NORTH LAKELAND ELEMENTARY SCHOOL WATER EDUCATION PROJECT-FALL LAKES WEEK PROJECT

by
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Abstract

North Lakeland Elementary School (N.L.E.S.) is located in the heart of the Northern Highlands Lake District of Wisconsin. Many of Vilas County's 1300+ lakes lie within the four townships (Boulder Junction, Manitowish Waters, Presque Isle, Winchester) in the North Lakeland Elementary School district. The North Lakeland Elementary School district covers 260 square miles with a student population of about 280 students in grades K-8. The region is sparsely populated, and the lakes are generally considered pristine. Since northern lakes are an integral part of the lives of North Lakeland Elementary School students and the economic base of their communities, it is appropriate for the school to integrate lake studies into the general curriculum. Since these northern lakes are also under increased human pressures from development and tourism, it is important that young citizens develop solid and effective stewardship skills based on sound knowledge and personal experience. This will be a key element in preserving and protecting the resources for future generations.

The purpose of this project is to develop an integrated K-8 Lakes Curriculum that will enhance the current Outdoor Education Curriculum while preparing students to make sound decisions about their natural resource conservation as adults, specifically with respect to lake protection in Northern Wisconsin. In an interdisciplinary program extending from grade K-8, students will learn about the ecology and societal value of northern lakes and they will translate this knowledge into positive lake protection measures for their community.
This project will be implemented three times a year during the regularly scheduled Outdoor Education week. Three days will be spent in the classroom studying lakes while two days will be spent out on the lakes collecting data and observing changes on the lake. Community members will be asked to participate by sharing their expertise with students and by helping to provide boats, bathrooms, lab space and meeting places. The Lakes project at North Lakeland Elementary School will serve as a pro-active model for other school districts in Wisconsin who would like to develop and implement a Lake Studies Project in their School System.
ACKNOWLEDGEMENTS

This project taught me quite a bit about life, people and the environment. I am grateful to the staff at the University of Wisconsin Steven’s Point for providing such interesting, fun and challenging course work. Thanks also to the support staff for always being there to answer my many questions. Without the financial support of the Wisconsin Department of Natural Resources Lakes Planning Grant staff would not have been trained and the student’s would not have acquired the higher skills necessary to monitor and care for their lakes. A special thanks to Bob Young for ensuring that all aspects of the Lakes Planning Grant came to fruition and for answering my numerous questions. The project was enhanced greatly by the terrific staff at U.W. Extension, they provided endless resources and advice as well as excellent inservicing for the staff. (Libby McCann, Irene Grossman, Bob Korth, and all of the people involved in U.W. Extension.) Thanks also to the Staff at the University of Wisconsin Trout Lake Station for your support and advice on water chemistry and water quality testing techniques. Thanks to Sue Treb and Christy Dicka and the Staff at North Lakeland Elementary School for all of your efforts to apply for grant money and develop a Lakes Curriculum that would work for the Student’s at NLES. Thanks to Dennis Yockers for being so enthusiastic and for providing such wonderful, exciting, informative, in-services for our staff. Thanks to the students who participated and learned and who will continue to work to protect their lakes. Thanks to Brian Pierce for sharing his enthusiasm for the environment with me by being my very first Environmental Education Instructor. I would also like to thank Corky McReynolds, my advisor, for the extra hours that he devoted to make this project a success. Thanks to my Mother and Father for encouraging me to continue my education and for their continued support during my endeavors. My final thanks is to my husband and partner in life Carl Watras for helping NLES apply for grant monies, for sharing his knowledge about lakes with myself and the students at NLES, and for his support at home during the many hours that I was away at school and working on this project.
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Chapter I

THE PROBLEM AND ITS SETTING

The statement of the Problem

What strategies will significantly increase the use of area water resources for development and implementation of an integrated Environmental Education curriculum by North Lakeland Elementary School teachers in grade 5-8?

The Sub Problems

How will funding for implementation be secured?

How will teacher and administrative support be secured?

What type of training will staff need to develop curriculum and implement the Lakes Project successfully?

What strategies will be involved in promoting the use of water resources for infusion into the existing Environmental Education Program at North Lakeland Elementary School?

The Hypothesis

The first hypothesis is that a successful water resources program, integrated into all subject areas at the K-8th grade level, will increase the extent of Environmental Education infusion by North Lakeland Elementary School K-8 grade teachers.
The second hypothesis is that students, community members and teachers will feel empowered to take positive community action for protection of lake resources for future generations as a result of a water resources program.

The Delimitations

The teachers will need to develop an extensive background in water resources in order to implement the activities into their curriculum.

The teachers will need to be supportive and interested in water resources in order for the program to be successful.

The Definitions of the Terms

Water Resources- Lakes and Rivers within the boundaries of the school district.

Strategies- This term is used to indicate the researchers method of assessing the problem and implementing a viable solution.

Significantly- This term is used to measure the amount of improvement of curriculum implementation.

Abbreviations

EE is the abbreviation for Environmental Education

N.L.E.S. is the abbreviation for North Lakeland Elementary Education.
W.D.N.R. is the abbreviation for Wisconsin Department of Natural Resources.

Assumptions

The first assumption is that all 5-8th grade teachers will be willing to participate.

The second assumption is that the school administration is supportive of developing Water Resources Environmental Education Curriculum for K-8th grade.

The third assumption is that funding for a water resources project will be secured.

The Importance of the Study.

North Lakeland Elementary School is located in the heart of the Northern Highlands Lake District of Wisconsin. Many of the 1300+ lakes lie within the school districts boundaries. The N.L.E.S. district covers 260 square miles with a student population of about 280 in grades K-8. The region is sparsely populated, forested with mixed hardwoods and conifers, and the lakes are generally considered pristine. Wisconsin’s water resources are threatened by such serious problems as cultural eutrophication, sedimentation, acid deposition, user conflicts and loss of wildlife habitat. It is the intent of this project to create a K-8 curriculum which will address the area’s lake concerns. Some of the goals of this Lakes Curriculum are as follows:
1. Develop an appreciation for the unique area lakes and a knowledge of how to care for them.
2. Create a model lakes K-8 curriculum.
3. Create an integrated curriculum of units including all core subject area’s as well as related arts, to develop an accurate knowledge base for utilizing proactive stewardship practices.
4. Empower the youth of today to take positive community action for protection of lake resources for future generations.
5. Develop a partnership between youth and area adults to maximize lake stewardship.

Since lakes are an integral part of the lives of N.L.E.S. students and staff as well as being the economic base for the community it is appropriate for the school to integrate lake studies into the general curriculum. These lake are also under increased human pressure from development and tourism, it is important that young citizens develop solid and effective stewardship skills based on sound knowledge and personal experience. This education will be a key element in preserving and protecting the resource for future generations. The Lakes Project will spend one week of each trimester at N.L.E.S. focusing all subject matter regarding lakes and lake studies. Most grade levels (multi-age, 5, 6, 7th grades) will spend two days of the week on their adopted lake while three days will be spent in the classroom. Student’s will learn about their lakes through hands on experience as well as by participating in classroom projects specializing on lake topics which will help student’s to gain a better understanding and appreciation for their area lakes.
TIMELINE

February  1995- Deadline for Lakes Planning Grant.
July 10   1995- Sampling Teacher Inservice/ Introduce MLA Project
July 10   1995- Survey of staff for Next MLA Inservice.
August 26 1995- MLA Inservice with Dennis Yockers/ Libby McCann and Julie Stephens.
Sept. 18-22 1995- Fall Lakes Week
Nov. 1995- Project Wet Workshop
January 1996- Winter Lakes Week
March 1996- Lakes Convention in Steven’s Point
May 1996- Spring Lakes Week
Chapter II
LITERATURE REVIEW

Introduction

A lake is the Landscape’s most expressive feature. It is earth’s eye, looking into which the beholder measures the depth of his own nature (Henry David Thoreau). Wisconsin is rich in water resources. The word Wisconsin may be derived from the Chippewa word Wee-kan-san meaning “a gathering of waters.” Foremost among Wisconsin’s water resources are nearly 15,000 inland lakes, blue jewels in the landscape, amounting to approximately 1,000,000 acres of surface area (Town 1993).

In a 1970 survey, 62% of Wisconsin’s lake property homeowners indicated that they purchased lakeside property for solitude and beauty (Klessig, 1985). In addition to their aesthetic qualities, inland lakes provide a variety of recreational opportunities. Approximately half of Wisconsin residents report using inland lakes for outdoor recreation (Wisconsin Department of Natural Resources, aye).

Importance of Teacher Inservicing in Water Education

Teachers are an important facet for training an environmentally literate population. If they do not have environmental action skills, these will not be imparted to their students (Wilke, 1985). Role models appear to be equally important with outdoor experiences in developing
environmental sensitivity, therefore, the EE program should include environmentally concerned and active individuals. Often teachers were named as models in stimulating interest in environmental systems and providing educational and professional guidance (Peterson, 1981). To implement water education programs in the classroom, teachers must be knowledgeable about water topics and their importance to the future of students (Beiswenger, 1994). According to Rakow (1984), teachers give highest priority in their curriculum to those topics which they are most knowledgeable (Beiswenger, 1984). Mayor and Fortner (1987), found that the most effective mode of disseminating environmental curriculum materials is through a short, intensive interdisciplinary workshop with a follow-up (Beiswenger, 1984). In servicing teachers is a basic component of an effective EE program (McCaw, 1979).

**Program Planning and Evaluation**

Taking an organized and thorough approach to planning a program has many benefits. It helps ensure that you have thought about what you are trying to do and how you will get there. Evaluating helps you know what you are doing and helps you make decisions that will improve your program. It tells whether program and financial resources are being used effectively. It also reassures your audience and cooperators that they have invested their time, enthusiasm and confidence wisely. (USDA, 1995)
Key Elements of a Successful Water Education Program

1. It has stated goals about water education for youth. Youth should:
   - understand basic water science and ecology.
   - be able to collect and analyze information about environmental and socioeconomic conditions relevant to local water decisions.
   - be able to evaluate the impacts and alternatives for community decisions about water.
   - be able to apply new information in the community.
   - have the opportunity to practice personal water management skills and make a personal commitment to using them.

2. It is connected to community water issues.

3. It helps instill a sense of place and a responsibility for stewardship of that place.

4. It meets youth education and personal needs including fun/recreation.

5. It involves youth as full and valuable partners and acknowledges their contributions.

6. It involves community partners (individuals, schools, agencies, and organizations) to avoid duplication and expand impacts.

7. It uses the support of an organization to provide continuity and stability and to ensure high quality.

8. It uses program design and activities to further program goals and address community needs.

9. It delivers information and skills effectively, including actually using water as part of teaching.

10. It is evaluated on several dimensions and incorporates resulting insights into new programs (USDA 1995).
Aquatic Education Curriculum Development

To become responsible citizens, students must learn that people are an integral part of the biosphere, responding to changes and increasingly causing rapid changes to the environment. The roles that science, natural resources, and societal institutions play in our daily lives and their implications for future generations are an integral part of an effective educational system (Brody, 1995).

There is a clear need for an integrated, holistic approach to education with a focus on issues that affect the world's population. The problem remains as to how to accomplish these goals and what means have the greatest potential for success. One approach is to recognize curricula around concepts that have the greatest potential for bridging the gaps between disciplines. (Brody, 1995)

Curriculum reform principals are often derived from theories of cognition, the nature of science, and modern learning theory (Rutherford, 1990). Among those that seem particularly pertinent are the focus on the development of children and the fact that children's learning includes previous knowledge (Novak, 1977). Others point out that education is most effective when the learner is actually doing something. Other implications for teaching are that values are critical in teaching and learning and that both extend beyond the classroom (AAAS, 1993).

Student Development and Activity Selection

Responsible environmental behavior has been cited as the
ultimate goal of environmental education (Stapp, 1969; Winston, 1974). Lake adoption activities can be done at any grade level. Research in education has provided insight into stages of student growth and human development patterns. The findings of this research have been applied to the objectives of environmental education (Town, 1993). Young people could also learn about leadership, identify career opportunities, and improve their science knowledge (USDA, 1995). The purpose of this project is to develop and implement a Lake Stewardship Project that will encourage area youth with the opportunity to gain experience in lake management which will ultimately result in greater protection of Wisconsin’s inland lakes.

This project would give student’s the opportunity to gain the knowledge and skills that will enable them to be a leader in lake protection within their communities and the state and will enhance long-term protection of Wisconsin’s inland lakes.
Chapter III
PROJECT METHODOLOGY

Introduction
Wisconsin's water resources are threatened by such serious problems as cultural eutrophication, sedimentation, acid deposition, user conflicts, etc. It is the intent of this project to create a novel vehicle, Student Mock Lake Association, for learning about proactive lake management. Through MLA's at NLES grades 5-7 and in collaboration with community-based professionals at selected lake sites, student's will extend their learning in powerful new ways. Student's will also participate in a one week integrated classroom study of lakes where teachers across all subject areas integrate into their curriculum some aspect of Lake study. Some student's will be selected to present the information that they have collected at the Lakes Convention in Steven's Point and at a local Lake Association Meeting. Student's in grades K-4 will participate in integrated week long lake activities that will help them learn about the ecology and societal value of northern lakes. The Fall Lakes Project at NLES will serve as a pro-active model for other school districts in Wisconsin who have access to lakes for study purposes.
Treatment of Sub problem One

North Lakeland Elementary School staff and administration met with people from the community and applied for a Lakes Planning Grant. There were a number of staff and people from the community interested in implementing and developing curriculum that would enhance the current Outdoor Education program at North Lakeland Elementary School. The grant was written and submitted to the DNR through the township of Boulder Junction with the thought that if the school needed additional funding later in the year they could apply for another Lakes Planning grant through one of the other four townships. There were a number of different phases planned by the group applying for the grant. (See table 1A of the lakes planning grant.) These phases each had a different financial plan attached to the implementation of the program. The first phase which the DNR approved for the school and awarded funding for was for $10,000 to train teachers in Lake Protection and Lake Studies for implementation of the Fall Lakes Mock Lake Association Project.

Treatment of Sub problem Two

Staff and Administrative support was secured by involving the staff, community and administration in the planning process right from
the beginning. Staff, Community Members and Administration were invited and encouraged to attend all planning sessions. People who could not come or who chose not to attend were kept informed with a short newsletter after each meeting. All staff and administration were personally called and invited to each meeting by the coordinator. Even with all of this personal contact and information there were a few staff who resisted participating. The core group who planned the inservices and meetings felt that if the staff who were resisting the change were kept informed of all activities and if they were always personally invited to every function, they would become more interested in participating the project once it was underway. The group hoped that their enthusiasm would be infectious.

**Treatment of Sub problem Three**

An informal survey was completed by staff who attended the first inservice on the Lakes Project and it was discovered that staff were very concerned about lakes but that they did not have much background in lake studies and lake protection. They were all very interested and concerned about area lakes and wanted very much to initiate a school wide lake adoption project. Very few teachers had taught units on lakes and they all felt that student's in the area would benefit tremendously by participating in a Lake Adoption Project. All of
the teachers felt that additional training and reference materials would be necessary for the implementation of such a program. A number of the staff were also concerned about finding time in the school year to implement the Lakes Project. (See survey results Table 2A) It was decided by all of the staff in attendance at the first inservice that a good time to implement the Lakes Project would be during Outdoor Education week.

**Treatment of Sub problem Four**

Staff attended three inservice programs relating to lakes and lake studies. They were paid to develop curriculum that they would use in their classroom during Lakes Week. The first inservice was an informational inservice. Teachers were taught how to test water clarity, simple hands-on lake sampling techniques, and were given time to decide what additional teacher training would be necessary. They were also asked to fill out a survey that was developed by the Lakes Project Planning group. It was the hope of the core group that the survey would give some direction to the next inservice. The survey asked a series of questions regarding the project and the direction it might take. 14 of our 25 staff attended the first inservice.

The second inservice was a project planning inservice, the facilitators were Dr. Dennis Yockers, Libby McCann and Julie
Stephenson. Dr. Dennis Yockers, specialized in developing middle level EE curriculum and also co-authored, *A Guide to Curriculum Planning in Environmental Education* for the DPI. Dr. Yockers was instrumental in helping the staff at NLES develop curriculum for the Lakes Project. Libby McCann and Irene Grossman project coordinators for the Adopt-A-Lake project and Project Wet at the University of Wisconsin Steven’s Point Extension office gave a brief overview and presented both of these curriculum sources and their benefits to the teachers. Julie Stephens, a middle school teacher at Rice Lake Middle School, presented a lake project which she had developed and integrated for her middle level students. Attendance at the second inservice included nine North Lakeland Elementary School staff, two administrators, one board member and two community members.

The final inservice took an in-depth look at the project WET curriculum and was presented by Libby McCann and Dr. Dennis Yockers. This curriculum had many hands-on activities that teachers could use in their classroom or out on the lake. This inservice lasted all weekend and was attended by 13 staff, board members and administrators. People were very excited to learn the curriculum and many utilized the curriculum for their Lakes Week Project. Many of the staff were excited about how fun and informative the Project WET
curriculum was.

After teachers were inserviced in water studies and water curriculum development, they were paid to develop a curriculum that would work for them in the classroom. The staff at N.L.E.S. spent one week of class time and two days during the Fall Outdoor Education time teaching students about lakes.
Chapter IV
Results

Introduction

In the Summer, Fall and winter of 1995 the staff at North Lakeland elementary School developed and implemented a Lakes Studies Curriculum. This was an integrated lakes study across all subject areas in grades K-8. It was implemented during the week in each trimester that Outdoor Education usually occurs. After the Winter Lakes Week the staff and administration discussed the direction of the Outdoor Education program and the impact that the Lakes Project had on the Outdoor Education Program. They decided that while the Lakes Project was an important one, student’s still needed the Outdoor survival skills that the current Outdoor Education Program had traditionally provided. The Staff and the Administration decided after great debate that the traditional subjects taught during Outdoor Education were still important to the student’s education and that the Lakes Project was also important but that there were not enough hours available to run both programs independently so it was decided that a compromise would be reached where the Lakes Project would be combined with the traditional Outdoor Education Curriculum. The result was that one two hour lakes study course was added to the Outdoor Education Curriculum and one portion of the survival skills would be replaced with the lakes curriculum. The lakes project would continue in the classrooms, but at the teachers discretion, and without
an established time set aside, during which staff could have coordinated
the lake studies to give them more meaning. A lakes Studies Club was
developed for students who wanted to further pursue their interests in
lakes. This club offered students time once a week to pursue the topic of
lake studies more extensively.

Treatment of Subproblem One

Funding for the project was secured through a Wisconsin
Department of Natural Resources Lakes Planning Grant. North
Lakeland Elementary School was awarded $10,000 for the first phase of
the Project. Due to a change of Administration and a change in Board
Members the next phase of the grant was never applied for. In January
the new board decided to suspend all grant writing for the 1995-96 school
year. The project did continue through Winter Outdoor Education and
was then reevaluated by the staff in the Spring. There were three
inservice training sessions for staff for the lakes project with the funding
from the Wisconsin Department of Natural Resources. Two inservice
sessions were planned before the first Outdoor Education Session with
one follow up session where teachers were given additional curriculum,
training and materials. Teachers were paid for the time that they spent
developing a lakes curriculum which they would use to infuse into their
current curriculum.

Treatment of Subproblem Two

The Administration was very supportive of the project during its
initial stages, but in November when there was a change in administration the support of the administration waned considerably. The staff seemed to follow closely with the administrative leadership.

During Phase I of the lakes project the staff was asked to fill out a survey regarding their interest in the Lakes Project and their concerns. (See Appendix J) This survey was designed by a committee of 8 interested staff who wanted to find a direction for the Lakes Project that would work for a majority of the staff. Staff who could not attend workshops were given minutes or a short newsletter which was used to help keep staff informed of every decision made that involved the lakes project. The results of the survey which was developed by the lakes committee and which was filled out by most staff members. This survey was an open ended question survey and 17 staff responded to the questions on the survey. (See Table #1 for staff survey results.)

**Treatment of Subproblem Three**

It was decided through the survey that the teachers would need more curriculum materials available to them as well as more materials from which to develop their curriculum. The teachers also wanted time to develop a curriculum that would work for them. Many teachers were concerned about the amount of time that the lakes curriculum would take from their state mandated mastery by students of required subject matter.

The committee decided, by reviewing the survey, that an inservice where teachers were given ideas, curriculum materials and a
chance to help develop the first integrated lakes week curriculum covering all grade levels and all subject areas K-8 was essential. Teachers who participated were compensated financially for the time they spent developing curriculum materials and attending meetings and inservice sessions.

All Staff, Administrators, Board Members and Community Members were invited to attend all inservice sessions. The inservice sessions were not mandatory but about 75% of the staff attended. A few board members, community members and the administration also attended. Following the first inservice, during time set aside for curriculum development, a simple six question pretest and post-test (Appendix J) was developed for students in grades 5-7 so that staff could monitor the effectiveness of this new curriculum with regards to knowledge gained by the students who participated in the Lakes Week Project. (See table #2 for student pretest and post test scores)

Treatment of Subproblem four

The new Administration and the School Board decided not to apply for the second phase of the Lakes Planning Grant which would have funded the project for the Spring of 1996. The project has been scaled back considerably. A two hour Lakes unit will be taught at all of the Outdoor Education Programs in the future and a Lakes Studies Club has been established. Some staff will include lakes studies in their curriculum. The project could not maintain its momentum without the support of the Administration, the Board and some key staff. Even though the program has been scaled down many student’s, staff and
community members are continuing to show an interest in continuing the project at its current level.

**The Hypothesis**

The lakes project did increase the extent that environmental education is taught at North Lakeland Elementary School. There is now a Lake Studies Club. The multi-age classroom has also adopted a lake and has spent many hours developing a curriculum around lake studies. The Outdoor Education Program is teaching broader subject matter with regards to the environment and a number of local community people (community members were brought together during the Lakes Project) have committed many hours to establishing a new environmental center in Manitowish Waters, at the State House Lake Facility. I believe that these things would not have happened had the Lakes Project never been established. As a result of the Lakes Project a few new Lake Associations have formed and other Lake Associations have become more pro-active. The community, staff and students in the North Lakeland Elementary School District are more aware and interested in area lakes and the unique opportunities that lakes provide for us. Without the Lakes Project these activities might never have come to fruition.
Chapter V
Conclusions

Measuring the successes and shortcomings of the North Lakeland Elementary Lakes Project is a very difficult thing for me. I feel that the students and staff all gained some benefit and appreciation for our area lakes by participating in this project. My regrets are that if I could have known when I started the project what I know now, I might have been more successful at convincing some very influential staff that the lakes project was a worthwhile one. I was not 100% successful in convincing all of the teaching staff that their efforts towards developing this creative curriculum for the Lakes Project would result in an exciting, informative, integrated, program for students and staff. This type of curriculum development should have also helped staff to devote the three weeks originally planned for the implementation of the Lakes Project without feeling that their already prescribed subject matter was being neglected. Instead teachers and students should have felt that their curriculum had been enhanced. While this did happen at a number of grade levels and in a number of subject areas the feeling was not shared by all of the staff particularly the staff who had been working at the school for a number of years. Perhaps if I had taken the time to really get to know some of the staff this project would have been more successful.

During the implementation of this project students were excited to study lakes and enjoyed the change from the traditional Outdoor Education experiences. Many student’s invested recess time, time before and after
school, and weekends to follow the development on their lakes more closely. They collected additional data, history, held association meetings and built bathymetric models of their lakes. A few students presented their information at the Wisconsin Lakes Convention, in Steven’s Point. Community Lake Association members contributed their expertise to the project and became very involved in helping student’s get out onto their adopted lakes by supplying boats, garages, bathroom facilities, picnic space, and outdoor classroom sites for the lakes being studied. Board members and the Administration were also very supportive and interested until the November elections when a new members on the board changed and a resignation on the board changed the chemistry of the board which shortly thereafter resulted in the dismissal of the Administrator who had been so supportive of the project. This change in leadership changed how the whole project was perceived and forced a return to the traditional Outdoor Education Program with a few modifications.

Our district plans to continue with the lakes project but on a much smaller scale. Some of the staff felt that the Lakes Project could not be the main focus of Outdoor Education and that basic survival skills in the woods was an important part of the student’s Outdoor Education, they also were not willing to commit three weeks of classroom time to Lake Studies. A Lake Adoption Club has been established and at least one two hour session on lakes will be taught during the Outdoor Education Week. Some staff will continue to infuse the lake project into their curriculum but it will not be school wide and there will be no designated week/weeks to study lakes.

It is the hope of the staff at North Lakeland Elementary School that we can share with other schools the curriculum that was developed and any
resources that we may have collected. We are also hoping that by educating the students about lake stewardship they will take an interest in monitoring their lakes and in becoming active in their Lake Associations. In 1995 the 5th grade Lakes Studies Club presented their project at the Lakes Convention in Steven’s Point and shared their ideas with other schools. When the student’s came back from the convention they shared their presentation with the other student’s at school and the Parent Teacher Organization. Shortly after the presentation a number of student’s asked to join the Lakes Studies club. This lakes curriculum could be used by any school that has access to a lake. The curriculum has been shared with the D.N.R. and with U.W.S.P. Extension in the hope that these agencies will help other schools, clubs and organizations to adopt and implement a Lake Studies Program.

**Treatment of Sub Problem One**

Funding for the Lakes Project was secured through a Lakes Planning Grant from the Wisconsin Department of Natural Resources and was used for its intended purpose. The purpose was to implement Phase I of the project where staff was trained, curriculum was developed and supplies purchased. Student’s learned about lakes and gained an appreciation for the lakes located in the areas where they live. Without the grant the program would have not been as successful as it was. With continued funding, staff support and administrative support the project might have blossomed into an even bigger more extensive project.
Treatment of Sub Problem Two

Early in the project staff and administrative support was very strong. When the administration and the board changed many staff members became discouraged. The support for the project lost momentum and resulted in a lake study project much smaller than originally intended. The fact that the Lakes Project will be maintained at some level leaves hope that it could again grow if the political climate were to change. I think that if we had additional new staff, one or two new people on the School Board, and a supportive Administrator the project could be rejuvenated and might possibly grow to new levels.

Treatment of Sub Problem Three

The inservice staff training was very successful. The teachers who attended the staff training were pleased with the instructor's and the materials they received. Many staff have incorporated a number of the lessons into their daily plans. Project "WET" training was very well received and there were a number of very positive comments regarding the inservice with Dennis Yockers and Libby McCann. Teachers commented that they wished all inservices could be as fun and informative as the Lake Projects inservice training.

Treatment of Sub Problem Four

The staff agreed that the project is important and that a portion of the
Outdoor Education experience should include a Lake Study. Staff voted to maintain some of the project during Outdoor Education week. The Multi-age classroom decided to incorporate it into their curriculum during the school year, deciding to adopt a lake to study every year. There will be a Lakes Studies Club and many of the teachers will include some aspect of Lake Studies into their subject material. However, the staff decided that Lakes Week will no longer exist as a separate entity because some staff were concerned about the loss of student/teacher contact time from their required subject matter.

Many of the student's, staff, administration and community members were excited and supportive of the lakes project. I am pleased that North Lakeland Elementary School was able to have all of the student's in grades K-8 participate in the lakes project for 1995, so that student's would learn to appreciate the lakes that they live on. In 1996 the Lakes Project exists on a much smaller scale. I think the possibility exists that when the political climate changes, the Lakes Project will once again blossom. It was exciting to participate in a new and innovative project, as well as, to work with people who were excited about developing new ideas and curriculum to enhance an already successful program.
Chapter VI
Recommendations

The Lakes Project was a huge success for the Fall and Winter Semesters. A change in Administration, and in our Board caused a big change in staff focus. In establishing and developing the Lakes Project I neglected to bring a key person (the founder of the Outdoor Education Program) into the working group. He retired this year, but will continue to run the Outdoor Education Program for many years. If I had the opportunity to start this project over again I would definitely work on a better relationship with the Outdoor Education director and I might have tried to make the Lakes Project it’s own unit (not linked to the Outdoor Education Program). The Outdoor Education director was supportive of the Lakes Project and loves lakes but felt very strongly that the Outdoor Education Program, which he founded, should remain in tact. His relationship with a number of the staff still present at this school has a big influence on the projects that are accepted or not accepted. With his approval this project might have continued on a much larger scale than it is currently.

My open acknowledgement on environmental issues and women’s issues might also have played a part in some of the staff’s resistance to the project. I may have been pegged as an Environmentalist or a Liberal where many of the people I work with are quite conservative. I think that in the future I will try to express my views in a more diplomatic, sensitive manner. I also discovered
that when working from a grant, it is important to keep careful track of expenditures and that maintaining copies of every check and receipt is essential to the grant process. Even though we have a book-keeper, and an administrator, I kept copies of all financial transactions. This was very helpful when we had a change of administration and two changes in book-keepers half way through the year. The many hours I spent documenting our expenditures and applying for the grant funding was minimized by this record keeping. I would strongly urge anyone who applies for a grant to become thoroughly familiar with the grant and how the funds are documented and applied for once the grant money is spent.

My final recommendation would be that I should have paid closer attention to the power structure in this school system. We took a class on Leadership as part of the Master's program and I should have given this course my full attention. I might have discovered how to unlock the locked doors if I had known better how to assess the political climate. I would have known how not to aligned myself so closely to the administration and other staff members perceived as change makers by the staff. Our school has changed administrators once every two years for the past fifteen years. A few teachers, the custodians and a few School Board members hold most of the power to make things happen or not happen in this school system. These people do not like the staff or administration to interfere and they have the power to control situations they do not approve of. Overall I am very proud of this project and feel that it was successful. I know that the Lakes Project at North Lakeland Elementary School touched the lives of the students by helping them to be more active in their communities, by teaching them the
importance of monitoring their lakes water chemistry, by helping students to become more sensitive to issues surrounding their lakes and by letting students know that by actively participating in their Lake Associations they have the power to protect the lakes they live on.
Literature Cited


Appendix A

Grant Proposal
PART I.

A. Lake Name: CANDIDATE LAKES (see Table 1)
   Wool/Clear/VanVliet/Helmut/Rock
   
   County: 
   Township: 
   Town/Range/Section: 
   See Chart: 
   Waterbody Number: 
   Project Number: 

B. Management Unit Name (Applicant)
   Management Unit Type:
   □ County  □ City
   □ Village  □ Lake District
   □ Yes  □ N/A
   □ Township  □ Lake Association

C. Name of Applicant's Representative
   Jeffrey Long
   Street or Route: 5386 Park, Bldr Jct. Community Bldg
   City, State, Zip Code: Boulder Junction, WI 54512

D. Name of Project Contact (if different from C above)
   Susan Treb
   Street or Route: HCl Box 223
   City, State, Zip Code: Manitowish Waters, WI 54545

E. Other Management Units Around the Lake
   Letter of Support
   1. Vilas County Lake Association ✓
   2. Trees for Tomorrow ✓
   3. Trout Lake State Center for Limnology ✓
   4. Carlin Lake Association ✓
   5. UW-Extension Adopt-A-Lake ✓
   6. North Central District Headquarters Environmental Education Program

F. Lake Use
   See Chart
   Number of Public Sites: 1 ea @3 sites 1 ea @5 sites 0 Several
   Number of Private Sites: Unknown

---

LEAVE BLANK - FOR DNR USE ONLY

Date Received
Date of Review
Name of Reviewer

Tegrity of access (attach comments)
Project Priority

Eligible Project: □ Yes  □ No
Prior Grant Award (circle one) Yes  □ No
Amount $ Year:

Eligible Applicant: □ Yes  □ No
Adequate Public Access: □ Yes  □ No.
PART II. PROJECT DESCRIPTION

A. Reason for Proposed Project
Wisconsin's water resources are threatened by such serious problems as cultural eutrophication, sedimentation, acid deposition, user conflicts, etc. It is the intent of this project to create a novel vehicle, Student Mock Lake Association (SMIA) for learning about proactive lake management. Through MIAs at grades 5, 6, 7 & 8 and purposeful fieldwork in collaboration with community-based professionals at selected lake sites, students will extend their learning in powerful new ways. As a final step in the program, each MIA will review, revise and develop lake protection measures to be shared through town meetings in their community. By learning lake stewardship practices today, we can ensure lake protection in the future.

B. Project Goals
- Create a model curriculum for developing student Mock Lake Association's for grades 5, 6, 7 and 8.
- Create integrated curriculum units, i.e., all core subject areas as well as related arts, to develop an accurate knowledge base for utilizing proactive stewardship practices.
- Empower youth of today to take positive community action for protection of lake resources for future generations.
- Develop youth and adult effective water resource stewardship skills based on an accurate knowledge base.

C. Project Description: Please attach to this Application Form

D. Finish Date of Project:

E. Eligible Cash Expenses

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
<th>State Share Requested</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. State Laboratory of Hygiene Analysis</td>
<td>$200.00</td>
<td>$10,000.00</td>
</tr>
<tr>
<td>b. Other Laboratory Analysis</td>
<td>$400.00</td>
<td></td>
</tr>
<tr>
<td>c. Other Services (e.g., consulting, surveying services)</td>
<td>$4,150.00</td>
<td></td>
</tr>
<tr>
<td>d. Printing and Disseminating Final Report</td>
<td>$100.00</td>
<td></td>
</tr>
<tr>
<td>e. Other /Miscellaneous</td>
<td>$5,350.00</td>
<td></td>
</tr>
<tr>
<td>Total Expense</td>
<td>$10,000.00</td>
<td></td>
</tr>
</tbody>
</table>

F. How will the results of the project be distributed? (please check all that apply)
- [ ] Newsletter Mailing(s)
- [ ] Video Program(s)
- [ ] Fact Sheet Distributor(s)
- [ ] Entire Report Mailing(s)
- [X] Public Meeting(s)
- [X] Summary Report Mailing(s)
- [X] Local Newspaper Article(s)
- [ ] Comprehensive Management Plan
- [X] TV/Radio Spot(s)
- [ ] Poster Display(s)
- [ ] Curriculum Mock Lake Association Book after Phase V.

