

FOREST
INVESTIGATIONS
& RESEARCH

A Learning Resource

For

Outdoor Education Centres

Offered by:

Blue Lake Forest Education Society

The Blue Lake Forest Education Society (BLFES) would like to welcome you to Blue Lake and thank you for your interest in our facility and programs. Blue Lake has been an active member in community education and public information for over twenty years, and has developed a positive reputation for providing quality service and credible programs.

This information package has been developed to help guide you in the planning of a 3-5 day program at Blue Lake. The variety of facilities, services, and ecosystems present in the Blue Lake area offer you and your group an abundance of recreational and educational opportunities. These outdoor classrooms provide exciting possibilities for experiential learning in areas such as pond, stream and lakeshore studies, wildlife habitats and wildlife issues, soil structures, ecology and forestry. As well, Blue Lake residential camping experiences provide students with unique opportunities to develop social and community skills, respect for others and the development of self-esteem. Blue Lake programs can provide students and teachers alike with long-lasting memories and skills.

The Blue Lake staff are there for you the group leader. Our experienced outdoor leaders can provide many varied services to suit all your needs. Please do not hesitate to take advantage of our pre-trip planning sessions. We can help you with your planning, through a presentation to other group leaders, parents or students. We can also help with your trip organization, structure and suggest areas that are suited for your educational or recreational needs. Staff will also be present on-site to assist with your every need, from program leadership, organization of games and activities, first aid, and lifeguarding to our ever popular campfire programs. Blue Lake staff can help, don't hesitate to call.

The Blue Lake Centre has been in operation for twenty years, providing forest, environment and recreation education and activities to the general public. In January 1996 the Blue Lake Forest Education Society (BLFES) was formed to take over the Blue Lake operations. The BLFES is a community based, registered non-profit organization dedicated to providing youth and the general public with opportunities to recreate in and learn about BC's forested lands and resources. The Board of Directors consist of volunteers from the East and West Kootenays and the Columbia Valley, ensuring a locally driven organization. A diverse group of people, they come from the forest industry, school districts - both teachers and trustees, small businesses, local Colleges, youth organizations, and individuals.

We look forward to you and your group staying with us at Blue Lake, we know you will enjoy your stay. Remember, do not hesitate to call our staff if you have any questions regarding the materials contained in the manual, or you need some assistance in organizing your group, or for a class, group or parents presentation, we are here to help.

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INTRODUCTION

Forest Investigation & Research (FIR) investigates forest ecosystems - its effect on forest components and on ourselves, and its responsible care and management. It is focused on the forest environment surrounding Blue Lake Centre. Designed to be used by Grade 4 - 7 students, the FIR program offers a three-day experiential learning experience, as well as at-school activities to first orient the student and post camp activities to later culminate the camp experience.

FIR was developed to assist teachers with suggestions for planning and preparing an effective and enjoyable forest camp program. Experienced camp planners may wish to use FIR as a core of activities, extending and substituting other teaching ideas as necessary to fill out the camp schedule.

Why Forest Education?

As we begin to realize that society can no longer look for scientific technologies to solve all our problems, we must instead turn to ourselves to make change, to develop a new ethic - a responsible attitude of caring for the Earth. As students determine and continually redefine their needs, they are able to discover personal relevance, explore values, and develop skills and attitudes related to environment. Forest education provides students with opportunities to identify their beliefs and opinions, reflect on a range of views, and ultimately make informed and responsible choices.

FIR facilitates this change in attitude and helps develop the required skills. It provides students with opportunities to experience and investigate the relationships linking individuals, societies, and natural surroundings.

Why a Forest Education Centre?

School camp allows students to experience a range of connections with a forest ecosystem that is tangible and immediate. In the process, students form their own community while at the Centre. "Going to camp" is a phrase that brings out excitement in children; it implies a sense of fun, self-discovery, and inquiry. The sights, sounds, smell, textures, and atmosphere of an outdoor camp setting stimulates students and teachers alike, providing opportunity to discover, question, and observe first hand. Blue Lake puts learning into a real-life context in a way that is not always possible within the classroom. At Blue Lake, the students:

- make decisions about the forest environment in a forest environment
- learn through the direct experience approach, which accommodates different learning styles
- progress faster, retain information longer, and gain a deeper understanding and appreciation of forest education
- learn through visual, auditory, and kinesthetic experiences
- use the five senses to learn: smell, taste, touch, sound, sight
- learn not only about the environment, but they learn about themselves and others
- learn and have fun at the same time

FIR's Overview: A Curriculum-Based Approach

FOREST INVESTIGATIONS AND RESEARCH (FIR) presents a study unit for Environment Education / Sustainable Societies, in support of the prescribed curriculum of the province.

FIR is based on concepts of interdependence within a large forest ecosystem. All components of this ecosystem, whether biotic (living) or abiotic (non-living), affect the system. All are dependent upon each other in many different relationships and internal sub-systems. Humans are included as part of these systems.

FIR focuses on:

- exploring forest ecosystems
- identifying roles of forest ecosystems in:
 - the lives of forest plants and animals
 - the lives of humans
 - investigating ways of managing and caring for forest ecosystems
- Biodiversity and Natural Disturbance

Activities direct students to consider hypothetical problems and/or make decisions about forest ecosystems and their management. They will be asked to use an inquiry approach to hypothesize, investigate, gather data, and evaluate their findings. Group discussion and the sharing of perspectives and opinions will help students broaden their understanding of the forest experience.

Students will explore the concept of interdependence by looking at connections between:

- human needs and needs of the other members of an ecosystem;
- human activities and activities of the other members of an ecosystem.

The activities also offer the opportunity for students to gain skills in responsible social and personal behavior. School camp may be likened to a “mini-community” gathering in an exciting new setting to work and play together, promoting the development of mutual respect and cooperation among its members. Students focus on personal health and safety in planning

and sharing basic camp chores, and in recreation sessions where they gain insights into the wealth of outdoor pursuits available to them in this province. There is time for personal discovery and growth. Students experience new ways of relating to themselves, the teaching staff, and the forest environment around them.

What's In The FIR Package?

The major components in this package are:

Camp Planning

How to organize a successful school camp, including tips and suggestions for dealing with logistics, budgets, supplies, transportation, timelines, planning, and much more.

See **Appendix A** for Sample Lists and Forms.

Administration

Sample lists and forms, and guidelines to use in developing your own.

Pre-Camp Activities

Lessons that develop the necessary skills and knowledge base to prepare students for their camp experience.

At-Camp Activities

Activities based in the concepts of interdependence, designed with the camp setting in mind.

Recreational Activities

Games that complement the concepts of interdependence, designed with the camp setting in mind.

Post-Camp Activities

Wrap-up activities to use when back in the classroom, where students share and compare their experiences.

Evaluation

Forms are available to assist students, teaching staff, and volunteers in providing feedback to BLFES.

The BLFES is pleased to offer advice and assistance for teachers planning outdoor school programs. Please feel free to contact the Society office and talk with our staff, who can help you with your planning.

Other teachers in your school or district who have prior camp experience can be valuable sources of information and advice.

Location

BLUE LAKE CENTRE

85 km north of Cranbrook then
26 km northwest of Canal Flats
phone (250) 426-3676 or
(250) 426-3933 (fax)

See **Appendix B** for a map.

Planning Checklist

Adequate planning is essential to the success of your outdoor program, and should be completed well before your camp booking.

Here are some guidelines:

Cost

- How much will it cost, and how will you raise the funds?

Transportation

- How are you going to transport the students?

Communication

- How will you make certain the parents are informed and supportive?
- Are school and district staff aware and supportive of your plans?

Supervision and Safety

- Are there enough adult supervisors and do they understand what to do?
- Are safety and medical considerations addressed?

Gear

- Are the students properly outfitted with clothing and other equipment?

What Are the School District Policies?

Most districts have policies and publish guidelines for taking students on residential field trips. They will be important to establish direction on the following:

Fundraising

- What is acceptable and successful in your district?

Advance Notice

- What notification does the district require of your plans and of your proposed camp schedule?
- What forms and signatures of authorization need to be obtained?
- What Parental Consent forms, Medical forms, or Transportation forms are required?

Approved Transportation

- What regulations are there for the use of school district buses?
- Is there a list of approved bus companies?
- What are the regulations for volunteer parent drivers?
- Are there special insurance considerations?

Qualifications

- What district guidelines are there specifying qualified first aid attendants, canoeing instructors, lifeguards, other adult supervisors?

Student/Adult Ratios

- What guidelines are there for acceptable student/staff ratios? These should be considered when organizing sleeping arrangements, recreation activities, and teaching activities.

How Much Is It Going To Cost?

It is important that all costs are taken into account, arriving at a “cost per student” as early as possible. This will help determine how much fundraising is required, and how much of the cost each student will be expected to contribute. Typically, camp costs will include:

Camp Rental

Cost of renting the facility.
Meals include breakfast, lunch, and dinner for all students, teachers, volunteers, and visitors.

Transportation Costs

Cost of renting buses.
Will the budget cover the gas of volunteer drivers or is that part of volunteering?

Extras

Allow for special snacks, special field trips, stop-overs to and from camp, photographic supplies, etc.

First Aid

Cost of any additional supplies not provided by Blue Lake.

Teachers-On-Call

Substitute costs for any staff members who may accompany the class.

Teaching Supplies

Materials needed for the classroom activities that are not available through your school.

Good financial planning will ensure that you are accountable to parents and school administrators. Remember to include taxes and GST where applicable, as these are often not included when prices are quoted.

Where Will We Get the Money?

Fundraising is often necessary, and fundraising activities can be valuable learning experiences for the students. They provide excellent opportunities for cooperation among children, parents, the school, and the community.

Some considerations to keep in mind:

- Find out what your school and school district policies are regarding fundraising. These differ considerably from district to district, ranging from policies that stipulate that parents are not to be approached to pay anything towards the cost of such an activity, to policies that indicate strict

guidelines about the type of fundraising that may be carried out.

- Investigate district sources of funds for residential field studies.
- Look into community grants and other external sources. Some schools have had good success in approaching local companies, business groups, or service clubs who are interested in supporting youth activities in their communities.
- It may be possible to include fundraising for camp as part of a larger fundraising drive being conducted by the school.
- Explore the potential for support from parents. In some cases they are willing to pay most of the costs themselves. In most cases they will require assurance that fundraising is a worthwhile endeavour for students, and that it will not take away from learning time. Look for volunteers who would be available to assist the class with coordinating the activity.

The following suggestions may assist in your fundraising:

- Set up a class bank account. Encourage students to save some of their money each week and to make a deposit into the account under their own name. When it is time to pay camp expenses the amount saved by each person is subtracted from their personal costs. Any bank interest earned by the account could be contributed to over-all costs.
- Hold a student garage sale, where students clean out some of their outdated treasures to sell at lunchtime to children of other classes.
- Hold lunchtime or after school student concessions a couple of afternoons a week over a period of several weeks, selling popcorn, freezies, etc., to the school population.
- Have children gather pledges from friends and relatives for books read, spelling lists learned, etc.
- In many locations the community will get behind school events such as car washes, pledging for community pitch-in drives, etc.

- If you are planning to do the Post-Camp Activity “Class Newsletter” you may wish to approach organizations and community groups as potential field trip sponsors in exchange for a mention in your newsletter.

Are There Special Funding Concerns?

There is always a few special situations to work out. Remember to consider the following:

- Who pays for the adults who will attend camp with the students? Are their expenses to be included in the fees charged to the students? There are differing opinions about dealing with teacher and adult volunteer expenses. Investigate how this has been handled in your school or district in the past.
- Who pays for the student whose family cannot afford the camp fee? Many districts have special assistance funds which can help with this situation. Some schools have their own funds. Local service clubs, church groups, or community groups may also be able to sponsor students.

Pre-Planning With Blue Lake

The Blue Lake Centre operates under policies designed to protect the safety, health, and personal enjoyment of all camp participants, including students, teaching staff, and volunteers. The staff require advanced information about your group and your plans to allow them to formulate their own schedules for taking care of your needs. As well, Blue Lake staff are available to assist with pre-planning and at camp activities. If you are interested in assistance with planning, please contact the program manager in the early stages of planning your camp program. You will be rewarded with valuable information about the logistics of running an outdoor school at the facility.

