DEVELOPING AND DISSEMINATING
A K-5 RESOURCE GUIDE
CONTAINING ENVIRONMENTAL EDUCATION
CURRICULUM CONNECTIONS FOR THE
ROBBINS ELEMENTARY SCHOOL
OUTDOOR SITE

by

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ABSTRACT

This project's purpose was to create a K-5 environmental resource guide for the Robbins Elementary school site in Eau Claire, WI and to measure the effectiveness of this guide. It was hypothesized that teachers would use the outdoor school site more if given a guide that was designed specifically for their curriculum and for our site.

The methodology involved in evaluating the success of the guide included a series of three surveys. The first two surveys measured classroom use of the outdoor site during the 1995-1996 and the 1996-1997 school years. At the beginning of the 1997-1998 school year, teachers were given their own copy of the resource guide and were inserviced on it. The final survey came at the end of the 1997-1998 school year. Comparisons between the two years preceding the dissemination of the guide to the usage of the site during the year immediately after the implementation of the guide were then made.

The guide was created during the 1996-1997 school year. This project became one of the feature goals for the Integration Team, one of seven major committees at Robbins Elementary School, for the entire school year. We inventoried major plant species, created a map of the site, and reviewed several drafts of the resource guide. In April of 1997, I met with representatives of all the grade levels. At that time we went through the lessons specific to each grade level and made desired changes. Over the next few months, I met with Dr. Dennis Yockers, from the University of Wisconsin-Stevens Point, and we went through two additional revision stages before the resource guide was sent to print.

The results from the surveys indicated that the number of teachers who used the outdoor site four or more times per year almost doubled after the guide had been implemented over the preceding two years. Teachers recognize that teaching
outdoors can be highly beneficial to student learning, however, the major reason for not teaching outdoors still remains lack of time. With future revisions of the guide and additional staff outdoor teaching experiences, this drawback will be lessened.
ACKNOWLEDGMENTS

This project owes a lot of its success to the fine staff of Robbins Elementary School, and specifically to the Integration Committee. As chair of the Integration Team, Ms. Becky Mattson allowed some of the traditional functions of the committee to be set aside while giving the development of the guide the primary focus of the team for over a year. Through this flexibility, all the students of Robbins Elementary have benefited.

My advisor, Dr. Dennis Yockers, has done a tremendous job working with me over the past three years. His input has helped guide this project from the beginning phases into the complete implementation and evaluation. I'd also like to thank the entire staff of the Wisconsin Center for Environmental Education. Through their vast amount of expertise and experience, I have grown both personally and professionally.

Finally, I would like to thank my wife Barbara who has given me the support to be gone for weeks at a time over the past few summers. This degree became much more than simply my goal, it has been our goal. Barb has read through seemingly endless drafts of my project, and has spent extra time watching our son James while I have worked many hours at the computer.
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CHAPTER 1
INTRODUCTION

The Statement of the Problem
This project’s purpose is to develop a K-5 resource guide containing environmental education curriculum connections for the Robbins Elementary School outdoor site that will hopefully encourage the use of this site.

The Subproblems
The First Subproblem: To inventory the Robbins Elementary outdoor site so as to identify physical features that could be tied to EE activities.

The Second Subproblem: To identify desired learner outcomes resulting from the use of the Robbins Elementary outdoor site by K-5 students.

The Third Subproblem: To identify appropriate grade level activities which utilize the outdoor site and address the learner outcomes.

The Fourth Subproblem: To develop a K-5 resource guide including information about the site, learner outcomes, and suggested activities.

The Fifth Subproblem: To conduct a teacher inservice as a means of disseminating the resource guide.

The Sixth Subproblem: To compare site utilization before the resource guide was developed and one school year after the dissemination of the resource guide.

Hypothesis
Teacher use of the outdoor site for educational purposes will increase after they have received a resource guide and have had inservice training on the use of the guide and site.
The Delimitations

This study will not attempt to predict any long-term effect on student behavior.
This study will not require teachers to implement the guide.

The Definition of Terms

Connections- To make curriculum connections means that ideas and information from one area of study such as science are related and/or applied to another area of study such as language arts.

Incorporate- To incorporate environmental education into a curriculum, is to combine or infuse its ideas and principles into the ideas and principles of the existing curriculum in a mutually beneficial way.

Inservice- An inservice is a method of professional development designed to provide educators the necessary skills to implement a particular program.

Inventory- An inventory is a general list of plant and animal species as well as site characteristics.

The Abbreviations

EE is the abbreviation for Environmental Education
K-5 is the abbreviation for kindergarten through fifth grade

The Assumptions

The First Assumption: Through the frequent use of the outdoor site, and utilization of focused activities, students will be more likely to develop a positive environmental ethic.

The Second Assumption: Teachers will be more likely to use the outdoor site if they are given a resource guide that creates curriculum connections for them.
The Third Assumption: Teachers will be more likely to use the outdoor resource guide if they receive training on it.

The Significance of the Problem

Students in rural, suburban, and urban areas are all spending less free time exploring green spaces. For best results in the area of EE, however, students need to have regular exposure to the natural environment. As we continue to move toward an increasingly urban society, our role as environmental educators becomes even more crucial. Education taking place outdoors needs to be a part of each student's educational experience over a long period of time and through a variety of forms. By better utilizing this school site at all grade levels and in many different subject areas, students will be experiencing their natural environment through many different means. Building their awareness, knowledge, and sensitivity of natural areas, which are critical components of EE as defined in *A Guide to Curriculum Planning for Environmental Education* by the Wisconsin Department of Education, will ultimately strengthen their environmental ethic. Although many teachers at Robbins Elementary School have the desire to use the outdoor site for EE purposes, they fail to use it for reasons such as lack of planning time and lack of environmental knowledge related to the site. In addition, many teachers do not know how to use the outdoors as a classroom and are unsure of what can be done educationally with students when outdoors. This guide will minimize the amount of time needed for lesson planning, will help teachers feel more comfortable with their knowledge base, and will give them a plan for what to do with students when outdoors.
CHAPTER 2
LITERATURE REVIEW

Rationale Behind Environmental Education

In order for students to be able to make intelligent decisions that involve the environment, they need to have a sound background of ecological issues and principles from which to draw upon (Browner, 1995). According to Ballantyne (1996), EE has historically been taught through a values education approach, where it was thought that students would act on their beliefs and become more involved stewards of the environment. However, the lack of student knowledge of various issues meant that students were often acting on misconceptions. Conversely, students with higher levels of environmental knowledge and education report higher levels of action (Rockland, 1995). Ballantyne (1996) suggests a mixture of knowledge and values to have the optimal effect on behaviors. Students begin examining an issue by listing all that they know or believe to be true. This acts as a basis for them to begin their research. They then build their knowledge base which may refute some of their preconceptions. Finally, once they have gathered their facts, they are ready to respond in a well thought out manner.

Similar to the model presented by Ballantyne, the model adopted by the State of Wisconsin for its EE programs is designed to work through a hierarchy of thought which allows for the most effective personal growth (Engleson & Yockers 1994, page 14). The process of building awareness and knowledge of one's surroundings are the first two steps. These are especially important in the elementary years. Once students have a basis in these levels, they can proceed by forming an environmental ethic which will help guide them as they begin to take action based on their knowledge. Once students have reached high school, they should be ready to practice their citizen
action skills. At this point, it is important that students are allowed to gain experience working to solve or impact issues of interest. By guiding students through this process, they will have the tools to make sound environmental decisions. As educators, we can use EE as a means of infusing experiential learning, problem-based learning, and the multiple intelligences, into the classroom. This student-centered approach can be a great asset to student learning (Knapp, 1996).

To insure the integrity of environmental education and of our educational institutions, we need to be sure that what is presented in our classrooms is based on fact. It should also be noted that students often need instruction on what actually constitutes a fact. Corral-Verdugo (1993) found that third graders could do a much better job of distinguishing between fact and opinion if they were first given examples of both types to identify. Sanera (1997) suggests that we reexamine our sources of EE material. Since much of the environmental information available is put out by groups with a particular agenda, some of it may be biased. What better place for children to learn to be careful consumers of information than through guidance at school? As Sanera suggests, EE should rely on the scientific method of investigation. Students should develop hypotheses and then test them. During the testing of these hypotheses, students can conduct experiments and research information that will either prove or disprove the hypothesis. EE can then be a tool to teach students what quality research is. To aid in the selection of quality EE lessons and materials, the North American Association for EE has developed six criteria by which EE materials can be evaluated. This evaluative system focuses on fairness and accuracy, depth, emphasis on skills building, action orientation, instructional soundness, and usability of the material (NAAEE, 1996, p. 4). These guidelines can be applied to EE material to ensure that students are presented with materials that are non-biased and that have a high degree of educational integrity.
Integration of All Classroom Subject Areas

The concept of subject integration is becoming more widespread in public schools. This is likely because students do not effectively transfer information on their own from one subject to another when information is taught in isolation. The probable cause of this inability to make connections is due to the fragmentation of subject areas (Boidy, 1994). This fragmentation results in students who are unable to draw larger conclusions and who find it more difficult to think critically on a problem. This realization is why many education professionals are looking toward integration as a means of developing critical thinkers. Most students are already highly interested in the environment, which is why integrating relevant environmental themes into the curriculum can work so well. Curriculum integration should begin with a problem, idea, or issue that is meaningful to a student (Beane, 1995). An integrated teaching philosophy allows students to approach subject matter from a variety of angles, which supplies them with many more tools to solve a problem. For this integration to be most effective it should follow a student’s natural interests, which allows new subject matter to be presented in a form students are already familiar with (Krogh, 1990). In an integrated framework, students will still be learning from different areas of knowledge, however, it will drastically change the traditional subject-oriented approach. As Beane (1995) suggests, disciplines of knowledge naturally create interdisciplinary fields when a person is searching for answers to larger questions. The problem in most American schools is that our subject-oriented approach is merely reteaching what is already known to be true. The curriculum is largely a list of predetermined facts that students are taught. This doesn’t lend itself to personal growth, merely to the accumulation of unrelated information. By organizing the curriculum around themes that draw upon real-life concerns, rather than subject areas, students will grow as
critical thinkers at least as much if not more than they currently do under our traditional subject based curriculum (Bean, 1995 and Krogh, 1990).

Integration of Environmental Education into the Curriculum

There are many different ways EE can be infused into the curriculum. Schmidt (1996) suggests that EE be taught in a cross-disciplinary manner and that scientific problem solving techniques be used. She even points to Vice President Al Gore's program called *Global Learning and Observations to Benefit the Environment* (GLOBE) which was launched in 1995 as a way to use the environment to improve students' science skills. Experiential learning in an outdoor environment is another effective approach (Vars, 1990). This approach allows the school grounds to become the classroom. Activities such as surveying, tree identification, and map making can be a part of this program (Buetler, 1993). EE can also become a part of all subject areas and can be done both in the classroom and at an outdoor site.

An alarming concept is that although teachers realize that EE should be interdisciplinary, it is taught almost entirely as part of science classes (Wade, 1996). Science teachers are much more likely to attend EE workshops than non-science teachers, and they are much more likely to teach it as part of their science curriculum. Similarly, in a recent study of Wisconsin teachers, those that said that they do not infuse EE into the curriculum said that it was because they saw EE as being unrelated to their subject background (Lane, 1994). By relegating EE to science classes, we have narrowed the base of support and have gone against the ideology of EE. Wade continues by suggesting that we move toward a more critical pedagogy which involves action and reflection on issues, an examination of social and political structures, and more local involvement by teachers and students in their communities. Putting this pedagogy into actual practice will in effect, broaden the base of EE into all subject
areas as was originally the goal of EE.

It is important that EE is taught outdoors as often as possible because a key to developing environmental sensitivity and getting youth involved in environmental issues is getting them close to nature (Rockland, 1995). Teaching EE in outdoor settings provides students with the opportunity to be challenged in the outdoors, to test themselves, and to learn to move within their natural surroundings with as little disturbance as possible (Attarian, 1996). Students need experience in the outdoors in order to reflect upon it and to value it. Through modeling of proper behavior when in the outdoors, students will begin to recognize the broader implications of abuses of the environment. Consciously integrating EE lessons into outdoor settings helps students develop positive attitudes towards the environment. These affective benefits in outdoor education can then be the thrust behind student desire to examine these experiences more fully when back in the classroom (Spann, 1990 and Attarian 1996).

An alternative EE approach, is what Francis (1993) calls the natural resource systems approach. This approach begins by examining the basic ecological principles of an environmental issue. It then looks at possible uses of the area or solutions to the problem. At this point, the possible ecological effects of the solution are examined as well as the possible effects on other uses of the area. For example, if an area is logged, what would be the ecological changes and would the logging effect other uses of the area such as hiking and skiing?

**Concerns when Developing and Evaluating the Use of an Outdoor Classroom**

This section describes many items that should be considered when establishing an EE program. Tetlow (1981) describes modifications necessary to outdoor sites (path width, surface type, etc.) and modifications necessary to activities (such as
allowing for movement) that will make outdoor sites more accessible to physically handicapped students. Tetlow also suggests that we not lower our expectations simply because someone is disabled. Just as we should not physically limit students from accomplishing a task, we should not lower our expectations of them so much that they are not challenged to try. It is important that we are also aware of the cultural needs of our students when engaging them in EE activities (Contreras, 1990).

Unintended and/or inappropriate body language can be an enormous problem to overcome in any program. As instructors, we need to be aware of our tone of voice and gestures in order to avoid treating minority students differently from other students. EE programs can also be made more effective by utilizing multiple intelligences theory (Duval, 1994). This theory matches the material being taught to individual student learning strengths.

According to Farmer and Wott (1995) it is also extremely important that the lessons taught in our outdoor education site not be stand-alone activities. These outdoor mini-fieldtrips, while highly effective as motivators of student interest, provide the greatest impact and retention when taught with related pre and post activities. These additional activities reinforce what is taught in the outdoor classroom, which ultimately reinforces the curriculum. The writer of the guide will need to stress to teachers that these lessons should be taught in the context of larger units, which will then give the lessons the needed support for them to be committed to long-term memory.

When looking at the site itself, teachers view areas that seem less disturbed (i.e. lots of trees, undergrowth, etc.) as being more desirable (Simmons, 1993). Finely mowed lawns and trim work are seen as being too stark. When planning for and maintaining our nature trails, we will need to be sure they look as natural as possible. Simmons also found that teachers tend to view the educational possibilities of a
particular outdoor area in extremely stereotypical fashion. An open area is good for kite flying and recreational games, whereas wooded areas are good for tree identification. Teachers typically need the guidance of an inservice or of a naturalist and continued professional development in order for them to engage in other types of environmental lessons. Since it is impractical to suggest that Robbins Elementary School hire a full-time naturalist, it is critical that all staff be thoroughly trained on how to use the resource guide created for the outdoor site. Without it, teachers will continue to be reluctant to branch out into non-stereotypic types of outdoor lessons. The work we have done to expand the interpretive path on our school site will also add to the comfort of our classroom teachers, as Simmons found that teachers viewed such paths as being set up for education and as being a great asset.

**Characteristics of Effective Inservices**

In order to implement an effective EE program, teachers need to be trained in environmental education so that they feel comfortable with the materials and methods of teaching available to them. The use of inservice training has been shown to have the greatest positive impact on influencing teachers to incorporate EE into their teaching (Lane, 1994 & 1996). Dushane (1974) suggests that for teacher training to be effective, it must come in a variety of forms including the establishment of interdisciplinary teams, courses, lectures, workshops, a collection of available resources, and through discussion sessions for the sharing of ideas. A difficulty with formal EE training is that it is often time consuming and costly. An alternative is presented by Tillis (1974) where experts train a core group of teachers who then become facilitators and teach another group. That new group teaches another group, and so on. This can prove to be an effective, quick, and cost-efficient way of disseminating EE material and teaching techniques. Whichever inservice design is
selected, it is critical that it demonstrates for teachers how EE content and pedagogy can be integrated into all subject areas (Wade, 1996). These relationships must be made apparent for the inservice to meet its desired outcomes.

When preparing for an inservice, input is needed from the intended audience (Spiegel, 1996). This will allow the presenter to tailor inservice activities to meet the specific needs of those who will be attending. To promote optimal success a traditional inservice should include a seven-step session design (Braus, 1994). The first step sets the climate for the inservice. It is designed to motivate the participants and to set a rationale for the experience. It is not a time to conduct any unrelated school business (Spiegel, 1996). In the second step, the presenter reviews the goals and objectives for the inservice. Participants should have a clear understanding of what is to be gained. In the third step, conduct an activity, and the fourth step provides participants a chance to share their reactions to the activity. From there, apply or generalize what happened in the activity to how it relates to each participant’s needs. This step is crucial because it aids people in applying the inservice information to their own everyday lives. In step six, after generalizations have been made, participants communicate how they plan to apply the information to their own classrooms. Finally, it is important to reach closure (step 7). At this point, summarize what took place during the inservice, and relate what was learned to the original goals of the inservice. It is critical schools realize that if teachers are being asked to transform teaching methods or to implement a program, that these changes need to be implemented and taught over time (Spiegel, 1996). Complex topics need continued training in order to achieve success. One highly effective method is for the presenter to meet with a core group of teachers to give them more extensive training with the material. These people can conduct future roundtable discussions with the staff.

During all staff development activities, teachers need time to reflect on both their
environmental and educational values (Wade, 1996). Teachers need this time to internalize what is being asked of them and to figure out how it effects them. Since many EE lessons come from mass produced lesson books, this reflection is critical in refining these lessons. A better alternative is to challenge teachers to develop their own lessons and project ideas.

Summary of Literature Reviewed

The purpose of this discussion was to provide background information for the effective utilization of the outdoor school site for EE. An important element of curriculum integration is that students are better able to learn and apply what they learn when concepts are developed in all curriculum areas. EE then becomes a method from which information from various subject areas can be brought together to develop students as complete, critical thinkers and decision makers. When using EE in the classroom, it is important that before students become active on environmental issues, that they build the knowledge necessary to make sound decisions. The goals of EE are best accomplished when students have regular outdoor experiences. This is why the effective use of our outdoor site is an essential element of the EE that students receive at Robbins Elementary.

When working with teachers, it is important that they be given the training and support needed to make an effective transition toward the implementation of EE into the curriculum. Inservicing, coursework, peer help, and troubleshooting ideas need to be available if an EE program is to succeed. Through successful training, teachers will feel comfortable utilizing our outdoor site for meaningful educational purposes.
CHAPTER 3
METHODOLOGY

The methodology of the Robbins Elementary School outdoor site project is presented in this chapter. An overview of the methodology is outlined first, followed by treatment of each subproblem. An abbreviated project timeline is available in appendix A.

Overview of Methodology

During the fall of 1996, subproblems one and two will be completed. Having the inventory completed and the learner outcomes identified will help focus the scope of the rest of the study. During August and September of 1996, a preliminary survey of current usage of the outdoor site will be completed. This will establish a basis with which to compare the success of the project, and it will help identify people who would like to work on the committee which will focus more intensely on the project. From November 1996 through April 1997, the committee will develop curriculum connections and will create lesson ideas to be put into the resource guide. This group will meet approximately five times, with a final meeting during the first part of May to review a draft of the guide. At various times during the 1996-1997 school year, grant money from outside sources as well as from district funds will be sought to cover the cost of printing the resource guides and for paying stipends for the teacher inservice. During the summer of 1997, Dr. Dennis Yockers, graduate project advisor, will review the guide and final modifications will be made before printing. In the fall of 1997, a half day inservice will be conducted that reviews the formation of the resource guide, explains its practical application, and models a few sample activities. During April of 1998, the final survey will be conducted. This will show if there has been an increase
in the use of the outdoor site among teachers. The rest of the spring and early summer will be used to write up the results from the study. The findings will be presented during the summer of 1998.

**Treatment of the Subproblems**

The following methods were used to address each of the subproblems identified for the project of *Developing a K-5 Resource Guide Containing Environmental Education Curriculum Connections for the Robbins Elementary School Outdoor Site*.

**Subproblem One**

The first subproblem is to inventory the Robbins Elementary outdoor site.

During the fall of 1996, the Integration Team will meet during an early release day to inventory the outdoor site. The inventory will include major plant and animal species, human structures, and any other points of interest. Group members will be assigned different parts of the school site for them to inventory. Once completed, everyone’s inventory will be collected and compiled. This inventory will be found inside the front and back covers of the resource guide (Appendix J). It will provide a point of reference to teachers who are planning outdoor lessons.

**Subproblem Two**

The second subproblem is to identify desired learner outcomes resulting from the use of the Robbins Elementary outdoor site by K-5 students.

In deciding how best to identify the desired learner outcomes for this project, the
researcher realizes a need to gain input from many different people within Robbins Elementary School. The goals for this project need to match the goals of the building in order for it to be successful. It is also important to the success of the project for people throughout the building to take ownership in the project, so the researcher will meet with the principal to identify how to best gain building wide support. He will give her a copy of the proposed project which discusses its merits and outline how best to go about completing it. The researcher will also speak with Rebecca Mattson, the chair of the Integration Team. This team is one of the seven main committees at Robbins Elementary School. Its membership is made up of classroom teachers, specialists, and resource personnel. Its goal is to provide ways to promote the connection of subject matter throughout the curriculum. With this core group of teachers, the researcher will be able to draw upon a wide range of expertise for the project as well as broaden the base of support.

**Subproblem Three**

The third subproblem is to identify appropriate grade level activities which utilize the outdoor site and address the learner outcomes.

During the fall of 1996, the Integration Team will help identify ways that our outdoor site has been used in the past. Group members will examine resource guides and seek input from other schools to gain further ideas for lesson activities. We will begin to write actual lessons during our half day inservices. At this time we will align EE goals and curriculum connections so that each lesson meets specific needs at certain grade levels. The researcher will also meet with the building music teachers, Barb Sipple and Jodie Boca, to determine ways that music can be integrated into this program.
As a committee, we will discuss ways that each grade level can take an ownership role in our outdoor site. We would like each grade level to have an ongoing responsibility for some aspect of the outdoor site. We may need grant money and will likely utilize the Wisconsin Conservation Corps, an organization our building has used regularly. During the spring of 1997, the researcher will meet with grade level representatives to discuss the goals of the project and to discuss the progress we have made. At this time, we will discuss ways that each grade level can become involved with the outdoor site.

