Acknowledgements

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The Government of Canada’s Climate Change Action Fund provided major funding for Ontario EcoSchools. Please see back cover for more information on all of the partners involved in the development of the program.

*Ontario EcoSchools School Ground Greening: Designing for Shade and Energy Conservation Guide*

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**Designer:** Comet art + design
School Ground Greening and EcoSchools

Designing for Shade and Energy Conservation is the first in a series of EcoSchools greening guides that promote best practices on school grounds and in the classroom. The benefits of bringing nature into the learning environment are addressed in many resources. This guide, with its deliberate focus on providing shade for students (health) and buildings (energy conservation), draws on greening practices specific to school boards and on emerging research about how best to provide natural shade where children play and learn.

Using the EcoSchools five-step process, the whole school community is involved in designing for shade and energy conservation. Initiatives that follow a collaborative process have proven to be more sustainable over time because they ‘belong’ to everyone. The guide recommends starting with planting native trees and shrubs to provide shade in your school grounds - or if your school already has a greening project underway, to make this the next phase of your work.

This resource will help students, teachers, parents and community members learn how to select, position and plant trees that will last through the generations, making our school grounds places of comfort and safety, and making our planet just a little cooler than it would otherwise be.
GUIDES FOR GETTING STARTED

1 Introduction to EcoSchools and the Five-Step Process
This concise guide provides an overview of the Ontario EcoSchools program and sets out a practical method for successful implementation: (1) establish an EcoTeam, (2) assess the school’s needs, (3) identify priorities and develop an action plan, (4) implement the action plan, and (5) monitor and evaluate progress.

2 Waste Minimization Guide
This guide outlines the 10 Ontario EcoSchools waste minimization guidelines. It provides the school’s EcoTeam with tips for assessing the school’s current waste minimization efforts, sample reviews and action plans and a set of tools for implementing improved waste minimization practices.

3 Energy Conservation Guide
Similar in format to the Waste Minimization Guide, this resource outlines the 10 Ontario EcoSchools energy conservation guidelines. It provides the school’s EcoTeam with tips for assessing the school’s current energy conservation efforts, sample reviews and action plans and a set of tools for implementing improved energy conservation practices.

4 Waste Minimization by Grade (1-8)
This resource is organized around “big ideas” about waste and waste minimization that are based on identified clusters of learning expectations in both Science and Technology and Social Studies and Geography. Using these ideas as a focus helps the teacher incorporate ecological thinking into existing curriculum. Annotated Internet resources offer background facts and student learning activities.

5 Energy Conservation by Grade (1-8)
Like Waste Minimization by Grade, this guide is organized around “big ideas” about energy and energy conservation that are based on identified clusters of learning expectations in both Science and Technology and Social Studies and Geography. Using these ideas as a focus helps the teacher incorporate ecological thinking into existing curriculum. Annotated Internet resources offer background facts and student learning activities.

6 Systems Thinking: Grades 1-8
This resource helps shift our view of the nature of the human and natural worlds: instead of being collections of separate parts, they are seen as whole systems greater than the sum of their interdependent parts. Seeing the curriculum through a Systems Thinking lens highlights how the interconnections among learning expectations bestow the power of describing how the world works – seeing people in relation to the environment. This approach integrates diverse learning expectations into coherent clusters. Available in 2005.
<table>
<thead>
<tr>
<th>7</th>
<th>Climate Change in Grade 9 Geography (Academic and Applied)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This resource consists of a culminating task for summative evaluation plus a unit-by-unit breakdown of the conceptual understandings about climate change needed to ensure student success. Students select a Canadian town or small city and develop an annotated map that indicates the changes in the human and natural environments that would reduce greenhouse gases and thus slow climate change. Resource list, student worksheets and evaluation rubric are provided. See #17 for supporting multimedia presentations.</td>
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<table>
<thead>
<tr>
<th>8</th>
<th>Climate Change in Grade 10 Civics</th>
</tr>
</thead>
<tbody>
<tr>
<td>This unit introduces students to the concept of citizenship through a series of well-supported activities where they analyze the accomplishments of environmental activists and organizations. A simple Public Policy Primer helps students see points at which they can influence issues. Students apply their knowledge in responding to the Government of Canada’s One-Tonne Challenge for reducing climate change gases. An Environmental Citizenship Portfolio containing each student’s class work and other materials sums up her/his understanding of environmental citizenship. See #17 for supporting multimedia presentations.</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>9</th>
<th>Climate Change in Grade 10 Science (Academic and Applied)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This resource provides two possible culminating tasks: students are introduced to an actual problem and asked to propose solutions to either The Impact of Transportation Choices or Forest Management and Climate Change. Climate change related concepts have been identified in each strand. Charts link authorized texts and the Teacher Resource for each to relevant learning expectations. A student Checklist of Preparation, annotated Internet resources and evaluation rubrics are also provided. See #17 for supporting multimedia presentations.</td>
<td></td>
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<thead>
<tr>
<th>10</th>
<th>Climate Change in Grade 11 and 12 Science</th>
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</thead>
<tbody>
<tr>
<td>This resource ranges over 8 different Science courses (University, University/College, College and Workplace), highlighting learning expectations that can be met using climate change issues as the examples. Focus questions help students connect the learning of facts and concepts in a meaningful way. The questions also suggest ways to adapt the existing curriculum to explore the data, evidence, interactions and technologies related to climate change issues. Lists of resources that suit the needs of the courses are included. See #17 for supporting multimedia presentations.</td>
<td></td>
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<table>
<thead>
<tr>
<th>11</th>
<th>Climate Change in Grade 11 and 12 Geography</th>
</tr>
</thead>
<tbody>
<tr>
<td>This resource surveys 5 Geography courses (University, University/College, and Open). Overall and specific expectations for each course are accompanied by guiding ideas linking these expectations to different parts of the climate change story. Examples are provided for developing topics, and teaching and learning strategies recommended for different student needs. Resources for planning class activities and assignments are listed. See #17 for supporting multimedia presentations.</td>
<td></td>
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</tbody>
</table>

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<thead>
<tr>
<th>12</th>
<th>Interdisciplinary Studies: Climate Change and Your Future - Grade 12 (Open)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This single-credit course reviews the impacts of climate change on human and natural systems. Students investigate local businesses and agencies to learn about environmental practices that reduce the impact of climate change. Through case studies, students identify emerging work opportunities; in the culminating task students develop a business plan related to mitigating or adapting to climate change. See #17 for supporting multimedia presentations. Available in 2005.</td>
<td></td>
</tr>
</tbody>
</table>
Schoolground Greening: Designing for Shade and Energy Conservation

Based on a guide developed by Evergreen and the Toronto District School Board, this resource will help schools design for increased shade to protect students and staff from ultraviolet radiation (UVR) and to shade school buildings to save energy and make them more comfortable. Tips for involving the school community in the design process, surveying user needs, completing a site analysis, creating site plans and developing a fundraising strategy are included.

Celebrating EcoSchools: Festival Guide (Elementary)

This collection of learning activities for elementary schools is designed for Earth Week or another EcoSchools celebration. While each activity can stand alone, the collection is especially designed for an entire school to engage in environmental learning adventures, focusing on the theme of human-environment connections. Based on a resource developed by the City of Toronto and the Toronto District School Board.

The 20/20 Planner

Based on a Toronto Public Health resource, 20/20 The Way to Clean Air offers teachers a way to help students apply their learning about energy conservation at home. The planner is a “take-home” guide filled with simple tips and activity sheets that offer a range of actions that students and their families can undertake to reduce energy and vehicle use by 20% and respond to the Government of Canada’s One-Tonne Challenge.

Certification Guide

The Certification Guide is based on a resource developed by the Clean Air Partnership and the Toronto District School Board. It provides sample benchmarks and a scoring system for schools wishing to assess their environmental performance in a limited number of areas. The point system establishes Bronze, Silver and Gold levels of EcoSchools. How participating schools are recognized is left to individual Boards to decide.

Multimedia presentations: Changing Climate, Changing Attitudes; The Impacts of Climate Change; The Science of Climate Change

Three multimedia presentations have been designed to accompany the EcoSchools curriculum resources. Changing Climate, Changing Attitudes provides students and teachers with a general overview of global climate change and its impacts on Ontario society. The Impacts of Climate Change has been developed explicitly to complement the Grade 9 Geography course but can be used with all secondary students to examine the impacts of climate change on the natural and human worlds. The Science of Climate Change, while developed to support the Grade 10 Science course, is suitable for all secondary science students. These presentations include potential solutions and steps that citizens can take to help slow climate change.
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The Special Role of Trees

Imagine seeing trees for the first time.

Now imagine a world stripped of its trees.

What visions of richness and impoverishment are summoned up by these starkly contrasting scenarios! Trees make our world a very special place.

Words cannot adequately capture all that trees do to enhance our well-being. They give us something to look up to, literally and metaphorically. Planting trees in the school ground endows students, teachers and the community with a precious gift for generations to come.

Trees are an essential part of Earth’s ecology. They “provide summer shade… They block close to 60 percent of the sun’s rays, buffer cold winter winds, reduce water runoff and soil erosion, filter dust…provide habitat and shelter for songbirds and other urban wildlife…renew our oxygen and add moisture to the air through transpiration…filter air pollution…and absorb carbon dioxide, a principal greenhouse gas that contributes to climate change.”

Planting trees has many positive effects on children’s health and behaviour and can foster children’s awareness of their connection to the natural world. The following inspirational stories illustrate how schools can green their school grounds in unique ways to enrich the lives of children and have a significant influence on the health of the local environment.

The Circle of Trees

Schools are integrating their tree planting projects with innovative learning opportunities. One school wanted a gazebo constructed on its school grounds to provide shade for outdoor learning. However, the cost and the incidence of vandalism of this kind of structure had been so high that the committee decided to reconsider how to provide shade. Members of the school’s green team did some research and found that trees can block close to 60 percent of the sun’s harmful UV rays. They realized that they could provide shade - and much more - through tree planting instead. Thus was born the idea of The Circle of Trees. Nine native trees were chosen to form the circle and each grade from kindergarten to Grade 8 adopted a different tree species. Each year as the students progress through the grades they become familiar with another native species of tree from the circle. When they graduate from Grade 8 they will have learned many things about these nine trees that are native to their community!
Another school community chose to address the very serious issue of protecting children from the sun’s harmful UVR rays. They decided to create shaded areas on their grounds using native trees. However, they also wanted to make a connection between learning and physical fitness, which led to the idea of a tree trail. *The Tree Trail* is a self-guided walking tour that winds around the newly planted trees in the school ground. The trees along the trail are labeled to correspond with a *Tree Trail Guide* created by the students. The guide includes descriptions of the trees, pictures of their leaves and buds, their importance to the health of the local ecology, historical facts, medicinal uses, significance to native peoples and fun facts about trees. Students and teachers use the trail for conducting brisk warm-up walks before engaging in rigorous field sports. The project has grown well beyond designing for shade and energy conservation to engage the school community in cultivating an awareness of the important role a healthy urban forest plays in our daily lives.
INTRODUCTION

Why is it important to provide shade for children and youth?

“Adequate solar protection during childhood is more important than at any other time in life.”
Donald Wigle, Child Health and the Environment

It’s estimated that one in seven children born today in Canada will develop skin cancer later in life. Why? Because of over-exposure to ultra violet radiation (UVR). In fact, one blistering sunburn during childhood can double the risk of getting cancer. UVR has also been linked to cataracts, suppression of the body’s immune system and the development of allergies. Children and youth are particularly vulnerable because they rarely demonstrate ‘shade seeking’ behavior. At school, children spend up to 25% of their time outdoors, typically during the period of highest UVR exposure — between 10 a.m. and 4 p.m. In most cases, they have little choice about exposure to the sun. One of the most effective means of protecting students from UVR is to plant shade trees where they play and congregate - for example, around playground equipment, near asphalt play areas, and along sports fields - to offer students a number of protection options.

