stewardship, and Geography/Land Use/Urban Design/Built Environment.

3. A LETTER WRITING WARM-UP

In this 30 minute letter writing warm-up, get students articulating and recording their reflections through the topic of climate change. Prompts lead students through a letter writing narrative inviting them to share their feelings and ideas with a real or imagined relative or person they are close to. Through the narrative, students will begin to imagine their future selves and consider what actions they will take to shape the world they hope to live in.

Specific Curriculum Connections:

Grade 6

Science: Biodiversity.

Social Science: Heritage and Identity; Communities in Canada, Past and Present.

Grade 7

Geography: Physical Patterns in a Changing World; Natural Resources around the World; Use and Sustainability.

Grade 8

Geography: Global Settlement; Patterns and Sustainability - Economic Development and Quality of Life

Grade 6-8

Language: Reading, Writing, Media Literacy Social Studies

Materials

Copies of A Letter Writing Warm Up template, pencils & erasers, clipboards (optional if the activity is outdoors)

Time Consideration

2 periods / 90 minutes

Background:

According to the Climate Science Report for the City of Hamilton, climate change refers to changes in long-term weather patterns caused by natural phenomena and human activities that alter the chemical composition of the atmosphere through the build-up of greenhouse gases which trap heat and reflect it back to the earth's surface.



For a quick overview of Climate Change, share this 3 minute video - Climate Change: A Hot Topics - resource from COSI (Center for Science and Industry, Columbus, OH):



3.B. DEAR TREE LETTER WRITING ACTIVITY

- 1 Students reflect on a tree in their neighbourhood (or one that is meaningful to them) and write a letter to that tree. Dear Tree: A Letter Writing Activity Worksheet includes questions to prompt students on the kinds of information that should be communicated in their letter.

Students can imagine it is 100 years in the future, and the people living in this neighbourhood are celebrating a community Tree Day. One of the organizers finds a box of letters that were written by your class. The letters are addressed to young trees that have since grown tall and healthy. Everyone at the celebrations is curious about what students from 2022 had to say about these important trees.

- 2 Prompt students with the following questions. Questions 1-3 could be used to further classroom discussions:



What kinds of things did you notice about the trees in your neighbourhood?



Which tree was most important to you and why?

Did you have memories connected to a tree? Were these memories silly, surprising, sad, happy, comforting?



How did you interact with this tree? And how often?

What other living things interacted with or depend on this tree?



How do you think your tree felt either living alone (isolated from other trees) or as part of a tree family (near to trees of different varieties, ages)?



Do you think trees have rights? If yes, what do you think they should be? If no, why?



Did you ever think about the tree's future? What might it look like in 100 years? Or, what kinds of challenges will it have to overcome to survive for another 100 years?



How did this tree or others make you feel? Were your feelings different on a hot sunny day in the summer compared to a cold cloudy day in the winter?



How did you care for this tree? Did you know what to do if the tree looked unhealthy or damaged?



Did you know how important your actions could be in ensuring this tree would still be standing tall for the next 100 years?



3.C MAPPING MY URBAN FOREST




Lesson Overview:

We know that the urban forest is a powerful tool for the mitigation of climate change. Taking notice of, caring for, and imagining where we should plant more trees in our neighbourhoods is one way that a school community can practice environmental citizenship and play an active role in protecting the people and places we love.

Some interesting facts about Hamilton's urban forests and mature Monument Trees:

-  Total canopy cover in Hamilton's urban area is currently estimated at approximately 21.2%.
-  The loss of natural canopy cover affects watershed health and native biodiversity.
-  Compared to other Ontario municipalities, Hamilton's canopy cover is relatively low, at approximately two thirds of the City's 30% target.
-  Monument Trees are vital to the future resilience of cities because they absorb more carbon from the atmosphere than 10 smaller trees can.
-  The soil beneath a Monument Tree's roots has never been disturbed by urban development and contains ancient microbes that are essential for the future resilience of urban forests.

Learning Outcomes:

-  Students will be able to demonstrate their understanding of the term urban forest and the essential role that mature trees play in tackling climate change by actively participating in discussions and working through the mapping activity.
-  Through the completion of the mapping activity, students will communicate their understanding of human impacts on trees in the city landscape and the responsibility of citizens for preserving the urban forest.
-  Working cooperatively, students will demonstrate mapping skills, documenting the trees in their neighbourhood (or on the school property) and creating a system for recording data.

Grade 6

Science: Biodiversity.

Social Science: Heritage and Identity; Communities in Canada, Past and Present.

Grade 7

Geography: Physical Patterns in a Changing World - Natural Resources around the World; Use and Sustainability.

Grade 8

Geography: Global Settlement; Patterns and Sustainability - Economic Development and Quality of Life.

Grade 6-8

Language: Reading, Writing, Media Literacy Social Studies.

Visual Arts: Creating, Presenting, Reflecting, Responding, Analyzing, Exploring Forms and Cultural Contexts.

