

Tree Related Lesson Plans

August 2012



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Dear Teachers and Administrators,

ReForest London is pleased to present this collection of tree-related lesson plans. These plans were developed by teachers who have just completed the Education program at Western University, and edited and enhanced by experienced teachers.

This binder contains paper copies of all the lessons plans we have developed, plus a few we found that were developed by others. The enclosed CD contains PDF and Word version of all the lesson plans and accompanying support materials as well.

We hope that they are useful to you as you strive to introduce trees into your classroom and “outdoor classroom” learning. As these plans are new, we would appreciate any feedback you can give us on how to improve them and make them more useful to teachers.


ReForest London is a charitable, non-profit organization. Since 2005, ReForest London has planted 28,000 native trees and shrubs in 190 projects throughout London. We rely on strong community and governmental partnerships and the support of over 20,000 volunteers to support our efforts to keep the “forest” in the Forest City. We are dedicated to partnering with our community to plant one million trees to enhance environmental and human health in the Forest City.

Please visit us online at www.reforestlondon.ca. You can learn more about London’s Million Tree Challenge at www.milliontrees.ca.

Sincerely,

A handwritten signature in black ink that reads "Julie Ryan". The signature is written in a cursive style with a large initial 'J'.

Julie Ryan
Director of Programs

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| Curriculum Area: Science & Technology - UNDERSTANDING LIFE SYSTEMS The Arts – VISUAL ARTS | | Grade: 1-3 |  |
| Lesson topic/Title: Tree Rubbings | | Time: 70 mins (lesson) + (work period) | |
| Materials/Safety: Paper (wax paper if possible) Pencils Clay (dryfast) Large crayons Large chart paper or chalkboard Number Cards (1-5) | | | |
| Learning Expectations (OME): - <ul style="list-style-type: none"> - describe how the ideas and form in a variety of tree-based art works relate to their own knowledge, experience, and basic biology of schoolyard trees - describe the texture of various familiar objects (e.g., rough, smooth, slippery, wet), using vocabulary and terminology appropriate for this grade (<i>Knowledge of Elements</i>); - make artistic choices in their work, using at least one of the elements of design specified for this grade (e.g., create a three-dimensional work, using “found” materials to create specific textures) (<i>Creative Work</i>); - express a response to an artwork that clearly communicates how the ideas, information, and feelings relate to their own experiences (e.g., a response in which they note that their representation of tree relates to what they have been learning about the shape of trees) (<i>Critical Thinking</i>). | | | |
| Prerequisite Knowledge and Skills: Students should have knowledge of the playground, outdoor classroom, trees in area, etc. | | | |
| THE LESSON | | | |
| Est. Time 10 mins | Before (Anticipatory Set): Teacher may bring in a bag of found natural objects from schoolyard or home (e.g. leaves, pinecones, branches, nuts, keys, bits of bark, soil in a container or bag, etc.) Students may be asked to feel the objects inside the bag without looking. They may discuss what it feels like, encouraged to use adjectives and descriptive words. They may be asked: <i>what do you think it is? What colour do you think it is? Where could it be from?</i> Once all students have had a chance and all items are discussed the teacher may show the items. A discussion of the parts of the tree and their different uses may follow. Also, why trees are good for us – see Appendix A from <i>ReForest</i> . | | |

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| <p>50 mins</p> | <p>During:</p> <p>After motivation, students will be led outside to outdoor classroom or cluster of trees. Students and parents will have been advised of outdoor activity and should be dressed appropriately. Students will be shown how to make rubbings of leaves and bark (holding paper in place, working with a friend), and how to make impressions of bark and leaves in clay (careful not to smudge clay). Students may make multiple rubbings on one piece of paper for a more dramatic effect, a different colour for each of the 5 trees even. Clay impressions may be done by pressing clay firmly onto bark or leaf with the whole hand – this will leave a good tree impression on one side and a good hand impression on the other!</p> <p>If trees are nearby one another, students may choose a tree to do a rubbing and impression of, or, the teacher may assign trees to students using number cards to insure a variety of species. Students should be advised not to pick leaves or branches off the tree, but to take only what is on the ground. Once they have the rubbings and impressions, students may discuss why the trees are different, why some shed leaves (deciduous) and some keep their needles (coniferous) – see questions below. Teacher should know the type of trees used for the activity (from <i>ReForest</i> package). Back in the class, students may write a sentence about their impression or rubbing, making one comment about the tree they chose. Clay impressions may be displayed in class, wax rubbing look great on walls (on windows, if wax paper is used).</p> |
| <p>10 mins</p> | <p>After (Closure):</p> <p>Discussion with the following key questions can provide excellent closure for the lesson.</p> <ul style="list-style-type: none"> - <i>How are these trees different, or the same?</i> - <i>What does the bark or leaves tell us about the tree?</i> - <i>Why would a tree change with the seasons?</i> - <i>What do you know about fruit and seeds? When does this happen?</i> <p>Evaluation/Assessment</p> <p>Teacher circulation, in-class discussion.</p> |

Appendix A

Excerpts from “*Why Plant a Tree*”, from *ReForest London* (<http://reforestlondon.org/plant/whyplant.htm>)

15. Trees also provide nutmeats (walnuts, pecans, hickory), fruit (plum, peaches, apples, pears), berries for jams and jellies (chokecherry and buffaloberry) and maple syrup

21. Trees give people many recreational opportunities and provide habitat for wildlife.

22. Trees along rivers, streams, and lakes reduce water temperatures by their shade, prevent or reduce bank erosion and silt, and provide hiding places for improving fisheries habitat.

23. They provide brilliant colors to landscapes in the fall. After the leaves drop to the ground and are raked, they provide excellent mulch for flowerbeds and gardens as well as exercise for people.


24. Research indicates that trees help reduce stress in the workplace and speed recovery of hospital patients.

26. Trees help us experience connections with our natural heritage and with our most deeply held spiritual and cultural values.

29. Finally, many people enjoy planting and caring for trees simply because they like to see them grow.

Appendix B

| Tree/Activity | #1 (Maple) | #2 (Ash) | #3 (Pine) | #4 (Shrub) |
|---------------------------|------------|----------|-----------|------------|
| Leaf Rubbing Exemplar | | | | |
| Nut or seed | | | | |
| First Bud Date | | | | |
| First Leaf (quarter-size) | | | | |
| Animals present | | | | |
| Activity | | | | |
| First Colour change | | | | |
| First Fallen Leaf | | | | |
| Bare | | | | |
| Etc. | | | | |

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| <p>Programme région : Science & Technologie - Comprendre les systèmes de vie Les Arts – ARTS visuels</p> | <p>Niveau : 1-3</p> |  |
| <p>Thème et titre de la leçon : Effets de l'arbre</p> | <p>Temps : 70 minutes (leçon) + (période de travail)</p> | |
| <p>Matériaux/sécurité :</p> <ul style="list-style-type: none"> Papier (papier ciré si possible) Crayons Argile (dryfast) Crayons gros de couleur Papier grand graphique ou un tableau noir Cartes de nombres (1-5) | | |
| <p>Attentes d'apprentissage (OME): -</p> <ul style="list-style-type: none"> - décrivez comment les idées et la forme dans une variété d'œuvres d'art du arbre se rapportent à leurs propres connaissances, l'expériences et la biologie fondamentale des arbres de la cour d'école - décrivez la texture de divers objets familiers (p. ex., rugueux, lisse, glissant, humide), en utilisant le vocabulaire et la terminologie appropriée pour ce niveau (<i>Connaissance des éléments</i>); - faites des choix artistiques dans leur travail, en utilisant au moins un des éléments de conception spécifié pour cette catégorie (par exemple, créer une œuvre en trois dimensions, en utilisant « trouvé » matériaux pour créer des textures spécifiques) (<i>Travail créatif</i>); - exprimez une réponse à une œuvre d'art qui communique clairement comment les idées, les informations et les sentiments se rapportent à leurs propres expériences (p. ex., une réponse dans lequel ils notent que leur représentation de l'arbre se rapporte à ce qu'ils ont appris sur la forme des arbres) (<i>Pensée critique</i>). | | |
| <p>Prerequisite connaissances et compétences : Étudiants doivent avoir connaissance du terrain de jeux, salle de classe en plein air, arbres dans la région, etc..</p> | | |
| <p>LA LEÇON</p> | | |
| <p>Temps estimé. 10 mins</p> | <p>Avant (anticipation Set) : Professeur peut apporter dans un sac, des objets naturels trouvés de cour d'école ou à la maison (par exemple feuilles, cônes, branches, noix, clés, morceaux d'écorce, du sol</p> | |

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| | <p>dans un conteneur ou un sac, etc..) Étudiants peuvent être demandés à sentir les objets dans le sac sans regarder. Ils peuvent discuter la texture des objets, encouragé à utiliser des adjectifs et des mots descriptifs. Elles peuvent être posées : <i>Qu'est-ce que vous pensez est dans le sac? Quelle est la couleur? D'où il pourrait être?</i> Quand tous les élèves ont eu la chance et tous les éléments sont discutés, l'enseignant peut afficher tous les éléments. Une discussion peut suivre sur les parties de l'arbre et leurs utilisations différentes. Aussi, pourquoi les arbres sont bons pour nous – voir l'annexe a de <i>la reforestation</i>.</p> |
| 50 mins | <p>Au cours de :</p> <p>Après motivation, étudiants seront dirigés à l'extérieur à la classe en plein air ou groupe d'arbres. Avant l'activité, les élèves et parents seront informés des activités de plein air et doivent être vêtus convenablement. Étudiants verra comment faire des effets de feuilles et d'écorce (tenir le papier en place, en collaboration avec un ami) et comment faire des impressions de l'écorce et les feuilles dans de l'argile (attention à ne pas étaler l'argile). Étudiants peuvent faire des effets multiples sur le même morceau de papier pour un effet plus spectaculaire, d'une couleur différente pour chacune des 5 arbres. Impressions de l'argile peuvent être faites en appuyant sur argile fermement sur l'écorce ou les feuilles avec la main entière – cela laissera une bonne impression d'arbre d'un côté et d'autre part, une bonne impression de la main !</p> <p>Si les arbres sont proche, les élèves peuvent choisir un arbre pour faire un frottement et une impression, ou, l'enseignant peut affecter des arbres aux élèves en utilisant les cartes de numéros pour assurer une variété d'espèces. Étudiants devraient être informés de ne cueillir pas des feuilles ou des branches de l'arbre, mais de prendre seulement ce qui est sur le terrain. Quand qu'ils ont les frottements et les impressions, les élèves peuvent discuter comment les arbres sont différents, pourquoi certains remise des feuilles (feuilles caduques) et certains garder leurs aiguilles (conifères) – voir les questions ci-dessous. Enseignant doit savoir le type d'arbres utilisés pour l'activité (à partir de <i>ReForest</i> package). En retournant en classe, les élèves peuvent écrire une phrase sur leur impression ou frottement, faire un commentaire sur l'arbre, qu'ils ont choisi. Impressions d'argile peuvent être affichées dans la classe, les frottements de cire sont superbes sur les murs (ou si le papier ciré est utilisé, sur les fenêtres,).</p> |
| 10 mins | <p>Après (fermeture) :</p> <p>Discussion avec les questions clés suivantes pourrait être une fermeture excellent pour la leçon.</p> |

- *Comment sont ces arbres différents, ou le même?*
- *Qu'est-ce que l'écorce ou les feuilles nous dit-il du arbre?*
- *Pourquoi un arbre aurait changer avec les saisons?*
- *Qu'est-ce que vous savez sur les fruits et les graines? Quand est-ce qu'ils sont produits ?*

Évaluation

Circulation de l'enseignant, discussion en classe.

Annexe A

Extraits de «*pourquoi planter un arbre*», de *La reforestation de Londres*
(<http://reforestlondon.org/plant/whyplant.htm>)

15. Arbres fournissent également des nutmeats (noix, noix de pécan, hickory), fruits (prunes, Pêches, pommes, poires), petits fruits pour confitures et gelées (cerisier de Virginie et de shépherdie argentée) et maple syrup²¹. Les arbres, donner aux gens de nombreuses possibilités de loisirs et fournissent un habitat pour la faune.
22. Les arbres le long des rivières, des ruisseaux et des lacs réduisent la température de l'eau par leur ombre, prévenir ou réduisent l'érosion des berges et limon et fournissent des lieux de se cacher pour améliorer l'habitat des pêches.
23. Ils offrent des couleurs brillantes, des paysages à l'automne. Après que les feuilles tombent au sol et sont commissionnées, ils fournissent un excellent paillis pour les plates-bandes et jardins ainsi que d'exercices aux gens.
24. La recherche indique qu'arbres aident à réduire le stress dans la récupération en milieu de travail et la vitesse des patients de l'hôpital.
26. Les arbres nous aident à connexions avec notre patrimoine naturel et avec nos valeurs spirituelles et culturelles plus profondément l'expérience.
29. Enfin, beaucoup de gens jouissent de plantation et de soin des arbres, tout simplement parce qu'ils aiment les voir grandir.

Annexe B

| Arbre/activité | # 1 (Érable) | # 2 (Ash) | # 3 (Pin) | # 4 (Arbuste) |
|---------------------------------|--------------|-----------|-----------|---------------|
| Feuille Exemplar de frottement | | | | |
| Noix ou graines | | | | |
| Première Date de Bud | | | | |
| Première feuille (quart-taille) | | | | |
| Animaux présents | | | | |
| Activité | | | | |
| Premier changement de couleur | | | | |
| Premières feuilles tombées | | | | |
| Nues | | | | |
| Etc.. | | | | |

Name: _____

Date: _____

TREE INVESTIGATION

You are a reporter for the Galactic News. Your job is to help aliens understand how important city trees are in human neighbourhoods. But before you write your report, we need to do some research! Answer the questions below.

MY OBSERVATIONS

CANOPY

Examine the tree canopy. The canopy is where the leaves and branches are.

- Are the leaves: broad & flat needle-like
Is the edge: smooth toothed
Is the texture: leathery scaly rough
 shiny fuzzy other

On the back of this page draw a picture of the leaf or needle.

What types of animals are living or could be living in the canopy?

Name one benefit that the tree's canopy provides for people:

BARK

Examine the bark. The bark is the outer part of the tree. Describe the color of the bark.

Name: _____

Date: _____

Is the texture: rough smooth

What type of animals or insects could be living in or on the bark?

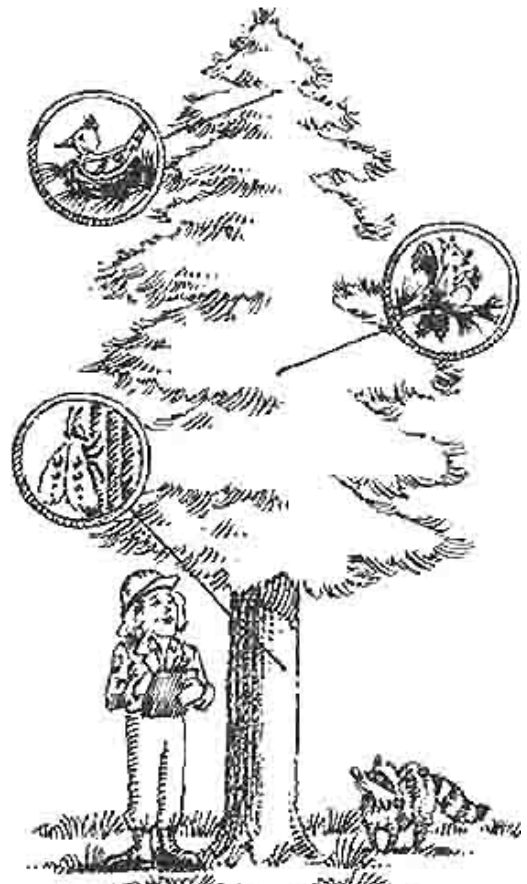
GROUND FLOOR

Examine the ground floor, the layer located on the ground.

Describe any plants, animals, rocks or other things you see.

TREE FACTS

- Trees are living plants that are very important to our planet Earth. Humans need to treat trees with care and respect.
- Trees absorb heat and energy from the sun. They can lower air temperatures by as much as 25 degrees.
- Trees clean the air by taking in carbon dioxide gas and by making oxygen gas.
- For every pound of oxygen that trees in rural forests produce, they take in twice as much carbon dioxide.
- Trees block wind and noise, provide food and homes for wildlife and insects, and hold soil in place.
- Trees add beauty to our community and create feelings of relaxation and solitude.
- You may find more information on trees in your school library.



ENQUÊTE DE L'ARBRE

Vous êtes journaliste pour la Presse Galactique. Votre travail consiste d'aider les extra-terrestres à comprendre l'importance des arbres de la ville. Mais avant que vous rédigiez votre rapport, nous avons besoin de faire quelques recherches ! Répondez aux questions ci-dessous.

MES OBSERVATIONS

CANOPIÉE

Étudiez la canopée. La canopée est où sont les feuilles et les branches.

Les feuilles sont large & plat ressemblant des aiguilles
les suivants : lisse dentées
Est la texture : coriace écailleuse bruts
 brillant flous autres

Sur le dos de cette page, dessinez une photo des feuilles ou des aiguilles.

Quels types d'animaux vivent ou pourraient vivent dans la canopée ?