The following topic points should be included in your planning discussion:

Travel directions

How to get there, including road conditions and weather.

HOW TO GET TO BLUE LAKE --

From Cranbrook

Drive North from Cranbrook on highway 95/3 for approximately 6 km. Follow directional signs and turn right taking highway 95/93 north. Follow this highway for approximately 79 km to the old Thunderhill Provincial Park turnoff which is approximately 2 km north of the town of Canal Flats near the top of the big hill. As you make a left off the main highway, you will immediately notice a Blue Lake sign. Follow the Blue Lake directional signs for 26 km until you reach Blue Lake. These signs are clearly visible.

From Invermere

Drive south along highway 95/93 towards Canal Flats for approximately 45 km. You will enter a long, sweeping left hand curve in the road as you approach the long hill approximately 2 km north of Canal Flats. Near the end of this curve, there is a right hand turn-off (the old Thunderhill Provincial Park turn-off). Once you are on this side road, you will immediately notice a Blue Lake Centre sign. Continue following the Blue Lake directional signs for 26 km until you reach Blue Lake. These signs are clearly visible.

The map in Appendix B will help you identify distances between important directional signs.

Camp Visit

Pre-camp visits are possible -- please contact the program manager if you are interested. Another option to get to know the camp is a slide presentation by a Blue Lake Staff to teachers, students or/and parents.

If you decide to do a pre-camp visit, be certain to review the Pre-Camp Activities to see how they relate to the site. As well, check outdoor and indoor study areas, sleeping areas for students and teaching staff, washrooms, staff rooms, recreation facilities, hiking trails, First Aid room, etc. Take some photos and/or slides to show the students and parents.

CAMP FACILITIES

Wood Heated Panabode and Log Cabins

- Total summer capacity of 84 people
- Total winter capacity of 72 people
- 6-8 people per cabin
- Fire safety equipment in each cabin

Wash House

- Separate boys and girls facilities
- Each equipped with showers, toilets, sinks and mirrors

First Aid Room

The Blue Lake Centre has a fully equipped first aid facility which includes an experienced and qualified first-aid attendant, emergency transport vehicle, and emergency contacts with medical support services. If you choose to have a resource person present, than this option is possible. More information on this option will be discussed in the "Optional Resources" section of this package.

Cook House and Dining Hall

- A large walk in cooler
- A large stove and grill
- 2 ovens
- Eating utensils for 100 people
- A wide variety of cooking utensils
- A large propane BBQ (please ask staff before using)
- Electric lights (on site electricity is limited)

Murray Hall

A large open-spaced heated indoor gathering area is available for a variety of educational and recreational uses. Fluorescent lighting is available upon request and an additional cost.

Education Trail System

Blue Lake Centre offers approximately 100 Km of hiking, biking, and cross-country skiing trails (maps are available on site).

Water Front Area

- 2 docks with a swimming area located between them
- 10 canoes equipped with paddles and life jackets
- A qualified National Lifeguard Service supervisor is available, upon request.

Picnic Area

- A large covered, open-sided outdoor shelter
- Equipped with picnic tables
- Located near the water front
- Provides outdoor educational opportunities during inclement weather.

Camp Fire Area

- a large sandy area
- provides seating for about 75 people around the firepit
- located near the lake shore
- available for use year round

Blue Lake Centre Map -- Appendix C**Student Supervision**

Discuss camp policies and student/staff ratios to be certain there will be an adequate number of adults to take care of your staffing needs for teaching and supervision. Determine how the Program Manager will be involved in your camp: this will vary depending upon your needs and the availability of camp staff to assist with programming.

Program Manager

Upon request, a Program Manager will be provided to assist you with your programs. This individual will be knowledgeable about the Blue Lake area and will also be familiar with the needs of large groups in a camp setting, (both camper needs and teacher needs). The Program

Manager is available to help teach the FIR program and other programs, but we encourage all teachers to become involved in teaching the various programs as a combined effort produces the best results so both teachers and students get the most out of their Blue Lake experience. This approach also gives the Program Manager the time to provide your group with the total experience that Blue Lake is known for.

Menus

Agree on menus, meal times, and any dietary concerns. Remember to discuss any snacks or extras you may wish to include.

Camp Cook (see rate sheet)

Upon request, we can provide your group with a qualified, professional cook. This service includes everything from menu planning and food ordering/delivery to the preparation of tasty and nutritious meals along with desserts and beverages. A hot beverage and snack will also be served during the evening campfire. If we are given enough advance notice, the cook can make provisions for any dietary concerns.

Safety and First Aid

Clarify with the Program Manager how these issues will be handled and who will be responsible for dealing with them. What camp policies are in place regarding safety, emergency and First Aid? What school district policies must you follow? Who will provide the First Aid supplies? Who will administer them? What medical information will students need to provide? What forms or paperwork will be needed? Where is the nearest medical facility? Is there a vehicle available for transporting students to the hospital should an emergency occur? If the program manager is present with your group, a first aid attendant is supplied; otherwise, you must supply your own.

Life Guard

Upon request, a National Lifeguard Service and CPR qualified lifeguard will be available to supervise the waterfront area when needed. If you choose not to use Blue Lake's qualified lifeguard, you must provide your own lifeguard who is currently certified with National Lifeguard Service. If no such lifeguard is

present at the waterfront area, no swimming can take place. If the program manager is present with your group, a lifeguard is supplied.

First Aid Attendant

Upon request, a qualified First-Aid attendant will be provided. This option includes 24-hour first-aid service, the use of emergency transport vehicles, and emergency medical systems. All necessary equipment and supplies are included. If you choose not to use Blue Lake's first-aid attendant, you must ensure that you are able to provide the above mentioned first-aid services in the event of an emergency.

To ensure that your Blue Lake experience is a memorable and enjoyable one, safety measures of the highest levels must be maintained. For liability and safety reasons, we strongly recommend the use of our qualified staff. All certifications of Blue Lake staff are current to ensure the latest up-to-date safety procedures and techniques.

Special Needs

The Camps have "basic" facilities, but staff will try to accommodate your special needs students with the resources that are available. Discuss these with BLFES staff to determine how these children will be accommodated.

Equipment and Materials

Appendix A includes an Equipment List for campers and teachers. You may wish to bring additional equipment and materials with you to meet your students' specific needs. If you have any questions regarding additional resource materials not listed, contact the Blue Lake Forest Education Society.

Student Groupings

Have your cabin groups, study groups and duty groups organized well in advance. Ensure they are workable with the available teaching staff and supervisors. The Program Manager can advise about cabin and work station capacities. This information will greatly assist you in setting up your schedules and organizing your staff.

Camp Chores

These duties are considered to be integral to the camp experience for all students. The Program

Manager can advise about setting up effective procedures.

DUTY GROUPS

The following duty groups are designed to ensure that cleanliness and discipline are maintained and everyone has the maximum amount of time to devote to what camp is all about: learning and having fun. The duties should be rotated to allow all campers the opportunity of performing various camp chores. Duty groups should consist of 8-10 campers and must be under the supervision of an adult as a lack of adult supervision usually results in the task needing to be performed again.

Roustabouts:

- Before Meals;
- show up 15 minutes before meal time
 - put away any dishes from the previous meal
 - set up dining room with the necessary utensils, plates, etc.
 - see the cook for setting out any condiments, etc.

- After Meals
- clear tables
 - wipe off tables and benches
 - sweep and then mop floors
 - sweep the front porch and steps

Kitchen Patrols (KP):

- clean dishes (wash, rinse, disinfect)
- place dish racks on clean tables to air dry
- put left over food away
- wipe all counters
- if full, empty garbage and place in the trailer behind the dining hall.

Replace the garbage bag

- sweep then mop floor
- clean the stove and grill
- help the cook with other tasks

Royal Order of Sanitary Engineers (R.O.S.E.):

Wash Houses:

- clean sinks, counters and mirrors
- replace toilet paper and paper towel as needed

- if full, empty garbages and place in the trailer behind the dining hall; replace garbage bags
- clean toilets
- sweep floors

Mornings Only - mop floors

Evenings Only - disinfect showers

Grounds:

Breakfast:

- pick up garbage in the compound, down the trails and by the beach
- check all garbages and empty if full
- replace garbage bags
- clean Murray Hall if used the night before

Lunch:

- clean the boat house
- hang up paddles and PFDs
- sweep out the boat house
- sweep the docks

Dinner:

- prepare for campfire
- stack wood in the campfire woodbin
- clean up and rake the campfire area

Composting:

Blue Lake encourages the composting of any wasted fruit or vegetable materials. The students will have a chance to participate in this program during meals. It is important to note that Blue Lake Staff encourages the students to take only what they need to eat.

Appendix D gives example of duty schedule.

Camp Regulations and Helpful Hints

Group size necessitates certain regulations which must be followed and your co-operation is essential. The following regulations and suggestions will help to ensure a safe and enjoyable stay at Blue Lake.

Cook House and Dining Hall

- Please ensure that the kitchen is as clean when you leave as when you arrive. This is your responsibility.
- When providing your own meal service, duties and kitchen staff should be organized well in advance of arriving at the Centre. Campers designated for dining hall duties must be supervised by adults.
- Due to it's possible effect on table setting and clean up, please check with the cooking staff before using the dining hall for instruction.
- A happy and relaxed group is great and it is even better when campers and staff observe good etiquette during meals. Hats are not to be worn in the cook house or dining hall but shirts and shoes must be worn at all time.

Cabins

- Groups are responsible for keeping their bunks and cabins in a clean and tidy condition.
- We ask all campers to show respect for the camp facilities by not carving or marking the walls. Unnecessary damages will be charged for.
- Due to fire regulations, doors must not be bolted.
- When using the wood heating systems, proper lighting and burning instructions are to be given by the adult supervisors.
- The fire extinguishers are to be used for emergency fires only. If improperly used, the group will be charged for the refill.
- Smoke detectors are present in the cabins for your safety. Please do not disconnect them. If they are not working, please notify the Program Manager or the Caretaker.
- Any wood used for the cabin heaters must be replenished from the large wood piles at the end of your stay.

Waterfront

- Campers are not to be near the water without adult supervision.
- No swimming can take place without a qualified lifeguard being present.
- No canoeing can take place without an adult being present.
- By federal law, everyone, including adults, while using the canoes must wear PFDs.
- Use the long wharf for getting in and out of the canoes.

- Do not ram the canoes together, beach the canoes or stand up in the canoes.
- NO fishing from or around the wharves.

Wash Houses

- Please conserve water. The camp is not on a city water supply or sewage system. Try to keep time in the showers to a minimum and do not run the taps unnecessarily.
- The wash houses are to be left in the same condition as when the group arrives -- clean!
- Each day, people should be designated to clean up each wash house. It is recommended that this be done after each meal. Three small jobs are easier than one large job.
- Camp staff will provide the necessary cleaning equipment and supplies, as well as offer advice on how to keep the wash houses clean.

Camp Fire Circle

- All camp fires are to be held in the "Fire Pit" and must be drowned out at the end of every evening. Do not cut roasting sticks from around the camp, but feel free to bring your own from home.

Litter

- Dispose of litter in barrels provided throughout the camp. Do not leave litter on the ground, either in the forest or around camp.

Parking

- parking is provided adjacent to the camp. Vehicles should be brought into the camp compound for loading and unloading only.

Sample Collection

- Blue Lake and the surrounding area are used by a large number of people and it is not possible to allow the collection of specimens or samples. Identification studies should be carried out in the field. Sketches and photographs serve well as permanent records and should be considered as alternative options.

Dutch and Findlay Creeks

- These creeks can be dangerous, especially in the spring. It is suggested that no camper or group of campers visit the creeks unless properly supervised.

Radio-Telephone

- A cellular telephone is located in the Caretaker's residence and is used primarily for emergencies. Any non-emergency call should go through the Caretaker or Program Manager before they are made. All personal calls will be billed at \$1.00 per minute and a minimal fee of \$10.00 will be charged. If for any reason someone needs to contact an individual staying at Blue Lake Centre, please contact the BLFES office and a message will be relayed to camp.
- Our telephone is on a party line. It should not be tied up for any length of time.