G. Official Management Resolution: Please attach to this Application Form

I certify that the information in this application is true and correct and in conformity with applicable Wisconsin Statutes.

Signature of Applicant's Representative

Title NLES Superintendent
Town of Boulder Junction Chairman

Print or Type Name
Jeffrey Long
Susan Treb

Date Signed

Please send your completed application with attachments to your local DNR District Office (see the instruction booklet for addresses).

Grant awards will be made on April 1 for applications received by February 1 or on October 1 for applications received by August 1.
NLES: 260 sq miles
Approx 1 student per sq mile

X: Towns
+: District Location
Student: 278
43% Free/Reduced Lunch
All students bused
The Mock Lake Association Project:
Lake Protection through Experiential Education
for Elementary School Students

PROJECT DESCRIPTION

1. PURPOSE. The purpose of this project is to develop an integrated elementary school curriculum that will prepare young students to make sound decisions about natural resource conservation as adults, specifically with respect to lake protection in northern Wisconsin. In an interdisciplinary program extending from grades 5 to 8, students will learn about the ecology and societal value of northern lakes and they will translate this knowledge into positive lake protection activities. A novel vehicle for learning, the Mock Lake Association (MLA), will be used to develop leadership and stewardship skills. As a final step in the program, each Mock Lake Association will review, revise and develop lake protection measures for their community. The MLA Project would be continuing part of the academic program at NLES and it would serve as a model for other school districts in Wisconsin.

2. PROJECT SUMMARY. We propose to integrate lake studies into the existing NLES curricula for grades 5 to 8 by using a novel vehicle for experiential learning: The Mock Lake Association (MLA). Small groups of students would assume responsibility for forming mock associations on real lakes. In groups of 4 to 7 students, fifth graders would adopt a local lake and form a traditional association dedicated to protecting their lake from degradation. Over a four year period (grades 5 through 8), students would develop the social and communication skills needed to elect association officers, draft by-laws, adopt articles of incorporation, and conduct formal business. All MLA's would learn about the nature of lakes in general and the specifics of their chosen lake in particular.

Learning would take place in special modules that would span all disciplines (e.g. science, math, social studies, technical education, etc.) and it would include experiential activities, like lake sampling, compiling and interpreting data, and making presentations at public meetings. In grade 8, each MLA would perform a community outreach activity designed to educate the people actually living on their lake as well as the community at large. As part of this community outreach, the 8th grade MLA's would review, revise and develop lake protection ordinances. In this way, students would apply their learning to effect positive social and environmental results. The outcome of this program would be the empowerment of young citizens for positive community action and the protection of lake resources for future generations.

3. BACKGROUND AND NEED. a. North Lakeland Elementary School. North Lakeland Elementary School (NLES) is located in the heart of the Northern Highlands Lake District of Wisconsin. Many of Vilas County's 1300 + lakes lie within the four townships and a small portion of a 5th township that comprise the NLES district (Boulder Junction, Manitowish Waters, Presque Isle, Winchester and Land O'Lakes). The NLES district covers 260 square miles with a student population of about 280 in grades K through 8 (Figure 1). The region is sparsely populated, forested with mixed hardwoods and conifers, and the lakes are generally considered pristine.
Since northern lakes are an integral part of the lives of NLES students and the economic base of their communities, it is appropriate for the school to integrate lake studies into the general curriculum. Since these northern lakes are also under increased human pressures from development and tourism, it is important that young citizens develop solid and effective stewardship skills based on sound knowledge and personal experience. This will be a key element in preserving and protecting the resource for future generations.

b. The Northern Highland Lake District. The Northern Highlands Lake District of Wisconsin includes all of Vilas and part of Iron, Price and Oneida Counties. This area is one of the most concentrated areas of lakes in the world. Vilas County contains 1,320 lakes - more than any other county in the state. Seventeen percent of the county is covered by open water and another 21% is covered by wetlands. Many of the counties' lakes are located in the four townships that comprise the NLES district (Boulder Junction, Manitowish Waters, Presque Isle, and Winchester). The township of Presque Isle contains almost 200 lakes - more than most of the counties in Wisconsin.

The region is covered by mixed Great Lakes forest of conifers and hardwoods. Tourism and forestry are major economic activities in the area. The population density is low - roughly 8 people per square kilometer. Because of the rural and remote nature of the area, many of the lakes in this region are considered pristine.

c. The Need for Lake Protection. The lakes in this part of Wisconsin were formed during the last glaciation, roughly 10,000 years ago. Many of the lakes are seepage kettles that formed in ice-block depressions. These seepage kettles have no surface inlets or outlets and are dominated hydrologically by direct precipitations and groundwater exchange. As a result, the residence times for water and dissolved constituents is often long, on the order of 4 to 10 years. In many cases, this type of lake is more sensitive to human disturbance than lakes which have shorter hydrologic resident times.

Although the region is still sparsely populated and non-industrial, development is increasing at a substantial rate. Between 1993 and 1994, the number of building permits issued in Vilas County increased by 16%. Permits for single family homes increased 10% while subdivisions applications increased by 36% during this time period. Since many of the new dwellings in the area are on water, the development pressure on lakes is high.

The Vilas County Zoning Board is presently considering stronger zoning regulations to offset the potentially adverse effects of unrestricted development. The success of new ordinances will depend on a number of factors. For the future, education will play a key role in the continued development and implementation of sound and effective policy to protect these northern lakes.
4. INTEGRATING LAKE PROTECTION INTO THE K-8 ELEMENTARY SCHOOL CURRICULUM.

When fully implemented, the MLA program would progress incrementally through four grade levels, grades 5 through 8, encompassing the entire middle school population (Table 1.) Beginner level activities would occur in grade 5. At this grade level, small groups of students would form Mock Lake Associations and adopt local lakes for intensive activities. The students would learn the fundamentals of limnology in Science class (the hydrologic cycle and the origin of lakes) and they would acquire additional basic skills and knowledge in each of their other academic classes. These students would then progress through the Intermediate Level (grades 6 and 7) to the Advanced Level in grade 8. At each level, each MLA would acquire progressively sophisticated skills and knowledge about lakes, societal values, communications skills and public policy. Since this MLA project is incremental, each phase can stand independent of succeeding stages. However, each of the five (5) quarterly phases represented in the planning and budget provides for expansion of the previous phase. Consequently, there will be expanded knowledge and skills on the part of both students and adults as the project proceeds through the phases.

The first project phase, July 1 through September 30, 1995, requires overall organization coordination by a MLA project coordinator. This coordinator will form an Environmental Advisory Council (EAC) with membership from the area environmental organizations. The coordinator will schedule a summer training session for a core group of staff members utilizing EPC expertise. Following this training, staff members will write a scope and sequence of MLA found in Table I.

During the academic year 1995-96, students and staff will begin developing a computerized catalog of the lake resources in the NLES district. When completed, we expect this catalog to contain information on approximately 650 lakes. The catalog will serve as the basis for lake selection by MLA's and each MLA will have the responsibility of updating information on their lake annually. Additionally, teachers will design a "Lake Stewardship Awareness" month and begin introducing content designed in Phase I and refined in Phase II.

Since the MLA program is incremental, the first levels of lake stewardship content of implementation will depart from this plan in the upper grade levels. For example, most Advanced Level activities will not be implemented until the present grade 5 students progress to grade 8. It is the intent of this planning grant to create lifelong learning for teachers, community and students in the area of lake stewardship.

Throughout the initiation and implementation phases the project coordinator will provide guidance in the formation and operating MLA's, coordinating academic programs across disciplines, and facilitation interactions between students, staff and the EAC professionals.
5. AVAILABLE HUMAN RESOURCES AND PROPOSED COLLABORATION. The proposed MLA project would be affiliated with the following programs:

Limnology Program, Trout Lake State, Center for Limnology, UW-Madison, 10810 Cty N., Boulder Junction, WI 54512
Contacts: Drs Carl Watras and Tom Frost

Adopt-a-Lake Program, UW-Extension, UW-Stevens Point, Stevens Point, WI
Contact: Libby McCann

Natural Resources Program, Kemp Natural Resources Station, UW, Woodruff, WI
Contact: Dr. Tom Steele

Trees for Tomorrow, 611 Sheridan Street, Eagle River, WI 54521
Contacts: Gail Pierce and Jim Holperin

Escanaba Lakes Research Program, Northern Highland Fisheries Research Area, Woodruff Area Headquarters, WI Department of Natural Resources, Woodruff, WI
Contact: Steve Newman

Self-help Lake Monitoring Program, North Central District Headquarters, Wisconsin DNR, Rhinelander, WI
Contact: Laura Herman

Environmental Education Program, North Central District Headquarters, Wisconsin DNR, Rhinelander, WI
Contact: Sherry Klosiewski

Lake Management Program, UWEX, UW-Stevens Point, Stevens Point, WI
Contacts: Bob Korth and Mike Dresen

Loon Watch Program, Sigurd Olson Institute, Northland College, Ashland, WI
Contacts: Terry Daulton

Vilas County Lakes Association
Contact: Bob Glashagel

Wisconsin Association of Lakes
Contact: John Seibel

Affiliation with these organizations would bring expertise in areas such as lake protection, ecology, limnology, natural resources management, wildlife ecology and fisheries to the MLA program. The EAC, coordinated by the MLA project director, will be the mechanism to ensure partnership with the community environmental professionals.
6. **PROPOSED TIMETABLE.** The proposed MLA project would be implemented over five phases, beginning in the summer of 1995. The timeline for project activities is described in #4. *Integrating Lake Protection into the K-8 Elementary School Curriculum.*

7. **PROPOSED BUDGET.** The total project cost for each phase of the project is as follows. Budget details are shown on Table 2.

<table>
<thead>
<tr>
<th>PHASE</th>
<th>PROJECT COST</th>
<th>MATCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>$10,000</td>
<td>$7,980</td>
</tr>
<tr>
<td>II</td>
<td>$9,990</td>
<td>$10,140</td>
</tr>
<tr>
<td>III</td>
<td>$9,990</td>
<td>$10,140</td>
</tr>
<tr>
<td>IV</td>
<td>$9,180</td>
<td>$10,140</td>
</tr>
<tr>
<td>V</td>
<td>$7,980</td>
<td>$7,980</td>
</tr>
</tbody>
</table>

8. **DELIVERABLES.** An annual report prepared following each phase of the project. Each report will include updates on curriculum development, the water resources catalog, databased for individual lakes, and summaries of MLA activities. The final report at the end of Phase V will consist of two parts: Part 1 will be a model curriculum for use by other Wisconsin school districts; Part 2 will compile recommended guidelines and lake protection ordinances developed for consideration by local communities and lake associations. Part 1 will be developed primarily by NLES staff. Part 2 will be developed primarily by students.
## TABLE 1. Overview of the Integrated Curriculum for Lake Protection Studies

<table>
<thead>
<tr>
<th>DISCIPLINE (LIMNOLOGY)</th>
<th>BEGINNER LEVEL Grade 5</th>
<th>INTERMEDIATE LEVEL Grades 6 &amp; 7</th>
<th>ADVANCED LEVEL Grade 8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCIENCE</strong></td>
<td>The hydrologic cycle</td>
<td>Biological communities,</td>
<td>Lake chemistry,</td>
</tr>
<tr>
<td></td>
<td>Lake origin and</td>
<td>Eutrophication,</td>
<td>Pollution</td>
</tr>
<tr>
<td></td>
<td>classification</td>
<td>Exotic species</td>
<td>Lakes affected by acid rain vs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acid Rain (&quot;Little Rock Lk&quot;</td>
<td>quality well water</td>
</tr>
<tr>
<td></td>
<td></td>
<td>acidification Project</td>
<td>Population Studies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and KidsNet)</td>
<td>Lake Quality vs. &quot;Wild Rice&quot; growth</td>
</tr>
<tr>
<td><strong>SOCIAL STUDIES</strong></td>
<td>Mock lake associations I:</td>
<td>Mock lake associations II:</td>
<td>Mock lake associations III:</td>
</tr>
<tr>
<td>(Mock Lake Assoc.)</td>
<td>Formation, (&quot;adopt-a-Lake</td>
<td>Conducting association business</td>
<td>Community outreach</td>
</tr>
<tr>
<td></td>
<td>Project&quot; design)</td>
<td>Observing Lake Associations in action.</td>
<td>Statutes and local ordinances.</td>
</tr>
<tr>
<td><strong>MATH</strong></td>
<td>Mapping skills I:</td>
<td>Mapping skills II:</td>
<td>Lake volume calculations</td>
</tr>
<tr>
<td></td>
<td>Use of GPS system</td>
<td></td>
<td>Analyte concentrations &amp; mass.</td>
</tr>
<tr>
<td><strong>LANGUAGE ARTS</strong></td>
<td>Technical writing I:</td>
<td>Technical writing II:</td>
<td>Technical writing III:</td>
</tr>
<tr>
<td>(Document preparation)</td>
<td>Lakes association by-laws</td>
<td>Articles of incorporation.</td>
<td>Laws and ordinances</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interviewing lake association members</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 1. Overview of the Integrated Curriculum for Lake Protection Studies

<table>
<thead>
<tr>
<th>DISCIPLINE</th>
<th>BEGINNER LEVEL Grade 5</th>
<th>INTERMEDIATE LEVEL Grades 6 &amp; 7</th>
<th>ADVANCED LEVEL Grade 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSUMER EDUCATION</td>
<td>Consumer-Pollutants</td>
<td>Environmental Pollutants</td>
<td>Economics of Environmental Practices</td>
</tr>
<tr>
<td>PHYSICAL EDUCATION/HEALTH</td>
<td>Muscle-powered water recreation I.</td>
<td>Waterborne diseases and waste management, Consumer recreational environment utilization</td>
<td>Health-related ordinances and laws.</td>
</tr>
<tr>
<td>COMPUTER/LIBRARY SCIENCE</td>
<td>Word processing and graphics programs for environmental sciences</td>
<td>Researching lake(s) history.</td>
<td>Accessing legal information (ordinances)</td>
</tr>
<tr>
<td>FOREIGN LANGUAGE</td>
<td>NO FOREIGN LANG. in 5th and 6th Grades.</td>
<td>Lakes in other cultures: vocabulary and cultural values.</td>
<td></td>
</tr>
<tr>
<td>ART</td>
<td>Watershed sketches.</td>
<td>Macrophyte drawing</td>
<td>Lake association logos.</td>
</tr>
<tr>
<td>MUSIC</td>
<td>Lakes in traditional American music</td>
<td>Lakes in contemporary American music</td>
<td>Handel's Water Music (classical)</td>
</tr>
<tr>
<td>TECHNICAL EDUCATION</td>
<td>Industrial &amp; home pollutants</td>
<td>Navigation</td>
<td>Lake models (3D)</td>
</tr>
</tbody>
</table>

Computer technology would be used across disciplines not only to gather information and prepare reports but also to store and analyze data from various sources.
<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Area (acres)</th>
<th>Depth (feet)</th>
<th>Public Access</th>
<th>Type*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wool Lake</td>
<td>T42N R6E S13</td>
<td>33</td>
<td>45</td>
<td>yes</td>
<td>Se,Cw,Ac</td>
</tr>
<tr>
<td>Clear Lake</td>
<td>T42N R5E S12</td>
<td>555</td>
<td>45</td>
<td>yes</td>
<td>Dr,Cw,Al</td>
</tr>
<tr>
<td>Van Vliet Lake</td>
<td>T43N R6E S16</td>
<td>220</td>
<td>13</td>
<td>yes</td>
<td>Dr,Eu</td>
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<tr>
<td>Helmut Lake</td>
<td>T43N R7E S20</td>
<td>7</td>
<td>36</td>
<td>yes</td>
<td>Se,Bw,Ac</td>
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<tr>
<td>Rock Lake</td>
<td>T44N R5E S33</td>
<td>122</td>
<td>18</td>
<td>yes</td>
<td>Dr,Bw,Ac</td>
</tr>
</tbody>
</table>

*: Ac=acidic; Al=alkaline; Bw=brownwater; Cw=clearwater; Dr=drainage; Se=seepage
## PROJECT BUDGET

### CATEGORY

<table>
<thead>
<tr>
<th>PHASES</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRICULUM DEVELOPMENT (c)</td>
<td>5580</td>
<td>1980</td>
<td>1980</td>
<td>1980</td>
<td>2880</td>
<td>14,400</td>
</tr>
<tr>
<td>e Protection Training:</td>
<td>720</td>
<td>720</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 6 staff/6 hrs @ 20.00/hr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated Modules:</td>
<td>2480</td>
<td>2160</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 6 staff/4 days/6 hrs @ 20.00/hr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 6 staff/3 days/6 hrs @ $20.00/hr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After Hrs. Staff Work: 24 staff/4 hr. @ 20.00/hr</td>
<td>1980</td>
<td>1980</td>
<td>1980</td>
<td>1980</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| PROJECT COORDINATION (c) | 1600   | 360    | 360    | 360    | 1200  | 3880  |
| Summer Planning & Curriculum Development: | 1600   |        |        |        | 1200  |       |
| • 80 hrs @ 20.00/hr |        |        |        |        |       |        |
| • 60 hrs @ 20.00/hr |        |        |        |        |       |        |
| Coordination of Classroom Experiment: | 360    | 360    | 360    |        |       |       |
| • 18 hrs @ 20.00/hr |        |        |        |        |       |        |

| OUTDOOR CLASSROOM USE | 1800   | 2700   | 2700   | 2700   | 1650  | 11,620 |
| TreeHaven Training for Students | 1500   | 1500   | 1500   | 1500   | 1500  |       |
| • $50.00/students X 30/phase (I-V) | 150    | 150    | 150    | 150    | 150   |       |
| • $30.00/staff X 5/phase (I-V) |        |        |        |        |       |        |
| Transportation to Lakes & Mentors | 220    | 1050   | 1050   | 1050   |       |       |
| • 7 buses/40 mi/12 trips @ 1.26/mi. |        |        |        |        |       |        |

| EXPENSES (b) | 750    | 1000   | 750    | 1750   | 1750   | 6,000 |
| Stipend: 4 days @ $500/day | 500    | 500    | 500    | 500    |       |       |
| Expenses: lodging/miles/food | 250    | 250    | 250    | 250    |       |       |
| Student Outdoor Ed Consultants |        |        |        |        |       |        |
| • 2 for Phase II, IV, V - $500/day |        |        |        |        |       |        |
| Lab Water Analysis | 400    |        |        |        |       |       |

| STAFF OVERNIGHT COSTS | 4000   |
| Staff Overnights Costs | 800    |
| 800 | 800 | 800 |

| PROJECT COSTS (d) | 3750   | 4000   | 2190   | 650    | 10,590 |
| PRINTING, TELEPHONE, NETWORK | 100    | 100    | 100    | 100    | 100    |
| PLENTATION MATERIALS (d) | 3750   | 4000   | 2190   | 650    |       |
| Acid Rain National Geographic module @ $1,000 | 1000   |       |       |       |       |
| Waters Quality Test Kits 12 @ 3.00 ea | 1800   | 1800   |       |       |       |
| Project Wild Manuals 10 @ 10.00 ea | 100    |       |       |       |       |
| Acid Rain onine costs $150/phase II-V | 150    | 150    | 150    | 150    |       |
| Lake mapping software @ $500 | 700    | 2060   | 2060   |       |       |
| Lake related curr. materials 24 staff @ $200 ea. |       |       |       |       |       |

| MINISTRA TIVE 10% BUDGET (d) | 100    | 100    | 100    | 100    | 500    |
| Audit, Evaluation, etc. | 9900   |       |       |       |       |

| TOTALS | 10,000 | 9,990 | 9,990 | 9,180 | 8,336 | 47,490 | 7,980 | 10,140 | 10,140 | 10,140 | 7,980 | 46,380 |
Appendix B

Inservice Agendas and Newsletters
AGENDA FOR

Lake Protection through Experiential Education for Elementary School Students

Meeting #1  6/28/95

9:00   Review Grant Proposal

10:00  Discuss modifications to original plan for various subject areas.

10:30  Set dates for the first week long session with the students in the fall.

10:45  Discuss the proposed in service plan and make modifications. Set a date for the teacher in service.

11:15  Brainstorm future sessions. One week in the winter and one week in the spring. Try to tie into outdoor ed.

12:00  Break for Lunch. Discuss any other concerns.

1:00   Adjourn
Lakes Planning Grant

Minutes of 6/28/95 Meeting

People in Attendance:

Jan Watras
Renn Karl
Lynn Szott
Becky Kayser
Ruth Fairbanks
Marcia Glasshagel

We discussed the parameters of the grant and it was decided by the team that we need to focus the topic down a little to make it more manageable for the group to work on. They felt overwhelmed with the proposal and wanted to just work on a small portion. Renn talked about his grant with the Wisconsin Academy of Sciences NSF Grant. He will target 5 lakes and will use a Tuffy Ball to study what types of plant and animals exist at various depths in differing lake types. He also talked about the school district in Three Lakes and their lakes project. He will get more information for the group and will try to have them attend the next lakes workshop. The names of the two teachers involved are (Beth Jacobson and Robin Peterson) Jan proposed an ambitious two day workshop inviting many experts and found that the teachers thought this might be too overwhelming and that it would be hard to get people to attend. It was decided by the group that we should rent two pontoon boats and invite anyone from the teaching and support staff for a brainstorming session. Two speakers were invited and Renn Karl will also do a presentation. Laura Herman will come to do some water quality experiments with the staff and a representative from the Three Lakes District will come to share the curriculum work that they have done with the staff. We will meet on Monday the 10th from 1-5 at Greer’s Pier. All staff will be given a $25 stipend for the afternoon and supper will be provided. A survey will be developed by Renn and Jan to help people brainstorm solutions for the Lakes Project.
Come and learn about our MLA Grant!

= Marvelous Leisure-filled Afternoon
= Many Libations Allowed
= Much Laughter Abounds
= Mingling Likeable Associates
= Mucho Lunch Around
= Money Legally Allotted ($25 stipend)
= MOCK LAKE ASSOCIATION (GRANT)

July 10, 1995
1-5 p.m.
Meet at Greer's Pier @ 12:45
for pontooning on MW chain

Lunch provided-BYOB

RSVP to Jan W.
by July 8
686-2036

-brainstorming
-hands-on lake sampling

(raindate July 11, same time, same place)
The MLA Grant get together was a huge success! We managed to float around the Manitowish Chain for four hours and have a nice picnic to finish up. We had fourteen participants: Sharon Schmidt, Lynn Szott, Renn Karl, Barb Peck, Sue Kern, Jan Pick, Becky Kayser, Ann Wilson, Lynn Vinall, Ruth Fairbanks, Sue Treb, Debbie Patterson, Marcia Glashagel and Jan Watras. There were a number of other people who expressed and interest in attending, but had other commitments. Laura Herman from Wisconsin Department of Natural Resources came and demonstrated using a Secci Disc and some simple water sampling techniques. We did some productive brainstorming and filled out a short survey. Survey results were as follows.

What is your main interest in Lakes?
Concern about overuse, pollution etc. Need for stricter building ordinances.
Keeping lakes pure. Good stewardship practices. The peace and Tranquility of lakes.
FUN-Boating, fishing, water sports.
Enjoyment of them- Keeping them clean.
Appreciating and enjoying the wild life, nature and preserving out clean waters.

How should we schedule “Lakes Week “ so that it will have the least impact on your regularly scheduled classes?

During Outdoor Ed. -Everyone who filled out a survey

What type of unit would you consider developing for a “Lakes Week?”

A multifaceted, integrated one-involving all subject areas.
Thematic interdisciplinary units-Teacher follows student group”Adopt-A-Lake.”
Scientific Study
Integrated with Social Studies and English.
Integrated with Social Studies and Reading.

How much planning time would you like to devote to developing your unit for the “Lakes Week” project?

As much as needed to develop a unit for Outdoor Ed.
Not sure?-2
6-1 hr. sessions like for the Space Unit
8 hours
The other questions on the survey were hard to answer without having all of the staff members input. During our brainstorming session some people suggested that since people are so busy in the summer maybe we should try to arrange a weekend retreat at “Tree haven”. All interested parties would have a chance to work with a couple of people who specialize in curriculum development and Environmental Activities to help us focus on developing an exciting multi-faceted, integrated lakes program. The target date is yet to be determined but will probably be at the beginning of September.

Other people expressed concern about not really understanding what this grant is all about. I will try to clarify this for all of you.

North Lakeland Elementary School has received a grant for $10,000 this summer to develop an integrated elementary school curriculum that will prepare young students to make sound decisions about natural resource conservation as adults, specifically with respect to lake protection in Northern Wisconsin. In an interdisciplinary program, students will learn about the ecology and societal value of northern lakes and the will translate this knowledge into positive lake protection activities. A novel vehicle for learning, the Mock Lake Association (MLA), will be used to develop leadership and stewardship skills. As a final step in the program, each MLA will review, revise and develop lake protection measures for their community.

In grades 5-8 small groups of students would assume responsibility for forming MLA’s on real lakes. 5th graders would adopt a local lake and form a traditional association dedicated to protecting their lake from degradation. Over a four year period (5-8) students would develop the social and communication skills needed to elect association officers, draft by-laws, adopt articles of incorporation, and conduct formal business. All MLA’s would learn about the nature of lakes in general and the specifics on their chosen lakes.

Learning would take place in special modules that would span all disciplines and it would include experiential activities, like lake sampling, compiling and interpreting data, and making presentations at public meetings. In grade 8, each MLA would perform a community outreach activity designed to educate the people actually living on the adopted lake as well as the community at large. The outcome of the program would be the empowerment of young citizens for positive community action and protection of lake resources for future generations.

This grant allows us to do something new and exciting with our students. If we are successful with this fall program there is the promise of additional funding some where on the order of $10,000 per quarter. We can get paid to develop curriculum, we can take field trips, we can buy equipment. I’ll try to keep you all updated. We are just getting things rolling so if you have any suggestions give Jan Watras or Renn Karl a call. Thanks for your time! Hope you have a terrific summer!

MLA Grant proposal is in the teacher’s workroom for your review.
Mock Lake Association Inservice

When: August 26, 1995
Where: North Lakeland Elementary School
Time: 8:30 - 4:00 (Lunch provided)
Stipend: $75.00

Guest Facilitators and Speakers:

Dr. Dennis Yockers: UW Stevens Point, Specializing in developing middle level EE curriculum. Co-authored A Guide to Curriculum Planning in Environmental Education (DPI)

Libby McCann: Master's in Environmental Education
Adopt-A-Lake Coordinator > WI Lakes Partnership
Project Wet Coordinator > (UWEX, DNR, WAL)

Julie Stephens: Middle School Teacher at Rice Lake Middle School. Developed and implemented an interdisciplinary curriculum for middle level students utilizing Rice Lake as a study site.

What we hope to accomplish:
- Receive some background knowledge on lakes and lake activities.
- Curriculum activities and ideas for Fall Lakes Week.
- Implementation plan for Fall Lakes Week (Mock Lake Association).
- Enthusiasm for new, innovative program which will bridge all grade levels and subject areas, while providing our students a valuable lesson about how to apply the things they learn in school to real life situations.

R.S.V.P. As soon as possible to Adele regarding your availability to attend this workshop. We will need to know how many people are coming so that we can prepare for the workshop.
Lakes Week '95
North Lakeland Elementary Teacher In-Service
Tentative Agenda
August 26, 1995
8:00 am - 4:00 pm

8:00 am - 8:30 am  Coffee and Treats
8:30 am - 9:00 am  Introductions: Let's Get WET!
9:00 am - 9:15 am  Grant/Workshop Overview
                    Participant Expectations
9:15 am - 9:30am   Lakes Issues in Wisconsin
9:30am - 10:15am   Making the Lakes Connection: Looking at Your Curriculum Needs and Lake Issues
10:15am - 10:30am  Break
10:30am - 11:00am  Rice Lake Middle School Adopt-A-Lake Project
11:00am - 1:00pm   Lake Activities and Lunching at the Lakeshore
1:00pm - 1:15pm    Interactive Lake Ecology Video Preview
1:15pm - 1:45pm    Making Your Lakes Curriculum a Reality: Some Suggestions
1:45pm - 3:00pm    Working on Your Grade Level Curriculum (Snacks Available!)
3:00pm - 3:30pm    Group Curriculum Sharing
3:30 - 4:00pm      What's Our Future Course? (Wrap-Up and Future Directions

$75 stipend
Lakes Week
Inservice Date 8/26/95  Time:9:00-4:00(flexible)
Major Focus : Fall/Mock Lake Associations

Audience: Teachers from North Lakeland Elementary School in grades K-8.
Number: 20-25
Location: I spoke with the people on our planning committee and they felt that in order for the workshop to be a success we would need to conduct our meeting either at Treehaven or at NLES. They felt that a majority of the teachers would refuse to attend if they had too much travel time. The week following the workshop is the first week of school with the students so many of them may need to be around to tie up loose ends.

Expectations for the Workshop: To develop a week long curriculum that is developmentally progressive and interdisciplinary, that will be tactile or experiential in nature for the students to learn about their lakes. “Fall” lakes week activities should lead to “Winter” lakes week which will then lead to “Spring”. Eventual outcomes are journals developed and printed and kept up to date by each Adopt-A-Lake group with students from these groups eventually leading the forefront in development of Lake Associations through their “Mock Lake Associations.” As a final step in the program, the MLA will review, revise and develop lake protection measures to be shared through town meetings in their community. Students will learn that lake stewardship practices today will ensure lake protection in the future.

Project Goals:
Create a model curriculum for developing student Mock Lake Association’s for grades 5,6,7 and 8.
Create integrated curriculum units, i.e., all core subject areas as well as related arts, to develop an accurate knowledge base for utilizing proactive stewardship practices.
Empower youth of today to take positive community action for protection of lake resources for future generations.
Develop youth and adult effective water resources stewardship skills based on an accurate knowledge base.
Lower grade students need awareness and knowledge activities which will lead into upper grade program.

Fee: $500 for workshop, two workshops to follow(?)
Travel: lodging/mileage/ food : $200
To: NLES Staff
From: Jan Watras (MLA Coordinator)
Date: 8/28/95

Enclosed you will find information regarding the 8/26/95 inservice and any materials that were passed out. We had a very good turnout, as well as some very good ideas for the lake project! The lakes that were chosen for adoption by the different grade level instructors were chosen for the following qualities to best teach our students: Local Lake Association on lake, Teacher in close proximity to chosen lake, students in close proximity to chosen lake, lake type, space/facilities to camp, pontoon boat on lake to access for water quality testing. The lakes chosen so far are...

- Carlin Lake 5th Grade
- Little Star Lake 6th Grade
- Van Vliet Lake 7th Grade
- To Be Announced Multi-Age Classroom

Please take time to review the information. If you are interested in being on the core planning committee. Contact: Jan Watras. We will have some time to plan the first weeks activities during Wednesday staff meetings. I will be ordering materials for your use which will be housed in the library for checkout. If you have any other questions or concerns please contact me.

Sincerely,

Jan Watras (MLA Coordinator)
Mock Lake Association Project
8/26/95

Identified Educational Issues

- Developing Citizenship Skills
- Transfer learning skills from content area to real life situations.
- Develop a zest for lifelong learning.
- Balance all learning experiences. Arts, Sciences etc.
- Well balanced subjects
- Service Learning
- Medium- Bring the "whole community" into the learning equation.
- Intergenerational learning experiences for community and students.
- Environmental Ethic
- Student Action- putting learning to practical applications
- Authentic Assessment of learning/project skills
- High level, high interest learning-engaged students-hands-on activities.
- A "Vision"

Concerns about Lakes

Ground water
Pollution-Salt, Phosphorus, Erosion, Noise, Bacterial
Septic Systems
Construction/Development-shoreline, erosion, development, NON-Point Source pollution.
De-Forestation
Industry
Personal Water Craft
Lake User Conflicts
Loss of Habitat
Sedimentation
Fishing Economy
Dockominiums
Poor understanding of H2O Quality.
Poor understanding of lake types
Generational Differences
Legacy of non-conforming structures
Social Responsibility
Poor understanding of Lake Ecosystems
Health concerns-issues
POLITICS
Wild life
Safety Aspects-Lake Users
Exotics
Tourists and Residents who are uninformed on lake sensitivity.
Participants of the MLA workshop were asked “What do you hope to gain by attending the MLA Workshop?”

Dan Rayala: (Board Member) Learn responsible uses of water. Investigate all sides of an issue.

Donna White: (Kindergarten Aid) Responsible behavior for all ages.

Scott Peterson: (Music Teacher) Ideas to make learning and appreciating water fun through music.

Marti Crunk: (Minocqua’s Priority Watershed Project) Enable youth to have access to learn about (and care for) natural resources, esp. lakes.

Bill Treb: find out/gain valuable, useful information regarding lake (Citizen) protection and balancing protection with social/economic issues.

Eric Matz: (Principal) Global View: Students gain an understanding of water uses, priorities and legal issues.