Materials

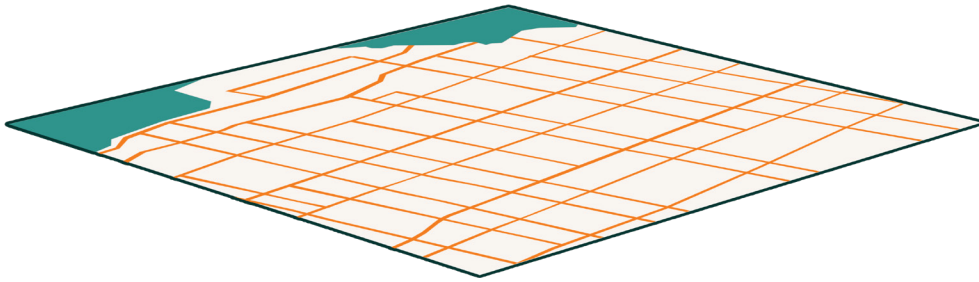
1 printed copy of the neighbourhood map, 6 large pieces of paper/white Bristol board, pencils, erasers, drawing supplies; for 3D maps: glue sticks and flyers/magazines that can be cut up OR white glue, popsicle sticks, and natural materials gathered from around the neighbourhood (i.e.: fallen leaves, tree seeds/keys, small sticks, etc.)

Time Consideration

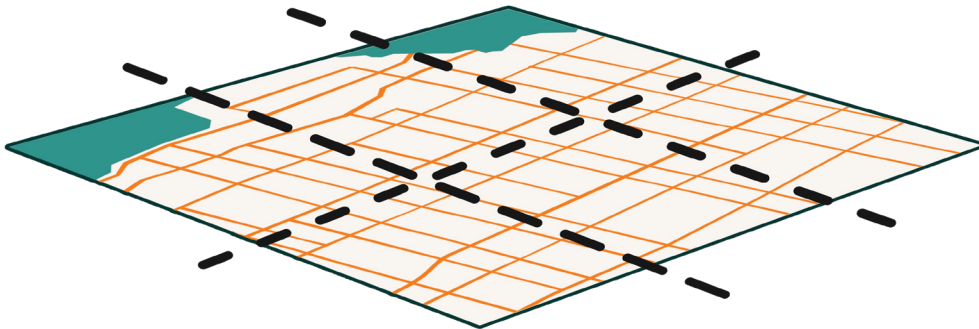
2 periods / 90 minutes, Group Work.

Lesson Sequence (doing the activity):

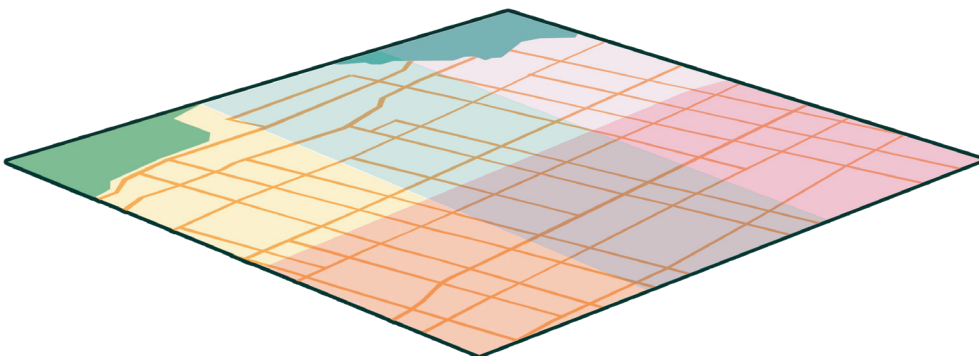
- 1** Divide up the printed map into 6 sections. The sections can be squared or cut into irregular shapes.









- 2** Have students organize themselves into 6 groups and distribute one section of the map to each group. It is ideal if all or some of the students in the group live in or walk through their group's section of the map.

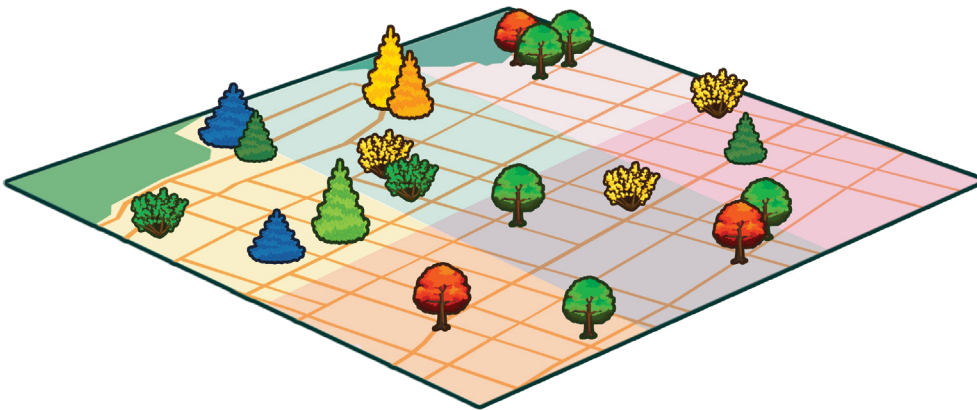


- 3** Students work together to transfer and enlarge their section of the map by drawing it onto a large piece of paper or Bristol board. Ask them to indicate where all the trees are in their section of the map. They must work collectively to ensure that every tree is accounted for.



4 Ask them to create a legend. This legend can include different colours or symbols, sliding scales and different pieces of information:

-  Sizes of trees (small, medium, large).
-  How important the tree is to them (very important, somewhat important, not important at all).
-  How quickly they remembered each tree (remembered it right away, eventually remembered it, almost forgot it existed).
-  How healthy they think the tree is.
-  How much people care about each tree.
-  How close trees are together (is the tree alone, does it have a tree buddy, or is part of a tree family).



5 Once they have recorded all the trees they can from memory and created a legend, the group can reference Google Maps (satellite view). Any additions or changes to their map based on Google Map information should be indicated with a different colour or symbol (add this to their legend).