How Do I Get Things Moving? Organize A Promotional Meeting!

The support and participation of parents and guardians are essential. Meet with parents and students early in your planning process to provide information, discuss plans, investigate ways to generate funds, ask for help, and build excitement. Invite everyone who will be involved in your outdoor school: parents, students teachers, volunteers, school principal.

Program Manager, potential community sponsors, etc.

Here are some items you may wish to include on your meeting agenda:

- Preliminary list of equipment each student will be expected to bring. Encourage families to borrow equipment and to look for thrift store bargains. Also a list of items that will not be acceptable at camp. See the sample lists that are included (Appendix A) to use in compiling your own.
- Anticipated costs to individual students.
- Fundraising activities. Use this opportunity to request parent help in organizing fundraising. Explain district and school policies. Give examples of past activities, including how much money was raised, how much student fees were reduced, and how much time was involved.
- Procedures for dealing with specific personal needs or concerns that parents or students may have. These may include medical concerns, dietary, or activity restrictions, financial difficulties, behavioural problems, etc. Indicate how these may be communicated to you in a manner that will afford everyone an acceptable degree of confidentiality. Emphasize that you want to hear about any concerns as soon as possible in order to have time to plan for them.
- Preliminary camp schedules.
- Preliminary menus.
- Teaching activities.
- Recreation activities available at camp especially those which may allow students to learn new skills.
- Camp duties and chores. Emphasize that all students will be participating.
- Show of support. You may wish to ask parents to indicate their support for your plans by signing a permission slip or other hand-out and returning it to you. Such tangible support from parents can often help

as you work through arrangements with your district, potential community sponsors, etc.

Plan a short presentation to highlight your plans and ideas. Blue Lake can provide a slide presentation and a brief introduction to the camp facility, and can often help you answer questions about safety and other camp procedures. Emphasize the unique opportunities available for learning in an outdoor school setting. Underscore the fact that outdoor school activities will carry on regardless of weather and everyone can expect to spend most of their time outside!

Students can also help host and run the meeting. Consider including a student presentation to help demonstrate how the camp experience will enhance student learning and integrate into your curriculum. Appropriate room decorations will “set the scene”, and a student display of acceptable camp clothing and equipment could be a way of beginning a discussion about camp preparations.

Record Keeping

As soon as possible set up a record-keeping system that works for you. Consider establishing a set of files or a 3-ring binder that can be brought with you to meetings and to camp. In some cases students can assist you with this. One section in your system should include copies of hand-outs, lists, parent letters, student work, photographs of all stages of your outdoor school project, etc., that are suitable for promotion, display, and description of your planning activities. Keep copies of permission slips, medical forms, and other required documents. Subsequent sections would include

lists: supplies and equipment to bring from school, lists of personal gear each student and adult will be responsible for, “to do” lists for your staff, etc. Be certain to list phone numbers, etc., for all the adults who will be involved in organizing or running your camp. Other sections could be devoted to schedules, student groupings, lesson plans, etc.

Send Lists and Forms Home

Assemble all information, supply lists, medical forms, permission slips, etc., as soon as possible to ensure plenty of time for parents to respond. Give a deadline for response, and follow up. This will help you ascertain how prepared students will be, and will allow time to resolve any problems.

Write a Newsletter

Keep the lines of communication open by sending periodic newsletters to families, school and district contacts, and community sponsors. A first newsletter could summarize discussions that occurred at the parent and student meeting. Other editions might focus on fundraising plans, student activities, reminders about organizing equipment, and any other aspect of pre-camp preparations. You might also consider submitting articles about your outdoor program to the school newspaper or local community papers. Students should contribute a major part of the writing, layout, artwork and distribution.

Plan Your Camp Schedule

Plan a realistic timetable for your outdoor school. Include pre-camp introductory lessons to be done at school, the at-camp activities, and a post-camp wrap-up. Demonstrate a strong curriculum fit to solidify support for your plans within your school and district.

Remember when planning your at-camp schedule that it often takes longer to organize things when outdoors. Consider the size and number of study groups, the skills and number of

staff available to run sessions, and the availability of materials and equipment. Try to rotate your staff so no one suffers from “burn-out”. Time for meals, duties, recreation, and resting must be built in.

Blue Lake Staff are available to assist in the planning phase. The staff will be able to suggest activities, locations, and time frames. If you decide not to use a Blue Lake Staff to assist in the planning, please keep in mind how much time you will need to move students from place to place for outdoor study sessions. Often this walking time can be part of the educational experience.

Meet With Staff and Volunteers

All teachers and adult volunteers who are assisting you should be fully briefed on all aspects of your outdoor school. Hold meetings to delegate tasks and confirm responsibilities. Check for comfort with tasks assigned and ask for suggestions. Check that your camp staffing will be adequate for any special needs students who will participate. Supervision duties need to be covered and students who are not attending camp must be taken care of.

Pre-Camp Activities

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It All Depends

Students look at themselves as part of an interdependent community. (1 class period) page 17.

trees for oxygen and water. (3 class periods) page 28.

What Is An Ecosystem?

Students investigate an ecosystem, discovering how an animal's needs are dependent upon interaction with other organisms and other factors. (2 class periods) page 20.

Products From Trees

Students investigate their own environment to discover some of the many uses of tree products. (2 class periods) page 31.

What Is A Habitat?

Students discuss what a habitat is, and examine how changes in a small ecosystem affect the habitat of the organisms. (1 class period) page 22.

The Forest - Who Needs It?

Students consider how different groups of people use the forest environment, and their effects upon the forest. (2 class periods) page 36.

What Is A Natural Resource?

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Who Will You Be? (Core Activity)

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The Importance Of Trees For Oxygen And Water

Students conduct a demonstration to show that people are dependent on

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page 40.

It All Depends

Students look at themselves as part of an interdependent community. They suggest ways they are dependent upon others and how others may depend on them. They use a consumer situation to study how production and consumption are interdependent.

Curriculum

- language arts
- social studies

Skills

- problem solving
- evaluating thinking
- critical thinking

Materials

- chart paper and felt pens
- student worksheet, "Hamburger Helpers"

Objectives

Students will understand the concept of interdependence, and how it affects all living things. They will also determine how opposite interests have mutual needs.

Vocabulary

- dependence
- interdependence

Recommend Time

One class period (40 min.)

Suggested Approach

This activity requires participants to work cooperatively with one another to achieve their goal. This is an example of interdependent behavior. The goal is to have a group of students make a circle, with each individual leaning far over into the centre, and then have the group push each member upright.

Participants require a surface that provides secure footing for this activity. Consider

doing it on a carpeted area or in the gymnasium.

Begin with the class in partners. Two individuals face each other, place the palms of their hands together, and take one or two steps backward so that they must lean on one another in order to maintain balance. To recover, each will do a standing push-up, to push each other back into balance. Some children will like to begin on their knees, and gradually move farther apart.

Once participants are proficient doing the activity in partners, try it again in groups of four. The trick is to balance the weight within the circle, and to push back out in unison.

Can anyone make a larger group? Discuss the implications of the game immediately following or upon returning to the classroom:

- What was the purpose of the game?
- Why did we do it in a circle?
- Who did you depend on?
Who depended on you?
- What happened when one person lost his/her balance?

Explain that the concept of depending upon others while others depend on you is called interdependence. We are all interdependent within our environment.

Who are you dependent upon in your community?

- Students may initially respond with parents, schoolteachers, and coaches. They may then move to shopkeepers, doctors, community workers, etc.

Guide their responses by encouraging them to look for indirect dependencies, such as the workers who transport goods to the stores, or the organizations that employ the parents.

Who are they dependent upon outside your community?

Encourage them to keep their responses to types of people.

Who is dependent upon you?

- This could be a more difficult question and students may need suggestions and examples before they see that they have an interdependent role in the community. For example, who they are depended upon for support and assistance at home, at school, as consumers for the many things they buy or that are bought for them, and as users of community facilities such as recreation centres, the library, and buses.

Small Group

Ask students to consider how many people it takes to make a hamburger. Starting with a hamburger at the top, have each group develop a pyramid that shows the major occupations that are involved in the making and selling of a hamburger. Distribute the student worksheet, "Hamburger Helpers" and ask them to complete it with other roles.

Alternatively use the worksheet as a guide and have each group complete a very detailed pyramid on chart paper. Display the completed charts and compare and contrast charts from different groups. Where on the chart do they fit as the consumer?

Culmination and Evaluation

Small Group

Demonstrate interdependence by using some of the people in the school community: students, teachers, librarian, principal. Write four titles on the chalkboard and draw two arrows between each pair to illustrate their interdependence:

Assign students to develop a more complete list, including parents, support staff, etc., and have them diagram the interdependencies in their notebooks or on chart paper. More advanced students may

be able to write a short paragraph to explain the results of removing one or more of the people in the school community.

Extension

Referring to either the Hamburger Helpers activity or the school community activity, ask what would happen if any one part was removed from the interdependency web. Ask them to consider what they know about interdependencies and speculate on what problems we might be facing since all life forms in the world are interdependent. Write a page based on current events that illustrates interdependence, e.g., sports stars and fans, television shows and sponsors, cities and rivers, etc.

Introductory activity adapted from *The Cooperative Sports & Games Book - Challenge Without Competition*, Terry Orlick, 1978, New York: Pantheon Books.

What Is An Ecosystem?

In this lesson, students investigate an ecosystem. Through the study of one animal -- the coyote -- they will discover how its needs are dependent upon interaction with other organisms and other factors such as the soil, amount of water, etc.

Curriculum

- language arts
- science

Skills

- analyzing
- predicting

Materials

- chart paper
- construction paper
- felt pens, crayons
- student handout
"What Is An Ecosystem?"

Objectives

Students will understand that an ecosystem is the interaction between a community of organisms and a set of abiotic (non-living) factors.

Vocabulary

- abiotic
- biome
- biotic
- community
- ecosystem
- population

Recommended Time

Two classroom periods (80 min.)

Background Information

A community is a collection of organism populations that live together in a particular place and time. This is known as their habitat.

Within this habitat each member of the community has specific needs. To fulfill those needs each organism depends directly or indirectly upon one another. For example, the robin depends upon the worm for food, but also depends upon the tree that

drops the leaves that decay into food for the worms. In addition, the tree depends upon the worm to help replenish the nutrients in the soil.

This simple food web illustrates the flow of energy from producers to consumers. Producers are green plants that use the soil to grow. Consumers are the herbivores that eat the plants, the carnivores that eat the herbivores, and the omnivores that eat both herbivores and carnivores. Completing the web are the decomposers -- the bacteria, molds, fungi and scavengers that eat waste matter and decaying organisms.

Abiotic factors -- the non-living factors such as water, sunlight, soil nutrients, minerals, etc., - influence the type and abundance of organisms within the ecosystem.

An ecosystem is the interaction between a community of organisms and a set of abiotic factors. The size of an ecosystem can vary from as small as a pond or a rotting log, to as large as a forest. Your garden at home and your playground at school are ecosystems. Very large ecosystems are called biomes, such as the tropical biome or the polar biome. All the world's various ecosystems and biomes together are called the biosphere.

Suggested Approach

Whole Class

Have the class list all the thing's animals need to live. Write their responses on the chalkboard. When the brainstorming is complete, begin to cross off the ones that are not essential, and categorize the rest.

These should be under headings:

- Food and Water
- Shelter and/or Warmth
- Ability to Reproduce
- Air

Distribute the student handout, "What Is An Ecosystem?" Discuss the opening question: "What will the coyote need if there are to be coyotes in this territory for many years?" Brainstorm with the entire class, and record responses on the chalkboard.

Culmination and Evaluation

Whole Class

On chart paper, create a mural of a coyote's territory. The mural can show a rural area, an urban area, a forest, or a combination of different territories. Each student should choose two or three things to be added to the ecosystem, and either draw them directly on the mural or cut them out of construction paper and glue them on. Where should people be placed on the mural? Are people dependent on coyotes? Are coyotes dependent on people? How do people affect the habitat of coyotes?