**Subproblem Four**

The fourth subproblem is to develop a K-5 resource guide including information about the site, learner outcomes, and suggested activities.

The Integration Committee will identify how the goals of EE fit within the current curriculum (subproblem two) of the Eau Claire School District. We will use the inventory of the school site (subproblem one) and will write lessons that fit the identified goals (subproblem three). Once this is completed, the researcher will compile a draft of the guide and review it, making necessary changes. During the spring of 1997, music specialists Barb Sipple will review the K,1,2 lessons and Jodie Boca will review the grades 3,4,5 lessons. They will add music connections to each grade level. After making these revisions, the researcher will meet with representatives of each grade level. These representatives will edit, revise the lessons for content, and write additional curriculum connections for each of the lessons for their grade level. After making these revisions, the resource guide will be sent to the research advisor, Dr. Dennis Yockers, at the University of Wisconsin-Stevens Point. He will write down his suggestions and the guide will be revised again.
before being printed during the summer of 1997. In August 1997, the completed
guides will be distributed to all certified staff at Robbins Elementary School.

Subproblem Five

The fifth subproblem is to conduct an inservice as a means of disseminating the
resource guide.

The researcher will meet with all certified staff members of Robbins Elementary
School early in the fall of 1997. During this inservice, the subgoals of environmental
education as defined by the Wisconsin DPI will be reviewed. Once this basis has
been established, a discussion will begin on what we will be doing to promote EE at
our school. We will take a tour of the outdoor site, pointing out areas designated on
the map. The resource guides will be passed out and teachers will be given an
opportunity to review their set of lesson plans. The format of the guide will be
reviewed and a sample lesson will be demonstrated for the staff. It is important for the
staff to realize that they do not need to be experts in the field of EE in order to teach it,
and that it can be taught in all subject areas. They will be informed that this guide is
not meant to take time away from the core subject areas, rather these lessons are a
way to teach elements that are required in the core curriculum.

Subproblem Six

The sixth subproblem is to compare site utilization before the resource guide
and one school year after the dissemination of the resource guide.

With this project, it is essential that the researcher be able to evaluate the
success of the resource guide. To measure the project's success, change in the
usage level of our outdoor site by teachers will be assessed. The pretest is a series of two identical surveys. Both of these surveys will be written with the help of Dr. Dennis Yockers during July of 1996. The first survey (Appendix B) will be given to teachers in September, 1996. It measures the usage of the outdoor site by certified staff in their classrooms during the 1995-1996 school year. Frequency of usage and subject areas are also quantified. In May 1997, teachers will be given a similar survey (Appendix C) which measures the identical material, but for the 1996-1997 school year.

In September 1997, teachers will be given the new resource guides (Appendix J) and will be trained on how to use them. In October 1997, further optional training will be offered to teachers during our half day inservice. By May 1998, approximately one full school year will have gone by. Teachers will first be given a questionnaire (Appendix D) that is almost identical to the previous two surveys (Appendices B and C). This will allow the researcher to compare the usage of the site both before and after the implementation of the guide. To do this, the mean number of outdoor lessons taught per classroom per year will be compared over the three year period. The researcher will also compare changes over the three year period in the number of teachers who say they use the outdoor site zero, 1-3, 4-9, or ten or more times per year. It is hypothesized that the number of teachers in the first two categories will go down, while the number of teachers in the last two categories will go up. Besides the basic survey, teachers will also complete an additional survey which identifies their grade level, which lessons they taught, and which ones they skipped. They will be asked if the guide was beneficial to them, if their understanding of EE has improved, what needs they still have to help them better utilize our outdoor site, and if their are any additional changes that they would like to see in the guide. This additional survey will be used to evaluate the success of specific lessons and to improve the resource guide.
CHAPTER 4
RESULTS

Subproblem One

The first subproblem was to inventory the Robbins Elementary outdoor site.

In October of 1996, the project was discussed with Pat Popple, the building principal, and the architect’s drawings of the school building and school grounds were obtained. Pat supplied several different sketches which were compiled into one sketch of the entire school property. Later in October, I met with the Integration Team for a half day so that we could inventory the outdoor site. The inventory was to include major plant species, human structures, and any other points of interest. We went outside, and I gave a brief overview of the area to be inventoried, and then group members were assigned different parts of the school site to inventory. At the end of this time, everyone’s inventory was collected, and compiled onto one sheet. This inventory can be found on inside the front and back covers of the resource guide (Appendix J). It provides a point of reference to teachers who are planning outdoor lessons.

While inventorying the site, the principal asked me to meet with the Wisconsin Conservation Corps to add educational sites to our trail system. As a result of these meetings, we created eleven stations on the new expansion of our trail. After each site was selected, a one page description of the area was written (see Appendix E). Topics that range from the explanation of a compost bin, to forest openings, to the effects humans have had on the area were discussed in these write-ups. These sheets were published and put into books in our library which correspond to each of the station markers so that teachers can take their students on a self-guided tour of our...
nature trail. In May of 1998, I again met with the Wisconsin Conservation Corps to discuss the possibility of creating a prairie area. In June of 1998, we planted an area of prairie grasses and forbs adjoining the woodland area. In the fall of 1998, we will add trail markers explaining prairie areas, prairie succession, and oak savannas. These will be added to the resources in the library for the self-guided tours.

Subproblem Two

The second subproblem was to identify desired learner outcomes resulting from the use of the Robbins Elementary outdoor site by K-5 students.

In deciding how best to identify the desired learner outcomes for this project, I realized I needed the input of many different people within the building. The goals for this project needed to match the goals of the building in order for it to be successful. It was also important for people throughout the building to take ownership in the project, so I began by meeting with the principal to identify how to best gain support. I gave her a copy of the proposed project, we discussed its merits and how best to go about completing it. She suggested that I meet with Rebecca Mattson, who was the chair of the Integration Team. This team is one of the seven main committees at my building. Its membership was made up of classroom teachers, specialists, and resource personnel. Its goal is to promote the connection of subject matter throughout the curriculum. After meeting with Becky, she was enthused by the project and decided that it could become one of two major tasks for the committee for the 1996-1997 school year. I used the first two half hour committee meetings to summarize the project and to familiarize the group with the goals of environmental education as outlined in A Guide to Curriculum Planning in Environmental Education. At that point, we decided that the best way to meet the goals of EE was by integrating EE into the current curriculum.
Our feeling was that teachers are already overburdened with “extras” that are supposed to be taught in the classroom. Our committee did not want the resource guide to become another one of these extras. We decided that we would use our outdoor site and corresponding resource guide as a way to teach our core subject areas (reading, writing, math, science, and social studies) in the outdoors. It was agreed upon that the EE curriculum guide should thus be a grouping of lessons for each grade level, that addresses material which needs to be taught in the core subject areas anyway, but which are designed to also meet the desired outcomes of EE. This would allow the outdoor site to be used as a tool for teaching the core subject areas.

**Subproblem Three**

The third subproblem was to identify appropriate grade level activities which utilize the outdoor site and address the learner outcomes.

During the fall of 1996, the Integration Team met twice a month for a half hour each time. During these meetings, we identified ways that our outdoor site had been used in the past. Group members examined resource guides and also spoke with other schools to gain further ideas for lesson activities. During a November half day inservice, we converted our list of potential lesson activities into actual lessons. At this time, we matched EE goals and curriculum connections so that each lesson met specific needs at certain grade levels. I continued this writing process all that winter, and we had a similar half day writing session for the committee during an inservice in January. During our half hour committee meetings in February, we met with the building’s music teachers, Barb Sipple and Jodie Boca, to determine ways that music could be integrated into this program.

As a committee, we also discussed ways that each grade level could take
ownership in our outdoor site. One way was through the development of a compost
pile. In December, 1996 I applied for a grant of $100 through Sierra Club to cover
building materials for a compost bin. We received the money in March and the
Wisconsin Conservation Corps built it in May of 1997. In April, 1997 I met with grade
level representatives to discuss the goal of the project and to discuss the progress we
had already made. At that time, we identified ways that each grade level could
become involved with the outdoor site. First, second, and fifth grades would each be
responsible for feeding the birds, with each being in charge of a different trimester (12
week period). Third grade was going to take over trail maintenance, and fourth grade
would maintain the compost pile. This system would allow each student, during their
school career, to be responsible for different aspects of our outdoor site. These jobs
get the students outside on a regular basis throughout their years at Robbins. They
also develop their sense of civic responsibility and citizen action. These grade level
jobs were discussed with the staff in August of 1997 and a reminder letter was sent out
January 12, 1998. During the school year, grades 1, 2, and 5 enjoyed feeding the
birds, although they occasionally ran out of bird seed. Once the school budget for
seed was spent, they asked for donations of money or seed for the rest of the year.
Third grade weeded the amphitheater and trails once in the fall and once in the spring.
Fourth grade collected leaves in the fall and then created the compost piles in the
spring once students were able to bring in grass clippings. Two out of the three bins
were able to be composted during the last six weeks of school, with the third bin still
storing leaves. Students turned and watered the compost pile once a week and were
then able to compare the finished compost with the pile of leaves still being stored.
**Subproblem Four**

The fourth subproblem was to develop a K-5 resource guide including information about the site, learner outcomes, and suggested activities.

The Integration Committee identified how the goals of EE fit within the current curriculum (subproblem two). We inventoried the school site (subproblem one) and wrote lessons that fit the identified goals (subproblem three). Once this was completed, a first draft of the guide was written, reviewed, and appropriate changes were made. In March, 1997, Barb Sipple reviewed the K, 1, 2 lessons and Jodie Boca reviewed the grades 3, 4, 5 lessons. They added music connections to each grade level. These revisions were made to the guide. On April 9, 1997, during a half day inservice, representatives from each grade level edited, revised the lessons for content, and wrote additional curriculum connections for the lessons for their grade level. After making these revisions, I sent the resource guide to my advisor, Dr. Dennis Yockers, at the University of Wisconsin Stevens Point. He wrote down his suggestions, and I revised it again. In July of 1997, I met with Dr. Yockers again, and he made final suggestions for the resource guide. In August, 1997 the completed guides were distributed to all certified staff at Robbins Elementary during an hour long meeting. At this time, the foundations of EE and the implications that these foundations have on the teaching at Robbins were discussed. Once the guides were passed out, the organization of the guides was discussed, as well as the general format for the lessons.

In May of 1998, teachers were surveyed as to their usage of the outdoor site during the 1997-1998 school year and were asked to report on the effectiveness of the resource guide. This data has been compiled, and changes to specific lessons will be made so as to improve future publications of the guide.
Subproblem Five

The fifth subproblem was to conduct an inservice as a means of disseminating the resource guide.

I was unable to receive grant money for inservicing teachers on how to best utilize the resource guide, however, my principal allowed me to use part of our inservice time in August, 1997 to train teachers on how to use the guide. This training period lasted for approximately a half hour. Throughout the rest of the school year, I met with well over half the teachers informally and on an individual basis to review the guide and to answer any questions that had come up. I also sent out reminder letters to all staff in March and April of 1998 (see appendix F) to encourage them to use their guides and to see me if they had any questions. In addition, I made myself available to answer any questions teachers had during our half day inservice in April 1998. I had several teachers come see me with questions after distributing these letters and during the April half day inservice time.

Subproblem Six

The sixth subproblem was to compare site utilization before the resource guide to the usage of the site one school year after the dissemination of the resource guide.

With this project, it was essential that I be able to to evaluate the impact of the resource guide on the teaching practices of the Robbins Elementary School staff. I decided to measure its success by the change in the usage level of our outdoor site. The pretest took the form of two surveys. Both of these surveys were written with the assistance of Dr. Yockers during July of 1996. The first survey (Appendix B) was given to teachers in September, 1996. It measured the usage of the outdoor site by certified
staff in their classrooms during the 1995-1996 school year. Frequency of usage and subject areas were also quantified (Appendix G). In May, 1997 teachers were given a similar survey (Appendix C) which measured the identical material, but for the 1996-1997 school year (Appendix H). In September, 1997 teachers were given the new resource guides (Appendix J) and were trained on how to use them. In October, 1997 further training was offered to teachers during our half day inservice. By May, 1998 approximately one full school year had gone by. Teachers were first given a questionnaire (Appendix D) that was almost identical to the previous two. This allowed me to compare the usage of the outdoor site with the previous two surveys to create a picture of how use of the site had changed over a three year period. Besides the basic survey, teachers also completed an additional questionnaire which identified their grade level, which lessons they taught, and which ones they skipped. This additional survey was used to evaluate the success of specific lessons and to improve the resource guide (Appendix I). Upon analyzing the data, the most significant results were that teachers who reported that they use the outdoor site 4 or more times (subset “4-9” and “10 or more” of the questionnaires combined) rose substantially one year after the guide had been in the hands of the teachers (see Table 4.1).

Table 4.1
Teachers using the Outdoor Site
Four or More Times

<table>
<thead>
<tr>
<th>School Year</th>
<th>1995-96</th>
<th>1996-97</th>
<th>1997-98</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>22</td>
<td>16</td>
<td>17</td>
</tr>
</tbody>
</table>

Percent of Teachers Who Used the Site 4 or More Times

- 1995-96: 20%
- 1996-97: 40%
- 1997-98: 80%

25
During the 95-96 school year, 36% of the teachers (22 of 23 teachers responded to the survey) said that they used the outdoor site four or more times. This held relatively constant during the 96-97 school year, with 38% of the teachers (16 of 23 teachers responded to the survey) using the site 4 or more times. These two surveys were for the two school years immediately proceeding the implementation of the resource guide. Teachers were again surveyed after having the guide for one full school year, at the end of the 97-98 school year, 71% of the teachers (17 of 23 teachers responded) said that they used the guide 4 or more times. The usage of the outdoor site increased in all of the core subject areas during the 97-98 school year and 15 of 17 teachers said that their students benefited greatly by the lessons taught outdoors (see Table 4.2).

Table 4.2
I feel my students benefited from the lessons I taught outdoors.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>47%</td>
<td>41%</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Teacher Responses (n=17)
1997-1998 Survey
Eight of the 17 respondents said that they used the guide to design lessons for their class and that the guide did save them time (see Table 4.3). Of those that did not use the guide, many of them either said that they already did lessons similar to what the guide had or they said that they just didn't have time for environmental education. Subsequently, what the guide did was help the teachers who had an interest in utilizing the site, but who either lacked the time for planning or the knowledge of what to do with the students outdoors.

Table 4.3
The resource guide helped me save time in planning lessons.

<table>
<thead>
<tr>
<th>Number of Teachers Responding</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>18%</td>
<td>29%</td>
<td>41%</td>
<td>6%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Teacher Responses (n=17)
1997-1998 Survey
Summary of Key Results

The 23 certified staff members of Robbins Elementary School were surveyed as to the amount they used the outdoor teaching site. They were also asked which subjects areas they taught using the outdoor site. This survey was given in August of 1996 for the 95-96 school year (96% of teachers responded), in May of 1997 for the 96-97 school year (70% of teachers responded), and in May of 1998 for the 97-98 school year (74% of teachers responded).

In the fall of 1996, a committee of teachers took the development of a resource guide for the outdoor site as their primary focus for the school year. This team inventoried what was currently at the site, and then designed EE lessons that incorporated all subject areas for all grade levels at our K-5 building. The first draft of the guide was completed by March of 1997. On April 9, 1997 representatives from each grade level reviewed and made revisions to the lessons for their grade level. Final revisions were made and copies of the completed guide were distributed to teachers in August of 1997.

Table 4.4
Use of Outdoor Site
1995-1998

![Bar Graph]

- **1995-96**: n=22
- **1996-97**: n=16
- **1997-98**: n=17
Beginning with the 1997-1998 school year, the woodland trail was expanded to include eleven additional educational stations. Also, as a means of having students take over ownership of the outdoor site, the Integration Team determined that each grade level should have a specific job. Grades 1, 2, and 5 took over the bird feeding, grade three was responsible for maintaining the amphitheater and trails, and grade four managed the compost bin.

The surveys showed a substantial growth in the amount the outdoor site was used during the final year of the study which was the first year that teachers had the resource guides (see Table 4.4). During this year, there was also an increase in the number of times that the outdoor site was used to teach in each of the core subject areas (reading, language arts, math, science, and social studies).
CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The successful implementation of the K-5 resource guide was due to the energy and motivation of the Robbins Elementary certified staff. We were fortunate that we had several teachers who were already using the site on a semi-regular basis, from whom we could draw ideas. It also helped that early on in the project I involved a core group of teachers in inventorying the site and in creating the guide. During the design of the guide, this core group was able to work through many of the problems associated with the outdoor classroom. They also were able to take an in-depth look at what was available at our outdoor school site and what was still needed. Based on informal conversation, I know that these teachers made tremendous growth in the way they viewed EE as well as how they viewed the utilization of the site.

In deciding how to meet the goals of EE through this project, the Integration Committee decided that the best way to meet them was through the integration of EE lessons into the current core curriculum. This decision was necessary because teachers already felt so overwhelmed by what they had to teach that they did not want to have more "extras" dropped on them. This technique of integration also quelled many of the concerns that back-to-basics teachers and parents have about their child's education. The guide allowed students to improve their understanding of math, language, reading, science, and social studies while also allowing teachers to meet the goals of EE.

The target group for this project became the teachers who had the desire and motivation to teach outdoors, but who previously had not utilized the outdoor site to teach lessons. These teachers were the ones that had the potential to show the most
growth once an EE program was designed for them. Once grade level expectations had been formulated, they had the guide to help organize the lessons, and had been inserviced on how to use the guide, many of these teachers began to use the outdoor site more frequently (see Table 5.1).

Table 5.1
I taught outside more because I had the resource guide.

<table>
<thead>
<tr>
<th>Teacher Responses (n=17)</th>
<th>1997-1998 Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>29%</td>
</tr>
<tr>
<td>Agree</td>
<td>35%</td>
</tr>
<tr>
<td>Neutral</td>
<td>29%</td>
</tr>
<tr>
<td>Disagree</td>
<td>6%</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td></td>
</tr>
</tbody>
</table>

Teachers have the motivation to teach outside, as is evident by the 88% of teachers that feel their children benefit greatly from the outdoor experience. The job of anyone wishing to promote EE in the classroom is to first overcome the problem of lack of time. The guide is a crucial element to getting teachers to frequently teach outside. They have extremely demanding schedules, which require that they utilize their time as efficiently as possible. As seen in Table 5.2, one of the main reasons that teachers do not teach the lessons is due to lack of time.
Besides lack of time, an additional problem that needs to be overcome is the education of teachers so that they feel confident when planning for outdoor lessons. A beginning step to solve this problem was the establishment of grade level jobs. These are jobs that get students outside on a regular basis and ones that don’t require a lot of teacher planning. They provide a positive EE experience for both students and teachers. Obviously, the resource guide will continue to be a crucial component in meeting the needs of teachers. In an effort to better meet the needs of the teaching staff, many of whom would like to see even more lessons put into the guide (see Table 5.3), the guide will continue to be modified.

Table 5.3
I would like to see more lessons put into the resource guide.
Upon conclusion of this study, teachers understood that students benefited by outdoor lessons (88% of the teachers responding to the 1998 survey recognized that students benefit from lessons being taught outdoors). As Table 5.4 demonstrates, some of these teachers had already been comfortable teaching outdoors (only 47% of teachers said they used the guide to design lessons), but since the implementation of the guide and grade level jobs, the numbers of teachers and the numbers of times each teacher uses the outdoor school site have risen.

Table 5.4
I used the resource guide to design lessons.

<table>
<thead>
<tr>
<th>Number of Teachers Responding</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Responses (n=17)</td>
<td>6%</td>
<td>41%</td>
<td>35%</td>
<td>12%</td>
<td>6%</td>
</tr>
</tbody>
</table>

1997-1998 Survey
Recommendations

**Recommendation #1:** Involve as many people in the design phases of any project as possible. I involved people in the survey of the site and in the writing of lessons for the guide. These people not only had the most input into the project, but they also showed some of the most growth in the area of EE.

**Recommendation #2:** Any type of EE guide written for the elementary level, should have its lessons integrated into the core curricular areas. This will allow teachers to meet the goals of EE while staying within their core curricular restraints. It will also help ensure that EE is being taught at various times throughout the school year, in various subject areas.

**Recommendation #3:** More input from grades K-2 in the earliest stages of writing the guide would have been more effective. The Integration Team had representatives from grades 3-5, physical education, music, and special education, however, no one from K-2. This made writing these lessons more cumbersome because we continually had to go to them for feedback on what we had done. This input usually came after the fact, which took more time.

**Recommendation #4:** A resource guide needs to be organized by grade level, and needs to be cross-referenced by subject area. This can be done in the table of contents as well as in the index. Teachers also appreciate having some pre and post activities with each lesson. This provides teachers with a more complete understanding of what concepts the lessons are meant to convey. Finally, approximate time allotments for each lesson provide a framework which teachers can use to plan their lessons.
Recommendation #5: Time needs to be allotted for a complete inservice on a guide. This inservice should include an overview of the guide, tour of the outdoor site, and time to actually model a few of the lessons. In the case of this study, the training period was exceedingly short (approximately a half hour), which was not sufficient time to meet all the aforementioned inservice goals. It was merely a way of doing a quick overview so that teachers had the resource guide in their hands when they began the school year. A more lengthy inservice time would likely have increased the number of lessons being taught out of the activity guide.