Designing for Shade and Energy Conservation, Climate Change and EcoSchools

Keeping the natural environment healthy for future generations is everyone’s responsibility. Climate change is one of the most serious threats to a healthy environment, and schools and school boards have a vital role to play in helping students and staff understand what they can do about it.

Scientists expect climate change to increase global temperatures by 1.4 to 5.8 degrees Celsius by the end of this century. The electricity generated to meet people’s additional cooling needs will mean increased greenhouse gas emissions. When we plant trees and large shrubs in school grounds to provide strategic shade and windbreaks, we conserve energy as well as providing protection from harmful ultraviolet radiation. Trees planted to shade the south and southwest sides of a school building can reduce cooling costs by as much as 15 - 20%. Trees planted north

---

3 World Health Organization Fact Sheet # 261, Protecting Children from UVR (July 2001). Available at www.who.int/mediacentre/factsheets/fs261/en/
4 Intergovernmental Panel on Climate Change. Available at www.ipcc.ch
and west of the school building can act as a windbreak and reduce heating costs by 10 to 15%. This reduces greenhouse gas emissions and, in turn, helps to slow climate change.

Designing for shade and energy conservation provides year-round comfort and safety for the students and staff of our schools. When we improve our school grounds, we help improve the environment for everyone.

UVR Protection
Designing for shade is only part of the story...

Protecting children and youth from harmful UVR rays requires a multi-faceted approach. Along with providing natural shade, schools can try to schedule outdoor activities in shaded areas or during non-peak UVR times. Parents can be advised to provide a hat for their child to wear during recess. Teachers or other outdoor supervisors can model sun smart behaviour by wearing a broad-brimmed hat and sunglasses, and encourage students to play in the shade. At the Board level, Curriculum and Operations/Facility departments can work together to develop a shade policy that includes these strategies and others to provide effective protection for students. For information about shade policies, see the Resources section at the end of this document.

Holding down soil, shading the earth and cooling its surface, absorbing rainwater and gradually re-releasing moisture, softening the sweep of winds, trees are a major climate regulator in our country and on our planet....The importance of maintaining our green canopy cannot be overemphasized. Climate moderation is perhaps the most essential—and least recognized—role of our trees.

Henry Kock in *A Breath of Fresh Air: Celebrating Nature and School Gardens*
Designing for Shade and Energy Conservation

THE FIVE-STEP PROCESS AT A GLANCE

Step 1
ESTABLISH AN ECOTEAM

Once you’ve decided to make some positive changes to your school ground, invite others to join your EcoTeam – students, teachers, parents, the Principal, custodian and community members.

- Spread the word
- Hold a start-up Meeting

Step 2
CONDUCT AN ECOREVIEW

After establishing roles and responsibilities, the EcoTeam’s first task is to conduct an EcoReview to help you better understand your site and how it is used. The review involves surveying the needs and wants of users, the physical features of the grounds, play and use patterns, and existing shade.

- Survey User Needs
- Survey Your Grounds
  - Map 1 Physical and Environmental Features
  - Map 2 Play and Use Patterns
  - Map 3 Existing Shade Patterns
- Complete the EcoReview Site Assessment for Shade and Energy Conservation Template

TOOLS
- Sample Letter
- Volunteer Opportunities

TOOLS
- Questionnaires
- Canopy Density Guide
- EcoReview Site Assessment for Shade and Energy Conservation Template
Step 3 DEVELOP AN ACTION PLAN FOR SHADE

Building on what the team has learned in the EcoReview, you will now complete a series of steps that will result in your Action Plan.

- Develop a Conceptual Plan (Map 4)
- Complete a Detailed Phase One Site Plan
- Obtain Board Approvals
- Record Project Goals in Your School Plan
- Devise a Tree Care Plan
- Develop a Fundraising Strategy

Tools
- Planning for Shade
- Guidelines for Tree Planting
- Tree Care
- Fundraising

Step 4 IMPLEMENT THE ACTION PLAN FOR SHADE

Once you have your Phase One Site Plan approved and have raised funds for the project, it is time to implement the plan.

- Prepare for Planting Day
- Planting Day
- Celebrate Success!

Step 5 MONITOR AND EVALUATE

The final step of your EcoTeam’s work is to evaluate your progress toward the goals and targets you have set.
STEP 1. ESTABLISH AN ECOTEAM FOR SHADE AND ENERGY CONSERVATION

1.1 Build Your Team

Include representatives from across the school community - students, parents, neighbours, on-site child care workers. Please see the Introduction to EcoSchools and the Five-Step Process Guide* for helpful and concise information about who should be on the team, what the EcoTeam does, how to facilitate good teamwork, and the special role of the Principal.

1.2 Spread the Word and Build Momentum

Once you’ve established your team, notify the school community - teachers, students, parents, neighbours - that your school is initiating a project to create more shade on the school grounds. Encourage people to get involved and attend the first meeting. Use or modify the Sample Letter to Announce Your Project (Toolkit pp. 34).

1.3 Hold a Start-up Meeting

The purpose of the initial meeting is to provide information and generate enthusiastic support for your EcoSchools project from all members of the school community.

At the meeting:

- Present a strong rationale for the project, emphasizing (a) the importance of protecting students and staff from UV radiation and (b) the benefit of saving energy in heating and cooling the school, thus reducing both energy costs and greenhouse gas emissions.

- Sign up people who are interested in volunteering for the project, and take note of their skills and interests. Use the Volunteer Opportunities survey form (Toolkit pp. 35). This will help to establish roles and responsibilities for people on your team.

* Available at www.yorku.ca/fes/envedu/ecoschools.asp
Preparing for an Effective Meeting

See the *Introduction to EcoSchools and the Five-Step Process Guide* for ideas on conducting effective meetings. Available at www.yorku.ca/fes/envedu/ecoschools.asp

Consult the Evergreen shade slide show resource to see examples of several schools’ successful shade projects. Rent from Evergreen by calling 416-495-1495 ext. 42.

Get current information about sun exposure from the following websites:
- **Canadian Dermatology Association** www.dermatology.ca/english/sun/index.html
  www.hc-sc.gc.ca/english/iyah/environment/ultraviolet.html
- **Sunsafety for Kids** www.sunsafetyforkids.org

Find out why trees are important and the special role they play in maintaining a healthy environment.
- **The International Society of Arboriculture** www.treesaregood.com
- **Tree Link** www.treelink.org/linx/?navSubCatRef=56

Looking Ahead...

*You might want to distribute the questionnaires for conducting the survey of your school grounds (Toolkit pp. 36-41) at this meeting.*
STEP 2. CONDUCT AN ECOREVIEW

2.1 Survey User Needs and Use Patterns

To design a school ground that takes everyone’s needs into consideration, it’s important to survey students, teachers, and parents to learn how they use the site through the seasons (e.g. for play, meetings, outdoor classes, organized sports). Have each group take a walk around the school grounds and fill out the Questionnaires for Shade and Energy Conservation Project (Toolkit pp. 36-41) that applies to them. (An ideal time might be at your first meeting.) This information will be used later when the team is mapping the play and use patterns on your school ground.

Be sure to include students at all stages of the project: planning, design, implementation and care. Students can become very enthusiastic participants when they feel their opinions and views are being heard. Including the student perspective will also give a more complete picture of the perceived as well as the actual shade and use patterns on the school ground.

Gathering Students’ Ideas

- Use the printed questionnaire to guide a brainstorming session with students. Encourage them to add to and discuss each other’s suggestions and points of view.
- Start the session by asking students to talk about their play and sports activities throughout the year to help them focus on the grounds.
- When all the responses have been compiled, the team can create a chart that lists everyone’s ideas. You may choose to have students vote for their preferences: give each student in the school three choices. This exercise helps to prioritize the projects listed as fairly as possible (Ann Coffey, Asking Children, Listening to Children - see Resources).
2.2 Survey your School Grounds

Before you can begin planning the details of your shade project, you’ll need to learn a few things about your school grounds. The following mapping exercise will help your team understand the physical features of the grounds, the way people use the site and further explore where shade is needed. This is a great opportunity to involve the students in collecting and analyzing information.

To begin you must obtain a base plan of your school grounds. If it is 8.5”x11” enlarge it to 11”x17” and make several copies. Go outside with your 11”x17” plans and make three maps of the features on your school ground.

Map 1 Physical and Environmental Features

Before you begin, determine the orientation of your map and place a North arrow on the page. Then label the following features:

**Physical Features**
- School Building
- Parking Lots
- Gardens
- Existing Trees and Their Types
- Classroom Windows on the South and South-West Sides of the Building
- Main Entrances
- Hills and Slopes
- Play Structures
- Sports Fields

**Environmental Features**
- Areas where water collects
- Areas that are muddy
- Areas where the snow is plowed and piled
- Areas that are hot
- Areas that are shady
- Portables - Existing or Proposed
- Sandbox
- Seating
- Student Pick-up and Drop Off
- Neighbours’ Houses
- Emergency and Maintenance Vehicle Access
- Water Outlets
- Outdoor Lighting
- Flag Pole
- Outdoor Video Cameras

Other things to consider before you plant:

- Irrigation lines
- Overhead wires
- Utility lines. (To check for buried utilities: contact Ontario One Call 1-800-400-2255.)

- Sight lines for surveillance and safety issues
- Proposed new construction (additions, portables)

Make sure your school site plan is up to date. The custodian or board staff in charge of grounds can help you here. Determine the location of irrigation systems, catch basins, available sources of water for maintaining trees and migration patterns of winter salt that might harm the health of your trees.
2.2 MAP 1 SAMPLE

PHYSICAL AND ENVIRONMENTAL FEATURES

Legend

- Hot and Sunny
- Cool and Shady
- Neighbours
- Existing trees
- Westerly winds
- Turf
- Sunnyview Public School

Sunnyview Public School

Legend

- Hot and Sunny
- Cool and Shady
- Neighbours
- Existing trees
- Westerly winds
- Turf
- Sunnyview Public School

Emergency and maintenance vehicle access

Sunnyview Public School

Legend

- Hot and Sunny
- Cool and Shady
- Neighbours
- Existing trees
- Westerly winds
- Turf
- Sunnyview Public School

Emergency and maintenance vehicle access
Map 2 Play and Use Patterns
A map that shows the play and use patterns of your site will help you choose suitable locations for planting trees and shrubs and creating shade where it will be most effective. Record these patterns using the information collected from the questionnaires as well as by observing play and use patterns on the school grounds during recess, lunch and before and after school. Circle the following zones and shade them with coloured pencils:

- active play areas (sports fields, baseball, sandpits, etc);
- asphalt game areas (basketball, four square, hopscotch, wall ball);
- passive/quiet play areas (gathering spots, benches, seating);
- circulation routes where people walk, including naturally worn pathways across grass;
- ‘out of bounds’ areas where students aren’t allowed to be during school hours.

Make note of (1) the student activities that take place in these zones and (2) the age group of students involved.

Ever wondered if the tree you’re standing under is actually protecting you from the sun’s UV rays? Use the Canopy Density Guide (Toolkit p. 42) to assess the quality of existing shade cast by different tree types!