Nommez un des avantages que la canopée des arbres peut offrir aux gens :

ÉCORCE

Examinez l'écorce. L'écorce est la partie extérieure de l'arbre. Décrivez la couleur de l'écorce.

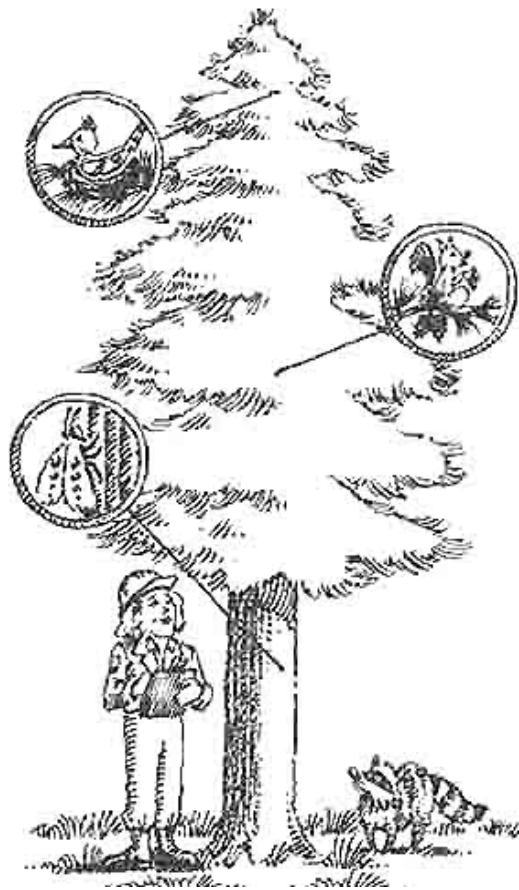
Est la texture : bruts lisse

Quel type d'animaux ou d'insectes peuvent être vivant dans ou sur l'écorce ?

COUVERTURE DE SOL


Examinez le couvertre de sol, la couche située sur le terrain.

Décrivez toutes les plantes, les animaux, les roches ou autres choses que vous voyez.




FAITS D'ARBRE


- Les arbres sont les plantes qui sont très importants pour notre planète Terre. Les humains ont besoin traiter les arbres avec soin et respect.
- Les arbres absorbent la chaleur et l'énergie produit par le soleil. Ils peuvent abaisser la température de l'air par autant de 25 degrés.
- Les arbres nettoient l'air en prenant du gaz carbonique et en faisant de l'oxygène gazeux.
- Pour chaque livre d'oxygène qui produisent des arbres dans les forêts de régions rurales, ils prennent en double la quantité de dioxyde de carbone.
- Les arbres bloquent le vent et le bruit, fournissent de la nourriture et sont des maisons pour la faune et les insectes et tiennent le sol en place.
- Les arbres ajoutent la beauté à notre communauté et créent des sentiments de solitude et de relaxation.
- Vous trouverez plus d'informations sur les arbres dans votre bibliothèque de l'école.

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| Curriculum Area: Science & Technology - UNDERSTANDING LIFE SYSTEMS | | Grade: 1-3 |  |
| Lesson topic/Title: My Tree Book | | Time: 60 mins (lesson) + (work period) | |
| Materials/Safety: <ul style="list-style-type: none"> - Outdoor classroom or forested area - Paper for foldable/tree journal - Glue sticks - Scissors | | | |
| Learning Expectations (OME): <ul style="list-style-type: none"> - observe and compare the parts of a variety of plants - use a variety of forms to communicate with different audiences and for a variety of purposes - describe the changes that different plants undergo in their life cycles | | | |
| Prerequisite Knowledge and Skills: <ul style="list-style-type: none"> - basic knowledge that plants have distinct characteristics and that there are similarities and differences among different types of plants. | | | |
| Lesson Objectives: <ul style="list-style-type: none"> - Students will "adopt" a tree and create an updateable foldable journal. - Throughout the year they will record and examine its characteristics and the changes that the tree goes through. | | | |
| THE LESSON | | | |
| Est. Time 10 mins | Before (Anticipatory Set): Ask students to free write about a special tree in their life (eg. One in their yard they climb, tree forts, the biggest one you've ever seen). Have students share some of their stories (share your own). | | |
| 40 mins | During: <ol style="list-style-type: none"> 1. Take students out into a forested area and ask them to pick a tree that they like. If this tree will be difficult to find again, tie a piece of yarn (secure it well) onto one of its branches. 2. Make a rubbing of a section of its bark. Use this as an illustration for the title page of the foldable. 3. Create a foldable or journal, leaving room for a title page, journal for observations, changes, illustrations, and research. Make some observations and record. eg: My tree is very tall, it has yellow leaves and it has a big chunk of bark taken off of it. Draw a picture of it. If it is a deciduous tree dry and press one of its leaves to add to a page in the book. If it is a coniferous tree paste some of its needles to a page in the book. 4. Choose other days to make recordings, maybe once a month. Write the date, something about it that's changed and draw another picture. 5. Do some actual research on the tree. Find out its name, other areas it grows in, what animals rely on it, etc.. Include these facts in the book. | | |

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| 10 mins | <p>After (Closure): Over the course of the year, students can periodically observe and update their tree journal. The end of the assignment can be celebrated with presentations in the outdoor classroom about the various types of trees.</p> <p>Evaluation Teacher circulation, in-class discussion, project completion.</p> |

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| Programme région : Science & Technologie - Comprendre les systèmes de vie | | Niveau: 1-3 |  ReForest London planting the future today |
| Thème et titre de la leçon : Mon livre d'arbre | | Temps : 60 minutes (leçon) + (période de travail) | |
| Matériaux/sécurité : <ul style="list-style-type: none"> - Classe en plein air ou la zone boisée - Papier journal pliable/ journal d'arbre - Bâtons de colle - Ciseaux | | | |
| Attentes d'apprentissage (OME): <ul style="list-style-type: none"> - Observez et comparez les parties d'une variété de plantes - Utilisez une variété de forme pour communiquer avec des publics différents et pour une variété d'usages - Décrivez les changements que plantes différentes subissent dans leurs cycles de vie | | | |
| Prerequisite connaissances et compétences : <ul style="list-style-type: none"> - Connaissances de base que les plantes ont des caractéristiques distinctes et qu'il y a des similitudes et des différences entre les différents types de plantes. | | | |
| Objectifs de la leçon : <ul style="list-style-type: none"> - Les élèves « adopter » un arbre et créer un journal. - Pendant l'année, les élèves seront responsable d' enregistrer et examiner les caractéristiques et les changements que passe l'arbre. | | | |
| LA LEÇON | | | |
| Temps estimé. 10 mins | Avant (anticipation Set) : Demandez aux élèves d'écrire au sujet d'un arbre spécial dans leur vie (eg. Un dans leur jardin qu'ils grimpent, les arbres forts, l'un plus gros vous n'avez jamais vu). Demandez aux élèves de partager certaines histoires (partager votre propre). | | |

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| 40 mins | <p>Au cours de :</p> <p>Prenez des étudiants dans une région boisée et les demandez de choisir un arbre qu'ils aiment. Si cet arbre sera difficile à retrouver, attachez un morceau de fil (sécurisée bien) sur l'une de ses branches.</p> <p>Faites un frottement d'une section de son écorce. Utilisez comme une illustration de la page de titre du journal.</p> <p>Créez un pliable ou journal, laissant une place pour une page de titre, journal des observations, des changements, des illustrations et des recherches. Faites quelques observations et l'enregistrement. Par exemple: mon arbre est très grand, il a des feuilles jaunes et il a un gros morceau d'écorce prise hors de celle-ci. Dessinez un portrait de l'arbre. Si c'est un arbre à feuilles caduques sèches, prenez une de ses feuilles pour les ajouter à une page du livre. Si ses un conifère, collez certains de ses aiguilles à une page du livre.</p> <p>Choisissez les autres jours à faire des enregistrements, peut-être une fois par mois. Écrivez la date, quelque chose sur ce qui est changé et dessinez une autre image.</p> <p>Faites des recherches réelles sur l'arbre. Trouvez son genre, autres régions ou ils poussent, quels animaux s'appuient sur l'arbre, etc... Incluez ces faits dans le livre.</p> |
| 10 mins | <p>Après (fermeture) :</p> <p>Au cours de l'année, les étudiants peuvent périodiquement observer et écrire dans de leur journal de l'arbre. La fin du projet peut être célébrée avec des présentations en salle de classe ou en plein air sur les différents types d'arbres.</p> <p>Évaluation</p> <p>Circulation de l'enseignant, discussion en classe, la réalisation du projet.</p> |

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| Curriculum Area: Science & Technology - UNDERSTANDING LIFE SYSTEMS | Grade: 1-3 |  |
| Lesson topic/Title: Threats to Urban Trees | Time: 70 mins (lesson) + (work period) | |
| Materials/Safety: <ul style="list-style-type: none"> - Images of local community from past 50-100 years - Seedlings from seed growing experiment - Paper, Mural paper (3' x 6') - Pencils, pencil crayons <p style="text-align: center;"><i>Threats to London's Trees</i> by Justin Morgenroth (http://reforestlondon.org/plant/threats.htm).</p> | | |
| Learning Expectations (OME): - <ul style="list-style-type: none"> - 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. - assess the impact of different human activities on plants, and list personal action they can take to minimize harmful effects and enhance good effects; - use a variety of forms (<i>e.g., oral, written, graphic, multimedia</i>) to communicate with different audiences and for a variety of purposes (<i>e.g., letters to family to think about their actions' effect on trees, mural to show how a world may look without trees</i>); - identify examples of environmental conditions that may threaten plant and animal survival (<i>e.g., extreme heat and cold; floods and/or droughts; changes in habitat because of human activities such as construction, use of street salt, pesticides, factories, dams, etc.</i>) | | |
| Prerequisite Knowledge and Skills: Teacher should read <i>Threats to London's Trees</i> by Justin Morgenroth (http://reforestlondon.org/plant/threats.htm). Students should have an awareness of the varieties of trees on school grounds and in community. | | |
| THE LESSON | | |
| Est. Time 10 mins | Before (Anticipatory Set): As a class, students may look at old pictures of their school or community (check in the office or archives for old pictures) and compare them to what the school looks like now. <i>How is it different? Are there more or less trees? What difference do you think it makes?</i> If ReForest London has planted trees in your schoolyard recently, ask the students if they noticed a difference in the schoolyard before and after planting. | |

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| <p>50 mins</p> | <p>During:</p> <ul style="list-style-type: none"> ○ As a class, students will look at young tree growth. A discussion may be in class if students have planted seedlings, or if there is an outdoor classroom or natural green space on school grounds, discussion may be better outside. If outdoors, let students look for new growth: seedlings, moss, budding branches, etc. Recap what a tree needs to survive: sunlight, soil, water and carbon dioxide. Discuss what we do that may hurt the growth of trees. A synopsis of the article <i>threats to London's Trees</i> may be given and review solutions. For example, if street salt from winter affects the roots and growth of trees, what are some solutions? If available, the teacher could take 3 seedlings and do an experiment. Water one with salt water, dust one with chalk dust on the leaves, and put a box over another. Monitor the trees' growth over the next 2 weeks, how does it compare to un-tampered seedlings? How does this illustrate how we can affect trees everyday? ○ Choosing three examples of how we can harm trees in everyday life (salt, pesticides, chemicals and dust, deforestation, foreign species, etc.), students will write a letter to their family/guardian that gives them solutions to damaging actions (For example, <i>"Please use a little sand rather than salt to melt snow in the winter. Salt seeps into the soil and stops tree roots from getting water."</i>) ○ As a class, you could write a letter on large recycled paper to the mayor, city councilors, etc. asking for more trees downtown. <p>When finished, students may contribute to a class mural. A large piece of [recycled] mural paper divided in two with line down the middle (left & right), on the left write the heading TREES and on the right NO TREES. Ask students to together make a landscape of what the school, community, etc may look like in 50/100/etc. years under each heading, with trees or without. Ask them to be creative about their images. <i>What are people doing on the left to keep the trees, what are animals like on the right, without trees?</i> After, students may put the mural in a school hallway to present their causes.</p> |
| <p>10 mins</p> | <p>After (Closure):</p> <p>Following up lesson with these key questions can provide excellent closure for the lesson.</p> <ul style="list-style-type: none"> - <i>How can we help get plants and trees what they need to survive? How does that help us to survive?</i> - <i>What do we do that may hurt trees – carve them, peel bark off?</i> - <i>How may we model to younger students how to treat trees?</i> - <i>What do <u>you</u> think the school will actually look like in 100 years, TREES or NO TREES?</i> <p>Evaluation/Assessment</p> <p>Teacher circulation, in-class discussion, letter completion, mural work.</p> |

Appendix A



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| Programme région : Science & Technologie- Comprendre les systèmes de vie | Niveau : 1-3 |  <p>ReForest London planting the future today</p> |
| Thème et titre de la leçon : Menaces d'arbres urbains | Temps : 70 minutes (leçon) + (période de travail) | |
| Matériaux/sécurité : <ul style="list-style-type: none"> - Images de la communauté locale des dernières 50-100 années - Semis de graines d'une expérience de culture des semences - Papier, papier mural (3 « x 6 ») - Crayons, crayons de couleur, crayon <p style="text-align: center;"><i>Menaces pour les arbres de Londres</i> par Justin Morgenroth (http://reforestlondon.org/plant/threats.htm).</p> | | |
| Attentes d'apprentissage (OME): - <ul style="list-style-type: none"> - évaluez les façons comment les plantes ont un impact sur la société et l'environnement et les moyens comment l'activité humaine a un impact sur les plantes et les habitats de la plante. - évaluez l'impact des différentes activités humaines sur les plantes et listez l'action personnelle qu'ils peuvent prendre pour réduire au minimum les effets néfastes et de renforcer les effets positifs ; - utilisez une variété de formes (<i>par exemple, par voie orale, écrite, graphique, multimédia</i>) pour communiquer avec des publics différents et pour une variété de fins (<i>par exemple, des lettres à la famille de penser à l'effet de leurs actions, arbres, murale pour montrer comment un monde peut regarder sans arbres</i>) ; - identifiez des exemples de conditions environnementales qui peuvent menacer la survie des plantes et des animaux (<i>p. ex., chaleur et froid ; inondations et sécheresses ; changements dans l'habitat en raison des activités humaines telles que la construction, l'utilisation de sel, pesticides, usines, barrages, etc.</i>) | | |
| Prerequisite connaissances et compétences : Enseignant devrait lire <i>menaces aux arbres de Londres</i> par Justin Morgenroth (http://reforestlondon.org/plant/threats.htm). Étudiants devraient avoir une prise de conscience des variétés d'arbres sur les terrains de l'école et dans la communauté. | | |
| LA LEÇON | | |
| Temps estimé. 10 mins | Avant (anticipation Set) : Comme une classe, étudiants peuvent regarder des photos anciennes de leur école ou collectivité (vérifiez dans le bureau ou les archives de photos anciennes) et comparer à l'apparence de l'école maintenant. <i>Comment est-elle différente ? Y a-t-il plus ou moins d'arbres ? Quelles différences est-ce que la quantité des arbres pourraient faire ?</i> Si ReForest a planté des arbres récemment, demandez aux élèves s'ils ont remarqué une différence dans la cour de l'école avant et après la | |

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| | plantation. |
| 50 mins | <p>Au cours de :</p> <ul style="list-style-type: none"> ○ Comme une classe, les étudiants examineront la croissance des jeunes arbres. Une discussion peut être en classe si les élèves ont planté des semis, ou s'il y a une classe en plein air ou les espaces verts naturels sur les terrains de l'école, la discussion peut être mieux à l'extérieur. Si à l'extérieur, laissez les élèves pour chercher de nouvelle croissance : semis, mousse, branches en herbe, etc.. Récapitulez ce qu'un arbre a besoin pour survivre : lumière du soleil, le sol, l'eau et dioxyde de carbone. Discutez de ce que nous faisons qui peuvent blesser la croissance des arbres. Un résumé de l'article <i>menaces aux arbres de Londres</i> peut aider et examiner des solutions. Par exemple, si le sel de voirie de l'hiver affecte les racines et la croissance des arbres, quelles sont certain solutions? <p>Si possible, l'enseignant peut prendre 3 semis et faire une expérience. Arrosez un avec l'eau salée de l'eau, poudrez un avec la poussière de craie sur les feuilles et mettez une boîte sur une autre. Surveillez la croissance des arbres au cours des 2 prochaines semaines, comment il compare-t-elle à semis non-altère ? Comment est-ce que cette expérience illustrer comment nous pouvons affecter les arbres chaque journée?</p> <ul style="list-style-type: none"> ○ Sélectionnez trois exemples de comment nous pouvons blesser les arbres dans la vie quotidienne (sel, pesticides, produits chimiques et de poussière, déforestation, espèces étrangères, etc.), les élèves vont écrire une lettre à leur famille des solutions pour l'endommagement des arbres (par exemple, «<i>Veillez utiliser un peu de sable plutôt que de sel pour faire fondre la neige en hiver. Sel s'infiltrer dans le sol et s'arrête les racines des arbres de s'infiltrer l'eau.</i>») ○ Comme une classe, vous pouvez écrire une lettre sur du papier recyclé au maire, conseillers municipaux, etc., demandant plus d'arbres du centre-ville. <p>Lorsque terminé, les étudiants peuvent contribuer à une murale de la classe. Sur un grand morceau de papier murale [recyclé], divisez en deux avec la ligne du milieu (gauche et droite), et au gauche la rubrique écrivez « Arbres » et au droit écrivez « Sans les Arbres » Demandez aux élèves de faire un dessin de paysage de l'école communautaire, etc. peuvent ressembler au cours des années 50/100/etc. sous chaque rubrique, avec des arbres ou sans. Leur demander d'être créatif sur leurs images. <i>Qu'est-ce que les personnes sur la gauche font pour conserver les arbres, qu'est-ce que se passent aux animaux sur le droit, sans arbres?</i> Après, étudiants peuvent mettre la peinture murale dans un couloir de l'école de présenter leur cause.</p> |
| 10 mins | <p>Après (fermeture) :</p> <p>Suivez la leçon avec ces questions clés pour une fermeture excellente de la leçon.</p> <ul style="list-style-type: none"> - <i>Comment pouvons nous donner ce que des plantes et des arbres ont besoin pour survivre ? Comment nous les aidons à survivre ?</i> - <i>Que pouvons-nous faire pour blesser les arbres – couper ou éplucher leur écorce ?</i> |


- *Comment pouvons nous modèler aux jeunes étudiants comment traiter les arbres ?*
- *Selon vous, qu'est-ce que l'école ressemblera dans 100 ans, arbres ou sans arbres ?*

Évaluation

Circulation d'enseignants, discussion en classe, fin de la lettre, œuvre murale.