Recommendation #6: The most critical part of this study was the three surveys. These created the basis for all evaluations of the project. The intent was to show any change in the usage of the outdoor site over a three year period, by using a set of three identical surveys. By surveying the same staff, and by using the same questions, inferences could then be made from the tabulated results. The main drawback with this component was that the original surveys were not detailed and/or sensitive enough to measure specific changes in the usage of the outdoor school site. It would have been helpful to know which grade level the survey was from and to know exactly how many lessons had been taught outdoors. For example, a person may have gone from using the outdoor site 4 times during the 1995-1996 school year to using it 9 times during the 1997-1998 school year. This person's usage doubled, but the surveys used would not show this. Also with these surveys, there is no way to know which grade levels saw the most change. Had we been able to know this, it would make it easier to target grade levels who may have encountered specific problems with the implementation of the guide.
Recommendation #7: To ensure regular usage of any outdoor site by all teachers and their classes, it is advantageous to have simple, on-going projects that each classroom is responsible for. For example, in addition to the resource guide, as part of this project each grade level has a job as has been previously mentioned. Third grade teachers knew that the rest of the building was relying on them to do the trail maintenance. Similarly, fourth grade was expected to maintain the compost pile. These grade level responsibilities were easy for teachers to plan for, were something the students got to do regularly, and provided a slight element of peer pressure between teachers that gave the extra added motivation for teachers to meet their grade level responsibilities.
BIBLIOGRAPHY


APPENDICES
Appendix A
Abbreviated Project Timeline
Timeline

Summer 1996

1. Meet with Robbins Elementary Principal Pat Popple to discuss the project and to receive her approval.

2. Begin the literature review of related resource guides, integration techniques, and of inservice designs.

Fall Semester 1996

1. Give an overview of the project to the Integration Team, one of seven leadership committees at Robbins Elementary, to gain their support.

2. Survey the K-5 certified staff as to their utilization of the Robbins outdoor site during the 1995-1996 school year.

3. Invite interested staff to either join the Integration Team for this project or to send lesson ideas to the team.

4. Use one of the early release days to inventory the outdoor site.

Spring Semester 1997

1. Apply for a Sierra Club Grant to cover woodland trail improvement costs.

2. Meet with representatives from all grade levels during a half day inservice to review grade level lessons in the resource guide and to discuss curriculum connections.

3. Send the resource guide to Dr. Dennis Yockers, project advisor, for review.

4. Survey teachers as to their use of the outdoor site during the 1996-1997 school year.

Summer 1997

1. Meet with Dr. Dennis Yockers to make further revisions to the resource guide.

2. Continue the review of related literature.
3. Have copies of the completed resource guide printed for all certified staff at Robbins Elementary School.

Fall Semester 1997

1. Disseminate the resource guides to all certified staff.

2. Conduct a half day inservice for all Robbins certified staff identifying how the resource guide is to be used.

Spring Semester 1998

1. Survey teachers on their use of the outdoor site and on their utilization of the guide.

Summer 1998

1. Tabulate all survey material.

2. Present masters project at UW-Stevens Point.
Appendix B

Staff Survey 1995-1996
To all Robbins Classroom Teachers and Specialists:

I am currently beginning a two year project focused on increasing the usage of the wooded area outside our school. I will be establishing a resource guide that can be used to make curriculum connections between the woodland area and our current curriculum. You will each receive a copy of the resource guide next fall, and I will be conducting an optional inservice on how to use the guide in your classroom.

This survey is a means of documenting the current usage of the woodland area, and of gaining input as to any particular lesson or subject ideas you would like me to focus on. Please take a few moments and answer the following questions. Your input will be greatly appreciated and highly beneficial. We will be working on this project September 18 from 1:30-5:00. It will also be a major project of the integration team this year. You are welcome to join us!

*Note For the purposes of this survey, do not count the times that your class fed the birds with the school birdseed.

1. Estimate the approximate number of times you used the woodland area for classroom purposes during the 95-96 school year. Circle the one that applies.

zero 1-3 4-9 10 or more

2. If you used the woodland area, what subjects did you teach while using it? For each subject, put the approximate number of times it was taught in the woodland area.

Math _____ Language Arts_____ P.E _____
Science_____ Social Studies_____ Art _____
Music _____ Reading _____
Other _____(please explain below)

3. Are there any specific lesson or unit topics you would like included in the resource guide? Please list any ideas you have on the back of the sheet. Also please photo copy and send me any lessons you use during the year that would apply. These can also be sent during the school year as they come up.

Thank you for your help. Please put it in Mark Goings’ box by September 13.

45
Appendix C
Staff Survey 1996-1997
To all Robbins Classroom Teachers and Specialists:

Last fall I inquired asked you for input on the formation of a resource guide for our woodland area. A committee was established last fall, and we have been designing the guide ever since. You will each receive a copy of the resource guide next fall, and I will be conducting an optional inservice on how to use the guide in your classroom.

As a means of documenting the impact of the inservice and resource guide, I need more information on the current usage of the area. This will provide me with the ability to compare the use of the woodland area before teachers have been inserviced on the guide with the usage of the woodland after you have received the guide. Please take a few moments and answer the following questions. Your input will be greatly appreciated and highly beneficial.

*Note For the purposes of this survey, do not count the times that your class fed the birds with the school birdseed.

1. Estimate the number of times you used the woodland area for classroom purposes during the 96-97 school year. Circle the one that applies.
   
   zero   1-3   4-9   10 or more

2. If you used the woodland area, what subjects did you teach while using it? For each subject, put the approximate number of times it was taught in the woodland area.

   Math  ______  Language Arts______  P.E  ______
   Science______  Social Studies______  Art  ______
   Music  ______  Reading  _____
   Other  _____(please explain below)

Thank you for your help. Please put it in Mark Goings’ box.
Appendix D
Staff Survey 1997-1998
To all Robbins Classroom Teachers and Specialists:

This is the final survey in a two year project focused on increasing the usage of the Robbins Elementary outdoor educational areas. In August of 1997, you each received a resource guide that contained curriculum connections between the outdoor area and our current curriculum. This survey is designed to evaluate and improve the effectiveness of that guide.

The first page of this survey is almost identical to the one you filled out last year. It focuses on the overall usage of our outdoor site. The second page of the survey focuses specifically on the resource guide itself. It will be utilized to evaluate the quality of the grade level lessons. This information will be used by the integration team during the 1998-1999 school year to further improve the guide.

*Note For the purposes of this survey, do not count the times that your class fed the birds with the school birdseed.

1. Estimate the approximate number of times you used the woodland area for classroom purposes during the 97-98 school year. Circle the one that applies.

<table>
<thead>
<tr>
<th>zero</th>
<th>1-3</th>
<th>4-9</th>
<th>10 or more</th>
</tr>
</thead>
</table>

2. If you used the woodland area, what subjects did you teach while using it? For each subject, put the approximate number of times it was taught in the woodland area.

- Math
- Science
- Music
- Language Arts
- Social Studies
- Music
- Other (please explain below)

3. For each of the items below, circle the one that best expresses your feelings toward the resource guide (SA-Strongly Agree, A-Agree, N-Neutral, D-Disagree, SD-Strongly Disagree).

- I used the resource guide to design lessons.
- The resource guide helped me save time in planning lessons.
- I taught outdoors more because I had the resource guide.
- I feel my students benefited by the lessons I taught outdoors.
- I would like to see more lessons put into the resource guide.

Thank you for your time and effort in making the outdoors an educational place to be.

Mark Goings and the Integration Team

** Only Classroom Teachers Need to Complete the Back of this Form **
Please return completed forms to Mark Goings by May 15.
1. What grade level do you teach? _____

2. Which lessons from the resource guide did you use during this school year? Please put an asterisk beside the ones you tried, but did not go especially well.

   ___________________   ___________________   ___________________
   ___________________   ___________________   ___________________
   ___________________   ___________________   ___________________

If you put an asterisk beside any of the lessons, please explain what happened and suggest possible changes for the guide.

   ___________________________________________________________________
   ___________________________________________________________________
   ___________________________________________________________________

3. Which lessons from the resource guide did you not use during this school year? Please put an asterisk beside any that you still plan to teach during the last three weeks of school.

   ___________________   ___________________   ___________________
   ___________________   ___________________   ___________________
   ___________________   ___________________   ___________________

For the lessons that you did not teach, please circle the one that best applies.

   Lack of time.   SA A N D SD
   Teaching outdoors is a low priority.   SA A N D SD
   Didn't see the connections to the curriculum.   SA A N D SD
   Students don't behave well outside.   SA A N D SD
   Lack of outdoor teaching skills.   SA A N D SD
   Other   ___________________________________________________________________

Please list any suggestions that you have to improve these lessons for future guides.

   ___________________________________________________________________
   ___________________________________________________________________
   ___________________________________________________________________

4. Please list any of the lessons that you would like to see dropped from the guide.

   ___________________   ___________________   ___________________

5. What other lessons did you teach using our outdoor site, that you believe should be included in our resource guide? Please attach these to the survey.
Appendix E
Trail Guide
Compost Bin

Compost is decomposed organic matter. We can use compost to replenish and enrich the soil. We can encourage the decomposition of organic matter into usable compost by putting our garden, kitchen and lawn scraps into bins or piles.

In the piles, chemicals and microorganisms work together to break down the material. The intense activity of microorganisms create heat in the pile. Enough heat will kill disease and the seeds of weeds. In an amount of compost the size of a pea, there may be up to one billion bacteria alive and working.

Your compost pile needs air to operate. To be sure your compost pile has enough air it must be turned over every week or so. Turning the heap regularly aerates the compost and ensures that all the materials are exposed to the heat of the pile's interior. Worms and other animals who live in the pile help or aerate as well.

Good compost will be about as damp as a moist sponge. Too little moisture slows down decomposition and prevents the pile from heating up. Three microorganisms need a steamy environment.

Too much moisture drives out air, drowns microorganisms and washes away nutrients. Lack of nitrogen seems to be the main reason why compost fails to heat up. It will be next to impossible to get a pile working during the cold months, but the warmer temperatures of spring through fall provide enough heat to allow the pile to work.

Composting is a good way of putting scraps back to work.
Damaged Trees

This is a Norway Maple. It is native to Europe. It reaches 40-70 feet at maturity with a crown spreading 40-60 feet. The leaves are large (4-7" across) with long teeth along the edge. It is palmately lobed. The bark is dull to dark green and smooth becoming furrowed with maturity. It prefers full sun and rich soil.

These trees were injured. One, by a lawnmower and the other by a buck.

Trees growing in parks or lawns are in danger of being damaged by lawnmowers. When lawnmowers hit a tree it gashes a groove into the bark. This wound leaves the tree unprotected against diseases and pest infestation. These maladies may cause branch die-back or death. A scar will develop if the tree is to survive.

To help control mower damage, trim around trees by hand or put plastic guards around trees and landscape around tree base.

A buck in fall needs to shed the velvet from his antlers. Deer choose trees to rub this velvet off. The rubbing causes damage similar to what a lawnmower would do, but usually it is less severe. The tree usually survives with a scar. There are times, if the tree is small or if the rub is too rough, that the tree will die.
Brush Piles

Brush piles are also known as rabbitat. If you enjoy watching rabbits, chipmunks, and ground feeding birds, a brush pile is a good way to attract these animals. Brush piles provide a place where animals can eat, court, nest, sleep, escape, and even over winter.

It's best to build your brush pile near food and water so the animals can move quickly to and from shelter with minimum exposure to predators.

Though your brush pile should last 10-15 years, it will require maintenance. About every six years, add new brush to the pile.
Red Oak

The Red oak is a tree we have all seen. The leaves are lobed with bristled points on the tips. It grows to 90 feet tall and 3 feet wide with some exceptions. Its acorns are bitter with flat tops, whereas a black oak's acorns are more round. The bark is gray to dark brown and pliated when mature. On younger trees, the bark looks smooth and dark gray.

You may notice a wire through the red oak trunk. This wire may have marked a property line. Normally a property line is cleared of all brush before it is built. In time, the trees will grow around wires or anything else touching them. Eventually the fence, if neglected, will rust and fall apart leaving the fence parts hidden in the tree. These parts are preserved and will remain in the tree until the tree is removed. The fence impaled trees can be helpful in the future to reestablish property lines.

Fence impaled trees are dangerous to anyone cutting down trees, because they may injure them on someone nearby. The equipment used may also be damaged.

BLACK OAK
(Quercus velutina)

RED OAK
(Quercus rubra)
White Oak

Both the white and red oak are common to this area. They are similar trees, but they have differences. White oak leaves have rounded lobes. The red oak leaves have pointed lobes. The acorns of the white oak are smaller and less bitter tasting than the red oaks. The white oak's bark is pale gray-white and scaly. The red oak's bark is dark gray-brown and broken with deep furrows and ridges.
Hackberry

Hackberries are unusual to this area. Hackberries prefer richer soils. Soil in our area is mostly sandy. The hackberry was brought to our area as an ornamental tree. You may find berry laden hackberries lining the roads.

Many birds eat these berries. When they do back to their homes in the woods they poop. Where the poop landed, the seed also landed. This is how the hackberry made it here.

The hackberry's bark makes it easy to identify. It is covered with corky ridges up to 1/4 inch deep, disappearing as the tree matures. The leaves are ovate, 2 to 4 inches long, with prominent veins and a hairy topside.

HACKBERRY

*(Celtis occidentalis)*

[Image of hackberry leaf and branch]
The forest is always changing. Every plant and tree is competing to get the sun or shade it needs. Red maple and cherry are shade tolerant trees and the oaks are sun loving. The red maple and cherry trees provide shade over younger oaks and that would prevent younger oaks from growing. If openings are available in the oak forest, the red maple or cherry may fill it and dominate the forest.
Forest Succession

The forest is constantly changing. Every plant in the forest competes for the sunlight it needs. Plants grow towards the sun. This is called heliotropism. Some trees can tolerate shade, others cannot. The competition between these types of trees is called forest succession.

An oak is a shade intolerant tree. It will grow tall and wide enough to get all the sun it needs. If it does not get sun, it dies back.

A white pine is shade tolerant. It can stand to live underneath other trees in partial shade for a time, but it too needs the sun and will take any advantage of any opening. If white pines grow up underneath a red oak forest and a red oak falls, the white pine will take its place in the sun.

If this trend of oaks falling continues, the faster growing pines will completely replace the oaks. Oaks seedlings cannot survive in the shade of so many pines. It is in this way, through chance and tolerance, that an oak forest changes to a pine forest.

Succession

<table>
<thead>
<tr>
<th>Pioneer Species</th>
<th>Climax Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspen</td>
<td>Oak</td>
</tr>
<tr>
<td>Jack Pine</td>
<td>Red Maple</td>
</tr>
<tr>
<td>Birch</td>
<td>River Birch</td>
</tr>
<tr>
<td>Red Pine</td>
<td>Basswood</td>
</tr>
<tr>
<td>Spruce</td>
<td>White Pine</td>
</tr>
<tr>
<td>Sugar Maple</td>
<td></td>
</tr>
</tbody>
</table>
Critter Condos

A critter "condo" is a term used to describe a dead tree used by animals and insects.

Standing dead trees make good shelter for many birds, insects, and other animals. Downed trees or logs provide hiding places for smaller animals such as snakes, mice, weasels, and chipmunks.

Critter condos are homes to salamanders, moles, shrews, and other small animals. Some animals will feed on the soft fibers. Larger animals will use them for winter dens. They decay releasing nutrients into the ground enriching the soil.
The Edge Effect

The edge effect is where two habitats meet, like woodlands and fields or woodlands and wetlands.

The edge is important because it has many of the plants from habitats; therefore it provides the food and cover wildlife from both habitats need. The edge is also important for many of the predators of the world because they can hunt all sorts of animals.

If you walk along the edge of two habitats you should be able to see many animals using this area. Example include cats, rabbits, deer, raccoons, foxes, hawks, and various songbirds. You should also be able to find different kinds of insects.
Forest Openings

Forest openings are important to the animals of the forest because they give them a clear place to exercise, feed and sun themselves. The openings allow grasses, wildflowers and other sunloving vegetation to thrive. These plants are food to many creatures. Whitetail deer, rabbits, butterflies, grasshoppers, squirrels, birds and many other animals take advantage of the sunny spots in the forest.
Appendix F
Reminder Letters
Greetings from The Woods!

As a new layer of snow falls outside, we have a few reminders.

As was agreed upon at the beginning of the year, feeding the birds has been taken over by first, second, and fifth grades. Second grade fed the birds during the first trimester. Fifth grade is feeding the birds for the second trimester. First grade will take over on March 9th when the new trimester begins. If supplies run low, you can either talk to Pat about possibly purchasing more bird seed or you may want to ask students to bring in bags of seed.

Third grade did a great job of trail maintenance last fall. Thanks to all of our weed pullers. Keep it up this spring!

Fourth grade filled the compost bins with leaves last fall and will be gathering grass clippings this spring. Once the clippings are available they will be able to begin composting. All grade levels may want to check this out once the compost piles have been established.

Enjoy the wonderful opportunities provided by the snow. Some of you may wish to search our woodland trail for fresh tracks in the snow. Who knows what you may find?

Thanks to everyone for making our outdoors an exciting and educational experience.

If you have questions for “The Woods” ask Mark Goings. (He talks to it quite often.)
Update from The Woods

* Spring can be a great time to take your students outside for various academic lessons. We encourage you to utilize the outdoor teaching resource guide that Mark designed for our outdoor site. These lessons are tied to your curriculum, generate student enthusiasm, plus they get you outside on these beautiful spring days!

* During the week of April 20-24 we encourage all classrooms to do something outside. April 22 is Earth Day and April 24 is Arbor Day. The integration committee decided to not have any extra school-wide projects at this time, rather we thought you could use the lessons from the resource guide that are already tied to your curriculum. In music, Jodie will also be using her fun Earth Day related songs.

* Thanks to the fifth grade students for feeding the birds during the second trimester. During the remainder of the year, the first grade will be responsible for feeding the birds. (Students may need to bring in bird seed as supplies and funds have run low.)

* Third grade will continue their trail maintenance and fourth grade will begin composting in the next few weeks.

* The final evaluation for the outdoor resource guide will be sent to all teachers on May 4. Your input will be used to further enhance the usefulness of the guide. You will be asked which lessons from the guide you taught this year, what you liked about them, and what you didn’t like or need more training on. Mark will be available during the staff development day on April 15, in his room, if you have questions about the guide.

Thanks for your help,

The Woods and the Integration Team
Does your class need a change?

Do you want something that enhances student interest?

How about meaningful lessons that stick with students?

April 22 is Earth Day and April 24 is Arbor Day. Please plan to teach some lesson(s) outside during this week. The integration team suggests that everyone make use of the resource guide you received last fall. These already have age and curriculum appropriate lessons designed for each grade level.

If you have any questions about the guide, please let Mark Goings know. He will be available for any questions during the half day staff development time on April 15.

Thanks for your help,

The Integration Team
Appendix G

1995-1996 Survey Results
To all Robbins Classroom Teachers and Specialists:

I am currently beginning a two year project focused on increasing the usage of the wooded area outside our school. I will be establishing a resource guide that can be used to make curriculum connections between the woodland area and our current curriculum. You will each receive a copy of the resource guide next fall, and I will be conducting an optional inservice on how to use the guide in your classroom.

This survey is a means of documenting the current usage of the woodland area, and of gaining input as to any particular lesson or subject ideas you would like me to focus on. Please take a few moments and answer the following questions. Your input will be greatly appreciated and highly beneficial. We will be working on this project September 18 from 1:30-5:00. It will also be a major project of the integration team this year. You are welcome to join us!

*Note For the purposes of this survey, do not count the times that your class fed the birds with the school birdseed.

22 of 23 surveys were returned for a 96% return rate.

1. Estimate the approximate number of times you used the woodland area for classroom purposes during the 95-96 school year. Circle the one that applies.

<table>
<thead>
<tr>
<th>Number of Uses</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>zero</td>
<td>1-3</td>
</tr>
<tr>
<td>2 (9%)</td>
<td>12 (55%)</td>
</tr>
</tbody>
</table>

2. If you used the woodland area, what subjects did you teach while using it? For each subject, put the approximate number of times it was taught in the woodland area.

- **Math** 2
- **Language Arts** 13
- **P.E** 0
- **Science** 3 2
- **Social Studies** 6
- **Art** 7
- **Music** 2
- **Reading** 11
- **Other** 3 (please explain below)

1. **Recreation and leisure activities.**
2. **Environmental education.**
3. We use it everyday from our window to check the weather, talk about seasons, etc.
4. In art, I do impressionism with grade 4 (one lesson outdoors), drawing/sketching with grade 5 realism (one lesson outdoors), and grade 1 does one lesson of drawing things from nature outdoors.

3. Are there any specific lesson or unit topics you would like included in the resource guide? Please list any ideas you have on the back of the sheet. Also please
photo copy and send me any lessons you use during the year that would apply. These can also be sent during the school year as they come up.

1. Trees, woodland animals, seasons.
2. We take listening walks to identify sounds we hear and find the source when possible.
3. I have always been interested in a cement slab large enough to hold a class for drawing outdoors, outside my (the art) windows or where the picnic tables are located.
4. Use of Alpha Smarts.
5. Seasons, insects, and plants.
6. Observe seasonal changes (summer, fall, winter, spring), look for insects (spring), and 5 senses scavenger hunt (fall).
7. Units on trees (growth rings, structure of the tree, layers, seeds, conifer, deciduous, etc) and possible animal habitat with our woodland trails area (animals, diet, characteristics, etc.).
8. Trees - types (evergreen vs. deciduous) and how to know ages of trees
9. Can the area be expanded to include a small prairie grass area and savanna?

Thank you for your help. Please put it in Mark Goings' box by September 13.
Appendix H

1996-1997 Survey Results
To all Robbins Classroom Teachers and Specialists:

Last fall I inquired asked you for input on the formation of a resource guide for our woodland area. A committee was established last fall, and we have been designing the guide ever since. You will each receive a copy of the resource guide next fall, and I will be conducting an optional inservice on how to use the guide in your classroom.

As a means of documenting the impact of the inservice and resource guide, I need more information on the current usage of the area. This will provide me with the ability to compare the use of the woodland area before teachers have been inserviced on the guide with the usage of the woodland after you have received the guide. Please take a few moments and answer the following questions. Your input will be greatly appreciated and highly beneficial.

*Note For the purposes of this survey, do not count the times that your class fed the birds with the school birdseed.

16 of 23 surveys were returned for a 70% return rate.

1. Estimate the number of times you used the woodland area for classroom purposes during the 96-97 school year. Circle the one that applies.

   zero 1-3 4-9 10 or more
   4 (25%) 6 (38%) 4 (25%) 2 (13%)

2. If you used the woodland area, what subjects did you teach while using it? For each subject, put the approximate number of times it was taught in the woodland area.