Map 3 Existing Shade Patterns
Make a photocopy of the Play and Use Patterns map and take it out to the school grounds around noon to make note of existing shade patterns. (You may also want to observe shade patterns at other times of day when students are outside for recess, etc.) This process should be completed when trees have completely leafed out.
Ontario EcoSchools: Designing for Shade and Energy Conservation

2.2 MAP 2 SAMPLE

PLAY AND USE PATTERNS

Legend

- Hot and Sunny
- Cool and Shady
- Westerly winds

Sunnyview
Public School

Active play
Baseball
Spectator area
Pathways
Soccer field

Active play
Play structure
Meet and greet area

Student gathering area

Entrance
Main entrance
Asphalt pathway
Meet and greet area

School building
(single storey)

Parking lot

Meet and greet area

Spectator area

Student gathering area

Active play

Active play

Active play

Meet and greet area

Student gathering area

Kindergarten play area

Out of bounds

Active play

Baseball
Spectator area

Active play

Play structure

Meet and greet area

Student gathering area

Entrance

Entrance

Out of bounds
2.3 Complete the EcoReview Site Assessment for Shade and Energy Conservation

The Sample EcoReview Site Assessment for Shade and Energy Conservation on the next page provides an example to help you with your own school’s EcoReview. A blank template for planning appears in the Toolkit on page 43.

Use the data gathered by the different groups that mapped the physical and environmental features, play and use patterns and existing shade patterns. This information will help you set priorities for achieving your goals.

Young children rarely seek shade...

Children need to be reminded to play in the shade. In The Ontario Sun Safety Working Group report Sun Exposure and Protective Behaviours, parents reported that children age 12 and under sought shade only 35% of the time.
SAMPLE: ECOREVIEW SITE ASSESSMENT FOR SHADE AND ENERGY CONSERVATION*

* Built upon data gathered from questionnaires, mapping and canopy density results.

**Target/Goal:** Provide natural shade on school grounds to protect students and staff from exposure to solar UVR and to conserve energy

<table>
<thead>
<tr>
<th>Provide shade for UVR protection.</th>
<th>Sufficiently shaded or sheltered</th>
<th>Increase the amount of shade</th>
<th>Critical time of day shade is needed</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine whether the areas listed below are shaded during the most critical times of the day i.e., morning recess, physical education periods, lunchtime and/or afternoon recess.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Active play areas near the school building including asphalt play areas, adjacent to basketball courts, hopscotch, ball hockey courts, etc.</td>
<td>✗</td>
<td>12:00 p.m.</td>
<td>Hopscotch play area to be shaded</td>
<td></td>
</tr>
<tr>
<td>2. Play structures</td>
<td>✗</td>
<td>12:00 p.m - 2:30 p.m.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Sand play areas</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Meet-and-greet areas - where parents/buses pick up and drop off children</td>
<td>✗</td>
<td>12:00 p.m - 4:30 p.m.</td>
<td>Plant trees with benches for seating</td>
<td></td>
</tr>
<tr>
<td>5. Spectator areas adjacent to baseball diamonds</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Spectator areas adjacent to sports fields</td>
<td>✗</td>
<td>12:00 p.m. - 4:30 p.m.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Perimeter of school grounds</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Connecting corridors and pathways into school grounds</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Front of the school/areas that are out of bounds</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Provide natural shade near buildings to improve comfort and conserve energy.**

| 10. Next to school buildings on the south and southwest sides. | ✗ | 2:00 p.m. - 4:00 p.m. | | |

**Block winter winds to conserve energy.**

| 11. Trees and shrubs planted as a windbreak to reduce wind speeds and shelter the north and western exposures of the school building. | ✗ | | | |

We recommend that you record the results of the review in your school plan to help raise the visibility of this important part of school life. See sample on page 26.
STEP 3. DEVELOP AN ACTION PLAN

Step 3 is a 6-part action plan.

**Action Plan**

3.1 Complete a *conceptual plan* for shade and energy conservation

3.2 Develop a detailed phase one site plan

3.3 Obtain Board approvals

3.4 Record your phase one activities in the school plan

3.5 Create a tree care plan

3.6 Develop a fund-raising strategy

3.7 Complete a conceptual plan for shade and energy conservation

3.8 Develop a detailed phase one site plan

3.9 Obtain Board approvals

3.10 Record your phase one activities in the school plan

3.11 Create a tree care plan

3.12 Develop a fund-raising strategy
3.1 Complete a Conceptual Plan for Shade and Energy Conservation

Developing a Conceptual Plan for Shade and Energy Conservation helps you to think about your whole school ground and the changes you would like to make over time based on the results of your EcoReview. This is an important first step to ensure the development of a vision that represents the longer-term goals and objectives of the school community.

1. First, decide as a team the priority areas for shade on your school ground. Use the data you’ve gathered to guide your decision-making:
   a) questionnaire results
   b) the maps you’ve created
   c) your EcoReview Site Assessment for Shade and Energy Conservation

2. Next, circle the general areas where you are planning to focus your efforts, label them and indicate the phases in which you will do the work (using an unmarked copy of your 11” x 17” site map). This is your Map 4, Conceptual Plan for Shade and Energy Conservation.

Planning Shade for Best Results

- Use or build on existing shade - e.g., redesign shaded ‘out of bounds’ areas at the front of the school to make them safely accessible to students.

- Quality of shade matters: large-leafed trees such as maples give dense shade while trees with small leaves such as locusts give dappled shade. Dense shade provides greater UV protection.

- Shade must be effective - take the movement of the sun into account, and make sure the shade is where you want it when you want it.
CONCEPTUAL PLAN FOR SHADE AND ENERGY CONSERVATION

Legend

Phase 1
- Shade play structures
- Shade meet and greet areas (groves of trees)
- Extend Kindergarten play area (fenced shaded areas)
- Shade asphalt active play and shade the building (plant trees 7m from the building and add seating)

Phase 2
- Shade spectator areas (allée of trees)
- Shade social gathering areas (groves of trees, circle of trees)

Phase 3
- Build windbreaks by enhancing line of Maples on west side of school grounds (woodland project and naturalising north-west slope)
- Develop walking trail (tree trail)

3.1 MAP 4 SAMPLE
When making choices about your phase one plan, contact Board staff who oversee school grounds. Early input from people with first-hand experience can often help you avoid pitfalls and achieve greater success!

3.2 Complete a Detailed Phase One Site Plan for Shade and Energy Conservation

Now that you’ve completed the conceptual plan, it’s time to decide what your team will focus on first. Take some time to explore a variety of design ideas and solutions for your detailed phase one plan. See Sample Phase One: Shading the Play Structure on next page. (See also Toolkit pp. 44.)

Start small and do it well!

1. Keep your vision for shade small and manageable. This might mean developing your project in stages, adding new elements as funds become available or as new individuals bring special skills to the project.

2. Align the size and scope of your project with your EcoTeam’s ability to maintain the project throughout the seasons.

3. Keep the neighbours on the perimeter of the school grounds in mind - don’t shade their vegetable gardens or block exceptional views.

4. Visit other school grounds with shade projects. See Evergreen’s Project Registry for a list of schools across Canada with greening projects. www.evergreen.ca/en/registry/search.php

Your detailed phase one site plan for shade and energy conservation should include:

- **the location** for your project in relation to the school
- **a planting plan** – mark the location of the trees and the shade they will cast. (See Toolkit pp. 56-57)
- **a species list** of trees and shrubs with common and botanical names (See Toolkit pp. 60-62)
- **a materials list** - include the types of built and natural elements you wish to incorporate into your design (e.g., rocks for seating, wooden pergola or metal gazebo)

One team member can begin looking for funding sources (See Toolkit p. 77) as other team members are working on the site design and getting approvals. Once you know what you will be focusing on in the first stage of your project, you can begin fundraising.
Trees planted along south and west side of play structure area, at 6m intervals, 2m from concrete edge.
3.3 Obtain Board Approvals

Getting Board approval for your school ground greening project may be a multi-step process, depending on your Board’s policies. Usually the school principal must give initial approval to the plans. Often, the department that is responsible for outdoor maintenance and landscaping will also want to see the proposal. Be flexible with your design (have a few options) and be prepared to do your project in phases.

We recommend that you have the following information ready for review:

- EcoReview Site Assessment for Shade and Energy Conservation
- Existing Shade and Use Patterns Map
- Conceptual Plan for Shade
- Detailed Phase One Site Plan
- Tree Care plan (a task list and schedule)

3.4 Identify Priorities and Develop the Action Plan

Consider using the School Improvement Plan template to record your plans. The Targets or Goals section corresponds to the priorities for shade that came out of the planning process. The Actions section corresponds to your detailed plans for adding shade. Writing your project into the school plan will demonstrate your school’s commitment both to children’s health and conserving energy.

The documents used to obtain approvals may also be used when completing funding applications for your project.
## SAMPLE SCHOOL IMPROVEMENT PLAN

### School:

### Areas of Focus: EcoSchools Designing for Shade and Energy Conservation

### Evidence of Need:

(What data indicate the need for improvement?)

Refer to your EcoReview Site Assessment Comments section as you complete your Action Plan below.

### School Improvement Plan Table

<table>
<thead>
<tr>
<th>Targets/Goals</th>
<th>Actions</th>
<th>Indicators of Success</th>
<th>Resources</th>
<th>Budget Responsibility</th>
<th>Timelines</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve children’s health and well-being on school grounds by increasing the amount of usable shade near the play structure: begin research.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Complete the following: a) Physical &amp; Environmental Analysis map b) Play &amp; Use Patterns map c) Existing Shade &amp; Use Patterns map d) Conceptual Plan for Shade e) Detailed Phase One Site Plan f) Tree care plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research will show where and what trees in plant (e.g. plant 5 native trees on the west and south sides. 2m from the play structure pathway)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 classes of 32 students, with the help of adult members of the EcoTeam, will complete 1a), b) &amp; c) listed in the Actions column</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trees 5 $3250</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prinicpal with the guidance of the EcoTeam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall 2004: planning and fundraising Fall 2005: planting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Record results after analysing the increase in student attendance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Improve energy efficiency and comfort in the school building |
| 2. Plant native deciduous trees on the south side of the school building |
| Increased number of trees next to building |
| 6 adults $2500 |
| Fall 2004: planning Spring 2005: planting |
| Record results after analysing the increase in student attendance. |
3.5 Create a Tree Care Plan

Don’t let all your hard work come to nothing by neglecting maintenance! Especially at first, your new trees and shrubs will need special care. Over time, the need for maintenance will decrease - the more you plan for it in the beginning, the less work there will be later. To learn more about mulching, watering and tree protection, turn to the Tree Care section of the Toolkit, page 68.

3.6 Develop a Fundraising Strategy

Fundraising is an essential part of all school ground greening projects. Every funding organization has specific requirements and often has a deadline for applications. Please see the Fundraising section of the Toolkit, page 77.

Top Four Things You Can Do For Your Trees...

1. Mulch your trees to protect them from physical damage caused by lawn mowers and string trimmers.
2. Water regularly until new trees are established and during dry periods.
3. Always have a protection strategy in place for new trees (see pp. 71-74 for options).
4. Leave your leaves - they are the best natural fertilizer.
STEP 4. IMPLEMENT THE ACTION PLAN

4.1 Prepare for Planting Day

Planting Day Checklist

☐ Make sure you know where the underground services are located on your school grounds before you dig. Ask your custodian which utilities companies provide service to your school. Contact Ontario One Call and other companies from which you require clearance (see below).

☐ Take pictures of your site prior to planting.

☐ See if board staff are able to supply trees and what additional help they can offer on planting day.

☐ Determine when your trees and/or nursery stock will be available and select a date for planting. Fall plantings are highly recommended, especially if you are unsure of the availability of summer maintenance and watering.

☐ Order your trees and shrubs as soon as funding is secured to ensure that your stock will be available for planting day.

☐ Notify the principal and any board grounds staff of the planting date well in advance.

☐ Organize publicity and mobilize your volunteers.

Call Before You Dig: Ontario One Call 1-800-400-2255

Ontario One Call is an umbrella organization that will inform you which companies offer locating services in your area. However, it is your responsibility to contact the companies that are not covered by Ontario One Call and have them come to your site to locate remaining services.