Annexe A



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| Curriculum Area: Science & Technology - UNDERSTANDING LIFE SYSTEMS The Arts – VISUAL ARTS | Grade: 4-6 |  |
| Lesson topic/Title: Colour Theory in a Tree’s Life | Time: 75 mins (lesson) + (work period) | |

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| Materials/Safety: <ul style="list-style-type: none"> - 5 green leaves (freshly fallen) - 5 baby jars - Rubbing alcohol - Coffee filters - Old newspapers, recyclable paper (bright colours) - Leaves, cones, found tree objects - Art Reproductions (Appendix A) - Scissors - Pencil - Glue - Chalk pastels | |
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| Learning Expectations (OME): <ul style="list-style-type: none"> - Define the elements of design (colour, line, shape, form, space, texture), and use them in ways appropriate for this grade when producing and responding to works of art. - identify the three pairs of complementary colours (red and green, purple and yellow, blue and orange) (<i>Knowledge of Elements</i>); - produce two- and three-dimensional works of art (i.e. works involving media and techniques used in paper-making, low-relief sculpture, watercolour) that communicate a range of thoughts, feelings, and ideas for specific purposes and to specific audiences (using natural elements to create a composition that will communicate those elements, and have practical application) (<i>Creative Work</i>); - compare works on a similar theme (e.g., seasons) from various periods and cultures, and describe the impact of time and location on style (e.g., <i>The Red Maple</i> by A.Y. Jackson; <i>Autumn Leaves – Lake George</i> by Georgia O’Keefe; and Matisse’s paper cut-outs) (<i>Critical Thinking</i>). |
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| Prerequisite Knowledge and Skills: <ul style="list-style-type: none"> - Students should be familiar with colour, basic colour theory and be able to identify primary (yellow, red and blue) and secondary (purple, green and orange) colours. They should have an awareness of the varieties of trees on school grounds and be able to discern between deciduous and coniferous, etc. |
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THE LESSON

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| Est. Time 15 mins | Before (Anticipatory Set): At the beginning of class, students are divided into 5 groups. They are given a jar with rubbing alcohol and a leaf (they may have been instructed to bring a green leaf from home – freshly fallen!) Tear the leaf into small pieces and place the pieces in the alcohol. The solutions are left for 10-15 minutes while, as a class, the students will look at Canadian works of art (Georgia O’Keefe and A.Y. Jackson) that use bright colours and demonstrate an understanding of |
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| | <p>colour theory (warm, cool, complimentary, etc.) and paper cutouts by French artist Henri Matisse (Appendix A).</p> <p>Discussion:</p> <p>Students may be asked to reflect on what the colour choice contributes to the artworks – <i>does it make it light, heavy, moody, etc.</i></p> <ul style="list-style-type: none"> - <i>Why do you think these artists choose to paint nature?</i> - <i>Do we pay attention to the nature around us?</i> - <i>Where do you think the artist lived? The desert? The arctic?</i> - This may be a good reintroduction to the benefits of trees – <i>do they hold meaning? Do we respect them?</i> |
| <p>45 mins</p> | <p>During:</p> <p>Following the discussion, each student is instructed to take a strip of coffee filter and dip it into the jar – just touching the solution. The filter will suck up the solution, revealing a strip of green (chlorophyll), then orange and yellow colours also (leaf pigments). Can the students identify what the colours are - <i>primary, secondary, are they complimentary?</i> A discussion of the reason for the presence of orange and yellow can follow (these colours are present throughout the leaf’s lifetime, but are overshadowed by the bright, green chlorophyll, in the fall the chlorophyll retracts and the underlying warm colours are revealed – hence our beautiful autumns!) Chlorophyll is a molecule that is responsible for photosynthesis, turning sunlight into energy for a tree to use. Some trees use photosynthesis all year long, other deciduous trees stop in the late fall and wintertime. Leaves are the place where photosynthesis occurs and there is lots of chlorophyll, which is why they are green. This motivation may take 30 minutes or so.</p> <p>Activity (30 minutes)</p> <p>After a class discussion students may return to their desks where they will receive instructions. Using recycled materials, pastels and glue sticks students must make a work of art. Drawing from their knowledge of colour theory, repetition and natural shapes they must create an artwork (approximately 8 ½“x 11”) that communicates a season or stage in the life of a tree. They may gather fallen leaves and found tree-objects (cones, keys, etc. depending on the seasons) to trace and use as templates for their cutouts. A finished artwork should use positive and negative space (this may be achieved most simply by cutting out a leaf design from a piece of paper, gluing the outside to one side of the artwork and the inside to the other (Appendix B)), pattern and repetition and the use of pastels for highlights and details.</p> <p>This may take 30-45 minutes.</p> |
| <p>15 mins</p> | <p>After (Closure):</p> <ul style="list-style-type: none"> - Allow students to reflect upon their work and to offer comments to their peers. Work through discussion questions to close activity. - <i>What does Georgia O’Keefe’s painting Autumn Leaves say about the life cycle of a tree? How does something change, from its life, death and how we use them?</i> - <i>Do you think Matisse is making a statement about trees? Do you think he found them important? Inspiring?</i> - <i>How is it important that deciduous trees always have warm colours in their leaves?</i> - <i>How do we take trees for granted?</i> |

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| | Evaluation |
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| | Teacher circulation, in-class discussion, project completion. |
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Appendix A



The Red Maple, A.Y. Jackson, 1914 (National Gallery of Canada)




Autumn Leaves - Lake George, Georgia O'Keeffe



Snow Flowers, Henri Matisse, 1951



Appendix B

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| <p>Programme région : Science & Technologie - Comprendre les systèmes de vie</p> <p>Les Arts – ARTS visuels</p> | <p>Niveau : 4-6</p> |  |
| <p>Thème et titre de la leçon :</p> <p>Théorie de la couleur dans la vie d'un arbre</p> | <p>Temps : 75 minutes (leçon) + (période de travail)</p> | |
| <p>Matériaux/sécurité :</p> <ul style="list-style-type: none"> - 5 feuilles vertes (fraîchement tombées) - 5 pots de bébé - Alcool à friction - Filtres à café - Vieux journaux, papier recyclable (couleurs vives) - Les feuilles, les cônes, arbre objets trouvés - Reproductions d'art (annexe A) - Ciseaux - Crayon - Colle - Craie pastel | | |
| <p>Attentes d'apprentissage (OME):</p> <ul style="list-style-type: none"> - Définir les éléments de design (couleur, ligne, forme, forme, espace, texture) et de les utiliser de manière appropriée pour cet niveau lors de la production et de répondre aux œuvres d'art. - identifier les trois paires de couleurs complémentaires (rouge et vert, mauve et jaune, bleu et orange) (<i>Connaissance des éléments</i>); - produire deux ou trois dimensions des œuvres (c.-à-d. les travaux portant sur les médias et les techniques utilisées dans la fabrication du papier, de faible relief sculpture, aquarelle) qui communiquent une gamme de pensées, des sentiments et des idées spécifiques et à des publics spécifiques (à l'aide d'éléments naturels pour créer une composition qui va communiquer ces éléments et avoir une application pratique) (<i>Travail créatif</i>); - comparer les œuvres d'un thème similaire (p. ex., saisons) de différentes périodes et cultures et décrire l'impact de temps et du style (par exemple, <i>l'érable rouge</i> de A.Y. Jackson ; <i>Feuilles d'automne – Lake George</i> de Georgia o ' Keefe ; et de papier de Matisse <i>prédécoupées</i>) (<i>Pensée critique</i>). | | |
| <p>Prerequisite connaissances et compétences :</p> <ul style="list-style-type: none"> - Étudiants devraient être familiers avec la couleur, théorie des couleurs de base et devraient être capable d'identifier les primaires (jaune, rouge et bleu) et les couleurs secondaires (violet, vert et orange). Ils devraient avoir une conscience des variétés d'arbres sur les terrains de l'école et être capable de discerner entre feuillus et conifères, etc.. | | |

LA LEÇON

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| <p>Temps Estimé. 15 mins</p> | <p>Avant (anticipation session) : Au début de la classe, les élèves sont divisés en 5 groupes. Ils sont donnés un pot avec une feuille et l'alcool à friction (ils pourraient avoir reçu la consigne d'apporter une feuille verte de la maison – fraîchement tombées!) Déchirer les feuilles en petits morceaux et les placent dans l'alcool. Les solutions sont laissées pendant 10-15 minutes, et avec toute la classe, les élèves examineront les œuvres d'art canadiens (Georgia O'Keefe et A.Y. Jackson) qui utilisent des couleurs vives et démontrer une compréhension de la théorie des couleurs (chaude, cool, flatteur, etc.) et des découpages de papier par l'artiste français Henri Matisse (annexe A).</p> <p>Discussion :</p> <p>Étudiants peuvent être invités à réfléchir à ce que le choix des couleurs contribue aux œuvres d'art – <i>est-ce que c'est léger, lourd, mauvaise humeur, etc.</i></p> <ul style="list-style-type: none"> - Pourquoi pensez-vous que ces artistes choisissent de peindre la nature? - Payez l'attention sur la nature qui nous entoure? - Où pensez-vous que l'artiste a vécu? Le désert ? L'Arctique ? - Cela peut être une bonne réintroduction des avantages des arbres – <i>Est-ce qu'ils ont signifié? Est-ce que nous les respectons?</i> |
| <p>45 mins</p> | <p>Au cours de :</p> <p>Après la discussion, chaque élève est chargé de prendre une bande de papier filtre à café et de tremper dans le pot – juste touchant la solution. Le filtre absorbera la solution, révélant une bande verte (chlorophylle), puis les couleurs oranges et jaunes aussi (pigments de la feuille). Est-ce que les élèves peuvent identifier les couleurs - <i>primaire, secondaire, sont elles flatteuses?</i> Une discussion sur la raison de la présence de l'orange et le jaune peut suivre (ces couleurs sont présentes tout au long de la durée de vie de la feuille, mais sont éclipsées par la chlorophylle brillante et verte, mais à l'automne, la chlorophylle se rétracte et les couleurs chaudes sous-jacentes sont révélés – la raison pour nos beaux automnes!) La chlorophylle est une molécule qui est responsable pour la photosynthèse, qui transforme la lumière du soleil en énergie pour un arbre à utiliser. Certains arbres utilisent la photosynthèse toute l'année, autre d'arbres à feuilles caduques arrêtent à la fin de l'automne et l'hiver. Les feuilles sont l'endroit où la photosynthèse se produit et il y a beaucoup de chlorophylle, c'est pourquoi elles sont vertes. Cette motivation peut prendre 30 minutes ou plus.</p> <p>Activité (30 minutes)</p> <p>Après une discussion de classe, les étudiants peuvent retourner à leurs pupitres où ils recevront des instructions. À l'aide de matériaux recyclés, bâtons de pastels et de la colle les étudiants doivent réaliser un travail de l'art. S'inspirant de leur connaissance de la théorie des couleurs, répétition et des formes naturelles, ils doivent créer une œuvre d'art (environ 8 ½ à le "x 11") qui communique une saison ou une étape dans la vie d'un arbre. Ils peuvent recueillir des feuilles tombées et arbre-objets trouvés (cônes, clés,</p> |

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| | <p>etc. selon les saisons) pour tracer et utiliser comme modèles pour leurs découpages. Une œuvre finie doit utiliser espace positif et négatif (cela peut être fait plus simplement en coupant par un dessin de la feuille d'un morceau de papier, collage de l'intérieur à l'autre (annexe B) et l'extérieur d'un côté de l'illustration), modèle et répétition et l'utilisation des pastels de faits saillants et les détails.</p> <p>Cela peut prendre de 30 à 45 minutes.</p> |
| <p>15 mins</p> | <p>Après (fermeture) :</p> <ul style="list-style-type: none"> - Permettre aux élèves de réfléchir à leur travail et d'offrir des commentaires à leurs pairs. Travailler avec les questions de discussion pour fermer l'activité. - <i>Qu'est-ce que la peinture de Georgia O' Keefe « Autumn Leaves » dit au sujet du cycle de vie d'un arbre ? Comment est-ce que l'arbre change, de sa vie, morte et comment nous les utilisons?</i> - <i>Pensez-vous que Matisse fait une déclaration sur les arbres ? Pensez-vous qu'il les trouve important ? Source d'inspiration ?</i> - <i>Comment est-ce c'est important que les arbres à feuilles caduques ont toujours des couleurs chaudes dans leurs feuilles ?</i> - <i>Comment est-ce que nous prenons les arbres pris pour acquis ?</i> <p>Évaluation</p> <p>Circulation de l'enseignant, discussion en classe, la réalisation du projet.</p> |

Annexe A



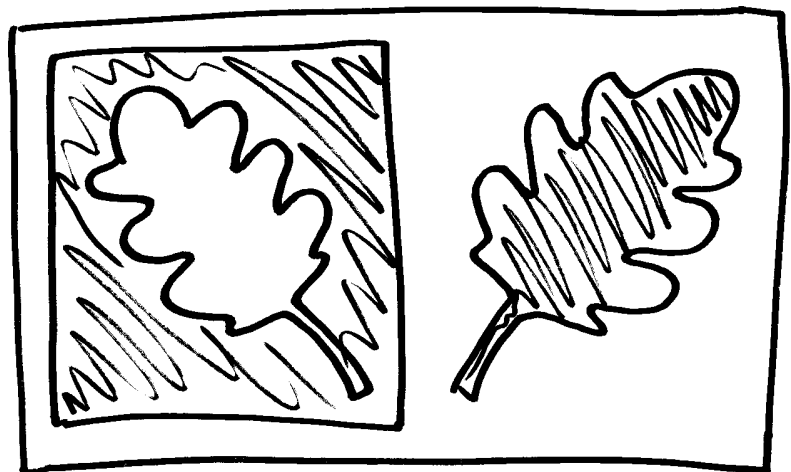
The Red Maple, A.Y. Jackson, 1914 (National Gallery of Canada)




Autumn Leaves – Lake George, Georgia O'Keeffe



Snow Flowers, Henri Matisse, 1951



Appendix B

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| Curriculum Area: Science & Technology - UNDERSTANDING LIFE SYSTEMS | Grade: 4-6 |  |
| Lesson topic/Title: Tree Detectives - Identifying Different Species of Trees | Time: 75 mins (lesson) + (work period) | |
| Materials/Safety: <ul style="list-style-type: none"> - Wax Paper and iron - Paper and pencils - Folders with information sheet (see Appendix A) - Number cards (1-5) - Measuring tapes and metre sticks - Family tree poster - Access to computer lab - Books on local tree species - <i>ReForest</i> pamphlets: <i>Choosing the Right Tree in London</i>, and <i>Choosing the Right Shrub in London</i> - Digital Camera (if possible) | | |
| Learning Expectations (OME): - <ul style="list-style-type: none"> - investigate the characteristics of living things, and classify diverse organisms according to specific characteristics investigate the trees found in a specific habitat and classify them according to a classification system - identify and describe the distinguishing characteristics of different groups of plants and trees (<i>e.g. coniferous and deciduous trees, fruit-bearing and nut-bearing trees; flowering plants produce flowers and fruits</i>), and use these characteristics to further classify various kinds of plants - describe ways in which biodiversity within species is important for maintaining the resilience of those species (<i>e.g., because of genetic differences, not all trees are affected equally by infectious diseases such as Dutch Elm disease, pine beetle</i>) - describe ways in which biodiversity within and among communities is important for maintaining the resilience of these communities (<i>e.g., having a variety of species of trees allows some green space to survive adverse conditions</i>) biodiversity, and act on the proposal. | | |
| Prerequisite Knowledge and Skills: Students should have an awareness of science terms such as <i>species</i> , an understanding of the difference between <i>deciduous</i> and <i>coniferous</i> trees, fruit and nuts, and possible the concept of a <i>Dichotomous Key</i> . They should have an awareness of the varieties of trees on school grounds. In addition, they should be familiar with basic computer functions, <i>Google Earth</i> and standard web browsers. <i>Note:</i> This is an extension of prior lessons from previous grades (such as <i>First Impressions</i> (Grade 1) and <i>How to Use a Dichotomous Key</i> (Grade 3), but allows students to bring prior knowledge to develop a deeper understanding of biodiversity and provides greater geographical and social context. | | |