Extension

Have each member of the class conduct research on different aspects of coyotes, and present five significant pieces of information to contribute to a class coyote booklet. Examples of questions to research include:

- How are coyotes portrayed in stories?
- Why do we see them in that way?
- How do coyotes benefit nature?
- How are the skin and fur of a trapped coyote prepared?
- Why do farmers not like to have coyotes around?
- How long do coyotes live?
- Where do coyotes live in other parts of the world?
- How do coyotes take care of their young?
- How do coyotes learn survival skills?
- What do coyotes eat?
- How do coyotes adapt to living in an urban environment?

What Is An Ecosystem?

What will the coyote need if there are to be coyotes in this territory for many years?

The Coyote

- mammal
- canine (dog family)
- carnivore (eats meat)
- found worldwide

- size: 105-130 cm long (without tail)
60-65 cm high (ground to shoulder)
- weight: 9 to 18 Kg

Coyotes, like many dogs, are very territorial animals, and they live and hunt in an area they have chosen. They also try to keep other coyotes out. Coyotes are carnivorous, but enjoy an occasional salad if necessary. They eat rabbits, voles, birds, frogs, mice, rats, bird eggs, and even insects! They will attack an animal larger than itself only when hungry.

The coyote will also eat carrion (dead meat). Coyotes like fruit and berries and have been known to eat grass when hunting is poor.

A coyote's territory can be several square kilometres and is marked by recognition posts. These are not marked with urine (which has very little odor), but rather with a small scent gland located just above the tail. Within their territory they find food and water, have their homes, and mate. Coyotes have two types of homes. One is a burrow in the earth, often made by another animal such as a fox or a badger. This is where the female raises the young. The other is above ground, a hollowed-out area in the underbrush where the coyote can rest.

What Is A Habitat?

Students discuss what habitat is, and examine how changes in a small ecosystem affect the habitat of the organisms.

Curriculum

- language arts
- science
- social studies
- personal planning

Skills

- inferring
- predicting
- communicating
- hypothesizing
- critical thinking
- problem solving

Materials

- student worksheet, "This Old Tree House"

Objectives

Students will understand that a habitat is where an organism lives, providing basic needs of food, shelter and protection, and that a change in the ecosystem will result in a change in the habitat.

Vocabulary

- habitat
- ecosystem
- basic needs
- niche

Recommended Time

One class period (60 min.)

Suggested Approach

Whole Class

On the chalkboard, write the basic needs that the students discussed in the introduction to the previous lesson, "What Is An Ecosystem?" Remind them that air, food and water, shelter and/or warmth, and the ability to reproduce are the very basic needs that all organisms need to live. All other things may be classified as wants.

Explain that where an animal or plant lives will be a place where there needs are met.

This place -- the environment where a plant or animal is normally found -- is called a habitat. Ask the students to suggest what might happen if one or more of their needs were no longer being met in a certain place. Record their answers on a chalkboard.

Read to them the following scenario and discuss its implications to the habitat. Kelly's farm had an old tree that stood quite alone with some shrubs and blackberry vines in the middle of a field. Many animals and birds lived in that tree. During a windstorm, it blew down and did not survive the winter.

Brainstorm the implications of the above scenario.

Small Group

Divide the class in to small groups of four or five, and give each student a copy of the student worksheet, "This Old Tree House". Initiate a discussion and have the students complete Part 1.

Ask each group to report their lists to the entire class. Make up a master list in the chalkboard.

Individual

Discuss the exercise for Part 2, and assign. When students have finished, volunteers can read their story.

Culmination and Evaluation

Ask each student to choose to become one of the animals mentioned in “This Old Tree House”, and have them write a story about what it was like for the animal when their home blew down. How were their lives changed?

Have the students share their experiences with the rest of the class. Which animals were affected the most? The least? Which animals could stay in the tree? Which ones had to leave? Are there any situations that humans have to face that are similar to the tree blowing down? Tell the students that one of their responsibilities when they get to camp will be to identify some trees that provide rich habitats, as did the one on Kelly’s farm. They will, of course, be different from Kelly’s tree, and will provide different habitats supporting the life of different organisms.

Extension

Ask the class if any students have ever had to move and are still able to remember the experience. Ask these students to tell the class about it. What needs did he or she take along? What needs had to be satisfied after the move? Are people’s needs different from an animal’s needs? From a plant’s needs? How are they different?

Are there any people who are completely independent? How do you feel when you can be dependent on others? When you can be independent of others? Have the students record their thoughts about this discussion in their learning logs or journals.

This lesson is adapted from lessons found in *Ecology*, L. Hagely, 1984, St. Louis, MO: Milliken Publishing Co.

This Old Tree House

Kelly's farm had an old tree that stood quite alone with some shrubs and blackberry vines in the middle of a field on the property of their summer cabin. Many animals and birds lived in that tree. During a windstorm, it blew down and did not survive the winter.

Part 1

Imagine Kelly's tree before it was blown down.

List as many types of animals and plants that might have lived there and why this tree made a good habitat. Your list has been started as an example. Consider other types of birds, bugs (caterpillars, spiders), shade plants, ground-dwelling animals (rodents), tree dwelling animals (raccoons, squirrels), etc.

Fill in the chart and be ready to share them with the class.

ANIMALS	WHY THE TREE WAS A GOOD HABITAT
1. Stellar's Jay	Nest in branches and eats the insects and worms it finds in the moist soil under the tree.
2.	
3.	
4.	
5.	
6.	
7.	
8.	

What Is A Natural Resource?

Students will develop their own definition of a natural resource and categorize lists of natural resources into those that are renewable and those that are non-renewable.

Curriculum

- language arts
- science
- social studies

Skills

- classifying
- inferring
- critical thinking

Materials

- chart paper
- pieces of paper 4cm x 6cm
- masking tape
- dictionaries

Objectives

Students will give examples of natural resources and be able to categorize them as renewable or as non-renewable.

Vocabulary

- natural resource
- renewable resource
- non-renewable resource

Recommended Time

One class period (60 min.)

Advance Preparation

Relate this activity to the Blue Lake Centre the class will be attending. Each camp has a unique integrated resource character. Use your site plan, refer to your preliminary camp visit, and contact your Programs Manager for further information. Provide one 4cm x 6cm piece of paper for each student. Hang 2 or 3 strips of masking tape from the top of the chalkboard with the adhesive side out.

Background Information

A natural resource is a resource that has been established by nature. Although many things come from nature, not all are considered a resource. What is considered a resource may differ from culture to culture

and from region to region. The only common resource available throughout the world is the human resource.

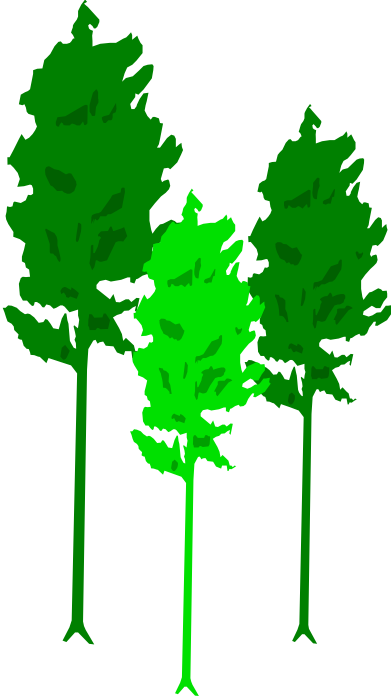
Natural resources can be divided into two types -- renewable and non-renewable. If the resource grows and can therefore be regenerated, such as fish and forests, it is a renewable resource. A resource that cannot be grown, such as minerals and oil, is considered a non-renewable resource.

Suggested Approach

Whole Class

Write the words "Natural Resource" on the chalkboard or an overhead projector. Give each student one piece of paper and have them write a definition for natural resource on it. Have them stick their definitions to one of the strips of masking tape, one under the other. Designate two students to look up "natural", "resource", and "natural resource" in the dictionary and be prepared to read them to the class.

Ask a student to read out several of the student definitions to the class. As a group, identify key words that seem to occur often in the definitions and write these on the board. Continue with the posted definitions, and together create an acceptable definition of "natural resource". Compare the dictionary definition to definition generated by the class.



Small Group or Individual

Divide the class into groups of 3 or 4 and have them designate a recorder and spokesperson. Give each group a piece of chart paper and have them create a list of all the natural resources they can think of. Ask one group to display their list. As they read off each item, compare it to the class definition of a natural resource. As each item is read out, other groups can cross that item off their list. Meanwhile, a student can be making a master list on the chalkboard. Choose a second and a third group to read out their items that were not included on the first list. Continue until all groups have had their suggestions discussed and added to the list. If students are working individually have them brainstorm the list on a small sheet of paper and then create a class list from their suggestions.

Culmination and Evaluation

Individual

Have each student copy the agreed-upon definition and the list of resources into their notebook. Ask each student to think of several non-renewable resources and list them. How does society presently use these resources? Can you think of any alternative ways that would lessen the impact on non-renewable resources?

Partners

Discuss the terms renewable and non-renewable. Working in pairs, ask the students to identify 2 or 3 renewable and non-renewable resources. Have each pair compare their choices, discuss any differences, and any of their alternatives.

Whole Class

Share some of the choices and the alternatives with the whole class and discuss any differences.

Extension

Discuss some of the following with the class:

1. Is air a renewable resource? Water? Sunlight?
2. What examples are there of people replacing non-renewable resources? e.g., fish farming.
3. What examples are there of non-renewable resources that people do not have a replacement for? What would be some possible alternatives? What would be their advantages? Disadvantages? What problems or issues would need to be overcome in the use of these alternatives?
4. All renewable resources are interdependent. What happens when a renewable resource is adversely affected? e.g., people polluting the air.
5. What are some effects of natural phenomena on renewable and non-renewable resources? e.g., tornadoes, earthquakes, hurricanes, volcanoes, fires, weather, etc.

Following the discussion, assign each student to take one of the questions and expand its ideas into a short essay, a poem, a song, drawing, dramatization, etc.

The Importance of Trees For Oxygen And Water

Students will conduct a demonstration to show that people are dependent on trees for oxygen and water.

Curriculum

- language arts
- science
- mathematics

Skills

- observing
- measuring
- inferring
- predicting
- hypothesizing
- controlling variables
- interpreting data
- measurement
- data analysis
- critical thinking

Materials & Equipment

- small aquarium
- several sprigs of an oxygen-producing aquatic plant available from a pet supply store:
 - wisteria
 - Amazon Sword
 - elodea
- clear pill bottle with cap
- small funnel
- three wooden clothespins
- matches
- wooden toothpick
- watch or stopwatch
- several small plastic sandwich bags, with twist tie closures
- small clean pebbles
- small graduated cylinder

Objectives

Students collect the oxygen and water given off by plants, to reinforce their understanding of interdependency and the importance of trees and other plants in the web of life.

Vocabulary

- chlorophyll

- photosynthesis
- transpiration

Recommended Time

Three class periods:

- 30 minutes for Demonstration #1
- 90 minutes of class time and time overnight for Demonstration #2

Background Information

Demonstration #1

This demonstration allows students to observe the process of photosynthesis using water plants. In photosynthesis plants give off oxygen through their leaves. Green plants use the energy from the sun to make food from water and carbon dioxide. Only green plants can make their own food and all other organisms rely on this food to live.

The sun's energy is trapped by chlorophyll in the plant. Chlorophyll is made from minerals obtained from the soil. While the plant is taking and using the carbon dioxide to make its food, it is releasing oxygen back into the air.

Collect the equipment necessary for this demonstration, and fill the aquarium with water. Have the students calculate the volume of the pill bottle so that they can calculate the amount of gas produced in one hour by measuring the time it takes to fill the bottle.

Suggested Approach

Outline the demonstration and have the students start to fill out their lab report in their notebooks using the following headings:

Title

Procedure: a short paragraph explaining what they are looking to find out, what equipment will be used, and how the demonstration will be done

Diagram: a drawing of the setup.

Observations: several paragraphs describing what they observed.

Conclusion: a short paragraph explaining what they learned.

Procedure

Do this demonstration in sunlight or in strong artificial light. You will need a student to assist.