   Math     0 Language Arts 6 P.E     2
   Science 11 Social Studies 2 Art     0
   Music    1 Reading      2

   Other     2 (please explain below)

   1. Spring - picked up all litter, watched fourth grade perform.
   2. Use the amphitheater for K-5 Guidance lessons in the spring and fall.
   3. Friday fitness walking, buddy classroom, sharing, etc.
   4. I would have done more, but my group had a little trouble with working in a nature - like environment.
   5. I have not used the woodland area. Sure do enjoy it out my window though!
   6. We do a listening walk in music.

Thank you for your help. Please put it in Mark Goings’ box.
Appendix I

1997-1998 Survey Results
To all Robbins Classroom Teachers and Specialists:

This is the final survey in a two year project focused on increasing the usage of the Robbins Elementary outdoor educational areas. In August of 1997, you each received a resource guide that contained curriculum connections between the outdoor area and our current curriculum. This survey is designed to evaluate and improve the effectiveness of that guide.

The first page of this survey is almost identical to the one you filled out last year. It focuses on the overall usage of our outdoor site. The second page of the survey, focuses specifically on the resource guide itself. It will be utilized to evaluate the quality of the grade level lessons. This information will be used by the integration team during the 1998-1999 school year to further improve the guide.

*Note For the purposes of this survey, do not count the times that your class fed the birds with the school birdseed.

17 of 23 surveys were returned for a 74% return rate.

1. Estimate the approximate number of times you used the woodland area for classroom purposes during the 97-98 school year. Circle the one that applies.

<table>
<thead>
<tr>
<th>Number of Times</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero</td>
<td>1 (6%)</td>
</tr>
<tr>
<td>1</td>
<td>4 (24%)</td>
</tr>
<tr>
<td>4-9</td>
<td>9 (53%)</td>
</tr>
<tr>
<td>10 or more</td>
<td>3 (18%)</td>
</tr>
</tbody>
</table>

2. If you used the woodland area, what subjects did you teach while using it? For each subject, put the approximate number of times it was taught in the woodland area.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Number of Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math</td>
<td>13</td>
</tr>
<tr>
<td>Science</td>
<td>46</td>
</tr>
<tr>
<td>Language Arts</td>
<td>15</td>
</tr>
<tr>
<td>P.E</td>
<td>1</td>
</tr>
<tr>
<td>Social Studies</td>
<td>12</td>
</tr>
<tr>
<td>Art</td>
<td>11</td>
</tr>
<tr>
<td>Music</td>
<td>1</td>
</tr>
<tr>
<td>Reading</td>
<td>15</td>
</tr>
</tbody>
</table>

Guidance used the site for lessons on responsibility, teamwork, careers, critical thinking, community helpers, and communications.

3. For each of the items below, circle the one that best expresses your feelings toward the resource guide (SA-Strongly Agree, A-Agree, N-Neutral, D-Disagree, SD-Strongly Disagree).

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I used the resource guide to design lessons.</td>
<td>1</td>
<td>7</td>
<td>6</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>The resource guide helped me save time in planning lessons.</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>I taught outdoors more because I had the resource guide.</td>
<td>0</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>I feel my students benefited by the lessons I taught outdoors.</td>
<td>8</td>
<td>7</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I would like to see more lessons put into the resource guide.</td>
<td>3</td>
<td>4</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Thank you for your time and effort in making the outdoors an educational place to be.

Mark Goings and the Integration Team

** Only Classroom Teachers Need to Complete the Back of this Form **

Please return completed forms to Mark Goings by May 15.

2. Which lessons from the resource guide did you use during this school year? Please put an asterisk beside the ones you tried, but did not go especially well.

Activity numbers are listed. See appendix 8 for names. Some teachers did not list specific lessons. 1(2), 2, 6(2), 7, 8(2), 10, 13(2), 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28(2), 30(2), 31(2), 32(2), 33(2), 34(2), 35(2), 36(2), 37(2), 38(2), 39, 45(2).

Comments:
1. No time yet.
2. I hope to use the lessons this month- I know you guys worked hard on this and my review of the material was worthwhile.
3. I haven’t used the guide to teach from. Many of the lessons in it are some I already do in science. I take the first graders outside for a lesson on trees in April.

If you put an asterisk beside any of the lessons, please explain what happened and suggest possible changes for the guide.

3. Which lessons from the resource guide did you not use during this school year? Please put an asterisk beside any that you still plan to teach during the last three weeks of school.

Lesson numbers: 3, 4, 5, 7, 29(2), 39.

Comments:
1. Frog Opera-not comfortable singing.
2. I plan to get outside, but will relate it to my current lessons.
3. Not sure.

For the lessons that you did not teach, please circle the one that best applies.

<table>
<thead>
<tr>
<th>Lack of time.</th>
<th>Teaching outdoors is a low priority.</th>
<th>Didn’t see the connections to the curriculum.</th>
<th>Students don’t behave well outside.</th>
<th>Lack of outdoor teaching skills.</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>&quot;Perhaps not a good excuse - it just didn’t happen for me yet.”</td>
</tr>
</tbody>
</table>

Please list any suggestions that you have to improve these lessons for future guides.

1. More language and math.
2. Combined Layers of the Forest, Sun Loving, and Land Succession.
into one.

4. Please list any of the lessons that you would like to see dropped from the guide.

   **Lights, Camera, Action! - too much time!**

5. What other lessons did you teach using our outdoor site, that you believe should be included in our resource guide? Please attach these to the survey.

   **Comments:**
   1. Signs of fall/winter/spring. We predicted (from books and discussions) what signs of seasons we would find. Took the list with us and looked for things on our list. Checked them off and added new ideas.
   2. It is very helpful to have the resource guide! Nice job.
   3. Mark, this summer I’ll look for other potential lessons, but at this point in grade 3 we all share our resources.
   4. Hope to use more lessons next year.
Appendix J
Robbins Elementary's Environmental Education Activity Guide
H - bird house
F - feeder
T - tables
S - spruce
L - white oak

North

White Spruce

Parking Lot

Library

Sugar Maple

Green Ash

Oak

Ash

Walnut

Sidewalk

Pole

Light pole

Oak

Ad

Light pole

South Hastings
It is the intent of this resource guide to engage students at all grade levels at Robbins Elementary School in educational outdoor activities. The activities are designed to build a student's awareness, appreciation, and knowledge of our environment. Environmental education takes a holistic view of our environment and of a student's education. Therefore, it is to be taught during all seasons of the year, at all grade levels, and in all subject areas. Students need this time to explore not only the outdoors, but also themselves. They will be formulating their own opinions about the world around them, and hopefully this guide can help them have a positive experience in the outdoors. It is important that students have this experience so that they can one day make intelligent decisions concerning the environment.

The guide has a list of activities to be taught at each grade level. The guide provides a number of experiences from which you can expand. These activities have been integrated into what you already teach, however, they all have an outdoor component. These lessons are designed to guide you toward using the outdoors as a classroom. We ask that you not do activities from higher grade levels because many of these are exploratory activities which require that the student be doing them for the first time. Since these activities will be used in various ways by different teachers, we have not included an evaluative component to each lesson. This is left to individual teacher's discretion.

Thank you for helping our students become environmentally literate citizens.

Mark Goings and The Robbins Elementary Integration Team
1997

Note * There is an "Adopt a Tree" lesson for each grade level. This environmental experience is designed to build during all six years that students are at Robbins.
## Table of Contents

<table>
<thead>
<tr>
<th>Activity #</th>
<th>Grade</th>
<th>Title</th>
<th>Subject Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>K</td>
<td>What Trees Give Me</td>
<td>Science; Art</td>
</tr>
<tr>
<td>2</td>
<td>K</td>
<td>Look At All the Color!</td>
<td>Art; Music</td>
</tr>
<tr>
<td>3</td>
<td>K</td>
<td>Match Up the Animals</td>
<td>Math; P.E.; Music</td>
</tr>
<tr>
<td>4</td>
<td>K</td>
<td>What is That?</td>
<td>Math</td>
</tr>
<tr>
<td>5</td>
<td>K</td>
<td>Natural Names</td>
<td>Language</td>
</tr>
<tr>
<td>6</td>
<td>K</td>
<td>Buddy Class Nature Hunt</td>
<td>Reading; Language; Science</td>
</tr>
<tr>
<td>7</td>
<td>K</td>
<td>Adopt a Tree</td>
<td>Science; Language</td>
</tr>
<tr>
<td>8</td>
<td>K</td>
<td>Beginning Sounds Scavenger Hunt</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>I Spy</td>
<td>Language; Science</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>Where Does the Water Go?</td>
<td>Reading; Science</td>
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<td>1</td>
<td>How Many More?</td>
<td>Math</td>
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<td>12</td>
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<td>Magic Leaf Prints</td>
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<td>Adopt a Tree</td>
<td>Science</td>
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</tr>
<tr>
<td>18</td>
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<td>A Magnify-cent Walk</td>
<td>Art; Science</td>
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<td>19</td>
<td>2</td>
<td>Down the Drain</td>
<td>Science</td>
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<td>20</td>
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<td>I’m Lost, Where Am I</td>
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<td>21</td>
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<td>Adopt a Tree</td>
<td>Science</td>
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<td>22</td>
<td>3</td>
<td>Manabozho and the Maple Trees</td>
<td>Social Studies; Science; Math</td>
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<td>What’s in the Soil</td>
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<td>Science; Social Studies</td>
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<td>27</td>
<td>3</td>
<td>Archaeologists of Trash</td>
<td>Social Studies; Science; Music</td>
</tr>
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<td>28</td>
<td>3</td>
<td>Adopt a Tree</td>
<td>Science</td>
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29 4 Frog Opera Science; Music
30 4 Sniffing Out A Trail Science
31 4 Grandfather Rock Social Studies; Science
32 4 How Turtle Flew South for the Winter Social Studies; Science
33 4 Circle of Life/Age of the Earth Social Studies
34 4 Match Them Up! Science
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40 5 A Night in the Woods Music; Art; Science; Reading
41 5 Have There Been Any Abuses Reading; Social Studies
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45 5 Lights, Camera, Action Language; Social Studies; Science
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Appendix

49 Works Cited
50 Additional Resources
51 Local Agencies
KINDERGARTEN
LESSONS
What Trees Give Me

Grade K  
Curriculum Connection: Science-plants, Art  
Duration: 30 minutes  
Setting: woodland area

Objectives:
1. Students will be able to describe how trees are beneficial to them.

Materials needed: Shel Silverstein’s *The Giving Tree*, colors, construction paper

Key Vocabulary: special, beauty, enjoyment

Pre-lesson:
1. Introduce vocabulary.
2. Brainstorm examples of things that are special, beautiful, and enjoyable.

Outdoor Activity:
1. At the amphitheater, read *The Giving Tree*.
2. Brainstorm ways that trees are special, beautiful, or bring us enjoyment. This list can also contain things we get from wood (baseball bats, furniture, etc.).
3. Have each child draw their favorite gift from trees.

Wrap-up:
1. Share favorite gifts from trees with the class.
2. Combine these drawings into a class book (your own Giving Tree book) or display them around the room.

*This activity is based on “Trees Help Me” on pages 45-46 of *Living Lightly in the City* available from the IMC #90165.*
Look At All the Color!

Grade K
Curriculum Connection: Art, Music
Duration: 15 minutes
Setting: any outdoor site

Objectives:
1. Students will be able to name and identify the primary colors.

Materials needed: construction paper, crayons

Key Vocabulary: names of colors used

Pre-lesson:
1. Choose 3-5 colors to make a rainbow with.
2. Have students draw their own rainbow using the same colors.

Outdoor Activity:
1. Walk to a good “looking” spot. This could be a grassy area, the woodland amphitheater, etc.
2. At the looking spot, look for things that are the first color. (What can you see that is red?)
3. Do this with the other colors.
4. On the way back in, look for other things that are the same colors as your rainbow.

Wrap-up:
1. Were the students surprised at the number of colors they could find?
2. Ask if there are some colors that don't appear in nature or that would be difficult to find.

* Music Extension: Change the words to “A Little White Duck” so that they become the things that you saw from your looking spot.

** This activity is based on “Neighborhood Rainbows” on pages 15-16 of Living Lightly in the City available from the IMC #90165.
Little White Duck

Music by Bernard Zaritsky
Words by Walt Barrows

1. There's a little white duck, sit-tin' in the water,
   Little white duck,
2. There's a little green frog, swim-min' in the water,
   Little green frog,
3. There's a little black bug, float-in' in the water,
   Little black bug,
4. There's a little red snake, fly-in' in the water,
   Little red snake,
5. Now there's no-body left, sit-tin' in the water,
   No-body left,

Flapped his wings, and he said, "I'm glad I'm a little white duck,
"I'm glad I'm a little green frog,
"I'm glad I'm a little black bug,
"I'm glad I'm a little red snake,"

sit-tin' in the water, Quack, *(quack) quack, (quack) quack (quack, quack).*
swim-min' in the water, Glumph, (glumph) glumph, (glumph) glumph (glumph, glumph)."
float-in' in the water, Chir, *(chir) chir, (chir) chir (chir, chir).*
fly-in' in the water, Hiss, *(hiss) hiss, (hiss) hiss (hiss, hiss).*
sit-tin' in the water, Boo *(boo) hoo, (hoo) hoo (hoo, hoo).*

hoppin' cross the ground, little green frog
hoppin' cross the ground, little green frog
hoppin' cross the ground, little green frog
hoppin' cross the ground, little green frog

Grumph, *(grumph) grumph, (grumph) grumph.*
Chir, *(chir) chir, (chir) chir (chir, chir).*
Hiss, *(hiss) hiss, (hiss) hiss (hiss, hiss).*
Boo *(boo) hoo, (hoo) hoo (hoo, hoo)!
Grade K
Curriculum Connection: Math-sorting, P.E.-movement, Music-long and short sounds
Duration: 45 minutes
Setting: Grassy Area

Objectives:
1. Students will be able to match animal movements together.
2. Students will be able to use movements and sounds associated with their animal.

Materials needed: animal names (or pictures) written on cards

Key Vocabulary: Introduce animal names that will be on the cards.

Pre-lesson:
1. Discuss animals that will be on the cards. (sounds they make, the way they walk, what they eat, etc.)
2. Explain how to play the “Animal Match Up Game.”
   - Have two sets of matching cards that have animals on them.
   - Students draw a card and think about how they will act.
   - Students in two lines, on your signal, they begin to act like their animal while they look for the similar animal.
   - After all pairs are found you may wish to draw new cards and do it again.

Outside Activity:
1. Once you are at the grassy area, establish boundaries.
2. Students draw names and form two lines.
3. Begin to find your partner.

Wrap-up:
1. Ask them what clues told them that they found an animal just like them.
2. Make animal sounds again, decide if they are long or short sounds.

* This activity is based on “Branching Out: Find Your Partner” on page 39 of Ranger Rick's Nature Scope, Amazing Mammals Part 1 which is available from the IMC #90553.
What is That?

Grade K
Curriculum Connection: Math-sorting
Duration: 45 minutes
Setting: any outdoor site

Objectives:
1. Students will be able to sort items from nature into different classifications.

Materials needed: containers filled with various items (acorns, leaves, twigs, etc.)

Pre-lesson:
1. Have students practice sorting blocks in the classroom. This will help them get ready for what is expected of them.
2. Please encourage students to stay on the path when in the woods so that delicate plant and animal life do not get trampled.

Outside Activity:
1. Walk through the woodland trail or grassy area adding a few more items to your boxes.
2. Either at the amphitheater or in a grassy spot, divide students into groups.
3. Have the groups classify: freely, by shape, size, texture, weight, color, etc.

* This activity is based on “Sorting Station” pages 19-22 of Sammy’s Science House from the IMC.
Natural Names

Grade K
Curriculum Connection: Language
Duration: 30 minutes
Setting: Woodland Area

Objectives:
1. Students will be able to correctly spell their names.
2. Students will be able to correctly form each letter in their name.

Materials needed: construction paper, glue

Pre-lesson:
1. Discuss outdoor expectations (Stay on the trail, don’t pick any living things, etc).

Outside Activity:
1. Walk the entire woodland trail noting what’s out there.
2. End up at the amphitheater, have some natural materials (leaves, twigs, etc.) that students can use to glue onto their paper to form their name.

Wrap-up:
1. Share names.
2. Read a picture story book while you are outside.

* This activity is based on “Nature Names” on page 14 of Sammy’s Science House from the IMC.
Buddy Class Nature Hunt

Grade K
Curriculum Connection: Reading, Language-listening, Science-5 senses
Duration: 30-45 minutes
Setting: woodland area

Objectives:
1. Older students will be able to work with younger students to help them learn about our trail/5 senses.
2. Students will be able to fine tune and think about 4 of our 5 senses.

Materials needed: Nature Hunt sheet and one pencil per group.

Key Vocabulary: 5 senses, taste, touch, smell, hear, see

Pre-lesson:
1. Match up older students with kindergartners.
2. Explain/review 5 senses and how to use them in nature.
3. Talk about how quiet we will have to be and how we need to stay on the path.

Outside Activity:
1. Pass out the list of things to find.
2. Partners hunt for items on the list.

Wrap-up:
1. Class discussion of what we found. What was the easiest/hardest to discover?
things to see
- A feather
- A hole in a tree
- A yellow leaf
- A red & black bird
- An ant
- A woodtick
- A butterfly

things to hear
- A bee
- Trees in the wind
- A duck
- Dry leaves under feet
- A chipmunk

things to smell
- The mud
- A yellow flower
- A burrow
- Green grass
- Old leaves

things to feel
- Wet mud
- Prickly plant
- The wind on a hill
- A mosquito bite
- Rotten wood
- Tree bark

things happening
- An ant moving something
- A spiderweb with a bug on it
- A leaf falling
- An animal eating
- A turtle swimming
- A frog jumping

NAME ___________________________
DATE ___________________________
Four Senses Nature Hunt

Things to See

- A feather
- Den Tree
- Bird Nest
- Red or yellow leaf
- Tree bud
- Bird Flying
- Insect Cocoons
- Spider Web
- Scat
- Dragonfly

Things to Hear

- Buzzing Insects
- Cawing Crow
- Wind in the trees
- A Woodpecker Tapping
- A Blue Jay Scolding
- Dry Leaves Crunching
- A Chipmunk Running
- An Angry Red Squirrel
Things to Feel

- A Web
- Wet Mud
- Wind on a hill
- Mosquito Bite
- A Drop of Water
- Rotten Wood
- Last Years Leaves
- Smooth Tree Bark
- An Animal Track

Things to Smell

- Mud
- A Flower
- Green Grass
- Old Leaves
- A Hole in the Ground
- Moss
Grade K

Curriculum Connection: Science/Language- Seasonal Changes

Duration: 20-30 minute blocks of observation time at least four times a year (fall, winter, early spring, and late spring/early summer)

Setting: Woodland Area or select tree somewhere on the school site

Objectives:
1. Students will select a tree on the school site which they can observe throughout the school year.
2. Students will observe and photograph the tree four times during the year. They will discuss what they see and the seasonal changes using words related to their senses (see, hear, feel, taste, smell).
3. Students will work together to write a language experience story with the teacher. It will be displayed in the classroom with the photograph. As the year progresses students will compare and contrast the seasonal changes.

Materials needed: Large lined writing paper for language story, camera (to take a class photos of the tree), collected samples from the tree (fallen leaves or needles/cones, bark rubbings, other seeds, etc.)

Key Vocabulary: tree, trunk, bark, cones, needles, leaves, roots, branches, summer, fall/autumn, winter, spring

Pre-lesson:
1. Some discussion on the changing seasons, their effect on plants/trees in Wisconsin.
2. Practice looking at objects and describing them, as well as talking about the parts of a tree.

Outside Activity:
1. Search out a tree with some character to adopt. Have the students discuss how we might go about selecting a tree.
2. Take a photo of the tree. Children may want to make their own sketch. They could keep a tree journal, or the class could keep a classroom journal.

During the different class sessions during the year we could collect bark rubbings and leaves. Leaves could be sorted (large, medium, small), comparisons could be made with other trees on the school site, measurements could be made (size of tree), etc.

Wrap-up: Throughout the year continue to talk about changes. Display the on-going photos and language experience stories.
Class Projects
Special Observations

You need: 18” x 24” (or larger) white construction paper
crayons
8½” x 11” white paper
scissors
stapler
12” x 18” light blue and green
construction paper
dark marker
3” x 5” unlined index cards
thumbtacks or pushpins

Steps:

1. Divide your class into groups of two to four children each. Give each group a large piece of white construction paper and a black or brown crayon.

2. Take the children outside and ask each group to find an interesting tree trunk. While one or two children hold the white paper tight against the trunk, another child in the group rubs the side of the crayon gently across the paper, using a side-to-side motion. After a minute, have the children in each group trade places so that each child has a chance to make a bark rubbing on part of the paper. The paper should be covered when the children have finished their rubbings.

3. Then ask each child to collect a few leaves with thick veins. Bring the class inside and collect their bark rubbings.

4. Have each child make a rubbing of each leaf he or she found. To make the rubbings, each child places a leaf vein-side up on a desk or table and lays an 8½” x 11” piece of white paper on top of it. Each child then rubs the paper with the side of a green crayon (use fall colors if appropriate) in a side-to-side motion, making an impression of the entire leaf. Ask each child to cut out his or her leaf rubbings.

5. While the children are making their leaf rubbings, staple several sheets of light blue construction paper onto a bulletin board for a background. Rip green construction paper into strips about 6” wide and staple them along the bottom of the bulletin board to make a grassy border.

6. Next, cut or rip a large tree trunk shape from each group’s bark rubbing. Then cut or rip several narrower strips for branches.

7. Staple the tree trunks and branches in place on the bulletin board.

Some strips may be stapled end-to-end to form tall trunks and long branches.

8. Make labels for the trees by writing on separate 3” x 5” unlined index cards the names of the different kinds of leaves (maple, oak, elm) found. Pin each label below a tree on the bulletin board.