THE LESSON

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| <p>Est. Time</p> <p>15 mins</p> | <p>Before (Anticipatory Set):</p> <p>In the outdoor classroom, or in the schoolyard, discuss the term <i>family tree</i>. <i>What does it mean? Have they ever seen one?</i> Perhaps show the students an example of a family tree, and see if they are able to apply their own family to the concept of <i>family tree</i> (e.g. they are different then their cousins, but in some ways the same). Review as a class what the different qualities of trees are; review deciduous and coniferous, fruit and nut, keys and cones. Discuss what the benefits and disadvantages they see in having only one type of tree (e.g. easier to maintain, but not very exciting). Introduce the term <i>biodiversity</i> as nature’s way of promoting variety. Discuss benefits and disadvantages (e.g. more variety of food and shelter, but harder to know what is poisonous, etc.). Ask students if they know what types of trees are on school grounds, perhaps giving prizes for correct answer (perhaps Maple candy or other natural tree product). Discuss different types of trees as families and varieties, introducing terms <i>genus</i> (family, e.g. <i>maple</i>) and <i>species</i> (variety, e.g. <i>Sugar Maple</i>) and possible use of Latin naming system. Make the connection between this naming system and our concept of a family tree.</p> |
| <p>50 mins</p> | <p>During:</p> <p>Divide class into five groups, each group is assigned a different tree or shrub in the outdoor classroom or schoolyard (a number card left at its base prior to class). As a group, the students must:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Collect 1 good leaf (1 only!) for preserving <input type="checkbox"/> Make a rubbing of the bark (gently rub a crayon over wax paper against the bark) <input type="checkbox"/> Collect one example of nut, key, fruit, cone, etc. <input type="checkbox"/> Draw a sketch of its branches and overall shape (e.g. long/short trunk, branches droop down or point up, etc.) <input type="checkbox"/> Note any nests or animal activity around the tree <input type="checkbox"/> Note any strange characteristics, leaf colour (e.g. pale green, dark red, etc.) and bark colour <input type="checkbox"/> Estimate height using meter stick shadow (see <i>Measuring a Tree by its Shadow</i>) and trunk circumference <input type="checkbox"/> If possible, students may take a picture of the leaf and branch of the tree <p>Once back in class the group must press the leaf and key (if applicable) and put all information into the folder. These folders will be available for updates throughout the year. They should have a page for activity log (buds, animals, colour change, etc.) and each group is responsible for updating their tree’s information.</p> <p>Students should be able to look through books in the class to discern what type of tree they have “discovered”. They could go online to look through <i>Evergreen’s</i> database, see Resources below. Teacher should have knowledge of the trees to possibly guide their research. Once discerned, they could upload a photo of their tree to the <i>Evergreen</i> database. They could also look for the tree or shrub in the <i>ReForest</i> pamphlets and discern if they are native or not.</p> |
| <p>10 mins</p> | <p>After (Closure):</p> <p>Following their classification, each group may present their findings to the class, and mention one interesting thing they read about the tree, was it native, etc. This lesson could be carried out over a week, but could be completed in two classes provided access to books, computers, and typical subject trees.</p> <p>A class discussion about the following key questions can provide excellent closure to the lesson.</p> |

- The class could discuss if they thought the trees grew in their spots naturally, or if they were introduced, if so from where and why?
- How do the different trees represent biodiversity and how does that make the school better (or worse)?
- As a class, they may identify distinct similarities and differences between the trees, they could then create a simple family tree diagram to show the relationship between the trees.
- If we could plant more trees, which of the five would you plant? Should we plant only one type? Where should they go?
- Why are there trees we should plant, plant *with caution* or avoid planting altogether?
- What could be some possible consequences to ignoring warnings like these?

Students could chart and locate their trees in a *Google* map and upload their digital pictures, plan out where new trees could be planted. (see *Cassandra Public School Tree Tour* in Resources)

Evaluation

Teacher circulation, in-class discussion, project completion, peer and self-evaluation.

Resources

Evergreen Tree Database

<http://www.evergreen.ca/nativeplants/search/guided.php>

Trees of Ontario by Linda Kershaw, published by Lone Pine Publishing, 2001.

Cassandra Public School Tree Tour:


Synopsis and link at http://evergreen.ca/en/about/newsletters/OC_2008_Winter.html

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| Programme région : Science & Technologie - Comprendre les systèmes de vie | Niveau: 4-6 |  |
| Thème et titre de la leçon : Détectives de l'arbre - Identifier les différentes espèces d'arbres | Temps : 75 minutes (leçon) + (période de travail) | |
| Matériaux/sécurité : <ul style="list-style-type: none"> - Papier ciré et fer - Papier et crayons - Dossiers avec les feuilles d'information (voir l'annexe A) - Cartes de nombres (1-5) - Rubans à mesurer et des bâtons de mètre - Affiche de l'arbre de la famille - Accès au laboratoire informatique - Livres sur les types d'arbres locales - <i>ReForest</i> brochures : <i>Choisissant l'arbre idéal à Londres</i> et <i>Choisissant l'arbuste idéal à Londres</i> - Appareil photo digital (si possible) | | |
| Attentes d'apprentissage (OME): - <ul style="list-style-type: none"> - étudiez les caractéristiques des êtres vivants et de classer les organismes divers selon les caractéristiques spécifique, examinez des arbres indigène à un habitat spécifique et les classifient selon une système de classification - identifiez et décrivez les caractéristiques distincts des différents groupes de plantes et arbres (<i>p. ex. conifères et de feuillus, des arbres fruitiers et à noix-production ; les plantes qui produisent fleurs et fruits</i>)et utilisez ces caractéristiques pour plus classifier toutes sortes de plantes - décrivez les façons dont la biodiversité de l'espèce est important pour le maintien de la solidité de ces espèces (<i>p. ex., les différences génétiques, pas tous les arbres sont touchés également par les maladies infectieuses telles que la maladie hollandaise de l'orme, coléoptère de pin</i>) - décrivez les façons dont la biodiversité d'arbre et entre les communautés est important pour le maintien de la solidité de ces communautés (<i>p. ex., ayant une variété d'espèces d'arbres permet un espace vert survivre à des conditions défavorables</i>) la biodiversité. | | |
| Prerequisite connaissances et compétences : Étudiants devraient avoir une connaissance des termes scientifiques comme l'espèce, une compréhension de la différence entre <i>feuillus</i> et <i>conifères</i> arbres, fruits et noix et éventuellement le concept d'une <i>Clé dichotomique</i> . Ils devraient avoir une compréhension des variétés d'arbres sur les terrains de l'école. Aussi, ils doivent se familiariser avec les fonctions de base informatique, <i>Google Earth</i> et les navigateurs web standard. <i>Note :</i> C'est une extension des leçons avant de l'année précédente (comme les <i>Premières Impressions</i> (Grade 1) et <i>comment utiliser une clé dichotomique</i> (Grade 3), mais permet aux étudiants d'apporter une connaissance préalable de développer une meilleure compréhension de la | | |

biodiversité et fournit le contexte géographique et sociale plus large.

| LA LEÇON | |
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| Temps estimé. 15 mins | Avant (anticipation Set) : Dans la salle de classe en plein air, ou dans la cour d'école, discutez le terme <i>arbre généalogique</i> . <i>Ce que cela signifie ? Ont-ils jamais vu?</i> Peut-être montrez aux élèves l'exemple d'un arbre de la famille et voyez s'ils sont capables d'appliquer leur propre famille au concept de <i>l'arbre de la famille</i> (par exemple, elles sont différentes de leurs cousins, mais au même temps ils sont d'une certaine manière la même). Comme une classe, examinez les différentes qualités d'arbres ; revoyez fruits de feuillus et de conifères et les noix, les clés et les cônes. Discutez les avantages et les inconvénients, ils voient en ayant qu'un seul type d'arbre (par exemple ; plus facile à entretenir, mais pas très excitant). Introduisez le terme <i>biodiversité</i> comme moyen de la nature de la promotion de la diversité. Discuter des avantages et des inconvénients (p. ex. plus de variété de nourriture et d'abris, mais plus difficile de savoir ce qui est toxique, etc..). Demandez aux élèves s'ils savent quels types d'arbres sont sur le terrain de l'école, peut-être donnez des prix pour la bonne réponse (peut-être érable bonbons ou autre produit naturel d'arbre). Discutez des différents types d'arbres comme les familles et les variétés, en introduisant des termes <i>genre</i> (famille, par exemple l' <i>érable</i>) et <i>espèce</i> (variété, par exemple l' <i>érable à sucre</i>) et le système des noms possible utilisation du Latin. Faire le lien entre ce système et notre concept d'un arbre de la famille. |
| 50 mins | Au cours de : Divisez la classe en cinq groupes, chaque groupe est attribué un arbre ou arbuste dans la classe en plein air, ou de la cour d'école (une carte nombre laissé à sa base avant de la classe). En groupe, les élèves doivent : <ul style="list-style-type: none"><input type="checkbox"/> Collecter des bonnes feuilles (1 seul!) pour préserver<input type="checkbox"/> Faire un frottement de l'écorce (doucement frotter a un crayon sur papier ciré contre l'écorce)<input type="checkbox"/> Recueillir un exemple de noix, clés, fruits, cône, etc.<input type="checkbox"/> Dessiner un croquis de ses branches et de la forme générale (p. ex. long/court tronc, affaissement des branches vers le bas ou point up, etc.)<input type="checkbox"/> Remarque les nids ou animale activité autour de l'arbre<input type="checkbox"/> Notez toute caractéristiques étranges, la couleur de la feuille (p. ex. pale, vert, rouge, foncé, etc.) et la couleur de l'écorce<input type="checkbox"/> Estimation de la hauteur à l'aide d'ombre stick de compteur (voir <i>mesurer un arbre par son ombre</i>) et la circonférence du tronc<input type="checkbox"/> Si possible, les étudiants peuvent prendre une photo de la feuille et la branche de l'arbre Quand ils sont retournés en classe, le groupe doit presser la feuille et la clé (si applicable) et mettez toutes les informations dans le dossier. Ces dossiers seront disponibles pour les mises à jour tout au long de l'année. Ils devraient avoir une page de journal d'activité (bourgeons, animaux, changement de couleur, etc.) et chaque groupe est responsable de la mise à jour des informations de leur arbre. Les étudiants seront capable de regarder des livres dans la classe de discerner quel type d'arbre ils ont « découvert ». Ils pouvaient aller en ligne pour rechercher grâce à <i>de Evergreen</i> base de |

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| | <p>données, consultez les ressources ci-dessous. Le professeur doit avoir connaissance des arbres pour éventuellement orienter leurs recherches. Une fois discerné, ils peuvent télécharger une photo de leur arbre à la base de données <i>persistantes</i> . Ils pourraient également chercher l'arbre ou un arbuste dans les brochures de <i>ReForest</i> et discerner s'ils sont indigènes ou non.</p> |
| <p>10 mins</p> | <p>Après (fermeture) : À la suite de leur classification, chaque groupe peut-être présenter leurs conclusions à la classe et une chose intéressante qu'ils ont lu de l'arbre, s'il était originaire, etc.. Cette leçon peut être effectuée plus d'une semaine, mais pourrait être terminée en deux classes, s'il y a l'accès à des livres, des ordinateurs et des arbres typiques. Une discussion sur les questions clés suivantes peut fournir une fermeture excellente à la leçon.</p> <ul style="list-style-type: none"> - La classe pourrait discuter s'ils pensaient que les arbres ont grandi naturellement, ou si elles ont été introduites, et si oui d'où et pourquoi? - Comment les différents arbres représentent la biodiversité et comment ils rendent l'école mieux (ou pire) ? - Comme une classe, ils peuvent identifier des similitudes et des différences entre les arbres, ils pourraient alors créer un diagramme simple d'arbre généalogique pour montrer la relation entre les arbres. - Si nous pouvions planter plus d'arbres, lesquelles seront ceux qui vous planter? Est-ce que nous devrions planter qu'un seul type ? Où devraient-ils aller? - Pourquoi y a-t-il des arbres nous devrions planter, planter <i>avec prudence</i> ou éviter de planter complètement? - Quels sont des conséquences possibles si nous ignorons des avertissements comme celles-ci ? <p>Étudiants pourraient tracer et localiser leurs arbres dans une carte <i>Google</i> et télécharger leurs photos numériques et choisissent où nouveaux arbres peuvent être plantés. (voir <i>Cassandra Public School arbre Tour</i> en ressources)</p> <p>Évaluation Circulation d'enseignants, discussion en classe, la réalisation du projet, des pairs et auto-évaluation.</p> <p>Ressources <i>Base d'arbre à feuilles persistantes</i> http://www.Evergreen.ca/nativeplants/Search/Guided.php <i>Arbres de l'Ontario</i> par Linda Kershaw, publié par Lone Pine Publishing, 2001. <i>Cassandra Public School Tour d'arbre :</i> Synopsis et lien à http://evergreen.ca/en/about/newsletters/OC_2008_Winter.html</p> |

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| Curriculum Area: Science & Technology - UNDERSTANDING LIFE SYSTEMS The Arts – VISUAL ARTS | Grade: 4-6 |  |
| Lesson topic/Title: Re-leaf Cards – Making Paper | Time: 90 mins (lesson) + (work period) | |

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| Materials/Safety: <ul style="list-style-type: none"> - Old newspapers, recyclable paper (nothing glossy) - Dried leaves - 5 Old window screens (no holes!), or silk screens - 5 big plastic bins (fairly shallow e.g. kitty litter box, big enough for screens) - 5 sponges - Blender(s) - Old blanket (felt works well) cut slightly bigger than screens - Water source - Art Reproductions (Appendix A) - Paper examples: hand-made, toilet paper, newspaper, etc. | |
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| Learning Expectations (OME): <ul style="list-style-type: none"> - define the elements of design (colour, line, shape, form, space, texture), and use them in ways appropriate for this grade when producing and responding to works of art. - identify negative and positive shapes in works of art and the environment (e.g., shapes created by both the branches of a tree and the spaces between the branches) (<i>Knowledge of Elements</i>); - produce two- and three-dimensional works of art (i.e. works involving media and techniques used in paper-making, low-relief sculpture, watercolour) that communicate a range of thoughts, feelings, and ideas for specific purposes and to specific audiences (using natural elements to create a composition that will communicate those elements, and have practical application) (<i>Creative Work</i>); - compare works on a similar technique (e.g. papermaking) from various periods and cultures, and describe the impact of time and location on style (e.g., Indian palm manuscripts; Indian leaf impression paper; Egyptian papyrus paper) (<i>Critical Thinking</i>). |
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| Prerequisite Knowledge and Skills: <ul style="list-style-type: none"> - Students should be familiar with colour, basic colour theory and be able to identify primary (yellow, red and blue) and secondary (purple, green and orange) colours. They should have an awareness of the varieties of trees on school grounds and be able to discern between deciduous and coniferous, etc. |
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| THE LESSON |
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| Est. Time 15 mins | Before (Anticipatory Set): At the beginning of class, students are divided into 5 groups. Each group is given a different piece of paper (hand-made fine paper, toilet paper, newspaper, egg carton, etc.) As a group, they must discuss what the paper is made from and where it comes from. They could be looking for recycling logos; they may notice <i>post/pre-consumer waste</i> etc. They may be asked where it comes from, how many trees it takes to make it. The teacher may introduce slights or images of ancient manuscripts or artworks. In Egypt, they made paper by overlapping papyrus reeds in different directions and pressing them, in India they would dry pal leaves and write and |
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| | <p>illustrate directly on them.</p> <p>Discussion:</p> <ul style="list-style-type: none"> - <i>How do we use trees today?</i> - <i>Are there enough trees to write every book?</i> - <i>What if the whole internet was put onto books, could there be enough trees to make paper?</i> - <i>What if we cut down the schoolyard trees to make paper?</i> <p>The teacher may show a fact sheet that discusses paper use in North America (see Appendix B). Students may go outside to collect any fallen leaves from the trees in the schoolyard</p> |
| 60 mins | <p>During:</p> <p>After initial discussion, students will watch a demonstration on papermaking. Instructions should be followed very clearly. For a comprehensive yet simple guide and illustration visit <i>Paper Magpie</i> at http://www.webcomicsnation.com/b_zedan/papermagpie1/series.php or http://erc.openschool.bc.ca/ERC/features/paper_making.pdf. Groups should be no larger than 4-5 students, and have their own workspace. The process is best done cooperatively, each group of five together works to make 5 or 6 pieces of paper – students will take turns doing different tasks, each coordinating their own design. They may have time to go into the schoolyard, outdoor classroom to collect fallen leaves from different species of trees. Drier, brightly coloured leaves could be used in the papermaking, fresher leaves to do impressions (see below).</p> <ol style="list-style-type: none"> 1. Tear pieces of newspaper or any recyclable coloured paper (not glossy) into pieces about 1 inch square. Tearing is easier and better for making paper than cutting. Put paper bits into a blender about 2/3 full of water. Students may also tear up bits of dried leaves collected from schoolyard – but not too many, maybe one or two for each blender full – they should be in even smaller pieces. When blender is filled with paper and water, it may be run on medium for no more than 10 seconds at a time. Continue in 10-second intervals until the mixture is pulpy – but not too fine. This could be done before class to save time; also, soaking the torn paper for about 30 minutes before blending makes a better product. The group members could be given letters, each responsible for a task, alternating after each piece of paper (see Appendix C). <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>STUDENTS MUST BE WARNED ABOUT BLENDER SAFETY! Lids must always be kept on; proper extension cords with charge-overload guards must be used. The blending process must be done carefully!</p> </div> <ol style="list-style-type: none"> 2. Add about <u>3</u> full blenders of pulp and <u>1</u> full blender of water (3:1 pulp:water) into the vat (large tub) and mix with hands – this is called <i>charging</i>. 3. Dip screens into the pulp mixture at an angle, then hold it flat in the vat, lift it out to collect pulp – and shaking gently to even out the mixture – like sifting for gold! This is called <i>settling</i> and <i>evening</i> – most of the water should drain off, but the screen may be tilted to drain more. 4. When the screen is drained (about 1 minute), they may flip it – pulp-side-down – onto a cloth, cut to size. This is called <i>couching</i>. Student may arrange dried leaves on the cloth before couching, these leaves will be pressed into the paper and can be left for colour or removed after drying, revealing their impression. 5. Using a sponge, students may soak up extra water off the back of the screen and, when it feels dry, carefully lift the screen away from the pulp and cloth. Again, students may gently press leaves into the topside of the wet paper to make impressions. The paper should be covered with another piece of cloth or felt and these steps repeated until each student has a piece of paper. To avoid confusion, each student should put a small piece of paper with their name onto their sheet; this will prevent argument and confusion when they are collected after drying. 6. The stack of cloth and wet paper should be weighed down and left to drain overnight, |