1. Immerse the funnel and the pill bottle under the water. Place the pill bottle full of water upside down over the neck of the funnel.
2. Clip clothespins onto the edge of the funnel so that it sits evenly and securely on the clothespins.
3. Place the aquatic plants into the water and cover them with the funnel. Adjust the water level and/or the clothespins so that part of the pill bottle and the neck of the funnel is above the surface of the water.
4. Begin timing. Gas will slowly bubble up from the plants into the pill container and displace the water. Have the students continue their observations. Depending on the health and quantity of the plants and the amount of light, this demonstration will take several minutes.
5. While holding the mouth of the pill bottle under water, remove the funnel by taking off the clothespins and/or adding more water. Cap the pill bottle while it is under water, take it out and put it on the desk, right-side up.
6. Demonstrate that the gas is oxygen. Light the end of a toothpick and let it burn for a few seconds and then blow it out. While the ember is still glowing, uncap the pill bottle and plunge the glowing toothpick into the pill bottle of collected gas. It will burst into flames. Oxygen is the only gas that has this effect.

Assign the students to complete their observations and write their conclusions. Have them answer the following questions:

- What does this demonstration tell you about plants?
 - Why is it important for a pond or a lake to have water plants in it?
 - Why is it important for us to have trees?
- While the students are writing up their reports, you may wish to re-set the apparatus and repeat the demonstration.

Background Information

Demonstration #2

Transpiration is the loss of water by the plant through openings on the leaf, called stomata. This process allows the water to be drawn up from the roots. Water molecules are strongly attracted to the walls of the thin water vessels that run the length of the tree. The molecules stack up on one another and pull each other along like in a siphon. This process is called capillary action. In order for the water to flow upwards it must be 'pulled' from the top, and this pull comes when the water molecule leaves the leaf. This water loss is called transpiration.

Locate some trees and shrubs in the local area with limbs that can easily be reached by the students. Try to locate both deciduous and coniferous trees and shrubs so that comparisons can be made.

Suggested Approach

Ask the students to imagine that they are walking from a street in a residential area into a forested area. Have them close their eyes and imagine the feelings, sounds, and smells as they walk deeper into the forest. Ask them what changes they would feel, hear, and smell. Elicit answers such as cooler, quieter, etc. Discuss these changes and feelings. Ask them why they felt cooler and moister in a forest than on a street in the shade of a tree. Explain that they will be conducting a demonstration that will help to explain this phenomenon. Outline the demonstration and distribute the materials. Have the students begin to fill out their lab report in their notebook, using the following headings:

Title

Procedure: a short paragraph explaining what they are looking to find out, what equipment will be used, and how the demonstration will be done.

Diagram: a drawing of the setup

Observations: several paragraphs describing what they observed.

Conclusion: a short paragraph explaining what they learned.

Procedure

1. Take the students to one of the chosen tree sites and show them how to place a plastic bag around the end of a branch. Be certain there are sufficient needles or leaves inside the bag. Put a few pebbles into the bag so that the water will collect in the bottom rather than run out. Tie the bag securely to the branch with the twist-tie and leave it there overnight.
2. Have the students disperse and set up their bags on different trees and shrubs, and then return to the classroom to complete as much as they can of the lab report.
3. The next day, return to the site and observe how much condensed water has collected on the interior of one of the bags. Review the process of transpiration and describe how it is part of the water cycle. Ask the students to consider what the effect of transpiration might be on the area immediately around the tree. Remove the plastic bag, being careful to retain all the water, and return to the classroom.
4. Students can measure the volume of water they collected using the graduated cylinder. Record the amounts on the chalkboard and in the students' notebooks. Compare the different amounts of water collected from different types of trees and shrubs, and discuss possible reasons.
5. For their conclusion, have the students discuss and answer the following questions:
 - Considering how much water a few needles or leaves transpired in a day, how much water might be transpired by an entire tree in a day? In a year? How could you estimate this?
 - How might a tree's transpiration affect the temperature and humidity in a forest? If the

students express an interest in this idea, you may wish to consider measuring this effect while the students are at camp.

- What might be the effect on the local climate of growing more trees in an urban area, or irrigating a desert region?

Culmination and Evaluation

Discuss how people are dependent upon trees and how trees are dependent on us. List ways we can assist trees, especially in urban and suburban environments.

Students can create a poster that depicts the interdependence of people and trees.

Extension

Have students use their imagination to write a story about how life would be different if the process of photosynthesis changed overnight. Brainstorm for what might happen if plants and trees started giving off different products other than oxygen and water. Have them use their creativity, e.g., helium and diet pop; carbon monoxide and green slime; smoke and school glue. Share the stories with the entire class.

Products from Trees

Students investigate their own environment to discover some of the many uses of tree products.

Curriculum

- language arts
- social studies

Skills

- critical thinking
- problem solving
- decision-making
- evaluating information

Materials

- student activity sheet, "What Should I Buy?"
- student handout, "These Products Come From Canada's Trees"
- chart paper and felt pens

Objectives

Students will understand that they depend upon trees for many items that effect their life style, and as non-renewable resources become scarcer in the future, many more items may need to be made from wood or other renewable resources.

Advance Preparation

Preview the list of products on the handout, "These Products Come From Canada's Trees". Have some samples of these and pictures of other tree products displayed in the classroom.

Recommended Time

Two class periods (90 min.)

Suggested Approach

Draw the following diagram on the chalkboard:

Under the heading "Living Trees" list the findings of the two previous demonstrations:

- provide oxygen
- provide moisture

Students can then add some of the other benefits of living trees they listed earlier, i.e., habitat, food, soil building, protection against erosion, etc.

Ask the class, "Do you think there would be an overall benefit to our lifestyle if we reduced the cutting of trees by half?" Ask them to choose on a scale from 1 to 5 where 1 would mean little benefit, 3 means some benefit, and 5 stands for great benefit. Tally the answers and record them on chart paper. Explain that they will re-examine the survey later in the lesson. Turn their attention to the other heading of the diagram, "Forest Products", and ask the students to think of some benefits we derive from harvested trees. Once they have brainstormed a list, extend the discussion by classifying uses under three headings, from those that are "Most Desirable", to "Desirable", to "Less Desirable".

You may point out that about 60% of the wood used in the world is burned for heat. Is this use Most Desirable? Less Desirable? From what perspective do you make this judgment? How would your classification change if you took a different perspective?

Ask the students to bring to their next class a list of all the ways that tree products are used in the community. Tell them to think not only of all the ways wood and paper are used but to look for more unusual ways as well. They should ask their parents for assistance and do some library research to find tree products. Have them consider places other than their own home to look for forest product use, e.g., shopping areas, on the streets, industrial areas, schools, etc.

These Products Come From Canada's Trees

Small Groups

In small groups, list all the ways the students have found tree products in use. Encourage them to list types of uses rather than being too specific. However, any uses of a forest product they feel are very unusual should be left as a specific example. Display the lists when they are finished and allow time for all groups to view and compare the lists.

Discuss the findings and let individuals present the unusual ways of using tree products they found.

Distribute the student handout, "These Products Come From Canada's Trees". Have the students return to work on their chart, circle any products they do not recognize or know the use of, and add to their chart any products that they have identified. Reconvene the class and identify and discuss the unfamiliar uses. Students can also research the unfamiliar uses and report back to the class.

Use some of the following questions to initiate discussion:

- Are any of you surprised at the number of products derived from wood?
- Which of the "unusual uses" you identified are not included in the information on the handout?
- Which of these products do you think is the most useful? Explain.
- Which are less useful? Explain.

Which Should I Buy?

Whole Class

Discuss with the class how over the years many traditional uses of wood have been replaced with other materials. A good example is the number of fibreglass boats in use now, and the amount of plastic instead of paper used in making bags and sacks. Have the students generate more examples of areas where wood has been substituted and explain why they think this might be so. Encourage them to give reasons for specific examples, and to list the advantages and

disadvantages of using materials other than wood. Hand out the student activity sheet, "Which Should I Buy?" Discuss and explain how the students are to make their purchase choices. Also discuss some of the reasons they might use for their choices, e.g., lasts longer, looks better, works better, better for the environment, or a combination of the above.

There are a number of empty spaces at the bottom of the list that can be filled in with students' own choices and reasons. After the activity sheet is completed and their reasons discussed, have the students consider the following:

- In most cases the substitute for wood has come from a non-renewable resource such as metal or oil. In other cases, the substitutes came from man-made chemicals like plastic or cement. What might happen in the future when the metal or the oil becomes scarce and expensive?
- What questions should you ask about producing and using materials other than wood?
- For which products would you accept a wood product substitute?

Return the attention of the class to the question asked earlier in this lesson: "Do you think there would be an overall benefit to our lifestyle if we reduced the cutting of trees by half?" Display the findings of the first survey and ask the students to reconsider the question using the same rating scale. Compare these new results with the previous results. Ask students to explain why there is or is not a change in people's opinions. Did some students think of economic benefits and others consider aesthetic or environmental concerns? All benefits are important, and it is necessary to decide what types of benefit we are talking about. This is one reason why coming to an agreement on these issues is so difficult.

Culmination and Evaluation

Ask the students to consider a future without some of the non-renewable resources.

Which products would they think it important to begin making from renewable tree product replacements? Have them write a press release announcing the development of such a new product. Include the company's plans for assuring a continuous wood supply to make the product.

Have students, individually or in small groups, create an advertisement for their tree product. Try to have them promote the product on the basis of quality, aesthetics, durability, and as coming from a renewable resource. Their advertisement could be for magazine, newspaper, radio, or television. Produce the advertisement or perform the script for the class.

Extension

Interdependence can be economic as well as biological. Have students find statistics on how many jobs in British Columbia rely on the forest industry and on wood products. It is important for students to realize that trees are only one consideration when discussing the use of forest products.

Portions of this activity are adapted from *Project Learning Tree Activity Guide K-6*, 1990, Washington DC: American Forest Council.

These Products Come From Canada's Trees

From Wood

A tree peeled of its bark may become a fence post or utility pole. Sawed into different sizes, it becomes dimension lumber used in building construction. Plywood can be used to sheath a house or construct a piece of fine furniture. Bolts, lumber, plywood and veneer are the basis of thousands of items that we all recognize as wood products.

Paper Products

Everyone knows that paper comes from trees. Newsprint and writing paper are products that we all come into contact with daily. But did you know that there are over 10,000 different paper products? They range from the obvious, such as cardboard boxes, toilet paper and food wrappings, to some that may not be obvious at all, such as insulation for electric cables, gypsum wallboard coverings, and paper "fabrics" like those used by hospitals for masks and gowns.

Wood Pulp

Wood pulp, or cellulose, which is used to produce paper, also yields an array of other items which may seem to have little to do with wood. Did you realize that rayon, a synthetic fabric, comes from trees?

Melamine, a type of plastic used for everything from dishes to toys to tool handles is another cellulose based product. And there are literally thousands of others!

Chemical Products

Turpentine, creosote, tar, tall oil, waxes, alcohol -- a list of chemical products as long as your arm can be extracted from wood. These, as well as byproducts from the pulping process are ingredients in a mind-boggling assortment of products such as paints, solvents, adhesives, deodorizers and disinfectants. The list goes on ...

Wood Waste

Even the waste of the lumber milling process has many uses. Wood pulp (cellulose) is produced from chips and many chemical products are extracted from bark. From particle board to animal bedding to a gravel substitute used in road construction, bark and wood chips are the basis of many products.

Which Should I Buy?

Wooden Choice	Alternative Choice	Reason For Choice
Redwood Furniture	Plastic Outdoor Furniture	
Wood Carving	Metal Sculpture	
Wooden Toys	Plastic Toys	
Wooden Kitchen	Metal Kitchen Cupboards	
Wood Burning Stove	Gas or Electric Stove	
Laminated Wooden Canoe	Aluminum Canoe	
Wood Hulled Boat	Fibreglass Hulled Boat	
Wood Ladder	Aluminum Ladder	
Wood-Slat Fence	Chain-Link Fence	
Fireplace Wood	Artificial Logs and Gas	
Wood-Paneled Walls	Plaster Walls	
Shake Single Siding	Stucco or Aluminum Siding	
Paperboard Carton	Glass Bottle	
Wood Clothes Hangers	Metal Clothes Hangers	
Newspapers	Computers/Internet	
Hardwood Floors	Wall-to-Wall Carpeting	
Cut Christmas Tree	Artificial Christmas Tree	
Paper Towel	Cloth Towel	
Paper Cup	Plastic Cup	
Polished Solid Wood	Formica Simulated	
Wood Decking	Cement Patio	

This worksheet is not designed to encourage students to think of more products using wood. Better management, replanting, recycling, reusing, etc., are also concepts that should be discussed.