9. Ask each child to pin his or her leaf rubbings on the correct trees on the bulletin board.

Variations:

1. Label each tree with a color word and have younger children match the leaves to the trees by color.

2. Children may also classify the leaves according to the type of edges—smooth, toothed, lobed, or lobed-toothed. (See the Types of Leaves reference chart on page 25.) Make appropriate labels for the trees.
Plan a unit of study about trees, using some or all of the activities in this section. Have children place their completed worksheets and projects in scrapbooks as they learn about trees.

**TREE SCRAPBOOK**

**You need:**
- 12" x 18" colored construction paper
- black markers
- newspapers
- paintbrushes
- tree leaves with thick veins
- tempera paints in fall colors, including green
- 9" x 12" white construction paper
- scissors
- glue
- stapler

**Steps:**

1. At the beginning of the unit, have each child prepare a folder as a cover for his or her tree scrapbook. Give each child a 12" x 18" piece of colored construction paper. Ask each child to fold the paper in half, making a 12" x 9" folder.

2. With a black marker, each child will write the title *Trees* at the top of the front cover of the scrapbook, and his or her name at the bottom of the front cover.

3. Next, children will make leaf prints to decorate these folders. Cover your work area with newspapers. Ask each child to lightly paint the underside of a thick-veined leaf with tempera paint. Then have each child place the leaf, painted side down, on a 9" x 12" piece of white construction paper. Each child presses the leaf down firmly without moving it and then lifts it carefully off the paper. Let the leaf prints dry.

4. When the leaf prints are dry, children will cut around the edges of their prints, leaving a 1/2" border of white paper on all sides. Each child then glues the leaf print onto the cover of his or her scrapbook.

5. As children complete work related to their study of trees, have them place their work in their tree scrapbook folders. At the end of the unit about trees, staple the pages of each child’s tree scrapbook together in book form.

6. Read children the Tree Facts on this page. Then have children complete the "Parts of a Tree" worksheet on page 27—or have younger children draw their own pictures of trees, showing the leaves, branches, trunk, and roots.

**TREE FACTS**

There are many different kinds of trees. They are the largest kinds of plants. Some trees grow as tall as a 30-story building. Most trees live for many years.

A tree has three main parts—the roots, the leaves, and the trunk. Its roots grow downward into the ground. They hold the tree in place. From the soil, the roots soak up water and minerals that the tree needs to live.

The leaves of a tree make food for the entire tree. The leaves use energy from sunlight, water, and air to make this food. Some trees belong to the evergreen family. They have long, thin, needlelike leaves that stay green all year long. Other trees have broad, flat leaves. These trees lose their leaves in the fall and grow new leaves in the spring.

The trunk holds up the tree’s leaves. Inside the trunk are many veins. These veins carry food and water to all parts of the tree.
Beginning Sounds Scavenger Hunt

Grade K
Curriculum Connection: Language Arts- Beginning Sounds/Vocabulary Development
Duration: 45-60 minutes (depends on the attention span of the children)
Setting: Woodland and Grassy Areas

Objectives:
1. Students will be able to find objects that begin with the letter sounds of the alphabet.

Materials needed: camera, containers to hold objects, alphabet cards.

Key Vocabulary: this depends on the kinds of things the students find outdoors

Pre-lesson: Students will need to be exposed to beginning sounds prior to going on their investigative Scavenger Hunt.

Outside Activity:
1. Gather together several adult helpers that could buddy with small groups of students no larger than 1 adult per 8 students).
2. Pass out alphabet cards so that each group has an equal number of cards.
3. With their boxes or containers/camera, they will walk around the school site collecting and photographing things that begin with the sounds of the alphabet that they have in their possession.

Wrap-up:
1. Organize materials found in the classroom in alphabetical order. Photos taken should be recorded by the adult so we know what they are before they are developed. A word card could take its place until the picture is present.
2. Children can continue to add to the collection for several weeks following the scavenger hunt.
3. Discuss what sounds were not discovered. Can they think of other things in nature that might begin with these sounds?
**You need:**
- brown-paper grocery bags
- large box
- assortment of objects with common characteristics (see list of suggested categories)

**Steps:**
1. Tell children they are going on a treasure hunt for things that are alike.
2. Divide the class into teams of four to six children. Give each team a brown-paper grocery bag in which to collect the treasure. Place a large box at the front of the room. This will be the treasure box.
3. Look at the list of suggested categories on this page. Assign to each team a different category of objects to hunt for (for example, things that open and shut or things to write with). Ask each team to find three objects having that specific characteristic. (If regular classroom objects do not provide enough variety of characteristics, additional objects fitting into the different categories can be scattered around the classroom).
4. Children hunt around the classroom for the objects. When a team has found three objects having the assigned characteristic, the team brings its bag to the teacher to check. The objects are removed from the bag and placed in the treasure box. Once an object is put into the treasure box, it cannot be used in another category.
5. As each team finds three objects with a specific characteristic in common, the teacher will assign another characteristic to the team. Continue checking the teams' bags and assigning new categories until each team has looked for and found objects in three different categories.

**Variations:**
1. Hold a treasure hunt outdoors in the spring or fall. Have children look for specific objects, such as different colors of leaves, pebbles, feathers, nuts, and so on.
2. Set up a "Picture Hunt" center for individual students to work at during their free time. Assign a category to each child and have him or her look through magazines to find pictures of things with wheels, different animals and plants, things that fly, and so on.

**Suggested Categories for Characteristics:**
- round things
- things of a specific color
- things to write with
- things that open and shut
- plastic things
- metal things
- things to read
- things to play with
I Spy

Grade 1 (You may wish to do this with your buddy classroom.)
Curriculum Connection: Language Arts, Science
Duration: 45 minutes
Setting: Any outdoor area.

Objectives:
1. Students will be able to write in complete sentences.
2. Students will be able to write clues.
3. Students will be able to write down facts.

Materials needed: I Spy is available from the IMC, paper, pencils, colors

Key Vocabulary: spy, clue

Pre-lesson:
1. Read the I Spy book to the students.
2. Practice making your own “I Spy” page as a class.

Outdoor Activity:
1. Have students find an object that they would like to use to create their page.
2. Students draw the object onto one side of the page.
3. Students write clues about the object so that others can guess what your object is.
4. As a music extension, students write the clues in four beat meter and “rap” them to the class.

Wrap-up:
1. Put the new “I Spy” pages together in a book, with written clues on the front side of each page, and share the new book with the class.

* This activity is based on I Spy which is available from the IMC. It also contains a list of other activities related to the story.

i.e.

1. I grow on trees.
2. Squirrels eat me.
3. I wear a cap.

front

back
Where Does the Water Go?

Grade 1
Duration: 30 minutes
Setting: woodland area

Objectives:
1. Students will be able to explain that water comes out of tree leaves.

Materials needed: plastic bags

Key Vocabulary:

Pre-lesson:
1. Discuss what plants need in order to grow.

Outside Activity:
1. Have students place a plastic bag over the leaves of various plants. Use a variety of plants (conifer and deciduous trees, small ground cover, etc.) Please remind students to put bags around them carefully so that the plant is not damaged.
2. Either go back inside for about an hour, or read a book and draw in the amphitheater for an hour.
3. Have students predict what the bags will look like.
4. Each child should collect their bag. They need to remember what plant it was on.
5. Discuss where the water came from and possibly compare amounts of water found in the bags. For instance, conifers should give off less water than deciduous trees.

Wrap-up:
1. Does a tree lose water in the winter time? Why not? (water would freeze and there aren’t leaves to let the water out)
2. Make a class drawing of the water cycle through a tree. (in through the roots, up the trunk, and out the leaves)
PLANTS GIVE OFF MOISTURE

FACTS FOR THIS LESSON
Plants get water through their roots. Plants also give off water through their leaves.

WHAT TO DO
Get a plastic bag and put it over a plant. Tie the bag around the stem at the bottom of the plant. Water the plant and put it in the sun.

1 HOUR LATER
What has happened?
ake the bag off the plant. Look at the underside of a leaf with a hand lens.
Can you see many small holes in the leaf?

Water comes out of these holes while the plant is making food. There are more of these small openings in the top side of the leaf.

Put some petroleum jelly on a few of the leaves so that all the openings are covered. Wait a week or two.

ANSWER THESE
What happened to the leaves you covered?

Can you think of anything outdoors that might coat the leaves of a plant and make them die?
How Many More?

Grade 1
Curriculum Connection: Math-greater than/less than
Duration: 45 minutes
Setting: any outdoor site

Objectives:
1. Students will be able to sort items into different classifications.
2. Students will be able to compare groups using greater than/less than.

Materials needed: containers filled with various items (acorns, leaves, twigs, etc.)

Key Vocabulary: greater than, less than

Pre-lesson:
1. Have students practice sorting blocks from treasures from Mathland tubs in the classroom and have them compare the groups. This will help them get ready for what is expected of them.
2. Remind students that they should not “pick” things out of the woods or around the grounds because it would damage the wildlife. Also, please encourage students to stay on the path when in the woods so that delicate plant and animal life do not get trampled.

Outdoor Activity:
1. Walk through the woodland trail or grassy area adding a few more items to your boxes.
2. Either at the amphitheater or in a grassy spot, divide students into groups.
3. Have the groups classify the objects: color (brown versus green, acorns versus leaves, etc.
4. Students then compare the classifications. “My number of acorns is less than my number of leaves.”
5. You can also use this with simply addition or subtraction. “How many more acorns do you need to have the same number of acorns as leaves?”

*This activity is based on “Sorting Station” on pages 19-22 of Sammy’s Science House available from the IMC.
Grade 1
Curriculum Connection: Art/Science-classification of leaves.
Duration: 60 minutes
Setting: woodland area in the fall

Objective:
1. Students will sort leaves into piles according to some common properties, and make magic leaf prints on paper.

Materials needed: Magic paint (one cup of chlorine bleach mixed with 4-5 drops of dishwashing detergent), different types of leaves, cotton swabs, construction paper, paper towels, paint shirts, picnic table to work on, newspaper to cover table. Check to see if anyone is allergic to bleach.

Key vocabulary: sort, common properties: simple, compound, lobbed, smooth

Pre-lesson:
1. Do the AIMS attribute lesson in which you group objects by their attributes (color, size, etc.).

Outside Activity:
1. Gather fallen leaves in the wooded area.
2. Observes the characteristics of 5 to 10 leaves placed before them.
3. Sort leaves into piles according to some common property.
4. Write the property by which they have been sorted on a sheet of construction paper.
5. To make the Magic Leaf Print, first use a cotton swab to lightly paint the leaf with the Magic Paint. (Use caution not to get on clothes or on (in) the body!)
6. Place the painted leaf on a piece of construction paper, with the appropriate label (i.e. simple, smooth), and press down with a paper towel.
7. Remove the leaf from the paper and watch the print

This activity is provided by Dr. Edward J. Zielinski, Clarion University, Clarion, PA. Council for Elementary Science International NSTA Division Affiliate.
MAGIC LEAF PRINTS

Inquiry learning requires students to respond at the higher cognitive levels. Teaching by inquiry helps to maintain the students' curiosity. In addition, it involves them in learning activities which require a high degree of cognitive skill while providing concrete experiences for children who have not reached Piaget's formal operations stage. Inquiry learning also assists in developing positive attitudes toward science. There is a close relationship between the process skills and the responses of pupils.

Classification is a primary process skill needed for inquiry learning. It involves categorizing objects according to a predetermined property or set of properties. Examples of classifying are sorting paper shapes, blocks, pictures, buttons, etc. Classifying may be accomplished through single or multi-stage classification systems.

Materials:
- Magic Paint (one cup of chlorine bleach mixed with 4-5 drops of dishwashing detergent)
- Different types of leaves
- Cotton Swab
- Construction Paper
- Paper Towels
- An old shirt to be used as an apron (for each child)
- Check to see if anyone is allergic to bleach

Procedure
1. Have the students observe the characteristics of 5 to 10 leaves placed before them.
2. Then have the students sort the leaves into piles according to some common property.
3. Then have the students make a Magic Leaf Print of the leaves in one pile and write the property by which they have been sorted on a sheet of construction paper.
4. To make the Magic Leaf Print, first use a cotton swab to lightly paint the leaf with the Magic Paint. (Use caution not to get on clothes or on (in) the body!)
5. Place the painted leaf on a piece of construction paper and press down with a paper towel. (Teachers, test the construction paper beforehand; some types contain dyes which will not bleach.)
6. Remove the leaf from the paper and watch the print develop.

This activity provided by:
Dr. Edward J. Zielinski, Clarion University, Clarion, PA
Rock Hound

Grade 1
Curriculum Connection: Science-Rocks and Soil
Duration: Three 45 minute sessions
Setting: Rocks in play area.

Objectives:
1. Students will observe and classify rocks.
2. Students will discover where rocks may have come from.
3. Students will discover and record rock attributes.


Key Vocabulary: texture, scratch, hardness, weight

Pre-lesson:
1. Discuss uses of rocks i.e. playground safety, tombstones, soil, buildings, chalk, jewels, statues, sandpaper, etc.
2. Introduce data collecting sheets.
3. Discuss attributes that rocks have.
4. Where do we find rocks?

Outside Activity:
1. Collect three interesting rocks per student in playground area (or kids can bring them from home).
3. Share data.

Wrap-up:
1. Discuss where these rocks came from.
2. Could we figure out which rocks may have come from the same large rock?

Follow-up:
1. See Baker’s Dough Rocks and Fossils
   - analyze black top
   - “make” soil/dissect soil
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<tr>
<th></th>
<th>Color</th>
<th>Weight</th>
<th>Hardness (scratch test)</th>
<th>Texture</th>
<th>Observations</th>
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<td>When you use a magnifier, how does your rock look?</td>
<td>How hard is each rock?</td>
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<td><strong>Word Box</strong></td>
<td>1-2 your fingernail can scratch</td>
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<td>lines</td>
<td>3 penny with pressure can scratch</td>
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<tr>
<td>shiny</td>
<td>4-5 steel nail can scratch</td>
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<td>bands</td>
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<table>
<thead>
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<th>Texture</th>
<th>Weight</th>
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</thead>
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<td>What word describes how each rock feels?</td>
<td>How many units does it take to equal each rock?</td>
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<td><strong>Word Box</strong></td>
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<td>hard</td>
<td>jagged</td>
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<tr>
<td>sharp</td>
<td>sandy</td>
</tr>
<tr>
<td>bumpy</td>
<td>gritty</td>
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<tr>
<td>flat</td>
<td>heavy</td>
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</tbody>
</table>

| Color | |
|--------||
| What color is each rock when dry? | |
| What color is each rock when wet? | |
Investigation
Making copies of rocks.

Skills
Describing attributes ○ Matching shape, size, and texture ○ Comparing weight

Materials
Rocks; baker’s dough; modeling tools; cookie sheets; paints with a wide range of colors.

Setting Up
Make up a batch of baker’s dough by mixing 1 cup flour, ¼ cup salt, and ¼ cup of water. Place the dough on the science table. You will also need enough rocks for each child to have one. You will need to have an oven available for baking the dough.
Starting Out

Begin the activity by describing one of the rocks, saying, for example, I'm thinking of a small, round rock that is gray in color. Challenge the children to identify the rock you are describing. If they name a rock that fits the description but is not the one you chose, give them positive feedback and then ask: Can anyone find another rock that is small, round, and gray?

Next, have each child in turn choose a rock to describe in a similar way. When the rock is found, remove it from the collection. Note: Some children will no doubt look at the rock while they are describing it, thereby giving away which rock they chose. If so, you might want to suggest that they turn their backs and do the description from memory.

Guiding Children’s Actions

1. Give each child a rock or have each child choose a rock to copy. Rocks with lots of different faces will be most difficult to copy; flat smooth rocks will be easiest. You might want to adjust the difficulty level to the children’s abilities.

2. Tell the children to make a baker's dough rock to match their real rock; that is, mold the dough into a shape that looks just like the real rock.

3. As the children work, encourage them to look at the rock from many different angles and to see whether the dough rock matches the original. The children can copy the texture of the original rock and any cracks or bumps in the rock using clay modeling tools, or pencil points and dull knives, or just their fingers.

4. When the children are finished making their dough rocks, have them place them on cookie sheets. Bake the dough at a low temperature for about an hour or until the dough is hard and slightly browned. (The amount of time required varies depending on the size of the dough rocks.)

5. Cool the dough rocks and let the children paint them to match the original rock.

Stretching Their Thinking

Have the children compare the weights of their real rock and their baker's dough rock by putting them on opposite sides of the balance scale. Which is heavier? (In most cases the baker's dough rock will weigh less than the real rock.) The activity serves to reinforce the concept that objects of the same size and shape can have different weights, a difficult notion for young children.
Fossils

Investigation
Making plaster casts.

Skills
Conjecturing ◊ Observing changes ◊ Inferring cause and effect ◊ Matching casts and molds

Materials
Fossils; rock and mineral identification book; modeling clay; fossil-making materials; plaster of Paris.

Setting Up
Have enough modeling clay so that each child can have a lump. On a work table, provide several objects that can be used for making impressions in the clay. The best objects are those that have a clearly-defined shape or texture. Seashells make good impressions as do the feet of plastic animals such as toy dinosaurs.
Starting Out

Let the children examine fossil specimens or pictures of fossils from books. Ask the children what animal or plant they think produced the impressions they see.

Guiding Children's Actions

1. Have the children make their own fossils. Begin by giving each of the children a lump of modeling clay on which to make an impression.

2. Let the children choose from the objects on the table or pick ones of their own to make the impression. Suggest that they experiment with different objects before they decide on one for their fossil.

3. After the children have made an impression in the clay, mix some plaster, using the directions on the box. Don't prepare the plaster in advance or it will harden before you can use it. Mix only as much plaster as you can use in ten minutes.

4. Pour a thin layer of plaster into the impressions the children have made in the clay (build up the sides of the clay, if necessary, so that the plaster does not overflow).

5. When the plaster has completely dried, let the children remove the casts from their impressions and examine their homemade fossils. Talk about how the plaster changed over time. Compare the hardened plaster to rocks.

6. Explain that one way fossils can form is when a layer of mud fills in and hardens over an impression left in soft mud, just as the plaster filled in and hardened over the impression they made in the clay.

7. Have each child show his or her fossil to the class. Challenge the others to tell what the child used to make the fossil.

Stretching Their Thinking

Mix up the plaster casts and the clay impressions on a table and have the children find the matching pairs. Let the children examine an example of gypsum, the rock from which plaster of Paris is derived.
Grade 1
Curriculum Connection: Math-data collection, Science-rocks and soil
Duration: 60 minutes
Setting: any outdoor site

Objectives:
1. Students will be able to describe what is in the soil.
2. Students will use observation skills.

Materials needed: sand, salt, hand lenses, “Sand/Salt” data sheet, shovels, buckets

Key Vocabulary: soil

Pre-Lesson:
1. Compare sand and salt using data sheet to hone the senses and prepare for observing soil (see attached sheet).
2. Talk about what soil generally is.

Outside Activity:
1. Go out to site(s) of choice and dig up samples of soil. Take samples from various outdoor areas and label the source on the container.
2. Inside “dissect” soil and put into piles according to attributes found in the soil such as living animals, rocks, leaves, twigs, etc.
3. Share results.

Wrap-up:
1. Do a “magic” trick for class. Use a bag and add rocks, twigs, water, leaves, worms(?). Say the magic words and take out baggy of soil (placed in bag beforehand).
2. Do what is on soil sheet.
What is soil?

Color the things that are part of soil.

- Duck
- Raindrops
- Leaf
- Pencil
- Worm
- Car
- Rocks
- Ant
- Light bulb
Name ____________

Write *S* for same.
Write *D* for different.

<table>
<thead>
<tr>
<th></th>
<th>sand</th>
<th>salt</th>
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Adopt a Tree

Grade 1
Curriculum Connection: Science-plants, Theme-change  
Duration: 30-45 minute blocks of observation time at least four times a year (fall, winter, early spring, and late spring/early summer)  
Setting: woodland area or select a tree somewhere on the school site

Objectives:
1. Students will select a tree on the school site which they can observe throughout the school year.
2. Students will observe and photograph the tree at least four times during the year. They will discuss what they see and the seasonal changes using words related to their senses (see, hear, feel, taste, and smell).
3. Students will describe what their tree needs to grow and facts which can hinder their tree’s growth.

Materials needed: camera, film, paper, crayons, nature trail tree guide (if necessary), measuring tape, samples of conifer and deciduous trees

Pre-lesson:
1. Some discussion on the changing seasons, their affect on plants/trees in Wisconsin. Talk about the differences between conifer and deciduous trees.

Outside Activity:
1. Search out a tree with some character to adopt. Have the students discuss how we might go about selecting a tree.
2. Take a photo of the tree. Children may want to make their own sketch. They could keep a little tree journal, or the class could keep a classroom journal.
3. Make bark rubbings and leaf rubbings sometime during the year. Make comparisons could be made between their tree and other trees on the school grounds.
4. Observe changing leaves on their tree in the fall. (See attached activity sheet.)
5. The children can measure its trunk several times during the year.

Wrap-up:
1. At the end of the year the children will have made a collection of their findings in their personal or classroom journal.
Use these projects to keep a record of important school events throughout the year. Children will enjoy reviewing what they have learned and the special activities in which they have taken part.

CLASS SCRAPBOOK

With this activity, younger children can make a large scrapbook that can be placed in the room and kept up throughout the year.

You need:
- masking tape
- experience chart paper
- dark marker
- 24" x 36" piece of colored construction paper
- crayons or markers
- stapler

Optional:
- hole puncher
- three small notebook clip rings

Steps:
1. On the last school day of each month, tape a large sheet of experience chart paper on the chalkboard.
2. Discuss with the children any special projects they have worked on or things they have learned during the month—how to write their names, how to count to ten, how to say the alphabet, how to sing a song, or how to play a game. Ask children to try to remember whatever they liked best about the month’s activities.
3. At the end of this discussion, incorporate the children's comments on the chart paper. Begin by writing the name of the month at the top of the paper. Then write “In [name of month], our class had lots of fun. We did many things, and here are some of them. We made _____ in art. In music, we learned to sing _____ . Our favorite story this month was _____ . We think ______ was the most fun,” and so on.
4. Explain to children that each month they will help prepare another page so that by the end of the year there will be one page for each month.
5. Make a cover for the monthly scrapbook by having all the children write their names on a 24" x 36" piece of colored construction paper. If children cannot write their names, write their names for them. Children may use markers to decorate the paper around their names.

