

# The Deerfield School Forest Education Plan

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<sup>1</sup> Education Plan edited and compiled by Christina Charles; all other authors are noted in the table of contents.

# Rationale

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## Value Statement

Free time in nature for children to discover and explore has become increasingly limited in recent years as children are herded inside—to avoid strangers, because they are too busy for free play, they are stuck in a strictly scheduled lifestyle, or they are simply interested in activities that involve other outlets.

Our circles of knowledge have expanded far beyond that of our parent generation. With the push of a button, the click of a mouse, one can travel around the world and back without leaving the comfort of their immediate surroundings. Video games, television, and the Internet are often favored over time outdoors. As our children have lost touch with the outdoors, a world filled with natural wonder, amazement, inspiration, and education, nature becomes merely an object to be observed from afar. For example, children in grade three can spend a week learning about rainforest ecosystems, animals and habitats. In the same unit, they learn to appreciate the gravity of the rainforest's continual destruction, and for that brief moment in their education, they are introduced to applicable environmental education. What they do not realize, though, is that while the unit was being taught, thirty acres of deciduous forest just outside of town has just been leveled to make way for the most recent housing development. To these children, destruction and environmental disrespect is something that happens in the rainforest, not down the street (Louv, 2005)<sup>2</sup>.

What these children need, as do many across the nation, is an understanding of their immediate surroundings and an appreciation of nature that is truly right outside their front doors. Deerfield schools have the opportunity to participate in active environmental education by utilizing a resource, our school forest, which has been in the hands of the school district since 1966. We hardly realize how lucky we are to have this as a gift, as undeveloped, natural, living land is hard to come by at this present time.

The Deerfield School Forest has the potential to become a valued asset to both the Deerfield school system and the Deerfield community as a whole. It can become an inexpensive, practical teaching and learning tool, a community event venue, and a model of significant small town accomplishment. To reach this, the forest will have to overcome environmental stressors and past misuse in order to thrive. In addition, the Deerfield school system must take responsibility with the faculty to ensure proper training for the use of forest facilities.

## Target Messages

1. It is important to establish a natural respect and responsibility for one's immediate surroundings. An appreciation of the surrounding area reminds children of the power of nature, and instills a sense of responsibility to protect the land around them, hence nurturing environmental stewardship.
2. Humans are a part of the natural world. An understanding of the outdoors teaches people their place in nature. With knowledge that humans are members of an ecosystem as opposed to mere observers, a greater understanding of people's role among their surroundings is reached.
3. Conservation and sustainability are important responsibilities to be practiced by each individual. The school forest has the potential to fall victim to the effects of climate change, environmental pollutants, and invasive pests. Each stressor offers a lesson and teaches the importance of environmental maintenance, conservation, and sustainability.

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<sup>2</sup> Louv, R. 2005. *Last Child in the Woods—Saving Our Children from Nature-Deficit Disorder*. Chapel Hill: Algonquin Books.

## Needs Assessment Results

In the fall of 2007, teachers were sent a survey via email regarding the school forest. Issues included present use of the forest, limitations to using the forest, and ideas for future use of the forest. Feedback was as follows:

According to surveys, the school forest has not been very frequently used. While some elementary teachers take students out once per year, the only other significant use occurred during the high school's Field Biology class. The two most frequently cited barriers to use were **lack of transportation** and **lack of restrooms**. The other overall theme is that many teachers are comfortable with the curriculum in place, and **do not have the time or ideas** to include the forest in that curriculum.

However, the teachers that ARE interested in utilizing the forest have numerous ideas for their curricula. These include, but are not limited to:

- |   |                                      |
|---|--------------------------------------|
| ❖ Air quality monitoring                        | ❖ Life cycle investigations          |
| ❖ Art—photography, drawing, painting, sculpture | ❖ Mathematics—practical applications |
| ❖ Climate change study                          | ❖ Mapping                            |
| ❖ Creative writing                              | ❖ Multi-sense observation            |
| ❖ Conservation study                            | ❖ Navigation                         |
| ❖ Construction                                  | ❖ Nutrient cycles                    |
| ❖ Ecological restoration                        | ❖ Phenology                          |
| ❖ Exotic species impact and control             | ❖ Plant identification               |
| ❖ Food web analysis                             | ❖ Scout projects                     |
| ❖ Forest management                             | ❖ Stewardship projects               |
| ❖ Forest regeneration                           | ❖ Soil science                       |
| ❖ Forest surveys                                | ❖ Team building                      |
| ❖ Geology                                       | ❖ Trail hiking                       |
| ❖ Habitat studies                               | ❖ Water cycle analysis               |

The above opportunities will be discussed in more detail in the Educational Connections section of this document.

# Site Description and Opportunities

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## Description and Location

### Legal Description:

A part of the northwest quarter of the southwest quarter of Section 30, Town 7 North, Range 12 East, Township of Deerfield, Dane County, Wisconsin. Size is 6.684 acres.

### Ecological Description:

The Deerfield School Forest is located at the crest of a spectacular glacial drumlin that trains toward the southwest from approximately 20° east of north. Drumlins in the Deerfield area, created by the Green Bay Lobe of the Wisconsin Glacier during the Quaternary Ice Age, have been studied by geologists from around the world. All of our students are formally exposed to glacial geology during the 7<sup>th</sup> grade science course, and a handful of students electing General Science at the high school also study this topic. Most students are at least aware of the term “drumlin” as the Glacial Drumlin State Trail runs east/west approximately a mile north of the school forest.

Despite being surrounded by agricultural fields, it attracts a wide variety of wildlife. At the present time, there have been more than 30 species of birds observed in and around the school forest. Common species include chickadees, nuthatches, blue jays, red-tailed hawks, mourning doves, goldfinches, and crows. Reports of rare species include yellow-bellied sapsuckers, brown creepers, northern flickers, hermit thrushes, and a great horned owl.