Give Ontario One Call one week’s notice and have the following information ready when you call:

- the address of your school
- the closest cross street
- what side of the street your school is on
- where you are planning to dig

Arrange clearance with each of the following (where applicable): Hydro One; natural gas provider; sewer and water; telephone; cable. These companies will provide clearance numbers if all is clear, or a sketch detailing service locations.

www.on1call.com
4.2 Planting Day

It’s essential to involve students on planting day. Create a work plan that organizes students into crews with an adult supervisor. Each crew will be responsible for a specific task area.

1. Prepare your site by marking planting areas with stakes, orange cones or spray paint.
2. Have one or two adults volunteer to supervise the operation throughout the day to:
   a) ensure that work is carried on safely;
   b) ensure that trees are planted correctly, mulched, watered, trunk protection is applied, and that all work is completed to the EcoTeam’s satisfaction.
3. Make sure several people have copies of the Detailed Phase One Site Plan.
4. Have all the necessary tools available. Check to see if your volunteers can supply what is needed.
5. Make it fun! Reward hard-working students with snacks and drinks during the day. Make sure student volunteers have gloves and sturdy shoes. Have sunscreen available. Hats are a must!

The tools you’ll need

- Shovels
- Hoses (5/8”), hose nozzles
- Watering cans, sand play toy buckets for smaller children to water and to carry mulch; plastic ice cream containers also work well.
- Wheelbarrows or plastic/metal wagons - small wagons so younger children can transport their tools and water/mulch buckets around the site.
- Rakes

Be sure to have your Tree Care plan in place so that your newly-planted trees and shrubs will get the care they need.
Managing Private Suppliers
Suppliers of large caliper trees will often deliver, plant, mulch, stake, cage and guarantee their stock for 1 to 2 years. Make sure that you know what your contract/arrangement includes.

Nurseries will sometimes donate materials to schools or give a discount. However, they may not prepare the soil or plant the materials. If you get large caliper trees from a nursery and planting is not included in the price, talk to board staff first and ask if they will help you plant them.

4.3 Celebrate Success!
Undoubtedly your project has taken a lot of time and planning and involved many volunteers. Take the time to gather together, to acknowledge your efforts and accomplishments! There are many ways to celebrate your project after the planting day. Here are a few ideas: hold a school assembly in the newly defined space, have a ribbon cutting, organize an outdoor potluck picnic, or have older students give guided interpretive walks to younger students or other volunteers.

Having students write about their experiences in a greening project can reveal the powerful connection between children and nature:

If I went inside a leaf I would see the roots sprouting and hear the raindrops pitter patter. It sounds like a xylophone in a marching band and while the raindrops fall the roots do a little dance, and while all the leaves and stems are watching a stem says, “They are so young and they learn so fast.”

Christina Lee, 5th grade

National Environmental Poetry and Poster Contest for Students, River of Words

Take pictures of your project on planting day. These photos can be used for school newsletters, community newspapers, and to show your funders what you have accomplished.
Enhancing your school grounds is an ongoing process. Take the time to evaluate what you’ve done to help you in establishing future goals and timelines. Have you met your goals of providing more shade for students and teachers? …sheltering buildings from hot summer sun and strong winter winds? …learning about native species that will bring back natural communities?

If you used a formal planning document such as the School Improvement Plan included here (see sample page 26), revisit the targets and the corresponding success indicators. You may find that you have achieved even more than you set out to do.

Once your evaluation is complete, you can look ahead and begin to set new goals that draw on all that you have learned from your project so far!

One of the most powerful elements of naturalized school grounds is the change that occurs in cycles—from the daily and seasonal to the annual and beyond. The power of a changing landscape is that it captures the imagination and stimulates the mind while simultaneously stirring the emotions. Celebrating annual events is a marvelous opportunity to connect the school community to the local landscape.

Evergreen, All Hands in the Dirt.
Designing for Shade and Energy Conservation

Toolkit

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SAMPLE LETTER TO ANNOUNCE YOUR PROJECT

(You may want to ask the principal if your committee can use school stationery for this letter – and even ask if s/he will co-sign it!)

Date

Dear Neighbours, Parents, Teachers and Students,

[School Name] is initiating a project to design our school grounds for shade and energy conservation.

We will focus on creating shade for our students in areas where they play, are dropped off or picked up, line up for classes and gather to eat and socialize. Providing shade is critical to protect students from the sun’s harmful rays.

Children spend up to 25% of their school day outside and are typically on the school grounds during the periods of highest UVR exposure - between 10 a.m. and 4 p.m.

Research shows that one in seven children born today will develop skin cancer in their lifetime (Canadian Dermatology Association).

Shaded areas also cool air temperatures on school grounds, making playing and learning outdoors more enjoyable.

Shading the school building is also important for reducing both heating and cooling costs, thus saving energy and reducing climate-changing greenhouse gas emissions.

We will be looking at ideas for creating more shade - planting trees, shrubs and vines, building shade structures, and providing seating in shaded areas.

We welcome your input and involvement in this project. We need the support and effort of the entire school community to be successful and we want to hear from you!

Please join us at our upcoming meeting [date, time, location] to share your thoughts and ideas about the school ground. [If you can provide childcare, say so here.]

Sincerely,

[name]

[title — if there is one]

on behalf of the [School Name] EcoTeam
VOLUNTEER OPPORTUNITIES

1. Name: ______________________  Phone number or e-mail: ______________________

2. I am: ☐ a student ☐ a parent ☐ a school board member ☐ a teacher
       ☐ a neighbour ☐ a community member ☐ an administrator
       ☐ maintenance staff

3. What are some of your ideas for planting trees for shade and energy conservation at our school? _______________________________________________________
   ___________________________________________________________________

4. Would you be willing to help with any parts of the project? What might you be interested in doing? Please place a check mark beside the areas where you could help.

   **PLANNING**
   ○ drawing maps
   ○ collecting tools
   ○ designing the space
   ○ delivering questionnaires
   ○ compiling questionnaire results
   ○ surveying neighbours
   ○ involving the younger students
   ○ helping with a shade assessment
   ○ organizing a launch celebration

   **FUNDRAISING**
   ○ writing funding proposals
   ○ organizing an event
   ○ canvassing the neighbourhood
   ○ approaching various local groups and businesses
   ○ creating an adopt-a-tree program
   ○ bookkeeping

   **PLANTING AND IMPLEMENTATION**
   ○ planting trees and shrubs
   ○ making shade structures
   ○ building seating areas
   ○ organizing volunteer work bees
   ○ creating pathways

   **DOCUMENTATION AND RESEARCH**
   ○ taking photographs/videotaping
   ○ researching native trees species for shade
   ○ contacting other schools for useful tips
   ○ keeping a journal of the project
   ○ researching safety issues
   ○ researching the history of the site
   ○ preparing a field guide for the site
   ○ clipping newspaper articles/filing

   **PUBLICITY**
   ○ creating newsletters
   ○ writing articles
   ○ painting signs
   ○ creating murals
   ○ putting up posters
   ○ delivering information to neighbours
   ○ preparing media releases

   **MAINTENANCE**
   ○ watering during summer months
   ○ creating a year-round tree care schedule
   ○ overseeing safety inspections for built structures
   ○ mulching

5. Please list other ways that you might be able to help. _______________________________________________________
   ___________________________________________________________________
QUESTIONNAIRE FOR SHADE AND ENERGY CONSERVATION

1. What times of the day do you gather/play in the school grounds? __________________
   ______________________________________________________________________
   ______________________________________________________________________

2. What do you do in the school grounds? _____________________________________
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________

3. Where do you like to play or be? _________________________________________
   ______________________________________________________________________
   ______________________________________________________________________

4. Is there shade where you gather or play? Yes □ No □

5. What would you like to see done on your school grounds to increase the amount of shade and make it more comfortable?
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________

Note: You may wish to modify this form for secondary students.
We are looking at ways to shade the school grounds to improve children’s health and conserve energy. We’re interested in knowing your views on these issues. **Please complete this questionnaire and return it to the EcoTeam or Principal by ______________ (date).**

**Part A. Shade for Students**

1. Do you use the school grounds for teaching curriculum? ____________________________________________________________________________
   If yes, where? ____________________________________________________________________________

2. What subjects do you teach in these areas? _____________________________________________________________________________________________
   At what time of day? _________________ For how long? _________________

3. Is there shade in these areas? Yes ☐ No ☐
   If yes, is there adequate comfortable seating in the shade in these areas? Yes ☐ No ☐

4. In your opinion, where do the majority of students play or gather on the school grounds, e.g., neat the school building (asphalt play areas), sports fields, baseball diamonds, etc.? Please express your comments as percentages, e.g., 50% of students play within 25 metres of the school building on the asphalt, 20% play in the sports fields, 30% play on the play structure.

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

5. Are there shaded and/or sheltered areas which are out of bounds to students during recess and lunch time? Yes ☐ No ☐. If yes, could these areas become accessible if additional supervision or new boundaries were instituted? Please explain.

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

continued...
6. What are your thoughts and/or recommendations (e.g., changes, additions) for increasing the amount of useable shade on the school grounds to make them more comfortable and safer for play and learning outside?

___________________________________________________________________________
___________________________________________________________________________

7. Any other comments? __________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

Part B. Shade for Energy Conservation

1. Does your school have air conditioning? Yes ☐ No ☐

2. Is the school building uncomfortable during hot days – for instance, are classrooms on the south/west sides too warm? Yes ☐ No ☐ Don’t know ☐

3. Is it uncomfortable being out on the school grounds in winter because of strong winds? Yes ☐ No ☐ Don’t know ☐

4. Would you be willing to devote class time to a greening project focused on shade and energy conservation if the planning, development, maintenance and use could become part of delivering the curriculum? Yes ☐ No ☐
QUESTIONNAIRE FOR SHADE AND ENERGY CONSERVATION

We are looking at ways to shade our school grounds to protect students from harmful sun exposure and to conserve energy. We’re interested in knowing your views on these issues. Please complete this questionnaire and have your son or daughter return it to the school by _______________ (date).

1. Are there places to get out of the wind and sun on your school grounds?
   - Yes □ No □ If yes, where? ____________________________
   - Are students allowed to be there? ____________________________

2. Do you think there is enough shade where students gather/play on the school grounds?
   - Yes □ No □ If no, which areas do you think need more shade? Please list.

3. Is there existing shade in ‘out of bounds’ areas (e.g., the front of the school or back of the sports fields)? Yes □ No □ If yes, please list.

4. Is the school building uncomfortable during hot days – are classrooms on the south and south/west sides too warm? Yes □ No □ Don’t know □

5. Would you be willing to devote volunteer time to planning, designing, implementing or maintaining a greening project focused on shade and energy conservation at your school? Yes □ No □ If yes, please contact the school for information about volunteer opportunities.

6. Any other comments?

___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
QUESTIONNAIRE FOR SHADE AND ENERGY CONSERVATION

We are currently looking at ways to shade the school grounds to improve children’s health and conserve energy. We are interested in knowing your views on these issues. Please complete this questionnaire and return it to the EcoTeam by _________ (date).

Part A. Shade for Students
1. Do you think there is enough shade where students play/gather on the school grounds?
   Yes □  No □

2. If no, please indicate which of the following you would choose to increase shade for students:
   - □ large shade trees
   - □ shrubs
   - □ metal shade structures – (e.g., gazebo)
   - □ wooden shade structure
   - □ other _______________________

3. What, if any, are your concerns with regard to the placement of these elements on the school ground?
   ___________________________________________________________________________________
   ___________________________________________________________________________________

Part B. Shade for Energy Conservation
1. Does your school have a large open asphalt play area on the south and south/west exposures of the building? Yes □  No □

2. Does your school have air conditioning? Yes □  No □
   If no, do you receive or notice increased complaints from staff and students as a result of higher indoor temperatures during hot days? Yes □  No □
   If yes, in what part of the building does this occur?
   ___________________________________________________________________________________

3. Are there high wind speeds during winter months on the north and western exposures of the building? Yes □  No □  Don’t know □

4. Are there maintenance issues you would like to see addressed in the plan for the project?
   ___________________________________________________________________________________
   ___________________________________________________________________________________

5. Any other comments?
   ___________________________________________________________________________________
QUESTIONNAIRE FOR SHADE AND ENERGY CONSERVATION

Please complete this questionnaire and return it to the EcoTeam by ________________ (date).