6. Staple the cover onto the page. If desired, punch three holes along the left-hand sides of the cover and the page and attach them together with three small notebook clip rings.

7. Display the monthly scrapbook where children can refer to it and reread it in their free time.

PERSONAL SCRAPBOOKS

You need:
- worksheet on page 36
- pencils
- 12" x 18" colored construction paper
- crayons or markers
- stapler

Steps:
1. At the end of each month, make a copy of the worksheet on page 36 for each child. Help children fill in the sentences on the worksheets.
2. To make a cover for the scrapbook, each child will fold a 12" x 18" piece of colored construction paper in half lengthwise. Have the child write all the names of his or her classmates on the outside of the cover, along with your name, the year, and his or her name.
3. As each month's worksheets are completed, children will store them inside their folded covers. At the end of the school year, staple the pages inside the cover so that each child will have a personal scrapbook of events throughout the year.
SECOND GRADE

LESSONS
Count the Birds

Grade 2
Curriculum Connection: Science-birds, Math-graphing
Duration: 5 minutes every hour
Setting: any bird feeder

Objectives:
1. Students will be able to record and graph data.
2. Students will be able to form conclusions based on data.

Materials needed: full bird feeders, graph paper, notebook, pencil

Key Vocabulary: generalization, bird behavior

Pre-lesson:
1. Record student predictions: What time of day will the feeders be used most? When during the year will the feeders be used most?

Outdoor Activity:
1. Select a bird feeder to be monitored. Have students note how close the feeder is to brush, trees, etc. They could draw a map containing measurements of how close the feeder is to other objects.
2. Count the number of birds at the feeder each hour. Record this in student notebooks. Repeat this each day for one week.
3. Make a bar graph showing the feeder use by day and by hour.
4. To extend this activity, take readings either once a week or once a month to compare changes in feeder usage.

Wrap-up:
1. What generalizations can you make? What hours are the best?
2. Did you notice if the birds used any of the surrounding cover?
3. What other experiments could we use to learn more about bird behavior?

* This activity is based on “For the Birds” pages 63-64 of Living Lightly in the City available from the IMC #90165.
Can You Find a _____ Tree?

Grade 2
Curriculum Connection: Reading-inferring information, Science, Music
Duration: 45 minutes
Setting: woodland site

Objectives:
1. Students will be able to find trees that have a desired attribute.

Materials needed: sheets listing the attributes, pencils, and “Lollipop Tree” song sheets.

Key Vocabulary: seedlings

Pre-lesson:
1. Describe how a seed begins to grow and what its basic needs are (soil, water, light).
2. Discuss how even though many seeds may begin to grow, that very few actually become full-grown trees.

Outdoor Activity:
1. Divide students into groups and pass out attribute sheets.
   1. The Smallest Tree - students may be surprised that a tree can be tiny.
   2. A Sad Tree - Why is it sad? Does it have broken branches, things carved into it, etc.?
   3. A Happy Tree - Is it because it looks healthy?
   4. A Tree with a Nest - Why do you think the bird choose that tree?
   5. The Biggest Tree - As a class you may wish to find the circumference of one of these big ones.
2. Have student groups find their trees. If they get done early, they may wish to sketch some of their trees. Please encourage students to stay on the trail. This will limit the amount of young plants that get trampled.

Wrap-up:
1. Discuss why students chose the trees that they did.
2. Sing the “Lollipop Tree” as a class.

* This activity is based on “Small Trees, Tall Trees” pages 37-38 of Living Lightly in the City available from the IMC #90165.
86. The Lollipop Tree

Words by Joe Darion

Music by George Kleinsinger

Spirited

1. One fine day in early spring I played a funny trick,
2. Then one day I woke to find a very lovely sight,
3. Winter came and days grew cold as winter days will do,

Out in the yard behind our house I planted a lollipop stick,
Then tree all full of lollipops had grown in the dark of night,

On my tree, my lovely tree, not one little lollipop grew;
From every day I watered it well and watched it carefully,

I sat beneath that wonderful tree and looked up with a grin,
And every branch an icicle hung, the twigs were bare as bones,

Verse 1 & 2 can be sung "happily"
Verse 3 - to be added + something like freezing flakes to winter IL.
hoped one day that stick would grow to be a lol-li-pop tree.
when I o-pened up my mouth a pop would drop right in.
when I broke the i-ci-cles off they turned to ice-cream cones.

Ha, ha, ha, Ho, ho, ho, What a sight to see,
Ha, ha, ha, Ho, ho, ho, What a place to be,
Ha, ha, ha, Ho, ho, ho, How I danced with glee,


A Magnify-cent Walk

Grade 2
Curriculum Connection: Art-sketching, Science
Duration: 30 minutes
Setting: any outdoor site

Objectives:
1. Students will be able to correctly use a hand lens (magnifying glass).
2. Students will be able to draw creatures that they examine with the hand lens.

Materials: hand lenses, pencils, paper

Key Vocabulary: magnify

Pre-lesson:
1. Demonstrate how to focus the lenses. Focus on your thumb and move the lens forward or back until the image is clear.
2. Have students practice looking at objects with their hand lenses.

Outdoor Activity:
1. While outside, have students examine objects with the hand lens and sketch what they look like. For instance, at the woodland amphitheater, you may have them examine a twig. They would then draw in detail what they see on the twig.

Wrap-up:
1. Have students share their pictures. They can also verbally describe what they saw. Were there any surprises?
2. Review what magnify means, and how things look different when magnified.

* This activity is based on “Magnificent Walk” on pages 16-17 of Living Lightly in the City available from the IMC #90165.
Down the Drain

Grade 2
Curriculum Connection: Water
Duration: 20 minutes
Setting: Parking lot

Objectives:
1. Students will be able to describe how humans pollute our water.

Key Vocabulary: pollutant, evaporate

Pre-lesson:
1. Read and listen to tape of Captain Conservation: All About Water (IMC)
2. Discuss how we pollute our water.

Outside Activity:
1. Go to front parking lot area and look at how everything runs into the drain.
2. Describe how this goes untreated into the Chippewa River.
3. Put food coloring into a jar of water and watch it run down the drain.

Wrap-up:
1. Discuss where the water from the drain went.
2. Review the water cycle.
3. Discuss how pollutants do not evaporate and so they actually concentrate as the surrounding water evaporates.

* You may wish to use The Magic School Bus: Waterworks with this lesson.
I'm Lost, Where Am I

Grade 2
Curriculum Connection: Social Studies-mapping, P.E.-spacial awareness
Duration: 30 minutes
Setting: any outdoor site

Objectives:
1. Students will draw a map of an outdoor area containing major landmarks.

Materials needed: construction paper, pencil, something to draw on

Key Vocabulary: landmark

Pre-lesson:
1. Draw a map of the classroom.
2. Point to different spots on the map and have a student go to each spot.
3. Introduce the word “landmark”.

Outside Activity:
1. Explain to the class what area you would like them to map.
2. Each map should include all major landmarks.
3. Students draw their own map.

Wrap-up:
1. As a class, samples student maps and have them locate different spots on the map.
2. Put your finger between two landmarks and have a student find that approximate spot. Use directions: north, south, east, west, left, right, front, back, etc. in your discussion.
3. Briefly discuss how drawing maps to scale is helpful.
Adopt A Tree

Grade 2
Curriculum Connection: Science-patterns
Duration: 30-45 minute sessions at least four times during the school year
Setting: Woodland area or select a tree somewhere on the school site

Objectives:
1. Students will select a tree on the school site which they can observe throughout the school year.
2. Students will compare/contrast their tree to others on the school grounds.

Materials needed: nature trail tree guide (if necessary)

Key Vocabulary: conifer, deciduous, season

Pre-lesson:
1. Some discussion on types of trees, conifer versus deciduous.

Outdoor Activity:
1. Search out a tree with some character to adopt. Have the students discuss how we might go about selecting a tree.
2. Take a photo of the tree. Children may want to make their own sketch.
3. Use sunprint paper to make solar prints of its leaves or needles. Collect several sizes from the ground around the tree. Other leaves could be compared to its leaves by using sunprints or leaf/needle rubbings.
4. During the fall season, keep track of the changing color of the leaves on their tree. (See the attached activity sheet.)

Wrap-up:
1. At the end of the year the children will have made a collection of their findings in their personal or classroom journal. This can be a year-long project.

* You may wish to do this activity four times per year, having students draw their tree on a piece of paper (12x18) that is folded into quarters. This will show how their tree changed with the seasons.
MATERIALS NEEDED

leaves from trees around the school
5 x 8 index cards
tape
drawing paper
paper bag for each child

OUTSIDE ACTIVITIES

1. Ask the children:
   "How many different colors can we find in the leaves of this tree?"
   "Show me three trees that have leaves of the same color."

2. Give each child an index card with a leaf taped to it:
   "Can you find the tree that your leaf came from?"

3. Have each child collect about 15 leaves and put them into his bag to take back inside.

INDOORS FOLLOW-UP

1. Discuss with the class the fact that some leaves have the same shape, some have the same color,
and some have smooth edges while others have wavy or toothed edges. Have them find examples of these things in their own pile of leaves.

2. Give each child a piece of drawing paper. Have him fold it into four sections. Ask him to open out the paper. Then have each child make a "game" for his classmates, called "One of these leaves is not like the others." He pastes or tapes in three leaves that are alike in some way and one leaf that is different from the other three.

3. Have the class play the game, giving each child a turn to hold up his paper while the others guess which leaf is different.
THIRD GRADE

LESSONS
Manabozho and the Maple Trees

Grade 3
Curriculum Connection: Social Studies-Ojibwa folk tale, Science-plants, Math-measurement of tree rings (Interdependence Unit)
Duration: 60 minutes
Setting: woodland area

Objectives:
1. Students will discuss basic parts of trees and their functions.
2. Students will determine important resources that come from trees.
   (Maple sap, firewood/heat, and other parts of trees; people and animals from nuts, fruits, bark, roots, and other parts of trees; place for solitude, shade, noise reduction, clean air, erosion protection, oxygen for photosynthesis.)

Materials needed: Keepers of the Earth, Native American Stories and Environmental Activities for Children, pp. 144-149.

Key Vocabulary: tree functions, forest community, plant succession, roots, minerals, Manabozho, photosynthesis, transpiration, evaporation, deciduous, evergreens, trunks, annual rings

Pre-lesson:
1. An excellent book to read prior to the lesson is The Ancient Forest.

Outdoor Activity:
1. Read "Manabozho and the Maple Trees" to the students in our woodland amphitheater.
2. Discuss parts of trees and types of trees.
3. Describe how some people in March collect maple sap to make syrup. It takes 30-50 gallons of sap to make one gallon of maple syrup.
4. Introduce the idea of succession. Take a walk around the trail identifying ways that you can see plant succession. (Look at the clearing in the woods especially. It already shows signs of new tree growth.)

Wrap-up:
1. Review information from the outdoor activity.
2. Ask, "Do you think we appreciate things more if we have to work hard for them?"

* This activity is based on "Manabozho and the Maple Trees" on pages 145-149 of Keepers of the Earth available in our library. It also has a complete list of extensions.
What's in the Soil

Grade 3
Curriculum Connection: Science-soil, Art (Interdependence Unit)
Duration: 30 minutes
Setting: grassy area

Objectives:
1. Students will be able to identify different creatures that live in soil.
2. Students will be able to compare/contrast living creatures in different soil types.
3. Students will be able to sketch a creature found in the soil.

Materials needed: class set of hand lens, white construction paper, pencils, record sheets

Key Vocabulary: soil sample

Pre-lesson:
1. Discuss what types of things make up soil.
2. List types of soil that you will be looking at (moist compost, moist sand from the playground area, and some soil carefully taken from the woodland area).
3. Predict how the soils may compare.
4. Discuss how to use the hand lenses and what you wish them to record.

Outdoor Activity:
1. Collect soil samples. Please be sure to replace any samples that are taken to ensure that damage to our outdoor classroom does not occur.
2. Place soil samples on sheets of white paper.
3. Students record the number of different types of living creatures that they see. Samples that are moist will contain more living creatures.
4. Students may wish to sketch some of the creatures that are seen.
5. Students describe soils by color and by composition (twigs, small stones, etc.).
6. Rotate so that each student sees all of the samples.

Wrap-up:
1. Make a class list of soil descriptors and creatures seen. Students will not know the names of the creatures, but have them describe them.
2. Compare the soil types.

* This activity is based on “What Makes Soil?” on pages 46-47 of Over Head and Underfoot, Project AIMS Grades 3-4 available from the IMC #19014.
### WHAT MAKES SOIL?

**My Discovery About What Makes Soil.**

<table>
<thead>
<tr>
<th>KIND OF SOIL</th>
<th>COLOR</th>
<th>THINGS IN THE SOIL</th>
<th>HOW IT FEELS</th>
<th>WEIGHT OF SAMPLE</th>
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Snow Stories

Grade 3
Curriculum Connection: Language-writing, Science-animal tracks
(Interdependence Unit)
Duration: 30 minutes
Setting: woodland area-winter

Objectives:
1. Students will be able to write a fictional story.
2. Students will be able to identify animal tracks.

Materials needed: Charts of animal tracks or the models of animal tracks from the IMC (Introduction to Tracks and Tracking Vol. 1, 2, 3 #40129, #40130, #40131), pencil, and paper.

Key Vocabulary: Track (a footprint or to follow the footprints)

Pre-lesson:
1. Look at charts of animal tracks.
2. Practice identifying which way the animal is going.
3. Predict what types of animals may be in the area around the school.

Outdoor Activity:
1. With a partner, have students walk along the trail in different directions looking for animal tracks.
2. Once the partners have located some tracks, they need to try to identify which direction the animal was going and what type of animal it likely was.
3. Students will then begin to write a fictional story, using their animal as the main character and the woods as the setting.

Wrap-up:
1. Discuss tracks that were found.
2. Students will share story ideas with the class. You may wish to use The Littles as an example.
3. Students will complete their stories.

* This activity is based on “Snow Stories” pages 68-70 of Living Lightly in the City available from the IMC #90165.
Natural Recycling

Grade 3
Curriculum Connection: Science/Social Studies-recycling (Change Unit)
Duration: 45-60 minutes
Setting: woodland area

Objectives:
1. Students will be able to describe natural recycling of nutrients.
2. Students will be able to describe things that humans recycle.

Materials needed: hand lenses

Key Vocabulary: compost, decomposers

Pre-lesson:
1. Read Captain Conservation: All About Recycling (IMC classroom set).
2. Discuss what items we can recycle and show examples.
3. Ask, “How does nature recycle?”

Outside Activity:
1. Locate dead trees and branches.
2. Examine forest floor and what’s in it.
3. Look for decomposers.
4. Have students look at the compost pile and identify decomposers.

Wrap-up:
Compare compost pile and the forest floor to the recycle bins.
The Origin of the Big Dipper

Grade 3
Curriculum Connection: Social Studies-Anishinabe, Ojibway folk tale, Language-storytelling (Change Unit)
Duration: 60 minutes
Setting: woodland area and grassy area

Objectives:
1. Students will be able to describe why we have folk tales.


Key Vocabulary: constellation

Pre-lesson:
1. Ask students to name any constellations that they know of.

Outdoor Activity:
1. Read “How Fisher Went to the Skyland: The Origin of the Big Dipper” to the students at our woodland amphitheater.
2. Discuss why people may create stories to explain unknown items.
3. Demonstrate why constellations change throughout the year.
   - have students form a large circle with one person in the middle
   - the star gazer will have his/her back to the person in the middle (the sun) and will rotate around the sun noting the different stars (students) they can see

Wrap-up:
1. Describe that our sun is a star just like the stars that make up constellations. Stars do not move. Which is why as Earth moves around the sun, we can only see the stars that are on that side. (For example, Orion is a constellation bright in the winter sky, but it cannot be seen in the summer sky.)

* This activity is based on “How the Fisher Went to the Skyland: The Origin of the Big Dipper” on pages 117-125 of Keepers of the Earth available in our library. It also has a complete list of extensions.
Archaeologists of Trash

Grade 3
Curriculum Connection: Social Studies/Science-recycling, Music
(Change Unit)
Duration: 60 minutes
Setting: any

Objectives:
1. Students will be able to pick trash up in assigned areas.
2. Students will be able to analyze trash found in an area and make inferences as to who made the garbage.
3. Students will be able to discover what can be recycled out of trash found.

Materials needed: Plastic or paper bags, plastic gloves, "Your Can of Trash" worksheet and song sheets.

Key Vocabulary: archaeologists, artifacts, recycle

Pre-lesson:
1. Discuss littering along roadways, in fields, by our school, etc.
2. Explain that an archaeologist analyzes artifacts from the past to discover clues to the people who owned them.
3. Our artifacts will be trash that we pick up outside in a designated area.  
4. Safety discussion (crusted metal, large objects, broken glass, etc. are off limits).

Outside Activity:
1. Pick up trash in groups of 2-4.
2. Come back to outdoor classroom (or inside again) and discuss/show garbage found.
3. Speculate the age, sex, kind of person who littered a specific piece of garbage.
4. Sing "Something's Stinking" see song sheet.

Wrap-up:
1. Pass out "Your Can of Trash" worksheet.
2. Discuss what we found and what could have been recycled.
Something's Stinking! (sung to the tune of "Are You Sleeping?"

Something's stinking! (Something's stinking!)  
Is it me? (Is it me?)  
If I'm being careless, (If I'm being careless,)  
Shame on me! (Shame on me!)  

Some drink soda  
Toss the can  
Rolling down the highway  
Garbage-land  

Something's stinking!  
Is it you?  
If you're being careless  
Shame on you!  

Wasting paper  
Every day  
Could've been recycled  
Thrown away!  

Right beside me  
Something smells!  
Someone's being careless  
I can tell!  

Might be teachers!  
Might be kids!  
Doesn't make a difference  
Who it is!  

Something's stinking!  
Oh, P.U.!  
Try to be careful  
It's not you!
Adopt a Tree

Grade 3
Curriculum Connection: Science-Seeds/Plants
Duration: 30-45 minute sessions monthly during the school year
Setting: woodland area or select tree somewhere on the school site

Objectives:
1. Students will select a tree on the school site which they can observe throughout the school year.
2. Students will be able to compare/contrast their tree to other trees on the school grounds.
3. Students will observe changes in their tree such as: new growth, tree grows fatter, taller, color of leaves, seeds, flowers, etc.

Materials needed: nature trail tree guide (if necessary)

Pre-lesson:
1. List 10 products that are produced from trees, talk about why trees would be important to Eau Claire.
2. Discuss the difference between deciduous and coniferous trees. Have students find three trees from each group found on our school property. From these choose one tree to adopt.

Outside Activity:
1. Search out a tree with some character to adopt.
2. Sketch your tree. Note its basic shape.
3. Measure its diameter.
4. Sketch its leaf. What type of leaf is it?

Wrap-up:
1. Discuss how a tree grows (from its tips and gets fatter by adding rings).
HOW A TREE GROWS

Trees Grow Fatter

Every year a new layer of wood forms just beneath the tree's bark. The tissue that causes this growth by dividing its cells is called the cambium. The new cells become wood, or xylem, and the layers of cells towards the outside of the tree are called phloem.

The cells produced in the spring are much larger and lighter in color than the smaller, darker colored ones produced in the summer. These alternating dark and light colored cells make the rings in trees. Each ring represents one year of growth.

Trees Grow Taller

The end of each twig has a terminal bud with special cells that divide and make the twig grow longer. Each year's growth comes from a bud that contains the beginnings of a twig, leaves and flowers.

Terminal Bud

The terminal (leading) bud is protected from weather by thick, overlapping scales. Terminal buds produce a hormone called auxin that prevents the growth of lateral buds. If the terminal bud dies or is removed, the lateral bud develops.

Kinds of Xylem

Heartwood
- This helps to support the tree.

Sapwood
- This carries water from the roots to the leaves.

Xylem
- Made of sapwood and heartwood

Cambium
- Makes new xylem (wood) and phloem (inner bark)

Phloem
- Carries food made by the leaves to other parts of the tree

Bark
- Protects the tree

Scale Scar

The scale scar, or growth rings, consists of lines around the twig that show where last year's terminal bud was located.

Winter Buds

During the cold winter months, a tree's buds become dormant (inactive). Trees can be identified, even in winter, by the shape and arrangement of their buds.

Lopsided Limbs

Sometimes tree trunks and branches do not grow equally on all sides. This is usually due to exposure to strong wind on the side with the slowest growth. Heavy branches often show more growth on the underside to help support the weight of the limb.
Stories in Stumps

You can learn much about the life of a tree by interpreting the clues recorded in the circles of light and dark wood on a freshly cut tree stump. These circles, called annual rings, are formed by new growth each year.

Study the How a Tree Grows poster. With the help of the four phrases in the Word Bank, label the four parts below to describe the events in this tree's history.

1. 

2. 

3. 

4. 

Study the rings, scars and cuts in the diagram above. Tell what you think probably happened to this tree.

THE TREE'S STORY


FOURTH GRADE

LESSONS
Frog Opera

Grade 4
Curriculum Connection: Science-wetlands, Music
Duration: 60 minutes
Setting: The wetland that is a half mile from Robbins.

Objectives:
1. Students will be able to listen for “sounds of nature” (birds, crickets, leaves, etc.).
2. Students will be able to identify frogs and their calls.

Materials needed: “Frog Opera” song sheets.

Key Vocabulary: Spring peeper, chorus frog, leopard frog, American toad, bullfrog, and green frog.

Pre-lesson:
1. Brainstorm sounds found in the classroom (talking, shuffling, intercom, etc.).

Outdoor Activity:
1. Listen for sounds of nature - name them.
2. Divide into six groups. Assign one verse to each group. Groups practice their verse’s frog call.
3. All sing song - each group performs own frog call.