According to Curtis (1965)<sup>3</sup>, the land was originally prairie/oak savannah. The forest is made up of many different types of trees, both deciduous and coniferous. These include white pine, red cedar, cherry, box elder, maple, mulberry, dogwood, and oak. Many of the white pines are well over 30 feet tall, while the maples and red cedars still remain saplings. According to the DNR, the school forest will eventually transform back into an oak savannah, as the pH of the soil cannot support the current species of trees. Evidence of this prediction can already be found on the north end of the forest, where the oak trees dominate that section.

Soil tests indicate a pH of 7 at the top of the drumlin and a pH of 6-6.5 at the northeast and southwest corners of the base of the drumlin.

### Directions from Deerfield:

- Take Liberty Road south to Oak Park Road.
- Go left at Oak Park, and take the next right at Olstad.
- Take Olstad, and go left on Deerfield Road.
- An entrance drive is on the east side of the street, across from Jargo Road.

## Cultural History

The history of the Deerfield school forest was extensively researched last in 1998 by a team compiled by Carol Banaszynski, consisting of several students who were a part of her Field Biology class. With the assistance of Matt Blessing of the Wisconsin Historical Society, the ownership of the forest was traced and a timeline was established.

Deerfield Community School District became the rightful owners of the present school forest on October 3<sup>rd</sup>, 1966. The land, consisting of 6.684 acres was then located in the Stoughton School District, and was transferred to Deerfield on July 1<sup>st</sup>, 1968. The land was a gift given by Mrs. Mabel J. Ziegelman as a memorial to her husband, Gregor D. Ziegelman, principal in the Deerfield School District from 1922 to 1952. She donated the land under two conditions: 1) The school

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<sup>3</sup> Curtis. 1965. “Early Vegetation of Wisconsin”. Taken from <http://www.uwex.edu/wgnhs/earlyv.htm>

would erect a plaque in memory of Mr. Ziegelman, and 2) Mrs. Ziegelman had access to the forest to remove Christmas boughs at her own discretion. A surveyor's map indicates that the school forest was rolling prairie until trees were planted on the land on Arbor Day of either 1937 or 1938.

Gregor D. Ziegelman acquired the property from the Bank of Deerfield on October 10<sup>th</sup> of 1938. The bank had foreclosed upon the land, owned then by Charles H. and Eleanore Sager, and S. M. and Helen Halvorson, on May 24<sup>th</sup>, 1932. Many foreclosures were taking place during this time, the height of the Great Depression. Eleven years previously, the Sagers had taken out a mortgage on April 1<sup>st</sup>, for \$7200 to purchase the land. This mortgage was paid in full on June 1<sup>st</sup>, 1910.

Prior to the Sagers' ownership, the property changed hands many times. The Sagers acquired the property from Mr. J. Perry Whaling of Madison, and Otis and Lillie Whaling of Deerfield on March 15<sup>th</sup>, 1894. J.P. and Otis Whaling acquired the property from Isaac and Martha McCann of Boynton, Virginia on April 18<sup>th</sup>, 1890. Mr. McCann, who lived in Battleboro, Vermont at the time, acquired the property from B.E. and Jennie Whaling, residents of London in Jefferson county on March 24<sup>th</sup>, 1885. B.E. Whaling bought the property from George B. and Alma Burrows of Dane county on January 5<sup>th</sup>, 1875. Mr. Whaling, pastor at one of the first churches in London, appears to have been some type of tax agent for the county. It was not uncommon for such agents to buy and sell pieces of land to pay taxes on other properties. Mr. Burrows came to own the land from the same Byron E. Whaling, who would later buy the land back, on December 21<sup>st</sup>, 1874.

Since the donation of the land in 1966, several names speckle the history of the forest. In 1971, area DNR forester Jerry A. Lapidakis recommended that an access road be constructed to the forest, and he suggested extensive pruning, which was later completed by Dean Wiseman, Superintendent of Deerfield Schools during the 1971-1972 school year. In 1979, fourth grade teacher, Cindy Godar contacted DNR forester, Paul E. Pingrey about assistance with an outdoor education program.

Timber sales were conducted in 1980, with Starks Horse Logging of Marshall, Wisconsin. Trees marked for removal were sold for \$5.00 per cord, though there is no record of the contract being fulfilled. In 1982, science club advisor Gerald Wichlacz prepared a proposal that suggested the improvement of the school forest facilities. The proposal was submitted to the Superintendent of Schools, but there is no evidence of anything being done in response to Mr. Wichlacz's proposal. In 1988, Deerfield High School's agriculture teacher, Burt Parris, made efforts to use the school forest as a resource, though there is no evidence that this was accomplished. Carol Banaszynski proposed a class, to be entitled Field Biology. After its approval, Mrs. Banaszynski became active in the maintenance and upkeep of the school forest.

## **Opportunities**

Over the years, many different man-made structures have been added to the forest. There is a picnic area, conveniently placed at the edge of the forest. It has three weather-resistant picnic tables that are available for anyone to use. There is also a waste disposal container set up near the area to prevent littering, which keeps the area more comfortable and inviting to both people and animals.

Throughout the trails in the forest, there are several benches on which people may use. They are made of the same weather-resistant material as the picnic tables. They are all placed in a way that, if anyone were to sit there, they wouldn't be disappointed by the view. One is facing a beautiful clearing in the forest interior, while another one overlooks the prairie that leads up to the forest edge.

Two birdhouses have been observed in the forest, but some still may have gone unnoticed, as it is unknown who put them there. Upon further inspection, the houses seem to have been made to attract chickadees and titmice, but other species that may use them include downy woodpeckers, white-breasted nuthatches, house sparrows, brown creepers, and house wrens. One has unfortunately been chewed open by squirrels. It is our goal to set up many more birdhouses

in and around the forest to attract an even wider variety of birds, such as tree swallows, red-bellied woodpeckers, bluebirds, and kestrels.