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| | preferably in a large wash-sink. After one night the layers of cloth and paper will be stuck together – they may be carefully pulled apart and hung up to dry in the class or outside. |
| 15 mins | <p>After (Closure):</p> <p>After the paper has dried overnight, they should be laid out for display. In groups or as a class, students should look at each piece; notice the textures, colours, different qualities of the paper. <i>Are there complimentary colours? What happened to the recycled paper (the paper will be grey, except for bits of brightly coloured paper and leaves)?</i></p> <p>Finally, the students may use the paper to make a card, do a sketch of a tree outside or mount on its own.</p> <p>Discussion:</p> <ul style="list-style-type: none"> - <i>Is this how all paper is made? Why are we not able to make all our paper like this?</i> - <i>Can we learn anything about the challenges for recycling (energy!), and about our dependency on paper (cutting down trees!)?</i> - Teacher could share statistics about paper consumptions in Canada and lead discussion (see Appendix B) <p><i>What would be a good application for this handmade paper?</i></p> |

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| Evaluation | |
| Teacher circulation, in-class discussion, project completion. | |



India, Bihar or Bengal; about 1151 – 1200 CE
 Ink and opaque watercolor on palm leaf
 Each, H. 3 in. (7.6 cm); W. 17 1/4 in. (43.8 cm)

Appendix B

Wood consumption fact sheet (American): <http://www.woodconsumption.org/products/paper.pdf>

Appendix C

| Student/Paper | A | B | C | D | E |
|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Sheet 1 | Timing Blender | Operate Blender | Screening Pulp | Couching | Sponging |
| Sheet 2 | Operate Blender | Screening Pulp | Couching | Sponging | Timing Blender |
| Sheet 3 | Screening Pulp | Couching | Sponging | Timing Blender | Operate Blender |
| Sheet 4 | Couching | Sponging | Timing Blender | Operate Blender | Screening Pulp |
| Sheet 5 | Sponging | Timing Blender | Operate Blender | Screening Pulp | Couching |

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| <p>Programme région : Science & Technologie - Comprendre les systèmes de vie Les Arts – ARTS visuels</p> | <p>Niveau: 4-6</p> |  |
| <p>Thème et titre de la leçon : Re-leaf de cartes – fabrication de papier</p> | <p>Temps : 90 minutes (leçon) + (période de travail)</p> | |
| <p>Matériaux/sécurité :</p> <ul style="list-style-type: none"> - Vieux journaux, papier recyclable (rien de laque) - Feuilles séchées - 5 Écrans de fenêtre ancienne (sans trous!), ou des écrans de soie - 5 grands bacs en plastique (assez profondes par exemple la litière kitty boîte, assez grande pour écrans) - 5 éponges - Mixer(s) - Ancienne couverture (feutre fonctionne bien) coupe un peu plus gros que les écrans - Source d'eau - Reproductions d'art (annexe A) - Exemples de papier : faites à la main, papier hygiénique, Journal, etc.. | | |
| <p>Attentes d'apprentissage (OME):</p> <ul style="list-style-type: none"> - définis les éléments de design (couleur, ligne, forme, forme, espace, texture) et de les utiliser de manière appropriée pour cette année lors de la production et de répondre aux œuvres d'art. - identifiez les formes négatives et positives dans les œuvres d'art et de l'environnement (p. ex., les formes créées par les deux branches d'un arbre et les espaces entre les branches) (<i>Connaissance des éléments</i>); - produisez deux ou trois dimensions des œuvres (c.-à-d. les travaux portant sur les médias et les techniques utilisées dans la fabrication du papier, de faible relief sculpture, aquarelle) qui communiquent une gamme de pensées, des sentiments et des idées à des fins spécifiques et à des publics spécifiques (à l'aide d'éléments naturels pour créer une composition qui va communiquer ces éléments et avoir une application pratique) (<i>Travail créatif</i>); - comparez les travaux sur une technique similaire (par exemple la fabrication de papier) de différentes périodes et cultures et de décrire l'impact du temps et de lieu de style (par exemple, les manuscrits de palm indien ; Papier d'impression feuille indienne ; Papier de papyrus égyptien) (<i>Pensée critique</i>). | | |
| <p>Prerequisite connaissances et compétences :</p> <ul style="list-style-type: none"> - Étudiants doivent être familiers avec la couleur, théorie des couleurs de base et être capable d'identifier les couleurs primaires (jaune, rouge et bleu) et les couleurs secondaires (violet, vert et orange). Ils devraient avoir une compréhension des variétés d'arbres sur les terrains de l'école et être capable de discerner entre feuillus et conifères, etc.. | | |
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| <p>LA LEÇON</p> | | |

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| <p>Temps estimé. 15 mins</p> | <p>Avant (anticipation Set) :</p> <p>Au début de la classe, les élèves sont divisés en 5 groupes. Chaque groupe est donné un morceau de papier différents (faites à la main papier fin, papier toilette, journal, boîte à œufs, etc.). En groupe, ils doivent discuter de quoi le papier est fabriqué et d'où elle vient. Ils pourraient chercher des logos de recyclage ; ils peuvent remarquer <i>post/pré-consumer déchets</i> etc.. Ils peuvent se demander d'où elle vient, combien d'arbres il prend pour la rendre. L'enseignant peut introduire des affronts ou des images des manuscrits anciens ou des œuvres d'art. En Égypte, elles faites de papier par le chevauchement des roseaux de papyrus dans des directions différentes et appuyant sur eux, en Inde ils sèchent de feuilles de pal pour écrire et illustrer directement sur eux.</p> <p>Discussion :</p> <ul style="list-style-type: none"> - <i>Comment utilisons-nous arbres aujourd'hui ?</i> - <i>Y a-t-il suffisamment d'arbres pour écrire tous les livres ?</i> - <i>Que se passe-t-il si l'internet entier a été mis sur les livres, peut-il y avoir suffisamment d'arbres pour faire des papiers ?</i> - <i>Que se passe-t-il si nous couper les arbres de la cour d'école pour faire le papier ?</i> <p>L'enseignant peut montrer une fiche qui traite de la consommation de papier en Amérique du Nord (voir annexe B). Étudiants peuvent aller à l'extérieur pour recueillir les feuilles tombées des arbres dans la cour de l'école</p> |
| <p>60 mn</p> | <p>Au cours de :</p> <p>Après discussion initiale, étudiants vont regarder une démonstration sur la fabrication du papier. Instructions devraient être suivies très clairement. Pour une explication complète et guide simple visite <i>Papier Pie</i> au http://www.webcomicsnation.com/b_zedan/papermagpie1/series.php ou http://erc.openschool.bc.ca/ERC/features/paper_making.pdf. Groupes devraient être 4-5 élèves, et chacune ont leur propre espace de travail. Le processus est mieux fait en collaboration, chaque groupe de cinq travaille ensemble pour faire 5 ou 6 morceaux de papier – étudiants prendront leur tour de faire des tâches différentes, chacune leur propre conception de la coordination. Classe en plein air de recueillir tombés de feuilles provenant de différentes espèces d'arbres, qu'ils peuvent avoir le temps d'entrer dans la cour de l'école. Les feuilles sèches, aux couleurs vives pourraient être utilisées dans la fabrication du papier, des feuilles fraîches pour faire des impressions (voir ci-dessous).</p> <ol style="list-style-type: none"> 1. Déchirez des morceaux de journal ou tout papier recyclable de couleur (pas brillant) en morceaux carré d'environ 1 pouce. Déchirant est plus facile et mieux pour la fabrication de papier à découper. Mettez le papier dans un mélangeur à environ 2/3 plein d'eau. Étudiants peuvent également déchirer morceau de feuilles séchées récoltées de cour d'école – mais pas trop nombreux, peut-être une ou deux pour chaque mélangeur complet – ils devraient être en morceaux encore plus petits. Lorsque le mélangeur est rempli avec de papier et de l'eau, il peut être exécuté sur moyen pour pas plus de 10 secondes à la fois. Continuez à intervalles de 10 secondes, jusqu'à ce que le mélange est pulpeuse – mais pas trop fine. Cela pourrait se faire devant la classe pour gagner du temps ; aussi, trempez le papier déchiré pendant environ 30 minutes avant de mélanger rendrait un meilleur produit. Les membres du groupe pouvaient être accordés lettres, chacune responsable d'une tâche, en alternance après chaque morceau de papier (voir l'annexe C). <p>ÉTUDIANTS DOIVENT ÊTRE AVERTIS SUR LA SÉCURITÉ DE MIXER ! Couvercles doivent toujours</p> |

être maintenus, rallonges appropriée avec les gardes de charge-surcharge doivent être utilisées. Le processus de fusion doit être fait avec soin !

2. Ajouter 3 mélangeurs plein de pâtes et 1 mixer plein d'eau (3:1 pâte : eau) dans la bac (grande baignoire) et mélangez avec les mains, cela s'appelle la *tarification*.
3. Trempez les écrans dans le mélange de pâte à un angle, puis maintenez-le plat dans la bac, les lèvent pour recueillir les pâtes – et secouez doucement sur le mélange, même – comme le tamisage d'or ! Cela s'appelle la *décantation* et le *couche* – la plupart de l'eau doit s'égoutter, mais l'écran peut être incliné pour égoutter plus.
4. Lorsque l'écran est égoutté (environ 1 minute), ils peuvent – pâtes-côté-vers le bas – il retourne sur un chiffon, coupé à la taille. Ceci est appelé *amorçant*. Étudiants peuvent organiser des feuilles séchées sur le tissu avant amorçant, ces feuilles vont être pressés dans le papier et peuvent être laissés pour couleur ou enlevée après séchage, révélant leur impression.
5. À l'aide d'une éponge, étudiants peuvent absorber plus d'eau au large de l'arrière de l'écran et, lorsque c'est sec, soigneusement lever l'écran loin de la pâte à papier et tissu. Encore une fois, l'étudiant peut doucement appuyez sur feuilles dans le recto du papier humide pour faire des impressions. Le document devrait être couvert avec un autre morceau de tissu ou de feutre et de ces mesures répétées jusqu'à ce que chaque élève a un morceau de papier. Pour éviter toute confusion, chaque étudiant doit mettre un petit morceau de papier avec leur nom sur leur feuille ; cela empêchera les arguments et la confusion lorsqu'ils sont recueillis après le séchage.
6. La pile de papier tissu et de la pluie devrait être pesée vers le bas et gauche à égoutter toute la nuit, préférablement dans un évier de lavage grand. Après une nuit, que les couches de tissu et de papier seront coincés ensemble – ils peuvent être soigneusement tirés à part et a raccroché à sec dans la classe ou à l'extérieur.

15 mins

Après (fermeture) :

Après que le papier a séché pendant la nuit, ils devraient être énoncés pour l'affichage. En groupes ou en tant que classe, élèves devraient tenir compte de chaque pièce ; Notez les textures, les couleurs, les différentes qualités de papier. *y a-t-il des couleurs complémentaires? Ce qui est arrivé le papier recyclé (le document sera gris, à l'exception des morceaux de papier aux couleurs vives et de feuilles) ?*

Enfin, les étudiants peuvent utiliser le papier pour faire une carte, faire un croquis d'un arbre à l'extérieur ou à monter sur sa propre.

Discussion :

- *Est-ce que tous papier est fait comme ça? Pourquoi ne sommes-nous pas capables de faire tout notre papier comme cela ?*
- *Pouvons-nous apprendre des défis pour le recyclage (énergie!) et notre dépendance sur papier (abattage d'arbres!) ?*
- Professeur pourrait partager des statistiques sur les consommations de papier au Canada et mener la discussion (voir annexe B)
Ce qui serait une bonne application de ce fait de papier à la main ?

Évaluation

Circulation de l'enseignant, discussion en classe, la réalisation du projet.

Annexe A



India, Bihar or Bengal; about 1151 – 1200 CE
Ink and opaque watercolor on palm leaf
Each, H. 3 in. (7.6 cm); W. 17 1/4 in. (43.8 cm)


Inde, Bihar ou Bengale ; à propos de CE 1151 – 1200
Encre et aquarelle opaque sur une feuille de palmier
Chaque, h. 3 po (7,6 cm) ; W. 17 1/4 po (43,8 cm)

Annexe B

Fiche consommation bois (américain): <http://www.woodconsumption.org/products/paper.pdf>

Annexe C

| Étudiant/papier | A | B | C | D | E |
|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Fiche 1 | Calendrier Mixer | Exploitation de Mixer | Dépistage des pâtes | Amorçant | L'éponge |
| Fiche 2 | Exploitation de Mixer | Dépistage des pâtes | Amorçant | L'éponge | Calendrier Mixer |
| Fiche 3 | Dépistage des pâtes | Amorçant | L'éponge | Calendrier Mixer | Exploitation de Mixer |
| Fiche 4 | Amorçant | L'éponge | Calendrier Mixer | Exploitation de Mixer | Dépistage des pâtes |
| Fiche 5 | L'éponge | Calendrier Mixer | Exploitation de Mixer | Dépistage des pâtes | Amorçant |

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|--|--|---|---|
| Curriculum Area: Math - MEASUREMENT Science & Technology -UNDERSTANDING LIFE SYSTEMS | | Grade: 7 and 8 |  |
| Lesson topic/Title: Measuring Trees | | Time: 60 mins (lesson) + (work period) | |
| Materials/Safety: <ul style="list-style-type: none"> - Tape measures - Metre sticks - Worksheet handout | | | |
| Learning Expectations (OME): <ul style="list-style-type: none"> - Determine the relationships among units and measurable attributes, including the area of a circle and the volume of a cylinder - Measure the circumference, radius, diameter of circular objects using concrete materials | | | |
| Prerequisite Knowledge and Skills: <ul style="list-style-type: none"> - basic knowledge that plants have distinct characteristics and that there are similarities and differences among different types of plants. | | | |
| THE LESSON | | | |
| Est. Time 15 mins | Before (Anticipatory Set): Discuss the measure of DBH or Diameter at Breast Height and why it is important to measure all trees at this same height. <i>(Tree diameter changes with height. Measuring all trees at the same height helps us compare sizes of different trees.)</i> | | |
| 30 mins | During: Explain procedure based on handout information. Create small groups of 2 -4 students. Starting with the trees in the schoolyard, measure and record the height of the tree and DBH based on the information on the handout. Students may then measure other trees in the schoolyard, large and small. | | |
| 15 mins | After (Closure): Return to classroom, compare data, and pack up materials. | | |
| | Evaluation Teacher circulation, in-class discussion, project completion | | |

How to Measure a Tree

Height:

Measuring the tree's height is a good way to track the growth of the tree. This is best done on a bright, sunny day.