Discussion Questions:



Which group thought it was easy to map out our neighbourhood trees? Why do you think it was easy for your group?



Did any group find it very hard to do? Why do you think it was particularly hard for your group to map out these trees?



Was it difficult or easy to remember certain trees? Why do you think that is? What makes one tree memorable while another is easy to forget?



Was it easier or harder to remember trees based on how you get to school (modes of transportation: walk, get a drive, take a school bus, bike, skateboard)? Why do you think your mode of transportation matters?



Were there trees that you remembered being part of the neighbourhood, but aren't there anymore? Maybe they were removed, or fell over after a big storm, or have changed a lot as branches have come down? The Monument Tree Project refers to these as Ghost trees.



Are there young trees that you forgot to add? Is it easier or harder to remember smaller younger trees? Why do you think that is?



How many of you would agree with this statement: "It is easy to forget trees are living beings. They just blend into the background."? How many would disagree? Why do you agree or disagree? What kinds or actions or ideas would help us and others to think about the trees in this neighbourhood?



Take it further: Story Mapping

Combine the reflections, stories, experiences, memories, and feelings students shared in their Dear Tree Letter (and Letter Writing Warm Up) with the Mapping My Urban Forest activity to create a Story Map.



Story Maps are a strategy that uses visual diagrams or graphic organizers to help show students the elements of a story.

- 1 For this activity, students are visualizing and recording elements of their stories onto a physical map. The stories are about the students' many reflections on and connections to the trees in their neighbourhood. The map can include visuals and text that capture or communicate everything from how students move around the neighbourhood and encounter trees to ways the student's wish their neighbourhood was designed so that trees had the space and care they need to thrive.

Each student can use different symbols or colours to signify their story on the group's section of the map. Add this information to the legend.

- 2 Or, choose a format and set parameters for the class project. Start by having the students brainstorm ways that they could visualize elements of their Dear Tree Letter and incorporate those visuals into the neighbourhood map. Students can create their own or work as a group to make a physical story map of the school's neighbourhood to capture the experiences of students, their families and/or members of the community. Or, employ a digital platform like HistoryPin or Google Maps to present information.

Introduce elements of Slow Looking into this activity by asking the students to draw or create parts of their story map a second time. What do they notice about the second version that is different from the first? By returning to an idea, memory or story, did they interpret it in a different way or present details that were missed the first time around? Did the way they felt about this part change? If so, how? Why do they think this happens? Are there other parts of this activity that would be different if they returned to them a second time? For additional information about Slow Learning as a tool for building empathy and self-awareness, see the Creating a Simple Dichotomous Key activity.



The background of the entire page is a light gray topographic map. It features a complex pattern of concentric, irregular lines that represent contour lines on a map, creating a textured, organic feel. The lines vary in thickness and spacing, forming a series of peaks and valleys across the entire surface.

APPENDIX: ACTIVITIES AND PRINTABLE PAGES

This list belongs to: _____

Find a Tree with...



Smooth bark



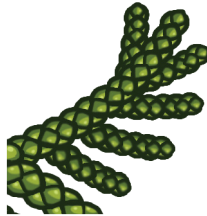
Rough bark



Peeling bark



Needles



Scale-like leaves



Toothed leaves



Heart-shaped leaves



Leaves that aren't green



Cones



Seed pods



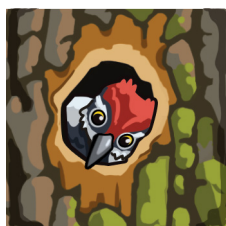
Keys



A bird in it



An insect on it

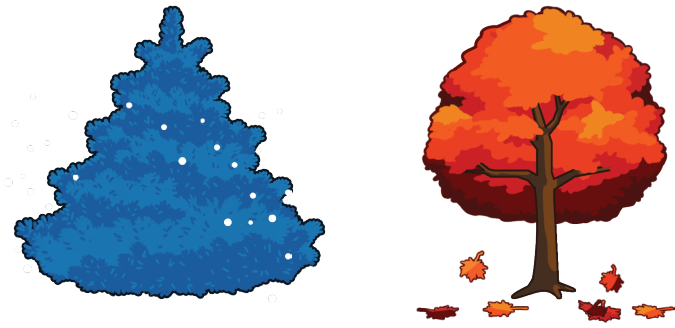


A hole made by an animal



Dead leaves

CLASSIFYING TREES



Evergreen or deciduous?

An evergreen tree has green leaves all year long, dropping small amounts of leaves all throughout the year. A deciduous tree loses its leaves annually, typically in autumn.

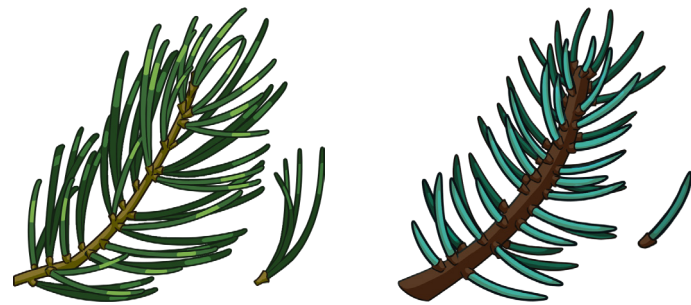


Needle-like, scale-like or broad leaves?



Coniferous or not?

If a tree is coniferous that means it has cones. Most conifers are evergreen trees, but there are some deciduous conifers too. One example of this is a tamarack.