Sue Treb: (Administrator) Develop a sense of the impact on water resources. (stewardship/citizen action among youth.) Use and learn about lakes as a teaching resource in the community.

Dan Wohleber: (Health/P.E.) Recognize importance of water usage.

Marcia Glashagel: (GT/LA/Reading) Curriculum ideas and hands-on activities which tie-in to “Lakes Grant”.

Jon Berg: “Think globally, act locally.” Affect local change so that (Multi-age) kids can see that they can make a difference.

Christy Dicka: (Guidance) Hands-on activities, but also direct on-going applications.

Sherry Wuest: (Multi-Age) Curricular ideas especially hands-on for younger students.

Jan Watras: (Tech-Ed) (Project Coordinator) Kids understand process to affect change. Pool knowledge and skills from subject areas to protect
Fall Lakes Week  
(9/18/95-9/22/95)

Listed below are a number of lake activities that MLA in service participants selected as possible lakes week activities under the various disciplines. Teachers will meet with their grade level groups to determine their classroom activities. Copies of all activities will be sent to Jan Watras so that a resource document can be compiled at each grade level for future use.

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<tr>
<th><strong>Language Arts</strong></th>
<th><strong>Music</strong></th>
<th><strong>Art</strong></th>
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<tbody>
<tr>
<td>Lake Survey</td>
<td>Water Theme Songs</td>
<td>Water Plant Art</td>
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<td>Journaling</td>
<td>Water Opera</td>
<td>(Aquatic Wild)</td>
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<td>Classifying Lakes (See M.G.)</td>
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<td>Lakes Art Show</td>
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<td>Poetry</td>
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<td>Personal Experiences</td>
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<td>Pen Pal/other schools or lower grades</td>
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<th><strong>PE/Health</strong></th>
<th><strong>Tech Ed.</strong></th>
<th><strong>Science</strong></th>
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<tbody>
<tr>
<td>Outdoor Skills-Angling</td>
<td>Mapping Models</td>
<td>Done</td>
</tr>
<tr>
<td>Lake classification</td>
<td>Water Sheds</td>
<td>Ricing (Native Am. Culture)</td>
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<tr>
<td>&quot;Limbo&quot; Reaching your limits.</td>
<td>Video Production</td>
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<tr>
<td>&quot;Micro Invertebrate Mayhem&quot; (Project Wet)</td>
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<tr>
<td>&quot;Deadly Links&quot; (Project Wild)</td>
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<tr>
<th><strong>Foreign Language</strong></th>
<th><strong>Social Studies</strong></th>
<th><strong>Computers</strong></th>
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<tr>
<td>Pen/pal Mexico</td>
<td>History of Lakes</td>
<td>Flyers</td>
</tr>
<tr>
<td>Water Quality/Other countries</td>
<td>Brian Pierce (Lake Ass)</td>
<td>Newspaper</td>
</tr>
<tr>
<td>Water Vocabulary</td>
<td>Paul Brenner (History)</td>
<td>Video-script</td>
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<th><strong>FACE</strong></th>
<th><strong>Math</strong></th>
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<tr>
<td>Pollution and natural cleaners</td>
<td>Data Graphing (computers)</td>
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<tr>
<td>Composting</td>
<td>Terms for measuring Lake quality</td>
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<tr>
<td>Ecological Lifestyles-see Jan</td>
<td>Lake Volume</td>
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<tr>
<td>Wild Rice Recipes/Edible Plants</td>
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School Ideas:  Focal Bulletin Boards for student Lakes  
School Wide Lakes Fair  
Videos-Historical Photo Albums

Where do we go from here?

Meet in grade level groups to finalize Activities for Lakes Week in September.

Offer workshops for credit in Project Wet and Project Aquatic.

Develop Short and Long Term Curriculum.

How to “Hook” others?

Develop a core group consisting of board member, administration, students, teachers, community members and other interested parties. (Meet Quarterly)
Project Wet Workshop
Dennis Yockers

Saturday November 11th
North Lakeland Elementary School

8:30 a.m.-3:30 p.m.

7 equivalency clock hours available.
($75 Stipend for NLES Participants)

Lunch Provided

Dress for the weather as some activities will be outside.
Appendix C

Resources
Lakes and Water Resource List


Entine, Lynn B. "Water Quality and Stream Biology" Madison, WI: Dane County Extension (Dane County Waterwatchers Program)


Give Water A Hand Program/Publications (Ph#1-800-WATER20)


See Yowa (Adventures in Water Education)
Ecology Center
417 Detroit St.
Ann Arbor, MI 48104 1-313-761-3186


My World, My Water, and Me! Association of Environmental Authorities. For FREE Copies of this teachers guide, call 609/584-1877 or 609/984-9802.

National Association of Conservation Districts (NACD). The Living Waters Educator's Guide: Soil and Water Stewardship Series, 1995. (Ph# 1-800-825-5547 or write: NACD, 408 E. Main PO Box 855, League City, TX 77574-0855) $25.00


The Volunteer Monitor: The National Newsletter of Volunteer Water Quality Monitoring. (Published twice yearly. Subscriptions are FREE. To be added to the mailing list, call 415/255-8049 or write Eleanor Ely, editor, 1318 Masonic Avenue, San Francisco, CA 94117).
Water Activities to Encourage Responsibility. Wisconsin Department of Natural Resources (Pub. WR324-93), March 1992.

Water Action Volunteers: Introductory, hands-on stream and river action projects for Wisconsin. (Pamela Packer, Program Coordinator) Madison, WI: University of Wisconsin Extension/Department of Natural Resources Publication. (Ph# 608/262-3346, ask for Cooperative Extension Publication # GWQ018)


Cromwell, M., Flanagan, R., Mitchell, M., Newman, J., Stapp, W., Susskind, Y., Wals, A., & Zogg, G. 1991. *Investigating Streams and Rivers*. Ann Arbor, MI: The GREEN Project. Designed to produce information and observations concerning a local watershed to be used by students in a computer network system. Specific examples and information are included about how students access and interact within the GREEN computer conference project. (Green, Global Rivers Environmental Education Network, is an international computer conference through the computer network EcoNet.) Includes guidance on developing a citizen action participation project. Excellent opportunity for students to interface with other projects on an international level. Contact: GREEN, 216 South State Street, Suite 4. Ann Arbor, Michigan 48104.

action projects to protect and improve stream habitat, an extensive reference section, and copy pages. The Water Quality and Stream Biology Appendix details how to make many of the sampling devices. Contact: Dane County Extension c/o Mindy Habecker. Agriculture and Natural Resources. 57 Fairgrounds Dr. Madison, WI 53713-1497. (608) 266-4106.

Farthing, Patty; Hastie, Bill; Weston, Shann; & Wolf, Don. 1990. The Stream Scene: Watershed, Wildlife, and People. Portland, OR: Watershed Education Project, Oregon Dept. of Fish and Wildlife. Designed to develop watershed awareness for grades 6-12, with many activities adaptable to lower grade levels. Contains six activity units: water cycle, watersheds, riparian areas, hydrology, water quality and aquatic organisms. Units contain teacher background information, evaluation forms, and reproducible information sheets, activities, and worksheets. Some of the background information and student worksheets are specific to an Oregon watershed, but are adaptable to any locale. Contains excellent information on constructing water quality testing field equipment from readily available supplies.


Institute for Environmental Education. 1971. A Curriculum Activities Guide to Water Pollution and Environmental Studies, Vol. I-III. Chagrin Falls, OH. Activities involve community investigative skills. Volume I and II are concerned with investigating environmental situations from an interdisciplinary approach involving social, political and scientific aspects. Goal of activities are to develop attitudes and understandings. Volume I provides process education activities, and Volume II contains 7 technological and operational activities. Volume III contains directions for making and/or purchasing the equipment needed for activities described in Volumes I and II. Contact: Institute for Environmental Education, 18554 Haskins Road. Chagrin Falls, Ohio 44023-1823. Tel: 216/464-1775. FAX: 216/543-7160.

Institute for Environmental Education. A Curriculum Activities Guide to Watershed Investigations and Environmental Studies. Chagrin Falls, OH. Guide to identify and solve problems on a watershed level for high school students. Highlights schools and community groups in a long term approach using a multi-disciplinary process. (Process could not be accomplished in one year, may require a multi-year approach.) Provides many examples of successful programs and activities conducted in various schools. Strong on providing goals, objectives, and methods. Many activities are not detailed and may require additional resources. Additional resources are listed in an annotated bibliography. Contact: Institute for Environmental Education, 18554 Haskins Road. Chagrin Falls, Ohio 44023-1823. Tel: 216/464-1775. FAX: 216/543-7160.

pollution and distribution problems. Activities focus on the development of responsible and realistic attitudes towards water issues. This guide provides background information for teachers, additional resources, and lesson plans. Section included on field methods and equipment that contains helpful hints for field experiences, and information on purchasing or making equipment. Contact: Utah Water Research Laboratory, Utah State University. Logan, Utah 84322-8200. Tel: 801/797-3182 or 800/922-4693.

Izaac Walton League of America. 1990. S.O.S. (Save Our Streams): A Guide to Water Quality Monitoring (videorecording). This video introduces the viewer to the Izaac Walton League of America and the history of the S.O.S. program. Most of the video was recorded during an S.O.S. workshop in Virginia. The workshop includes the methods of adopting and monitoring a section of stream. The health of the stream is monitored by macroinvertebrate surveys and the report of eroding banks, oil slicks, fish kills, trash and shells. In conclusion, a final grade is given to the stream section. To order contact: Save Our Streams. Arlington, VA.

Kaufmann, Jefferey, et.al./LHSGEMS. 1989. River Cutters. Berkeley, CA: University of California-Berkeley. Guide organized through the use of a river model to aid in teaching the evolution and dynamics of a river. Activity sessions are organized in a step-by-step order and are clearly written. Includes follow-up activities, a glossary, and summary outlines for each session. Excellent drawings and photos are included to aid in the construction and implementation of the activities. Contact: Great Explorations in Math and Science(GEMS). Lawrence Hall of Science. University of California, Berkeley, CA 94720.

Lake Michigan Federation. 1989 The Great Lakes in my World. Chicago, IL. Activity guide for grades K-8, focusing on the Great Lakes ecosystem. Activities are designed to fit into regular curriculum units in core subject areas. Variety of skills are incorporated into activities addressing human uses, current management concerns and natural processes. Contact: Lake Michigan Federation, 59 E. Van Buren, Suite 2215, Chicago, IL 60605.


Simonson, Gayle. *Adopt-A-Stream*. Alberta: Friends of EE Society of Alberta. Designed for grades 4-12. Activity guide includes an extensive background information section including information about water quality, stream and riparian habitat, and water uses and management of streams and rivers. Activities section has 31 well organized activities within the subsections: Concept, Awareness, Investigation, Impact, and Action. Good "Resources and Funding" section.

Towne, Chari and Lowell Klessig. 1994. *Adopt-A-Lake Project: A Resource Guide for Teachers*. University of Wisconsin - Extension. Stevens Point, WI. This resource guide is written primarily for students. The goal of the guide is to provide activities for students which will help them learn about the challenges in lake protection and management. Included in the guide are lake protection activities, background information, and related lake management resources. Contact: Adopt-A-Lake Coordinator, University of Wisconsin - Extension, College of Natural Resources, University of Wisconsin - Stevens Point, Stevens Point, WI 54481, (715) 346-3366.

U. S. EPA. 1991. *Always a River: Supplemental EE Curriculum on the Ohio River and Water, Grades K-12*. Cincinnati, OH: U. S. EPA. Integrated, hands on approach to investigating a watershed ecosystem. The curriculum is divided into 4 activity areas; (1) the river as an ecosystem, (2) chemical and biological aspects of water, (3) human use and its influence on the river system, and (4) historical aspects of the river (specific to the Ohio River.) Focuses on investigating the Ohio River system, but most activities are adaptable to other river systems. Contact USEPA, Office of Research and Development, 26 West Martin Luther King Dr., Cincinnati, OH 45220.

Wisconsin Department of Natural Resources. *Make Waves Become a Water Action Volunteer*. 1995. Department of Natural Resources. Madison, WI. The WAV packet offers volunteer groups (both youth and adults) eight different hands-on activities designed to teach them about streams and rivers. Some of the activities included in the packet are: storm drain stenciling, habitat surveying, stream or river clean-ups, stream walk surveys, creative erosion control. A resources section includes sources of information related to water including state and federal agencies, books, videos, and newsletters. Contact: DNR publications, 2421 Darwin Rd., Madison, WI 53704, ask for publication #PUBN-R-388-95.

Water Resources Management Workshop. *Caring for Our Lakes: A Curriculum on the Yahara Watershed*. Curriculum helps students develop an awareness of the values and problems of lakes, focusing on the Sahara Lakes in Dane Co. WI. Most activities are generic, others can be adapted to any watershed. Designed for middle school students. Integrated approach involving aquatic ecology, geography, hydroscience and environmental ethics. Good approach to identifying problems and possible solutions in a selected watershed. Manual contains background information and a reference list for supplemental information. Contact: Department of Natural Resources, University of Wisconsin-Madison, Madison, WI 53706.
YOUR LAKE CONNECTION: Following is a list of folks that can help answer your lake stewardship and management questions.

STATEWIDE

Department of Natural Resources
Jeff Bode, Lakes Section Chief (608-266-0502)
Carroll Schaal, Lake Planner (608-261-6423)
Jim Vennie, BBS Questions (608-266-2212)
John Panuska, Lake Engineer (608-267-7513)
Jo Temte and Celeste Moen, Volunteer Monitoring (608-266-8117)

UWEX-Lake Mgmt Program-Stevens Point
Mike Dresen, Specialist (715-346-2278)
Bob Korth, Specialist (715-346-2192)
Lowell Klessig, Specialist (715-346-4266)
Libby McCann, Adopt-A-Lake Coord (715-346-3366)
Dorothy Snyder, Program Asst (715-346-2116)

Wisconsin Association of Lakes
Wil Burns, Executive Asst (1-800-542-5253)
Elmer Goetsch, Board Chair (715-546-2340)
Lisa Conley, President (414-567-5947)

LAKE MICHIGAN DISTRICT

Tim Rasman, DNR-Lake Coordinator, Green Bay (414-492-5903)
Scott Szymanski, DNR-Water Quality (414-492-5905)
Alvin Habeck, WAL-Treasurer (414-779-4736)

NORTH CENTRAL DISTRICT

Bob Young, DNR-Lakes Coordinator, Rhinelander (715-369-8937)
Laura Herman, DNR-Aquatic Plants (715-369-8984)
Mary Bierman, WAL-Three Lakes (715-479-9888)
Dick Peterson, WAL-Big Bass Lake (715-479-7767)

NORTHWEST DISTRICT

Dan Ryan, DNR-Lake Coordinator, Spooner (715-635-4073)
Frank Koshere, DNR-Water Quality (715-635-4072)
Gerald Kafka, WAL-Balsam Lake (612-489-0667)
Al Erickson, WAL-Mud Hen Lake (715-349-5269)

WESTERN DISTRICT

Buzz Sorge, DNR-Lake Coordinator (715-839-3794)
Sue Borman, DNR-Aquatic Plants (715-839-3836)
Karen Voss, DNR-Eau Claire (715-839-3746)
Jim Kissinger, WAL-Little Sissabagama (715-835-7846)

SOUTHEAST DISTRICT

Bob Wakeman, DNR-Lakes Coordinator, Milwaukee (414-263-8700)
Dan Helsel, DNR-Lake Mgmt. Spec. (414-263-8714)
Judy Joos, WAL-Twin Lakes (414-877-9301)

SOUTHERN DISTRICT

Jim Leverance, DNR-Lakes Coordinator, Fitchburg (608-275-3329)
Dave Marshall, DNR-Water Res. Mgmt, Fitchburg (608-273-5968)
Mark Sesing, DNR-Horicon (414-387-7879)
Mary Danoski, WAL-Fox Lake (414-928-2772)

Also check the yellow pages under Government-County for the telephone number of your UW-Extension Community Resource Development Agent and other important contacts; or check The Lake List, available from UWEX-Lake Management Program-Stevens Point for lake organization contacts throughout the state.
Appendix D

K-4 Fall Lakes Week Curriculum
Kindergarten

Carolyn Kovar
Ideas for a Lakes Theme in a Kindergarten Classroom

Carolyn Kovar

* many of these suggestions can be used in classrooms beyond Kindergarten

**Math**

Weigh things that are dry and then wet - compare the differences.

Fit geometric forms (pattern blocks), together to make fish.

Play color and shape fishing. Materials are a 3 ft. stick with a string attached and a magnet at the other end. Fish are made of construction paper with paper clips on them.

Measure fish with unifex cubes.

Count things in and around the lakes.

**Science**

Fredericka & the Big Bad Biting Bee - hands on math with the frog, Fredericka Lakes theme center display - Colorful pictures of lakes, animals in, on, and around lakes, people using lakes for fishing, canoeing, swimming, etc. Include many books with nice pictures also.

Talk about the characteristics of water, do some water experiments.

Demonstrate the 3 forms of water and how a lake looks in the 3 forms.

Show the shapes water can take with various bottles and containers and talk about the many shapes that lakes can have.

Use the *Is It Floating?* big book for a discussion on what is floating in our lakes, and do some sink and float experimenting in the classroom.

Take a specific animal that lives in, or around a lake and study it closer. Do projects, learn facts about fish, a loon, ducks, frogs, etc.

Learn about the water cycle.

**Reading Readiness**

Play ABC fishing - refer to materials needed in math fishing, each fish has a letter of the alphabet on it.

Look at the non-fiction books together, encourage discussion.

Read some of the fiction books, encourage discussion, sequencing events, use them as a take off for a picture or project. Ex: If a Wish Fish granted 3 wishes, what would you wish for?
**Art**

Make an underwater lake box. Paint the inside of cardboard box blue, and put it on its side. Children make plants and animals that we would find in a lake and hang them in the box, or tape on the sides.

Make diving masks to wear out of construction paper to see the things underwater better.

Make a big mural that children make things to put on the water's edge or in the water - plant and animal life.

Going to a beach picture using real sand to glue on and water color wash for the water.

Do fish prints with real fish.

**Social Studies**

Make a list of things that people do in and around lakes, what they use them for.

Make a lakes book. Each child contributes a page depicting something they do in or by a lake. Could use a blue watercolor wash for water.

Discussion using pictures as props of ways people may be harming or polluting lakes.

Follow up discussion on how people can help keep our lakes clean and safe.
Lake Books

The Hidden Life of The Pond - David M. Schwartz  (LMC 574.5)
Life in Ponds and Streams - William H. Amos  (LMC 591.5)
Pond Life - Barbara Taylor    (LMC 591.92)
Loon Magic For Kids - Tom Klein
Raccoons For Kids - Jeff Fair
Busy Beavers - Lydia Dubcovich
Fish Story - Robert Tallon
The Little Fish That Got Away - Bernadine Cook
Wish Again, Big Bear - Richard Margolis
Who Lives Here?, Book 1, Rivers, Lakes, & Ponds - Dawn Baumann Brunke
Who Lives Here?, Book 4, Wetlands & Woodlands - Dawn Baumann Brunke
In The Small, Small Pond - Denise Fleming

Big Books

A Beaver Tale - Rebel Williams
Is It Floating? - Fred & Jeanne Biddulph

Lake Songs

Row, Row, Row, Your Boat
Three Green Speckled Frogs
I'm a Little Fishy
Make a Wish
Think back to units you’ve just done and, as an interdisciplinary team (or a grade level team), see if you can find a theme that might have worked for all of you.

- The Water Cycle
- People & Lakes
- Plants & Creatures in & around lakes
- The Forms & Shapes of Water
- Taking care of lakes
- Lake animal theme ex: Fish

Notes & Reflections
Cut out the fish. Put the fish in the right basket.
Fish Facts

1) Fish have scales.
2) Most fish have skeletons.
3) Fish swing their tails back and forth to swim.
4) Fish steer and stop with their fins.
5) Fish breathe water with their gills.
6) Fish eat bugs, worms and plants.
7) Big fish will eat smaller fish.
8) Some fish hibernate in the winter.
9) Fish can swim under the ice.
10) Fish are born from eggs.
Use blocks to make the fish.
Multi-Age Classroom

Jon Berg, Sherry Wuest & Joanie Bykam
Lake Activity
Multi-Age Classroom
September 1st, 1995

Objective: To help students become aware of all water uses and concerns.

Activity: Use an open discussion format to brainstorm uses of water and concerns about lake use. Student's also looked at maps of area lakes to determine which lake they would like to adopt. Teacher's helped student's locate a lake that would fit the criteria for lakes study. Rest Lake was chosen.
Our News

We went to Rest lake. We had a pontoon ride over to Fox's Island. We ate lunch. We did Monet paintings and looked in the lake for water creatures. We found:

- crayfish
- leeches
- a water snake
- minnows
- snails
- worms that we could see through
- water spiders
- water beetles
- water bugs
- and little green worms.

We found Dr. Fox's roof and Theo found a deer bone. We used our water scopes to search for water critters.

We put down our secchi disks to test how clean the water was. Tory and Theo lost theirs on the bottom of the lake.

Mr. Byram, Mr. Theisen, Mr. Colasacco, and Mrs. Hraychuck went with us. She is a nurse and we're glad we had her for Tory.
WATERSHED IN A BOX

DESCRIPTION:
You and your group will build a simple runoff model and use it to demonstrate how nonpoint source pollution can affect surface water. Whether you live in a city, town or rural area, nonpoint source pollution can be a problem.

OBJECTIVES
By building a runoff model, you and your group will:

1. Define a watershed.
2. Use powdered drink mix to represent nonpoint source pollution and demonstrate how this pollution affects surface water.
3. Design a community that will try to minimize the effects of pollution on surface water.

TIME
The runoff model is very easy to build and takes approximately 10 minutes to construct. This activity would work well at a club meeting.

AGE
This activity is appropriate for ages 8 and up.

COST
All supplies for the watershed model can be found in grocery stores, craft stores or your home.

YOU WILL NEED:
For each model:
- A box cover or other shallow box that is 12" x 12" or larger
- Foam pieces, styrofoam®, or paper
- Heavy-duty aluminum foil
- Permanent markers
- Spray bottle
- Cup of water
- Powdered, unsweetened drink mix—2 or 3 different colors
- Bucket
BACKGROUND
No matter where you live, the water quality in rivers and streams is determined by what happens on the land around them. The land around a stream or river is called a watershed.

One watershed is separated from another watershed by a low rise, the crest of a hill or a mountain chain. Rain or snow that falls on opposite sides of the higher land causes water to flow into different watersheds.

Not all watersheds are the same. Some watersheds are hilly, while other watersheds are flat plains. In all cases, precipitation that falls on the watershed flows over land to reach the lowest point—a lake, river, or stream.

As water flows over land, it picks up soil, chemicals, and other pollutants and carries them to lakes, rivers or streams. This water transportation system is called runoff.

In rural or agricultural areas, runoff water carries a wide variety of materials, including pesticides, soil, and animal wastes, directly into waterways.

In urban areas, hard surfaces such as driveways, sidewalks, rooftops and roadways prevent water from soaking into the ground. As a result, the runoff water, which can be contaminated with road salt, heavy metals, or automobile fluids, rushes quickly into storm drains or dump directly into streams and rivers. These kinds of pollutants do not have a single source, so they are called nonpoint source pollution. This pollution originates from many different places.

Everyone lives in a watershed. We may not realize that what happens somewhere in the watershed will eventually have an impact on the lowest point in the watershed—a lake, a river, or a stream.

HOW TO MAKE THE MODEL
1. Get a box.
Use a box cover or a shallow box to contain the runoff model.

2. Create land forms.
Arrange pieces of foam or crumpled paper to represent hills and land forms in the bottom of the box. Encourage your group to be creative. Remember, the highest points should be near the box walls. Leave a gully or valley in the middle of the box to represent a stream or river.

3. Cover the land forms.
Cover the land forms with a large piece of aluminum foil, shiny side up. Start in the middle of the box and gently press the foil into all of the hills and valleys, working your way towards the box walls. Be careful not to tear the foil.

4. Create a community.
With a permanent marker, draw on the foil to outline the streams or rivers in your model. Next, draw houses, roads, farm fields, feed lots, stores or anything else that you want in your community.

5. Create a waterbody.
Gently pour a little water in the river or stream valleys for special effects.
6. **Add some pollution.**

Sprinkle different colors of powdered drink mix onto the model. The colors represent different kinds of pollution. For example:

- Use red powder to represent yard care chemicals and sprinkle it around the houses.

- Use green powder to represent salt on the roads or automobile waste and sprinkle it along roadways or in a parking lot.

- Use brown powder to represent exposed soil at a farm field or a construction site.

- Use blue powder to represent human or animal waste and leave little piles of powder near homes and farms.

When sprinkling the powder, be careful not to contaminate your stream or river.

7. **Ask what will happen.**

Ask the group what they think would happen if it rained.

8. **Make it rain.**

Using the spray bottle to represent a rain storm, spray water on the hillsides. Watch the water flow towards the rivers and streams.

9. **Follow up.**

Ask the group to tell you what happened. Then ask the group how they would redesign the community to prevent water pollution.

10. **Try it again.**

Dump the water from the model into a bucket. Remove the foil from the model and set it aside. Place a new piece of foil on the watershed. Ask the group to redesign the community to prevent water pollution (for ideas, see Storm Sewers). Sprinkle powdered drink mix in the appropriate areas. Let it rain. Was there an improvement?
MORE FUN WATERSHED ACTIVITIES

Long-lasting models
Try building a more permanent runoff model made of modeling clay or paper maché (a mixture of 1 part glue, 3 parts water, and shredded office paper) covered with enamel paint. When the model is complete, use powdered drink mix to represent possible pollutants that can be washed into surface waters.

The Enviroscape, which is a runoff model, can be borrowed from the Environmental Resources Center in Madison. The Enviroscape cannot be mailed. This model can be reserved and picked up by contacting:

Suzanne Wade
Southern Wisconsin Area Water Quality Specialist
216 Agriculture Hall
1450 Linden Drive
Madison, WI 53706-1562
(608)265-3257

A demonstration
This demonstration shows common runoff pollutants that can enter our streams and rivers. The demonstration will take about 10 minutes, and it is appropriate for kindergarten to second grade.

In a container out of sight, place the following common runoff pollutants: soil, leaves, small model cow and dog (representing farm animal wastes and pet wastes), a can of oil or brake fluid, and small containers of fertilizer and pesticide.

Ask the group what kinds of pollution could be washed into a storm drain and end up in a stream or river. As the different items are mentioned, place the item in full view of the group.

Watershed survey
This project is much bigger than a stream or river survey! You can investigate an entire watershed to identify nonpoint source pollution sites that may be harmful to water resources.

Look for pollutant sources such as auto graveyards, landfills, fuel storage sites, construction sites, mining and quarry operations, animal feed lots, overgrazed pastures, places where a lot of fertilizers and insecticides are used to maintain turf, and industrial complexes.

Contest
Hold a community-wide contest that illustrates the importance of pollution prevention. Try using different categories for poetry, story writing, song writing, dance, photo essays and painting. Be creative with themes; for example, the four seasons.

RESOURCES
For more information about nonpoint source pollution, and resources specific to this unit, see the Resources unit.
Grade K-4

Dan Markofoفسki
Lake Music Blues

*Teach the students the words to the six songs

*After students learn the words to the songs - sing them as a group

*Teacher uses their judgement as to when to split up in rounds and when to include dancing

TIME: 60 minutes

MATERIALS: tape - spiral notebook of songs - tape deck

OBJECTIVE: students will learn songs dealing with lake issues and concerns
To the Tune Row, Row, Row....

1) Water, water, everywhere
   Flowing from the hills;
   Tumbling, moving toward
   the lake;
   Life without would kill.

   People, people, everywhere
   Helping out the lakes;
   Cleaning, learning,
   Showing concern;
   Making life just great!

To the Tune Michael Row the Boat Ashore

1) Lakes and streams
   Are our life and blood;
   HALLELUIAH! (repeat)
   Brother let's keep
   Our lakes clean;
   HALLELUIAH!
   Keep the water's edge
   Serene;
   HALLELUIAH!
   Sister let's stop pollution;
   HALLELUIAH!
   Be part of the solution;
   HALLELUIAH!
   Let's increase habitat;
   HALLELUIAH!
   Can you all imagine that?!
   HALLELUIAH!

To the Tune I've Been Working on the Railroad

1) I've been living by the lake,
   All my live-long life;
   I've living by the lake,
   Just to watch the wildlife.

   Can't you hear the loon a-calling,
   Yodeling so early in the morning;
   Can't you see the fish a-jumping'
   For the water bugs.
Plants and ducks and fish,  
Loons and crayfish;  
Herons, beavers, minnows,  
Swish-swish-swish.

Plants and ducks and fish,  
Loons and crayfish;  
Minnows swimming,  
Swish-swish-swish.

I need to care for the wildlife,  
I need to care I know oh-oh-oh;  
I need to care for the wildlife,  
So they won't die. Oh no!

Keep singing,  
Fish love to swim in the lake,  
Turtles love to swim in the lake;  
I love to swim in the lake,  
So keeping it clean is great!

To the Tune She'll Be Comin' round the Mountain

1 ) They'll be canoeing  
Round the lakes at dawn.

They'll be drifting past  
the island on the lake.

They'll be catching frogs  
and crawdads from the lake.

To the Tune Are You Sleeping?

1 ) Are you littering?  
Are you littering?  

In the lakes?  
In the lakes?

Keep them clean and healthy,  
Keep them clean and healthy;  

Everyday!  
Everyday!
To the Tune Camptown Races

1) Deep cold springs they
form our lakes;
Do-Da, Do-Da!
Rain and snow they
also take;
Do-Da, Do-Da!

Rain it forms up in the cloud;
Do-Da, Do-Da!
Thunderstorms are very loud;
Oh-Do-Da-Day!

Water from above,
Water from below;
The earth makes water everyday,
We need to help go!
2nd Grade

Sue Kern
I. All life depends upon water in some way.
   A. Discuss a variety of ways and reasons why water is important to people and wildlife.
   B. Look at pictures
      1. Brainstorm words

II. Explain they will be writing Haikus. Originated with the Japanese. consists of 3 lines with 5, 7, & 5 syllables each. Shouldn't be concerned with rhyming words. Most haiku poems refer to some element of nature. They express a moment of beauty which keeps you thinking or feeling.
   A. discuss syllables (word parts, clap)
   B. Read examples from chart:

   Gentle raindrops fall.
   Reflected in the puddles,
   thirsty flowers drink.

   The big hungry frog
   resting on a lily pad
   dreams of careless flies.

   Tiny hummingbirds
   dart from flower to flower.
   Rainbows in motion.

   In freezing weather,
   Little snowflakes start falling.
   Catch them on your tongue.

   One sparkling spring day
   I saw a tiny spider
   spin a web of silk.

C. Read examples of Haiku from "My Own Rhythm" by Ann Atwood (spring on the river, spring in the river, reeds, dark canoe, stream)
III. Pass out p. 33 -- "Write a Haiku" -- a pattern for haiku writing.
   A. Write a sample
      1. Topic -- fish
      2. Brainstorm words or phrases that describe object and
tell how you feel about it. swims, leaps for a minnow, feel
excited, heart beats.
      3. Write a sentence using ideas you wrote: A fish swam by
me, leaped for a minnow, and made me feel excited.
      4. Adjust the syllables & words to fit the haiku pattern:

         The trout swam by me.
         It leaped to catch a minnow.
         My heart beat faster.

IV. Read the guided imagery. Have "The Babbling Brook" tape on in
the background. Remind children to listen for words that can be
used in their haiku; i.e. -- babbling brook, river, stream, lake, pond,
shore, fish, frog, etc.
   A. Groups will do a rough draft on p. 33 & then rewrite on paper
provided. If time, they will illustrate their haikus.
   B. Share haikus with group.
Write a Haiku

1. Decide on your topic. (You may use a picture or object to help you get started.)

2. Write several phrases or sentences describing an action or feeling about your topic. Remember to refer to nature or the season.

3. Choose the phrases or sentence that you like the best. Work to make them fit the correct haiku form.

   5 syllables
   7 syllables
   5 syllables

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Write a Haiku

1. Select a topic. (You may want to use an object or picture to help you get started.) Write your topic here.

2. Think about your topic. Write a list of words or phrases that describes the object or picture and words or phrases that tell how you feel about it.

3. Write a sentence using the ideas you wrote in step two. Write your sentence here.

4. Adjust the syllables and words to fit the haiku pattern. Write your haiku here.

   5 syllables
   7 syllables
   5 syllables
Procedure

1. OPTIONAL: If at all possible, the students should visit a real stream, pond, lake, river, or beach. Try to choose one where human-made sounds are at a minimum. If possible and not dangerous, allow the students to touch the water during the part of this activity where they are being led through a guided imagery. Consider the possibility of taking battery-operated tape recorders on the field trip to tape some of the natural sounds the students experience for later playing once the students are back in the classroom.

2. OPTIONAL: If the field trip is not possible, then try to use a tape player with recordings of natural ecosystems: the sounds of oceans, rivers, streams, swamps, or brooks are often available on tape from bookstores, music stores, and shops that specialize in nature. Classical music can be substituted. “La Mer,” “The Pines,” and “Fountains of Rome” are examples. Any of a number of selections of “new age” music are also excellent. You can also make your own tape recordings.