Materials:

- Meter stick or a stick for which you know the exact length.
- Tape measure

Procedure:

- 1) Stand next to the tree and place the metre stick or other stick on the ground, standing straight up.
- 2) Measure the length of the shadow of the stick from the base to the tip of the shade of the stick.
- 3) Measure the length of the tree's shadow. Use your measuring tape to determine the length of the tree's shadow from the base of the tree to the tip of the shadow. This works best if the ground all along the shadow is fairly level; if the tree is on a slope, for example, your measurement won't be very accurate. You want to do this as quickly as possible after measuring the meter stick's shadow, since the sun's position in the sky (and hence the shadow length) is slowly but constantly changing.
- 4) Calculate the tree's height by using the proportion of the stick's shadow length to its actual length. Since you know the length of the tree's shadow, and you also know that a certain height (of the stick) produces a certain shadow length (the length of the stick's shadow), you can determine the tree's height with a little math:

$$\frac{\text{Tree Height}}{\text{Stick's Height}} = \frac{\text{Tree's Shadow}}{\text{Stick's Shadow}} \quad \text{OR} \quad \text{Tree Height} = \frac{\text{Tree's Shadow} \times \text{Stick's Height}}{\text{Stick's Shadow}}$$

Diameter at Breast Height

Another useful measure is known as Diameter at Breast Height, or DBH.

Procedure:

- 1) Measure 137 cm from the ground level. This is "Breast Height".
- 2) Wrap a tape measure around the tree to measure its circumference. Be sure to read the scale on the correct side of the tape.

Hints:

- The tape must be held tightly around the tree at right angles to the main stem.
- On sloping ground, breast height should be measured from the uphill side. Obvious swellings, distortions or branches at 1.3 metres need to be avoided. If there is a distortion at 1.3 metres, measure the diameter 10 cm up (at 1.4 m) and again at 10 cm down (at 1.2 m) and take the average of the two measurements.
- Measure diameter to the closest 10th of a centimetre as shown by the graduations on the tape.
- Calculate the diameter by dividing the circumference by π (3.14).

Tree Measuring Chart


| Height: | | | | | Diameter: | |
|----------------------|-----------------------------|-------------------------------------|----------------------------|---------------------|-------------------------|---------------|
| Height of Stick (cm) | Length of Stick Shadow (cm) | <u>Stick Height</u> Stick Shadow | Length of Tree Shadow (cm) | Height of Tree (cm) | Circumference at 137 cm | Diameter (cm) |
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Calculations:

Remember:

$$Tree\ Height = Tree's\ Shadow \times \frac{Stick\ Height}{Stick's\ Shadow}$$

$$Diameter = Circumference / 3.14$$

| | | |
|--|---|---|
| Programme région : Math - mesure Science & technologie - Comprendre les systèmes de vie | Niveau : 7 et 8 |  |
| Thème et titre de la leçon : Mesure des arbres | Temps : 60 minutes (leçon) + (période de travail) | |
| Matériaux/sécurité : <ul style="list-style-type: none"> - Rubans à mesurer - Bâtons de mètre - Document de feuille de calcul | | |
| Attentes d'apprentissage (OME): <ul style="list-style-type: none"> - Déterminer les relations entre les unités et les attributs mesurables, y compris la superficie d'un cercle et le volume d'un cylindre - Mesurer la circonférence, le rayon, le diamètre des objets circulaires à l'aide des matériaux concrets | | |
| Prerequisite connaissances et compétences : <ul style="list-style-type: none"> - Connaissances de base que les plantes ont des caractéristiques distinctes et qu'il y a des similitudes et des différences entre les différents types de plantes. | | |
| | | |
| LA LEÇON | | |
| Temps Estimé. 15 mins | Avant (anticipation Set) : Discutez la mesure de la DHP ou le diamètre à hauteur de poitrine et pourquoi il est important de mesurer tous les arbres à cette même hauteur. (<i>Changements de diamètre arbre avec la hauteur. Tous les arbres à la même hauteur de mesure nous aidons à comparer les tailles des arbres différents.</i>) | |
| 30 mins | Au cours de : Expliquez la procédure basée sur l'information du document. Créez des petits groupes de 2 -4 étudiants. Commençant avec les arbres de la cour de l'école, la mesure et l'enregistrez l'hauteur de l'arbre et DHP basé sur les informations sur le document. Étudiants peuvent mesurer autres arbres dans la cour de l'école, petit et grand. | |
| 15 mins | Après (fermeture) : Retour à la salle de classe, comparer les données et ramasser matériaux. Évaluation Circulation de l'enseignant, discussion en classe, la réalisation du projet | |

Comment mesurer un arbre

Hauteur :

Mesurer la hauteur de l'arbre est un bon moyen pour suivre le développement de l'arbre. C'est mieux fait pendant un jour clair et ensoleillé.

Matériaux :

- qMètre bâton ou un bâton dont vous connaissez la longueur exacte.
- qRuban à mesurer

Procédure :

- 1) Prenez position à côté de l'arbre et placez le bâton de compteur ou autre bâton sur le sol, en restant directement vertical.
- 2) Mesurez la longueur de l'ombre du bâton de la base de l'arbre jusqu'à l'extrémité de l'ombre du bâton.
- 3) Mesurez la longueur de l'ombre de l'arbre. Utilisez votre ruban de mesure pour déterminer la longueur de l'ombre de l'arbre de la base de l'arbre jusqu'à l'extrémité de l'ombre. Cela fonctionne mieux si le sol tout au long de l'ombre est assez plat ; Si l'arbre est sur une pente, par exemple, vos mesures ne seraient très précises. Vous souhaitez de faire ceci aussi rapidement que possible après avoir mesuré l'ombre du bâton de compteur, parce que la position du soleil dans le ciel (et donc la longueur de l'ombre) est lentement, mais en constante, évolution.
- 4) Calculez la hauteur de l'arbre à l'aide de la proportion de la longueur d'ombre du bâton de sa longueur réelle. Puisque vous connaissez la longueur de l'ombre de l'arbre, et vous savez aussi qu'une certaine hauteur (du bâton) produit une certaine longueur d'ombre (la longueur de l'ombre du bâton), vous pouvez déterminer la hauteur de l'arbre avec un peu de mathématiques :

$$\text{La hauteur de l'arbre} = \text{ombre de l'arbre} \times \frac{\text{hauteur du bâton}}{\text{l'ombre du bâton}}$$

Diamètre à hauteur de poitrine

Une autre mesure utile est connue comme le diamètre à hauteur de poitrine, ou DHP.

Procédure :

- 1) Mesurez 137 cm du niveau du sol. Il s'agit de « Hauteur de la poitrine ».
- 2) Enroulez un ruban à mesurer autour de l'arbre afin de mesurer sa circonférence. N'oubliez pas de lire la balance du bon côté de la bande.

Conseils :

- qLa bande doit être tenue de serré autour de l'arbre à angle droit à la tige principale.
- qSur la pente du sol, la hauteur de poitrine doit être mesurée du côté amont. Renflements évidents, des distorsions ou des branches à 1,3 mètre doivent être évités. S'il y a une distorsion à 1,3 mètre, mesurer le diamètre de 10 cm jusqu'à (à 1,4 m) puis à 10 cm vers le bas (à 1,2 m) et prendre la moyenne des deux mesures.
- qDiamètre de mesure à la dixième le plus proche d'un centimètre, comme illustré par les graduations sur la bande.
- qCalculez le diamètre en divisant la circonférence par π (3.14).

Tableau de mesure des arbres

Hauteur :


Diamètre :

| Hauteur de la Bâton (cm) | Longueur de bâton Ombre (cm) | Hauteur du <u>bâton</u> Bâton ombre | Longueur d'arbre Ombre (cm) | Hauteur de la Arbre (cm) | Circonférence à 137 cm | Diamètre (cm) |
|--------------------------|------------------------------|-------------------------------------|-----------------------------|--------------------------|------------------------|---------------|
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Calculs :

N'oubliez pas :

$$\text{Hauteur de l'arbre} = \frac{\text{ombre de l'arbre} \times \text{hauteur bâton}}{\text{Ombre de bâton}} = \frac{\text{circonférence}}{3,14}$$

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|--|---|---|
| Lesson Topic/Title: <i>The Lorax</i> : Children’s Literature and the Environment | |  ReForest London planting the future today |
| Grade/Course: English Gr. 7-10 | Curriculum Area: Children’s Literature | |
| Materials/Reserves/Safety: Pencil crayons, markers, crayons etc. <i>The Lorax</i> by Dr. Seuss Construction paper, white paper Examples of other children’s books (see next page) | | |
| Specific Expectations: Reading and Literature Studies <ol style="list-style-type: none"> 1. Reading for Meaning: read and demonstrate an understanding of a variety of literary, informational, and graphic texts, using a range of strategies to construct meaning; 2. Understanding Form and Style: recognize a variety of text forms, text features, and stylistic elements and demonstrate understanding of how they help communicate meaning Writing <ol style="list-style-type: none"> 1. Developing and Organizing Content: generate, gather, and organize ideas and information to write for an intended purpose and audience; 2. Using Knowledge of Form and Style: draft and revise their writing, using a variety of literary, informational, and graphic forms and stylistic elements appropriate for the purpose and audience; 3. Applying Knowledge of Conventions: use editing, proofreading, and publishing skills and strategies, and knowledge of language conventions, to correct errors, refine expression, and present heir work effective! Oral Communication <ol style="list-style-type: none"> 1. Speaking to Communicate: use speaking skills and strategies appropriately to communicate with different audiences for a variety of purposes | | |
| Lesson Objectives: Students will read several picture books that share a common theme--it is important for people to protect and cherish the natural world around them. The class will discussing this theme and why it is an important message to pass on to young people. After examining how environmental themes in various texts, students will create a picture book or poem of their own for a young child with the purpose of passing on this respect for the environment. These stories can be put on display in the library or shared with younger students during reading buddies activities. | | |
| THE LESSON | | |
| Est. Time | Activity | |
| 0:10 | Hook: Read or watch <i>The Lorax</i> by Doctor Seuss Q: What is the intended audience for this book? Q: What is the purpose of this book? Q: What techniques does Dr. Seuss use? And What features set it apart from novels or short stories for adults and youth? | |

| | |
|------|--|
| 0:20 | <p>1. Vocabulary Activity: Made up words</p> <p>Dr. Seuss took a lot of liberty in this story to make up his own words. Deciphering the meaning of a word by its context is excellent practice for “real” words. Set up a graffiti exercise where students spend 30 seconds with each word on chart paper, adding their definition or illustrating an example.</p> <p><i>moof</i> <i>gruvvulous</i> <i>slupps</i> <i>snergelly</i> <i>rippulous</i> <i>snargled</i> <i>cruffulous</i> <i>smogulous</i> <i>biggering</i></p> <p>When discussing the definitions, challenge the class to give the part of speech each word belongs to.</p> |
| 0:20 | <p>2. Complete and take up <i>The Lorax</i> handout (attached)</p> <p>Q: What strategies can you borrow from Dr. Seuss to make a good children’s story?</p> |
| 0:30 | <p>3. After looking at several examples, students create their own Children’s story with an environmental theme.</p> |
| 0:20 | <p>4. Create a draft of story or poem. Have it edited by a peer or reviewed by teacher.</p> |
| 0:30 | <p>5. Add images and/or drawings to illustrate the story.</p> |
| 0:15 | <p>6. Bind story with hole punches and yarn/ribbon.</p> <p>Closure: Students should share their finished product with the class and, ideally, younger students in the school or an elementary school library.</p> <p>Note: If you feel like this would be too difficult for one student, pair students together and have them work in groups.</p> |

Tree Themed and Environmentally Themed books

Are Trees Alive? by Debbie S. Miller, Illustrated by Stacey Schuett.

A poetic description of how trees and people are alike. The wonderful illustrations depict trees and people from many parts of the world to show shared appreciation of the beauty and gifts of trees

Tree Bear's Adventures In Learning by June A. Bradlaw, illustrations by Harry Rossoll.

With the help of the tree of knowledge, TreeBear finds his own unique way of teaching people about the "Good Things That Come From Trees" and how trees are planted and harvested.

The Giving Tree by Shel Silverstein

A tree shares everything she has to offer with a boy she loves, only asking for his love in return.

The Lorax by Dr. Seuss

The Oncler cuts down all of the Truffula Trees making Thneeds- "something everyone needs."

The Tree by Judy Hindley

Simple poems about trees.

Farewell To Shady Glade by Bill Peet

Shady Glade, a home to many animals, begins to disappear forever.

The Great Kapok Tree by Lynne Cherry

Publisher's Weekly explains it well: "In this breathtakingly beautiful picture book, Cherry combines illustrations that reveal a naturalist's reverence for beauty with a mythlike story that explains the ecological importance of saving the rain forests.

The Tree in the Ancient Forest, by Carol Reed-Jones, Illustrated by Christopher Canyon

The remarkable web of plants and animals living around a single old fir tree takes on a life of its own in this stunningly illustrated story.

The Wump World by Bill Peet

The imaginary Wumps get pushed out of their homes and watch as the natural resources disappear due to development.

Where Once There Was A Wood by Denise Fleming

A simple, yet powerful story of homes slowly replacing the once beautiful woods.

From Amazon.com's list of environmentally themed books:

Hoot by Carl Hiaasen

Flush by Carl Hiaasen

Anatopsis by Chris Abouzeid

Island of the Aunts by Eva Ibbotson


Mortal Engines (The Hungry City Chronicles) by Philip Reeve

The Wheel on the School by Meindert De Jong

Timescape by Gregory Benford

Alejandro's Gift by Richard E. Albert

Judy Moody Saves the World! (Book #3) by Megan McDonald

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| Lesson Topic/Title: Invasive Species – A NOT WANTED Poster | |  |
| Grade/Course: SNC1P | Curriculum Area: Biology: Sustainable Ecosystems | |
| Materials/Reserves/Safety: ReForest London pamphlets Choosing the Right Shrub/Tree in London | | |
| Specific Expectations: <p>B1.1 analyse, on the basis of research, how a human activity (e.g., urban sprawl, use of pesticides and fertilizers, creation of pollution, human interaction with wildlife) threatens the sustainability of a terrestrial or aquatic ecosystem [IP, PR, AI, C]</p> <p>B1.2 assess the effectiveness of a local initiative of personal interest that seeks to ensure the sustainability of a terrestrial or aquatic ecosystem (e.g., greening their school grounds; conservation efforts of local Aboriginal communities; naturalizing banks of local rivers or ponds with native vegetation; adoption of an integrated pest management strategy to combat pests in a local garden), and explain why the initiative is important to the sustainability of the ecosystem [AI,C]</p> | | |
| Required Knowledge: <p>Students should already have learned about the different elements of an ecosystem and how they interact. (B 2.1, B 3.2)</p> <p>Students should have already learned about the characteristics of a population. (B 3.4)</p> <p>Students should also have learned about habitats and have introduced to the idea that human activity has changed them. (B 3.5)</p> | | |
| Lesson Objectives: <p>Students will define and give examples of invasive species and research one invasive or introduced tree species. Students will recognize the importance of planting native trees instead of ornamental or exotic ones.</p> | | |
| THE LESSON | | |
| Est. Time | Activity | |
| 5 – 10 min | <ul style="list-style-type: none"> – Review concept of biodiversity and habitats (could use clicker activity or online quiz as pretest such as http://www.quibblo.com/quiz/7FUzEvP/Biodiversity-to-our-environment and http://www.nhptv.org/natureworks/quiz5.htm) | |
| 15 min | <ul style="list-style-type: none"> – Have students brainstorm human threats to biodiversity and habitats <ul style="list-style-type: none"> – Invasive species, climate change, habitat change, pollution and overexploitation – The 11th Hour at http://www.11thhouraction.com/11thhour/about, view trailer | |
| 15 min | <ul style="list-style-type: none"> – Make a Venn diagram comparing and contrasting invasive species and native species of trees (Background references include ReForest London pamphlets, http://www.gardening.cornell.edu/factsheets/ecogardening/native.html and http://www.patrees.org/native-trees-vs-invasive-plants) | |
| 20 min | <ul style="list-style-type: none"> – Use the ReForest London pamphlets and identify the species in the outdoor classroom | |
| 10 min | <ul style="list-style-type: none"> – Introduce assignment and have students select one tree to research from list | |

Assessment and evaluation: Students may submit research for assessment and be evaluated on the final product of a (not)wanted poster and related questions on unit test.

Teacher Notes (Alternative to wanted or not wanted poster)

For the assignment have each student select one invasive species and create a pamphlet for the invasive species. The pamphlet should include:

- The species name and physical appearance
- Where the species native area is
- Where the species is invading
- How it came to be there
- Problems posed by the invasive species
- It's natural place in a food web and where it has inserted itself in the new habitat
- Anything being implemented to control the species

Environment Canada has good resources on invasive species as well as what is currently in place to deal with them. (<http://www.ec.gc.ca/nature/default.asp?lang=En&n=EAC9183B-1>)

Invasive (<http://www.invasive.org/index.cfm>) has a wide range of invasive species of North America and information about them. There is a specific section on Trees.

Check out Ontario's Tree Atlas at the web site given and make up the student choice list based on trees native to the area and trees not recommended for planting or print out/save "What Trees Grow Best Where You Live" at

<http://www.mnr.gov.on.ca/en/Business/ClimateChange/2ColumnSubPage/267027.html>

i.e. South-western Ontario – Middlesex - Eastern

| Wanted- Native Species | | Not Wanted – Introduced/Invasive/Exotic Species |
|------------------------|------------------|---|
| Bitternut Hickory | Red Oak | Northern Catalpa |
| Black Cherry | Shagbark Hickory | Horsechestnut |
| Burr Oak | Silver Maple | Little Leaf Linden |
| Eastern White Cedar | Sugar Maple | English Oak |
| Eastern White Pine | Tamarack | Norway Maple |
| Peachleaf Willow | Trembling Aspen | White Elm |
| Pin Cherry | Tulip Tree | Black Locust |
| Red Maple | White Oak | |



SNC 1P “Wanted or Not” – A Poster Assignment

Task: Each student will produce an “Old West” style wanted (or not wanted) poster after collecting information about the species of tree selected on the teacher’s master list.