Single needles or bundled needles?

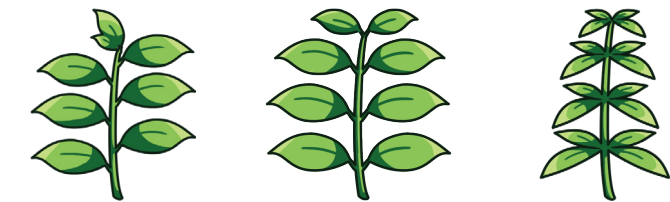
Some trees with needles have each one attached to the branch individually, whereas other species have their needles attached in bundles of two or more.



Simple or compound leaf

A simple leaf is when there is a single leaf connected to the tree branch.

A compound leaf looks like it has several leaves coming off the leaf stem that is connected to the branch. This is actually all one leaf, but it has several leaflets. With compound leaves we can further categorize them into pinnate or palmate.



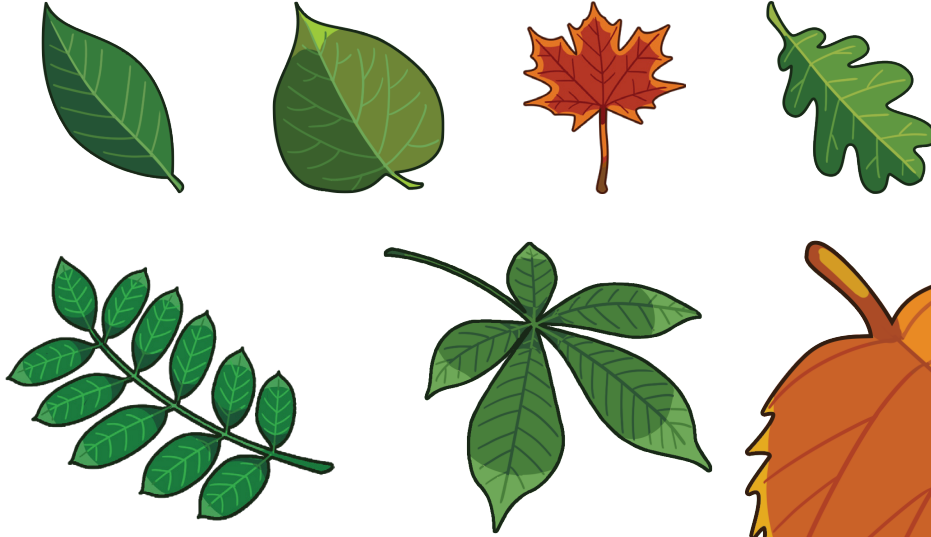
Alternate, opposite, or whorled leaf arrangement?

Make sure you look carefully, as sometimes fallen leaves can make it tricky to tell at first.

CLASSIFYING TREES

What kind of leaf shape?

There are many different leaf shapes, but here are some of the common basic shapes



Pinnate or palmate leaves?

Pinnate leaves have a long stem, with leaflets coming off the stem on either side. Palmate leaves have the leaflets coming from a central point, like fingers connected to your palm.



What kind of seed?

Cones, keys, round balls, long seed pods, or a bunch.



Smooth or toothed edging?

Some leaves have smooth edges, whereas others are jagged like a saw blade.

STUDENT WORKSHEET:

A LETTER WRITING WARM-UP

Name:

Date:

Reflect on the following prompts and free-write your answers below. Free-writing is like brainstorming, but here you can express your ideas in sentence and paragraph form. Don't think too much about each idea. Just write it down.

Start with a Greeting:

Dear /To_____,

This is where you decide who you would like to address your letter to. Is it for a parent, grandparent, a younger sibling or a friend?