3. Ask the students to sit or rest quietly in a comfortable position. Begin the guided imagery.

OPTIONAL: If available, invite the students to relax and listen carefully to the water and/or musical sounds. These sounds are simply background for the ideas you are going to ask them to visualize in their minds.

NOTE: Please modify the water images in the text of this guided imagery as needed to adapt to your location. Also you may want to read the section about guided imagery that appears in the appendices to this activity guide for additional suggestions concerning use of this instructional strategy with students.

"You are to try to imagine the things you will hear me describing. Sit comfortably and close your eyes... Relax, and do your best to imagine what I am describing... You are sitting on the edge of a stream (lake, ocean, etc.)... Your bare feet are swinging in clean, clear water... The water feels good, but it is cool... You feel a current washing over your feet, pulling at them... Think about the water flowing past your feet until it reaches a larger stream... The water connects you with the larger stream... Feel its more powerful flow... See the green ribbon of trees and plant life on the banks... The larger stream carries the water past flat farmlands, cities, factories, and forests until it eventually reaches the sea... Through your feet and the continuous currents of water you can imagine that you feel the sea... Now stretch your mind and realize that you interconnect with all the world's oceans... You are now touching one single body of water that stretches all around the world... Your own body contains water that is part of this system... Your touch laps against the shores of the Pacific Ocean, it flows under the Golden Gate bridge in San Francisco's bay, it leaps and plunges around oil drilling platforms in the North Atlantic... It pours from the sky as a storm rages dark and gray... It drenches an Alaskan native who shivers on the Arctic shores before her parka begins to warm her... It glistens on the back of a Creek boy who tugs fiercely on fishing nets in the warm Mediterranean Sea... Water connects your feet with every stream flowing into the oceans around the world... You can reach up the rivers to the hearts of continents... You can feel the tremor of the hippopotamus that just dove into an African river... You can feel an alligator silently sliding toward a heron in the Florida Everglades... You can feel beavers busily building a dam on a stream in Europe... You can see water, thousands of tons of it, in great drifting fleets of heavy white clouds... Your reach embraces all the whales, all the porpoises, all the sharks... You are connected with the mythic creatures, living only in the minds of people in the past—mermaids, citizens of Atlantis, and the mythic monsters that swim in Loch Ness... Your feet feel the flow of the current of the miles-wide Amazon River in South America, the ancient Nile River pushing north through Africa, the Colorado River thundering with a boatful of river rafters through the Grand Canyon... Your watery embrace wraps all around the Earth... And, of course, the water flowing over your feet connects you with everyone else who is now sitting, with feet dangling in a stream, wondering where the water goes... It is time to come back... Bring the limits of your senses back from the world's rivers and oceans... back to the surfaces of your feet... back to where you are... When you feel ready, you may open your eyes."
4. Once the imagery is complete, ask the students to open their eyes. Tell them that they each had their own private journey even though they all heard the same words. Tell them that in a moment you will ask them to close their eyes again to find one place on the journey through the world’s waters that was their favorite—and you will ask them to try to remember what that image was like.

5. Ask them to relax again and have them try to re-create the picture in their minds. Tell them to look at the detail, the colors, the plants and animals, and to try to capture it all in one scene. Have them pay particular attention to the role of water in the lives of people, plants, and animals.

6. When you feel they have had enough time, ask them to open their eyes. Provide the art materials and ask them to each get paint sets and paper and to quietly paint the image of their favorite place. OPTIONAL: You may provide an opportunity at this time for some or all of the students to talk briefly about their favorite places.

NOTE: If you choose the field trip instead of the classroom option, try to take water-based paints to the field so the actual water of the site can be used to paint the images. If you remain in the classroom, you might mention how some of the waters of their journey will now be used to help them paint their image.

7. Once the images are complete, ask the students to write various short forms of poetry that express some of their feelings about water and its importance. Here are a few examples of poetic forms which can be used.

**Haiku**

Haiku, originated by the Japanese, consists of three lines of five, seven, and five syllables each. The emphasis is syllabic, not rhyming. For example:

The fish swam by me
Nothing left in the shimmer
My heart beat faster

**Cinquain**

Cinquain is derived from the French and Spanish words for five. This form of poetry is also based on syllables—or may be based on number of words—but there are five lines. Each line has a mandatory purpose and number of syllables or words. These are: 1) the title in two syllables (or two words); 2) a description of the title in four syllables (or words); 3) a description of action in six syllables (or words); 4) a description of a feeling in eight syllables (or words); and 5) another word for the title in two syllables (or words). Here are two examples, the first using syllables and the second using words.

Osprey
Fishing eagle
Moves above dark water
With graceful strength it finds its meal
Seeker

Sea otter
Mammal of living waters
Swimming, sleeping, eating,
diving, basking, playing
Sensitive indicator of the quality
of continuing life
Still here

Diamante
Diamante is a poem shaped in the form of a diamond. It can be used to show that words are related through shades of meaning from one extreme to an opposite extreme, following a pattern of parts of speech like this:

noun
adjective adjective
participle participle participle
noun noun noun noun
participle participle participle
adjective adjective
noun

For example:

Stream
Small, clear
Rippling, moving, growing
Life, plants, animals, people
Rushing, sustaining, cleansing
Connected, universal
Ocean

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OUTDOOR ED
"HAIKUS"

Deer go to the lake.
They will drink clean lake water.
Their fawns are pretty.

by Brigitte, Dustin, Andrew,
Tori and Brittany.

Loons swim gracefully.
I hear loon calls on my lake.
They make my heart race.

by Danny, Peter, Blake
and Jenny

Loons dive to catch trout.
Schockingly it pops back up!
I feel heavenly.

by Clayton, Curtis, Emily
and Ashley

Loons have nice patterns.
Start out flying beautiful,
Dive into water.

by Emily, Alice,
Richard
and Ryan
Grade 1-4

Barb Peck
Lakes Study

Session: “On The Edge”
Grades: 1 - 4

Background Information: Where the edges of two ecosystems come together and overlap is “where the action is”. This area of overlapping ecosystems tends to be more complex than any ecosystem by itself. There is greater diversity in plant and animal life; those common to both are brought together in the overlapping area. Children can look for indirect evidence of this—footprints, scat, feathers, etc. Edges also attract humans—lakeshores, streambanks, ocean beaches, etc. Humans may change the overlapping area (ecotone) - drain marshes, remove trees, dam streams, etc.

Procedure: 1. Discuss what children think of when talking about “the edge” of anything.
2. Introduce ecosystem edges by having students in groups of two paint two circles on plain paper—one yellow and one blue (not overlapping). They have them extend both circles until they do overlap. Discuss the results of colors new color but one made from both circles.
3. Give each group of two students a piece of green yarn and blue yarn. The green will represent a forest
and the blue a lake. Then using pattern blocks or some other manipulatives have the students use them to represent trees, animals, fish, etc. in each ecosystem. Then they are to overlap the yarn circles - making sure that one of each animal, etc. is in the overlap area. Do they notice the greater diversity?

4. Discuss where most of the students live and why --- on the edges of lakes.

5. Use the 8½ mm. filmstrip “Where Land Meets Water”, if time.

6. Walk to lakeshore. Using a paper with a Venn diagrams drawn on it, have students write names of what they see in each circle and in the overlapping area. Collect lake samples and observe with magnifying glasses.

7. Next visit a bog and repeat the procedure in #6.

8. Wrap-up discussion.

Barb Peck
Appendix E

5-8 Fall Lakes Week Curriculum
Art Lakes Project

Mrs. Jensen
ART PLANS FOR OUTDOOR ED; LAKES PROJECT :IMPRESSIONIST DRAWINGS-PASTEL

Opening: compare Impressionist music with Impressionist art

While listening to Debussy's "La Mer" discuss "water music". Instead of using music according to the old rules, Debussy used it freely, choosing certain chords for effect. His style was similar to the way the Impressionist painters used color. Debussy's ideas set music free and opened the creative door for other composers.

The Impressionist painters also opened up the creative doors for other artists. The Impressionists based their work on the fact that nature changes continually. The Impressionists tried to create paintings that capture the moment --keeping in mind that because of changes in the weather or light nothing stays the same. The lake looks totally different at dawn, at noon and then again at dinnertime.

Claude Monet was a French painter (show prints of Monet's waterlilies and lakes) (1840-1926)Monet became the leading member of the Impressionists. The Impressionists were painters who tried to show how light effects nature. The name Impressionist refers to the "impressions" of color, beauty and light which celebrate nature.

LESSON PLAN: Grades 1-4: mixed groups of 18 students

While listening to Debussy's water music, think about the beauty of the northwoods and particularly Lake Manitowish. Using a viewfinder select a section of the waterfront to draw in pastels. Sketch the general areas first with a light color and then use overlapping colors to create the effects of light on the water and the surrounding woods and lakefront.

Remember - The Impressionists based their work on the fact that nature changes continually.
Leaves move in the wind.
Light transforms the appearance of things.
Reflections change color and form.
The Impressionists tried to create paintings that capture the moment.

Texture creates depth. Overlapping colors create new colors.
Health Lakes Project

Mr. Wohleber
LAKES WEEK

1-4 P.E.
Objective: Have students understand the relationship of man's role in keeping lakes within their normal operating capacity. Increased knowledge and awareness that lakes can only "Take so much."

Activity: Limbo (How far can you go before you succumb to the rope?)

5-7 HEALTH
Objective: Knowledge of how and why lakes are classified the way they are.

Activity: Lecture and discussion on lake classes.

8 HEALTH
Objective: 1) Increased knowledge of area lakes.
2) Increased knowledge of environment in relation with man.

Activity: 1) Draw and label contour maps of some area lakes including access, size, depth, fishery, and bottom characteristics.
2) Make a collage of environmental goods and evils.
Social Studies
Lake Project

Mr. Anderson
Lakes Project Week “Fall”
6th and 7th Grade
Social Studies
Andy Anderson

Each student will “design” their own personal lake-showing the following on their drawings.

a. Shoreline shape (Lake Outline)
b. Contour lines for depth
c. Weed growth and types
d. Sand/Rock bars
e. Islands
f. Inlets
g. Shoreline developments (If any)
h. Any other information that they wish to include.
LAKES

POINTS TO PONDER. Did you know?

1. 20% of all the world's fresh water is in the Great Lakes?
2. Only 1% of all fresh water is safe to drink in its natural state?
3. Water QUALITY, worldwide, is in shape decline?
4. Vilas County contains over 1300 lakes and is one of the 3 most concentrated lakes regions in the entire world?
5. All natural ground water tables east of the Appalachian Mountains is polluted by some un-natural substances?
6. Much of the decline in water QUALITY is due to one or all of the following:
   a. septic pollution
   b. lawn fertilizer run-off
   c. agricultural fertilizer and other chemical run-off
   d. road salt run-off
   e. silt and erosion from shoreline and riverbank development
   f. gasoline from outboard motors and jet-skis
   g. TOO MANY PEOPLE USING A VERY LIMITED RESOURCE

MATERIALS NEEDED FOR THIS UNIT:
1. a sample lake map  2. notes from the blackboard as we discuss this unit
3. a large sheet of white paper  4. a pencil  5. colored pencils and/or FINE LINE magic markers

REQUIRED WORK FOR THIS UNIT:
1. Each student will create an imaginary lake map. (A "rough draft" will be created prior to creating your "final" drawing on the large sheet of white paper!!!!!!)
2. Your imaginary lake map must include the following items:
   a. the outline of the shoreline    b. contour lines showing depths at intervals of 10 feet
   c. symbols showing weed growth, both submergent and emergent
   d. symbols showing rock bars      e. symbols showing fish shelters (cribs)
   f. all shoreline development, homes, resorts, marinas, etc.
3. Your imaginary lake map must include at least 4 of the following 6 items:
   a. an inlet       b. an outlet   c. island(s)   d. adjoining roads and/or highways
   e. public boat ramp f. public campsites, picnic or beach areas

THIS PROJECT WILL BE WORTH 50 POINTS TOWARDS YOUR SOCIAL STUDIES 9 WEEKS GRADE.
Consumer Education

Monday- wild rice
Tuesday- household cleaners
Wednesday- "Poison Pump" activity, water-borne illness
Thursday- Journals
Friday- Pictographs, petroglyphs, shirt decorating
WILD RICE AND CHICKEN

6 OZ. PKG. UNCLE BEN'S WILD RICE MIX
1/2 CUP CHOPPED ONION
1/2 STICK MARGARINE
1/3 CUP FLOUR
1 TSP. SALT
1/4 TSP. PEPPER
1 CUP CHICKEN BROTH
1 CUP MILK
1/2 CUP PARSLEY
2 CUPS CUBED CHICKEN
1/2 CUP CHOPPED ALMONDS

1. COOK RICE MIX AS PACKAGE DIRECTS.

2. SAUTE ONION IN BUTTER TILL BUBBLY.

3. BLEND FLOUR, SALT, AND PEPPER WITH SAUTEED ONION.

4. STIR LIQUIDS INTO PRECEDING MIXTURE.

5. COOK TILL THICK.

6. COMBINE RICE AND SAUCE WITH PARSLEY, CHICKEN, AND ALMONDS.

7. MIX AND BAKE IN 2 QUART CASSEROLE AT 375° FOR 30 MINUTES.
Tried and true recipes for a less hazardous home

Household cleaning is an ancient chore and people tidied up without fancy chemicals for a long time. Simpler times called for simpler cleaners that still work today.

These remedies were drawn from a number of sources. Although they are usually less hazardous than popular products, they should still be used with caution. Their effectiveness has not been tested by formal research or consumer test groups. When trying a new alternative, test it on a small, inconspicuous area first to be sure you'll get the results you want.

Most jobs can be accomplished with six simple ingredients mixed with water: vinegar, soap, baking soda, washing soda, borax and ammonia. Even so, handle these compounds carefully. Ammonia in particular irritates eyes, nose and lungs. Wear gloves and eye protection when mixing and working with ammonia in these recipes and clearly label the containers of all cleaning solutions you concoct.

ILLUSTRATIONS BY HAWLEY W. WRIGHT

Air freshener: Herbal potpourri or cotton balls soaked in vanilla are sweet-smelling. Also try boiling cinnamon and cloves in a small amount of water. An open box of baking soda absorbs refrigerator odors. Borax sprinkled in the bottom of a garbage can controls odors.

Blood stains: Club soda and cold water will remove fresh blood stains. Blot it up with a clean cloth or paper towel.

Chocolate stains: Blot the stain with club soda.

Cockroach control: Try a light dusting of borax around the refrigerator, stove and duct work. You can also combine sugar, flour and boric acid to poison roaches; they'll carry the powder back to their nests. (Keep pets and children away from these mixtures.)

Copper cleaner: Dip the copper in warm vinegar, then sprinkle salt on the piece and scrub with a soft cloth. Rinse well with clean water.

Disinfectant: Mix ¼ cup each of soap, borax and isopropyl alcohol.

Hand cleaner: To clean hands of paint or grease, massage them with baby oil, mineral oil, margarine or butter. Wipe them dry on a paper towel, then wash your hands with soap and water.

Drain cleaner: Keep drains open and clean with a plunger or metal snake. As a preventative or if a drain becomes clogged, pour in ¼ cup baking soda, followed by ½ cup vinegar. Close the drain until all the fizzing stops, then flush well with boiling water.

Floors and toilets: A mixture of two to three teaspoons each of borax and liquid dish soap in two quarts of hot water works well on tough jobs like floors and toilet bowls. Adjust the concentration of ingredients to fit the job. Likewise, baking soda and a mild detergent plus a little elbow grease can take the place of powder cleaners. Baking soda mixed with a small amount of bleach is an effective toilet bowl cleaner. (Remember, never mix ammonia with bleach.)

Bathroom cleaner: Use baking soda to scrub surfaces clean and wipe surfaces with a solution of ¼ cup vinegar in a gallon of water.
Laundry: To remove tough stains, soak the spot in a mixture of ¼ cup borax in two cups of cold water prior to washing. Rub corn meal and water into greasy stains and then rinse the stain with lemon juice before machine washing.

Pet stains and odors: Try a mixture of ¼ cup vinegar in ¼ cup liquid soap. Rub in the mixture, then rinse with water.

Rust remover: Vinegar’s weak acid works wonders on rust stains. Warmed vinegar coupled with some scrubbing will remove rust from dishes, sinks and your teapot.

Silver cleaning: Baking soda and water or buttermilk make fine silver-soaking solutions. The fine abrasives in toothpaste will also brighten your silver jewelry with mild brushing. Also try boiling silver for two to three minutes in a mixture of one cup water, one teaspoon baking soda, one teaspoon salt and a piece of aluminum foil. Rinse pieces well in water and dry with a soft cloth.

Sinks and countertops: Use vinegar mixed with water and salt.

Window cleaner: Use newspaper dipped in vinegar to scrub windows. A mix of one quart water, a few drops dishwashing detergent and two tablespoons of sudsy ammonia works well.

Spot removers: To remove grease from garage floors, sprinkle the spot with dry cement or fresh cat litter. Let stand for a few hours, then sweep it up. Grease is absorbed by the dry clay or cement.

Stains: General household stains can be cleaned and disinfected with borax solutions.

Wood furniture polish: Look for products containing pure oils like lemon oil, tung oil or almond oil without petroleum distillates. You can also make furniture polishes with a mixture of one part lemon juice to two parts mineral oil or other oil. Don’t use vegetable oils to preserve wood because the oils eventually turn rancid and emit foul odors. Be aware that mineral oil is flammable and mineral spirits should not be used.

Wood cleaning: Try Murphy’s Oil Soap.

Finally, clean lightly, but more frequently to avoid the need for stronger cleaners. Use preventative strategies at home. Check your home for small spaces where pests can gain access. Learn about pest habits so you can apply the least hazardous alternative when pests are most vulnerable. And remember that your household can still be considered clean without a shiny, “spanking clean” look every day.

Elaine Andrews is a University of Wisconsin Extension environmental education specialist. Liz Wessel is a toxics use reduction specialist for Citizens for a Better Environment.
## LESS TOXIC RECIPES

<table>
<thead>
<tr>
<th>INSTEAD OF:</th>
<th>TRY:</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Purpose Household Cleaner</td>
<td>1 tsp oil soap, 1 tsp borax (*).</td>
</tr>
<tr>
<td>Ammonia</td>
<td>Vinegar, water</td>
</tr>
<tr>
<td>Ants and Roaches</td>
<td>1 cup flour, 2 cups borax (*): sprinkle around house foundation, doorsills, or baseboards</td>
</tr>
<tr>
<td>Bleach</td>
<td>Borax (*)</td>
</tr>
<tr>
<td>Disinfectant</td>
<td>1/2 cup borax (*), 1 gallon water</td>
</tr>
<tr>
<td>Drain Cleaner</td>
<td>Pour 1/2 cup baking soda, followed by 1/2 cup vinegar down the drain. Wait 5 minutes, then rinse with boiling water.</td>
</tr>
<tr>
<td>Flea &amp; Tick Remover</td>
<td>Mix brewers east or garlic in your pets food; sprinkle fennel, rue, rosemary or eucalyptus around animals sleeping area.</td>
</tr>
<tr>
<td>Odors</td>
<td>Soak a cotton ball in pure vanilla (*).</td>
</tr>
<tr>
<td>Oven Cleaner</td>
<td>Sprinkle salt on fresh spills and lift off with spatula when oven cools. For general cleaning: layer water and baking soda, then rub w/ very fine steel wool.</td>
</tr>
<tr>
<td>Plant Sprays</td>
<td>Wipe leaves with mild soap and water and rinse.</td>
</tr>
<tr>
<td>Silver Polish</td>
<td>Soak 5-10 min. in 1 quart warm water, 1 tsp baking soda, 1 tsp salt with a small piece of aluminum foil.</td>
</tr>
<tr>
<td>Window Cleaner</td>
<td>1/2 tsp oil soap, 3 Tbsp vinegar, 2 cups warm water.</td>
</tr>
</tbody>
</table>

*These ingredients are safer but still toxic.*
### Alternatives to Hazardous Household Products

<table>
<thead>
<tr>
<th>Products</th>
<th>Hazard Properties</th>
<th>Hazardous Ingredients</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaners</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silver Polish</td>
<td>Causes burns, toxic</td>
<td>Acidified thiourea, sulfuric acid</td>
<td>Soak in boiling water, baking soda, salt, and a piece of aluminum foil</td>
</tr>
<tr>
<td>Oven Cleaner</td>
<td>Causes burns, toxic</td>
<td>Potassium hydroxide, sodium hydroxide, ammonia</td>
<td>Baking soda and water, salt, a quarter cup of ammonia overnight</td>
</tr>
<tr>
<td>Toilet Cleaner</td>
<td>Irritant, causes burns, toxic</td>
<td>Muriatic (hydrochloric) or oxalic acid, parachlorobenzene, calcium hypohalite</td>
<td>Toilet brush and baking soda or mild detergent</td>
</tr>
<tr>
<td>Disinfectants</td>
<td>Causes burns, toxic</td>
<td>Diethylene or methylene glycol, sodium hypochlorite, phenols</td>
<td>One-half cup of borax in 1 gallon of water</td>
</tr>
<tr>
<td>Drain Cleaner</td>
<td>Causes burns, toxic</td>
<td>Sodium or potassium hydroxide, sodium hypochlorite, hydrochloric acid, petroleum distillates</td>
<td>Plunger; metal snake; flush with one-fourth cup baking soda and boiling water; 2 oz. vinegar</td>
</tr>
<tr>
<td>Rug and Upholstery Cleaners</td>
<td>Irritant, causes burns, toxic</td>
<td>Naphthalene, perchloroethylene, oxalic acid, diethylene glycol</td>
<td>Dry cornstarch sprinkled on rug and vacuumed</td>
</tr>
<tr>
<td>Floor and Furniture Polishes</td>
<td>Flammable, toxic</td>
<td>Diethylene glycol, petroleum distillates, nitrobenzene</td>
<td>One part lemon juice with two parts olive or vegetable oil; mineral oil with lemon oil or Carnauba wax</td>
</tr>
<tr>
<td>Bleach Cleaners</td>
<td>Causes burns, strong oxidizer</td>
<td>Sodium or potassium hydroxide, hydrogen peroxide, sodium or calcium hypochlorite</td>
<td>Use powdered, not liquid, bleach</td>
</tr>
<tr>
<td>Mothballs</td>
<td>Toxic</td>
<td>Naphthalenes, parachlorobenzene</td>
<td>Cedar chips; newspapers; lavender flowers</td>
</tr>
<tr>
<td>Pool Chemicals</td>
<td>Causes burns, toxic</td>
<td>Muriatic acid, sodium hypochlorite, algicide</td>
<td>Unknown</td>
</tr>
<tr>
<td>Ammonia-based Cleaners</td>
<td>Irritant, causes burns, toxic</td>
<td>Ammonia, ethanol</td>
<td>Vinegar, salt and water mixture for surfaces; baking soda and water for the bathroom</td>
</tr>
<tr>
<td>Powder or Abrasive Cleaners</td>
<td>Causes burns, irritant, toxic</td>
<td>Trisodiumphosphate, ammonium, ethanol</td>
<td>Rub area with half a lemon dipped in borax and rinse; baking soda and mild detergent; elbow grease</td>
</tr>
<tr>
<td>Spot Removers</td>
<td>Toxic, flammable</td>
<td>Solvents</td>
<td>Club soda; immediate cold water; corn meal and water soak; lemon juice</td>
</tr>
<tr>
<td>Window cleaners</td>
<td>Toxic</td>
<td>Solvents</td>
<td>Rub windows with newspapers; vinegar and water</td>
</tr>
<tr>
<td>Automotive Products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antifreeze</td>
<td>Toxic</td>
<td>Ethylene glycol</td>
<td>Unknown</td>
</tr>
<tr>
<td>Transmission Fluid</td>
<td>Flammable, toxic</td>
<td>Hydrocarbons, mineral oils</td>
<td>Unknown</td>
</tr>
<tr>
<td>Brake Fluid</td>
<td>Flammable, toxic</td>
<td>Glycol ethers, heavy metals</td>
<td>Unknown</td>
</tr>
<tr>
<td>Used Motor Oil</td>
<td>Combustible, toxic</td>
<td>Hydrocarbons including benzene, heavy metals</td>
<td>Unknown</td>
</tr>
</tbody>
</table>
Poison Pump

A killer has swept through the streets of London; hundreds are dead! Would you believe that an accomplice to this terrible crime is something you use everyday?

Summary
Through a series of clues, students solve a mystery to discover that water can also produce negative effects for people.

Objectives
Students will:
• apply investigative methods used by epidemiologists to trace the source of contagious diseases.

Materials
Each group of students will need the following:
• Student activity sheet, Broad Street Area Map (The map is a fictionalized representation of London streets in 1854.)
• Copies of Victim Cards
• Colored marking pens
• Copies of Clue Cards

Making Connections
Of the world’s leading diseases, over half depend on water for their transmission. These diseases often occur in catastrophic proportions. Epidemics of the past and present intrigue many students. Through following the clues used by scientists in the past, students use investigative and analytic skills to locate the source of a killer disease.

Background
Cholera is a disease caused by the Vibrio cholerae bacterium. The bacterium travels through untreated water contaminated by human or animal feces. Cholera is spread by sharing contaminated water or by eating contaminated food. Since the body does not produce lasting immunity against the bacterium, the disease can be contracted more than once.

Cholera is characterized by rapid dehydration resulting from simultaneous vomiting, diarrhea, and profuse perspiration. As victims dehydrate, their skin darkens, shrivels, and loses its elasticity. Depending on general health, body mass, age, and amount of ingested bacteria, cholera victims may suffer only mild symptoms or can die in less than an hour.

In 1854, hundreds of people living in London died during a cholera epidemic. The disease spread from India to London on ships that carried contaminated drinking water. If a ship was known to carry disease, the London port authorities refused to grant docking privileges. Rather than lose money on their cargo, some ship captains deceived the authorities by dumping contaminated water overboard into the Thames River, London’s water source.

London was served by competing water companies in 1854. At least one, in an effort to cut costs, failed to filter adequately the river water being pumped into the city. While upper- and most middle-class citizens had indoor plumbing, the poor of London relied on public pumps for their water needs.

Dr. John Snow, considered the father of epidemiology, is credited with tracking and identifying the source and transmission agent of the 1854 cholera epidemic. The agent for spread of the disease was found to be the Broad Street public pump.

Today, most people understand that unclean water carries organisms that cause disease. In the mid-nineteenth century, the idea of waterborne disease...
... an unpopular and frightening story. Many people believed that the poor suffered as a result of their shiftlessness and sinful living and deserved retribution in the form of a catastrophic disease.

Even though many people doubted and disapproved of Snow's contaminated water theory, Dr. Snow persuaded the authorities to remove the Broad Street pump handle. This simple act saved the lives of many people and marked the beginning of the end of a tragic situation.

We now know that people can avoid cholera infection by making sure their water supplies are clean. Unfortunately, in developing countries where only 35 percent of the population has access to clean water, cholera epidemics continue.

Modern medicine has produced a vaccine against cholera, but it must be repeated every twelve months because the antibodies are short lived. Too often, though, citizens of impoverished nations do not have the funds to procure the vaccine. Used for centuries in India, the most effective treatment is to provide the victim with copious amounts of liquids and rehydration salts. This method replaces lost body fluids and electrolytes and flushes out the bacteria. After the pathogen has been purged from the body, antibiotics can promote the victim's recovery.

Cholera has been absent from the Western Hemisphere for most of this century. Nonetheless, health officials warn that the United States could experience outbreaks of cholera and other waterborne diseases. As population increases, more waste products are generated, a situation that can strain the abilities of municipalities to maintain plentiful and clean water supplies.

**Procedure**

- **Warm Up**
  Ask students to share mysteries they have read or seen on television. Discuss how detectives solve crimes in general: they identify the crime, determine the method or weapon used, seek and question eyewitnesses, search for clues, etc.

- **The Activity**
  1. Tell students that in 1854 a cholera epidemic broke out in the slums of London. Without mentioning water describe the symptoms of cholera. Tell the class that throughout history this disease has killed millions of people, and that hundreds died in the 1854 epidemic. One man, Dr. John Snow, discovered the source and stopped the epidemic.
  2. Inform the class that they will be given the same information that Dr. Snow possessed and will try to solve the mysterious epidemic.
  3. Divide students into groups and give each group a Broad Street Area Map, a set of Victim Cards, and a marking pen. (If after five minutes, any group has not begun to mark the location of victims on the map, suggest this as a logical strategy.)
  4. Allow the class 20 minutes to fill out the map, study the Victim Cards, and write down all common characteristics.
  5. Ask if any group has located the source of the epidemic. Without telling the groups whether they are right or wrong, ask how they arrived at their conclusions.
  6. One at a time, have different students read the Clue Cards aloud. The cards reveal additional information uncovered by Dr. Snow. As more information is given, students will either confirm or revise their conclusions.

Dr. John Snow is considered to be the father of epidemiology.

**Explain that scientists, particularly epidemiologists, identify, trace, and arrest diseases in the same manner that detectives solve crimes.**
Wrap Up and Action

Have students discuss how water from the pump became contaminated. Tell them that the disease broke out in India prior to the London epidemic. Point out that since ships travel to many countries, they often transport diseases.

Discuss with students why most North Americans need not worry about becoming infected with cholera. Some students who have traveled abroad may have received a cholera vaccination. Why was this necessary?

Have students research how pathogens are prevented from entering their water supplies. Students can make a poster of water diseases that have occurred in their community and how people can avoid contracting them.

Assessment

Have students:

- use investigative skills to trace the source of a waterborne disease (steps 4, 5, and 6).

Extensions

Students can research recent outbreaks of waterborne epidemics in the United States (e.g., Alabama-1991; Milwaukee-1993).

Have students study their community's water resources. Obtain a map of the water system. Visit a water treatment plant. Talk with community water managers and determine the methods and frequency of water testing. How would water suppliers and health department officials manage outbreaks of disease?

By visiting local museums and reading old diaries and newspapers, students may research the history of waterborne diseases and epidemics in their community, region, and/or state. A host of other diseases depend on water-breeding insects to survive. These include malaria, yellow fever, dengue fever, and encephalitis. Malaria alone infects 800 million people annually and over 1 million die each year.

Have students research diseases that directly result from water scarcity—trachoma, leprosy, conjunctivitis, and scabies. Cholera, typhus, infectious hepatitis, diarrhea, and dysentery occur because of poor water quality. Diarrhea and dysentery kill tens of thousands of children around the world each year.

Resources


**Victim Cards**

**THOMAS SUTTERFIELD, ESQUIRE**, lawyer:
- Lives in Hyde Park with wife and two children.
- Only member of his immediate family to contract cholera.
- Won most recent case, defending a Broad Street butcher accused of selling spoiled meat.
- Recovering.

**MATILDA WRIGHT**, wealthy 90-year-old spinster:
- Lived alone (with her three servants) in the family mansion in Marston Court.
- Great-aunt of Thomas Sutterfield.
- Only member of the household to contract cholera.
- Died in a matter of hours.

**TOLLY MARTIN**, 10 years old, professional pickpocket:
- Homeless orphan who slept in doorways around Soho Square.
- Occasionally roamed quite far from Soho, looking for wealthier citizens to rob.
- Died of cholera two days after a fist fight with another boy at Broad Street Square.

**SLYE CHILDREN**, ages 7, 8, and 10:
- Three of the eight children of Gideon and Lucy Slye.
- Gideon Slye is a Broad Street butcher accused of selling spoiled meat.
- Slye family recently moved to Kings Cross from Broad Street and now have indoor plumbing.
- When not in school, three of the Slye children often accompanied their father to work and played on Broad Street Square.
- These three are the only family members to contract cholera.
- Two died; one recovering.

**MUCKY JOHNSON**, 18, delivery boy from Coventry Circle:
- Delivered fresh seafood from Coventry Market to wealthy homes in Marston Court.
- Often stopped to eat lunch and talk to people on Broad Street Square; said the water from the Broad Street pump was the best in the city.
- Died of cholera.

**JOHN AND MARY CANTY**, tinkers from Soho:
- Pulled their cart through wealthy neighborhoods, mending pots and pans for the well-to-do.
- Often stopped to visit John’s ailing mother who lived on Butcher Lane.
- Both died of cholera.

**Twenty-five families on Queens Row:**
- 89 individuals dead; 31 recovering

**Eighteen families on Paddy Lane:**
- 83 individuals dead; 7 recovering

---

Poison Pump
Project WET Curriculum and Activity Guide
Clue Cards

1. The people living around Broad Street are poor. Large families are crowded into one- and two-room apartments. None has indoor plumbing; residents use outdoor toilets and haul their water from the nearest public pump.

2. Thomas Sutterfield fell ill two hours after stopping off to visit his great-aunt "Tilda." He had tea, biscuits, and sausages with his great-aunt. It was a hot day and he took a drink of cool water before leaving.

3. Following his fight with another boy, Tolly Martin washed the blood off his mouth at the Broad Street pump and ran off with a sausage stolen from the butcher shop.

4. Matilda Wright refused to drink water from the faucets in her home. She would only drink the sweet-tasting water that her gardener hauled from the Broad Street pump.

5. Ausley and Marthy Brown and their two children are the only people on Ely Street who haven't gotten cholera. Marthy's family lives in Soho. The Browns haul their water from the Soho pump, which allows them to visit their relatives.
CREATIVE JOURNALING

A JOURNAL IS A PLACE FOR THINKING AND FEELING. IT HELPS YOU REMEMBER THE TIME, PLACE, AND EVENTS YOU ARE EXPERIENCING.