The Forest -- Who Needs It?

Students consider how different groups of people use the forest environment. After identifying the needs of these groups, they discuss their effect upon the forest. Students then develop a plan that meets the needs of a number of groups.

Curriculum

- language arts
- social studies
- science

Skills

- critical thinking
- problem solving
- decision making
- interpreting maps
- evaluating information

Materials

- chart paper for each group
- felt pens

Objectives

Students will understand that forests are important to different people for different reasons.

Advance Preparation

Teachers should be aware of local organizations and companies who use the forest. This will provide student background information for this lesson. Contact the BLFES Program Manager for assistance in bringing experts into the classroom to make presentations on these topics.

Recommended Time

Two class periods (90 min.)

Suggested Approach

Whole Class

Discuss and list how the forest is used by plants and animals. Have students give examples of how different organisms are interdependent within the ecosystem. Brainstorm a list of human user groups. Elicit answers such as forest workers, fishers and hunters, resort owners, land developers, RV and automobile campers, cottage owners, skiers and hikers, First Nations peoples, and preservationists.

Small Group

Divide the class into small groups and have them choose one member to record suggestions and another to be the spokesperson. Assign each a user group and have students decide what that group would do in the forest environment. Remind students that most user groups have an interest in changing the forest in some way and in keeping parts of it the same. Each group can display and present its conclusions to the class. Have each group brainstorm and record their discussions on the following:

- Give at least one good reason why each group should have the right to participate in decisions about the forest.
- How would the needs of your user group affect each of the other user groups?

Culmination and Evaluation

Individual or Pairs

Have each individual or pair choose three user groups and design a forest environment that would satisfy the needs of all three. Presentations could be in the form of a map showing physical features, areas of growth, buildings, and other man-made features. Accompanying each map should be a short description of the features of this environment and why they would meet the needs of the three user groups. Students should identify those parts of the ecosystem that would be most heavily affected and which other user groups might not be able to use the forest. Discuss how these "model forests" might relate to forested areas around BC.

Who Will You Be?

Core Activity In preparation for role simulations that are part of several of the following activities, each student researches the specialized professions related to the forest environment.

Curriculum

- language arts
- social studies
- personal planning
- science

Skills

- critical thinking
- decision making
- acquiring information through reading
- evaluating information
- career awareness

Materials

- student worksheet, “Who’s Using Our Forest Resources?”
- library reference materials on the different professions

Objectives

Students will understand that different interests may give different points of view to a common experience.

Vocabulary

- forester
- geologist
- hydrologist
- marine biologist
- zoologist

Advance Preparation

Preview the simulation exercise, “The Town Meeting” in the Post-Camp Activities section. Arrange time for the students to access any pertinent library reference materials.

Recommended Time

Two class periods (80 min.)

Background Information

During the Post-Camp Simulation Exercise, groups of students will make proposals for the future use of the forest camp site. They will consider requirements of the delicate

ecosystem of the forest as well as the wishes of the many interest groups. The experience they gain during the activities at camp will qualify them as “experts” in a number of areas, and allow them to suggest very informed choices about appropriate uses for the camp site. Conducting initial research into different professions related to the forest environment, what people do in these jobs and what they are responsible for, will allow students to become aware of the opinions and positions of different professions and areas of interest throughout their stay at camp.

Note: do not provide a detailed explanation of the post-Camp role simulation activity until after they have returned from camp.

Suggested Approach

List the following professions on the chalkboard:

Forester: specializing in forest management;

Geologist: specializing in soils;

Hydrologist: specializing in water management;

Marine Biologist: specializing in aquatic animals and plants;

Zoologist: specializing in animal habitats.

Have the students describe what they know about each profession. Explain that they will be gathering data and expertise that will help them in future activities in the **FIR PROGRAM**. From time to time, throughout the Pre-Camp Activities and later when at camp, they will be reminded of the different professions and that they should consider their answers from that point of view.

Allow the students to sign up for one of the professions and research it. Try to ensure that students are evenly divided among the different roles.

Ask students to consider from what point of view that person would look at the forest ecosystem. Encourage them to find out what their major areas of interest would be.

Culmination and Evaluation

Have the students write a short paragraph, in their role, that looks forward to the coming trip and mentions what they are hoping to study about the forest. Have the students present their information to the rest of the class.

Extension

The future of the forests in British Columbia depends on integrated resource management of both renewable and non-renewable resources. All of these resources are part of an interdependence resource ecosystem. The interdependence of resources is apparent within the ecosystem: vegetation requires soil and water; wildlife requires vegetation and water, etc.

Small Group

Assign the students to complete the worksheet, "Who's Using Our Forest Resources?" Divide the class into small groups of 4 or 5 and have them choose a recorder and spokesperson. Have the group discuss the inquiry.

Whole Class

After reporting back and discussing the worksheet responses, have the students suggest a process through which to develop and agree upon a forest management plan that would ensure that the needs and wishes of all British Columbians are met.

Who's Using Our Forest Resources

List some of the groups of people who use our forest resources. Put a star ★ under the name of the resource that is most important to that group. Put a check mark ✓ under the other resources that the group might use.

Group using a forest resource, and their reasons for their use	Soil Minerals	Trees Plants	Water	Fish	Wildlife	Parkland	Grassland

Additional Pre - Camp Activities

Blue Lake Centre offers teachers a unique opportunity to prepare lessons in many different subject areas. The more varied the activities, the more worthwhile the camp experience will become. Remember to contact the BLFES office to provide speakers and resources for in-class activities.

The previous Pre-Camp lesson plans cover only a small number of suggestions for class experiences. Following is a list of additional activities to be used with different age levels, to consider as part of the preparation for camp.

- Write a newsletter to parents telling them about all of the preparations that have been made for camp.
- Write invitations to parents asking them to attend an information evening about the camp program, indicating the place, time, date, and what item will be on the agenda.
- Have each student prepare a diary, journal, learning log, or file folder that can be used for recording information, ideas, and feelings at camp.
- As a class, discuss different techniques for taking notes at camp. Students should be given an opportunity to practice this skill in the classroom setting.
- Teach the class different poetry forms such as acrostic, haiku, and cinquain that they can use in a creative writing periods during camp.
- Have students make oral reports to the class about areas of special interest that they have concerning the camp.
- Involve the class in multi-sensory activities, e.g., guided imagery.
- Have groups of students prepare skits that describe the preparation for camp, for presentation immediately or later at camp.
- Have students research and prepare lists and reports on the plants and animals that will likely be found at the camp site.
- Practice inviting guests to meals and making introductions.
- Present oral reports on the weather by researching newspaper, radio, or television weather reports.
- Teach students how to write letters home and how to address postcards.
- Use role simulation to practice tolerance and cooperation with students they will be with at camp or those they may have for cabin-mates.
- Involve students in a class discussion of how cabin groups should be determined.
- Learn some local history from around the camp site area. BLFES staff can help.
- Study the map of the camp area and teach students the map symbols they encounter.
- Invite speakers to discuss forest resource issues.
- Learn about the local community and how it depends on resources for its prosperity.
- Have the class research different methods of logging.

- Invite professional foresters, biologists, hydrologists. etc., to speak to the class about their profession.
- Have the class write a letter to an important person who can make decisions about the future of the forests. i.e., Chief Forester of B.C.
- Have the class conduct research into careers in forest resources.
- Discuss how health habits affect people, especially people living very close together.
- Discuss the importance of proper rest, diet, exercise, hygiene, and clothing in people's lives, and especially in a camp setting.
- Make a chart showing the ways in which the school and the school population has an impact on the environment of the community.
- Make posters showing sources of air and water pollution in the community.
- Discuss survival techniques to use if lost in the woods.
- Identify and label trees on and near the school grounds.
- Go on a field trip to a local park or nature trail and have the class make detailed observations.
- Examine a road cut near the school to see different soil horizons.
- Take soil samples near the school and observe its structure, texture, and colour.
- Plant trees or shrubs on a plot of ground on the school site.
- Design, construct, and set out bird feeders.
- Conduct erosion control experiments at home or on the school grounds.
- Identify animal life around the school grounds.
- Learn some common bird calls.
- Observe various cloud formations and discover what they mean.
- Make a graph of temperature and precipitation prior to going to camp, and check them daily with the official results posted in the local newspaper.
- Do some research to find out what fungus does.
- Study the effects of fire and fire prevention.
- Study how plants reproduce and what effect animals have on plant reproduction.
- Study the area around the school and how people have influenced the natural environment.
- Study what effects weather has on animals and people.
- Visit a zoo, a silvaculture nursery, a fish hatchery, a greenhouse, etc.
- Visit a farm to learn how land can be used so it can remain productive.
- Research rare, endangered, and extinct plants and animals throughout the world.
- Study earthworms and their purpose.
- Investigate your community's water supply and how much is used at various times if the year.
- Estimate the distance between certain landmarks.
- Learn to use pacing to determine distance.
- Estimate and measure the width of roads or creeks in the community.

- Estimate and measure the percentage of slope on the grounds near the school.
- Estimate, measure and mark out a hectare on the school ground. Hint: one hectare is the size of three football fields.
- Estimate the height of objects by using shadows.
- Learn to read a barometer, thermometer, and other weather instruments.
- Use a map to estimate the distance from the school to the camp site.
- Make up a song about forests, the environment, or camp using a melody that students are already familiar with.
- Encourage students who are musically inclined to prepare a short presentation for camp.
- Study the song of birds.
- Design covers for the notebooks, journals, etc., that will be taken to camp.
- Construct a trophy for an inter-cabin neatness competition.
- Design certificates to be given out at camp to the most cooperative students, the cheeriest students, etc.
- Construct a compost box so that the school can begin a composting project.
- Construct raised wooden flower boxes so that students can grow flowers.
- Plan a display of camp, wildlife, or nature photographs that can be used back at the school.
- Make placemats for use during the evening meals at camp.
- Design a table centrepiece for use at camp.
- Prepare name tags with each student's first name.

At -- Camp Activities

This section offers several activities for use as lessons during camp. These activities involve the students in the forest ecosystem, gathering information and making choices about their environment.

Most of the activities are based on a camp group of about 30 students, split into three study groups with one adult leader per group. If you have more than one class, divide the class into six groups and offer two different activities at the same time. This will make three study groups for each activity. Having all the groups work on the same activity is not recommended as there may not be enough equipment to go around. These activities may be done in any order and not all the investigations need to be completed by every student. Be flexible with time allotments as many students will become very interested in some aspect of their investigation. They may not complete their entire study but they will be able to share many insights with the others in the class.

Make time throughout the activities to encourage the students to think back to the role simulation, "Who Will You Be" from the Pre-Camp Activities, and to consider what they are learning about from the point of view of the professional they studied. They should think about the interests of the profession they researched, and how he or she would react to the experiences of camp.

Blue Lake provides all equipment needed for the "At Camp" activities and lessons. If you are interested in incorporating other activities, you will need to bring the materials and supplies.

Index of Activities

Water, Water Everywhere

Students will explore the general characteristics of a lake, including its source of water, major physical features and characteristics; determine the health of the lake; and view the lake for its aesthetic value. (2 hours) P.45.

Variations in a Forest

Students examine several ecosystems, their living and non-living components, and investigate areas of the forest that show different stages of succession. (2 hours) p.53.

They Think I'm Lunch!

In a highly involving physical activity, students become "deer", the components of their habitats, and deer predators. (1 hour) p.59.

How We Can Use a Forest

Students examine an area of forest to decide whether to harvest the marketable trees in it or not. Students should have had a pre-camp visit from a forester in preparation for this activity. (2 hours) p.63.