Part A. Shade for Students

1. In your opinion, where do students gather on the school ground, e.g., near the school building (asphalt play areas), sports fields, baseball diamonds, play structures etc.? Please express your comments as percentages, e.g., 50% of students play within 25 metres of the school building on the asphalt, 20% play in the sports fields, 30% play on the play structure.

___________________________________________________________________________________
___________________________________________________________________________________

2. Are there areas that could provide shade and/or shelter, but are out of bounds for students during recess and lunch time? Yes ☐ No ☐. If yes, could they become accessible if additional supervision or new boundaries were established? Please explain.

___________________________________________________________________________________
___________________________________________________________________________________

3. Do you have any current concerns about supervision on the school grounds? Please explain.

___________________________________________________________________________________
___________________________________________________________________________________

4. What are your recommendations (e.g., changes, additions) for increasing the amount of useable shade on the school grounds to make them more comfortable and safer for gathering/play and learning outside?

___________________________________________________________________________________

5. Any other comments? _________________________________________________________

Part B. Shade for Energy Conservation

1. Does your school have a large open asphalt play area on the south and southwest sides of the building? Yes ☐ No ☐

2. Does your school have air conditioning? Yes ☐ No ☐. If no, do you receive or notice increased complaints from staff and students as a result of increased indoor temperatures during hot days - especially with regard to rooms located on the south and southwest sides of the building? Yes ☐ No ☐ Don’t know ☐

3. Are there high wind speeds during winter months on the school grounds on the north and western exposures of the building? Yes ☐ No ☐ Don’t know ☐
CANOPY DENSITY GUIDE

The canopy density guide will help you assess the level of UVR protection provided by different trees. View the tree canopy against the sky and compare with illustrated leaf/canopy patterns. Estimate which pattern of sky and leaves most closely approximates the observed canopy.

Heavy – over 90% UVR protection
[all Maples, White Ash, White Spruce, etc.]

Good protection from direct UVR. Protection from indirect UVR will depend on canopy size and where a person is positioned under the canopy. Suitable for long-stay use if personal sun protection measures are also used.

Medium – around 60% UVR protection
[Kentucky Coffee, Hackberry, White Cedar, etc.]

Filtered shade provides low level of protection from direct and indirect UVR. Suitable for short-stay use only. Personal sun protection measures should also be used.

Light – less than 30% UVR protection
[Black Locust, Nannyberry, etc.]

Poor protection from direct and indirect UVR. Suitable for transit shade only.

ECOREVIEW SITE ASSESSMENT FOR SHADE AND ENERGY CONSERVATION

Date: __________________

Build upon data gathered from questionnaires, mapping and canopy density results.

Target/Goal: Provide natural shade on school grounds to protect students and staff from exposure to solar UVR and to conserve energy

<table>
<thead>
<tr>
<th>Provide shade for UVR protection.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: Determine whether the areas listed below are shaded during the most critical times of the day for your students, i.e., morning recess, physical education periods, lunchtime and/or afternoon recess.</td>
</tr>
<tr>
<td>1. Active play areas near the school building including asphalt play areas, adjacent to basketball courts, hopscotch, ball hockey courts, etc.</td>
</tr>
<tr>
<td>2. Play structures</td>
</tr>
<tr>
<td>3. Sand play areas</td>
</tr>
<tr>
<td>4. Meet-and-greet areas - where parents/buses pick up and drop off children</td>
</tr>
<tr>
<td>5. Spectator areas adjacent to baseball diamonds</td>
</tr>
<tr>
<td>6. Spectator areas adjacent to sports fields</td>
</tr>
<tr>
<td>7. Perimeter of school grounds</td>
</tr>
<tr>
<td>8. Connecting corridors and pathways into school grounds</td>
</tr>
<tr>
<td>9. Front of the school/areas that are out of bounds</td>
</tr>
</tbody>
</table>

Provide natural shade on school grounds to improve comfort and conserve energy

| 10. Next to school buildings on the south and southwest sides | | | | |

Block winter winds to conserve energy

| 11. Trees and shrubs planted as a windbreak to reduce wind speeds and provide a shelter effect to the north and western exposures of the school building | | | | |
Use of existing shade

- Reschedule activities outside of peak UVR times (11:00 a.m. and 4:00 p.m.)
- Make program and supervision changes that will allow the use of existing shade.
- Add seating under existing trees.

Design ideas using natural shade

Trees in a school ground setting must be able to withstand harsh growing conditions and the rigours of play. Planting larger trees and placing them well helps ensure survival and the success of your project. The effectiveness of natural shade depends on the density of the foliage (leaves). In the case of coniferous trees, their lower branches can be pruned to 2 metres once they are approximately 10 metres high, allowing people to seek shade under their canopy.

The design ideas on the following pages will help the team to envision a variety of possibilities for providing shade on the school grounds.

What other types of shade are there?

Willow structures
Willow can be used in creative ways to provide shade for children. For interesting and functional design ideas see the Living Willow website. [www.livingwillow.com](http://www.livingwillow.com)

Built shade - gazebos, shade sails
Built structures out of wood or canvas are another way to provide shade and shelter for students and staff. Visit the following websites to view a variety of design options.
- Playshade - [www.playshade.co.uk/](http://www.playshade.co.uk/)
- Sun Safety for Kids - [www.sunsafetyforkids.org/shade.htm](http://www.sunsafetyforkids.org/shade.htm)

Combination of natural and built shade
Natural and built elements can combine to provide effective shade in several ways. See John Greenwood’s comprehensive guide* on environmental strategies for UVR protection and visit his website for current research and information on designing for shade. [www.shelterstrategies.com.au/paper.htm](http://www.shelterstrategies.com.au/paper.htm)

*Undercover: Guidelines for shade planning and design* can be purchased by contacting the Cancer Council South Australia - Email: tcc@cancersa.org.au
When designing for shade consider tree size and form at maturity. Trees with broad crowns and dense foliage provide the best protection from UVR. However, trees with narrow form can be planted in a mix of broad and narrow shapes to achieve higher rates of shade coverage. See pages 81-82 of the Resources section for recommended field guides that will provide this information.
Shade active play areas to cool down classrooms and conserve energy by planting trees 7m from the foundation of the school building. Add rocks for seating and you’ll be providing a comfortable shady place for students and staff to sit.
Planting one tree isn’t as effective as planting many in a grove to form a natural gazebo for shade. Plant a minimum of 6 trees 6m apart in a grouping. Mulch to a depth of 15cm underneath the trees and add rocks for seating.
Providing shade where students, staff and parents gather to watch sports events is an important part of your shade strategy. Plant trees in a row 8-10m from boundary lines, if there is enough room, plant a second row to create an allele of trees.
SEATING IN SHADE – Grove of Evergreens

Plant evergreens 6m apart in a grove. Mulch to a depth of 15cm and add rocks to provide seating.
Plant a combination of evergreen and deciduous trees. Mulch to a depth of 15cm and add logs to provide seating.
Plant a combination of trees and shrubs. Mulch to a depth of 15cm and add rocks or logs to provide seating.
Natural materials for seating in the shade

Logs: Do’s and Don’ts
Logs are a short-term solution to creating seating or edging for a garden. Here are a few guidelines for the use of logs on school grounds.

» Do use logs from hardy disease-free tree sources. Use hardwoods only such as oak to ensure longevity. Try to peel the bark from the logs to discourage insect infestations.

» Don’t use logs from old or sick trees that have been felled. These logs attract carpenter ants, termites, raccoons, wasps and rodents, rot quickly and can spread disease to other trees on your grounds.

» Size is important: logs should be a minimum of 45 cm in diameter; this allows them to be dug into the ground 8 cm to prevent rolling.

» Do mulch around logs to a 10 cm depth to secure them.

» Do place logs at least 2 m apart to discourage students’ jumping from one to the other.

Rocks
Armour stone (square or rectangular shaped stone) has been used successfully on school grounds for informal seating. The following guidelines allow for the safe placement of these large rocks.

» Ensure height is comfortable for students to sit on - between 40 - 45 cm above the mulched surface.

» Place rocks right up against each other or space them out according to your preferred design. When placing them randomly or in a circle in the landscape leave a 2 m distance between them to discourage students from jumping from one to the other.

» Provide a soft bed of wood mulch around rocks - approximately 10 - 15 cm in depth.

Forestry and tree removal companies are eager to get rid of logs and will often dump them free of charge on school property. Contact your board’s ground staff before accepting free logs. It can be very difficult to dispose of them once they begin to rot.
Plant trees on the south and southwest sides of a play structure area. Maintain a 2m distance from the outer limit of the fall zones and/or from the timber or concrete curbing surrounding the perimeter of the play structure.
Planting double rows of trees 6m apart creates a dense canopy of green along pathways and trails and offers natural protection from UVR.
Windbreaks and hedgerows

Trees and shrubs can create screens between different areas and provide protection and comfort from sun and prevailing winds. Schools can incorporate these features on their grounds to make it a more comfortable and inviting place for play and learning (as well as providing habitat for wildlife).

For more about designing windbreaks, hedgerows and living fences see Evergreen’s resource Design Ideas for the Outdoor Classroom, available on the Evergreen website at www.evergreen.ca

Remember, keeping sight lines clear to maintain good visibility is particularly important in designing school greening projects!

Did you know...

Windbreaks planted on the north and west sides of a building can reduce heating costs by up to 20%.

A windbreak can reduce wind speed for a distance of as much as 10 times the windbreak’s height.
Choosing effective locations for your shade trees

Consider the movement of the sun, and make sure that the shade is where you want it when you want it.

Tree shadow template - Where does the shade fall?
Use the tree shadow template below to see what direction the shade is being cast by the trees you are planting. This will help you determine where seating should be placed and if the shade will be cast where you want it when you want it (i.e., during peak sun periods).

To determine the tree shadow:
1. Place a circle on your site map to represent the tree.
2. Draw a line from the center of the tree toward North on the map.
3. Place two more lines at a 45° angle from the centre line.
4. The shade from the tree will fall between the 45° angles at noon.

When planning for shade consider these questions...

- Where and at what time of day will the shade be cast?
- Where does the shade of neighbouring trees fall? Will this affect the trees you are planting?
- Are there any obstructions overhead? Will your trees grow into these?
- Will the tree’s canopy hang over a neighbour’s yard?
- Are you choosing nut trees? Check to see if your Board has a policy prohibiting the planting of nut trees because of allergies.
- Are there obstructions underground (i.e., utility pipes or wires)? Refer to your site plan.
Shading Hills and Berms

Students love hills and berms and many schools want to plant trees on them. Keep hills under 90 cm with gradual slopes of 20-25% and plant the trees on flat ground at the base of the slope.
Tree planting distances from built objects

All distances are measured as a radius and are expressed as minimum distances. Your Board may have its own guidelines or standards about tree planting distances from built objects; check with your Operations/Facility Services department.