EACH PERSON SETS THE RULES FOR THEIR OWN JOURNAL. YOU SHOULD NOT BE CONCERNED ABOUT DOING IT "RIGHT". THIS IS YOUR JOURNAL; IT SHOULD BE A REFLECTION OF WHO YOU ARE AND HOW YOU SEE THINGS.

YOU MAY NOT ALWAYS WISH TO WRITE THINGS IN YOUR JOURNAL. PERHAPS YOU WANT TO DRAW, PAINT, STAMP, OR SKETCH. OR MAYBE YOU WANT TO WRITE SIDEWAYS, UPSIDE DOWN, IN FREEFORM LINES, IN PATTERNS LIKE TRIANGLES AND CIRCLES, HOLDING YOUR JOURNAL IN DIFFERENT POSITIONS FROM TIME TO TIME.

SOME SUPPLIES YOU MIGHT EVENTUALLY USE FOR YOUR JOURNAL ARE: COLORED PENCILS, WATERCOLORS, TAPE, CLEAR ADHESIVE PAPER, STAMPS AND INK PADS, STICKERS, PAPER PUNCH, RIBBONS, STENCILS, PINE CONES, LEAVES, BARK, POSTCARDS, NEWSPAPER CLIPPINGS, MAGAZINES, ETC.

HAPPY JOURNALING !!!!!!
Adopt a Lakes T-Shirt

1. Creatively design on paper your adopt a lake T-Shirt design.
   
a. Indicate your name.
   b. Indicate your adopted lakes name.
   c. Indicate your committee or officer title.
   d. Draw a Logo or picture of lake or wildlife on lake or recreational activity.
   f. Indicate color and design location.
   e. Have design approved by teachers.
   f. Use fabric pens to create your design.
Guidance Lakes Project

Ms. Dicka
1st Grade Water Safety

Swim with a Buddy in a Supervised Area

1. Poster
2. Discussion
3. What do they Supervise overhead
4. The Case of Missing Supervisor Worksheet
5. Which are safe overhead
6. What does a lifeguard Need worksheet
7. Your boat is Sinking Game
8. PFD Relay
Grade 2 Water Safety

Be Cool, Follow the Rule

1. Poster

2. Discussion

3. Show you Know overhead

4. Pool Patrol overhead

5. Dangerous Beach overhead

6. What should you do situations in groups

7. How close is the lightening overhead

8. Review
3rd Grade Water Safety

Look before you leap

1. Poster
2. Discussion questions
3. Check it Out overhead
4. Better safe than sorry overhead
5. Crossword puzzle
6. Review
4th Grade Water Safety

Think so You Don't Sink

1. Poster

2. Discussion

3. Brainstorm why people panic, what to do, how to prevent

4. Self Rescue quiz

5. Don't Panic worksheet in groups, present

6. What should you do as a review
5th Grade Water Safety

Reach and Throw, Don't Go

1. Poster

2. Discussion Questions

2. Reach out and Help worksheet, fill out, discuss

3. Do collage, Find a Float

4. Word Search as groups

1. Where there is Ice There is Water

2. Don't go situations by groups, discuss

1. Make a Heaving Line

2. Make a Safety Post

3. Review
6th Grade Water Safety

Don't Just Pack it, Wear Your Jacket

1. Poster
2. Pre test, discussion
3. Overhead on currents and dams
4. PFD's word search
5. Review
7th Grade Water Safety

Cold Can Kill

1. Poster

2. Discussion and questions on hypothermia

3. Group discussion of scenarios, report

4. Ice rescue

5. In groups do worksheets, Cold Can Kill, report

6. Review
8th Grade Water Safety

Learn About Boating Before You go Boating

1. Verbal pretest, Discussion

2. Overhead on hypothermia, discussion

3. Overhead on Emergency Action Principals, discuss

4. Word Scramble
Computers Lakes
Project
Ms. Johnson
Computers

Grade 5- Fashion A Fish

We will do the creation of fish using the computer program Kid Pix.

Grade 6- Easy Street

Instead of doing calculations on paper we will use Claris Works spreadsheet to make a similar chart as found in the exercise.

Grade 7- Wet Vacation

Brochures will be created on the computer, students will be able to use the scanner to add pictures to illustrations.
FASHION A FISH

Objectives

For Younger Students Students will be able to classify fish according to body shape and coloration.

For Older Students Students will be able to: 1) describe adaptations of fish to their environments; 2) describe how adaptations can help fish survive in their habitat; and 3) interpret the importance of adaptations in animals.

Method

Students design a variety of fish adapted for various aquatic habitats.

Background

Aquatic animals are the product of countless adaptations over long periods of time. These adaptations, for the most part, are features that increase the animals' likelihood of surviving in their habitat.

When a habitat changes, either slowly or catastrophically, the species of animals with adaptations that allow them many options are the ones most likely to survive. Some species have adapted to such a narrow range of habitat conditions that they are extremely vulnerable to change. They are over-specialized and are usually more susceptible than other animals to death or extinction.

In this activity, the students design a kind of fish. They choose the adaptations that their fish will have. Each choice they make would actually take countless years to develop. As these adaptations become part of the fish's design, the fish becomes better suited to the habitat in which it lives. Because of the variety of conditions within each habitat, many different fish can live together and flourish. Some adaptations of fish are shown in the table that follows.

Age: Grades K–12
Subjects: Science, Art
Skills: analysis, application, classification, communication, description, discussion, drawing, identification, inference, invention, media construction, public speaking, reporting, small group work
Duration: two 30-45 minute periods for older students; one or two 20-minute periods for younger students
Group Size: any; groups of four students each
Setting: indoors or outdoors
Key Vocabulary: adaptation, coloration, camouflage, habitat
## Adaptation Advantage

### Mouth

<table>
<thead>
<tr>
<th>Mouth</th>
<th>Advantage</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>sucker shaped mouth</td>
<td>feeds on very small plants and animals</td>
<td>sucker, carp</td>
</tr>
<tr>
<td>elongate upper jaw</td>
<td>feeds on prey it looks down on</td>
<td>spoonbill, sturgeon</td>
</tr>
<tr>
<td>elongate lower jaw</td>
<td>feeds on prey it sees above.</td>
<td>barracuda, snook</td>
</tr>
<tr>
<td>duckbill jaws</td>
<td>grasps prey</td>
<td>muskellunge, pike</td>
</tr>
<tr>
<td>extremely large jaws</td>
<td>surrounds prey</td>
<td>bass, grouper</td>
</tr>
</tbody>
</table>

### Body Shape

<table>
<thead>
<tr>
<th>Body Shape</th>
<th>Advantage</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>torpedo shape</td>
<td>fast moving</td>
<td>trout, salmon, tuna</td>
</tr>
<tr>
<td>flat bellied</td>
<td>bottom feeder</td>
<td>catfish, sucker</td>
</tr>
<tr>
<td>vertical disk</td>
<td>feeds above or below</td>
<td>butterfish, bluegill</td>
</tr>
<tr>
<td>horizontal disk</td>
<td>bottom dweller</td>
<td>flounder, halibut</td>
</tr>
<tr>
<td>hump backed</td>
<td>stable in fast moving water</td>
<td>sockeye salmon, chub, razorback sucker, coho salmon</td>
</tr>
</tbody>
</table>

### Coloration

<table>
<thead>
<tr>
<th>Coloration</th>
<th>Advantage</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>light colored belly</td>
<td>predators have difficulty seeing it from below</td>
<td>most minnows, perch, tuna, mackerel</td>
</tr>
<tr>
<td>dark upperside</td>
<td>predators have difficulty seeing it from above</td>
<td>bluegill, crappie, barracuda, flounder</td>
</tr>
<tr>
<td>vertical stripes</td>
<td>can hide in vegetation</td>
<td>muskellunge, pickerel, bluegill</td>
</tr>
<tr>
<td>horizontal stripes</td>
<td>can hide in vegetation</td>
<td>yellow and white bass, snook</td>
</tr>
<tr>
<td>mottled coloration</td>
<td>can hide in rocks and on bottom</td>
<td>trout, grouper, rockbass, hogsucker</td>
</tr>
</tbody>
</table>

### Reproduction

<table>
<thead>
<tr>
<th>Reproduction</th>
<th>Advantage</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>eggs deposited in bottom</td>
<td>hidden from predators</td>
<td>trout, salmon, most minnows</td>
</tr>
<tr>
<td>eggs deposited in nests</td>
<td>protected by adults</td>
<td>bass, stickleback</td>
</tr>
<tr>
<td>floating eggs</td>
<td>dispersed in high numbers</td>
<td>striped bass</td>
</tr>
<tr>
<td>eggs attached to vegetation</td>
<td>stable until hatching</td>
<td>perch, northern pike, muskellunge, carp</td>
</tr>
<tr>
<td>live bearers</td>
<td>high survival rate</td>
<td>guppies</td>
</tr>
</tbody>
</table>
The major purpose of this activity is for students to investigate the concept of adaptation in fish.

Materials
five cards for each adaptation from the masters provided: mouth, body shape, coloration, reproduction; art materials: paper (NOTE: Body shape and coloration are the only cards needed for younger students.)

Procedure
1. Assign students to find a picture or make a drawing of a kind of animal that has a special adaptation—for example, long necks on giraffes for reaching high vegetation to eat, large eyes set into feathered cones in the heads of owls to gather light for night hunting.
2. Conduct a class discussion on the value of different kinds of adaptations to animals. As a part of the discussion, ask the students to identify different kinds of adaptations in humans.
3. Pool all of the students' pictures or drawings of adaptations. Categorize them into the following groups:
   • protective coloration and camouflage
   • body shape/form
   • mouth type/feeding behavior
   • reproduction/behavior
   • other (one or more categories the students establish, in addition to the four above that will be needed for the rest of the activity)
NOTE FOR TEACHERS OF YOUNGER STUDENTS: The first three steps in the Procedures are optional for younger students. The remaining steps need only include the adaptation cards for body shape and coloration; reproduction and mouth cards are optional for younger students.
4. Divide the adaptation cards into five groups of four cards each, one each of coloration, mouth type, body shape and reproduction.
5. Pass one complete set of cards to each group of students. There might be five groups, with four to six students in each group. If the class size is larger than about 30 students, make additional sets of adaptation cards.
6. Ask the students to "fashion a fish" from the characteristics of the cards in the set they receive. Each group should:
   • create an artform that represents their fish
   • name the fish
   • describe and draw the habitat for their fish
7. Ask each group to report to the rest of the class about the attributes of the fish they have designed, including identifying and describing its adaptations. Ask the students to describe how this kind of fish is adapted for survival.
8. FOR OLDER STUDENTS: Ask the students to make inferences about the importance of adaptations in fish and other animals.

Extensions
1. Take an adaptation card from any category and find real fish with that adaptation! NOTE: A collection of books about fish is useful. Do not be as concerned about reading level as much as profuse illustrations.
2. Look at examples of actual fish. Describe the fish's "lifestyle" and speculate on its habitat by examining its coloration, body shape and mouth.

Evaluation
For Younger Students
Circle the fish with vertical stripes, the one that can best hide in plants. Circle the fish with the horizontal, flat shape. Circle the fish that would be difficult to see from above. (Use the masters provided to give the students drawings of fish.)

For Older Students
Name two fish adaptations in each of the following categories: mouth, shape, coloration, reproduction. Then describe the advantages of each of these adaptations to the survival of the fish in their habitats.
Invent an animal that would be adapted to live on your school grounds. Consider mouth, shape, coloration, reproduction, food, shelter, and other characteristics. Draw and describe your animal.
<table>
<thead>
<tr>
<th>Coloration</th>
<th>Reproduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Colored Belly (Albacore)</td>
<td>Eggs Deposited in Nests (Blue Gill)</td>
</tr>
<tr>
<td>Dark Upperside (Catfish)</td>
<td>Eggs Deposited on Vegetation (Yellow Perch)</td>
</tr>
<tr>
<td>Mottled (Crappie)</td>
<td>Eggs Deposited on Bottom (Trout)</td>
</tr>
<tr>
<td>Vertical Stripes (Croaker)</td>
<td>Free Floating Eggs (Striped Bass)</td>
</tr>
<tr>
<td>Horizontal Stripes (Yellow Bass)</td>
<td>Live Birth (Gambusia)</td>
</tr>
<tr>
<td>Shape</td>
<td>Mouth/Feeding</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Flat Bellied (Catfish)</td>
<td>[Image of Catfish]</td>
</tr>
<tr>
<td>Torpedo Shape (Tuna)</td>
<td>Extremely Large Jaws (Grouper)</td>
</tr>
<tr>
<td>Horizontal Disc (Halibut)</td>
<td>Elongate Lower Jaw (Barracuda)</td>
</tr>
<tr>
<td>Vertical Disc (Butterfish)</td>
<td>Duckbill Jaws (Muskellunge)</td>
</tr>
<tr>
<td>Humpbacked (Sockeye)</td>
<td>Elongate Upper Jaw (Cod)</td>
</tr>
<tr>
<td>[Image of Catfish]</td>
<td>[Image of Sucker]</td>
</tr>
<tr>
<td>[Image of Tuna]</td>
<td>[Image of Grouper]</td>
</tr>
<tr>
<td>[Image of Halibut]</td>
<td>[Image of Barracuda]</td>
</tr>
<tr>
<td>[Image of Butterfly]</td>
<td>[Image of Muskellunge]</td>
</tr>
<tr>
<td>[Image of Sockeye]</td>
<td>[Image of Cod]</td>
</tr>
</tbody>
</table>
You use about 50 to 100 gallons (190 to 280 liters) of water a day... how much did your great-great-grandparents use?

Summary
Students compare the quantities of water used by a contemporary family to one in the late 1800s, and investigate changes in water use habits.

Objectives
Students will:
• compare and contrast contemporary and historical water uses.
• identify water conservation strategies.

Materials
• Copies of Drought Days Simulation
• Copies of Water Use Calculations Worksheet
• Calculators
• Copies of Cool Clear Water and The Bath

Making Connections
People often use water without thinking about the implications. Comparing present access to water to that of the late 1800s, helps students appreciate how convenience can lead to increased use of a resource.

Background
Too often, we take water for granted. It easily flows from taps, spurts from the ends of garden hoses, flushes down toilets. Because water is convenient, it is also easy to think of water as plentiful, almost limitless. This was not always so. In North America less than 100 years ago, many people had to pump and haul their own water for washing, cooking, bathing, and other needs. A dependable well or spring was a critical factor in choosing a homestead, and an inadequate supply of water caused daily hardship. In many parts of the world, including some regions of North America, hauling water remains a common practice.

Imagine how differently we would feel about water if we had to pump and carry it by hand. Imagine, also, the effects of drought or pollution on the life-giving supply we too-easily think of as infinite

Procedure
▼ Warm Up
Ask students to guess how much water their families use every day. Have them gather and compare estimates from individual family members. If necessary, review math skills needed to complete the Water Use Calculations Worksheet.

▼ The Activity
Part I
1. Ask students to work through the Drought Days Simulations, starting with the present day, then moving to the 1890 family, and record their computations on the Water Use Calculations Worksheet.
2. Discuss results. Do students think the average household in 1890 would consume 200 gallons (760 liters) of water per day (not including water for livestock), as many households do today? Ask students to list several reasons why they would or would not

Part II
1. Give the class time to read the short selections, Cool Clear Water and The Bath.
2. Discuss the following questions:
   • Why do students think homesteaders recycled so much of their water?
   • How would students feel if they had to haul water to their house every day?

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instead of simply turning on a
faucet.
Do students know that in some
places in the world people still
have to carry water to their
homes?
What lifestyle impact do students
think hauling water has on people
who live in less-developed parts of
the world?
Do students think they would
alter the amount of water they use
every day if they had to haul it
themselves?

Wrap Up and Action
Ask students to estimate again how
much water their families use per
day and compare with their origi-
nal guesses. Have the class brain-
storm conservation ideas. Encour-
ge students to discuss water
conservation at home. Have them
talk with grandparents or other
older relatives about times when
they had to haul water or do
without indoor plumbing.

Assessment
Have students:
• compare and contrast water use
  habits from the 1890s and the
  present (Part I, steps 1 and 2).
• provide reasons why a modern
  family might use more water than
  one in the 1890s (Part I, step 2).
• analyze a story about water use in
  the past to evaluate their own use
  of water (Part II, step 2).
• develop strategies for water
  conservation (Wrap Up).

Extensions
Calculate what students’ monthly
water bills would be without any
conservation measures, then figure
the savings after changes are insti-
tuted (using their figures from the
calculation worksheet).

Ask students to get a copy of their
families’ last water bill, then institute
several water conservation measures
with the help of their parents. See if
these changes are reflected in the
next bill.

Have students research their family
histories to determine when their
ancestors stopped hauling water and
installed indoor running water.

Visit a local retirement home to
interview residents about their water
use experiences before modern
plumbing. Students can tape their
interviews.

Bring in a local expert from the water
commission or city water board to
discuss local and regional water use
problems.

Resources
Cramer, Marian. 1984. Lantern
Glow. Contact: Marian Cramer, RR 1,
Box 147, Bryant, SD 57221.

Kesselheim, Alan S., and The Water-
course and National Project WET
Staff. 1993. The Liquid Treasure Water
History Trunk: Learning From the Past.
Bozeman, Mont.: The Watercourse.

Wilder, Laura Ingalls. 1935. Little
House on the Prairie (and other
Row.
1890 Family

This scenario is based on a homesteading household in the American West. You are a family of eight persons: two adults and six children (a 9-month-old boy, a 3-year-old girl, a 6-year-old boy, an 8-year-old boy, a 10-year-old girl, and a 15-year-old girl). You live in a wooden house with three rooms.

You get your water from a well located near the barn, 150 feet (45 m) from your house. Your dad recently dug a pit for an outhouse. Your family has five horses (consuming 12 gallons [45.6 l] of water per horse per day), two hogs (3 gallons [11.4 l] per hog per day), and four cows (12 gallons [45.6 l] per cow per day). Also, you rely on a garden for most of your family's vegetables.

Problem 1: You have noticed that the well is unable to meet your family's water needs during prolonged periods of hot and dry weather. If dry weather conditions persist, you will have to decrease your water consumption or take some other action.

On the Water Use Calculations Worksheet, list the ways your family uses water. Remember, there was no running water or electricity in 1890. In addition, water was often recycled for several purposes. For example, bath and dish tub rinse water were used to water the garden.

Problem 2: How much water do you think your family of eight would consume in one day?

How much of this total would be consumed by livestock?

Why do you think the well was dug closer to the barn than to the house?

If the family had to decrease water consumption, how would they do it? List your ideas on the worksheet.

GALLONS OF WATER CONSUMED BY COMMON USES

<table>
<thead>
<tr>
<th>Water Use</th>
<th>Gallons</th>
<th>Before Running Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toilet (outhouse)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wash basin</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td>Washing dishes by hand</td>
<td>2</td>
<td>7.6</td>
</tr>
<tr>
<td>Drinking water (see present-day common uses)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washing clothes by hand</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>Watering the garden</td>
<td>10-20</td>
<td>38.78</td>
</tr>
<tr>
<td>Bathtub</td>
<td>30</td>
<td>114</td>
</tr>
</tbody>
</table>

WATER USE CALCULATIONS WORKSHEET — Past

<table>
<thead>
<tr>
<th>Water Use</th>
<th>Gals.</th>
<th>1st Change</th>
<th>Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td>TOTAL USE</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Drought Days Simulation

Present

Consider the following two problems and perform calculations:

Problem 1: The area in which you live is beginning to experience a water shortage because of persistent hot, dry weather. Your water department has requested that each household voluntarily reduce water consumption by 20 percent. Decide how you will deal with the request. List the ways your family commonly uses water and determine quantities. Identify five changes you can make in your water use habits. Record your computations on the Water Use Calculations Worksheet.

Problem 2: Two weeks have passed. Hot and dry conditions continue to plague your area. The water department has asked each household to decrease water consumption another 20 percent. On the Water Use Calculations Worksheet, list an additional five changes you can make and figure the result.

GALLONS OF WATER CONSUMED BY COMMON USES

<table>
<thead>
<tr>
<th>Water Use</th>
<th>Gallons</th>
<th>Liters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brushing teeth (water running)</td>
<td>2</td>
<td>7.6</td>
</tr>
<tr>
<td>Drinking water (1 quart/ 50 lbs. [1 l/22.5 k] body weight/day)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flushing toilet</td>
<td>5-7</td>
<td>19-26.6</td>
</tr>
<tr>
<td>Dishwasher</td>
<td>10</td>
<td>38</td>
</tr>
<tr>
<td>Shaving (water running)</td>
<td>20</td>
<td>76</td>
</tr>
<tr>
<td>Leaky faucet (per day)</td>
<td>25-30</td>
<td>95-114</td>
</tr>
<tr>
<td>Washing dishes by hand (water running)</td>
<td>30</td>
<td>114</td>
</tr>
<tr>
<td>Bath</td>
<td>35</td>
<td>133</td>
</tr>
<tr>
<td>Ten-minute shower (without water-saving head)</td>
<td>25-50</td>
<td>95-190</td>
</tr>
<tr>
<td>Washing machine (large load)</td>
<td>60</td>
<td>228</td>
</tr>
<tr>
<td>Watering lawn (10 minutes)</td>
<td>75</td>
<td>285</td>
</tr>
<tr>
<td>Washing car (hose running)</td>
<td>180</td>
<td>684</td>
</tr>
</tbody>
</table>

WATER USE CALCULATIONS WORKSHEET — Present

<table>
<thead>
<tr>
<th>Water Use</th>
<th>Gals.</th>
<th>1st Change</th>
<th>Saved</th>
<th>2nd Change</th>
<th>Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL USE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cool Clear Water

Kerwump-squeak, kerwump-squeak. The cold water gushed from the pump, kerwump-squeak. Was any drink ever as sweet as that you caught in an improvised hand-cup dipper and sucked up noisy?

Towering above the well was the windmill, sentinel of the prairie. Kicked into gear, it ran day and night: lugged drippingly beside Dad who swung along while the pump would be pressed into service. It was a feeling of sheer power to stand by the fence alone, pouring water into the hog trough as the squealing porkers fought noisily for a drink. The livestock you family needed you! The importance wore a bit thin as you made possibly ten trips. It was an incentive to keep trying to haul two pails at one time and cut the trips to five.

The water and water tank were in the best possible position it might be possible to arrange fences so that at least two yards had access to it.

It was the windmill, sentinel of the prairie. Kicked into gear, she whipped her tail away from the wind of the prairie. Kicked into gear, she whipped her tail away from the wind of the prairie. If by chance a small bucket dipped full from the tank and sucked up noisily, you caught in an improvised hand-cup, water gushed from the pump. Was any drink for a thirsty child more sweet than that? You stood and scrubbed; some used a wash basin, it was set of a matter of tradition and using what you had.

The kitchen was hot with the stove really fired up. Ma would come in quietly wearing her night clothes for each member of the family. With a pail of cold water at hand, the baths were moved up so the baths could be done and be ready for bedtime.

There might be a bottle of lotion set on the table to smooth on elbows and rough knees. Pa, the last one in the bath, took care of emptying the water into slop pails. He would wipe out the tub and hang it on the back-porch wall by the boiler.

There used to be a round rinse-tub from washday in which water gushed from the pump. Was any drink as that you caught in an improvised hand-cup, water gushed from the pump. Was any drink for a thirsty child more sweet than that?

The livestock you family needed you! The importance wore a bit thin as you made possibly ten trips. It was an incentive to keep trying to haul two pails at one time and cut the trips to five.

The water tank, because of its importance and danger, had an unofficial set of rules for children. For toddlers...

Stay away from the tank. You may fall in and drown...

For middle sized children...

"Yes, you may sail ships on it but take them out when you are done and DON'T stir up the water. The horses will be in from the field at noon and need a good, fresh drink."

If by chance a few days of calm descended on the farm hand pump would be pressed into service. Farm boys with an inclination for arithmetic could tell how many strokes it took to fill the tank.

Farm children were and are notorious dreamers of big dreams. Pumping water was a chore that required almost no concentration and visions of wonder flashed through active minds as they pumped away. Not one of the most accomplished, wildest dreamers envisioned a farm where water came from the pumps and a water system with mains crossing the countryside bringing water to every farm.

If such notions had been proposed to a B.E. (Before Electricity) farm kid he would surely have laughed and answered...

"Ya, come with me; I'll race you to the foot of the rainbow."

—Marian Cramer, Lantern Clow

The Bath

Ma took down the wash-boiler from the back-porch and moved it to the front-yard. She announced it was three o'clock on Saturday afternoon and that she was going to have a wash day. The first four pails of water for the boiler were fetched by her chief water-hauler, a boy about ten years old.

It was the windmill, sentinel of the prairie. Kicked into gear, it ran day and night: lugged drippingly beside Dad who swung along while the pump would be pressed into service. It was a feeling of sheer power to stand by the fence alone, pouring water into the hog trough as the squealing porkers fought noisily for a drink. The livestock you family needed you! The importance wore a bit thin as you made possibly ten trips. It was an incentive to keep trying to haul two pails at one time and cut the trips to five.

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Wet Vacation

Do you take a parka when you travel to Florida? Do you pack a beach towel when you visit Nebraska in December?

Summary
After plotting annual precipitation and average temperatures, and researching climatic conditions of places around the country, students design attractive travel brochures.

Objectives
Students will:
• identify factors that affect temperature and precipitation patterns.
• analyze how weather conditions influence tourism.

Materials
• Map of the United States
• Copies of Temperature and Precipitation Statistics for Cities Across the United States
• Samples of travel brochures
• Atlases, reference manuals, encyclopedias, etc.
• Copies of Tips for Designing a Brochure for a Wet Vacation

Making Connections
Every year thousands of people plan trips. Students are familiar with popular vacation spots, but may not know why people prefer one area over another. Often weather is the primary criterion for choosing a destination. By investigating seasons and topographic features, students learn how unique weather patterns create attractive vacation sites.

Background
A region’s climate is based on long-term weather conditions. Temperature ranges and amounts of precipitation characterize climates. Location on Earth’s surface (latitude—distance from the equator) and circulation of planetary winds mainly determine an area’s temperature and precipitation.

The United States is located within a temperate climate region. Temperate climates have definite winter and summer seasons (compared to polar regions that experience no true summer and tropical regions where winter never occurs).

Even though the United States is classified as having a temperate climate, arctic tundra, deserts, high mountains, rain forests, and subtropical conditions are found within the country. In addition, latitude and planetary winds, other factors influence precipitation and temperature. These include elevation, proximity to large bodies of water, and nearness to mountain ranges. These conditions can alter or even override typical temperate climate patterns and create deserts and tropical regions.

For example, the weather on one side of a mountain range often differs from that on the other side. As wind carries moisture over a mountain range and the air mass rises, it cools and loses its ability to hold water. By the time air passes to the other side, it contains little moisture.

Lands near oceans and large freshwater lakes are subject to milder weather patterns. This is because water takes longer than air to gain or lose heat energy. After the sun goes down, heat slowly escaping from water will continue to warm the air.

Weather patterns often influence where people live and vacation. Some people prefer cool, dry weather, while others enjoy basking in the sun. People also consider the amount of precipitation. They want to avoid floods and drought but they enjoy rafting down rivers churning with whitewater. In winter,
Deep snowfall promises an exciting ski season.

Travel agencies keep in mind the likes and dislikes of people when creating brochures. Knowing the weather patterns of a region helps them design fun, comfortable vacations for travelers.

Procedure

▼ Warm Up
Point out locations on a map of the United States and have students describe what they think the weather patterns (temperature and precipitation) of an area are. Have students list factors that they think contribute to an area’s weather.

▼ The Activity

Part I

1. Provide students with a copy of Temperature and Precipitation Statistics for Cities Across the United States. Tell students to locate the cities on a map of the United States. When they are done, three to four cities should be plotted for each state.

2. Have students look for similarities and differences in temperatures and precipitation within states and regions of the country. Is the information consistent for the areas? Do some states have cities that differ greatly from each other in average temperatures and precipitation? Have students look for expected patterns of temperature and precipitation ranges and note where the information differs from their expectations.

Part II

1. Divide the class into groups; have each group select a state (or portion of a state) and identify the seasons and weather patterns for the area. Have them research if and how latitude, elevation, large bodies of water, ocean and air currents, and mountains affect the area’s temperature and precipitation. For organization, they may want to arrange these influences into a table. Sources for research include atlases, encyclopedias, Geography and Earth Science texts, reference books about the region, etc. They may want to contact the tourist department of the state to request information.

2. Have students plan a wet vacation to the area. Explain that a wet vacation focuses on how water determines the best times for travel or the most appealing quality of the region (e.g., dry deserts are good for allergy sufferers; spring thaws create river rapids for whitewater enthusiasts).

3. Tell students they are to design a travel brochure or guide for their study area. Provide them with Tips for Designing a Brochure for a Wet Vacation.

4. Involve students in establishing a grading criteria for the brochures. This could consist of a list of the recommended components (e.g., accurate information, persuasive language, suggested activities) followed by a rating scale.

▼ Wrap Up and Action

Have students evaluate their own and/or other groups’ travel brochures using the grading criteria they developed. Ask them to summarize the factors that contribute to an area’s temperature and precipitation. Other classes or family members can read the brochures to learn about different parts of the country and to see if they would be interested in a wet vacation.

Assessment

Have students:
• identify factors that influence a region’s temperature and precipitation (Part II, step 1).
• design a travel brochure that highlights the attractive water-related components of a location (Part II, step 2).
• evaluate travel brochures developed in class (Part II, step 4 and Wrap Up).

Extensions

Establish a travel agency in the classroom. Display all the students’ brochures and a large map. Have train, plane, and cruise ship schedules available. Ask students to choose a brochure (not their own) and determine how they would travel to that destination. What would they pack? How long would the trip take? How much would it cost?

Students may want to explore water’s resistance to temperature change. Have the students place two cups in a refrigerator: one filled with warm water, the other empty. Place a thermometer in the water and another thermometer in the empty cup. Compare the change in temperature of the water to that of the air over a 30-minute period. Leave the cups in the refrigerator overnight and remove them in the morning. Have students once again compare changes.

Resources


Tips for Designing a Brochure for a Wet Vacation

**Content of the brochure**

The main portion of the brochure should describe the temperature and precipitation range of the area, listing factors that contribute to its weather patterns.

Other information to include:

- What seasons does the area experience? How wet are the spring months and how much snow does it receive in winter?
- Should weather precautions be considered, specifically, water-related disasters (e.g., floods, hailstorms, drought)?
- What water-related recreational activities are available (e.g., boating, skiing, scenic water views).
- When would be the best time of year to visit the area and why?

**Design considerations**

1. Pay attention to the size of your brochure. A brochure is intended to be a “quick read.” It should fold in an interesting but uncomplicated way, so that the reader can easily follow the flow of the text.

2. The cover of the brochure should indicate the subject of the document. Usually the front cover contains a title, a logo, and an illustration or photograph. If possible, use color; generally, color has more impact than black-and-white.

3. Within the text of the brochure, highlight main points by using a larger, or bolder, type. Details of the main points should be in smaller type.

4. Use photographs or illustrations to complement the text. We live in a visual world.

5. Professional designers use the term FAB (features and benefits). In your brochure, tell readers the features of your particular wet vacation and how these features benefit them.

6. In a brochure, you don’t have much time to capture your audience’s attention, so make the design appealing. Use color and don’t clutter. That is, leave plenty of white or negative space.
Technical Education Lakes Project

Ms. Watras
Technical Education Fall Lakes Activities

5th Grade- Create a bulletin board with a Motto about lakes. Include the name of the adopted lake. Use drafting equipment to make letters and fish or scenery. You will be given a grade on your contribution to the bulletin board.

5th, 6th, 7th- "Lakes Week"
Objective: To develop an understanding of the depth and shape of the adopted lake and to explore a lake issue.

Activity: Students will use a bathymetric map of their lake to create a 3-D Model. This model will be made of Styrofoam or of card board and will then be molded with plaster of paris. On you model you will show the following things.

Depth indicated on each level 10 points
A frame around the edge 15 points
Neatness and accuracy 15 points
Use of natural objects to model trees, shrubs, piers, houses, resorts etc.
(Use your survey map) 20 points
Name of Lake/Grade/St. Names 10 points
Lake use issue described (typed) 10 points
Lake use issue demonstrated 10 points
Use of color and symbols 10 points

Total points 100 points

Comments:
Technical Education Fall Lakes Activities

Students Name ______________________

5th, 6th, 7th - “Lakes Week”

Objective: To develop an understanding of the depth and shape of the adopted lake and to explore a lake issue.

Activity: Students will use a bathymetric map of their lake to create a 3-D Model. This model will be made of Styrofoam or of card board and will then be molded with plaster of paris. On your model you will show the following things.

Depth indicated on each level 10 points ______
A frame around the edge 20 points ______
Neatness and accuracy 20 points ______

Total points 50 points ______
Comments:
On the Lake: Thursday or Friday

Using the bathymetric map indicate where houses, docks, wetlands, resorts, beaver lodges, fish cribs, water plant beds or any other interesting items are. You will then use your map to finish your model. Make your houses, docks resorts as close to scale as possible. They may be cut from wood or you may collect natural items.

Decide on a topic to illustrate using your 3-D model and type at least a one page paper describing your topic. Some topics to consider, recreational use, development, water quality, history, planning for natural and human compatible uses, non-point source pollution, watersheds etc.