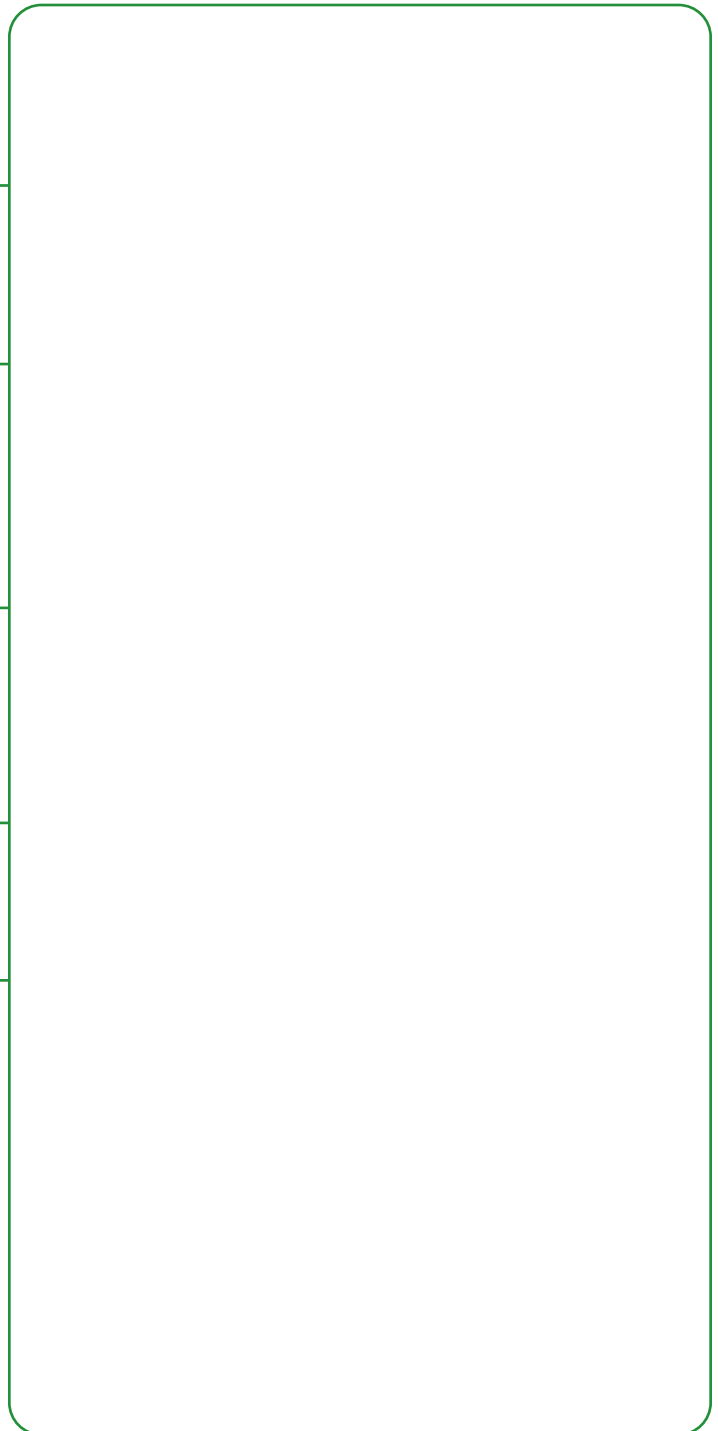
Share with that person something special about you or them. This could be a memory, one of their unique characteristics, something you/they love, a place they care about that you want to preserve.

Express your thoughts about climate change. Share with them your thoughts about climate change or pollution and how it could impact their lives and the future. What are your hopes for the future? Tell them what you hope to see for your world when you are the age they are now or when you grow up.

Your promise.

Share with them your thoughts on how you will work to protect trees in your community and will leave a healthy and vibrant urban forest to them.

End with a Closing salutation:



STUDENT WORKSHEET:

DEAR TREE - A LETTER WRITING ACTIVITY

Name:

Date:

Imagine it is 100 years in the future, and the people living in this neighbourhood are celebrating a community Tree Day. One of the organizers finds a box of letters that were written by your class. The letters are addressed to young trees that have since grown tall and healthy. Everyone at the celebration is curious about what students from 2022 had to say about these important trees.

Imagine: In 100 years, lots of families in your neighbourhood take good care of trees because they think of them as living organisms that contribute to the health and wellbeing of their community. And, They have witnessed first hand how trees help to mitigate the effects of climate change by lowering temperatures, improving air quality and reducing flooding.

People from the community may want to know:



What kinds of things did you notice about the trees in your neighbourhood?



Which tree was most important to you and why?



How did you interact with this tree? And how often?



Did you have memories connected to a tree? Were these memories silly, surprising, sad, happy, comforting, etc.?



What other living things interacted with or depended on this tree?



How do you think your tree felt either living alone (isolated from other trees) or as part of a tree family (near to trees of different varieties, ages, etc.)?



Did you ever think about the tree's future? What might it look like in 100 years? Or, What kinds of challenges will it have to overcome to survive for another 100 years?

Do you think trees have rights? If yes, what do you think they should be?

How did this tree or others make you feel? Were your feelings different on a hot sunny day in the summer compared to a cold cloudy day in the winter?

How did you care for this tree? Did you know what to do if the tree looked unhealthy or damaged?

Did you know how important your actions could be in ensuring this tree would still be standing tall for the next 100 years?

KEY TERMS & RESOURCES

Key Terms

Climate Change - Refers to changes in long-term weather patterns caused by natural phenomena and human activities that alter the chemical composition of the atmosphere through the build-up of greenhouse gases which trap heat and reflect it back to the earth's surface.

Slow Looking- "...the practice of observing detail over time to move beyond a first impression and create a more immersive experience with a text, an idea, a piece of art, or any other kind of object. It's a practice that clears a space for students to hold and appreciate the richness of the world we live in...Slow Looking fuels empathy and self-awareness..."

For a brief, but concise article about role of Slow Looking in the classroom and some suggested mini activities check out - [Link](#)

Urban Forest - Hamilton's urban forest includes all of the publicly and privately-owned trees and supporting vegetation in the urban area. The urban forest includes more than Hamilton's natural areas. Individual trees and groups of trees along streets, in backyards, parks, and commercial areas in Hamilton's urban boundary are also part of the urban forest.

Storm Water Management - Urban stormwater is rainfall and snowmelt that seeps into the ground or runs off the land into storm sewers, streams and lakes. It may also include runoff from activities such as watering lawns, washing cars and draining pools. Source - [Link](#)

Green Infrastructure (GI) - is defined as the "natural vegetative systems and green technologies that together provide a multitude of economic, environmental and social benefits." It includes soils that can sustain vegetation and absorb water, as well as other stormwater infiltration and retention technologies like porous pavements, bioswales, rain

barrels and cisterns. All of these mimic natural ecosystem services.