<table>
<thead>
<tr>
<th><strong>OBJECTS</strong></th>
<th><strong>DISTANCES</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPACES BETWEEN TREES</strong></td>
<td><strong>5-7 m</strong></td>
</tr>
<tr>
<td><strong>Seating</strong></td>
<td><strong>2 m</strong></td>
</tr>
<tr>
<td><strong>Rocks, benches, picnic tables, game boards</strong></td>
<td><strong>2 m</strong></td>
</tr>
<tr>
<td><strong>Play structure</strong></td>
<td><strong>2 m</strong> (measure from outside the fall zones and/or from the timber or concrete edging surrounding the perimeter of the installation)</td>
</tr>
<tr>
<td><strong>Base of a slide</strong></td>
<td><strong>4 m</strong></td>
</tr>
<tr>
<td><strong>School building</strong></td>
<td><strong>7 m</strong></td>
</tr>
<tr>
<td><strong>Fence lines</strong></td>
<td><strong>2 m</strong> (respect neighbours’ views)</td>
</tr>
<tr>
<td><strong>Walkways</strong></td>
<td><strong>2 m</strong></td>
</tr>
<tr>
<td><strong>Edge of asphalt</strong></td>
<td><strong>2 m</strong></td>
</tr>
<tr>
<td><strong>Running track</strong></td>
<td><strong>5 m</strong> (no trees or shrubs should be planted on the inside of the track)</td>
</tr>
<tr>
<td><strong>Soccer and football boundary lines</strong></td>
<td><strong>8-10 m</strong></td>
</tr>
<tr>
<td><strong>Fire hydrants</strong></td>
<td><strong>6 m</strong></td>
</tr>
<tr>
<td><strong>Flag poles</strong></td>
<td><strong>10 m</strong> (adjust according to branching patterns)</td>
</tr>
</tbody>
</table>

Maintaining visibility

- Avoid blocking night lighting or interfering with security cameras.
- Remove low branches of large shrubs in areas where visibility is a concern.
- Adjust patterns of supervision and routine observations of school grounds to reflect the new plantings.
Native species of trees and shrubs are recommended because they are hardier for the tough growing conditions of school grounds.

**What are native species?**
Native species of trees and shrubs are those that occur in the region in which they have evolved. Plants evolve over time in response to climate and interactions with other species inhabiting the community. Thus native plants possess certain traits that make them uniquely adapted to local conditions. There are three main benefits of using native species in your greening project:

- Native species require little to no watering once established.
- Native species have evolved with local insects and wildlife, providing them with food and habitat.
- Native species offer us the opportunity to study plants that are part of our natural heritage.

**Use of non-native species**
Sometimes non-native species are required to fulfill a particular goal (e.g., maintaining clear access routes). In these cases, the following guidelines are suggested:

- Ensure that the non-native is non-invasive and that it will not spread into nearby natural habitats (e.g., Norway Maple and Chinese Elm are prolific seed producers and can easily invade nearby green spaces).
- In areas around buildings or access routes, select columnar or dwarf species that are cultivars of native species or non-invasive non-native species (e.g., Pyramidal Oak) so that maintenance does not become a problem.
Native trees and shrubs

The following is a sample list of shade trees and shrubs native to Southern Ontario. See the Native Plant Database on the Evergreen website for a list of recommended trees and shrubs to plant on school grounds in your particular region. [www.evergreen.ca/nativeplants](http://www.evergreen.ca/nativeplants)

Nut trees have not been included in this list because of potential student allergies. American Beech and Bur Oak are native nut trees that may be suitable for planting on school grounds. Check to see if your Board has policies on planting nut or fruit trees. The Board’s grounds staff may be able to help you select trees and shrubs best suited for your site.

### Native Deciduous Shade Trees

<table>
<thead>
<tr>
<th>COMMON NAME</th>
<th>SCIENTIFIC NAME</th>
<th>HEIGHT AT MATURITY</th>
<th>GROWTH RATE</th>
<th>SILHOUETTE AND SPREAD</th>
<th>WILDLIFE VALUE</th>
<th>SEASONAL INTEREST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar Maple</td>
<td>Acer saccharum</td>
<td>20-30m</td>
<td>Slow</td>
<td>14-25m</td>
<td>Provides food and shelter for birds and butterflies</td>
<td>Fall colours red, orange, yellow</td>
</tr>
<tr>
<td>Red Maple</td>
<td>Acer rubrum</td>
<td>20-25m</td>
<td>Medium</td>
<td>12-18m</td>
<td>Especially favoured by squirrels, chipmunks and birds</td>
<td>Fall colour bright red; flowers are red in dense clusters and bloom in March-April</td>
</tr>
<tr>
<td>Silver Maple</td>
<td>Acer saccharinum</td>
<td>20-35m</td>
<td>Fast</td>
<td>12-18m</td>
<td>Trunk sections may become hollow and provide habitat for squirrels, raccoons and other animals</td>
<td>Fall colour pale yellow or brown</td>
</tr>
<tr>
<td>Basswood/American Linden</td>
<td>Tilia americana</td>
<td>20-35m</td>
<td>Medium</td>
<td>12-16m</td>
<td>Fragrant yellow flowers are an excellent source of nectar for bees and other insects</td>
<td>Fall colour pale yellow or remain green</td>
</tr>
<tr>
<td>Ironwood/Hop-Hornbeam</td>
<td>Ostrya virginiana</td>
<td>10-12m</td>
<td>Slow</td>
<td>6-8m</td>
<td>Seeds eaten by squirrels Attract birds and butterflies</td>
<td>Fall colour dull yellow; flowers are green/brown</td>
</tr>
</tbody>
</table>

* Tree Growth Rate: Slow = \(<30 \text{ cm/yr}\)  Medium = \(31-65 \text{ cm/yr}\)  Fast = \(>66 \text{ cm/yr}\)

† Asphalt Tolerant: This indicates that the species has proven to have a good survival rate when planted in asphalt play areas on school grounds in the Toronto District School Board.

#### Best Shade Tree: refers to the sun-blocking ability of the tree.
See Toolkit p. 42.
### Native Deciduous Shade Trees (continued)

<table>
<thead>
<tr>
<th>COMMON NAME</th>
<th>SCIENTIFIC NAME</th>
<th>HEIGHT AT MATURITY</th>
<th>GROWTH RATE*</th>
<th>SILHOUETTE AND SPREAD</th>
<th>WILDLIFE VALUE</th>
<th>SEASONAL INTEREST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>White Ash</strong>†</td>
<td>Fraxinus americana</td>
<td>20-30m</td>
<td>Medium</td>
<td>15-18m</td>
<td>Seeds are eaten by birds</td>
<td>Fall colour purple-yellow; flowers are purple and bloom in April-May</td>
</tr>
<tr>
<td><strong>Tulip Tree</strong></td>
<td>Liriodendron tulipifera</td>
<td>25-30m</td>
<td>Fast</td>
<td>12-15m</td>
<td>Seeds provide food for birds and squirrels</td>
<td>Fall colour yellow; flower colour greenish yellow and blooms in June</td>
</tr>
<tr>
<td><strong>Kentucky Coffee</strong></td>
<td>Gymnocladus dioicus</td>
<td>18-25m</td>
<td>Medium</td>
<td>12-15m</td>
<td>White flowers in spring attract insects</td>
<td>Fall colour yellow; leaves appear late in spring</td>
</tr>
<tr>
<td><strong>Hackberry</strong></td>
<td>Celtis occidentalis</td>
<td>12-18m</td>
<td>Medium</td>
<td>12-18m</td>
<td>Birds are attracted to the fruit</td>
<td>Fall colour yellow</td>
</tr>
</tbody>
</table>

### Native Coniferous Shade Trees

<table>
<thead>
<tr>
<th>COMMON NAME</th>
<th>SCIENTIFIC NAME</th>
<th>HEIGHT AT MATURITY</th>
<th>GROWTH RATE*</th>
<th>SILHOUETTE AND SPREAD</th>
<th>WILDLIFE VALUE</th>
<th>SEASONAL INTEREST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>White Cedar</strong></td>
<td>Thuja occidentalis</td>
<td>10-15m</td>
<td>Slow</td>
<td>3-5m</td>
<td>Excellent food and shelter for birds</td>
<td>Needles turn bronze colour in winter</td>
</tr>
<tr>
<td><strong>White Pine</strong>†</td>
<td>Pinus strobus</td>
<td>25-30m</td>
<td>Medium</td>
<td>6-12m</td>
<td>Provides food and shelter for birds</td>
<td>Cones open in September and seeds fall over the winter</td>
</tr>
<tr>
<td><strong>White Spruce</strong>†</td>
<td>Picea glauca</td>
<td>20-30m</td>
<td>Fast</td>
<td>3-7m</td>
<td>Excellent food and shelter for birds</td>
<td>Cones open in September and seeds fall over the winter</td>
</tr>
</tbody>
</table>

* Tree Growth Rate:  
  - **Slow** = ≤30 cm/yr  
  - **Medium** = 31-65 cm/yr  
  - **Fast** = >66 cm/yr

† Asphalt Tolerant: This indicates that the species has proven to have a good survival rate when planted in asphalt play areas on school grounds in the Toronto District School Board.

Best Shade Tree: refers to the sun-blocking ability of the tree. See Toolkit p. 42.
### Large Native Deciduous Shrubs for Shade

<table>
<thead>
<tr>
<th>COMMON NAME</th>
<th>SCIENTIFIC NAME</th>
<th>HEIGHT AT MATURITY</th>
<th>WILDLIFE VALUE</th>
<th>FRUIT FLOWERS SEEDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downy Serviceberry</td>
<td>Amelanchier arborea</td>
<td>5-10m</td>
<td>Provides food and shelter for birds</td>
<td>White flowers in April-May; purple/red fruit in Sept.</td>
</tr>
<tr>
<td>Shadblow Serviceberry</td>
<td>Amelanchier Canadensis</td>
<td>5-10m</td>
<td>Provides food and shelter for birds</td>
<td>White flowers in April-May; blue/black fruit in Sept.</td>
</tr>
<tr>
<td>Nannyberry</td>
<td>Viburnum lentago</td>
<td>4-7m</td>
<td>Provides food and shelter for birds</td>
<td>White flowers in May-June; blue/black fruit in Aug-Sept.</td>
</tr>
<tr>
<td>Staghorn Sumac</td>
<td>Rhus typhina</td>
<td>1-6m</td>
<td>Provides food and shelter for birds</td>
<td>Yellowish flowers in June-July; red fruit cones in July-Aug.</td>
</tr>
<tr>
<td>Elderberry</td>
<td>Sambucus canadensis</td>
<td>1-3m</td>
<td>Provides food and shelter for birds and butterflies</td>
<td>White flowers in June; edible black berries in Aug.-Sept.</td>
</tr>
<tr>
<td>Pussy Willow</td>
<td>Salix spp., discolor</td>
<td>2-10m</td>
<td>Flowers are an early food source for bees and provide material for hummingbird nests</td>
<td>White/cream flowers in Mar.-April; brown fruit in fall</td>
</tr>
<tr>
<td>Alternate Dogwood</td>
<td>Cornus alternifolia</td>
<td>3-5m</td>
<td>Provides food and shelter for birds</td>
<td>Pale yellow flowers in June; bluish-black fruit in August</td>
</tr>
</tbody>
</table>

### Did you know...

Large shrubs and small trees planted in hedgerows and living fences are also useful for shading sidewalks and buildings. They help reduce the heat that is reflected off asphalt surfaces, and because cool air settles near the ground, air temperatures directly under trees can be as much as 10 degrees Celsius cooler than air temperatures above the asphalt.

“Windbreaks, Corridors, Hedgerows and Living Fences”, Common Grounds, Evergreen
GUIDELINES FOR TREE PLANTING

Tree size

- It is recommended that trees meet minimum size requirements to greatly improve the chances of survival. Deciduous trees should have a trunk width or caliper of between 70 and 75 mm with a 1.75-2.15 m clear stem (no branching) from the base of the trunk to the first set of branches. Coniferous trees should be 2.5 m tall.