In the near future, we plan to construct a small pond on the edge of the forest, complete with a water dripper. The pond will be an oval shape, measuring three feet wide and nine feet long. This pond is meant to benefit much of the wildlife that resides in the forest and will be constructed in that way. It will be two feet at its deepest. On one edge, it will have a relatively steep slope going into the water to help the larger mammals, like deer, raccoons, and opossums, have access to water. Another edge of the pond will have a subtle slope into the water, to give several species of songbirds (and the occasional squirrel) a location to get a drink and take a bath. The water dripper is meant to keep the pond supplied with water and attract many species that would not otherwise live in the forest, as many migratory species of birds are attracted to the sound of flowing water. Some birds will only raise their young near a convenient water source. These birds, like eastern wood peewees, wood thrushes, and bank swallows may use the pond to teach their young how to catch insects off the surface or how to make their nests from the mud found along the shore.

We are also planning on erecting a small wall several feet behind the pond. One side of the wall will have rocks from all over Wisconsin with little informational plaques that are secured to the stone. The other side will have the same kinds of rocks, but mixed around, without any plaques. This provides an opportunity for people to see if they can match the rocks on one side to the labeled rocks on the other side.

Throughout the year, many seed-eating birds may find it difficult to find food. We have set up a bird-feeder in the forest to provide them with food that will meet their nutritional needs. It is presently only a single platform feeder, but we are planning on making it into a bird feeding station, providing sunflower seeds, peanuts, and rendered beef suet. It will be located near the benches.

The final man-made structure is a small amphitheater, placed directly in the middle of the forest. Currently, it only consists of several rows of wooden benches facing a small, clear area. We hope to eventually add a small platform for a person stand on and address the people on the benches, or even a small stage for performances. We may add more benches as the need arises.

As can be seen from this section, there are a variety of options available for use in the school forest.

## Management

At its beginning stages, the school forest has immediate needs that must be met to improve its overall health, as well as provide a baseline of safety and usefulness for students. This includes:

### Immediate Tasks

Task	Parties Involved	Educational Value
Control of and education about invasive species—buckthorn, honeysuckle, garlic mustard, mulberry, box elder	Deerfield High School's Field Biology class, Deerfield High School's Science Club, and the local Boy Scouts of America troop	Invasive species are a major ecological issue in our local and global communities. Students of all ages can learn about this concept and be on the lookout for these species in their everyday lives.
Control of poison ivy in heavy traffic areas—trails and amphitheater area	Deerfield High School's Field Biology class, Deerfield High School's Science Club, and the local Boy Scouts of America troop	All students and community members can benefit from learning about being able to recognize poison ivy and other harmful plants.
Improvement of trails—trimming and addition of wood chips	Deerfield High School's Science Club	In adding wood chips to the trails, students will understand the principles of succession (in trying to avoid succession by weeds) and

		become stewards of their local environment.
Regular mowing of driveway	Deerfield facilities staff or community volunteers	Community members will be given the opportunity to become stewards of their local environment.

#### Longer-term Tasks

<b>Task</b>	<b>Parties Involved</b>	<b>Educational Value</b>
Addition of bathroom facilities—composting toilet	Deerfield High School's Technology Education classes	Besides being an effective way to handle the human waste issue, using a composting toilet provides a segue way to discuss ecological decomposition.
Construction of bird pond	Deerfield High School's Science Club	Students will get a lot out of this activity. Besides learning about ideal bird habitats and the value of having a water source, they will also educate themselves about the wide variety of Wisconsin geology in the rocks that will surround the pond.
Addition of bat houses and cavity nesting boxes	Deerfield High School's Science Club and Technology Education classes	All parties involved will learn about ideal habitats and behaviors of different species of bats and birds. Technology education students will gain experience in woodworking.
Implementation of interpretative materials—cedar and carbon fiber signs, displays	Deerfield High School's Science Club, and Field Biology and Technology Education classes	To create the interpretive materials, student will have to acquire a detailed knowledge of the historical, geological and natural features of the forest, and in turn, their local community. Technology education students will again gain experience in woodworking and building.
Creation of art and literature corridor	Deerfield High School's Art Club, and Art and English classes	Students will have the opportunity to make the connections between nature and art, and the community will have the opportunity to appreciate the beautiful works of art created by our students.
Construction of a performance stage	Deerfield High School's Technology Education classes	Students will have the opportunity to make the connections between nature and performance, and the community will have the opportunity to appreciate beautiful art and music in an inspiring setting.
Introduction of independent study course—"School Forest Management"	Deerfield High School Science Department	Students will have the opportunity to observe and record the ongoing changes in the school forest. By keeping these records, students will become deeply aware of the forest's activities and will develop a sense of stewardship for the forest. This class



		will also give the student the opportunity to communicate forest activities with the community, through the creation of a school forest newsletter.
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Advisors and collaborators are available to assist in the above projects. They include (but are not limited to):

- John Exo
- Randy Stamphl
- Bill Volkert
- Pete Vogel
- Boy Scouts of America, local troop
- The Pond Shop
- The Audubon Society

# Educational Connections

## Key Concepts

1. Humans seek to understand natural phenomena.
2. The natural world is in a constant state of dynamic equilibrium, and humans have a large influence on the state of that equilibrium.
3. An understanding and appreciation for nature promotes a sense of responsibility and stewardship in humans.
4. Interaction with nature can serve as a source of inspiration, and has done so throughout human history.
5. Activity in nature promotes physical and emotional well-being.
6. The history of human interaction with nature is reflected by the social/political situations of different time periods.

## Classroom Curriculum Connections (organized by grade level, then content area for Middle/High School)

Grade Level	Skill/Goal/Content Area	Activity—Site Connections	Key Concept	Wisconsin Model Academic Standard
<b>ELEMENTARY SCHOOL</b>				
<b>K-2</b>	Understand the relationships in nature Build on the idea that we are all stewards of the earth	Adopt-a-Tree Autumn Scavenger Hunt Bird Watching	1, 2, 3, 6	N/A
<b>3</b>	Understand the life cycle of plants and insects	Hunt for examples of living things at different stages of their life cycle	1	F.4.3
<b>3</b>	Understand renewable and nonrenewable resources, and gain respect for the environment	Have a cleanup in and around the forest	1, 2, 3, 6	E.4.3
<b>3</b>	Compare and contrast a deciduous forest with a tropical rainforest	Stand in one place in the forest and sketch everything that is observed	1	F.4.4
<b>4</b>	Soils have properties to support the growth of plants	Describe soil and rock properties	1	E.4.1, E.4.2, E.4.3
<b>4</b>	Earth's surface changes—slow vs. rapid	Observe changes in the land based on water, ice, and wind	1	A.4.5
<b>4</b>	Changes in environment can be natural or human based	View changes in the area and determine if they are caused by natural or human processes	1, 2, 3, 6	A.4.5
<b>4</b>	Wind/water erosion	Observe erosion and how it affects the area	1	A.4.5, E.4.1, E.4.2, E.4.3
<b>4</b>	Weathering	Keep a record of long term changes from year to year	1	A.4.5
<b>4</b>	Basic needs of organisms	Discover organisms that live in the area and what needs they have	1, 2	F.4.1, F.4.2, F.4.3
<b>4</b>	Animal and plant structures used for growth, survival, and reproduction	Observe plants and animals, and learn their structures	1	F.4.2, F.4.3