Civic Engagement - Involves "working to make a difference in the civic life of one's community and developing the combination of knowledge, skills, values and motivation to make that difference. It means promoting the quality of life in a community, through both political and non-political processes."¹ Civic engagement includes both paid and unpaid forms of political activism, environmentalism, and community and national service. Source - [Link](#)

Environmental Citizenship- Is a concept that arose in Canada and that has been adopted around the world. Initially created by Environment Canada, it comprises three main attributes:

1. The idea that we are an integral part of our environment.
2. The recognition that our future is dependent upon the way in which we care for our own environment.
3. The sense of responsibility that engenders positive action on behalf of the environment. In order to achieve these, the success of environmental citizenship requires everyone's participation. This includes:
 - An informed citizenry, in tune with the needs of the environment and its impact on human life,
 - A supportive government, interested in fostering useful and working relationships, and an interest in protecting and conserving the environment - even if this comes in the form of a desire for human self-preservation.

Landscape Architecture - Landscape architects shape the world around us through analysis,

planning, design and management of the natural and built environment. Their work involves conceptual and detailed design of environments ranging from streetscapes to parks and playgrounds, created wetlands and restored river systems, transit solutions and tourism strategies, private backyards to planning new suburbs and even cities. Landscape architecture attracts individuals with wide-ranging interests in the arts and sciences, many with backgrounds in design, visual arts, history, and the natural and social sciences. Landscape architects draw on their knowledge of landscape aesthetics, environmental design, analytical and problem solving skills, technical capabilities, as well as professional practice and management skills to create spaces that improve amenities, add beauty, support the environment and the economy, and increase social health, safety and welfare.

Evapotranspiration - Is the sum of all processes by which water moves from the land surface to the atmosphere via evaporation and transpiration.

Evapotranspiration includes water evaporation into the atmosphere from the soil surface, evaporation from the capillary fringe of the groundwater table, and evaporation from water bodies on land.

Evapotranspiration also includes transpiration, which is the water movement from the soil to the atmosphere via plants. Transpiration occurs when plants take up liquid water from the soil and release water vapor into the air from their leaves.

Resources

Hamilton based Monument Tree Project and Learning Tools - [Link](#)

Suggested Field Guide apps - Use your smart phone for a fun and educational way to identify trees:

Seek - Available for Android and iPhone.

Google Lens - Available for Android and iPhone.

- Tap the screen when you want to take a photo of the item. Google Lens will then display one main result accompanied by a photo, and a couple more text suggestions. Tapping the item will take you to a Google search page of the item that you tapped.

LeafSnap - Available only for iPhone

- Snap a picture of a leaf using your smartphone. The app will provide a list of possible tree species with accompanying photos to help you select the best match.

vTree - available for Android and iPhone

- Provide your location and answer a few questions about the tree you want to identify. The app will provide a list of possible tree species and accompanying photos to help you identify the tree.

The Royal Botanical Gardens has a wide selection of free nature based learning tools including this printable Leaf Rubbings Activity Page - [Link](#)

Project Learning Tree Canada - [Link](#) - has an incredible suite of sleekly designed and easy to print activity pages for PreK to Grade 8. Topics include: Name that Tree, Adopt a Tree, Bursting Buds and the Value of Trees. Additional activity pages for Grades 4-11 are also available through this link.

Dear Tomorrow - www.deartomorrow.org - A digital archive project for people to personally connect with the issue of climate change and to share their stories.

Seeds to Saplings Challenge - [Link](#) Provides simple instructions for planting and propagating tree seeds (keys) and pods.

National Forest Week is celebrated across Canada annually at the end of September-
Visit treecanada.ca - for resources and info.

KNOW BEFORE YOU GO

CHECK LIST FOR TEACHERS

Ensure you have the right knowledge, tools and confidence to take your students outdoors: around your school grounds, through your school's neighbourhood and into urban parks!

Review this helpful checklist before heading out:



KNOW WHERE TO GO

Find out which parks are closest to your school.

Note that open lawn areas are perfect places to play and gather, while natural areas (such as forests and wetlands) are protected for their ecological value and are accessible to the public on designated trails.



KNOW YOUR RESPONSIBILITIES

Familiarize yourself with your responsibilities before visiting a park with your class. This will not only keep you safe but also ensure that you are minimizing your environmental impacts. Remember to:

- stay on designated trails and paths,
- give wildlife and their nests the space they need,
- leave flowers and other plants to grow,
- not leave any art or other unnatural items behind, and
- not collect or harvest natural items from the park.



DO A SITE VISIT

Familiarize yourself with the landscape features of your school property, your proposed walking route through the local neighbourhood, the park's trail system, and any posted signage. This is also a chance to scope out a gathering place and brainstorm activities that are appropriate for the space. Consider how others may be using the park and any spatial conflicts.



INCORPORATE A SAFETY ROUTINE

Before beginning any outdoor activity, conduct a site safety sweep to identify possible hazards. Scan the ground, shrubs, around picnic tables and benches, and in the washrooms. Don't forget to look up in the canopy for detached hanging branches and unnaturally leaning trees.

Outdoor hazards could include: extreme temperature (heat or cold warnings), extreme weather events, broken glass or sharp objects, school grounds maintenance equipment (riding lawn mowers or weed

whips), neighbourhood construction that compromises or obstructs pedestrian paths, or visible insect nests (e.g. hornets or other stinging insects).



BRIEF YOUR STUDENTS

Review expectations for appropriate behaviour, responsibilities, and risks when visiting a park. Include your students in a risk assessment or practice identifying hazards as a reminder to always be aware of your surroundings. Remind students that they are sharing this space with wildlife and other members of their community. Students are there to explore, learn about and respect these special places.