You will be graded on your type written paper and on how you illustrate your topic on the 3-D Model.

Grade On Topic Paper

Names, Grade, Topic Centered on top of page 10pnts
Introduction-one paragraph 10pnts
Background information/project description 20pnts
Conclusion/Solutions 10pnts

Total: 50pnts
Comments:

Grade on Illustration of Topic on 3-D Model

Ability to show to scale the points of interest on your lake. 20pnts
Creative use of objects to show points of interest. 20pnts
Labels neatly typed and use of color 10pnts

Total 50pnts
Comments:
Appendix F

Schedules and Curriculum for Outdoor Portion of Fall Lakes Week
5th Grade Lakes Project
Day 1
Sept. 21

9:00-9:30 Pre-Lake Survey
What do students actually know about lakes?

Divide students into three groups and have students rotate from one session to
the next. (1 hour Each) 9:30, 10:30, 11:30.

Session A: Water Clarity
Pontoon boat around lake, check for water clarity and
test for PH in 4 spots. Graph current results and past results. (Dan)

Session B: Survey the edge of the lake for shoreline
development and indicate on their map where development is
occurring, where wildlife is located and where other
interesting formations are located. (Jan)

Session C: Journaling:
Student's find a quiet spot to water-color a picture of the lake and then
write one page or more on their thoughts about the lake. Search for water
critters and draw 4 in your journal.
Share with the rest of the group. (Deb)

12:30-1:30 Shore Lunch
Ultimate Lake (People vs. Nature)

1:30-2:30 Forming a Lake Association
Choose board members and officers.
Form lake interest committees. (Water Quality, Recreation, fisheries,
History, Record Keeping, Shoreline Alterations. 5 to a committee)

3:30-4:30 Tent Set-up
4:30-5:30 Build fires, cook supper
5:30-6:30 Dinner
6:30-7:00 Clean-up
7:00-7:30 Capture the flag
8:00-10:00 Evening Program "Brian Pierce" Songs and Stories
5th and 6th Grade Lakes Project
Day 2
9/22/95

7:00-9:00: Breakfast/Pack up clothes and sleeping bags.

9:00, 10:00, 11:00: Students rotate from one session to the next on an hourly basis.

Session A: Adopt-A-Lake T-Shirt fabric painting of your Lake Association. Students bring their own shirt. Write name of committee or Office held on shirt. Decorate with Lake symbols. (Deb/Ruth/)

Session B: Fishing/Canoeing skills (Dan/Sam/Scott/Lynn S.)

Session C: Orienteering (Jan/Marcia)

12:00-1:00 Shore Lunch and Pack up tents

1:00-2:00 Use or Abuse Lake Activity
5th Grade- Jan/Dan/Deb/Scott
6th Grade- Marcia/Sam/Lynn

2:00-3:00 Large Group- Post Lake Survey
Project "Wet" Games or Help with Color-Rama. (All Staff)
5th Grade Tent Groups

<table>
<thead>
<tr>
<th>4 Person</th>
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<tbody>
<tr>
<td>Liz E.</td>
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<td>Kristin H.</td>
<td>Bill Bryk</td>
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<td>Katherine K.</td>
<td>Mark Bjork</td>
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<td>Need Tent</td>
<td>Lorence Colin</td>
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<tr>
<th>Need Tent Partners</th>
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<tr>
<td>Rachel</td>
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<td>Becky Winters</td>
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<td>Kathyrn B.</td>
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<td>Matt H.</td>
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<td>Joel Schroeter</td>
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<td>Randy M</td>
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<td>Brandon Corbin</td>
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6th Grade Lakes Project
Day 1
Sept. 21

9:00-9:30  Pre-Lake Survey, etc.
What do students actually know about lakes?

Divide students into four groups and have students rotate from one session to the next. (1 hour each 9:30, 10:30, 11:30, and 1:30)

Session A:  Water Clarity
Pontoon boat around lake, check for water clarity and test for PH in 4 spots. Graph results. Survey the edge of the lake for shoreline development and indicate on their map where development is occurring, where wildlife is located and where other interesting formations are located. Sam Johnson, Bob Glashagel, and others

Session B:  Critter Catching
Wading along shore line, look for aquatic animals, sketch in journals. Scott Peterson

Session C:  Journaling and Art Project
Students find a quiet spot to water-color a picture of the lake and then write one page or more on their thoughts about the lake. When finished, begin collage with natural materials. Ruth Fairbanks

Session D:  Exploration of Area, Knot Tying
Identification of trees, shrubs, flowers, etc. in this habitat. Sketch in journals, list, discuss roles these play in the lake's health. Walk down Little Star Lake road to Smith's property. Marcia Glashagel

12:30-1:30  Shore Lunch
Ultimate Lake (People vs. Nature)

1:30-2:30  Last session
12:00-1:00  Shore Lunch and Pack up tents

1:00-2:00  Use or Abuse Lake Activity
5th Grade- Jan/Dan/Deb/Scott
6th Grade- Marcia/Sam

2:00-3:00  Large Group- Post Lake Survey
Project "Wet" Games or Help with Color-Rama.
(All Staff)
7th Grade Groups

A
Nikki
Bryan B.
Adena
Jake
Darren
Heather S.
Kit
Jessica

B
Cort
Jillian
Scott
Erica
Bobby
Kirsten
Willy
Jon
Luke

C
Ben
Heather B.
Blair
Brian G.
Ryan
Katie
Jesse
Sadie

D
Angela
Frank
Keegan
Alicia
Kim
Matt
Nick
Carly

7th Grade Schedule

Thursday, Ropes Course at Camp Manitowish
Friday, Lakes Project on Van Vliet Lake

8:30-9:00
Departure for Van Vliet Lake

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Maping and Journaling</th>
<th>Critters</th>
<th>Water Clarity</th>
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<tbody>
<tr>
<td>9:00-10:15</td>
<td>A&amp;B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>10:15-11:30</td>
<td>A&amp;B</td>
<td>D</td>
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<tr>
<td>11:30-12:00</td>
<td>Lunch at Treb's</td>
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<td>12:00-1:15</td>
<td>C&amp;D</td>
<td>A</td>
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<tr>
<td>1:15-2:30</td>
<td>C&amp;D</td>
<td>B</td>
<td>A</td>
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<tr>
<td>2:30-3:00</td>
<td>Clean Up and Return to Treb's for Pick Up</td>
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162
Carlin Lake - Carlin Club Lodge 8:30-9:45
Water quality group-5th Grade
Frank Jerkowic
Kris Clem
Kathryn Kayser
Max Wallace

Little Star Lake- Bob Glasshagel’s- 10:30-11:45
Take W to #51. Go left on #51 to the 1st main road to the right called “Powell Rd.” Go on Powell Rd. until you reach Alder Lake Rd. Go 1 mile. The drive is on a sharp curve. Fire #AL159. Follow blacktop until it loops.

Van Vliet Lake- Taylor’s Alpine Resort- 1:15-2:30
“Crab Lake Rd.” 686-2800

Water Chemistry Tests

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<tr>
<th>Acidity</th>
<th>PH</th>
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<td>Total (low level) phosphorus</td>
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<td>Total NO3 (low level)</td>
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<td>Total NO2 (low level)</td>
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<td>Total NH4 (low level)</td>
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<td>SO4</td>
<td>Cl</td>
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Chlorophyll
Water Color
Water Chemistry Field Trip  
September 22, 1995  
Jody Host-Trout Lake Station

Carlin Lake - Carlin Club Lodge  8:30-9:45  
Water quality group-5th Grade  
Frank Jerkowic  
Kris Clem  
Kathryn Kayser  
Max Wallace

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| Calcium Ca |
| Sodium Na |
| Magnesium Mg |
| Iron Fe |
| Mangenese MN |
| Sulfate SO4 |
| Chloride Cl |
OUTDOOR EDUCATION SEPT. 1995

Thursday, Sept. 21, 1995

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</tr>
<tr>
<td>Rick C.</td>
<td>2nd 3rd</td>
<td>8:45</td>
<td>Camp Manitowish</td>
<td>Back</td>
</tr>
<tr>
<td>John</td>
<td>4th</td>
<td>8:45</td>
<td>Camp Manitowish</td>
<td>Back</td>
</tr>
<tr>
<td>Lois</td>
<td>5th</td>
<td>8:45</td>
<td>Carlin Lake</td>
<td>Front</td>
</tr>
<tr>
<td>Marge</td>
<td>6th</td>
<td>8:45</td>
<td>Van Vliet</td>
<td>Front</td>
</tr>
<tr>
<td>Rich B</td>
<td>7th</td>
<td>8:45</td>
<td>Camp Manitowish</td>
<td>Front</td>
</tr>
<tr>
<td>Jon B</td>
<td>8th</td>
<td>8:45</td>
<td>Porkies</td>
<td>Front</td>
</tr>
</tbody>
</table>

Lois 5th 2:40 PM Carlin Lk to Camp Manitowish 3:05 PM
Marge 6th 2:40 Van Vliet Lk To C. Manitowish 3:05

ALL BUSES DISMISSED FROM CAMP MANITOWISH 3:25

Friday, Sept 22, 1995

ALL BUSES GO TO SCHOOL WITH THE LOWER GRADES.

<table>
<thead>
<tr>
<th>Bus</th>
<th>Grade</th>
<th>Time</th>
<th>Destination</th>
<th>Leave</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lois</td>
<td>1st 2nd</td>
<td>8:45 AM</td>
<td>Camp Manitowish</td>
<td>3:25 PM</td>
</tr>
<tr>
<td>Marge</td>
<td>2nd 3rd</td>
<td>8:45</td>
<td>Camp Manitowish</td>
<td>3:25</td>
</tr>
<tr>
<td>Rick C.</td>
<td>4th</td>
<td>8:45</td>
<td>Camp Manitowish</td>
<td>3:25</td>
</tr>
</tbody>
</table>

Rick C. 5th 9:00-2:40PM Little Star Lake 3:25 PM
Could these be switched? Rick will be working with our students
Lois 6th 9:00-2:40 Carlin Lake 3:25
Marge 7th 9:00-2:40 Van Vliet Lake 3:25

ALL BUSES DISMISSED FROM CAMP MANITOWISH

NOTE! All buses should unload in the front so that students may put their equipment on their appropriate pile. This is on Thursday only. Students were requested to bring their camping equipment on previous days. This excludes any food. Have fun.
North Lakeland Elementary School received a Lakes Planning Grant this summer from the Wisconsin Department of Natural Resources to conduct Lake Study with the students. This year, for Outdoor Education, our focus will be on Lakes. We are calling the whole week "Lakes Week." Students will be working in their classrooms on projects which revolve around lakes and "Lakes Studies." Attached is the agenda for the 5th grade class. We will be at Carlin Lake on the 21st and at camp Manitowish on the 22nd of September. We need to ask that the students bring along a few items along with their camping gear. I have enclosed a checklist which will help you to make sure that your child has everything that he/she needs. Please sign the enclosed permission slip and send your child's things to school with him/her on Monday September 18th. The outdoor education overnight experience is a tradition at North Lakeland Elementary School but if you have a concern about your son/daughter attending the overnight session please contact one of the homeroom advisors and return the permission slip at the bottom.

For Class your child needs:

_____ A T-Shirt which she/he may use fabric paint on.
_____ Rubber Boots or something to keep his/her feet dry in the water.
_____ A personal flotation device or lifejacket.

For camping your child needs:

_____ Warm Coat and Rain Coat
_____ Mittens/gloves
_____ 2 pair of comfortable pants
_____ a sweater or fleece top
_____ 2 pair of heavy weight socks
_____ 2 pair of light weight socks
_____ Plastic bag for dirty clothes
_____ Sun Glasses
Tooth brush and toiletries
Flash light
Warm Hat
Sneakers
2 T-Shirts
P.J.'s
underware
Sleeping Bag/Pillow
Tent if he/she has offered

The 5th grade class must bring all of their gear on 9/18/95.

Thank you so much for your help.

Sincerely,

Jan Watras, Dan Wohlleber and Deb Wooldridge

I give my child _______________________ permission to spend the night at Camp Manitowish with her/his homeroom teachers on the evening of 9/21/95.

I do not give permission for _______________________ to spend the night at Camp Manitowish on the evening of 9/21/95.

______________________________ Parent’s Signature
5th Grade Lake Groups
Thursday September 21st

Group A
Lisa Austin
Mark Bjork
Justin Chamberline
Brandon Corbin
Brett Colasacco
Bree Hale
Josh Jackson
Frankie Jirikowic
Randy McClellan
Megan Mecklenburg
Susie Stephenson

Group B
BillyBryk
Ryan Denton
Kristin Hawkins
Kathy Jenczala
Katherine Kayser
Colin Lawrence
Cody Meier
Geoffrey Reimer
Jason Tornow
Jarread Wagner
Rachael Winters

Group C
Kathryn Bieschke
Kris Clem
Liz Eldred
Matt Hasser
Matt Mazur
Joel Schroeter
Aaron Spencer
Tina Stein
Jesse Stephenson
Max Wallace
Becky Winters
Andrew Zwers
Carlin Lake Survey

Objective: The purpose of this activity is to familiarize students with the topography and development that is currently taking place on Carlin Lake.

Activity: Student’s will mark on their map the following features and will then identify two possible environmental problem on the lake. Using the map of Carlin Lake indicate the following features using the Letter before each word to indicate what type of feature you have located. Outline a portion on your map to indicate how much land is covered by this feature.

Critical Areas:

W Wetland
SS Steep Slopes
ES Erodible shorelines/soils
NAP Native Aquatic Plant beds
SH Species Habitat (spawning areas, endangered species habitat, eagle, loon nesting area, frogs, beavers)
PA Public Areas (Lodges, Restaurants, Gas Stations, Marinas)
D High Density water development
H Hazardous spill sites, landfills, storage tanks
NPS Significant non point pollution sources

Current Land Use:

R Residential
C Commercial
A Agriculture
I Industrial
F Forestry
I Institutional
TU Transportation or Utility Corridors

Indicate any other item of interest and if you have time feel free to actually draw houses, garages, roads etc. on you map. List two conflict areas at the bottom of your map.
CARLIN LAKE
VILAS COUNTY, WI
C. 17, 19, 20 T. 43 N. R. 6 E.

Surface area: 12 hectares
(30 acres)

Two benches: sill 12 m (39 ft)
Max. elevation: 12 m (39 ft)

Contour

ONTOUR INTERVALS IN METERS

0 500M 1 KILOMETER
Choosing a Survey

The objectives of lake studies may be either aesthetically or scientifically oriented, or both. However, two objectives of surveying a lake should be to (1) determine present-day characteristics (e.g. biological, physical, and/or chemical) and (2) monitor the lake over time to determine if it is improving, remaining the same, or getting worse. There are three basic types of surveys that can be used: 1) the visual survey; 2) the physical/chemical survey; and 3) the biological survey.

Visual Survey

The visual survey is the easiest of the survey types, and a lot of information about the lake can be learned if it is conducted correctly. This survey requires very little equipment: a clip board, pencils, data sheets (see attached), field guides, and USGS lake maps. Hip boots, cameras and binoculars are always good to have along, but not required. For safety reasons, the visual survey should be conducted by more than one individual. Having a "buddy system" or doing a group survey will also help to do a better job describing the characteristics of the lake.

During the initial visual survey, draw a map of (or locate on a USGS map) that portion of the lake to be surveyed. The map does not have to be a perfect likeness of the area, but it should include the major habitat types, locations of discharge pipes, dumps, and other visual characteristics mentioned in the survey itself. A camera is useful in documenting the various natural or unnatural lake characteristics. Be sure to label all pictures with the proper location, date, time, and photographers' names. It may be helpful to have photographic stations where pictures are taken at various times of the year and over a period of several years. These pictures will create a visual record, making subtle changes over time more evident.

If your lake survey group has access to boats, you may want to conduct your visual survey with some people walking the shoreline and others following along in boats. This will provide more information on the extent of shallow areas and vegetation. If the boat has a depth/fish finder, you can prepare a bottom-depth map of the lake.

Physical/Chemical Survey

Because of their size and depth, lakes can be sampled at different depths and in different zones. Consequently, the techniques (and time) required to conduct physical/chemical (and biological) surveys in lakes can be extensive. Nevertheless, a lot can be learned by doing some simple tests at your lake site, without much investment of time or money. Your group will have to decide what is feasible, given your interests and access to the needed equipment.
Biological Survey

An analysis of aquatic organisms provides valuable water quality information. Chemical and physical measurements generally catch only one moment of a lake's history. The diversity of species, particularly aquatic plants and animals, and their numbers are important to any lake study because: 1) they are an indication of water quality in the lake; 2) they are crucial to various food chains. In particular, aquatic macroinvertebrates have proven to be excellent organisms for water quality analysis.

Many macroinvertebrates, or aquatic insects, can be seen on the surface, in the bottom substrate, or swimming in the water. You can usually find a lot of macroinvertebrates using a simple dip net, but some kinds may be harder to locate and examine, especially in the daytime. It takes a keen eye and some patience to be a "Critter Catchin' Supersleuth!" Often they hide on or under aquatic vegetation. You can find many of them by turning over floating leaves like lily pads or by closely examining the stems and bodies of emergent and submerged plants. You'll be amazed at the variety and numbers you can find!
Water Clarity

Objective: To become aware of the range and types of instruments limnologists use to determine the “health” of a body of water. Students will be able to do simple water quality tests and understand the importance of those tests. They will graph results.

Activity: Students will be given previously collected data on water clarity for their lake, as well as, previous water chemistry information. They will then go to four different spots on the lake and collect water clarity information using a secchi disk. Students will also take water temperature and will complete PH tests. Simple water chemistry will be done time/equipment permitting. Students will then graph results and put it in their journal. Discuss what type of a lake is this?

Read/Discussion: In the interactive Lake Ecology student handbook, review the section on “Testing a Lake.”

Discussion Question: What type of a lake are we testing? Can you think of any other lakes in the area which fit into the other two categories? Give your reasons.

Eutrophic: classification of a lake that is characterized by high nutrient levels leading to high populations of algae and aquatic weed.

Oligotrophic: If a lake possesses high levels of dissolved oxygen, an extremely high transparency and has sparse vegetation and low levels of plankton growth.

Mesotrophic: A lake that falls between the two extremes of eutrophic and oligotrophic.
Lake Site Monitoring Data Sheet

Date: ___________________________ Time: ________________

Name of Lake: ____________________________________________

Group: ________________________________________________

Number of People in Group: ________________________________

Survey Site Location (include a map of the lake if available):
________________________________________________________________________________________________________________________

County: ___________________________ Nearest Town: __________

Weather Conditions:
Season: ___________________________ Wind Direction: ____________
Air Temperature: _________________ Wind Speed: ________________
Sky Conditions:
☐ Clear  ☐ Cloudy (% cloud cover = ________ )  ☐ Rain
☐ Other ________________________________________________

Lake Description (Check type of lake):
☐ Seepage Lake (i.e., no inlet or outlet)
☐ Drainage Lake (i.e., both inlet and outlet)
☐ Groundwater Drainage Lake (i.e., no inlet; fed by groundwater)
☐ Impoundment (i.e., created by damming rivers or streams)

Visual Survey Data

Water Appearance (Check all that apply):
☐ Scum  ☐ Foam  ☐ Muddy
☐ Milky  ☐ Clear/Blue  ☐ Brownish
☐ Colored sheen (oily)  ☐ Green  ☐ Reds/Purples
☐ Other ___________________________  ☐ Grey  ☐ Blues/Black

Bottom Coating Along Shoreline (Check all that apply):
☐ Orange to Red  ☐ Yellowish  ☐ Black
☐ Brown  ☐ White deposits along bank  ☐ None
☐ Other ________________________________________________
**Water Uses:**

- Drinking water withdrawal
- Industrial water withdrawal
- Agricultural withdrawal
- Irrigation
- Livestock watering
- Recreation (check all that apply)
  - Swimming
  - Boating
  - Fishing
  - Other: ____________________________

- List the number of dams, piers, signs, entry ramps (public and private), shoreline erosion control structures, etc.:

  ______________________________________________________

  ______________________________________________________

- Estimate and note the location of the amount of paper, small trash, cans, bottles, tires, cars, and any other types of litter within your study site area:

  ______________________________________________________

**Physical/Chemical Survey Data**

- **Lake Depth:**
  - Maximum Water Depth
  - Average Water Depth

- **Water Clarity:** (record to nearest 1/4 foot)
  - 1st measurement
  - 2nd measurement
  - Sum of 2 measurements
  - Secchi Disk Visibility Depth (Sum/2) =  
  
  (= the limit of the visibility of the disk)

  Did the Secchi disk hit bottom?  □ Yes  □ No

- **Surface pH:**
  - Value 1:  
  - Value 2:  
  - Value 3:  
  - Average Surface pH \((= \text{Value } 1 + 2 + 3/3)\) =  

175
Lake Bottom (Substrate type):

- □ Plant debris
- □ Black mud
- □ Other ____________________

- □ Gravel
- □ Pebbles
- □ Sand
- □ Other ____________________

Plant cover in littoral zone (i.e., near shore):
- □ Less than 30%
- □ 30-70%
- □ 70-100%

Plant covering on shoreline (% total):
- Trees __________
- Shrub __________
- Grass/lawn __________
- Other ________

- Rushes, Sedges, etc. __________
- Exposed Soil __________
- Rocks __________

Land Uses in the Watershed:

Agricultural (%):
- Pasture ________
- Crops ________
- Other ________

- (__________)%

Urban (number):
- Homes ________
- Factories ________
- Stores ________
- Other ________

- (__________)%

Forestry:

- % land area forested ________

Number of active logging sites ________

Record all land uses observed in the watershed area and surrounding your sampling site. Indicate whether the following potential land uses have a high (H), moderate (M), or slight (S) potential for impact.

- Housing developments
- Oil/gas drilling
- Public (lake) access
- Marinas
- Utility/Transportation corridors
- Sanitary landfill
- Mining (types: __________)
- Cropland (types: __________)
- Livestock pasture
- Forest
- Logging
- State/County parks
- Public fishing docks
- Urban uses (parking lots)
- Construction
- Refuse dumps
- Fields
- Other __________

Are there any discharging pipes? □ No □ Yes—how many? ________

What types of pipes are there?
- □ Runoff (field or stormwater runoff)
- □ Sewage treatment
- □ Industrial (list type of industry) ____________________
Biological Survey

Plant/Animal Diversity: Where possible, indicate the number and type of organisms observed in and around the lake monitoring site.

<table>
<thead>
<tr>
<th>Organism</th>
<th>Species (list)</th>
<th>None</th>
<th>Few</th>
<th>Abundant</th>
<th>Date Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mammals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reptiles/Amphibians</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Plants Observed: Indicate the major types of plants and the percentage of total plants that each makes up. If possible, mark the location of plant beds on a map of the lake.

__________________________________________________________________________________________

Macroinvertebrates Observed: List kinds, and the number of each type in parentheses, of different aquatic insects observed in the lake (also indicate how the samples were taken).

__________________________________________________________________________________________

Habitats Observed: List any places in and around the lake system where organisms might live.

__________________________________________________________________________________________

Additional Comments: List any other observations needed to describe the lake.

__________________________________________________________________________________________
Temperature: (Give values for air and surface water. List other values by depth.)

Surface Temperature Reading 1:  
Surface Temperature Reading 2:  
Surface Temperature Reading 3:  
Average Surface Temperature (=Reading 1 + 2 + 3/3)  

Odor: (Sample both the surface water and bottom water if possible; specify which area you are sampling)

<table>
<thead>
<tr>
<th>Type of Odor</th>
<th>Surface or Bottom Water</th>
<th>Strength of Odor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0 = no odor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = weak</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 = distinct</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 = overwhelming</td>
</tr>
</tbody>
</table>

Rotten egg  
Chlorine  
Oil  
Sewage  
Musky  
Acrid  
Other  
None  

Dissolved Oxygen: (using Hach kit)

\[
\text{No. of drops} = \quad \text{ppm DO} \quad \text{°C Temp.}
\]
Table 1. Summary of Water Chemistry for Carlin Lake. Samples collected from surface waters during spring (7 May 1993) and Fall (October 1993) during periods when the watercolumn was relatively well mixed. Data are means for the two sampling periods.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Units</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td></td>
<td>6.2</td>
</tr>
<tr>
<td>Alkalinity</td>
<td>ueq/L</td>
<td>49</td>
</tr>
<tr>
<td>Chlorophyll-a</td>
<td>ug/L</td>
<td>2.4</td>
</tr>
<tr>
<td>Suspended particulate matter</td>
<td>mg/L</td>
<td>1.4</td>
</tr>
<tr>
<td>Dissolved oxygen</td>
<td>mg/L</td>
<td>8.2</td>
</tr>
<tr>
<td>Dissolved organic carbon</td>
<td>mg/L</td>
<td>3.1</td>
</tr>
<tr>
<td>Dissolved inorganic carbon</td>
<td>mg/L</td>
<td>1.2</td>
</tr>
<tr>
<td>Conductivity</td>
<td>uS/cm</td>
<td>16.8</td>
</tr>
<tr>
<td>Ca</td>
<td>mg/L</td>
<td>1.3</td>
</tr>
<tr>
<td>Mn</td>
<td>mg/L</td>
<td>6</td>
</tr>
<tr>
<td>Mg</td>
<td>mg/L</td>
<td>0.4</td>
</tr>
<tr>
<td>Na</td>
<td>mg/L</td>
<td>0.4</td>
</tr>
<tr>
<td>Fe</td>
<td>ug/L</td>
<td>53</td>
</tr>
<tr>
<td>SO4</td>
<td>mg/L</td>
<td>2.6</td>
</tr>
<tr>
<td>Cl</td>
<td>mg/L</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Summary: Carlin Lake is a moderately acidic, clearwater seepage lake with low buffering capacity and very high water quality. The chemistry suggests that the lake is fed primarily by rainwater rather than groundwater. The low levels of chlorophyll-a and suspended particulate are characteristic of low to moderately productive waters. Increases in nutrients or acid inputs could have a noticeable effect on water quality.
Secchi Depth Data For Carlin Lake 1993-95

0.0
2.0
4.0
6.0
8.0
10.0
12.0

Transparency (Meters)

1993 1994 1995
Every tool stroke... every new page of a personal creative journal expands the accomplishment and sense expression of its creator... each entry expands the vision and capacity of its creator... as she or he plunges below the surface of life into the rich arena of enhanced sight, sound, smell, feeling, emotion, and immersion, into a deeper sense of place; the journal is a place to stretch the imagination, to feel thoughts incubate; to balance active expression with relaxed reflection; it can connect you to such a magnificent planet with so many other living things and wonders often missed in the rush! rush! everyday world; the creative journal becomes an alternative to the rapid superficial life pace often encountered by most people today be they the journal keeper or the one enriched by a sharing of an entry.

Through the ages right into today's creative world, journals have been the working-thinking place of the world's greatest thinkers, inventors, and artists. Artist-scientist Leonardo DaVinci was among the greatest. Scientists and social scientists like Einstein, Darwin, DuBois, Margaret Mead, Rachel Carson, and Aldo Leopold, were great journal keepers as were philosophers Thoreau and Emerson; naturalists like Muir, Pinchot, and Earnest Thompson Seton; prominent government leaders such as Gandhi, Eleanor Roosevelt, Churchill, and Jefferson; futurists like Fuller, Soleri. Now is the time for you and me!

Every journal is uniquely shaped by its keeper. Every journal is designed by its keeper and as a powerful creativity tool which in turn helps to continue to redesign the designer! This is exactly why there can be no "best" way to do journals. You as the designer must design not only the journal techniques and approaches you wish to use but you must understand YOUR purpose for journal keeping and design a journal keeping system which will nurture that purpose. Journals should be places for invention!
Why Journals?
Journals can be many things but most of all they should be a "fun" place to work!

* a place and system for "harvesting" those ideas and thoughts that often pass with little recognition of their power or depth of insight and to invent new ideas and thoughts.
* a tool to help train all of your senses and powerful ways of knowing to be better observers and mechanisms for helping you to feel and record more than your everyday mind tends to pay attention to.
* a place to harvest those inner thoughts and feelings which are often so spontaneous they tend to evaporate quickly unless fixed in time and space.
* an opportunity and mechanism to physically organize one's thoughts and observations.
* a place to play with ideas and information which often leads to new synergic ideas and insights as a result of ideas hanging out together in the same journal.
* a place to practice specific creativity skills (my key four skills are Flexibility, Fluency, Invention and Personal Expression).
* a place to develop one's skills in writing and graphic expression.
* a place to freely experiment and play with undeveloped ideas, skills and creative techniques of expression without any concern for judgment from others who might not understand or appreciate.
* an artifact of you the creator... an original work you produce and the wonderful personal sense of satisfaction from the completion of a creative journal.
* the outcomes of a creative journal are virtually endless... only limited by the inputs....from you... so JUST DO IT!

What is a Personal Creative Journal?
A journal takes the form and function from the designer and then becomes anything you would like it to be.

I have completed creative journals in all types of bound books; some with sewn, glued, looseleaf or metal spiral bindings; with pages of graph paper, lined paper and plain paper of all sorts and colors; of sizes from 2" x 3" to 24" x 30"; some bound on the short axis some on the long; even a journal on a
laptop computer. It is not the physical makeup of the journal that makes it a personal creative journal.... it is the mind and spirit of the designer that makes the creative outcome.

I simply ask each journal keeper, “What you would really like to learn from your journals?” Then set up your own rules for getting yourself to learn and master those things.

I want to be more creative; thus, I choose to hone the creativity skills of flexibility and fluency; to become comfortable using many different media and techniques in my journals in order to stay out of inflexible ruts. My favorite pen! To be fluent in my creativity over time—not just be creative in isolated bursts. Thus, how can I get myself to love doing my journal most all of the time, not just when I am in the mood?

A journal is a place for thinking and feeling, for harvesting the moment, the image, the idea, the place you occupy. Don’t wait to paint the perfect picture or sketch; don’t wait for the time when you have time to write the polished essay or poem but rather get down on the pages of your journal those core images, ideas and fragments of experience you are now feeling. Edit or recompose later if you must. Grab images, words, drawings, pressed leaves, dirt, post cards, anything that impresses you and will help you remember the time, place and events you are experiencing and creatively get them into your journal.

When you look back at your journals in a year, two or five... the feelings and experiences of the day you created each page will flow back into your consciousness in ways that will surprise and please you!

How to do Journal’s...
Anyway you want to is an o.k. approach....but here are some things I’ve learned that have worked for many people.

Once you have chosen a journal book you need to acquire some tools to work with.
Next create a "bonding" to your journal that makes this a special journal for you. A variety of techniques work. You need to find what speaks most powerfully to you. You may begin by dedicating your journal to an idea, a person, a place, a thing, a special time... whatever is most moving to you. For me most of my journals begin with a bonding with the place, time and experience I am engaged in when the new journal is started.

Starting Ritual: I begin by simply sitting in the place with my new journal and sketching or painting something of the image that moves me... I also write something- a poem, a stream of consciousness description of the feelings I have in this place, in this time in my life, in the reason I am in this place, of my dreams and hopes.... whatever comes out of my writing tool and brain mind system. My journal then becomes the journal of that beginning place... thus, no two of my journals are ever the same right from the beginning.

Then depending on what kind of journal book I am using I usually will begin to create the cover for the journal (acrylic paint works well since it is waterproof when it dries).

My working "rules" for my journals are:

# only put positive things in my journal.
# balance the images with writing and vice versa.
# change the medium you work with you change the vision and thinking.
# can't use the same medium for more than three pages in a row (flexibility).
# only do fun stuff in the journal.
# creativity and invention is a priority in presentation.
# do creative "stuff", new ideas in progress and bonding with places I am experiencing in the front to back section of my journal and notes and specific thinking stuff of a daily nature from the back to the front of my journal (often, a set of notes in the back of the journal triggers an idea for a page of fresh ideas in the front section).
# take notes on 3x5 or 5x7 inch cards and then either transfer them to my journals or just gluestik them into my journal.
# tape a large cardboard pocket on the inside of my journal covers so I can stuff the note cards into until I can work with them.

# use a variety of media, pencil, pen, crayons, watercolors (simple Crayola Set is fine), markers, acrylics, picture cut outs, photos and postcards all are great ways to get power images and writing into your journal.

# write sideways, in freeform lines, in patterns like triangles and circles holding your journal in different positions from time to time.

# harvest those great quotes from others that speak to you.

# don't worry about mistakes in grammar or graphics... focus on spontaneity.

# experiment: with pigments from nature, charcoal, etc.

# make your writing and printing become part of the graphic presentation by experimenting with new techniques and sizes.

# above all make your journal a pleasant place to work... a place that is so much fun that you miss it if you don't mess about in it every day! We get better at mastering anything through practice, practice, practice!

Many more journalling things to think about!

* Using multiple journals
* How to best use journals in schools... journalling across the curriculum.
* How to assess student progress in journals.
* Should journals be graded?
* Lots of ideas for journal activities.
* Where do I learn more?
Adopt a Lakes T-Shirt

1. Creatively design on paper your adopt a lake T-Shirt design.

   a. Indicate your name.
   b. Indicate your adopted lakes name.
   c. Indicate your committee or officer title.
   d. Draw a Logo or picture of lake or wildlife on lake or recreational activity.
   f. Indicate color and design location.
   e. Have design approved by teachers.
   f. Use fabric pens to create your design.
Forming a Mock Lake Association

Objective: Students will form a Lake Association for their adopted lake and will perform duties as Lake Association officer or committee members and will learn the importance of developing Lake Associations.