Wrap-up:
1. Discuss each group’s performance. Were they accurate with their frog call?
2. Have individual students make a frog call sound. Class guesses which one!
Activity 4

Frog Opera

Music, Science

Your students can learn more about frogs and their calls by singing this song.
Sing to the tune of "Six Little Ducks" (Traditional)

Verse 1

Six little frogs that I once knew,
Fat ones, skinny ones, spotted ones too,
But the one SPRING PEEPER with the "X" on his back,
He led the others with his Peep-peep-peep.

Verse 2

Six little frogs that I once knew,
Fat ones, skinny ones, spotted ones too,
But the one CHORUS FROG
with the stripes on his back,
He led the others with his
Wr rank - wr rank - wr rank
(trill R's, sounds like running a finger down a comb)
Wr rank - wr rank - wr rank
Wr rank - wr rank - wr rank
He led the others with his
Wr rank - wr rank - wr rank.

EE News. Carrie Morgan, Editor. Madison, WI. Department of Natural Resources.
Verse 3

Six little frogs that I once knew,
Fat ones, skinny ones, spotted ones too,
But the one LEOPARD FROG
with the spots on his back,
He led the others with his
Bruuup – bruuup-bruuup.
(low pitched, back of throat, sounds like plucking an inflated balloon)
He led the others with his
Bruuup – bruuup-bruuup.

Verse 4

Six little frogs that I once knew,
Fat ones, skinny ones, spotted ones too,
But one AMERICAN TOAD
with the bumps on his back,
He led the others with his
Trill – trill – trill. (high-pitched-trill tongue on roof of mouth)
Trill – trill – trill
Trill – trill – trill
He led the others with his

Verse 5

Six little frogs that I once knew,
Fat ones, skinny ones, spotted ones too,
But the huge BULLFROG
with the plain green back,
He led the others with his
(Low pitched – sounds like a foghorn)
Jug-O-Rum – Jug-O-Rum – Jug-O-Rum
Jug-O-Rum – Jug-O-Rum – Jug-O-Rum
He led the others with his

Verse 6

Six little frogs that I once knew,
Fat ones, skinny ones, spotted ones too,
But the bright GREEN FROG
with some brown on his back,
He led the others with his
Glup – glup – glup. (In back of throat – sounds like a loose banjo string)
Glup – glup – glup
Glup – glup – glup
He led the others with his
Glup – glup – glup.

A Mixed Chorus

Using the frog calls above, have different groups of students sing a verse at the same time. In Wisconsin, most of these frogs chorus at different times. In the southern United States, there may be as many as 14 kinds of frogs and toads in one pond singing in a mixed chorus.

—from Wisconsin Junior Ranger, Wisconsin Department of Natural Resources, Madison, WI 53707.
Sniffing Out A Trail

Grade 4
Curriculum Connection: Science-senses and Wisconsin ecology
Duration: 45 minutes
Setting: any outdoor site

Objectives:
1. Students will be able to use their sense of smell to locate clues.
2. Students will be able to write down notes about different animals.

Materials needed: 30 clue cards, 30 cotton balls, 6 different scents, 60 pieces of yarn, pencil, and paper.

Key Vocabulary: olfactory bulb, olfactory area

Pre-lesson:
1. This should be done in conjunction with the senses unit.
2. Explain how to play the game.
   -Clues about six different animals will be written on note cards.
   -Attached to the note card is a scented cotton ball that indicates which animal the fact is about. Match the scents to match the facts.
   -The cards are scattered about (hung on a tree branch, etc.).
   -Students record all facts about their animal and try to identify what kind of animal it is.

Outdoor Activity:
1. Students work in groups to identify their animal. (Depending on time, they may be able to figure out more than one animal.)
2. Students record facts about their animal in their notebook.
3. After all facts are gathered, they need to decide as a group what kind of animal they think it is.

Wrap-up:
1. Share what the animals are.
2. Discuss if some scents were difficult to detect or easily confused with another scent.

* This activity is based on “Sniffing Out A Trail” pp. 9-10 of Ranger Rick’s Nature Scope, Amazing Animals Part 1, which is available from the IMC.
Grade 4
Curriculum Connection: Social Studies-Native Americans (Lakota Sioux and Pawnee), Science-Structures of the Earth and Weather
Duration: 60 minutes
Setting: woodland area

Objectives:
1. Students will be able to explain how people used stories to explain natural occurrences.
2. Students will be able to find examples of “weathering”.

Materials needed: Keepers of the Earth, Native American Stories and Environmental Activities for Children, pp. 57-63.

Key Vocabulary: erosion, igneous, metamorphic, sedimentary water erosion, wind erosion

Pre-lesson:
1. Discuss common folk tales. (For example, how Paul Bunyan supposedly created the Grand Canyon.)

Outdoor Activity:
1. At the outdoor amphitheater, read “Tunka-shila, Grandfather Rock” and “Old Man Coyote and the Rock” to the students.
2. Discuss how both of them attempt to explain something about the land around us.
3. Explain that the rock in “Old Man Coyote” was actually eroding.
4. Brainstorm types of erosion (wind, water, trampling)
5. Look for types of erosion along the woodland trail.

Wrap-up:
1. Have students share the examples of erosion that they found and classify each example under its cause.
2. Discuss ways to prevent erosion.

* This activity is based on “Tunka-shila, Grandfather Rock” and “Old Man Coyote and the Rock” on pages 57-63 of Keepers of the Earth available from our library. It also has a list of additional activities.
How Turtle Flew South for the Winter

Grade 4
Curriculum Connection: Social Studies-Native Americans (Dakota Sioux), Science-weather and Wisconsin ecology
Duration: one ten minute period and one 60 minute period
Setting: any outdoor area

Objectives:
1. Students will be able to explain why some animal species must migrate or hibernate.
2. Students will be able to list adaptations some animals have that allow them to spend the winter in Wisconsin.


Key Vocabulary: adaptation, migration, cold-blooded, warm-blooded, hibernation

Pre-lesson:
1. During the fall, pick a spot and list all animals you see and hear in a ten minute period.

Outdoor Activity:
1. During the winter, go back to the same spot and read “How Turtle Flew South for the Winter” to the students.
2. After the story, sit for ten minutes again and list all animals seen or heard.

Wrap-up:
1. Back inside, compare both lists to each other. What changed?
2. Discuss possible reasons for the changes that occurred.
3. List common characteristics of animals that hibernate, migrate, or stay and adapt to the winter.

* This activity is based on “How Turtle Flew South for the Winter” on pages 157-163 of Keepers of the Earth available through the IMC. It also has a list of additional activities.
Circle of Life/Age of the Earth

Grade 4
Curriculum Connection: Social Studies-Native Americans (Lakota Sioux) and human effects on Wisconsin (Social Studies Unit A)
Duration: 45 minutes
Setting: any area

Objectives:
1. Students will be able to describe how old the Earth is.
2. Students will be able to describe why it was so important to the Lakota to live in harmony with nature.


Key Vocabulary: geologic time line

Pre-lesson:
1. Read "The White Buffalo Calf Woman and the Sacred Pipe" to the students in a group outside.
2. Discuss how this eludes to the circle of life.
3. Describe how the Sioux were dependent on the balance of nature.
4. Discuss the problems that occurred when the balance was altered (the buffalo disappearing).

Outdoor Activity:
1. Brainstorm ways humans have changed the Earth.
2. Illustrate how old the Earth is by making a geologic timeline with the students (see measurements on page 190 of Keepers of the Earth).

Wrap-up:
1. Discuss how fast the human changes have occurred compared to the age of the Earth.
2. Ask, "Is it important that we also live in harmony with nature?" "What are possible results?"

* This activity is based on "The White Buffalo Calf Woman and the Sacred Pipe" on pages 187-192 of Keepers of the Earth available in our library. It also has a list of additional activities.
Match Them Up!

Grade 4
Curriculum Connection: Science-Wisconsin forest ecology
Duration: 60 minutes
Setting: woodland area

Objectives:
1. Discover plants on our trail with trail signs. (Must be done in early fall or late spring.)


Key Vocabulary: see match-up sheet, coniferous, deciduous, simple leaf, compound leaf

Pre-lesson:
1. Look through the outdoor classroom booklets which explain what can be seen along the trail.
2. Collect the booklets.
4. Pair up students (optional).

Outdoor Activity:
1. Try to determine which trail marker number is next to a particular plant. Record on the sheet.
2. Come back to outdoor classroom when done.

Wrap-up:
1. Discuss answers.
2. Go to each area as a class and point out each plant.
3. Point out things like whether each tree is coniferous/deciduous or simple leafed/compound leaf etc.
MATCH THEM UP!!!

name

#___stump lichen
#___white spruce
#___prairie
#___buckthorn
#___prickly ash
#___elm
#___black walnut
#___raspberry
#___vine
#___box elder
#___red pine
#___black cherry
#___white oak
ANSWERS
#1 prickly ash
#2 black walnut
#3 box elder
#4 buckthorn
#5 elm
#6 stump lichen
#7 black cherry
#8 white spruce
#9 red pine
#10 Raspberry (and gooseberry)
#11 vine
#12 white oak
#13 prairie
Layers of a Forest

Grade 4
Curriculum Connection: Science-Wisconsin forest ecology
Duration: 45 minutes
Setting: woodland area

Objectives:
1. Students will be able to identify three different layers in a forest.

Materials needed: Sketch paper, pencil, something to write on.

Key Vocabulary: forest floor, understory, canopy

Pre-lesson:
1. Brainstorm types of plants found in our woods.
2. Discuss proper behavior and expectations in going outside.

Outside Activity:
1. At the amphitheater, identify the three layers of the forest (forest floor, understory, and canopy).
2. Discuss how each layer is used by wildlife.
3. Students find a spot along the trail and briefly sketch the forest.
4. Students label each layer on their drawings.

Wrap-up:
1. Share sketches.
Forest Facts

The Mature Forest: The established, or mature forest, has several layers of vegetation, each providing a usable habitat for a different type of animal.

Canopy—the tallest trees: There are two kinds of canopies: the closed canopy—where the trees grow very close together allowing little sunlight to the forest below, and the open canopy—which has trees much more widely spread. In the open canopy, sunlight to the forest is plentiful. Forests are named for the species of tree which grows most predominantly. For example, there are oak forests, pine forests, sugar maple forests, etc. The kind of tree will determine, in part, the canopy.

Understory: The understory is made up of either younger trees of the same variety as the canopy, or simply low-growing trees. The amount of understory growth is regulated by the density of the canopy.

Shrub Layer: This vegetation is mostly woody plants with several stems, rarely growing taller than 6-7 feet.

Herb Layer: Here we find the green plants with soft stems. The amount of vegetation at this layer is dependent upon the location of the forest, the soil, and the moisture.

Forest Floor: This layer is the “litter bag” of the forest! All the natural droppings of plant and animal life cycle through a process of decomposition, to provide the fertilizer for forest growth.

Discuss with students the make-up of a mature forest; sharing photographs and slides of forests. Provide a schema of forest life. Discuss the types of animals that may be found at each layer.

Older students, individually or in small groups, may research a particular kind of forest (maple, pine, etc.) and describe the vegetation and animal life at each layer of the forest. Younger students may work together on a class mural illustrating a mature forest using trees common to the area.
What's on the Floor?

Grade 4
Curriculum Connection: Math-graphing
Duration: 45 minutes
Setting: any outdoor area

Objectives:
1. Students will be able to observe, quantify, and graph what is on the ground.

Materials needed: Graphing paper, scratch paper, pencils, and string.

Pre-lesson:
1. Practice identifying and graphing items in class.

Outdoor Activity:
1. With a partner, put a piece of string on the ground enclosing a square foot.
2. Write down different items that are within the string (you may want to create a minimum size for the items so that the number is not endless).
3. On scratch paper, have students estimate what percent of the area each item covers.

Wrap-up:
1. Graph the top four items on your paper, with the fifth being “other”.
2. Compare the graphs created by different students.

Extensions:
1. Compile students graphs into one larger graph, containing ten different items.
2. Create different types of graphs with the same information (i.e. pie, bar, line, etc.).
A Soil Ecosystem Transparency

Background Information
The soil beneath our feet is full of life. Many animals, such as moles, badgers, and prairie dogs use the soil to find food and shelter. Earthworms and many insects also live in the soil. As these animals burrow and tunnel, they mix the soil, allowing air and water to penetrate beneath the ground's surface. Plant roots stretch down through the soil where they can absorb the air, water, and nutrients needed for growth.

In addition to these plants and animals, billions of microscopic organisms, such as bacteria and algae, inhabit the soil. They, along with fungi, earthworms, and other soil creatures play an important role in the decomposition of organic material. Decomposers help break down dead plant and animal tissue. Nutrients are returned to the soil, where they become available once again to plants.

The next time you stand on the soil, think about the billions of organisms at work beneath you. They are part of a cycle that returns valuable nutrients to the soil. Without these unseen creatures, the plants we depend on for food could not grow, and the life-sustaining cycle on earth would be broken.

About the Transparency
The transparency illustrates a cross-section of hypothetical soil. The top portion of the circular enlargement is about 50X normal size; the center, about 150X; and the bottom about 300X. You can write on the transparency with a grease pencil or water-soluble marker, and remove markings with a dry towel. Permanent-ink writing cannot be removed.

Activities
★ Use the transparency to introduce the topic of soil.
- What evidence of plant life do you see in this soil profile? (dandelion, grass, leaves, acorn, algae)
- What animals live here? (earthworm, snail, centipede, spider, cricket, daddy-longlegs, shrew, grub, ants, nematode, bacteria)
- What role do these plants and animals play in the ecosystem? How do they use the soil? How do they contribute to the nutrient cycle? Can you see different soil layers? Do some plants extend their roots into the subsoil layer?

★ Collect soil samples from different areas. Working in groups, have your students examine the soil samples using a white tray or sheet of paper, a bright light, forceps, and a magnifier. What different plants and animals can they find? Can they identify them using resources from your library? Find out what role these plants and animals play in the soil ecosystem.

★ Create a soil mural by projecting the transparency onto a large sheet of white paper, using an overhead projector. Trace the image and add other plants and animals that live in the soil.

Nutrient Cycle
Grade 4
Curriculum Connection: Science-Wisconsin forest ecology
Duration: 45 minutes
Setting: woodland area

Objectives:
1. Students will be able to classify plants as shade tolerant or shade intolerant.

Materials needed: Guide to Wisconsin Trees, paper, pencil

Key Vocabulary: shade tolerant, shade intolerant, regenerate, succession

Pre-lesson:
2. Introduce vocabulary.
3. Find shade tolerant and intolerant trees in the book.
4. Divide a sheet of paper in two and label each side as either tolerant or intolerant.

Outside Activity:
1. Identify a tree near the amphitheater.
2. Decide as a class, which category to put the tree in.
3. Go through the wooded area and decide where to put the different oaks, maples, and pines.
4. Back at the amphitheater, review lists.
5. Ask, “How will the oaks be able to regenerate in the woods?”

Wrap-up:
1. Use this lesson as an introduction into the idea of succession.
Land Succession

Grade 4
Curriculum Connection: Science-Wisconsin forest and prairie ecology
Duration: 60 minutes
Setting: woodland area and grassy area

Objectives:
1. Students will be able to describe how plant species change over time.

Materials needed: Student notebooks, pencils, sketches of the forest layers, and lists of shade tolerant and intolerant trees.

Key Vocabulary: succession, clearcutting

Pre-lesson:
1. “Layers of a Forest” and “Sun Loving” lessons should have been completed.
2. Discuss fire and clearcutting as a class.

Outdoor Activity:
1. Go to the edge of the woods and ask, “What keeps the grass from becoming part of the woods?” Describe mowing as continual clearcutting.
2. Ask, “What types of trees would you expect to come in on the edge of the woods or to come up first after a clearcut?” (sun loving)
3. At the amphitheater, have students look at their pictures of the forest’s levels and at the lists of tolerant and intolerant trees. “What trees will likely make up this woods in another 100 years if nothing is done to the woods?” “What could cause it to revert back to a grassy area?” “What would the grassy area likely look like if it was not mown for another 100 years?”

Wrap-up:
1. Discuss natural succession and examine ways that we can alter this process.
Forests cover about one-third of the United States. Of these forests, the U.S. Department of Agriculture Forest Service manages 156 National Forests spread out over 186 million acres. The rest are managed by other federal and state agencies and by private owners.

Today, most forests are managed to meet many different needs. Some have large wilderness areas that are managed to emphasize conditions that occur naturally. But most forests are managed for specific uses, such as timber, recreation, hunting, and fishing. In their jobs, forest managers try to meet people's needs for forest products and recreation. At the same time, they protect the living places—called habitats*—of plants and animals by planting and harvesting trees, improving wildlife areas, and preventing accidental fires.

*Boldfaced words are words that may be new to students and that might be emphasized in class discussions.

Forests and Forestry

Forests Are Always Changing

Forests are special places where many kinds of trees, plants, and animals interact with each other in many complex ways. Plants use sunlight to make food needed by animals. Animals, in turn, help the plants by pollinating flowers, distributing seeds, controlling insects, and aerating the soil. There are countless examples of these living connections between plants and animals. Consider, for instance, the way squirrels bury acorns that later grow into oaks—trees, in turn, that feed and shelter other squirrels.

The Squirrel-Nut-Tree Relationship
Now think about how the oak grows from a tiny seedling to a majestic tree with a trunk wider than your outstretched arms. Indeed, let's think about how a whole forest starts from bare ground, grows, and changes. Like all living things, a forest grows in stages—its physical structure changes over time. In the picture below, you can see the stages of growth from bare ground to shrubs and small trees, and then from young forest to mature forest.

At each stage of growth, the forest supports different sizes and kinds of trees. As the forest slowly changes, the wildlife slowly changes as well, with different kinds of animals moving in as other's move on to more suitable areas.

Every stage of a forest's growth is important to wildlife. Just as the living tree helps support the forest, the dead tree also does its part. For instance, a forest filled with young trees is not good for the woodpecker. The woodpecker prefers to peck away at dead or diseased trees, searching for insects hiding under the soft bark or in the dead wood. Woodpeckers also raise their young in the holes of dead, broken-topped trees called snags. Snags are important for a forest's diversity. Diversity means the variety of plants and animals that live in a forest. Without snags, for instance, a forest will have few woodpeckers. Likewise, without marshes, a forest will have few ducks.

A forest can grow and change naturally, or it can be changed by people. During the early development of America, European settlers cleared much of the forested land for pastures and cropland they needed to produce food. But the settlers also benefited from the forest's gifts: fish and game for table and clothing, wood for their homes and furniture—and, of course, for firewood.

Animals responded in different ways to these habitat changes. Rabbits, quail, deer, and other animals that could adapt to farm settings began to flourish. But other animals didn't fare so well. Some, such as wolves and cougars, were pushed out by the steady growth of the early settlements and towns. Still other animals became extinct, one reason being that they slowly lost the kinds of forest areas they needed to live; that is, they lost their habitats.

Toward the beginning of this century, people began to realize that the growing scarcity of trees, as well as the decline and disappearance of certain animals, was becoming a problem. This led to new ideas—forest management and wildlife management. Rather than just cut trees down, people began to plant and even farm them.

Today, nearly a hundred years after the first forest management efforts began, forest and wildlife management are well-established fields. These two fields have clearly shown the need to protect forest and wildlife resources—and not just for the sake of trees and wildlife. By properly managing this natural heritage, we also can keep our air and water clean and provide natural places for us to enjoy now and in the years ahead.

One thing we see in this story of change in forests is that many kinds of wildlife have very special living requirements. Thus if a forest is to support a variety of wildlife, it must have all the different kinds of places and foods those animals need. But because many forests do not have these varied spaces and foods, people often must work to protect, manage, and even create wildlife habitats. This basic principle—helping create the habitats that certain animals need—can be used to encourage countless plants, mammals, birds, and reptiles.
The Habitat Puzzle

Wildlife habitat management is something like a big puzzle. In this puzzle, wildlife managers try to put the pieces together to find the best possible fit of plants and animals. Here are some of the main pieces of the habitat puzzle:

**Meadows and Openings:**
Meadows and openings are alike in that they are basically open spaces within forests. But meadows, strictly speaking, are naturally occurring habitats that usually don’t favor tree growth. Openings is a more general term: it might refer to an area created by humans, as in the case of an old farm, or one that resulted from natural phenomena, such as a fire started by lightning. While openings can be created or maintained for wildlife by mowing or special controlled burning, openings will return to forest given the time. But a meadow tends to stay a meadow.

One animal found in meadows and openings, especially while feeding at night, is the white-tailed deer. Another common inhabitant is the meadow mouse, which moves through the grass, feeding on seeds, fruits, and grasses. Many birds feed on insects and seeds from the abundant plants found in meadows and openings. Birds also hide or nest in the tall grass here. Meadows and openings often draw nature’s hunters as well—animals such as the barred owl or the red fox, which prey on meadow mice and other rodents.

These and many other animals also strongly favor the edges where two or more habitats come together. One example of an edge might be where an opening turns into a forest—or where a marsh turns into dry forest.

**Shrubs and Small Trees:** This habitat, which commonly occurs after a fire or tree harvest, is more open to the sunlight than more mature forests. The increased sunlight stimulates plant life, and deer come here to feed on the young stems and buds of the small trees and shrubs springing up. Fruit such as the blueberries and blackberries that grow in these areas also provides an important food source for many birds and the black bear. In addition, this habitat provides cover—hiding places—for large and small animals.

**Young Forest:** Young forests can grow up either from natural growth or from trees that have been planted—planted, say, after timber has been cut or after a wildfire. Since the trees in young forests do not crowd out all the sunlight, these forests are filled with shrubs and other plants that support a wide variety of wildlife, ranging from reptiles, such as the box turtle, to small mammals, such as rodents. These areas are also prime habitat for deer and bears, which use these areas for both food and cover. Young forests are home for many birds, too.

**Mature Forest:** As the forest matures, the tree canopy—the leafy roof of branches—keeps the forest floor shady and cool, even on sunny days. With so little sunlight below, few ground plants live here. As a result, there is little to eat for those animals that cannot climb or fly to the upper branches, where most of the food is found. Animals that can reach this food are the gray squirrel or birds such as the black-capped chickadee.