Establish Boundaries. Tell students that when you arrive to your outdoor space, they will be asked to stay within site lines at all times or whatever perimeters you have decided upon. It is also a good idea to have students work in pairs so that they can look out for one another.

Consider your environmental impact. Stay on trails and open lawns. Do not pick, trample or remove plants, flowers, berries or other natural items. Leave things how you found them.

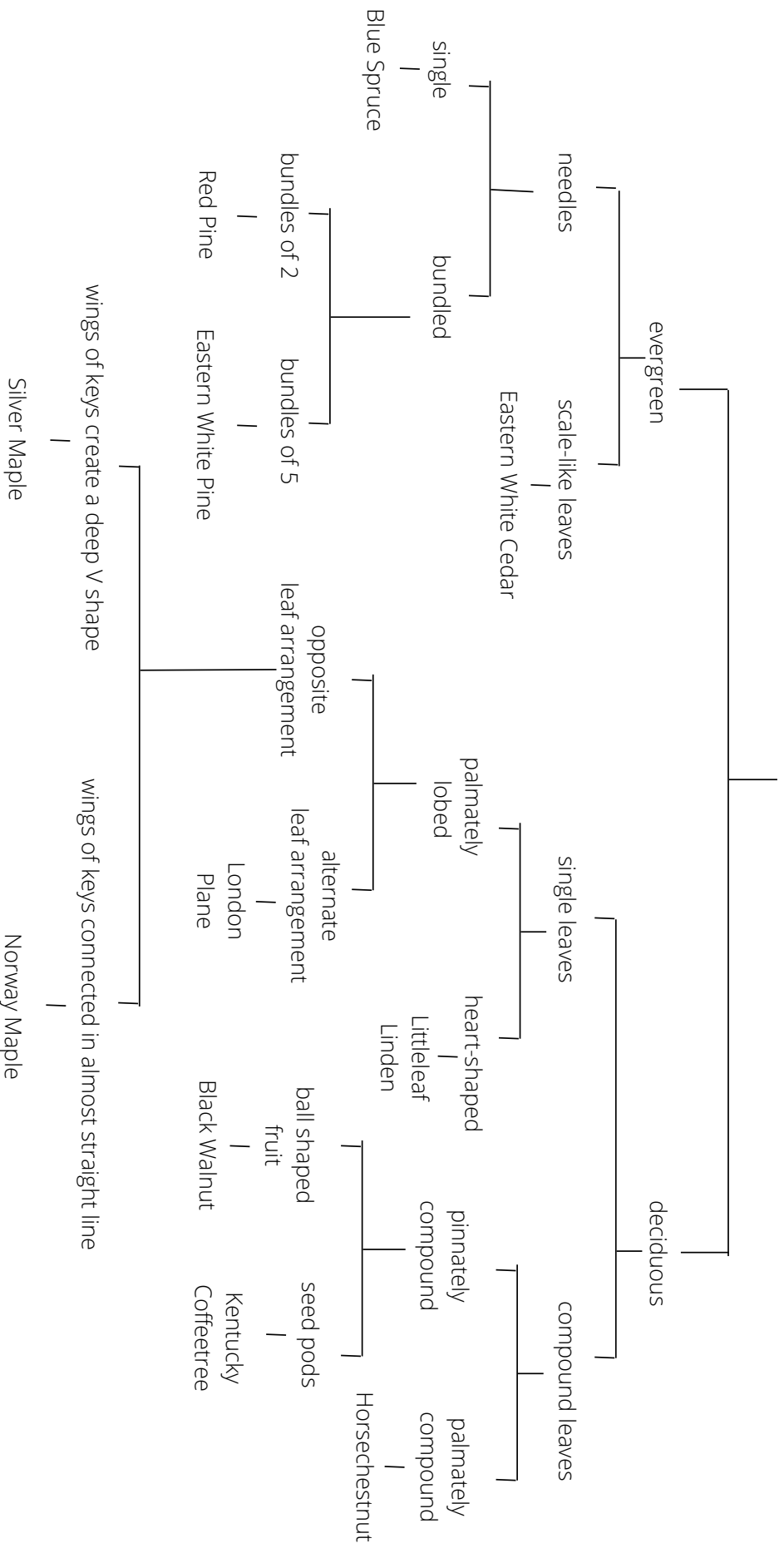
Give wildlife space. Watch animals from trails to minimize stress. Do not feed them or disturb their nests. Animals are safer and healthier when they don't become accustomed to people.

Pack it in, pack it out. Have students take their litter home if possible. Do not leave unnatural items in parks (e.g. painted rocks, strings, etc.).