<b>Grade Level</b>	<b>Skill/Goal/Content Area</b>	<b>Activity—Site Connections</b>	<b>Key Concept</b>	<b>Wisconsin Model Academic Standard</b>
<b>4</b>	All animals are dependent upon plants	Observe how animals use plants to survive	1, 2	A.4.5, F.4.1, F.4.2, F.4.3
<b>4</b>	Behavior patterns of organisms are related to their environments	Observe organisms and determine how their behavior relates to the environment	1, 2	F.4.2, F.4.3
<b>4</b>	Classification of living things	Use plant and animal classification systems to learn what organisms are	1	F.4.1, F.4.2, F.4.3
<b>4</b>	The sun provides energy to living organisms	Observe how organisms use the sun to help them survive and function	1, 2	E.4.5, E.4.6
<b>4</b>	Weather changes from day to day and season to season	Make observations on the weather Put up a weather station	1	A.4.5, E.4.5, E.4.6
<b>4</b>	Using tools for observation and measurement	Use tools to measure the growth of organisms	1, 2	C.4.1, C.4.2, C.4.4, E.4.8, F.4.4
<b>4</b>	Engage in scientific inquiry about nature	Develop questions to help improve knowledge of observations	1	C.4.1, C.4.2, C.4.4, E.4.8, F.4.4
<b>4</b>	Engage in the scientific process—observation, hypothesis making and testing...	View natural objects to experience aspects of the scientific research process	1	C.4.1, C.4.2, C.4.4, E.4.8, F.4.4
<b>4</b>	The water cycle	View different parts of the water cycle	1, 2	C.4.1, C.4.2, C.4.4, E.4.8, F.4.4
<b>4</b>	Learn about the air all around us	Observe how air movement affects organisms	1, 2	C.4.1, C.4.2, C.4.4, E.4.8, F.4.4
<b>5</b>	Identify parts of a plant	Record plants found and describe parts	1	F.8.1
<b>5</b>	Identify plant cells and parts of a plant cell	Use a microscope to observe plant cells	1	F.8.1
<b>5</b>	Identify stages in the life cycle of a plant	Look for seeds, seedlings, and mature plants	1	F.4.3
<b>5</b>	Describe the flow of energy through an ecosystem	Identify plants and animals in the forest and use it to generate a food web	1, 2	F.4.3, F.8.8
<b>5</b>	Describe changes to the ecosystem	Identify changes to the forest ecosystem	1, 2	F.8.9
<b>5</b>	Identify properties of rocks and minerals and use those properties to identify and classify them	Investigate and classify rocks and minerals at the school forest	1	E.4.1, E.4.2
<b>5</b>	Identify earth processes that change rocks	Look for and identify examples of erosion in the school forest	1	F.8.9, E.8.1, E.8.4

<b>Grade Level</b>	<b>Skill/Goal/Content Area</b>	<b>Activity—Site Connections</b>	<b>Key Concept</b>	<b>Wisconsin Model Academic Standard</b>
<b>6</b>	Understand how organisms interact with their environments	Investigate and observe organisms in the forest and describe their interactions	1, 2	F.8.8
<b>6</b>	Describe parts of an ecosystem	Investigate and observe ecosystems, and describe them	1	F.8.8
<b>6</b>	Explain how organisms may have the same habitat but not the same niche	Investigate and observe organisms in the forest and identify each of their niches	1, 2	F.8.8
<b>6</b>	Recognize why organisms live where they do	Investigate and observe organisms of different levels and classify them—primary, secondary, tertiary, scavenger, and decomposer	1, 2	F.8.8
<b>6</b>	Identify producers and different feed levels of consumers in an ecosystem	Investigate organisms in the forest and make models to show their relations, as well as connections to food webs.	1, 2	F.8.8
<b>6</b>	Explain and construct models to show how organisms are related by how they get their food	Investigate organisms in the forest and make models to show their relations, as well as their connections to food webs.	1, 2	F.8.8
<b>MIDDLE/HIGH SCHOOL</b>				
<b>7</b>	<b>Earth Science</b> Students use GPS to locate positions relative to the points on a compass and compete in teams to follow a course through the school forest	Orienteering	1	C.8.1, C.8.8
<b>7</b>	<b>Earth Science</b> Students create and utilize different weather instruments to measure and predict weather	Weather, climate	1	A.8.4, C.8.1, C.8.2, C.8.3, C.8.11, E.8.1, E.8.3
<b>7</b>	<b>Earth Science</b> Students measure and create topographic maps of the area using GPS technology	Mapping	1	A.8.4, C.8.2