Activity: Read “What is a Lake Association?”
Read Carlin Lake Association By-laws, pay particular attention to . . .
Article VII Officers of Carlin Lake Assn.
In committee read . . . Article VIII Committees

After reviewing Lake Association By-Laws and reading about officer duties the class will now seek nominations for a . . .

President

Vice President

Secretary

Treasurer

The class will now vote on officers. The designated record keeper will take minutes until a secretary is elected. The record keeper will indicate the following items on the form above. The name and number of votes that each nominated person received from the election.

Once officers have been selected they will be seated in front of the group and will call the meeting to order. At this point the secretary should start taking notes of all important events to follow. These will be kept in the Carlin Lake Association Handbook.
Carlin Lake Association Script

President: I now call the meeting to order. Since we are a new group we need to form committees where we will address all of the concerns on our lake. Let's brainstorm some of the items which are a concern to the people in attendance at this meeting.

Secretary: List all items on Butcher Paper.

Vice-President: Read items from “Typical Lake Association Activities page that the group missed that he/she feels are important items.

President: Thank-you Ms./Mr. Vice-President. Now we need to identify 4 major concerns that we would like to address. Vote on items. Everyone has one vote per round. (President may need to have association members vote on items again once they have been narrowed down to reach four acceptable items. President may recommend that the group consider the four committees already formed within the current Carlin Lake Association so that guidance from those committee members could be used. Insert committee names on committee sheet and then recommend that association members keep committees to five people.

Secretary: Have association members sign up under the committee that most interests them. No more than five to a group.

President: Have committees meet for 20 minutes to write up their responsibilities paragraph like the sample copy. Also have them pick a project to start on and write down what each committee member will do. Have committees list their names and phone numbers on their committee list so that the secretary can form a master list. Excuse groups for 20 minutes and meet with officers to discuss how your group will publish at least three newsletters for the class and how student's will communicate with the Carlin Lake Association Adult Officers to link their classroom experience with the current Lake Association. Write the officer responsibilities out and indicate how the newsletter could be developed and distributed.
WHAT IS A LAKE ASSOCIATION?

The oldest organizations interested in lake management in Wisconsin are its lake associations.

The following are their main features.

WHAT IS A LAKE ASSOCIATION?
The first association in Wisconsin was organized about 1898. Today, nearly 400 lake associations are in existence. Usually, lake associations are voluntary organizations with members who own land on or near a lake. They can be involved in various levels of lake management activities and vary from well-run lake management groups to loose-knit social groups.

WHAT IS ITS PURPOSE?
Lake associations may operate under diverse titles, but the purpose is normally the same. In most, it is to maintain, protect, and improve the quality of a lake, its fisheries, and its watershed.

HOW IS IT FORMED?
A lake association can be formed when any number of individuals concerned with lake issues decides to deal with them in an organized manner. Many associations opt to incorporate under Chapter 181 Wisconsin Statutes (available at your library).

WHO IS INCLUDED IN IT?
Associations can be comprised of all or a few of the people living on a lake and may have members not living on the lake. Membership in associations is rarely mandatory; people may or may not decide to participate. The one exception to this is mandatory lake associations, which are normally formed by developers as part of a deed restriction.

HOW IS IT RUN?
Roberts Rules of Order are commonly used when conducting meetings. Many associations have adopted by-laws to guide the direction of their organizations.

HOW IS IT FINANCED?
Associations use various fund-raising activities and voluntary dues to raise capital for their activities. Certain qualified associations are eligible for limited state moneys through specific grant programs.

-over-
BY-LAWS
CARLIN LAKE ASSOCIATION, INC.
P.O. BOX 61, Manitowish Waters, WI 54545

Article I - PURPOSE

The purpose of the Association is to preserve and protect Carlin Lake and its surroundings, and to enhance the water quality, fishery, boating safety, and aesthetic values of Carlin Lake, as a public recreational facility for today and for future generations. To carry out the program of the Association and to make representations on behalf of its members, the Association shall be organized as a non-profit, non-stock corporation under Chapter 181 of the Wisconsin Statutes. (Sections of the Statutes are cited throughout these By-laws.) No asset of the Association shall benefit any officer or member. The Association shall not participate in partisan political activity.

Article II - STATUS AND LIMITATIONS

To carry out the program of the Association and to make effective representations on behalf of its members, the Association shall be organized as a non-profit, non-stock corporation under Chapter 181 of the Wisconsin Statutes. (Sections of the Statutes are cited throughout these bylaws.) No asset of the association shall benefit any officer or member. The Association shall not participate in partisan political activity.

Article III - MEMBERSHIP

Section 1 - ELIGIBILITY: Membership in the Association shall be open to any individual, family, business, or organization, that (a) subscribes to the purposes of the Association and (b) owns or leases property in the immediate vicinity of the lake.

Section 2 - DUES: Dues shall be $10.00 paid on a calendar year basis, at or before the annual meeting.

Article IV - VOTING

Section 1 - MULTIPLE VOTING: Any individual member may cast only one vote on any question called to a vote. Up to two individuals may represent a family, a business, or organization; and each of those two individuals may cast one vote on any question called to a vote.
the Association may be recognized to speak at Association functions at the discretion of the presiding officer who shall also serve as parliamentarian.

Article VI - BOARD OF DIRECTORS

Section 1 - AUTHORITY: Subject to directives of annual and special meetings and these By-laws, the Board of Directors shall have authority over the activities and assets of the Association.

Section 2 - COMPOSITION: The Board of Directors shall include the President, Vice-President, Secretary, Treasurer, up to 10 at-large directors, and the past President.

Section 3 - ELECTIONS: The Board of Directors shall nominate one or more members for each vacant position on the Board. Additional nominations of members, present at the annual meeting and willing to serve, shall be taken from the floor. All elections for the Board shall be conducted by secret, written ballot.

Section 4 - TERMS OF OFFICE: Officers and Directors are elected for two-year terms. Their terms shall expire after the annual meeting or upon the election of new Directors, whichever occurs later. The terms of office of President, Vice-President, and half of the at-large directors expire in even-numbered years. The terms of office of Secretary, Treasurer, and half of the at-large directors expire in odd-numbered years.

Section 5 - BOARD MEETINGS: The new Board shall meet within 60 days of the annual meeting and at least one other time prior to the next annual meeting. Regular meetings shall be held at places, dates, and times established by the Board. Special board meetings may be held on the call of the President or any three Directors after at least 24 hours notice by telephone, mail, or personal contact. Four directors, including at least 3 officers, shall constitute a quorum for the transaction of business. The meetings shall be open to the members. Decisions shall be made by majority vote of directors present, with the President voting only to break ties. Between meetings, the President may solicit decisions from the Board through written communications.

Section 6 - VACANCIES: Any director who misses two consecutive meetings without good cause as determined by the Board may, at the discretion of the Board, be removed from office. Any vacancy may be filled for the remainder of the term by the affirmative vote of a majority of the directors then in office, although less than a quorum but at least two.

Section 7 - COMPENSATION: Directors shall not be compensated for their time and effort. The Board may authorize officers, directors, and committee members to be paid actual and necessary expenses incurred while on Association business.
Section 3 - FINANCE COMMITTEE: The Finance Committee shall recommend fund-raising activities to the Board and, after receiving Board approval, shall organize such activities. The Finance Committee shall also annually audit the financial records of the Association.

Section 4 - LAND USE COMMITTEE: The Land Use Committee shall represent the Association at local public hearings and informational meetings relating to zoning, sanitation codes, subdivision ordinances, pollution sources, and changes in land use which might affect water quality, wildlife or aesthetics. The Committee shall offer proposals to the Board regarding land use issues.

Section 5 - BOATING SAFETY COMMITTEE: The Boating Safety Committee shall represent the Association at local public hearings and informational meetings relating to water safety patrols, lake use ordinances, and navigation. The Committee shall offer proposals to the Board regarding water use issues.

Section 6 - WATER QUALITY AND AQUATIC BIOLOGY COMMITTEE: The Water Quality and Aquatic Biology Committee shall represent the Association at Department of Natural Resources hearings and at local meetings relating to water quality, algae, aquatic plants, fish, wildlife, and hydrology. The Committee shall offer proposals to the Board regarding water quality monitoring and ecological management of the lake.

Section 7 - LAKE HISTORY COMMITTEE: The Lake History Committee shall gather, verify and record information on the history of Carlin Lake.

Section 8 - OTHER COMMITTEES: The President may appoint such other committees as are deemed necessary to support the efforts of the Board.

Article IX - MISCELLANEOUS PROVISIONS

Section 1 - INDEMNIFICATION OF OFFICERS AND DIRECTORS: As provided by Wisconsin law, the Association shall indemnify any officer, director, employee or agent who was, is, or may be involved in legal proceedings by virtue of his or her good faith actions on behalf of the Association.

Section 2 - FISCAL YEAR: The records and accounts of the Association shall be maintained on a calendar year basis.
Typical Local Lake Association Activities

Publish newsletter
Informational meetings
Social events (dinners, dances)
Water quality sampling
Fish stocking
Fish population surveys
Fish crib installation
Navigation buoy installation
Boating training
School scholarships
Weed/algae removal
Dam operation
Beaver dam removal
Channel dredging
Loon watch
Well water quality tests
Sanitary system surveys
Lake use ordinances
Speak for members with/before:
  town board
  school board
  county board
  planning & zoning committee
  board of adjustment
Oppose development/mining projects
Erosion control
Nonpoint source pollution control
Lake management planning
Representation at lake conventions/meetings
Watershed studies
Lake/stream hazard removal
XC ski/hiking trail development
Lake use surveys
Lake P&R district organization
Petition DNR Board for phosphate standards
Historic site development
Tree/shrub planting
Boat landing/picnic site development/maintenance
Put up/maintain boating rule signs
Conservation/scenic easements
Exotic species control
Support EMT/fire services
Fishing and Water Quality Committee

Responsibilities: The Fishing and Water Quality Committee shall represent the Association at DNR hearings and at local meetings relating to in-lake water quality, fish and wildlife habitat, and water levels. The Committee shall offer proposals to the Board regarding water quality monitoring and ecological management of the fishery.

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**Recreational Safety Committee**

**Responsibilities:** The Recreational Safety Committee shall represent the Association at local public hearings and informational meetings relating to water safety patrols, lake use ordinances, and obstacles to navigation and other year-round recreational concerns. The Committee shall offer proposals to the Board regarding water use issues.

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Land Use Committee

Responsibilities: The Land Use Committee shall represent the Association at local public hearings and informational meetings relating to zoning, sanitation codes, subdivision ordinances, pollution sources, and changes in land use which might affect water quality. The committee shall offer proposals to the Board regarding land use issues.

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**Lake History Committee**

**Responsibilities:** The Lake History Committee shall gather, verify and record information on the history of the lake and will make a book containing the history for the school library.

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President: Call the meeting back to order. Allow each group 10 minutes to share their responsibilities description and first project with the association. Officers will share their plan to develop a one page newsletter each quarter and their responsibilities with the group. Ask if there is a motion to accept the committee projects? Is there a second? Thank all of the Association members for attending and for their concerns. Is there a motion to adjourn? Is there a second? Meeting adjourned.

Teachers will now help students develop a time line to implement their plan of action for the committee's. Committees will be given one home-room a week to plan together.
If you only marked one "x" for each kind of use, the total would be 80 gallons (using only the bath and not the shower). That's more than 100 times as much water as you need to keep your body alive. Where does all that water come from?

Ask your parents to help you find out where your household water supply comes from.

Write it here ______________. Does someone pay for the water? ______________. How much? ______________. Many other uses of water indirectly benefit you too. For example:

It takes 75 gallons of irrigation water to grow just one ear of corn!
... 130 gallons to produce one egg!
... 200 gallons to make the rubber for one car tire!
... 1,000 gallons to produce one quart of milk (figure for a gallon)!
... 650 gallons to produce the steel for one bicycle!
... 3,500 gallons to produce one pound of beef!

It's a good thing there's a lot of water on this earth, and that it doesn't get used up!

Water is never used up. When you drink water, it is later perspired or excreted away. When a plant draws water from the ground into its roots, water moves up into the leaves, stem and a fruit. Most of it is released into the air as water vapor through pores (transpiration). One important use of water for both you and the green plant is to carry away wastes. These stay is the water.

If all the water we now use has been used many times before in the history of the world, how is it possible that we have any clean water at all?

(To be used with Activity IV. Water Supply)

V. USE OR ABUSE?

CONCEPTS:

To explore decisions, values, and economics related to water pollution.

OBJECTIVES:

Participants will develop a better awareness of how people (and animals) depend on lakes.
Participants will develop a better understanding of the complexity of economic decisions faced by polluters of lakes.
Participants will develop a better understanding of how they, as individuals, can avoid polluting lakes.

MATERIALS NEEDED:

Large map of Lake Superior (15' x 20') including cities with dots and state/province borders with lines (do not identify them by name), 10 liter (or larger) bucket filled with clean
water to represent Lake Superior, red food coloring (one full eyedropper to 100 ml of water), eyedropper (one full eyedropper equals one unit of color), four small vials or envelopes filled with dust or mud, clean container (500 ml for withdrawing municipal water supplies), similar clear container filled with slightly colored water (about two drops of food color in 100 ml of water) to use as a standard for comparing the extent of pollution, play money for roles involving paying instead of polluting, a piece of plastic with the word "shipwreck" on it, a Secchi disk for estimating water clarity (see instructions).

**PROCEDURE:**

(Preparatory Activity)

- Hand out a map of Lake Superior and its drainage basin, accompanied by the Lake Superior worksheet.
- Orient the participants to the map. Explain that all water within the watershed boundary (theoretically) drains into Lake Superior.
- Mention other sources or reservoirs of water within the watershed, such as lakes, streams, wetlands and groundwater. Stress that the reservoirs of water are interconnected: pollution of upstream inland lakes and rivers eventually affects Lake Superior.
- Have participants fill out the worksheet. Indicate that some of the questions do not have right or wrong answers. Look at economic constraints: what we would like to see happen is often tempered by money constraints.

(Playing the Game)

- Place the bucket representing Lake Superior in the center of the map. Place the "shipwreck" sign at the bottom of Lake Superior. Hand out money to participants.
- Near Lake Superior, set up the pollution solution and eyedropper, the container for withdrawn water, mud, etc.
- Distribute the role cards and assign a playing order. If you have a small group of participants, eliminate some roles or assign more than one role per person. If you have more than 26 participants create additional roles that require action.
- Encourage players to role play. They should step into the shoes of the person they are representing and act as that person would.
- Have players find their "home" around the lake, read their cards (cards may need to be adapted using vocabulary appropriate for a particular age level), and consider their decision.
- Have players read their roles and announce their choices out loud.
♦ Have players perform appropriate actions according to their cards and decisions.

♦ Discuss the students' decisions as you play. Balance economic considerations against idealism. If no students opt to pollute, ask how realistic that is. Compare the high-priced, million-dollar decisions with what they can do as individuals to reduce or prevent pollution. You can also take money from each player for taxes used to fund agencies that research and assist in pollution prevention.

♦ Remind participants that the bucket is a simple model of Lake Superior. In reality, water is constantly being added through precipitation and runoff; pollution is diluted or flushed. Stress that water in Lake Superior is a limited resource, not infinite.

♦ Follow the game with a discussion of values and economics and review what participants can do to prevent/reduce pollution of Lake Superior. Although they may not be able to easily affect corporate decisions, they can choose to recycle, avoid littering and support family actions that reduce pollution.

NOTE:

The order of play often affects the decisions made. You may want to "stack the deck" somewhat. Ensure that some of the polluters with no choice precede the people that remove drinking water. This makes it more difficult to see the shipwreck and the "drinking water" is not very appealing.

ROLE CARDS:

These are examples of roles, decisions and actions that can be used in the game. The roles are based on real-life situations, but do not necessarily reflect the circumstances of any particular individual or community. (See page 20).

(Adapted with permission from Minnesota Sea Grant Extension's "Lacustrine Lessons")
WORKSHEET ANSWERS:

Most of the questions have no correct or incorrect answers. The questions are meant to provoke thought. Participants will have very different answers for some of the questions.

1. Users include residents, tourists and visitors, animals and industry. Uses include domestic activities, transportation, industry, recreation and tourism, fishing research and wastewater treatment.

2. Any three.

3. Any, including its size, beauty, depth, storms, clarity, clean water, history, etc.

4. Answers many reflect value judgements, but current thought has it that the most pressing concern is atmospheric deposition to the lake for things such as acid rain, mercury, organic contaminants like PCBs, etc.

5. A decision-making body could include representatives from three states and Ontario, both federal governments, people from outside the basin, etc. The question gets at the problem of identifying who "owns" the resource.

6. Any five, including shipping, industrial processing, recreation and tourism, water supply, wastewater treatment, commercial fishing and real estate.

7. Everyone!

LAKE SUPERIOR:
USE IT, DON'T ABUSE IT

IT IS A SUPERIOR LAKE!

Lake Superior and the other four Great Lakes represent America's fourth coast. The size of the lakes and the resources associated with them make the Great Lakes an ecosystem that is vital to the economy and quality of life in the United States. Among the Great Lakes, Lake Superior stands out as unique. The problems and opportunities associated with Lake Superior reflect the magnitude of its size.

Lake Superior is about 350 miles long and 160 miles wide. It is bordered by the states of Minnesota, Michigan and Wisconsin, and the Canadian province of Ontario. Because it lies at the headwaters of the Great Lakes and is at the head of the St. Lawrence Seaway, Lake Superior is of critical concern to Americans and Canadians alike.

The Great Lakes are huge. Together they represent about 20 percent of the fresh water available on the surface of the earth. Lake Superior is the largest surface area of freshwater lake in the world. It covers 31,700 square miles, roughly the area of Massachusetts, Connecticut, Rhode Island, Vermont and New Hampshire.
In addition to being the largest of the Great Lakes in surface area, Superior is also the deepest, with a maximum depth of 1,330 feet. Lake Superior has an average depth of 483 feet and contains nearly three quadrillion gallons of water.

Lake Superior is valued for transportation. Ships are the most cost-effective way of moving bulky and/or heavy cargoes over long distances. Major commodities moving across Lake Superior include grain and other agricultural products, western coal, iron ore, steel, limestone and cement. Maintaining adequate water levels is important to shipping. Unfortunately, optimal water levels for shipping can cause coastal erosion.

The water of Lake Superior is important for power generation, manufacturing and mineral processing. Although much water is withdrawn each year for these uses, only a small amount (about 21,134 million gallons) is consumed (not returned to the lake). Compared to the amounts consumed from other Great Lakes, this is nearly insignificant.

Domestic water use is also important. The shores of Lake Superior are sparsely populated. The coastal area has about 14 people per square mile. This ratio is less than 10 percent of the Great Lakes average of 183 people per square mile and far below Lake Erie's ratio of 567 people per square mile. Lake Superior's sparse population has helped it remain the cleanest and clearest of the Great Lakes. Municipal and domestic use of Lake Superior's water is minor when compared to figures from the other Great Lakes. Municipal and individual effluent released to lake Superior contribute a minimal amount of pollution.

The quality of Lake Superior's water is vital to the aesthetic and recreational uses of the lake and to the sport and commercial fisheries. The quality of the water is therefore important to our economy. If the concentration of PCBs in the lake increased, fish would be considered inedible. Polluted water would also attract fewer visitors, who are major contributors to the region's economy.

Residents and visitors are not the only people concerned about the quality of Lake Superior's water. Those further down the Great Lakes are eventually the recipients of Lake Superior's water. An estimated 23 million people get their drinking water from the Great Lakes. Many more live and recreate along the Great Lakes coast. These people are also concerned about Lake Superior.

Water quality in Lake Superior needs to be preserved, because once such a large lake becomes contaminated it is difficult to clean up: it takes about 182 years for water in Lake Superior to be flushed out. Pollutants come from five major sources: 1) the atmosphere, 2) municipal and industrial discharges, 3) farmland and municipal runoff, 4) contaminated groundwater and 5) contaminated sediments. Over half of the toxics entering Lake Superior are believed to come from the atmosphere.

The concern for Lake Superior's water quality extends beyond its shores. The care for Lake Superior's water quality also needs to extend beyond its shores. As a society we need to use Lake Superior without abusing it.
I own a well near Silver Bay, Minnesota. I don't use water from the lake for my water supply so I don't care if the lake gets polluted. My system is old and needs repairs that will cost $300. I'd rather use the money for a trip to Florida. I have to choose whether to fix it up, or let my leaky system pollute L. Superior. (Pay or add one unit of color.)

I represent the Canadian Department of Transportation in Marathon, Ontario. We salt our highways during winter. This makes the road safer for travel, but the salt runs off in the spring and pollutes L. Superior (Add two units of color.)

I run a sewage treatment plant at Sault Ste. Marie, Michigan. We don't think our customers will pay the extra $15 a month needed to clean up our process. We continue to pollute the lake. (Add two units of color.)

I am a logger living near Grand Marais, Minnesota. I cut trees from an area too close to a stream, which caused erosion and the sides of the streambank to collapse into the stream. This makes the stream cloudy polluting the lake. (Add mud to lake and stir.)

I own a mining company at Nipigon, Ontario. It will cost us $1 million to clean up our process. If we pay we will go out of business, and 300 people will lose their jobs. I have to choose whether to clean up and go bankrupt or continue to pollute L. Superior. (Pay or add four units of color.)

I own a campground near Wawa, Ontario. Families will stay here as long as L. Superior is clean and they can catch fish, but if the lake is too polluted they won't stay and I will go broke. (Compare the color of water from L. Superior to the standard, if it is too polluted people won't stay at the campground.)

I am a shipowner from Thunder Bay, Ontario. My ship has made the trip from the lower Great Lakes and the tanks are full of polluted water. I can pay $1,000 to clean the water before emptying the tanks or I can save money and pollute L. Superior. (Pay or add three units of color.)

I live near Knife River, Minnesota and I know I should take my garbage to the landfill, but it's cheaper and easier to dump it in my backyard. I continue to dump it in my backyard. This pollutes both the creek and the lake. (Add one unit of color.)

I am a resident of Ashland, Wisconsin who likes to scuba dive. I paid $1,500 for scuba equipment. If the lake is too cloudy, I can't enjoy my dive and have wasted money. (Try to read the word on the bottom of L. Superior.)

I am in charge of a paper mill in Michigan. We use 500,000 gallons of water each day. Most of the water is supposed to be cleaned before being returned to the lake, but I know there is something wrong with the system and we are putting contaminated water into the lake. If I report the flaw, I will lose my job. If I don't report it, pollution of the lake will continue. (Give up job or add two units of color.)
I am a research scientist from the Univ. of Minnesota in Duluth. I paid $20,000 to use the research submersible to study fish that live near the bottom of L. Superior. If the water is too cloudy I won't be able to see the fish and I will have wasted my research money. (Lower the Secchi disk to the bottom of the bucket. If it can be seen, the lake is clear enough for your study.)

I own a company in Marquette, Michigan. We want to send water to California and have $4 million to spend in the community if you let us take the water. You will hardly miss it and you could clean up a lot of pollution with $4 million. All the people who live around the lake must vote on whether to let us divert the water. (If the group votes to let you divert the water, remove four cups of water.)

I own a commercial fishing company in Bayfield, Wisconsin. If I catch fish that contain toxic materials that exceed the U.S. Environmental Protection Agency guidelines for fish consumption, I cannot sell them to the public and my company will go to broke. (Compare the color of 500 ml of water from L. Superior to the standard color. If the color in the lake is darker than the standard, the fish are too contaminated to sell.)

I own a mining company near Wawa, Ontario. We have been told to clean up our process. We will have to pay $1 million to clean up or continue to pollute L. Superior. (Pay or add two units of color.)

I am in charge of a fish hatchery in Nipigon, Ontario. My job is to stock fish in L. Superior. If the lake is too polluted, the fish won't survive, so there is no point in stocking. (Compare the color of water from L. Superior to the standard color. If the water from the lake is darker than the standard, it is too polluted to stock fish.)

I represent the city of Duluth, Minnesota. We need 400,000 gallons of clean water from L. Superior each day for our city to use. (Remove eight cups of water from L. Superior.)

I am a careless tourist from the U.S. driving along the north shore of L. Superior near Marathon, Ontario. I throw a burning cigarette out my window and start a major forest fire. Because many trees are destroyed, much soil and ashes are washed into L. Superior and pollute it. (Add mud and stir.)

I run an industry at Houghton, Michigan that dumps particles into the lake and causes the water to become cloudy. We can pay $1 million to clean up our process or we can continue to pollute the lake. (Pay or add mud and stir.)

I own a resort on the shore of L. Superior near Grand Marais, Michigan. My septic system is old and doesn't work well. I know it is polluting the lake, but it will cost me $5,000 to repair it. If I pay that much to repair the system, I will have to charge tourists $75 per night for a room. I don't think they will pay that much. (Pay or add two units of color.)

I head the Board of Directors of an electric power company in Duluth. We would like to clean up our emissions by building scrubbers on our towers, but it will cost $1 million. I don't think the public will agree to pay higher rates for electricity. If I won't pay for the clean up, our power company will cause acid rain and pollute L. Superior. (Pay or add one unit of color. You may ask for the people around the lake to vote on whether they would pay higher rates.)

I own an industry in Thunder Bay, Ontario that used 500,000 gallons of water each day in its processing plant. We return 100,000 gallons of polluted water to the lake each day. We can pay $1 million to clean up the process or continue to pollute L. Superior. (Remove five cups of water and get rid of four. If you choose to pollute, add one unit of color to the fifth cup and return it to the lake; if you choose to pay to clean up the process, put the water back into the lake without adding color.)

I have a cabin near Ontonagon, Michigan. I only live there for three months each year and don't think it is worth paying $500 to get my septic system fixed. I cause some pollution of L. Superior. (Add one unit of color.)
MAP TO HAND OUT TO STUDENTS (Enlarge to place on the floor for game. See "Procedures").
LAKE SUPERIOR WORKSHEET

1. Who uses the water in Lake Superior? List at least 10 uses.

2. What do you feel are the three most important uses of water from Lake Superior (in order)?

3. What is unique or special about Lake Superior?

4. What is the most damaging source of pollution to Lake Superior today?

5. Who should decide if water can be diverted from the basin? Should the same person or group decide how much water is taken and where it goes?

6. How does Lake Superior affect the economy of our region? List at least five businesses or industries that depend on Lake Superior.

7. Who is responsible for keeping Lake Superior clean?

8. On your map, locate and label:

MINNESOTA: Duluth, Knife River, Two Harbors, Silver Bay, Grand Marais, St. Louis River;
WISCONSIN: Ashland, Bayfield, Superior, Apostle Islands;
MICHIGAN: Sault Ste. Marie, Grand Marais, Marquette, Houghton, Ontonagon, Isle Royale;
ONTARIO: Thunder Bay, Nipigon, Marathon, Wawa, Sault Ste. Marie, Michipicoten Island;
6th Grade Lakes Project  
Day 1  
Sept. 21

9:00-9:30  Pre-Lake Survey, etc.  
What do students actually know about lakes?

Divide students into four groups and have students rotate from one session to the next. (1 hour each 9:30, 10:30, 11:30, and 1:30)

Session A:  Water Clarity  
Pontoon boat around lake, check for water clarity and test for PH in 4 spots. Graph results.  
Survey the edge of the lake for shoreline development and indicate on their map where development is occurring, where wildlife is located and where other interesting formations are located. Sam Johnson, Bob Glashagel, and others

Session B:  Critter Catching  
Wading along shore line, look for aquatic animals, sketch in journals. Scott Peterson

Session C:  Journaling and Art Project  
Students find a quiet spot to water-color a picture of the lake and then write one page or more on their thoughts about the lake. When finished, begin collage with natural materials. Ruth Fairbanks

Session D:  Exploration of Area, Knot Tying  
Identification of trees, shrubs, flowers, etc. in this habitat. Sketch in journals, list, discuss roles these play in the lake’s health. Walk down Little Star Lake road to Smith’s property. Marcia Glashagel

12:30-1:30  Shore Lunch  
Ultimate Lake (People vs. Nature)

1:30-2:30  Last session
@2:40   Bus pick-up for transport to Camp Manitowish
3:30-4:30  Tent Set-up
4:30-5:30  Skit Practice Time “Lakes Theme”
5:30-6:30  Dinner
6:30-7:00  Clean-up
7:00-8:00  Skit Presentation and Singing around the campfire.
8:00-10:00 Evening Program “Waterwalker”

Forming a Lake Association (Friday - after Lake Superior role-playing, if time for 6th)
Choose board members and officers.
Form lake interest committees. (Water Quality, Recreation, fisheries, History, Record Keeping, Shoreline Alterations. 5 to a committee)

5th and 6th Grade Lakes Project
Day 2
9/22/95

7:00-9:00: Breakfast/Pack up clothes and sleeping bags.

9:00, 10:00, 11:00: Students rotate from one session to the next on an hourly basis.

Session A:  Adopt-A-Lake T-Shirt fabric painting: of your Lake Association. Students bring their own shirt. Write name of committee or Office held on shirt. Decorate with Lake symbols. (Deb/Ruth/Lynn)

Session B:  Fishing/Canoeing skills (Dan/Sam/Scott)

Session C:  Orienteering (Jan/Marcia)
12:00-1:00  Shore Lunch and Pack up tents

1:00-2:00  Use or Abuse Lake Activity
          5th Grade- Jan/Dan/Deb/Scott
          6th Grade- Marcia/Sam

2:00-3:00  Large Group- Post Lake Survey
          Project "Wet" Games or Help with Color-Rama.
          (All Staff)
ARTS N' CRAFTS

Here are some suggested activities to accompany Adopt-A-Lake Projects. Feel free to adapt all or part of these suggestions to suit your program's needs.

Have Fun and Be Creative!

Wire Coat Hanger Mobile**

Materials:
- Wire Coat Hangers (sticks or other materials can be substituted)
- Scissors
- Old magazines, newspapers, other objects (absolutely anything!)
- String
- Glue
- File folders (or other heavy paper)
- Tape
- Construction Paper

Process:
1) Bend coat hanger (or use a stick if desired) in the form you want your mobile to be.
2) Collect pictures of lakes and images you relate to lakes and lake activities. Glue the pictures to old file folders cut in squares (or other shapes). You can also add other objects to your mobile that you think are appropriate.
3) Attach the pictures to your coat hanger/stick/etc. using string.
4) If time permits, let everyone talk about their creations and why they chose the objects, pictures, etc. they did for their mobile.

(Variation 1: Use only natural materials found near your lake (e.g., leaves, pine cones, twigs, wildflowers, grasses, nuts, feathers, shells, pebbles, etc. to design your mobile)

(Variation 2: Instead of a mobile, make a collage of items you think are related to lakes and water)

Lake Models

Materials:
- Cardboard
- Paints and paint brushes
- Markers
- Construction Paper
- Clay or other material(s) to provide a 3-dimensional effect
- Natural materials (sticks, sand, grasses, leaves, shells, etc.)

Process:
1) Study the geography of your lake. How big is your lake? Are there any buildings or other structures on or around your lake? What sorts of trees surround the lake? Take an inventory of your lake and record your observations.

2) Collect materials which can represent the various characteristics of the lake you study.

3) Create a scale model of your lake using the materials you collect and other items you think are appropriate to represent your lake.

Lake Views

Materials:
- Paper
- Pencils
- Cardboard or other heavy paper
- Markers, Crayons
- Paints and Paint Brushes

Process:
1) Make a "view finder" by cutting a small square of rectangle (approx. 1.5 X 3 inches) in a small piece of cardboard. Trace your view finder on a piece of drawing paper (3 or 4 tracings of the square or rectangle should fit on one piece of sketch paper).

2) Using a view finder can give you different perspectives of your lake. Looking through your view finder at the lake, sketch the area you see in one of the tracings you drew on sketch paper. Use different angles and distances; sketch some views of objects up-close and others from a distance.

3) Having these new perspectives, make a larger drawing or painting of the lake.
Lake Scenes**

Materials:
Piece of log, wood, driftwood, rock, other natural material
Glue
Small objects gathered from your lake such as:
   Pebbles, shells, small branches, leaves, bracket fungi, etc. (try not to use living organisms — respect the needs of the lake ecosystem)
Paper
Scissors
Markers, crayons
Paints and paint brushes

Process:
1) Glue natural objects such as pebbles, sand, or small branches, grass on a piece of wood/rock.
2) Use paints or markers to add design.
3) Cut out paper and glue onto the art design, if desired. You can also use paints to create lakes. Add cut-out animals, people, buildings, etc. to your lake scene.

(Variation: Make a "picture frame" on the ground near your lake using twigs or other natural material. Create a nature scene within your frame using all natural materials found near your chosen artwork site. Leave your artwork on the ground for others to see. Again, try not to disturb living organisms.)

Three Days on a River in a Red Canoe
by Vera B. Williams

Summary

Aunt Rose, Mom, cousin Sam, and the child narrator spend three days on the river in a red canoe. During the course of their journey they experience the river. The foursome canoes, camps, discovers wildlife, and explores nature along the river. Part story and part activity book, the story will entertain and teach your students about life on the river.

The outline below is a suggested plan for using the various activities that are presented in this unit. You should adapt these ideas to fit your own classroom situation.