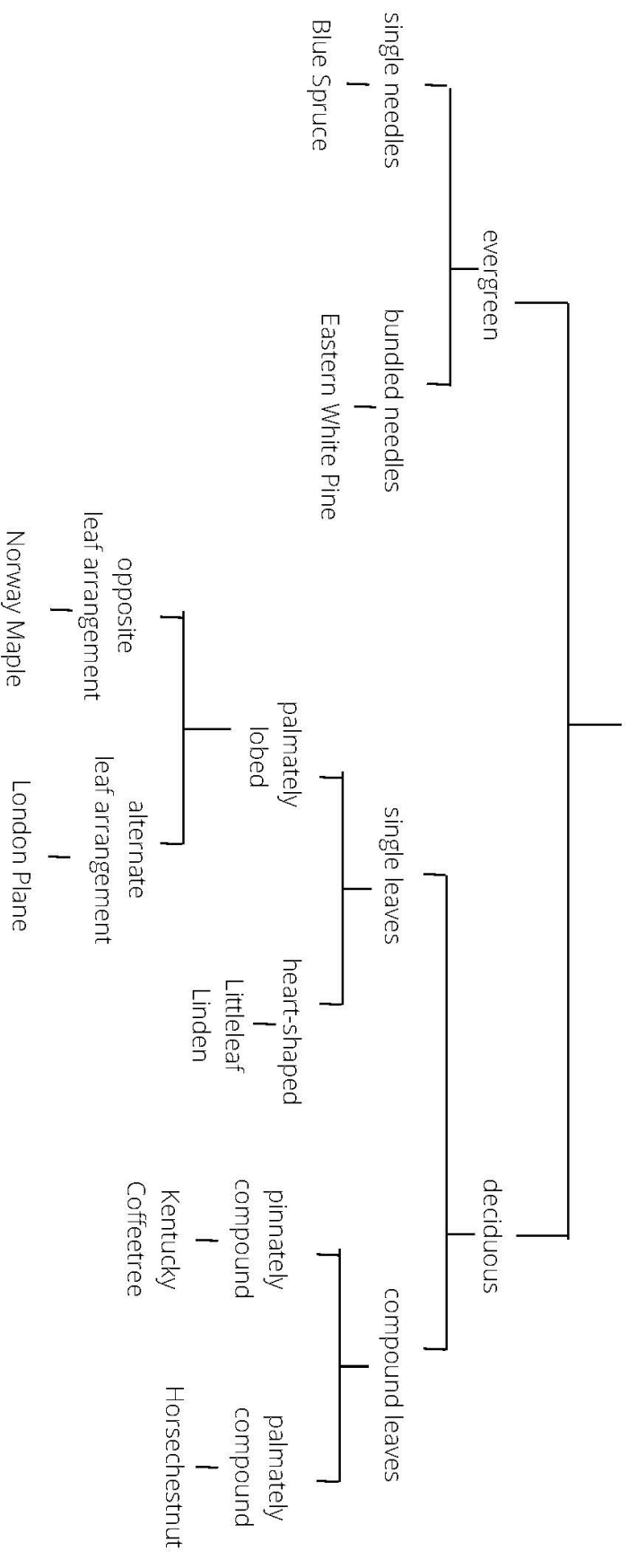
Stay out of creeks. Footsteps can stir up silt in streams (which can suffocate fish and destroy spawning habitat) and crush eggs. Do not create new trails to access creeks.

Be prepared. Check the forecast, dress for the weather, and scan the space before visiting.

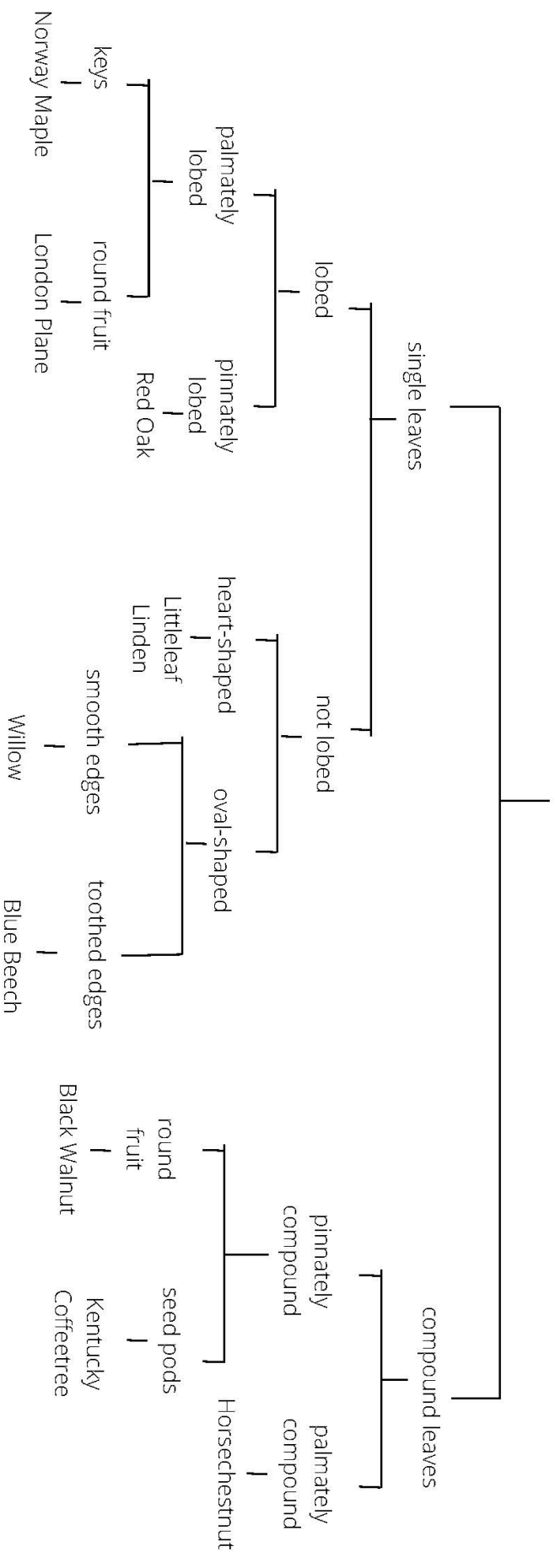
WHAT TREE IS IT



WHAT TREE IS IT



WHAT TREE IS IT





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