Looking at an Ecosystem

Students inventory a pre-set forested area for its resources and predict the outcome of an event upon their area. (1.5 hours) p.69.

ECOSYSTEM MANAGEMENT

This separate section of At-Camp activities for Blue Lake is our newest. These activities focus on ecosystems and responsible ecology based forest management. P. 71.

Recreational Activities, Pg. 90.

Other At Camp Activities, Pg. 98.

Water, Water Everywhere

Students will explore the general characteristics of a lake, including its source of water, major physical features, physical characteristics (temperature, pH, dissolved oxygen), and will determine the health of the lake by collecting and classifying organisms according to their ability to tolerate pollution. They will also view the lake for its aesthetic value.

Curriculum

- language arts
- science
- mathematics

Skills

- observing
- measuring
- data analysis
- classifying
- interpreting maps

Material & Equipment

- white trays
- pH test kit
- dissolved oxygen test kit
- thermometer
- Camp DataSheet of the area (from Program Manager)
- map of the area (from Program Manager)
- dip net
- plastic jars
- strainer
- Styrofoam egg carton
- pond diagrams (from Program Manager)
- student datasheets:
 - “Physical Characteristics”
 - “Plants”
 - “Animals”

Objectives

Students will understand that a number of abiotic factors can influence the quality of water and therefore have an influence on the habitat of aquatic organisms

Vocabulary

- biotic index
- contour interval
- contour line
- dissolved oxygen
- pH
- run-off
- topographic map

- watershed

Advance Preparation

Select an aquatic area at the edge of the lake. Ensure that there is easy access for the two separate working groups of students. There must be at least one adult supervisor for each group. The supervisors should be familiar and comfortable with using the equipment and with doing the activities.

Refer to the appropriate Camp Data Sheet for details on the characteristics of the lake. The BLFES Program Manager will be able to provide additional information as to the unique qualities of the lake, as well as the best locations to use for this activity.

Recommended Time

120 minutes

Background Information

Watershed and Water Quality

Watershed is the term used to describe all the land that drains into a specific stream, river, or lake. The water may move on top of the soil as run-off, or within the soil as ground water. The size of a watershed can vary from a few hundred metres to many thousands of hectares.

Most of the water that people use spends some time in or on the watershed. If the watershed consists of soils that will not allow the water to sink in a summer shower, it could cause a flash flood. On the other hand, if the watershed consists of soils that are highly porous, you may find an ideal location for sinking a well. Materials such as fertilizers, pesticides, animal wastes, and industrial wastes can and do enter the ground water. This ground water, which is tapped by wells, can also run off into the streams, rivers, and lakes, thereby decreasing the quality of the water. The water quality can become so poor that it cannot be used.

Main Activity

Explain to the students that they are going to examine water quality. They will look at how water runs into the lake, and determine the quality of the water using several physical characteristics, and by the types of plants and animals that live there.

Suggested Approach

1. Divide the students into two groups: Group A and Group B.
Group A will examine the topography of the watershed and will investigate the physical characteristics of the water.
Group B will study the plants and animals found in the water.
2. Go with the group leader to the locations identified for the studies.
3. Hand out the activity sheets (pages ?? to ??) to each group and have them follow the instructions.

Group A: Topography of the Area

Interpreting A Topographic Map

Explain to the students that a topographic map locates both natural and man-made features in an area. Man-made features are indicated by specific symbols. Draw their attention to the legend of the map and point out some of the symbols used and locate the buildings of the camp. In some cases the buildings may have been built after the map was completed and therefore students

may wish to choose the appropriate symbols that should be included.

Explain that one feature indicated by a topographic map, that is not shown on any other type of map, is the physical characteristics of the terrain. These characteristics include the elevation as well as the location of mountains, valleys, plains, streams, and rivers.

The elevation is usually measured in metres and is recorded as the number of metres above sea level. However, quite often older maps use "feet" and "feet above sea level".

Topographic maps use a symbol called a contour line to indicate elevation. A contour line connects all points that are at the same elevation. The contour interval is the vertical difference in metres between each contour line. Every fourth or fifth contour line is usually marked with a numerical value that indicates the distance above sea level.

Water Flow and the Topographic Map

All bodies of water are indicated in blue on a topographic map. A contour line bends upstream when crossing a valley. Quite often the valley will have a stream at its bottom. The ground must rise away from the stream's course. Ask the students to find the camp's lake on the map and to look for a stream that is running into it. Have them look out over the lake and see if they can see the valley that contains the stream.

Discussion Questions

Use the following to initiate discussion.:

1. Look at the topographic map and identify the following features near the lake:
 - an area where the ground is steep;
 - any streams that run into the lake;
 - any streams that run out of the lake.

2. Explain to the students that areas that are steep or recently deforested, such as a road bend or an area burned by fire, may be a potential area for run-off that would add silt to the stream and lake.

Look at the lake and the watershed area around it:

- Are there any areas where you can see potential run-off problems for the lake? If so, what are these areas, and what problems might they cause?
- Investigate a stream that enters the lake. Is the stream water clear? Is it moving quickly? Are there any streams that seem to be coming from areas that might have potential run-off problems?

3. Show diagrams of a pond at different stages: the “Young”, the “Middle-aged”, and the “Old” ponds. Discuss the similarities and differences in the diagrams. Identify circumstances that may explain why ponds change over time.

Have students explore the perimeter of the lake and describe the type of vegetation found there. These investigations could be made by canoe or along walking trails. Would they describe the lake as young, middle-aged, or old? Why do you think so?

4. Ask the students to look on the map and on the terrain around the lake to identify any areas that might have the potential to bring silt into the water system. Have them discuss their findings with the others in the group.

The Physical Characteristics of the Lake

Many of the physical characteristics of a lake can help determine what type of life the lake will support. In this activity, the students will measure several of these physical features.

1. Have the students record the air temperature and the water temperature. Record the water temperature at both the lake surface and at a depth of 1 metre. Take water temperatures near the shore as well as farther out into the lake - use the dock or a canoe to get to deeper water. Record the readings on the student datasheet.

2. Have the students record the clarity of the lake as follows:

- clear
- slightly turbid
- very turbid

3. Concentrations of 7-8 milligrams of oxygen per litre of water (7-8 ppm / parts per million) generally indicate water of sufficient purity for recreational use.

Explain to the students that:

- Dissolved oxygen is commonly used as a guide to describe general water quality. It measures the amount of oxygen available in the water and, as a rule, the higher this level the better the quality of the water.
- Many of the wastes that pollute ponds, streams, and lakes are organic; that is, they originate from plant or animal sources that were alive at one time. When these decompose or decay in a body of water, the process of decay uses up that dissolved oxygen. Untreated or partially treated human wastes, food processing wastes, farm run-off, algae, etc., use up oxygen when they decay. Therefore, a low dissolved oxygen reading suggests that there is a nearby source of organic pollution.
- If the dissolved oxygen content falls to a very low level, or even to zero, fish cannot survive because they cannot breathe. In addition, the process of decay changes and further decay occurs. This type of decay produces many of the unpleasant odours, such as the rotten egg smell, that accompany polluted water.
- A highly dissolved oxygen content indicates either the absence of organic pollutants, or sufficient re-aeration such as in a bubbling brook.

As each point is discussed, encourage students to identify areas or situations where dissolved oxygen content may be high or low.

Follow the instructions included with the test kit to determine the level of dissolved oxygen. Test for dissolved oxygen in the same locations that have already been used for checking temperature and pH levels.

4. Discuss the finding of the three tests of temperature, pH, and dissolved oxygen. Ask the students to describe the qualities of a lake that would not support life, and ones that would be very supportive of aquatic organisms. Ask them to rate the camp lake for its ability to support life. Have them prepare a short report of their findings for the rest of the group.

Group B: Plant and Animal Life

Use the collecting equipment (dip nets, strainer, jars, etc.) to collect various lake specimens. You will want to look at both plant and animal specimens.

Introducing the Lake

Ask the students to take a few minutes to stop and observe the lake setting, and the activity in the air, on the lake, and in the lake. Discourage the students from immediately rushing into the lake, as this will disturb the life in and around it. Look for the numbers of insects and animals visible before capture.

Establish the boundaries of the study. Stress the need for the buddy system when working around water. Also, stress the need to take great care when working with tiny animals. They need to be returned to their environment.

Sampling Procedures

Have students collect organisms by hand collecting them from stones, logs, and other drifting materials. The smaller stones will often have smaller insects and small crustacea on them, especially if algae are attached to the stones. Many small tube-like structures are attached to the stones; sometimes they are built from small bits of gravel and plant material. These are the homes of caddisflies and larvae. Also many cling to plants floating on or growing from the water. Have students use a kitchen sieve to scoop some mud from the bottom of the stream or lake. Run some water through it, and carefully pick out the specimens.

Once you have collected your samples of plants and animals, have the students draw and attempt to identify them. Use the datasheet to help organize their findings.

Culmination and Evaluation

After calling the class back together, have each group report and explain their findings to the entire class. Compare their results.

The following questions may help to guide the discussion:

1. What features did you study about the water? How does the understanding of these features help describe the quality of the lake or stream water?
2. How would you describe the quality of the water in this stream or lake?
3. What might account for any differences in results from each of the groups?
4. What else do you need to know in order to decide about using this water in different ways, e.g., for drinking, for irrigation, etc.
5. Under what conditions might you expect to get different test results than you did today?
6. How can you summarize your investigations today?
7. What processes and methods did you use to find things out?
8. What could you do to improve the stream environment as a habitat for plants? For insects? For fish?
9. What could you do to improve the lake environment as a habitat for plants? For insects? For fish?
10. How could you involve the community in improving the water quality of a local

stream? What features of stream quality would different members of the community be most concerned about?

Extension

Imagine, draw, and describe an aquatic animal that would have characteristics that would allow it to survive in all but the most adverse conditions. Name it with both a common name and a scientific name.

This activity is adapted from materials in *Education Goes Outdoors*, Frank Johns, Kurt Liske and Amy Evans, 1986, Don Mills, ON: Addison-Wesley Publishing Co., and *Nature with Children of All Ages*, Edith Sisson, 1982, New Jersey: Prentice-Hall.

Water, Water Everywhere

DataSheet on Plants

Study Questions	Sketch of Plant
What colour is it? What size is it? Can you identify it? Where does it grow? Can you make any other observations?	
What colour is it? What size is it? Can you identify it? Where does it grow? Can you make any other observations?	
What colour is it? What size is it? Can you identify it? Where does it grow? Can you make any other observations?	
What colour is it? What size is it? Can you identify it? Where does it grow? Can you make any other observations?	

Water, Water Everywhere

Datasheet on Animals

	Sketch of Animal
What colour is it? What size is it? Where did you find it? Can you identify it? How does it move? Can you make any other observations?	
What colour is it? What size is it? Where did you find it? Can you identify it? How does it move? Can you make any other observations?	
What colour is it? What size is it? Where did you find it? Can you identify it? How does it move? Can you make any other observations?	
What colour is it? What size is it? Where did you find it? Can you identify it? How does it move? Can you make any other observations?	

Variations in a Forest

Students examine several ecosystems and investigate both their living and non-living components. They look at how soil, plants and animals interact in these ecosystems. They investigate areas of the forest that show different stages of succession.

Curriculum

- language arts
- science
- mathematics

Skills

- observing
- measurement
- data analysis
- classifying
- inferring
- predicting
- hypothesizing

Materials & Equipment

For each group:

I. Abiotic Activity

- soil thermometer
- soil pH kit
- plastic collecting jars for soil
- trowel
- sling psychrometer (to measure humidity)
- light meter
- wind speed indicator
- air thermometer
- ruler
- large glass jar
- soil compaction device
- two tin cans (one with the top and bottom removed)

II. Biotic Activity

- white tray
- sweep net
- hand lens
- petri dish
- “suck-a-bug” or “pooter” (insect aspirator)
- plastic jars for animals
- clip boards
- identification guides: trees, shrubs, wild flowers, and animals
- chart paper

- student worksheets, “Biotic Data Collection Sheet” “Abiotic Data Collection Sheet”

Objectives

Students will understand that:

- an ecosystem is an interaction between a community of plants and animals, and a set of abiotic factors;
- soil is an important component of an ecosystem and has its own set of characteristics;
- ecosystems naturally change over time in a process called succession.