<table>
<thead>
<tr>
<th>Sample Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Day I</strong></td>
</tr>
<tr>
<td>• Discuss and graph trips students have taken on the water.</td>
</tr>
<tr>
<td>• Demonstrate how much fresh water there is on earth. (page 21, Setting the Stage #2)</td>
</tr>
<tr>
<td>• Begin reading <em>Three Days on a River in a Red Canoe</em> (pages 1-7); begin journal.</td>
</tr>
<tr>
<td>• Daily Writing Activity (page 46)</td>
</tr>
<tr>
<td><strong>Day II</strong></td>
</tr>
<tr>
<td>• Continue reading <em>Three Days on a River...</em> (pages 8-16); continue journal.</td>
</tr>
<tr>
<td>• Daily Writing Activity (page 46)</td>
</tr>
<tr>
<td>• Decide on necessary camping items. (page 28)</td>
</tr>
<tr>
<td>• Try knot tying. (page 68)</td>
</tr>
<tr>
<td>• Complete Rivers of North America activity (page 24)</td>
</tr>
</tbody>
</table>

| **Day III** |
| • Continue reading *Three Days on a River...* (pages 17-22); continue journal. |
| • Daily Writing Activity (page 46) |
| • Water Demonstration #4. (page 54) |
| • Learn about the Water Cycle. (page 60) |

| **Day IV** |
| • Finish reading *Three Days on a River...* (pages 23-30) |
| • Daily Writing Activity (page 46) |
| • Complete Three Day Journal. (pages 22- 23) |
| • Water Demonstration #5 (page 54) |
| • Steamed or Boiled? Experiment through cooking (page 66). |
Overview of Activities

SETTING THE STAGE

1. Ask the students if they have taken a trip that had anything to do with water. If there are several, make a graph after discussing how to classify them (e.g., trip on a boat, a city by water, swimming, etc.).

2. Fill a 1 liter container and ask the students to imagine this represents all the water on earth. If you were to take all the fresh water out of the container (i.e. all the water in all rivers, lakes, wells, reservoirs, etc.) how much of the 1 liter should you take out? Take responses. Use a dropper and take out one centiliter. Show the students the difference.

ENJOYING THE STORY

1. Read the story in four sections, pausing after each one for a brief discussion. Give the students time to share their thoughts.

2. Directions for tying a half-hitch are given on page 12 of the story. Let students practice these knots.

3. Complete the Three Day Journal (pages 22-23) to retell the story. This can be done after the book is completed or as you read each section. Let students create a cover, illustrating it with a favorite scene.

EXTENDING THE BOOK

1. Form cooperative groups. Have groups make lists of what they would need to go camping for a weekend. Share the lists. Get ads from a grocery story and have the groups buy food for a weekend. Give them a budget.

2. Use Rivers of North America (page 24) to expand students’ knowledge of geography.

3. Do some more water demonstrations (page 54). Complete demonstrations 4 and 5. Monitor students’ use of their little books.

4. Experiment through cooking. Talk about how water is used in cooking. Take a poll in class to determine whether vegetables would taste better steamed or boiled. Then complete page 66 and poll the class again. Which did the students enjoy more?

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Vocabulary and Spelling
August 28-September 1

Three Days on a River in a Red Canoe

We will choose 10 of these words for this week, and 10 for the following week. Some will NOT be for spelling, just reading.

canoe  river
noticed  life jackets
paddle  *freeze-dried
bought  waterproof
*pocketknives  *mosquitoes
poked  hardly
mist  roaring
waterfall  though
dessert  *bonfire
*half hitches  *scouring powder
tongues  *axhead
predictor  cocoa
current  meadow
discovered  agreed
spread  creaked
*whooshed  travels
midnight  stumble

*Sight words only
Three Day Journal (cont.)

Second Day on the River

Most important thing about today:

---

Third Day on the River

Most important thing about today:
Types Of Knots

Background

A knowledge of how to handle ropes has been, and still is, important to sailors and many other people. The knots below are examples of the two main classes of knots.

"Stopper knots" are those that are tied to one end of a rope. They can be used to keep the rope from going through a hole, a pulley, or for handholds. They also can be used for decorations. "Binding knots" are ones that are used to tie ends of ropes together—for example, you use binding knots when tying a package.

Stopper Knot: A Figure Eight Knot

The figure eight knot was the most popular of stopper knots for most sailors. It begins with an over and loop (1). Then the loose end is brought around and through the loop (2). The finished knot should look like the number eight.

Binding Knot: Square Knot

Sailors used this knot when furling sails. We use it for tying packages, among other uses. It is a useful knot because it is strong, yet can easily be untied. Begin by passing the left end over and under the right end (1). Then cross what is now the right end over and under the left. (2) Pull tight.

Binding Knot: Surgeon's Knot

This is a knot which doctor's sometimes use in operations. Begin by passing the left end under and over the right twice, and then under one more time (1). What is now the right end is then passed under, over and under what is now the left end (2).
Decisions, Decisions

When the family went camping, they had to make some decisions about what to take and what to leave behind. Look at the list below. Rate the items from the most important (#1) to the least important (#20):

<table>
<thead>
<tr>
<th>Item</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>rubber bands</td>
<td></td>
</tr>
<tr>
<td>matches</td>
<td></td>
</tr>
<tr>
<td>pan</td>
<td></td>
</tr>
<tr>
<td>paper clips</td>
<td></td>
</tr>
<tr>
<td>blankets</td>
<td></td>
</tr>
<tr>
<td>compass</td>
<td></td>
</tr>
<tr>
<td>hatchet</td>
<td></td>
</tr>
<tr>
<td>candles</td>
<td></td>
</tr>
<tr>
<td>flashlight</td>
<td></td>
</tr>
<tr>
<td>pencil</td>
<td></td>
</tr>
<tr>
<td>map of the region</td>
<td></td>
</tr>
<tr>
<td>ball of string</td>
<td></td>
</tr>
<tr>
<td>extra batteries</td>
<td></td>
</tr>
<tr>
<td>knife</td>
<td></td>
</tr>
<tr>
<td>tent</td>
<td></td>
</tr>
<tr>
<td>sunglasses</td>
<td></td>
</tr>
<tr>
<td>paper</td>
<td></td>
</tr>
<tr>
<td>forks/knives/spoons</td>
<td></td>
</tr>
<tr>
<td>canteen</td>
<td></td>
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<tr>
<td>sleeping bag</td>
<td></td>
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</tbody>
</table>

Discuss what you thought about to make your decisions.

Can you think of other things you think you would need?

Extension: How much space would you need if you actually got everything together that you think you would need for a three day hike?
7th Grade

Lakes Project

Fall of 1995
7th Grade Groups

A  B  C  D
Nikki Cort Ben Angela
Bryan B. Jillian Heather B. Frank
Adena Scott Blair Keegan
Jake Erica Brian G. Alicia
Darren Bobby Ryan Kim
Heather S. Kirsten Katie Matt
Kit Willy Jesse Nick
Jessica Jon Sadie Carly
Luke

7th Grade Schedule

Thursday, Ropes Course at Camp Manitowish
Friday, Lakes Project on Van Vliet Lake

8:30-9:00 Departure for Van Vliet Lake

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>A&amp;B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00-10:15</td>
<td>Mapping and Journaling</td>
<td>A&amp;B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>10:15-11:30</td>
<td>A&amp;B</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:30-12:00</td>
<td>Lunch at Treb's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:00-1:15</td>
<td>C&amp;D</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:15-2:30</td>
<td>C&amp;D</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:30-3:00</td>
<td>Clean Up and Return to Treb's for Pick Up</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
September 15, 1995

Dear Parent(s),

The teacher's at North Lakeland Elementary School received a Lakes Planning Grant this summer from the Wisconsin Department of Natural Resources to conduct Lake Studies with the student's. This year for Outdoor Education our focus will be on Lakes. We are calling the whole week "Lakes Week". Student's will be working in their classrooms on projects which revolve around lakes and "Lake Studies". Attached is the agenda for the 7th grade class. We will be at Camp Manitowish on the 21st of September to use the Ropes Course. It is a course designed to promote personal and education growth. Skills including teamwork, communication, trust, cooperation, decision making and risk taking will be used and strengthened as the students work together as a group. Then on Friday we will be out on Van Veliet Lake in Presque to work on our lake studies.

We need to ask that student's bring along a few items along with their camping gear. Following is a checklist which will help you to make sure that your child comes prepared.

For Class your child needs:
___ Rubber Boots or something to keep their feet dry in the water.
___ A life jacket

For camping your child needs:
___ Warm coat and Raincoat
___ Mittens/gloves
___ 2 pair of comfortable pants
___ Sweater or fleece top
___ 2 pair of heavy weight socks
___ 2 pair of light weight socks
___ Plastic bag for dirty clothes
___ Sun glasses
___ Toothbrush and toiletries
___ Flashlight
___ Warm Hat
___ Extra pair of shoes
___ 2 T-shirts

******************************************************************

__will/will not be staying over night at Camp Manitowish on Thursday night.

My son/daughter has my permission to take part in the cooperation activities and ropes course at Camp Manitowish on September 21st.

Signature__________________________________ Date________________

227
My Nature Journal

journal (jûr'nəl), n.
A record of daily happenings.

name ______________________
address ____________________
phone # ____________________
school ____________________
When you hike into the forest:

Get permission from your mother or father and tell them where you'll be.

Hike with a friend or an adult you know and trust.

Stay on main paths and trails or in places where you've been before.

Be prepared for weather, insects, and emergencies.
Bring a lunch or snack, extra clothing, and a loud whistle.

Mind your manners and share with others.

Be gentle to nature - take only photos and leave only footprints behind.

Be quiet and careful not to frighten away interesting wild things.

Explore with your senses but don't eat unfamiliar things.

Study the forest in different ways. Lie on your back and search the sky or look straight up the trunk of a tall tree.

Remember: The forest is a home to many living things. We must respect this home for we are only visitors.

IF YOU GET LOST!
Stay where you are until someone finds you.
Blow your whistle so people will hear.

IF YOU GET HURT!
Send your friend for help.
Blow your whistle so people will hear.
Use your senses to learn about this place.

In words or drawings tell about:

Things you see --

Sounds you hear --

Smells in the air --

Things you can touch --

Danger! Tasting or eating things in the forest could make you sick!
Many good foods do come from the forest. Can you name two of them?

1. __________________________ 2. __________________________

my group name is _____________________ location ____________________
trail name _____________________ site number ____ day/date _______
weather __________________________________ temperature ________
Using Other Senses -
(My thoughts & dreams.)

How does this place make you feel inside?
(Tell how you feel in words or drawings.)

A penny for your thoughts.
(Write or draw about anything else you are thinking.)
Water Clarity

Objective: To become aware of the range and types of instruments limnologists use to determine the "health" of a body of water. Students will be able to do simple water quality tests and understand the importance of those tests. They will graph results.

Activity: Students will be given previously collected data on water clarity for their lake, as well as, previous water chemistry information. They will then go to four different spots on the lake and collect water clarity information using a secchi disk. Students will also take water temperature and will complete PH tests. Simple water chemistry will be done time/equipment permitting. Students will then graph results and put it in their journal. Discuss what type of a lake is this?

Read/Discussion: In the interactive Lake Ecology student handbook, review the section on "Testing a Lake."

Discussion Question: What type of a lake are we testing? Can you think of any other lakes in the area which fit into the other two categories? Give your reasons.

Eutrophic: classification of a lake that is characterized by high nutrient levels leading to high populations of algae and aquatic weed.

Oligotrophic: If a lake possesses high levels of dissolved oxygen, an extremely high transparency and has sparse vegetation and low levels of plankton growth.

Mesotrophic: A lake that falls between the two extremes of eutrophic and oligotrophic.
7th Grade Lakes Unit
Van Vliet Lake
Pontoon Class

Pretest
Jigsaw
Lake Classification
Secchi disk
Lake Survey
Water Wizards
Water Clarity
Graph
Posttest
Conclusion
How to Use the Secchi Disc

1. Use the map of your lake and its marked sampling site(s) to proceed to the first site.

2. Anchor your boat at the sampling site. Remove your sunglasses. Unwind the Secchi disc rope from the dowel.

3. Lean over the shady side of the boat and slowly lower the disc into the water until it can no longer be seen.

4. Mark the rope at the water level with a clothespin.

5. Lower the disc a few more feet into the water. Slowly raise the disc. When the disc reappears, mark the rope at the water level with your fingers.

6. Form a loop between the clothespin and your fingers. Slide the clothespin to the center of the loop. Haul the disc back into the boat.

7. Carefully count the number of feet from the disc until you reach the clothespin. Round off to the nearest 1/4 foot.

8. Record the measurement on the data sheet.

9. If you are monitoring more than one site or lake, proceed to the next location and repeat steps 1-9.

10. Once back inside, carefully fill out the postcard to send to the DNR. Mail it as soon as you can.
Lake Classification

I. Write the type of lake over the picture of the lake and its water source.

1. seepage lake
2. impoundment
3. drainage lake
4. groundwater drainage lake

II. Trophic state is an indicator of water quality. These reflect a lake's nutrient and clarity levels (oligotrophic, mesotrophic, eutrophic). Write the trophic state category over each of the lake aging process illustrations.

1. oligotrophic
2. mesotrophic
3. eutrophic

III. Write the lake classification over each of the following illustrations (oligotrophic, mesotrophic, eutrophic).

1. oligotrophic
2. mesotrophic
3. eutrophic
**Water Wizards-Game**

**Objective:** To help students become aware of lake vocabulary.

**Activity:** Students will be divided into two groups. Each group will be given cards containing vocabulary words and the matching definition. The groups will be given 5 minutes to match the cards. The group with the most matches wins!
Critical Areas:
- W: Wetland
- SS: Steep Slop
- ES: Erodible shorelines/slopes
- NAP: Native Aquatic Plant beds
- SH: Species Habitat (spawning areas, endangered species habitat, eagle, loon nesting area, frogs, beavers)
- PA: Public Areas (Lodges, Restaurants, Gas Stations, Marinas)
- H: High Density water development
- NPS: Hazardous spill sites, landfills, storage tanks
- Significant non point pollution sources

Current Land Use:
- R: Residential
- CA: Commercial
- A: Agriculture
- I: Industrial
- F: Forestry
- I: Institutional
- TU: Transportation or Utility Corridors
1. water cycle

2. hydrologic cycle

3. watershed

4. contour maps

5. secchi disk

6. eutrophication

7. cultural eutrophication

8. eutrophic

9. water monitoring

10. limnologist

11. oligotrophic

12. mesotrophic

13. lake association
A Legacy of Lakes-Information Jigsaw

Objective: To help establish lake information awareness through becoming aware of lake history, classification, importance, and threats by different problems.

Activity: Groups of 2-3 of students will be given an information packet. The group will read through their packets and share the information in an information jigsaw.
Water and the History of Wisconsin

Take a look into the lakes and rivers of Wisconsin. You will find the history of our state reflected there. Native peoples appreciated lakes and rivers for the ample supply of food they provided—fish, shellfish, and aquatic plants, in particular, wild rice. Wisconsin's many waterways made trade and transportation possible. Burial mounds along waterways indicate the importance of lakes and rivers in the ceremonies of early native peoples.

Lakes and rivers also played an important role in the settlement of Wisconsin by Europeans especially as transportation corridors. The oldest European settlements in the state lie along rivers: Fort Howard, now Green Bay; Fort Winnebago, now Portage; and Fort Crawford, now Prairie du Chien.

Development occurred along lakes and rivers because they supplied drinking water and were a source of food. They provided a means for disposing sewage and, later, industrial waste. Lakes and rivers provided power and transportation for the lumber industry and the milling of grain. Pulp and paper mills and power utilities continue to rely heavily on water.

Just as the landscape of our state was shaped by the glaciers, the waters of Wisconsin have shaped the state's past and will continue to shape our future. Look into your local history. Did lakes or rivers play a role in the development of your community? Did your community develop because a dam could be built to power a mill?

Stop by your local library or historical society to investigate your community's past. Here are a few examples of the titles you might find:


The Importance of Lakes
Lakes are important to the economy of Wisconsin. Many industries in the state rely heavily on our water resources for power, processing, cooling, cleaning, and waste removal. In addition, lakes are at the heart of Wisconsin’s hospitality, recreation, and tourism industry. In 1990, this industry generated $5.4 billion in revenue.

Wisconsin’s lakes are popular recreation spots, due in part to their inherent beauty. Fishing, swimming, and boating are all popular forms of recreation in Wisconsin. In fact, Wisconsin ranks among the top states in the number of fishing licenses sold. Lakes provide solitude and an opportunity for quiet reflection. Many lake property owners are drawn to Wisconsin’s lakes for their aesthetic qualities.

Unfortunately, conflicting uses of Wisconsin’s lakes can result in reduced enjoyment of the pleasures that lakes provide. Our actions affect the quality of our lakes and rivers. We must work together to protect lakes to insure that future generations will continue to enjoy the opportunities lakes provide.

There are a number of excellent resources that can help you and your class or club learn more about lakes. This guide includes a section describing resource materials available regarding lakes. Consider using some of these resources to plan your Adopt-A-Lake project.
Classifying Wisconsin's Lakes
The word Wisconsin may be derived from a Chippewa word meaning "gathering of waters." With roughly 15,000 lakes covering approximately 1,000,000 acres, Wisconsin is truly an appropriate name for our state.

Worldwide, lakes are formed through natural processes such as glacial scouring, meandering rivers, volcanic activity and earthquakes. Most of Wisconsin's lakes were formed in the wake of a retreating glacier over 10,000 years ago. In the southwestern part of the state--the unglaciated "driftless" region--there are fewer natural lakes than in the rest of the state.

Each of Wisconsin's lakes is unique. Physical, chemical, and biological characteristics affect the "personality" of the lake in your community. For example, conditions of lakes can vary based on topography, geology, or land use within the watershed.

Classification systems have been developed to help us better understand differences among lakes. Water sources and type of outflow provide the basis for one means of classifying lakes. For example:

- **Seepage Lakes** are the most common type of lake in Wisconsin. Precipitation, surface runoff, and groundwater flow are the main water sources for these lakes. Seepage lakes have no inlet or outlet. Fluctuations in the depths of seepage lakes can serve as an indicator of groundwater levels.

- **Drainage Lakes** have both an inlet and an outlet. A stream serves as the primary water source. Drainage lakes can be found along most major rivers in Wisconsin.

- **Groundwater Drainage Lakes** have no inlet, but are fed by groundwater flow. These lakes do have an outlet. Groundwater drainage lakes, common in northern Wisconsin, are the headwaters of many streams and rivers.

- **Impoundments** are created by damming rivers or streams to provide water power and for flood control. These lakes are also drained by rivers or streams though lake levels are regulated by man-made control structures. Though impoundments account for only 13% of Wisconsin's 15,000 lakes, some impoundments such as the Petenwell Flowage covering over 23,000 acres, are among the larger lakes in the state.

A lake's water source can help determine appropriate lake management practices. For example, leaking septic systems would be a concern for a lake association seeking to protect a groundwater drainage lake. Soil erosion would be a threat to a drainage lake. What is the primary water source for your lake? Does your lake have an inlet or an outlet? Determine the category in which your lake belongs.
Threatened Resources
Wisconsin’s lakes are threatened by many different problems. Some of the most serious problems are explained briefly below:

Sedimentation:
Sedimentation is one factor in the natural aging process of lakes. Soil and organic materials are moved by wind and rain into lakes resulting in a decrease in lake depth. Sedimentation alters the conditions of lake bottoms, covering habitat in which fish spawn, even smothering aquatic invertebrates. Certain farming and construction practices can cause increased levels of sedimentation in Wisconsin’s lakes.

Cultural Eutrophication:
Another factor in natural lake aging is eutrophication, the enrichment of lakes by nutrients such as nitrates and phosphates. However, cultural eutrophication is caused by human activities. Nutrients from sewage and surface runoff are fed into our lakes. As lakes become over-nourished, they can become choked by algae and plant growth.

Acid Deposition:
Commonly known as acid rain, acid deposition refers to deposition of acid and acid-forming compounds. What causes acid rain? Power plants and factories emit large quantities of sulfur dioxide and some nitrogen oxides. Automobile emissions contain large quantities of nitrogen oxides. As rainwater falls through air contaminated with these pollutants, sulfuric acid and nitric acid are formed and rainwater becomes more acidic. Acid deposition can make lakes more acidic and harm organisms that live in lakes. Due to the limited buffering capability of the soils and bedrock, lakes in north central Wisconsin are most sensitive to acid rain.
Toxic Contamination:
Toxins are poisons. Industrial and municipal wastes, which may contain toxic substances, are discharged into rivers and eventually reach lakes. Some toxic substances from farming or mining operations enter lakes through surface runoff. The introduction of these hazardous materials into lakes threatens these fragile aquatic communities.

To grow to one-pound, a bass must consume 10 pounds of minnows. Ten pounds of algae and zooplankton are needed to produce one pound of minnows. The diagram below illustrates this food pyramid.

![Food Pyramid Diagram]

Some toxic substances, consumed by a predator when it eats its prey, will remain in the predator's system. Over time, poisons accumulate from very low levels in the water to very high and damaging levels in bass, pike, or eagles. At each "bite" in the food chain, more and more of the toxic substance is accumulated.

For example, mercury, a toxic substance, can enter a lake from the atmosphere and be taken up into the food chain. Mercury levels can accumulate in the fatty tissue of sport fish. Any human or other animal who eats that fish could be consuming considerable amounts of mercury. In large quantities, toxic substances can cause illness or death, alter behavior, and lead to mutations. Some toxins, such as PCBs (Polychlorinated biphenyls) accumulate in living tissue more efficiently than mercury. Toxins can seriously impact predator populations. Bald eagles almost became extinct because they accumulated DDT and were unable to lay healthy eggs.
Exotic Species:
Species that have been introduced--accidentally or intentionally--into habitats in which they had not previously been found are called exotic. Often exotic species have no natural predators to keep their populations in check. As a result, exotic species may displace native species reducing the diversity of species in aquatic communities. Exotic species have even been termed "biological pollutants." The introduction of exotic species, such as Eurasian milfoil, has upset the balanced plant and animal community of Wisconsin’s lakes.

Shoreland Development:
Shoreland developments can detract from the natural beauty of the lake--the lake characteristic that is most appreciated by residents and other citizens. Many Wisconsin lakes are now ringed with cottages, homes, boathouses, and piers. This increasing development has resulted in decreased habitat for wildlife. When shoreland buffers are not maintained, increased sedimentation and eutrophication occur. The development of backlot subdivisions can also result in increased number of lake users.

User Conflicts:
User conflicts result in reduced enjoyment and opportunities for lake users. Shoreland development has contributed to the increasing numbers of lake users. Wisconsin’s lakes are experiencing expanded variety of uses as well. The size and horsepower of motorboats has increased and so has the number of personal watercraft. Increasingly, power boat traffic often conflicts with anchored fishing boats or unpowered watercraft, such as canoes and sailboards. As the uses of inland lakes grow, conflicts among the users of Wisconsin’s waters will continue to grow as well.
Appendix G

School Wide Activities
Lakes Trivia Contest

Questions will be read at the end of the day during home-room announcements. The first class to call in will receive a bag of tootsie rolls for the class. There will be a question for K-4 and one for 5-8 Monday, Tuesday and Wednesday. Good Luck!!! Classes who have already won may call in but the next class to get the correct answer who has not won will receive the prize.

Monday 9/18/95

K-4 Question: What is a Secchi disc used for?
Answer: It is used to determine water clarity

5-8 Question: List three names used to classify lakes.
Answer: Oligotrophic, Mesotrophic and eutrophic

Tuesday:

K-4 Question: What do raccoons do with their food before they eat it?
Answer: They appear to wash it.

5-8 Question: In what climate zone would you find icebergs?
Answer: Frigid

Wednesday:

K-4 Question: Salmon must complete a trip before laying their eggs. Which direction in the river do they go?
Answer: Upstream

5-8 Question: What percentage of an iceberg is hidden below the surface of the water?
Answer: About 90%.
Monday:

K-4 Question: Are iceburgs freshwater or salt water?
Answer: Freshwater

5-8 Question: What is the chemical symbol for water?
Answer: H2O

Tuesday:

K-4 Question: A pineapple is made up of mostly_______?
Answer: Water

5-8 Question: A person who studies lakes is called a ______?
Answer: Limnologist

Alternative Questions:

K-4 Question: How much of the human body is made up of water?
Answer: 2/3 rds

5-8 Question: What kind of energy is provided by the waterfall?
Answer: Hydroelectric Power Plant

K-4 Question: Does sound travel faster in salt water or fresh water?
Answer: In salt water, because it is closer to a solid than freshwater.

5-8 Question: Between which two Great Lakes does Niagara Falls lie?
Answer: Lake Erie and Lake Ontario

K-4 Question: Are iceburgs freshwater or saltwater?
Answer: Freshwater

5-8 Question: What percentage of an iceburg is hidden below the surface of the water?
Answer: About 90%
Appendix H

Lakes Data Collected
CARLIN LAKE
VILAS COUNTY, WI
C. 17, 19, 20 T. 43 N. R. 6 E.

ONTOUR INTERVALS IN METERS

Surface Area: 17 hectares

(1.71 km²)
Carlin Lake
9/21/96
11:00 P.M.
5th Grade

Secchi Depth: 13'
Temperature: 57 Degrees Fahrenheit
PH: 6.49-6.52
TIC: 1.16
TOC: 3.44

Critters: Crayfish, Leech, Frogs, Minnow, Water Strider, Fresh Water Clam, Tadpole, Damsfly Nymph, Snail.

Description of weather: Cloudy, windy, cold. Some snow and rain. We noticed that it looked as thought the lake was turning over because the water clarity had dropped from 13.5' on 9/10 to 13' on 9/21.

TIC= Total Inorganic Carbon
TOC= Total Organic Carbon
### Environmental Science Section

**Inorganic chemistry**

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<td>Time: 00:00</td>
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<tr>
<td>From:</td>
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<td></td>
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<tr>
<td>To:</td>
<td>BOB YOUNG</td>
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<td>DNR</td>
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#### Chemical Analysis

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<td>10. SU</td>
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Star Lake
9/21/96
11:00 P.M.
6th Grade

Secchi Depth: 17'
Temperature: 60 Degrees Fahrenheit
PH: 7.82-7.86
TIC: 10.28
TOC: 3.48

Critters: Water Scorpion, Crayfish, Snail, Ball (Water Penny?), Caddisfly Larva, Perch, Worm (Nematode?), Coontail, Algae.

Description of weather: Cold, Cloudy, and Windy. Some snow and rain.
Inorganic chemistry

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VAN VLIET LAKE
VELAS COUNTY, WISCONSIN
SEC. 16, 20, 21, T.43N. R.6E.

CONTOUR INTERVALS IN METERS

0
500M
1 KILOMETER

To: Jan Udels
From: Tim Kraft
10/24
Van Vliet Lake Data
9/21/96
11:00 P.M.
7th Grade

Secchi Depth: 4'
Temperature: 10 Degrees Centigrade
PH: 8.32-8.35
TIC: 16.42
TOC: 6.22

Critters: Mayfly Nyphs, Dobsonfly larva, Caddisfly Larva, Cranefly larva, Stonefly Nymps, Dashelfy nympha, Dragonfly Nymps, Scuds, Blackfly Larvae, Midge Larva, Crayfish, Snails (right foot), and some aquatic worms.

Description of weather: Cold, Cloudy and Windy. Some snow and rain.
March 7, 1996
Renn C. Karl

Re: Water Quality Investigations at Van Vliet Lake

Brief: As an attempt to develop a system for establishing water quality of Van Vliet Lake students used a macro invertebrate survey.

Procedure: Collection of macro invertebrates was conducted two ways. The first method of collection required using a long-handled net to loosen the detritus on the surface of the lake floor approximately 3-4 feet from the shoreline. The gathered debris was then emptied into a shallow rectangular pan marked with a grid. Invertebrates were picked from randomly selected squares until 100 had been gathered from that sample or 30 minutes has elapsed. In general each sampling site required two nets of detritus in order to continue gathering for the full 30 minutes. The macro invertebrates were then stored in glass jars and preserved in a mixture of ethanol and glycerin.

The second method of collection involved the placement of a miniature environment developed by several researchers called the “Tuffy Ball”. These TB’s are placed in groups of five near the net sampling sites in water approximately 1 meter in depth. The TB’s rest on the bottom secured by an anchor and tethered to a small float. Each TB is placed about 2 meters apart and parallel with the shore. After a 6 to 7 week placement period the TB’s were retrieved. The object was to disturb the TB as little as possible. This can be done by enclosing the TB in a plastic capture container. After capturing the TB, the entire unit was preserved in 95% alcohol solution. This allowed for later dissection at the lab. Five TB’s gave a total collection of about 100 macro invertebrates.

Data: Water quality data was based on macro invertebrate studies. Three methods of macro invertebrate study were utilized: family biotic indexing (a method originally adapted for streams), biodiversity indexing and sequence indexing. All techniques produced water quality results rating the lake as “high Quality” water. Students found a preponderance of Mayfly nymphs, Dobsonfly larva, Caddisfly larva, Stonefly nymphs, Damselfly nymphs, Dragonfly nymphs, Cranefly larva, Scuds, Black fly larvae, Midge larva, Crayfish, Snails (right foot), and some aquatic worms.
Appendix J

Staff Survey and Student Pre and Post Test
Lakes Week Staff Survey

Please answer the following questions as completely as possible so that the lakes week committee can help to make the inservices regarding the lakes project beneficial to all staff. Thanks for your time.

1. What is your main interest in lakes?

2. How should we schedule “Lakes Week” so that it will have the least impact on your regularly scheduled classes?

3. What type of unit would you consider developing for “Lakes Week?”

4. How much planning time would you need to devote to developing your unit for the “Lakes Week” project?
Lake Pretest

Student Name____________________

Student Grade____________________

Place the letter of the answer which best answers the question on the blank.

_____ 1. There are ______ number of names which classify lakes by age.
    A. 1
    B. 2
    C. 3
    D. 4

_____ 2. The following instrument tests the lake water for lake water transparency (clarity)
    A. Flow Meter
    B. Fathometer
    C. Secchi Disc
    D. Bathymetric Chart

_____ 3. A Limnologist is defined as...
    A. A person who studies lakes.
    B. A measure of time by which lakes are classified.
    C. An instrument used to measure the flow of water through a lake.
    D. A type of fish that lives in freshwater lakes and rivers.

_____ 4. The water cycle is also known as the ____________________.
    A. Precipitation cycle
    B. Evaporation cycle
    C. Hydrologic cycle
    D. Ground water cycle
5. What is a watershed?

A. A tank used to store and keep water.
B. Water that is absorbed by the soil and is still flowing downhill.
C. An area within which all water flows to the lowest spot and collects.
D. Water that has come down as precipitation and is on the earth’s surface.

6. A Lake Association is . . .

A. A group of people who live on or around a lake who want to pay lower taxes.
B. A group of people who live on or around a lake who form to plan social outings.
C. A governmental unit formed to develop legislation to make lake laws.
D. A group of concerned citizens living on or near a lake who develop a plan for the use of their lake.

Essay:

I value the lakes in Northern Wisconsin because?

Lakes are important to humans because?
Lake Post Test

Student Name_______________________________________

Student Grade_______________________________________

Place the letter of the answer which best answers the question on the blank.

_____1. There are ______ number of names which classify lakes by age.
   A. 1
   B. 2
   C. 3
   D. 4

_____2. The following instrument tests the lake water for lake water transparency (clarity)
   A. Flow Meter
   B. Fathometer
   C. Secchi Disc
   D. Bathymetric Chart

_____3. A Limnologist is defined as...
   A. A person who studies lakes.
   B. A measure of time by which lakes are classified.
   C. An instrument used to measure the flow of water through a lake.
   D. A type of fish that lives in freshwater lakes and rivers.

_____4. The water cycle is also known as the ____________________.
   A. Precipitation cycle
   B. Evaporation cycle
   C. Hydrologic cycle
   D. Ground water cycle
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Tables
Table #1
Staff Survey Results

17 of the 25 staff at NLES answered the survey.

1. What is your main interest in lakes?
   - 85% Concerns about overuse, pollution, better building ordinances, good stewardship practices.
   - 15% FUN, Boating, fishing and water sports.

2. How should we schedule “Lakes Week” so that it will have the least impact on your regularly scheduled classes?
   - 100% During Outdoor Education Week.

3. What type of unit would you consider developing for “Lakes Week?”
   - 80% Integrated, thematic, interdisciplinary units.
   - 10% Teacher follows student group with Adopt-A-Lake
   - 10% Integrated with Social Studies, Reading and English.

4. How much planning time would you need to devote to developing your unit for the “Lakes Week” project?
   - 50% Same amount of time as we need to develop a unit for Outdoor Ed.
   - 10% Possibly two hours/not sure.
   - 10% 8 hours
   - 30% About the same amount of time as it took to prepare for the space unit.
Student’s in 5th-7th Grade were given a six question Post-Test and a six Question Pretest about Lakes. The results were then tallied and documented to determine if the students had learned what teachers had determined would be beneficial for the students to learn during North Lakeland Elementary School’s Lakes Week Project.

Results are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Lakes Pre Test</th>
<th>Lakes Post Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>5th Grade</td>
<td>43% correct</td>
<td>70% correct</td>
</tr>
<tr>
<td>6th Grade</td>
<td>52% correct</td>
<td>79% correct</td>
</tr>
<tr>
<td>7th Grade</td>
<td>55% correct</td>
<td>85% correct</td>
</tr>
</tbody>
</table>