**Old Forest:** An old forest differs from a mature forest in that its trees are different sizes and much older. The large trees that are living provide cones, seeds, and nuts. Standing together, they also break the wind and thin the snow, protecting large and small animals from the weather. Old forests also contain many dead, dying, and fallen trees. As we’ve seen, these large, dead trees are needed by birds such as the pileated woodpecker,
which depend on them for nesting sites and food. Old trees are also important to barred owls, hawks, and other birds of prey, which use them for lookout towers—places to swoop down on their next meal.

Whether standing or fallen, dead trees are also important because they help open the forest to sunlight. With more sunlight, shrubs and plants on the forest floor will grow and provide food for ground dwellers and other animals. So old forests are not dead forests. Rather, they are changing forests that support a variety of wildlife on the ground and in the trees.

**Streams and Rivers:** Besides helping supply the forest with water, streams and rivers also stimulate a variety of vegetation that, in turn, supports many kinds of insects, fish, and other animals. Many animals also feed on the creatures found in streams and rivers—fish, frogs, and salamanders, just to name a few.

One animal that depends on these areas is the river otter, an agile swimmer that glides through the water, snatching fish or feeding on freshwater clams. Waterbirds and reptiles also come here to feed. Cool, rushing streams and rivers bubbling with air are prime habitat for rainbow trout. Rivers and streams are perfect for many other fish, too.

**Ponds, Lakes, and Wetlands:** Ponds and lakes will attract many of the same species as...
Meadows, openings
Shrubs, trees
rivers and small streams. The largemouth bass, which eats frogs, fish, and even small snakes, likes warmer ponds and lakes. Where a river or stream runs into wetlands, this can be a prime spot for wood­gnawing beavers, which cut down small trees to make dams for their underwater dens. In fact, by damming free-flowing streams, beavers can actually create wetland habitat necessary to waterfowl and other wildlife. In more remote ponds and lakes, you can even hear the eerie call of the loon.

Areas Managed by Burning or Harvesting Trees: Much work goes into preventing and putting out wildfires, yet it is well known that fire is one of nature's own forest management techniques. Fire is thus one way that nature forces change and diversity on a forest's plants and animals. Another management technique is harvesting—cutting down the trees in a carefully chosen area. By carefully planning tree cuts, foresters and wildlife managers can create a network of forest lands in different stages—diverse lands that can support a variety of wildlife.

Whether by fire or cutting, the result is roughly the same. Remove the trees and new growth emerges—food for animals ranging from deer mice to white-tailed deer.
Adopt a Tree

Grade 4
Curriculum Connection: Science-Wisconsin forest ecology
Duration: 60 minutes
Setting: Woodland Area or a selected tree somewhere on the school grounds.

Objectives:
1. Students will select a tree on the school site which they can observe throughout the school year.
2. Students will be able to describe their tree as coniferous/deciduous, sun loving/shade tolerant.

Materials needed: nature trail tree guide if necessary

Pre-lesson:
1. Have students research what tree species are found in Wisconsin. Allow students to use the encyclopedia and a variety of reference books; students will collect important facts describing each tree. This should help them when selecting the tree that they would like to adopt.
2. Brainstorm with the class types of human-caused destruction of forests. Use the news media, share stories of fires, logging, mining, farming, and ranching as they impact on the nation’s forests. Use local news articles to practice formatting their own stories about their tree and the environmental effects upon it and its surroundings.

Outdoor Activity:
1. Sketch their tree and the plant community around it.
2. Note types and sizes of plants in the area.
3. Research light requirements of the area plants.
4. Look for any human influences on plant life.

Wrap-up:
1. Predict what will happen to your tree and to others in the area in another 100 years. How will your sketch look different?
How a Tree Grows

Research/Reading Comprehension

Filling the Facts

Name ______________________

Use your science book or some other source to find the answers to the questions below.

1. Why might two trees of the same species be different in size and shape?
   ________________________________________________________________

2. How can you find the age of a tree?
   ________________________________________________________________

3. Name three parts of a tree and their functions.
   a. ____________________________________________________________
   b. ____________________________________________________________
   c. ____________________________________________________________

4. Explain how water and food move in a tree.
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

5. The color of bark is largely due to what?
   ________________________________________________________________

6. Describe the function of roots.
   ________________________________________________________________
   ________________________________________________________________

7. Find three facts about broadleaf trees.
   a. ____________________________________________________________
   b. ____________________________________________________________
   c. ____________________________________________________________

8. Where are needleleaf forests found and in what kinds of climates?
   ________________________________________________________________
   ________________________________________________________________

9. Name five broadleaf trees.
   a. __________________________________________
   b. __________________________________________
   c. __________________________________________
   d. __________________________________________
   e. __________________________________________

10. Name five needleleaf trees.
    a. __________________________________________
    b. __________________________________________
    c. __________________________________________
    d. __________________________________________
    e. __________________________________________
A Night in the Woods

Grade 5
Curriculum Connection: Music, Art, Science-vertebrates, invertebrates, astronomy
Reading-possible novels: Follow the Drinking Gourd, Freedom Train, Hatchet
Duration: Depends on teacher. Approximately one week.
Setting: woodland area

Objectives:
1. Students will create their own sound effects tape.
2. Students will make life-size pictures of nocturnal animals.

Materials needed: Tape recorders, cassette tapes, and various art supplies.

Pre-lesson:
1. Divide students into groups to explore the topic (What nocturnal animals could or may exist in our woodland area? - bats, raccoons, etc.).
2. Discuss or research the sounds these animals make.

Outdoor Activity:
1. Look for signs of these animals in the woodland area.

Indoor Activity:
1. Make sound effects tape of sounds heard at night in our woodland area (animals, leaves, wind, etc.).
2. Paint/make life-size pictures of nocturnal animals (make eyes glow with neon paint or foil with flashlights).

Wrap-up:
1. Turn off lights and listen to the tape and watch the animals.
2. Discuss what you heard.
Grade 5
Curriculum Connection: Reading-non-fiction, Social Studies-citizen action (How our lifestyles have had an ecological impact.)
Duration: 30 minutes
Setting: any outdoor site

Objectives:
1. Students will be able to search a newspaper for factual information.
2. Students will be able to identify ecological damage in their local area.

Materials needed: old newspapers

Key Vocabulary: participatory citizenship

Pre-lesson:
1. Have students look through newspapers, magazines, etc. for possible abuses and aids to ecology. Students will make a list of these.
2. As a class, discuss what students found.

Outdoor Activity:
1. Walk the school grounds looking for signs of ecological abuses.
2. Students record their findings in a notebook.

Wrap-up:
1. Discuss what students found outside.
2. Compare things outside to what was found in the newspaper. Were any of the things found outside a symptom of the abuses found in the newspaper?
3. Discuss how negative things in the newspaper and/or on the school grounds could be fixed. What agencies or people are responsible for them? Students may choose to write to one of these. Refer to participatory citizenship.

* This activity is based on “Activity #30 Ecological Balance” in Science in the News from the IMC #90062.
FOCUS: The Environment

Activity # 30

Ecological Balance

Ecology is the relationship between living and non-living things in their total environment. If you were to observe a person who is working in the garden, watering plants, tilling the soil and stopping for a break to take a drink of water, you would be witness to an ecological relationship.

Frequently, stories in the newspaper report on the abuse of ecology—for instance, man poisoning water by releasing toxic wastes from factories into a nearby river.

Special government agencies are charged with the responsibility to act as watchdogs over the environment and to help execute the laws that have been passed to protect the relationships between man and nature.

Five Possible Abuses Of Ecology Mentioned In The Newspaper

1. 
2. 
3. 
4. 
5. 

For each of these situations found in the newspaper and listed above, identify the governmental agency that is, or should be, involved in correcting the situation.

Government Agencies Which May Take Action In Each Of The Situations Above

1. 
2. 
3. 
4. 
5. 

Take the science challenge... What role can the government play in correcting the situations outlined above? Do some research to find out what kinds of laws or ordinances exist that pertain to the situations above and what kind of punishment may occur as a result of breaking or ignoring these laws.
Are You the World's Best

Grade 5
Curriculum Connection: Physical Education-fitness testing, Science-vertebrate and anatomy science, Math-ratios
Duration: 60 minutes
Setting: grassy area

Objectives:
1. Students will be able to test themselves physically.
2. Students will be able to compare their physical achievements to various animals.

Materials: Sidewalk chalk, stop watch, and measuring tape

Pre-lesson:
1. Do this in conjunction with the mammals unit in science. Ask, “How do you think you compare with animals?”
2. Divide students into six groups.

Outside Activity:
* Students will rotate through the following stations.
  1. 25 yard (23 meter) cheetah dash. (Have a running start. A cheetah could do this in less than one second.)
  2. 100 yard (90 meter) pronghorn dash. (Have a running start. Both a cheetah and a pronghorn could complete this in about 3 1/2 seconds.)
  3. 40 foot (12 meter) kangaroo hop. (Have students see who could hop the distance using the fewest hops. A red kangaroo could go the distance in one hop.)
  4. Cougar long jump. (Have students compare their longest jump with a cougar who could jump 30 feet 19 inches in a single jump.)
  5. Cougar/kangaroo high jump. (Students put a mark on the wall showing how high they can jump. Compare their mark to a red kangaroo that can jump almost twice its height and to a cougar that can jump 3 times its height.)
  6. Sperm whale hold. (Students time how long they can hold their breath. A Weddell seal can hold its breath for an hour and a sperm whale can hold its breath longer than that.)
Wrap-up:
1. Share the animal times and distances to student results. Discuss student reactions.
2. Refer to the anatomy science unit and discuss the muscles used in each event.
3. Students could compare these times to Olympians using the almanac.

* This activity is based on “Can You Beat the Best” on page 7 of Ranger Rick’s Nature Scope, Amazing Mammals part 1, which is available from the IMC #90553.
Creating a Balance

Grade 5
Curriculum Connection: Social Studies-Native Americans (Cherokee-North Carolina) and Science-animals
Duration: 30 minutes
Setting: woodland area

Objectives:
1. Students will be able to describe types of animal habitat.
2. Students will discuss reasons for restoring animal habitat.
3. Students will discuss hunting and the ethics behind it.


Key Vocabulary: ethics, restoration, habitat

Pre-lesson:
1. At the woodland amphitheater, read “Awi Usdi, the Little Deer.”
2. Discuss ways that humans have impacted wildlife habitat.
3. Discuss reasons for and against hunting.

Outdoor Activity:
1. Go to where the bluebird boxes are on the trail. Discuss how bluebirds naturally nest in holes in trees, but most of these were cut down for firewood. Next bluebirds began using holes in wooden fence posts, but now farmers use mostly metal posts. Populations really fell until people began to make boxes like these.
2. A balance has been created between bluebirds and humans. We need wood and land, but they also need a home. These boxes help fulfill there needs.

Wrap-up:
1. How did the Cherokee feel about hunting?
2. Does hunting help maintain a balance or does it hurt the balance?
3. Do modern day hunters have similar ethics to the Cherokee?

* This activity is based on “Awi Usdi, the Little Deer” on pages 173-178 of Keepers of the Earth available in our library. It also has a list of additional activities.
Fertilizer

Grade 5
Curriculum Connection: Social Studies-Native American (Cherokee-North Carolina) Science-compost, Reading
Duration: 30 minutes
Setting: At the compost pile.

Objectives:
1. Students will be able to describe ways Native Americans used fertilizer. (Social Studies curriculum discusses Squanto's role in teaching this concept.)
2. Students will be able to describe how compost can help plants grow.

Materials needed: Pitch fork, related novels: Squanto, Friend of Man
Key Vocabulary: fertilizer, compost, mulch

Pre-lesson:
1. At the woodland amphitheater, read “The Coming of Corn.”
2. Discuss types of fertilizers used by early farmers.

Outside Activity:
1. Walk over to the school compost pile, review what is in it (green grass-nitrogen and brown leaves-carbon).
2. Describe uses for the finished compost (mulch around plants, trees, etc.).
3. The mulch will help plants hold moisture which will improve growth rate.

Wrap-up:
1. Compare organic fertilizers to chemical fertilizers.
2. Could have speaker from a farm supply company come in to show modern uses and applications of fertilizers.

* This activity is based on “the Coming of Corn” on pages 137-142 of Keepers of the Earth available in our library. It also has a list of additional activities.
Grade 5
Curriculum Connection: Language-oral language, cooperative learning, story mapping, content can be informational to correlate to any social studies or science topic
Duration: a week
Setting: any area

Objectives:
1. Using an outdoor site, students will be able to create either an informational or persuasive video.

Materials: Student groups will decide what props they need, camcorder, VCR tapes

Pre-lesson:
1. Decide if the film is to be fictional or factual (all will have an outdoor setting).
2. Divide students into groups to explore the topic.
   -students brainstorm ideas (colonization, Native Americans, D.A.R.E.)
   -map the progression of the story
3. Write the dialogue (may also want to record some movements)
4. Rehearse the film in the classroom.

Outdoor Activity:
1. Have each group do a dress rehearsal.
2. Videotape each group’s movie. (While one group is being filmed, have the rest of the students working in a centralized area on other homework. You may also wish to work as a grade level team, with one teacher working with small groups filming, while the other two teachers have the rest of the students.)

Wrap-up:
1. Have a popcorn party, and watch the movies.
I'm Lost, Where Exactly Am I

Grade 5
Curriculum Connection: Social Studies-mapping Math-measurement, geometry
Duration: 60 minutes
Setting: any area

Objectives:
1. Students will draw a map of an outdoor area to scale containing major landmarks.

Materials needed: graphing paper, ruler, meter stick, pencil, compass

Key Vocabulary: landmark, cardinal directions, intermediate directions, compass rose, symbols, legend

Pre-lesson:
1. Explain the concept of drawing things to scale.
2. Draw the classroom. Each meter in the classroom equals one centimeter on the graphing paper.
3. Compare maps. Practice finding your way using the map.
4. Place the cardinal directions and intermediate directions on the map.
5. Practice using the map and directions to locate landmarks. (What is one meter east of Mike's desk, etc.)

Outside Activity:
1. Explain to the class what area you would like them to map.
2. Each map should include cardinal directions, intermediate directions, compass rose, legend, and all major landmarks (trees, picnic tables, etc.)
3. Students draw their own map. (During this time take some of your own measurements so that you can quiz them later.)

Wrap-up:
1. As a class, look at samples of student maps. Locate different spots.
2. Using your measurements, ask students how far it is between certain spots. They may use only their maps, but if it is to scale, their measurements should be very close to yours.
Grade 5

**Curriculum Connection:** Math-ratios, measurement, estimation, geometry

**Duration:** 60 minutes

**Setting:** Woodland Area and/or playground

**Objectives:**
1. Students will improve estimating ability.
2. Students will be able to figure out the height of an unknown item by using the height of a known item.

**Materials needed:** Meter stick, notebook, pencil.

**Optional items:** Calculator, measuring tape

**Key Vocabulary:** ratio

**Pre-lesson:**
1. Practice the mathematical formula you will use for this project.

**Outdoor Activity **
*To be done on a sunny day between 10a.m. - 3:30p.m.*
1. As a class, sit around a tree that is by itself and estimate its height. Each student records their guess.
2. Hold a meter stick vertically with one end touching the ground. Measure its shadow.
3. Measure the shadow of the tree that you just estimated.
4. Knowing these three measurements, show the class how to figure out the actual height of the tree. (shadow of ruler/length of ruler x shadow of tree=height of tree in meters)
5. In pairs, have students estimate and find the actual height of at least two other trees.

**Wrap-up:**
1. Discuss times that this information would be useful. (Loggers would want to know how much wood they could get before they cut a tree down. A painter may want to know how much paint they will need for a barn without having to actually measure how tall the barn is.)
Adopt a Forest

Grade 5
Curriculum Connection: Environmental Education (Rainforest/Mission Eau Claire), Language Arts, Science-animals
Duration: 45-60 minute sessions monthly
Setting: woodland area

Objectives:
1. Students will use the nature trail/woodland area on the school to observe throughout the school year.
2. Students will learn and understand vocabulary related to a mature forest.

Materials: Nature trail tree guide (if necessary), The Lorax by Dr. Seuss, and drawing paper.

Key Vocabulary: canopy, understory, shrub layer, herb layer, forest floor

Pre-lesson:
1. In small groups, students will research the kind of forest we have on our school property. They will describe the particular kind of forest it is and they will describe the vegetation and animal life at each layer of the forest.
2. Read The Lorax to your group. Ask the children what lesson the story is trying to teach. Explain what “deforestation” means, then continue the lesson. See p. 14 of handout “Forests Are More Than Trees.”

Outdoor Activity:
1. Students draw a cross section of the woods. Students label each of the layers of the forest.
2. Students identify what animals may live in each layer.
3. How does The Lorax relate to the uses of Wisconsin’s land?

Wrap-up:
1. Compare the layers of our woods to that of a rainforest. How is the animal life also similar?
LEARNING FROM

THE LORAX

Objectives: Define deforestation. List several competing uses of forests.
Ages: Primary and Intermediate
Subjects: Language Arts, Social Studies, and Science

The Lorax, by Dr. Seuss (Random House, 1971), is a make-believe story about what happened to a forest when people didn’t use it wisely. You can use this story to introduce the concept of deforestation to your class.

First read The Lorax to your group, then ask the children what lesson the story is trying to teach. Explain what deforestation means (see glossary) and point out that deforestation is a major problem in many areas, particularly in the tropics. Use the information on page 11 to discuss this problem.

Afterward, take a vote to find out how many of the students think trees should never be cut down. Have them discuss their reasons. Then make a list naming the ways people use forests (see pages 6 and 7 for ideas). Explain that if we never cut down trees, we would not have many of the products we use every day.

Next ask the students if they think the people in The Lorax needed the needs in the first place. Was it worth cutting down the truffula trees to make the needs? Why did the Once-ler keep making so many? How was the wildlife affected when the Once-ler cut down so many truffula trees?

Now ask what the Once-ler could have done so that he could have made the needs, but still not permanently harmed the forest. (He could have cut only some trees, replanted a tree each time he cut one, and so on.) Discuss the students’ ideas and then talk about how forests in many areas are managed so they can be used in different ways (see page 8). Also discuss the fact that, in some areas, such as tropical rain forests, more and better management plans need to be put into practice, so that they won’t disappear.

To conclude, have the class vote again on whether or not trees should ever be cut. Did anyone change his or her mind?

(Adapted from NatureScope—Trees Are Terrific!, pp. 52 and 53.)

From THE LORAX by Dr. Seuss. Copyright ©1971 by Dr. Seuss and A.S. Geisel. Reprinted by permission of Random House, Inc.

POUNDS OF PAPER

Objectives: Calculate the quantity of paper products people throw away each day.
Ages: Advanced
Subjects: Math and Social Studies

Each year Americans throw away about 45 million tons* of paper products. This figure includes everything from cereal boxes to notebook paper.

Since it’s so difficult to comprehend such a large amount, have your students do some calculations to determine the amount of paper products each person throws away each day. First figure out how many tons of paper Americans as a whole throw away per day. 

\[ \frac{45 \text{ million tons}}{365 \text{ days}} = 123,288 \text{ tons} \]

Then, to help them understand how much 123,288 tons is, use this analogy. Tell the students that the African elephant can weigh as much as 6½ tons. Ask them to figure out about how many African elephants would have to stand on the scales to equal the weight of paper products Americans throw away each day. (about 18,967)

Now tell the students that about 240 million people live in the United States. Using this figure, have them calculate the average amount of paper products (in pounds) that each person throws away in a day. 

\[ \frac{123,288 \text{ tons} \times 2000 \text{ pounds/ton}}{240 \text{ million}} = \text{about one pound} \]

* Metric conversion: 1 US. ton = .9 metric ton; 1 lb. = .45 kg.

HOLD A PAPER DRIVE

Objectives: List some of the benefits of recycling paper. Conduct a paper recycling drive.
Ages: Primary, Intermediate, Advanced, and Secondary
Subjects: Social Studies, Science, Art, and Math

Forests are a renewable resource, which means that they won’t “run out” if they’re properly...
Forest Facts

The Mature Forest: The established, or mature forest, has several layers of vegetation, each providing a usable habitat for a different type of animal.

Canopy—the tallest trees: There are two kinds of canopies: the closed canopy—where the trees grow very close together allowing little sunlight to the forest below, and the open canopy—which has trees much more widely spread. In the open canopy, sunlight to the forest is plentiful. Forests are named for the species of tree which grows most predominantly. For example, there are oak forests, pine forests, sugar maple forests, etc. The kind of tree will determine, in part, the canopy.

Understory: The understory is made up of either younger trees of the same variety as the canopy, or simply low-growing trees. The amount of understory growth is regulated by the density of the canopy.

Shrub Layer: This vegetation is mostly woody plants with several stems, rarely growing taller than 6-7 feet.

Herb Layer: Here we find the green plants with soft stems. The amount of vegetation at this layer is dependent upon the location of the forest, the soil, and the moisture.

Forest Floor: This layer is the “litter bag” of the forest! All the natural droppings of plant and animal life cycle through a process of decomposition, to provide the fertilizer for forest growth.

Discuss with students the make-up of a mature forest; sharing photographs and slides of forests. Provide a schema of forest life. Discuss the types of animals that may be found at each layer.

Older students, individually or in small groups, may research a particular kind of forest (maple, pine, etc.) and describe the vegetation and animal life at each layer of the forest. Younger students may work together on a class mural illustrating a mature forest using trees common to the area.
APPENDIX
Works Cited


*Forests are More Than Trees* (Brochure). U.S. Department of Agriculture Forest Service.


*Forest Trees of Wisconsin: How to Know Them*. Madison, WI. Department of Natural Resources. 1990.


**Additional Resources**


Local Agencies

Beaver Creek Reserve, Fall Creek, WI 877-2212
City of Eau Claire Parks and Forest Office 839-5039
1040 Forest, Eau Claire, WI
Eau Claire County Parks and Forest Department 839-4738
227 1st. W., Altoona, WI
Western District Headquarters, Department of 839-3700
Natural Resources, 1300 W. Clairmont Ave., Eau Claire, WI