As you begin

- While the trees are still laid out on the ground, take off all the ties, nursery tags and canopy ropes before planting.
- When the tree is in the hole remove the top 1/3 of the wire basket, peel back burlap (cut excess off) and remove ropes that surround the trunk.
- Have a tree protection strategy in place when you plant new trees (see pages 71-74).
Ontario EcoSchools: Designing for Shade and Energy Conservation

Guidelines for Tree Planting

**Planting in turf**

a) Dig a wide hole the height of the rootball and twice its width. The top of the rootball should be level with the surrounding ground.

b) Be sure that the sides of the hole are scarified* to help roots penetrate surrounding soil and to increase drainage.

c) Be sure that the rootball rests on solid ground before backfilling.

d) Begin to fill the hole in around the tree with a blend of 3/4 local soil and 1/4 composted soil amendments.

e) Backfill to 1/3 the rootball depth and tamp to stabilize rootball and prevent air pockets.

f) Continue to backfill until the rootball is covered. Mound backfill slightly to make a saucer of soil around the tree - see illustration.

g) Water the entire backfill area until saturated. Add more soil to compensate for settling if needed.

h) Apply 10-15 cm of tub grinder wood mulch to a diameter of 2m. (no less than 1/2 a cubic yard per tree). Keep mulch weeded and replace annually.

i) Using a standard 5/8" hose, set water flow on low and soak the mulched area for approximately 15 minutes.

* scarified – when digging the hole for the tree make sure the sides of the hole are rough not smooth.
Planting in poorly drained soils

Many schools have poorly drained, heavy clay soil that retains water for long periods of time. By raising the tree's rootball slightly out of the ground and amending with sharp sand that drains well, you can improve the tree's chances of survival.

a) Dig a wide, shallow hole that is twice the width of the rootball and only 1/2 as deep.

b) Be sure that the rootball rests on solid ground.

c) Begin to fill in the hole around the tree with a blend of 3/4 local soil and 1/4 sharp sand.

d) Backfill to 1/3 the rootball depth and tamp to stabilize rootball and prevent air pockets.

e) Continue to backfill until the rootball is covered. Mound backfill slightly to make a saucer of soil around the tree - see illustration below.

f) Water the entire backfill area until saturated. Add more soil to compensate for settling if needed.

g) Mulch over soil with 10-15cm of wood mulch to a diameter of 2m (no less than 1/2 a cubic yard per tree). Keep mulch weeded and replace annually.

h) Modify watering schedule to suit the drainage conditions - watering heavy clay soils too much will drown your tree.

Note:
If you are planting a grove of trees in a wet area, plant everything 10-15 cm above grade to raise the whole planting area.
Planting in asphalt

Planting trees to provide shade where children play often means putting them in asphalt. The following is a technique that’s proven to be successful on school grounds.

a) Make a minimum 85cm (73") square cut into the asphalt.

b) Remove asphalt leaving a 10cm ledge of granular base around the inside perimeter of the asphalt cut to allow for a firm base for the turf stone to sit on.

c) Excavate all gravel and soil to a depth of the rootball plus 10cm to accommodate the sand layer and turf stone (turf stone must be laid on a bed of sand). Scarify edges of hole to avoid smooth surfaces.

d) Place tree in the hole and begin backfilling with 3/4 local soil and 1/4 composted soil amendments up to 1/3 of the rootball. Tamp to stabilize and prevent air pockets. Thoroughly soak the backfilled area. Add more soil if necessary.

e) Place a 2"x4" board across the hole and continue to backfill to 10 cm below the board – this is to ensure that there is enough space for the sand and for the turf stone layer to be laid flush with the surrounding asphalt surfacing.

f) Never lay turf stone at the time of planting. Trees must be watered for several weeks to let soil and sand materials settle.

g) Top up with sand as necessary before laying stone.

h) Three weeks after planting lay turf stone. See illustration below.

i) Backfill spaces in turf stone with sand or use a soil mix for growing grass seed.

j) Using a standard 5/8” hose, set water flow on low and soak the area for approximately 15 minutes.
Planting near salt runoff

If you’re planting trees in areas where there’s a danger of salt damage (e.g., near walkways or exits), we recommend the following:

a) Saw cut the asphalt at 2.1m (83”) square.

b) Leave 15cm lip of granular base all around the inside of the asphalt cut to provide a secure base for the timbers.

c) To plant trees follow the steps for planting in asphalt (see previous page).

d) Plant in a square box planter built of 6” x 6” timbers. The height should be 30cm (12”).

e) Timbers only need to be set down 2-3cm below the top of the asphalt surfacing.

Note:
If you are planting near an entrance or exit, plant the trees with the turf stone treatment; in all other areas use mulch inside the planter to protect tree roots.

Avoid planters made of pressure-treated lumber. It can contain arsenic and other toxic chemicals. Consider using plastic composite products. For an example of products made from recycled materials, visit www.xpotentialproducts.com
**Maintenance**

**Mulching:**

_the key to healthy trees_

Mulching has many benefits: mulch keeps roots cool, retains moisture, protects roots from foot traffic, reduces erosion and soil compaction, prevents runoff and improves the organic content of the soil. It also keeps down weeds! Apply a minimum of 1/2 a cubic yard* of tub grinder wood mulch** around the base of your newly planted trees (10-15cm deep to a diameter of 2m from the base). Top up the mulch around your trees every year. For older trees mulch out to the drip line from the trunk to ensure you are protecting the tree’s root system.

---

* Most landscape supply companies use imperial measures.

** Tub grinder mulch is a wood mulch product that has been ground down into a fine fibrous material which binds together.
Note that wood mulch (a ground-up fibrous material) is preferable to wood chips. Chips are often offered free but come with a host of problems. They can become a hazard if they get thrown by a lawnmower or become used in careless play. Also, during storms wood chips can plug up catch basins and cause flooding.

**How much mulch?**

You can order large quantities of mulch by the cubic yard from your grounds and maintenance department or from a landscape supply company. Calculate the amount of mulch you need by measuring the size of the area you want to cover with mulch. Perform this easy calculation to determine the amount needed in cubic yards:

\[
\text{length} \times \text{width} \times \text{depth} \\
\text{(express as a fraction of a foot)} / 27 \\
= \text{cubic yards}
\]

\[
e.g. \ 6' \times 6' \times 6'' \ (.5 \ of \ a \ foot) = \\
18 \text{ cubic feet} / 27 = .7 \text{ cubic yard}
\]

**Watering**

Newly planted trees will need summer watering until they become established (approximately three years).

Give your newly planted trees a deep watering during June, July, August and September.

- For trees in turf, water each tree for a minimum of 6 minutes twice a week, using a standard 5/8” hose.
- For trees planted in asphalt, set water flow on low and water for a minimum 10 minutes 3 times per week.
- Give established trees a drink during dry periods.

See page 76 for watering schedule sign-up sheet.
Weeding
Weeds will compete with your newly planted trees for water and space. Check for and remove weeds regularly. Mulching on an annual basis will reduce weed growth.

Trimming and pruning
With newly planted trees remove only broken or badly damaged branches. Begin a regular pruning program the second or third year after planting. The two main reasons for pruning shade trees are safety and health.

Pruning for safety involves removing branches that hang low or could break and fall, trimming branches that interfere with lines of sight on playgrounds, reach into play structures or block surveillance cameras. Safety pruning can be largely avoided by carefully choosing species that will not grow beyond the space available to them, and have strength and form suited to the site.

Pruning for health involves removing diseased or insect-infested wood, thinning portions of the tree to increase airflow and reduce pest problems, and removing crossing and rubbing branches. Pruning encourages trees to develop a strong structure and reduces the likelihood of damage during severe weather. Removing broken or damaged limbs encourages wounds to close. For more details on when to prune, contact your grounds department, or a nursery or consult with a local arborist.

Replacing damaged plants
If you can keep your project in good condition people will show it more respect than if it looks beaten-up and damaged. Contact your custodian to report any dead or dying trees on your school property. Remove and replace dead trees right away.
Tree protection

Mulch protects trees against many ills, as described earlier. However, if you’re concerned that the trees may suffer from vandalism or wear and tear from children, protect the tree trunk with one of the following techniques:

Wire mesh caging

This method is highly recommended for active play areas. These cages can be constructed from materials that are available from a building supply store.

1. The wire cage is 10 gauge galvanized welded 2”x2” wire mesh that is 1.5m high.

2. Use 3 regular T bars that are 2 m long evenly spaced around the tree about 30cm out from the trunk of the tree - this helps to protect the trunk of the tree from vandalism and from mechanical damage (lawnmowers, string trimmers).

3. Overlap the required amount of wire mesh by 3 squares, but make sure that the overlap is located between the T bars. This ensures that the cage will remain round and will not leave a sharp point or ridge along the T bar (a safety issue).

4. The bottom of the cage should be 15cm above grade so that you can weed and clean garbage at the base of the tree. This gap also allows for mulching, which should be done annually.

5. The tops of the T bars should be below the top of the mesh. This type of tree cage can stay around the tree for about 10 years before removing it.
Plastic snow fencing

Using plastic snow fencing to protect the trunk of a tree is a cost-effective way of ensuring that your long-term investment in shade has a chance of surviving the rigours of children’s play. It is much less expensive than the wire mesh cage. All trees should be wrapped with biodegradable burlap (no nylon in it) to the first set of branches. Apply the 1.2m high wide-banded plastic snow fence (green, brown or black) in 60cm wide strips over the top of the burlap so that it is tied together, but is slightly loose around the trunk. The excess fencing can be adjusted for trunk expansion in three years.
**Woven tree basket**

This technique involves the students and a local artist in weaving a basket-like structure around the trees with different coloured twigs, willow branches and grape vines, creating a natural protective barrier around the tree. Add mulch both inside and around the basket to a depth of 10 - 15cm.
**Stones in a circle**

Another way to protect tree roots is to use stones in a circle approximately 2m in diameter around the trunk and fill this area with daylilies, native grasses or 10-15cm of mulch. Make sure the stones are placed on a solid base, not on the mulch where they can roll or shift.
Volunteers rarely like to work alone—establish a buddy system so that people can help each other out. A calendar with names and phone numbers facilitates collaboration.*

What to do during the summer months

It’s never too soon to start thinking about summer maintenance plans. Figuring out who is available for watering will save you from last-minute scrambling. During the summer, there may be few people to do the work, but the demands are greatest in terms of watering and weeding.

Here are some creative solutions:

- Make sure maintenance teams have access to an outdoor tap, which may require a special key. Arrange for the key to be kept in a central location.
- Organize student volunteers and their families to water and maintain the area for one-week periods during the summer. Try to have this schedule organized by mid-May. Reward their efforts.
- Provide a site map with all the areas/trees that need watering as a reference for the maintenance teams.
- Hire a student. Fundraising and matching government grants can help pay for a part-time student to weed and water.
- Enlist the help of school teams or clubs to come out and volunteer their time each year.

Establish a maintenance log to help keep track of what was done and to provide suggestions for the next round of maintenance.

See if custodians and office staff, daycare staff and neighbours would also be willing to help with summer watering.

What to do with leaves?

Custodians may be concerned about raking extra leaves from newly planted trees - remind them that they can:

- Blow leaves onto lawns and then mulch them with mowers – don’t bag them and have them trucked away from the property.
- Have students rake leaves onto a tarp and use as mulch in teaching gardens or under trees.
- Think about the 4Rs: reduce, reuse, recycle and rethink! Suggest using leaves on gardens and under trees to promote soil building and nutrient replenishment to plants.
- Compost them.

* For an excellent guide on working with volunteers see www.evergreen.ca/en/resources/toolshed/hands
Watering Schedule Sign-up Sheet

Refer to the site map for the location of the plantings that need to be watered.