<b>Grade Level</b>	<b>Skill/Goal/Content Area</b>	<b>Activity—Site Connections</b>	<b>Key Concept</b>	<b>Wisconsin Model Academic Standard</b>
<b>7</b>	<b>Earth Science</b> Students will use scientific instruments and methods to take various measurements (identify invasive species, test soil, measure height of trees, record flora and fauna) of the school forest to determine its overall health and devise a plan of action to improve it if necessary	Measurement Ecology Action planning	1, 6	A.8.1, A.8.8, C.8.1, C.8.11, F.8.8, F.8.9, G.8.5
<b>9-12</b>	<b>Alternative School</b> Participate in team-building activities, such as low ropes courses, orienteering, and wilderness survival exercises	Team-building	3, 5	Health B.12.6 Physical Education G.12.3
<b>9-12</b>	<b>Alternative School</b> Engage in forest projects to fulfill service learning requirements of the program	Service learning	3, 5	National Service Learning Standards
<b>9-12</b>	<b>Alternative School</b> Go for hikes in the forest to encourage healthy pastimes	Health and wellness	5	Health B.12.4 PE A.12.1, E.12.2
<b>9-12</b>	<b>English</b> Sit still in the forest use concrete, sensory details to describe surroundings	Sensory description	4	B.12.1
<b>9-12</b>	<b>English</b> Turn sensory detail writings into poems or stories to publish in the community	Poetry writing Prose writing	4	B.12.1 B.12.2
<b>9-12</b>	<b>English</b> After a study of nature writers, such as Henry David Thoreau and Barbara Kingsolver, spend time in the forest observing. Then, write a nature piece in the style of a chosen nature writer	Author studies	4	A.12.3 B.12.1
<b>9-12</b>	<b>English</b> Read outdoors adventure literature by a writer such as Gary Paulson or Jack London. Go to the forest to simulate nature survival techniques as depicted in the novels	Theme reading—nature, survival	4	A.12.2 A.12.3

Grade Level	Skill/Goal/Content Area	Activity—Site Connections	Key Concept	Wisconsin Model Academic Standard
9-12	<b>English</b> Students write language arts-themed scavenger hunts and use the forest to hide clues for classmates to find	Active study-skills	4	B.12.1
9-12	<b>English</b> Use the forest amphitheater to stage class productions of Greek myths and Shakespeare to recreate historical atmosphere	Drama Mythology Shakespearean literature	4	A.12.2 A.12.3
9-12	<b>English</b> As a class, read nature-themed stories and novels in the forest to enhance the experience of the writing	Theme reading—nature, survival	4	A.12.2 A.12.3
9-12	<b>English</b> Working with the science department, use technical writing skills to create informational plaques for stations in the forest	Technical writing	1, 2, 3, 4, 6	B.12.1 B.12.2
8	<b>Mathematics</b> <ul style="list-style-type: none"> <li>• Tree and plant growth proportions—shadows, ruler measures and similar figures</li> <li>• Compare tree growth in different areas, discuss growth factors (natural or human)</li> </ul>	Proportions	1, 2	B.8.1, B.8.3, B.8.5
9-12	<b>Mathematics</b> Forest regeneration—plant and animal populations; discussions on global effects/importance	Exponential Decay and Growth	1, 2, 6	F.12.1, F.12.2, F.12.3, F.12.4
9-12	<b>Mathematics</b> Algebraically model growth in nature. Discussions on global effects/importance	Linear Models	1, 2, 6	F.12.1, F.12.2, F.12.3, F.12.4
9-12	<b>Mathematics</b> Angle Proportions: use angles and trigonometry concepts in nature—distance to Planets, Earth measures, tree, measures	Trigonometry	1,	C.12.5, D.12.3

Grade Level	Skill/Goal/Content Area	Activity—Site Connections	Key Concept	Wisconsin Model Academic Standard
9-12	<b>Mathematics</b> Using knowledge of slope, distance, and angular grade, students will plot topographic maps of the school forest. Maps will be created each year and compared with maps created in other years	Topographic Maps	1	C.12.2, D.12.2, D.12.3
9-12	<b>Mathematics</b> An interdisciplinary adventure course that combines intellectual questioning, mathematical/reasoning in orienteering, scientific exploration and information gathering, and physical work in completing the course	Adventure Race/Orienteering	1, 2, 3, 4, 5, 6	Integration of content areas and standards
6-12	<b>Music</b> <ul style="list-style-type: none"> <li>• Concerts</li> <li>• Encore of school musical</li> <li>• Show choir retreat</li> <li>• Drama exercises in listening and improvisation</li> <li>• Use natural objects to make musical instruments</li> <li>• Summer theatre program (like smaller-scale APT)</li> </ul>	Music Drama	4	A.8.1, A.8.2, A.8.3, A.8.4 G.8.3, G.8.4
				A.12.3, A.12.4, A.12.5, A.12.6, A.12.7, A.12.8 G.12.4, G.12.5
6-12	<b>Physical Education</b> <ul style="list-style-type: none"> <li>• Nature scavenger hunt with pedometers</li> <li>• Fitness stations with pedometers</li> <li>• Orienteering/navigation skills with compass</li> <li>• Low ropes course</li> <li>• Team building challenges</li> <li>• Survival skills</li> <li>• Practical outdoor skills</li> <li>• Using and understanding pulse monitors</li> <li>• Group problem solving</li> </ul>	Fitness Team-building Survival Outdoor skills Problem-solving Equipment use	1, 5	A.8.3, A.8.4 D.8.1, D.8.2, D.8.4 E.8.1 F.8.1, F.8.2, F.8.3, F.8.4, F.8.5, F.8.6
				A.12.1 D.12.1, D.12.2, D.12.3, D.12.4 F.12.1, F.12.2, F.12.3, F.12.5, F.12.6, F.12.7

<b>Grade Level</b>	<b>Skill/Goal/Content Area</b>	<b>Activity—Site Connections</b>	<b>Key Concept</b>	<b>Wisconsin Model Academic Standard</b>
<b>9-12</b>	<b>Science</b> General Physical Science Students will learn about the glacial history of Wisconsin as they study the drumlin on which the school forest is located	Geology—glacial history of Wisconsin	1	E.12.2
<b>9-12</b>	<b>Science</b> General Physical Science Students will learn about Wisconsin geology as they study the rocks of the school forest bird pond	Wisconsin geology	1	E.12.2
<b>9-12</b>	<b>Science</b> Biology Field Biology Students will learn about birds (native to WI/migratory) at the school forest—learn bird calls, document bird sightings, use field guides, and study bird behaviors	Bird identification Behavioral ecology Field guide use	1, 2	F.12.7, F.12.12
<b>9-12</b>	<b>Science</b> Biology Field Biology Students will study the plant life at the school forest—they will identify the different species of trees and shrubs in the forest, make abundance estimates of each species, and study their growth	Plant biology Population ecology Field guide use Plant identification	1, 2, 3, 6	F.12.5, F.12.6, F.12.7
<b>9-12</b>	<b>Science</b> Biology Field Biology Students will study invasive species at the school forest—they will learn about ecological effects of invasive species, and identify them to plan for their control	Invasive species Community ecology Plant identification Field guide use	1, 2, 6	F.12.5, F.12.6, F.12.7, F.12.8, H.12.7