1, Pick a tree species and record the name below. I picked _____.

Is this tree native to this area? If YES then make WANTED poster If NO then make NOT WANTED poster

2. Collect the following information to use creatively on your poster:

Legal Name (Scientific Name) _____

Nickname/Alias (Common Name) _____

Distinguishing Features (Picture, description) _____

Usual hideout (native area or where it is invading) _____

Wanted for (It’s natural place in a food web or problems with species) _____

If seen then ... (i.e. plant another if native or how to control the species if non-native)

Recommended Resources:

<http://www.mnr.gov.on.ca/en/Business/ClimateChange/2ColumnSubPage/267027.html>

<http://www.invasive.org/index.cfm>

Sample poster



NOT WANTED

IN SOUTH WESTERN ONTARIO

***PICEA ABIES* (L.) KARST.**

AKA THE NORWAY SPRUCE KID



DESCRIPTION OF THIS ALIEN


- **CONES LIKE WHITE SPRUCE**
- **NOTE HIS DROOPING BRANCHES**
- **MAY GROW TO OVER 30 METRES AND SPREAD OUT 10 – 15 METRES**
- **PYRAMID SHAPE WITH NEEDLES**

ESCAPED FROM EUROPE DISGUISED AS A CHRISTMAS TREE AND IS TRYING TO POPULATE AREAS SUCH AS SOUTH-EASTERN CANADA!

NOT WANTED FOR REPLACING NATIVE SPECIES ON MANY LAWNS AS DECORATION OR AS A WIND BREAK

WARNING:

IF YOU SEE THIS TREE THEN CHOP IT DOWN FOR CHRISTMAS OR RETURN IT TO THE CUSTODY OF THE LOCAL TREE FARM

| | | |
|--|--|---|
| Lesson Topic/Title: Dendrochronology | |  |
| Grade/Course: SNC2D | Curriculum Area: Earth and Space Science: Climate Change | |
| Materials/Reserves/Safety: Tree Cookie(s), photos of tree cookies Computer Lab | | |
| Additional Resources from the Internet: | | |
| <p>Simulated tree cores available at http://eo.ucar.edu/educators/ClimateDiscovery/LIA_lesson5_9.28.05.pdf along with excellent teacher's guide and student handout "Trees: Recorders of Climate Change"</p> <p>Others include http://ltrr.arizona.edu/, http://www.ucar.edu/learn/1_2_2_11s.htm http://www.webrangers.us/activities/dendrochronology/ http://www.pbs.org/wgbh/nova/teachers/activities/2817_methusel.html, http://web.utk.edu/~grissino/</p> <p>Note: The activities found at the following web sites may be adapted for SNC 2P http://www.edgeo.org/images/pdf/putting-the-earth-into-science/putting-the-earth-into-science.pdf http://gen.uga.edu/documents/air/activities/Trees%20Have%20Needs%20Too.pdf</p> | | |
| Specific Expectations: | | |
| <p>D1.1 Analyse current and/or potential effects, both positive and negative, of climate change on human activity and natural systems (e.g., loss of habitat for Arctic mammals such as polar bears and loss of traditional lifestyles for Inuit as Arctic ice shrinks; famine as arable land is lost to desertification; an increase in water-borne disease and human resettlement as coastal lands are flooded; expansion of the growing season in some regions) [AI, C]</p> <p>D2.3 Analyse different sources of scientific data (e.g., lake cores, tree rings, fossils and preserved organisms, ice cores) for evidence of natural climate change and climate change influenced by human activity [PR, AI, C]</p> <p>D2.4 investigate a popular hypothesis on a cause- and-effect relationship having to do with climate change (e.g., the combustion of fossil fuels is responsible for rising global temperatures; the concentration of atmospheric CO₂ is responsible for rising global temperatures; global temperatures have been on the increase since the industrial revolution; the severity of cyclones, hurricanes, and tornadoes increases as atmospheric temperatures increase), using simulations and/or time-trend data that model climate pro- files (e.g., data from Statistics Canada and Environment Canada) [PR, AI, C]</p> | | |
| Required Knowledge: | | |
| <p>Students would ideally have already covered the biology unit already and be familiar with the basics of plants and plant cells. (B 2.1, B 3.3)</p> <p>Students should have a basic grasp about climate and climate change as well as how weather is measured.</p> | | |
| Lesson Objectives: | | |
| <p>Students will learn how scientists can look into the past and determine what the weather and weather patterns were by learning about a variety of methods including tree boring.</p> <p>Students will learn how a tree can give information on climate through tree boring and tree cookies and will use a tree cookie or suitable simulated alternative to determine climate patterns.</p> <p>Students will learn about a variety of climate related discoveries, innovations and policies.</p> | | |
| THE LESSON | | |
| Est. Time | Activity | |

ReForest London
Lesson: Dendrochronology

| | |
|---|---|
| <p>10 min</p> | <p>Day 1</p> <ul style="list-style-type: none"> – Show a clip from Ice Age: The Meltdown <ul style="list-style-type: none"> – How do scientists know what the weather was like back then? – What is dendrochronology? What are its applications? <p>Refer to http://www.ltrr.arizona.edu/skeletonplot/applications</p> |
| <p>20 min</p> <p>20 min</p> <p>20 min</p> <p>75 min</p> | <ul style="list-style-type: none"> – Introduce the methods scientists use to determine what climate was like (See teacher note, simplify/condense with students, also refer to http://tree.ltrr.arizona.edu/lorim/lori.html or http://www.ohio.edu/plantbio/staff/mccarthy/dendro/ for further background) <ul style="list-style-type: none"> – Focus on the information provided by trees – Refer to http://ltrr.arizona.edu/research and/or http://scientistatwork.blogs.nytimes.com/2012/03/15/the-tools-of-tree-ring-research/ – Pass around the tree cookie and introduce the sections of a tree cookie (Handout) Also see http://www.idahoforests.org/cookie1.htm <ul style="list-style-type: none"> – Talk about what can be learned from the tree cookie using some examples (refer to http://www.domtar.com/arbre/english/ and check out a year in the life of a tree) – Interactive at http://www.wonderville.ca/asset/tree-cookies and Tree Cookie Game at http://forestry.usu.edu/htm/kids-and-teachers/tree-cookie-game/ are geared to younger grades but may be used as examples (also may be adapted for SNC 2P class) – Handout assignment, have students form groups and begin the assignment <p>Day 2</p> <ul style="list-style-type: none"> – Computer Lab <ul style="list-style-type: none"> – Allow students opportunity to do research for assignment |

Assessment and Evaluation – Assessment may be based on participation during simulation or Tree Cookie Game used to introduce the topic. Evaluation should be based on completion of the related activity or a more complicated simulation requiring interpretation from one or more of the web resources suggested.

Teachers Notes

- Scientists tell us that about 125,000 years ago, temperatures were cooler by about 2°C.
- We are told that since the last ice age – about 10,000 years ago – our temperatures have been pretty stable. However, during the past 100 years things have started warming up rapidly.
- There is far more carbon dioxide in the atmosphere now than at any time in the last 400,000 years.

How do we know this stuff!?

Ice

ReForest London

Lesson: Dendrochronology

Hundreds or even thousands of years of snowfalls form glaciers. Each year, the snow lands and gets compacted by weather and more snow. Eventually, it becomes ice. The closer to the bottom of the glacier you go, the older the ice will be. Scientists have figured out how to drill into these glaciers and extract long cylinders of ice that are called cores. In Greenland, they can get core samples that contain 100,000 years of information. In Antarctica, the cores contain 400,000 years of data! When the scientists look at these cores, they can see layers in the ice. There are a number of things that scientists look for in the layers of ice to get a picture of what our ancient climates were like. These include:

Chemical isotopes: All chemical elements, like oxygen and carbon, are made up of atoms. An isotope is a form of an atom (different isotopes have a different number of neutrons). Scientists look at the isotopes of hydrogen, oxygen and other chemical elements in the ice to help them figure out what the temperatures would have been like at when the layers were being formed.

Volcanic ash: Humans in the northern hemisphere have kept records of volcanic eruptions for the last 1,000 to 2,000 years. So today's scientists look for fine layers of ash in the ice that would have fallen on the glacier during eruptions. This allows them to estimate how old the ice is at that point in the core. They also compare the temperature information (collected by looking at the isotopes) with the volcanic eruptions to figure out the impact of volcanoes on the temperature.

Salt: Scientists might also look for traces of salt in glaciers near oceans. Winter storms over the oceans kick up lots of salt spray that settles on the glaciers. So scientists can sometimes separate one year of winter storms from another because there is less salty layer of summer ice in between.

Carbon dioxide, methane and nitrous oxide: Ice cores also help us figure out how amounts of key greenhouse gases changed in the atmosphere over the period of time covered by the core. Researchers do this by analyzing the tiny air bubbles that get trapped in the glacier as it forms. These bubbles contain carbon dioxide, methane and nitrous oxide.

Dust: Scientists can also see where there were high levels of dust in the ice. This tells them that the climate at that point in time was dry enough to cause dust to get into the atmosphere.

Mud

Some scientists are also figuring out what past climates were like by taking core samples from the mud at the bottoms of lakes, rivers or oceans. Like the snow on glaciers, sediment settles in the bottom of water bodies every year. The layers of muck can help tell the story of past climates. For example, researchers look at the plant pollen that was trapped in the different layers. This tells them what plants were in the area when the layers of muck were formed (as some of the plant's pollen would have blown onto the water and settled to the bottom). The scientists can then get a good picture of what the climate must have been like if that type of plant was able to survive. People also look at the fossils of insects, plants and animals that they find in the muck. Carbon dating techniques can be used to sort out how old these things are. Knowing what types of insects, plants and animals were around at a certain time helps the researchers understand what the climate would have been like when the fossil started forming.

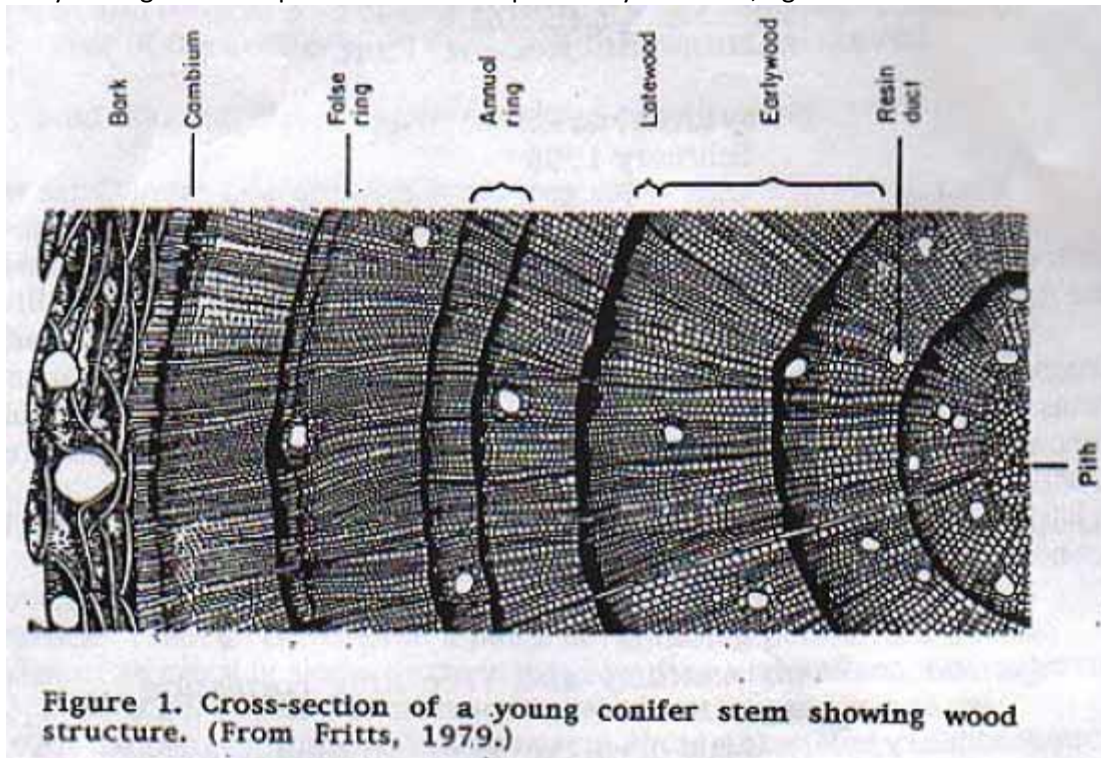
Trees

Have you looked at a stump or piece of wood and seen small circular lines? Each line represents one year of growth. In years when trees have enough moisture and good temperatures, they usually grow faster. The rings for these years would be thicker than rings for colder, drier years. With a small tool – a hollow drill – scientists can take a core out of a tree so they can look at the rings. By measuring the size of the rings, they can learn a lot about changes in climate, year by year, since the tree first started growing. Some of the trees being analyzed are hundreds, or even thousands, of years old!

Introduction to Wood Anatomy and Tree Ring Formation

A tree ring is made up of 2 distinct bands of cells. The earlywood, the light-coloured band, is laid down in the spring and early summer, when water availability is the highest. Latewood is produced later on in the summer and in the early fall. Latewood cells are somewhat smaller than earlywood cells, have a much thicker cell wall and much smaller lumen, and therefore the colour is much darker. At the end of

the growing season, wood production shuts down until the following spring, when the light coloured earlywood gives a sharp contrast with the previous year's dark, tight latewood.



Water availability and warmth of the growing season are the two main factors affecting ring width. A wet, warm growing season will lead to the formation of wide, light-coloured bands in most trees, with ring width increasing with the length of the favourable growing season. Dry and cold summers will result in narrower rings; a particularly long but relatively clement late summer and fall will be recorded as a wider latewood band. Deciduous species are more difficult to work with, as the latewood is not much different in colour from the earlywood.

Many events will happen in the life of a tree that may be recorded in its wood either at the ring level or as more obvious scars or deformations in the tree itself. Frost, insect epidemics, and droughts are a few examples of events that will be recorded in the rings at the precise year in which they occurred. Fire will stop the production of wood where the cells were damaged, leaving a scar which might eventually close with time. This scar can also be dated. Wide rings point to an increase in growth rate due to positive events; for example, an opening in the forest canopy following the death of a tree will allow the understory saplings to grow better due to an increase in the availability of light and rain.

Marker Years

While most tree rings look more or less the same, some rings known as marker rings may be noticeably different from their neighbours. Such rings are useful for cross-dating; some of them even speak of localized or widespread disturbance events that are of interest to ecologists.

Frost rings are caused by late-spring or early-fall frost events. The cambium is affected by the cold, and a few abnormal layers of cells are produced before the cambium resumes its organized cell divisions. Frost rings appear as a band of darker, disorganized cells within a regular ring.

False rings happen when for a short period during the growing season, growing conditions resemble that of the end of the season. For example when drier and colder conditions prevail for a few days, a few layers of thick-walled cells are formed, and they have the appearance of latewood. A close inspection of the suspicious ring will reveal that, although cell walls have thickened, cell size has not

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Lesson: Dendrochronology

really decreased and the return to thinner-walled cells is progressive, not sharp as it would be if spring had just returned.

Light rings are produced when wet summers are followed by a very short fall. Trees do not have the time to shut down properly and latewood formation is minimal. A light ring may be hard to detect, as the dark band of latewood can be very thin, very light, or even non-existent.

Narrow rings are the most useful of all marker rings. They appear faithfully in almost all of the trees of an area since they are usually influenced by climate felt at a regional scale. Depending on the tree species in which they are recorded, they speak of drier/wetter or warmer/colder conditions than those preferred by the species. A series of narrow rings may indicate a few years of unfavourable growing seasons.

Applications of Dendrochronology

Wildfires (fire scars) will often heat up some trees without actually killing them. This is particularly true for pine trees, because of their thick bark. Trees on the edge of a burn may also be heated but not killed. Damage to the cambium will leave a datable scar.

Ice floes (ice scars) carried by higher-than-usual rivers will sometimes damage the trees growing on the water's edge. Again, damage to the cambium will leave a datable scar.

Avalanches and rockslides (rock scars) may leave some trees scarred by rocks; rocks may even become embedded in trees as the trees keep growing around them. Rock scars, like ice scars, can be rather ragged-edged and difficult to date, but they may provide a good estimate of the year of the avalanche or rockslide that caused them.

Material from ClimateChangeNorth.ca



Lesson Topic/Title: How to use a dichotomous key

Grade/Course: SBI3U

Curriculum Area: Biodiversity

Document: The Ontario Curriculum, Grades 11 and 12 Science, Revised 2008.