**Trees in asphalt** - Set water flow on low and water for a minimum of 10 minutes 3 times per week

**Trees in turf** - Water a minimum of six minutes twice a week, using a standard 5/8” hose

### Spring (Students)

<table>
<thead>
<tr>
<th>MONTH</th>
<th>WEEKS</th>
<th>STUDENTS OR CLASSES</th>
<th>TASK COMPLETED</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>Week 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>Week 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>Week 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>Week 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>Week 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>Week 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>Week 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>Week 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Summer (Families)

<table>
<thead>
<tr>
<th>MONTH</th>
<th>WEEKS</th>
<th>FAMILY/GROUP/CLUB</th>
<th>TASK COMPLETED</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td>Week 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>Week 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>Week 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>Week 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>Week 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>Week 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>Week 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>Week 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>September</td>
<td>Week 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Start a new schedule for the fall if necessary.
Writing funding applications and proposals

Starting out
1. Have a clearly defined project to fund.
   Know what your project is before seeking money for it. Think it through carefully and thoroughly. Good planning up front may take one or two years longer than initially anticipated, but the team effort will be worth it. Don’t let funding deadlines rush your decision-making and perhaps override your best judgement.

2. Ask before you buy.
   - Let parents and others know what you need - it’s amazing what you can find.
   - Contact local service clubs and businesses, which may contribute in-kind goods and services as well as cash donations.

3. Understand the grant criteria (this step will save you unnecessary work).
   - Call the representative of the funding agency to discuss your project.
   - Does your project meet its funding criteria?
   - What does it not fund (e.g., delivery charges, salaries)?
   - When are the applications due?
   - What is the turnaround time? Does this give you time to order supplies?

Completing the grant application
1. Assume that you will receive what you are asking for.
   - Have a detailed plan–know how you will spend the grant.
   - Include details such as common and Latin names of plants, how many of each species, what size the plant material will be, tools (what type and how many).
   - Send your list out for actual prices from suppliers and use these amounts on your budget page.
   - Take time to anticipate all of your costs (don’t forget such things as taxes, delivery, film and processing).

2. Share the task with others.
   - It’s a big job. Get several volunteers to take different parts of the grant application and write them up (e.g., teacher representatives can write the curriculum connections).
   - Have one person compile all the parts and submit the final proposal (this person should also be the contact).
3. **Follow the grant application questions precisely.**
   ✆ Answer all the questions in the order they appear on the application.
   ✆ Include all attachments and documents requested.
   ✆ If you don’t use the application form itself, use the application form headings in your proposal.

4. **Be clear and concise.**
   ✆ Point form answers are often better than paragraphs.
   ✆ Clearly articulate the project goals and objectives related to the funds that you are requesting.
   ✆ Make certain that your plant species and design are consistent with your stated goals.

   ✆ Demonstrate that you are organized and have a plan - include photos and site diagrams.
   ✆ Include your in-kind donations of goods and services in the budget - this shows community support for your project.
   ✆ Include a cover letter to express your enthusiasm and your dedication to the project.

5. **Provide recognition.**
   ✆ List several ways in which the funding organization will receive recognition for its support and ways in which the organization can be involved.

Sample budget

This sample includes all taxes.

### Native Plants

<table>
<thead>
<tr>
<th>COMMON NAME</th>
<th>LATIN NAME (GENUS AND SPECIES)</th>
<th>SIZE OF PLANT MATERIAL</th>
<th>SOURCE (NURSERY NAME)</th>
<th>NO. OF PLANTS</th>
<th>COST PER PLANT</th>
<th>TOTAL COST PER SPECIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tulip tree</td>
<td>Liriodendron tulipifera</td>
<td>75 mm cal</td>
<td>Board suppliers</td>
<td>3</td>
<td>$650</td>
<td>$1950</td>
</tr>
<tr>
<td>White ash</td>
<td>Fraxinus americana</td>
<td>75 mm cal</td>
<td>Board suppliers</td>
<td>3</td>
<td>$650</td>
<td>$1950</td>
</tr>
<tr>
<td>Serviceberry</td>
<td>Amelanchier laevis</td>
<td>3 gallon pots</td>
<td>Ontario Native Plants</td>
<td>6</td>
<td>$30</td>
<td>$180</td>
</tr>
<tr>
<td>Staghorn sumac</td>
<td>Rhus typhina</td>
<td>3 gallon pots</td>
<td>Humber</td>
<td>10</td>
<td>$30</td>
<td>$300</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>22</strong></td>
<td></td>
<td><strong>SUBTOTAL</strong></td>
<td><strong>$4380</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Other resources

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>QUANTITY</th>
<th>COST PER ITEM</th>
<th>TOTAL COST PER ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shovels</td>
<td>5</td>
<td>$10</td>
<td>$50</td>
</tr>
<tr>
<td>Trowels</td>
<td>5</td>
<td>$4</td>
<td>$20</td>
</tr>
<tr>
<td>Mulch</td>
<td>14 cubic yards</td>
<td>$25</td>
<td>$350</td>
</tr>
<tr>
<td>Compost</td>
<td>10 cubic yards</td>
<td>$28</td>
<td>$280</td>
</tr>
<tr>
<td>Film Processing</td>
<td>2 roles of 36</td>
<td>$8</td>
<td>$16</td>
</tr>
<tr>
<td>Professional Design</td>
<td></td>
<td></td>
<td>$150</td>
</tr>
<tr>
<td>Pizza lunches</td>
<td>2</td>
<td>$50</td>
<td>$100</td>
</tr>
<tr>
<td>Refreshments on planting day</td>
<td></td>
<td></td>
<td>$125</td>
</tr>
<tr>
<td><strong>SUBTOTAL</strong></td>
<td></td>
<td></td>
<td><strong>$950</strong></td>
</tr>
</tbody>
</table>

**SUBTOTAL Native Plants**  $4380
**SUBTOTAL Other Resources** $1075
**Total Project Costs**     $5480
Fundraising and donation ideas

There are many ways to fundraise and find donations of materials for your project. Here are 10 ideas to get you started.

- **Donation trees**
- **Commemorative trees**
- **Loonie or toonie days**
- **Fair trade coffee sales**
- **Compact fluorescent light bulb sales**
- **Parent Council** (request that a percentage of general funds raised go to school ground project)
- **Pizza lunch**
- **Hot dog days**
- **Bake sales**
- **Canadian Tire money**

Funders

Canada Trust Friends of the Environment Foundation
www.fef.ca

Canadian Wildlife Federation: Habitat 2000/Learning about Wildlife
info@cwf-fcf.org

Environment Canada (Ontario Region):
EcoAction
ecoaction.on@ec.gc.ca
www.on.ec.gc.ca/ecoaction

Evergreen/Toyota Learning Grounds Grants
www.evergreen.ca/en/lg/lg-funding.html

*For a more comprehensive list of potential funders see the Evergreen website [www.evergreen.ca](http://www.evergreen.ca).*
RESOURCES

Designing for Shade and Energy Conservation


www.earthplay.net

Other Shade Treatments

Willow structures
Living Willow
www.livingwillow.com

Shade Sails
Shade Sails Canada
www.csolve.net/~bsm/shadesails/abo.htm

Built structures
Gazebos and metal shade structures
• Playshade
www.playshade.co.uk/
• Sun Safety for Kids
www.sun safetyforkids.org/shade.htm

Combinations of Natural and Built Shade

• Shelter Strategies

Sun Awareness
• Canadian Dermatology Association
www.dermatology.ca/english/sun/index.html
• Health Canada
• Sun Safety for Kids
www.sun safetyforkids.org

Benefits of Trees
• Eastern Ontario Urban Forest Network
http://eoufn.comf.on.ca/eoufnv2/home.html
• The International Society of Arboriculture
www.treesaregood.com
• Tree Link
www.treelink.org/linx/?navSubCatRef=56

Teacher Resources

Background information on UVR
• Solar noon calculator website
www.srrb.noaa.gov

• Sun Safety Information Guide for Schools

• Sun Savvy School Club—a free resource kit available from Environment Canada. To order, contact www.msc-smc.ec.gc.ca/uvindex. It contains a UV meter, various student activity worksheets and a poster.

• Toronto Public Health. Sunburn - Prevention and Treatment, a resource linked to the Grade 6 Health and Physical Education Curriculum in the Healthy Living Strand. Available at www.city.toronto.on.ca/health/sun_grade6.pdf

Identifying Trees

Field Guides


Websites

• [www.domtar.com/arbre/english/p_06.htm](http://www.domtar.com/arbre/english/p_06.htm) Identify trees in North America

• [www.butler.edu/herbarium/treelink/treelinks.html](http://www.butler.edu/herbarium/treelink/treelinks.html) Links to tree information, identification tips, and educational materials for teachers

• [treelink.org/whattree/index.htm](http://treelink.org/whattree/index.htm) What Tree is That? Tree identification key

The Participatory Design Process

  This manual will guide you through the planning process, providing tips and templates for designing a site that reflects your local natural environment and the ideas of all involved.

• Coffey, Anne. *Asking Children, Listening to Children.* Ottawa: Canadian Biodiversity Institute, 2004.
  This guide for consulting with students is designed to accompany a video of the same name to help schools organize and conduct class-by-class brainstorming sessions at the start of their school ground transformation projects.
  [www.biodiversityonline.ca/schoolgrounds/index.html](http://www.biodiversityonline.ca/schoolgrounds/index.html)

  This guide helps schools create outdoor learning environments on their school grounds by providing a road map to assist in the planning, design, implementation and maintenance of a school ground greening project.
  [www.evergreen.ca/en/lg/green-street.html](http://www.evergreen.ca/en/lg/green-street.html)

Mapping


Site Surveying

• For protocols to conduct surveys of insects and birds, see the Ecology Explorers website at [http://capler.asu.edu/explorers](http://capler.asu.edu/explorers). Baseline surveys conducted prior to installation of the habitat allow students to compare animal use of the site before and after the project.

Making Sundials

These websites are excellent for helping decide where and how to make permanent sundials:

• [www.sundials.co.uk](http://www.sundials.co.uk) Technical information, pictures and projects, easy-to-use site.


• [www.hps.cam.ac.uk/starry/sundcalen.html](http://www.hps.cam.ac.uk/starry/sundcalen.html) The history of sundials and calendars.

• [kids.msfc.nasa.gov/Earth/Sundials/Sundials.asp](http://kids.msfc.nasa.gov/Earth/Sundials/Sundials.asp) NASA

Shade Policy


• Sunsmart Policy

• Sunsmart School Policy Guidelines
  [www.cancerresearchuk.org/sunsmart/schoolsandchildren/schoolpolicyguidelines/](http://www.cancerresearchuk.org/sunsmart/schoolsandchildren/schoolpolicyguidelines/)
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Project Designer
Comet art + design

ORDERING INFORMATION
Free copies of all Ontario EcoSchools guides may be downloaded in PDF format from York University’s Faculty of Environmental Studies website at www.yorku.ca/fes/envedu/ecoschools.asp

The three multimedia presentations are available only on the EcoSchools Resources for Ontario Schools CD (both PC and Mac-compatible). This CD also includes the Ontario EcoSchools guides and curriculum resources and is available for the cost of shipping and handling. For ordering information, please contact:

Library and Learning Resources
Toronto District School Board
Tel: 416-397-2595  Fax: 416-395-8357
Email: curriculumdocs@tdsb.on.ca
This guide is an adaptation of *School Ground Greening: Designing for Shade and Energy Conservation* produced by Evergreen and the Toronto District School Board (TDSB). The TDSB and Evergreen have donated this resource to Ontario EcoSchools as part of their in-kind contribution to the project.

**PROJECT PARTNERS**

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www.yorku.ca/fes/envedu/ecoschools.asp