<b>Grade Level</b>	<b>Skill/Goal/Content Area</b>	<b>Activity—Site Connections</b>	<b>Key Concept</b>	<b>Wisconsin Model Academic Standard</b>
<b>9-12</b>	<b>Science</b> Biology Field Biology Chemistry Advanced Chemistry Students will study the abiotic factors in the school forest—soil temp/pH/composition, rainfall, and air temperature	Measurement Abiotic factors	1, 2	D.12.12
<b>9-12</b>	<b>Science</b> Biology Field Biology Students will take phenological data at the school forest, documenting changes in seasons and the effects on living things	Phenology	1, 2	F.12.8
<b>9-12</b>	<b>Science</b> Biology Field Biology Students will learn about tracking mammals, using field guides and studying mammal biology, ecology and behavior	Mammal tracking Field guides Mammal behavior	1, 2	F.12.5, F.12.7, F.12.12
<b>9-12</b>	<b>Science</b> Biology Field Biology Students will learn how to keep a field journal and make a variety of observations about the school forest	Science writing Making observations Recording data	1, 2	C.12.4
<b>9-12</b>	<b>Science</b> Biology Field Biology Students will identify and document the variety of insect species at the school forest—they will also learn about the biology and abundance of those insects	Insect identification Population ecology	1, 2	F.12.5, F.12.6, F.12.7, F.12.8
<b>9-12</b>	<b>Science</b> Biology Field Biology Students will collect and dissect owl pellets from the school forest	Food webs Bone identification	1, 2	F.12.7, F.12.11, F.12.12

<b>Grade Level</b>	<b>Skill/Goal/Content Area</b>	<b>Activity—Site Connections</b>	<b>Key Concept</b>	<b>Wisconsin Model Academic Standard</b>
<b>9-12</b>	<b>Science</b> Biology Field Biology Students will use photography to document and collect specimens from the school forest (as opposed to taking actual specimens)	Data collection	1, 2	C.12.4
<b>9-12</b>	<b>Science</b> Biology Field Biology Students will study land ethic and conservation principles, and they will discuss how suburban sprawl is affecting the Deerfield area, relating to the school forest as a local example	Conservation Land ethic Local issues	1, 2, 3, 6	A.12.5, A.12.7, C.12.7, H.12.1
<b>9-12</b>	<b>Science</b> Cross-curricular—PE, art, math <ul style="list-style-type: none"> <li>• Survival skills</li> <li>• Photodocumentation</li> <li>• Orienteering</li> </ul>	Survival Photography Orienteering	1, 2, 4, 5	Art--C.12.5, D.4.3, D.4.4
<b>9-12</b>	<b>Social Studies</b> US History Students will use the school forest to participate in an authentic reenactment of trench warfare in World War I	Tactical strategies of WWI History of WWI	3, 6	B
<b>9-12</b>	<b>Social Studies</b> US History World History Archaeology Anthropology Students will learn how to construct accurate maps, as well as how to read a map, use directions and a compass	Mapping Orienteering	1	A.12.1

<b>Grade Level</b>	<b>Skill/Goal/Content Area</b>	<b>Activity—Site Connections</b>	<b>Key Concept</b>	<b>Wisconsin Model Academic Standard</b>
<b>9-12</b>	<b>Social Studies</b> US History Grade 4—local history Students will research local history of the land area, the demographics, and the history of the village, its government and people. They can display this information on signs/plaques throughout the school forest area to accompany information about topographical and geographical features.	Local history Interpretive signs	3, 6	B.12.3
<b>9-12</b>	<b>Social Studies</b> US History World History Government Students will research the economic effects of environmental consumption vs. environmental conservation on surrounding local area, the US, and the world.	Economics—consumption vs. conservation	1, 2, 3, 6	A.12.9
<b>9-12</b>	<b>Social Studies</b> Government Students will study the idea of economics through state and local budgets by looking at the school board budget and the process used to determine what cuts to take. Students will look at the effect of ethics on budget policy	Economics—local and state budgets	3, 6	A.12.10
<b>9-12</b>	<b>Social Studies</b> Government Students will research the pros/cons of having the school forest for educational purposes vs. its economic value and write a position paper defending their view.	Economics vs. education Position defense	1, 2, 3, 6	C.12.8 C.12.10

<b>Grade Level</b>	<b>Skill/Goal/Content Area</b>	<b>Activity—Site Connections</b>	<b>Key Concept</b>	<b>Wisconsin Model Academic Standard</b>
<b>9-12</b>	<b>Social Studies</b> American Government Students will research the effects of public opinion on public policy by using the school forest as a local example.	Public policy	3, 6	C.12.11
<b>7-12</b>	<b>Special Education</b> Students will learn about how human behaviors affect ecology, from small scale to large scale	Human-nature interactions	1, 2, 3, 6	Individual goals are a part of each student's Individualized Education Program
<b>7-12</b>	<b>Special Education</b> Students will engage in community service experiences in the school forest to help fulfill their portfolio work	Community service	3, 5	Individual goals are a part of each student's Individualized Education Program
<b>7-12</b>	<b>Special Education</b> Students will get opportunities to do in-house work experience: clearing, designing, building	Work experience	3, 6	Individual goals are a part of each student's Individualized Education Program
<b>7-12</b>	<b>Special Education</b> To build self-esteem, students will get opportunities to take ownership of larger projects	Character building	3, 5, 6	Individual goals are a part of each student's Individualized Education Program
<b>7-12</b>	<b>Special Education</b> Students will get opportunities to take leadership and supportive roles	Character building	5	Individual goals are a part of each student's Individualized Education Program