Materials/Reserves/Safety:

Copy of the key for each individual/partnership ([provided](#))
Identification guide of leaves ([provided](#))
Outdoor classroom with trees planted by ReForest London (could be a class or school project earlier in year)
Trees labelled with ribbon or signs so the teacher can correct the report

Additional Recommended Resources:

Convention on Biological Diversity – Why is taxonomy important? <http://www.cbd.int/gti/importance.shtml>
Numerous classification activities, labs and links available at <http://www.nclark.net/Classification>
Safety: Follow procedures for field trip if appropriate. Check with students regarding allergies.

Specific Expectations:

B2.2 Classify, and draw biological drawings of, representative organisms
B2.4 Create and apply a dichotomous key to identify and classify organisms
B3.5 Explain why biodiversity is important to maintaining viable ecosystems

Required Knowledge:

Definition for biodiversity, importance of this concept in sustainable ecosystems, native versus non-native or introduced species (SNC 1D: B 1.1, B 2.1, B 2.4, B 2.5, B 3.5)

Lesson Objectives:

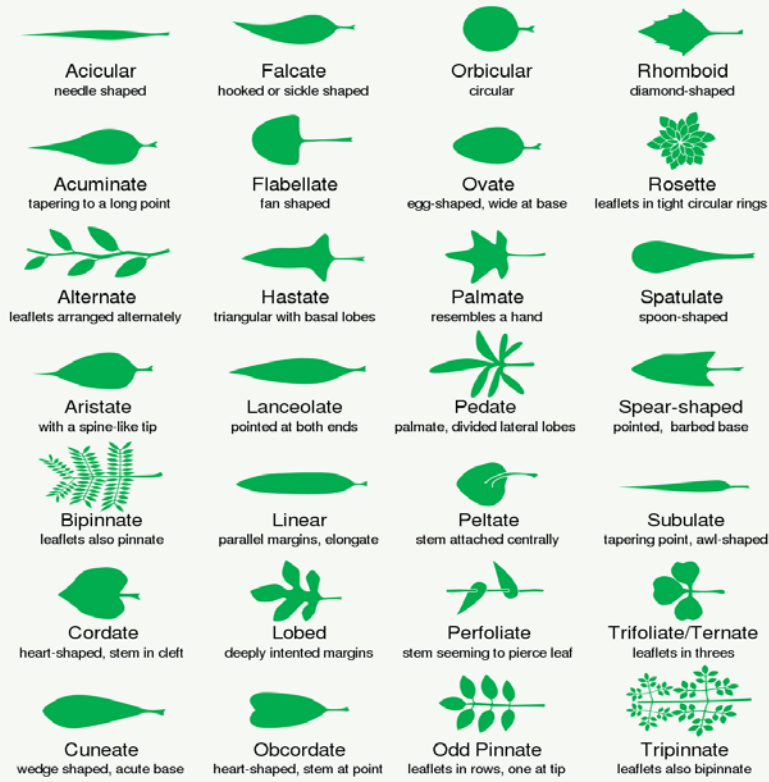
How to develop a dichotomous key
How to use a dichotomous key to correctly identify organisms (trees).

THE LESSON

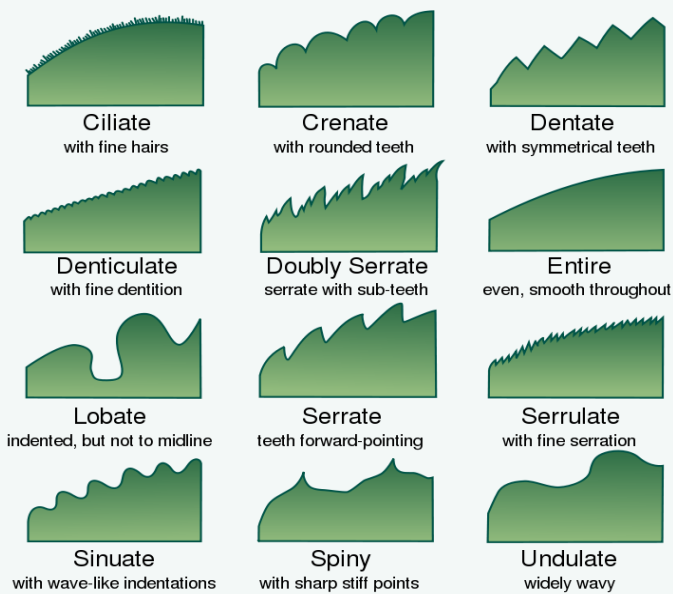
| Est. Time | Activity |
|-------------|--|
| 10 - 15 min | <u>Introduction</u> Review related terms/concepts – biodiversity, native species, invasive species Discuss importance of classification/ organization in everyday life and in the study of biology i.e. organization at home, school, stores, etc., also refer to articles such as “Why is taxonomy important?”, career links, ... |
| 15 – 30 min | <u>What is a dichotomous key and how is it set up?</u> Depending on resources (i.e. availability of computers) select one of the activities, labs or links from recommended resource above and use as is or simplify/shorten to suit timeline. After instructing students on how these keys work, and perhaps showing them how one is developed, then the students can go outside and identify the trees. |
| 20 – 30 min | <u>Classification of Trees using a Dichotomous Key</u> The attached sheet is a dichotomous key for the trees normally planted by ReForest London. |

| | |
|----------------------------------|---|
| Continued | <p>Give out a key as well as a leaf sheet for each student or partner. These could be laminated for future use. Have students scan the key to identify any terms they do not understand.</p> <p>The class would proceed to the outdoor classroom or a suitable location near the school. Check for field trip policies if going off school property.</p> |
| Assessment and Evaluation | <p>If this lesson takes place over a series of two or more classes, then students could be assessed on their initial activity relate to the development and use of a dichotomous key. After providing feedback and answering any questions, students would be expected to demonstrate their ability to use a dichotomous key and to accurately record some details of the tree (i.e. leaves, bark) through their completion of the related assignment provided.</p> |
| Additional Information | <p>Image for Leaf Morphology is from Wikimedia Commons under the following license: Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or any later version published by the Free Software Foundation; with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. A copy of the license is included in the section entitled GNU Free Documentation License.</p> |

SHAPE & ARRANGEMENT



MARGIN



VENATION



Arcuate
secondary veins
bending toward apex



Cross-Venulate
small veins connecting
secondary veins



Dichotomous
veins branching
symmetrically in pairs


Source: http://commons.wikimedia.org/wiki/File:Leaf_morphology.svg

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Dichotomous Key for Trees



| | |
|-----|---|
| 1 | If the leaves are flat or scaly needles, then go to 2. Otherwise, go to 3. |
| 2a | If the needles are long evergreen needles, it is a White Pine . |
| 2b | If the needles are flat and scaly, it is a White Cedar . |
| 3 | If the leaf forms lobes, and isn't a simple round leaf, go to 4. Otherwise, go to 11. |
| 4 | If the leaves are broad, flat, and sort of look like the palm of your hand, go to 5. Otherwise, go to 9. |
| 5a | If the leaf has four lobes, like a duck's foot, it's a Tulip Tree . |
| 5b | If the leaf doesn't have four lobes, go to 6. |
| 6a | If the leaf is 4-8 inches wide, and has 3 to 5 lobes, and possibly patchy bark it's a Sycamore . |
| 6b | If otherwise, go to 7. |
| 7a | If the leaf has very deep sinuses- cuts towards the middle of the leaf- it's a Silver Maple . |
| 7b | If it doesn't have these deep cuts, go to 8. |
| 8a | If the edge of the leaf is "toothed" meaning that it is rough and sort of pointy, it is a Red Maple . |
| 8b | If the edge is smooth and wavy, it is a Sugar Maple . |
| 8 | If the leaf has 7-10 round, easily distinguished lobes, it is a White Oak . If the lobes are hard to distinguish and irregular, or they are not round, go to 10. |
| 9a | If the lobes are hard to distinguish, and there are no bristles on tips: it is a Bur Oak . |
| 9b | If there are bristles on the tips, go to 10. |
| 10a | If it is a bright green leaf with 5-9 bristle-tipped lobes, it is a Pin Oak . |
| 10b | If the leaves are dull green and have 7-11 bristle tipped lobes, it is a Red Oak . |
| 11a | If one half of the base is unequal, meaning it meets the stem of the leaf lower than the other half, it is Basswood . |
| 11b | Otherwise, go to 12 |
| 12a | If the bark is reddish-brown when young, or has a shredded-looking appearance when older, and the leaves are oval with fuzz on the stem, it is Hop Hornbeam . |
| 12b | Otherwise, go to 13 |
| 13a | If the leaf has three veins coming from its base, and the edge of the leaf has single serrations (toothy, with no little teeth within it) and has cross-veins connecting the main veins, it is Hackberry . |
| 13b | Otherwise, if it has double serrations, go to 14 |
| 14a | If the leaf is waxy and tapers to a tip, and the bark is smooth, it is Hornbeam . |
| 14b | If the leaf doesn't taper to a tip, but still has a tip, and the bark is papery, it is Birch . |

| | | |
|---|--|---|
| Lesson Topic/Title: Factors Affecting Plant Growth | |  |
| Grade/Course: SBI3U | Curriculum Area: Plants: Anatomy, Growth and Function | |
| Materials/Reserves/Safety: Dependent on variables selected by students, variety of fast germinating seeds (i.e. radish, grass, lettuce), different soil mixtures, solutions made up to various pH levels or containing ingredients in waste water /runoff (i.e. detergent, salt, chlorinated water), rulers, glassware, light sources, cellophane film of different colours, cardboard boxes, timers, containers for growing plants)... | | |
| Specific Expectations: F2.2 Design and conduct an inquiry to determine the factors that affect plant growth (e.g., the effects on plant growth of the quantity of nutrients, the quantity and quality of light, and factors such as temperature and water retention or percolation rate) | | |
| Required Knowledge: Students should already have learned how to follow the scientific method to design an experiment with one independent variable and be able to communicate their findings in a formal laboratory report. Refer to Smarter Science – Introducing the Framework(resource on process skills used in Smarter Science at http://smarterscience.youthscience.ca/news/2012-versions-posters-are-here) | | |
| Lesson Objectives: Students are to design a procedure that will affect seed germination and/or early plant growth by the end of the unit and, upon teacher approval, test the procedure in the classroom setting. While performing this task, students will be expected to record observations and submit a formal lab write-up at the end of the unit outlining the details of their experiment. | | |
| THE LESSON | | |
| Est. Time | Activity | |
| 10 min | Introduction <ul style="list-style-type: none"> - Why is it important to know the main factors which affect plant growth? Refer to http://extension.oregonstate.edu/mg/botany/index.html and select introduction - Review scientific method and parts of a formal laboratory report (provide exemplars from previous years if possible or use a computer simulation to model the process such as http://www.biologycorner.com/worksheets/scientific_method_plant_exp.html) | |
| 25 min | Initial Planning – consider using numbered heads (Kagan) to increase participation in group <ul style="list-style-type: none"> - Have the students work in small groups of four or five with SMARTER SCIENCE resources (Level 3 Steps to Inquiry) to develop ideas for the experiment on chart paper <ol style="list-style-type: none"> a. What have they observed about plant growth through their own experiences? b. Brainstorm to develop a list of factors which may affect plant growth or seed germination (depending on time and resources available) – the botany web site mentioned above provides some basic information in “Environmental Factors Affecting Growth “ for further ideas or as background reading before forming hypothesis c. Fishbone Experiment Organizer is used to help students focus on identification of variables , list materials needed, and outline basic procedure | |

| | |
|--|--|
| <p>25 min</p> <p>On own time or as part of other biology classes</p> | <p>Peer and Teacher Feedback</p> <ul style="list-style-type: none"> - Students display chart paper with group plans for experiment for a “gallery walk”, use post-it notes of different colours to provide feedback to peers (different colour for each group, should provide feedback to two other groups), teacher may use another colour - Discuss areas for improvement as a class, and then set a specific date for students to come up with an appropriate materials list and procedure, highlighting all necessary variables (manipulated and controlled) and submit to the teacher for approval <p>Note: Other lessons may take place so teacher can collect students’ initial planning , assess , and then provide feedback before setting up experiment</p> <p>Perform and Record</p> <ul style="list-style-type: none"> - Upon teacher approval, students may begin to plant their seeds and set up their experiment. A log for care and observation should be set up by each group. <p>Analyze and Interpret</p> <ul style="list-style-type: none"> - Students should examine the data collected for patterns and think about how to explain their observations. Another gallery walk with input from other groups may be helpful. <p>Communicate</p> <ul style="list-style-type: none"> - Students should have been given a copy of the formal laboratory report expectations and evaluation at the beginning of the course (i.e. http://www.mmu.k12.vt.us/teachers/abbottk/Honors%20Bio/Microsoft%20Word%20-%20Guide) The teacher may decide on one report per group, individual reports, or give students the option of either one. |
| <p>Assessment and Evaluation</p> | <p>Initial assessment comes from peers and teacher at the beginning. Students should be encouraged to seek feedback on progress at regular intervals over the time period for the experiment (1 – 2 weeks for seed germination and early growth, 3 – 4 weeks for after seeds have germinated to focus on plant growth only). A sample formal laboratory report should be provided with a rubric or checklist for evaluation. Peer and self evaluation regarding participation and contributions during the process may be included. Students are encouraged to take healthy plants home.</p> |

SBI3U – Plants: Anatomy, Growth and Function

Open Inquiry

Task:

In groups of four or five, design an experiment to investigate one factor which may affect the germination and growth of plants.

Part 1: Initiate and Plan (Date - _____)

Each group will be given a copy of the Smarter Science Steps into Inquiry – Level 3
(<http://smarterscience.youthscience.ca/resources/steps-inquiry-level-three>)

a. Observations Starburst Diagram – write “seed germination” and/or “plant growth” in the middle as the event

- Think about what “behaviours” may be observed as seeds germinate or as plants grow and list them around the event (i.e. seed coat opens, radical emerges, shoot grows in height, number of leaves, increases, ...)
- Select one behaviour as the dependent variable and record it at the bottom of the diagram

b. Brainstorm – list factors which may affect the dependent variable around the “brain” graphic and select one to investigate as a group (independent variable)

c. Fishbone Experiment Organizer – record the independent variable(IV) and the dependent variable (DV) on the fishbone, include several of the other factors identified as controlled variables(CV)

- Identify the instrument needed to measure variable (i.e. thermometer to measure temperature) and add it to the organizer
- Decide what unit of measurement will be used (i.e. degrees Celcius)
- Outline technique used for measurement (i.e. reading thermometer at eye level once every 24 h)

Part 2 Initiate and Plan (Date - _____)

- Obtain chart paper, markers and tape.
- Write the group member names across the top of the chart paper.
- Attach the three parts of the Smarter Steps into Science onto the paper.
- Write the group’s causal question under these parts (...Does ___IV___ affect ___DV___?)
- Post chart paper on wall for gallery walk and obtain some sticky notes (colour _____)

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Lesson: Factors Affecting Plant Growth

- View the chart papers for groups ____ and _____. Write constructive suggestions or questions on sticky notes and add to their chart paper.
- Participate in teacher-led discussion providing feedback to each group.

Part 3 Initiate and Plan (Date - _____)

Write proposed experimental procedure, including materials list and observation table, based on initial planning, considering suggestions and questions, and materials available.

- Include instruments in materials list. Be prepared to provide items not currently available from your teacher.
- Organize procedure into numbered steps. While this proposal may be written in the present tense, the formal report will require that procedure is written in the past tense passive voice (http://www.usyd.edu.au/learningcentre/wrise/chemistry/procedure/proc_lang_verbs.html)

Submit the group's work for assessment on _____. When the experimental procedure is returned, then make changes if required and then proceed with experiment.

Part 4 Perform and Record (from _____ to _____)

Set up a log based on the approved experimental procedure to care for seeds/plants (i.e. watering) and record measurements in the observations table. Sign up for specific dates and contact another member of the group if absent to avoid problems.

Part 5 Analyze and Interpret (Date - _____)

Refer to related Smarter Science Framework Poster section. Use these ideas to determine any pattern(s) in the observations collected and work together to come up with rational explanations for these.

Part 6 Communicate (Date - _____)

Follow the guidelines for writing a formal laboratory report provided at the beginning of this course.

- Individual reports based on group work
- One report per group with summary of each student's contribution
- Student may choose to report in group or as individual

Assessment and Evaluation: Assessment may be provided throughout the process and students are welcome to request feedback as needed. Evaluation will be based on the formal laboratory report and may include self and peer evaluation in terms of contributions made to this extended assignment.

Assignment

Students will work in groups to determine information about climate through the use of a tree cookie and research.

Part A

Students will use the tree cookie or tree cookie photograph provided to determine to determine the age of the tree when it was cut down. Each group will also chose a 10 year period of the trees growth and estimate what they believe the climate was during the seasons represented by the tree rings.

Part B

Using the internet, each group will research the weather for the 10 year period from the tree cookie that they chose to estimate and will compare it to what their estimation was. A good place to look would be Stats Canada or Environment Canada.

Part C

Groups will use the internet to research an innovation, discovery or policy that was made that has an impact on the environment and climate change for each of the 10 years from their tree cookie. If no environmental or climate change link can be found a scientific discovery appropriate for the course can be used. Each innovation, discovery or policy must have an accompanying paragraph explaining its pertinence to the environment, climate change or why it was an important discovery.