Grade Level	Skill/Goal/Content Area	Activity—Site Connections	Key Concept	Wisconsin Model Academic Standard
7-12	<b>Technology Education</b> Students will build structures needed for the school forest, including animal houses, benches, and other large construction possibilities	Construction	3, 6	A.8.1, A.8.2, A.8.3, A.8.4, A.8.5, A.8.6, A.8.7 B.8.6, B.8.7 C.8.2, C.8.3, C.8.4, C.8.5, C.8.6
				A.12.1, A.12.2, A.12.3, A.12.7 B.12.2, B.12.5 C.12.4, C.12.6, C.12.9, C.12.10
7-12	<b>Technology Education</b> Students will learn about and work with solar energy units to power school forest features	Alternative energy	3, 6	A.8.1, A.8.2, A.8.3, A.8.4, A.8.5, A.8.6, A.8.7 B.8.6, B.8.7 C.8.2, C.8.3, C.8.4, C.8.5, C.8.6
				A.12.1, A.12.2, A.12.3, A.12.7 B.12.2, B.12.5 C.12.4, C.12.6, C.12.9, C.12.10

## Staff Development

As the school forest program gains momentum, teachers will be invited to take part in staff development opportunities. These will be held once per semester during our district's Early Release sessions.

This event will be organized in the following way:

- Teachers will go on a tour of the school forest. This tour will be presented by students from the Field Biology class or the high school Science Club. This will provide teachers that are new to the forest with the opportunity to discover the resources that are available in the forest, and it will provide experienced teachers with the opportunity to refresh themselves with the land and make any necessary updates to their curriculum.
- Experienced teachers will share how they have used the forest.
- Activity kits will be introduced to teachers who are new to the forest, and they will get a chance to explore the kits. If time permits, an experienced teacher can lead an activity using the kit.
- Finally, teachers will be given the time to brainstorm ways that they can use the forest in their curricula. There will be time for sharing at the end of the session. Interested teachers will be invited to attend Deerfield School Forest Teacher Committee meetings (see below).

There are also possibilities for guest speakers from forestry or naturalist professions, as the need arises and more teachers become familiar with the forest. Weather-permitting, activities will take place at the school forest.

## Resources Needed

- Interpretive signs
- Welcome sign and entrance
- Trail materials—woodchips
- Rope and stakes for gridding
- Clippers\*
- Work gloves (soft and hard palms)\*
- Composting toilet tank and building
- Construction materials for storage shed
- Construction materials for benches and performance stage
- Smaller construction materials for cavity nesting, bird houses, bat boxes
- Bird pond materials
- Solar heating and energy for composting toilet and bird pond
- Chemicals for invasives and poison ivy control
- Transportation funding
- Funding for mowing of driveway
- Educational and outreach materials
- Resource guides and activity books (ex—Project WILD, *I Love Dirt*, etc)
- Field guides, dichotomous keys, testing equipment, surveying/topology equipment\*
- Ananometer
- Collection materials

## Resources Available

\*The high school science department has some work equipment, testing and surveying equipment, and a few field guides and dichotomous keys. However, a larger quantity of those items (as well as updates to those items) is needed, as indicated in the list above.

### People

- Nelson-Young Lumber
- Wisconsin-Built
- Pete Vogel
- Deerfield Community Center
- Deerfield Public Library
- Local hardware stores

### Funding Sources

- **Wisconsin Environmental Education Board School Forest Grant—up to \$30,000**
- Dane County Community Partners Program—up to \$1,000
- Dane County Capital Equipment Program—up to \$5,000
- C.D. Besadny Conservation Grant Program—up to \$1,500
- AWLS Rose H. Roberts Curriculum Development Fund—up to \$1,000
- AWLS Jane Rombach Smith Memorial Fund—up to \$500
- ✓ Registered school forests have access to free seedlings and saplings from the DNR
- ✓ Possibilities also include fundraisers/community dinners

## Assessment

Assessment of the effectiveness of the school forest can take many forms, including:

- Student and teacher surveys—students and teachers can take **annual** surveys to assess
  - The frequency that the forest has been used

- How the forest has been used in curricula
- Effects on student learning (perhaps comparing non-forest vs. forest-related activities)
- Effects on learning climate
- Interest in future use of the forest
- Student and teacher anecdotes—students and teachers can address the above points, using written anecdotal descriptions, complementing the surveys above
- WKCE results—results for content areas can be correlated with those activities that take place at the forest, and a multi-year analysis can be done to indicate trends and improvements

Depending on the results of these assessments, actions can be taken to either a) expand the use of the forest in curricula, or b) address curricular issues that are arising, such as planning, implementation, and authenticity of assessment. These action plans can be developed at early release sessions or Deerfield School Forest Teacher Committee (see below) meetings. These meetings will take place annually, following completion of assessment analyses (most likely in the Fall semester of the school year. These meetings will generate further development of the education plan and a strategy for all funding applications.

# Sustaining the School Forest Program

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## Committee Members

To date, parties committed to developing and sustaining the Deerfield School Forest include:

- **Deerfield School Forest Task Force**—this group will be the go-to group for all planning and questions. It will host meetings and be in charge of heading the program. Duties will include finances and planning major projects.
  - Christina Charles (Deerfield High School Science)
  - Melissa Frame (Deerfield Middle School Math and Science)
  - Scott Griffin (Deerfield High School/Middle School Special Education)
  - Mark Klawiter (Deerfield High School Science)
  - Kirsten Wohlers (Deerfield High School/Middle School Math)
- **Deerfield School Forest Teacher Committee (comprised of the Task Force and additional teachers)**—this group will act as the heart of curriculum planning and implementation. They will also serve as outreach to other teachers who are interested in making the school forest a part of their curricula. They are represented by a diversity of grade levels and content areas.
  - Robin Apold (Deerfield High School/Middle School Music)
  - Angela Bazan (Deerfield High School Social Studies)
  - Pat Chua (Deerfield Elementary School)
  - Rory Meyer (Deerfield Elementary School)
- **Deerfield High School students**—this group will function as the liaisons to all student needs and interests in the school forest. They will also be a large part of forest site development and upkeep.
  - Kevin Riggle (grade 11, naturalist, conservationist, and bird expert)
  - Abram Krause (grade 10, Boy Scouts of America liaison)
  - Deerfield High School Science Club (grades 9-12)
  - Deerfield High School Field Biology class (grades 10-12)
- **Consultants**—this group will be available to help with all site management questions.
  - John Exo—Natural Resources Educator, UW Extension, Lower Wisconsin River Basin
  - Bill Volkert—Horicon Marsh State Wildlife Area
  - Randy Stamphl—Wisconsin DNR Forestry Representative
  - Jeremy Solin—LEAF, Wisconsin School Forest Education Specialist

As our program grows, we expect to include more members, and we recognize that membership may change.

## Communication Plan

Thus far, communication about the school forest has taken place thorough email to school and community members and letters in the local news publication, *The Deerfield Independent*. Future possibilities for communication include holding community meetings, attending town meetings, a seasonal newsletter (for distribution at the Deerfield Public Library and publication in *The Deerfield Independent*, a school forest website, and school/community dinners. All have potential for student education in outreach, planning, and leadership development.



## Long-Range Plan

To help our school forest achieve its potential as an asset to our schools and community, we have identified the following goals:

### Overall Vision

For the future of our school forest, we envision a place where students and community members are free to explore, investigate, and experience their natural landscape. Activities will range from investigation of natural phenomena, exploration of our past, and artistic expression, to recreation and meditation. As a piece of land that was donated to us, we hope to instill a sense of stewardship and responsibility in students and community members, and we hope that it becomes a place to go in our community.

### Immediate Goals

1. Identify and remove all invasive species—buckthorn, honeysuckle, mulberry, garlic mustard, box elder
2. Identify and control poison ivy plants in common areas
3. Re-establish trails with wood chips
4. Devise and implement a plan for transportation to and from the forest

### Future Goals

1. Design and install a variety of interpretive signs throughout the forest: local and migratory birds, animal tracks, bats, trees, shrubs, invasive species, pest species (poison ivy, ticks), local history, glacial history
2. Install a bird pond to provide birds with a water source, using a solar-powered pump to demonstrate renewable energy
3. Build a small shed to store educational and maintenance materials
4. Build animal shelters—bat boxes, cavity nest boxes for bluebirds and small owls, “see-through” bird houses to observe nest activities (plexiglass wall with hinged cover)
5. Redesign the school forest entrance, including a welcome sign
6. Build a performance stage for musical and dramatic performances
7. Build benches to be placed throughout the forest
8. Install a composting toilet for on-site restroom facilities, using solar energy and solar heating devices to demonstrate renewable energy, as well as environmentally responsible waste management
9. Establish a creative corridor—nature-inspired artwork and literary pieces will be displayed along the western trail in the forest

## Implementation Plan

Below is a tentative calendar for carrying out the school forest plan. Many items are subject to funding availability and will be rescheduled if necessary.

<b>By Spring 2009</b>	
<b>Goal</b>	<b>Groups in Charge of Implementation</b>
Remove invasives—buckthorn and honeysuckle in the fall	Boy Scouts (Abe Krause), Science Club
Use a chipper on the cut brush	School Forest Task Force
Math students will calculate the total area of the forest trails	HS Math Dept. (Kirsten Wohlers)
Math/social studies will grid the forest, plotting waypoints at line intersections	HS Math Dept. (Kirsten Wohlers)
Present WEEB grant to the school board for approval (December meeting)	School Forest Task Force
Set aside a 100 ft <sup>2</sup> enclosure for 10 years	HS Field Biology (Christy Charles)

Continue to cut and clear invasives—including garlic mustard in late April and poison ivy in late June	Boy Scouts (Abe Krause), Science Club
Hold an Early Release session at the school forest for all interested district teachers in April	School Forest Task Force/Teacher Committee
Attend a village board meeting to promote community involvement in the forest	School Forest Task Force
Start a school forest newsletter through the Science Club/independent study course (see below)	HS Science Club, HS Science Dept. (Christy Charles)
Research the possibility of a poison ivy burn	School Forest Task Force
Contact the school insurance company to learn more about liability	School Forest Task Force
Pilot independent study course through the high school science department—"School Forest Management"	HS Science Dept. (Christy Charles)
<b>By Spring 2010</b>	
<b>Goal</b>	<b>Groups in Charge of Implementation</b>
Completely tackle the invasive species	Boy Scouts (Abe Krause), HS Science Club
Take an abiotic and biotic inventory of the forest	HS Field Biology (Christy Charles)
Design and build a new entrance	HS Science Club, HS Art Club, HS Tech Ed Dept.
Install a bird pond	Kevin Riggle
Design and install bird and bat houses	Kevin Riggle, HS Tech Ed Dept.
Develop outreach programs with community groups	School Forest Task Force/Teacher Committee
Develop a plan for driveway upkeep	School Forest Task Force
Develop and implement school forest activity days or tours	HS Science Club
<b>By Spring 2013</b>	
<b>Goal</b>	<b>Groups in Charge of Implementation</b>
Build and place benches throughout the forest	HS Tech Ed Dept.
Build a stage in the amphitheater area	HS Tech Ed Dept., HS Music Dept.
Plan activities and construct a materials kit for the elementary school	School Forest Task Force/Teacher Committee
Develop an adventure race course to be used in the forest	School Forest Task Force, HS Math Dept.
Hold ongoing and established community events	School Forest Task Force
Use the forest as a community space	School Forest Task Force
Install a composting toilet in the forest	School Forest Task Force, Phoenix Composting Systems
Devise alternative energy sources for the forest	HS Science Dept. (Mark Klawiter)
<b>By Spring 2018</b>	
<b>Goal</b>	<b>Groups in Charge of Implementation</b>
Install and use a low ropes course	School Forest Task Force
Build an education shelter using sustainable building practices	HS Tech Ed Dept.

## **District Commitment**

Following meetings in April and May 2008, the school board decided to continue to support the use of the school forest as an educational and community resource.