Vocabulary

- abiotic
- biotic
- ecosystem
- primary succession
- secondary succession

Advance Preparation

Stake out and number three plots. Each plot should be at least 10m by 10m in size. Each plot should be at successive stages of ecological succession, e.g., Plot 1 is in a meadow/shrub area, Plot 2 is in an ecotone area of transition with shrubs and deciduous trees, and Plot 3 is in a climax wooded area with a stable community of plants and animals.

Prepare large chart-size copies of the datasheets for recording and summarizing collected data.

Divide the students into four working groups: Groups A & B (Abiotic Factors) and Groups C & D (Biotic Factors). Ask the students to complete the different tasks at each of the three numbered plots.

Recommended Time

120 minutes (60 minutes each activity)

Background Information

An ecosystem is an interaction between a community of organisms and the non-living environment. Thus an ecosystem has two main parts, a biotic (living) part and an abiotic (non-living) part. The biotic part includes all the living things in the ecosystem - animals, plants, fungi, and protists. The abiotic part includes all the non-living factors in the ecosystem - water, soil, temperature, light, wind, and others.

- sun-dependent trees
 - conifers
- shade-tolerant trees

Succession that begins in an area that once supported life is called secondary succession. An abandoned field or a forest destroyed by fire or harvested by logging will undergo this type of succession because the soil is already present. Secondary succession occurs much faster than primary succession:

Secondary Succession

- pioneer plants
- grassy meadow
- field community
- sun-dependent shrubs
- sun-dependent trees
 - conifers
- shade-tolerant trees

Interactions in an Ecosystem

The above diagram suggest that climate is an over-riding factor that determines the general nature of an ecosystem.

Remember that all parts of an ecosystem are interrelated. Each part affects, and is affected by, all the other parts. Thus, if the plants in an ecosystem change, the soil, animals, and all other factors will change as well.

Ecosystems will change naturally over time in a process called succession. Succession that begins in an area that has not supported life within recent time is called primary succession. This process could begin on a bare sand dune or on rocks:

Primary Succession

- bare rock
 - lichens
 - mosses
- annual weeds and grasses
 - biennial plants
- perennial plants and grass
 - sun-dependent shrubs

Suggested Approach

I. Abiotic Factors

Explain to the students that they are going to undertake an in-depth study of several ecosystems, and that each group will collect a different set of data. Each group will report its findings. The combined results should help the class to see the natural changes that occur in ecological succession.

Begin in the meadow. Explain that this is the start of a forest - it will just take time to get there. They will see what the future holds in store for the area by examining the next stages that the meadow will undergo.

1. Pass out Abiotic Factors Data Collection Sheets to each group. Explain to the students that in this session they will be studying the abiotic (non-living) factors that affect an ecosystem and succession.

2. Take teams to Plot #1 and organize them into their A and B groups to collect the data as shown.

3. Record all the data on the collection sheets. Repeat for the second and third plots. Students groups should take only about 20 minutes at each plot area, and will only be able to collect as much data as the time allows.

Group A

1. Measure the air temperature. If the sun is shining, use your hand to shield the thermometer bulb from the direct rays of the sun.
2. Note the aspect of the plot. Is it flat, or does it slope in a particular direction?
3. Measure the light intensity. Follow the directions supplied with the light meter.
4. Measure the wind speed using the wind speed meter.
5. Note the direction of the wind with a moistened finger. Then use the compass to identify that direction.
6. Measure the relative humidity. Follow the directions supplied with the sling psychrometer.

Group B

1. Measure the soil temperature at depths of 2cm, 5cm, and 10cm.
2. Measure the soil pH. Follow the directions supplied with the kit.

Relationship of Soil pH to Plant Species

pH readings from:

- 0.0 - 4.5 are usually too acidic for plants
- 4.5 - 6.5 a marginal area for plants
- 6.5 - 8.5 most plants do well here
- 8.5 - 14 are usually too alkaline for plants

3. Study the upper soil profile:
 - Note the average depth of the undecomposed litter - leaves that have fallen off the plants but have not yet begun to turn black due to the decomposition process.
 - Note the average depth of the decomposing litter - leaves that are decomposing and have started to become black.
 - Measure the average depth of the humus layer - black soil.
 - Collect a trowel full of soil from five places in the plot. Put these samples in

a collecting jar and mix them. The mixture represents the average soil at this plot.

4. Display the information from the data collection sheets and use it to consider why there are differences between the plots and how the abiotic factors might affect the living organisms within each plot.
5. Discuss different examples of how man changes ecosystems by changing some of the abiotic factors.

Suggested Approach**II. Biotic Factors**

Explain to the students that they are going to undertake an in-depth study of several ecosystems, and that each group will collect a different set of data. Each group will report its finding and the combined results should help the class see the natural changes that occur in ecological succession.

Begin in the meadow. Explain that this is the start of a forest - it will just take time to get there. The students will see what the future holds in store for the area by examining the next stages that the meadow will undergo.

Suggested Approach

1. Pass out Biotic Factors Data Collection Sheet. Explain to the students that in this session they are going to study the biotic (living) factors that affect an ecosystem and succession.
2. Take teams to Plot #1 and organize them into their C and D groups to collect the data as shown.
3. Record all data on the collection sheets. Repeat for the second and third plots. Student groups should take only about 20 minutes at each plot area, and will only be able to collect as much data as the time allows.

Group C

Begin by recording observations of the plant life. Record on the Biotic Factors Data Collection Sheet the name, relative abundance, and observations about the plants in the plot. You could include

anything else that you consider to be special about the plants or where they grow.

Use a four-category scale for the relative abundance of each plant:

- a = abundant
- f = frequent
- o = occasional
- r = rare

Group D

Begin by recording observations of the animal life. On the Biotic Factors Data Collection Sheet, record the name, relative abundance, and observations about the animals in the plot. You could include anything else that you consider to be special about the animals or where they live.

Sweep the vegetation with the net to collect any insects. Transfer the insects to jars to observe them. Describe them, their relative abundance, and observations on the Biotic Factor Data Sheet. Release any insects collected.

Use the trowel to collect some litter (the uppermost layer of forest soil), some decomposing litter, and humus. Put this material in the tray. Spread it out and search for insects. Describe them, their relative abundance, and observations on the data collection sheet. Release any insects collected.

Look for signs of any other animals. You may not see them but you know they live there. You may hear bird calls or hear other animal sounds. You may also see track or droppings from larger animals.

Culmination and Evaluation

Have each group transfer their finding to the chart paper for comparison by the whole

class. If possible, display a complete set of data cards for all three plots.

Have the students look at the abiotic data. Compare Plot #1 to Plot #2 and Plot #3, and describe any abiotic factors that are different. What would have caused the changes?

Look at the biotic data. Compare plots and describe any organisms that changed in relative abundance. What could have caused these changes?

Encourage the students to refer to the observations of the organisms as well as to the interdependence between biotic and abiotic factors.

Evening Activities

Later in the day, perhaps in discussion around the dinner table or the campfire, discuss what factors may affect human populations in a particular area.

If you were studying people, what biotic and abiotic factors would you consider?

How much control do people have over biotic and abiotic factors? Explain.

How are people interdependent with biotic and abiotic factors?

Of the two, which seems to be the most critical? Explain.

This activity has been adapted from Investigating Terrestrial Ecosystems, William Andrews and Donna Moore, 1986, Scarborough, ON: Prentice-Hall Canada Inc.

Variations in a Forest

I. Abiotic Data Collection Sheet

Factor		Plot #1	Plot#2	Plot #3
Brief Description				
Aspect (direction you are facing)				
Slope				
Percolation rate				
Air temperature				
Wind	Speed			
	Direction			
Soil Temperature	At depth of 2cm			
	At depth of 5cm			
	At depth of 10cm			
Soil pH				
Upper Soil Profile	Non-decomposed litter			
	Decomposing litter			
	Humus			

Variations in a Forest

II. Biotic Data Collection Sheet

	Name (or describe)	How Many?	Observations
Plants			
Insects			
Animals			

They Think I'm Lunch!

In a highly involving physical activity, students become “deer”, the components of their habitats, and deer predators.

Curriculum

- language arts
- science
- mathematics
- physical education

Skills

- data analysis
- critical thinking
- problem solving
- decision making

Materials & Equipment

- chalkboard or chart to record data
- graphing materials
- writing materials
- volleyballs or Nerf balls (optional)

This activity can be done either indoors in a gymnasium, or outdoors on a playing field or other area large enough for students to run.

Objectives

Students will be able to:

- identify and describe food, water, and shelter as three essential components of habitat;
- describe the importance of good habitats for animals;
- define limiting factors and give examples;
- recognize that some fluctuations in wildlife populations are natural as ecological systems undergo a constant change;
- recognize that changes in one animal population or habitat component may in turn have an effect on other animals.

Vocabulary

- balance of nature
- ecosystem
- habitat
- limiting factors
- population

- predator
- prey

Advance Preparation

Set up the playing area with three parallel lines 10 metres apart.

Recommended Time

60 minutes

Background Information

A variety of factors affect the ability of animals to successfully reproduce and to maintain their population over time. Disease, predator/prey relationships, varying impacts of weather from season to season (e.g. early freezing, heavy snows, flooding, drought), accidents, environmental pollution, and habitat destruction and degradation are among these factors.

Some natural limiting factors serve to prevent wildlife populations from reproducing in numbers greater than their habitat can support. An excess of such limiting factors, however, leads to threatening, endangering, and even eliminating whole species of animals. The most fundamental of life's necessities for any animal are food, water, shelter, and space in a suitable arrangement. Without these essential components animals cannot survive.

In this activity students will come to understand the importance of suitable habitat, as well as factors that may affect wildlife populations in constantly changing ecosystems. In this activity students will learn that:

1. a good habitat is the key to wildlife survival;
2. a plant or animal population will continue to increase in size until some limiting factors are imposed;

3. limiting factors contribute to fluctuations in wildlife population;
4. nature is never “in balance”, but is constantly changing.

Wildlife populations are not static. They continuously fluctuate in dynamic equilibrium in response to a variety of stimulating and limiting factors. A species' population may be limited by several factors; a limiting factor may affect several species.

Limiting factors in natural systems tend to maintain populations of species at levels within predictable ranges. This kind of “balance of nature” is not static, but is more like a teeter-totter or pendulum. Some species fluctuate or cycle annually. Quail, for example, may start with a population of one hundred pairs in early spring, grow to a population of 1,200 birds by late spring, and decline slowly to a winter population of one hundred pairs again. This cycle appears to be almost completely controlled by the habitat components of food, water, shelter, and space. These are also its limiting factors. Habitat components are the most fundamental and critical of limiting factors in most natural settings.

This activity is a simple but powerful way for students to grasp some basic concepts:

- everything in natural systems is interrelated;
- populations of organisms are continuously affected by elements of their environment;
- populations of animals do not stay at the same static number year after year in their environment, but rather are continually changing in a process of maintaining a dynamic equilibrium within natural systems.

Main Activity

Introduce the activity by telling the students that they are about to participate in an activity that emphasizes the most essential things that animals need to survive. Review the essential components of habitat: food, water, shelter, and suitable space. This activity emphasizes three of those habitat components - food, water, and shelter - but students should remember that animals also require sufficient space in which to live, and

that all the components must be in a suitable arrangement or the animals will not survive.

Suggested Approach

1. Select two students (Group 5) to go to the end line on the far side. Have the remaining students organize into four groups of approximately equal size. Have Group One line up behind the other end line, and the other three groups line up on the centre line.

2. Students in Group One are the Deer. They need good habitat in order to survive. Review the essential components of habitat: food, water shelter, and suitable space. For this activity assume that the deer have enough space in which to live, and that food, water, and shelter are the limiting factors.

The deer need to find these requirements in order to survive:

- when a deer is looking for food it should clamp its hands over its stomach;
- when a deer is looking for water it puts its hands over its mouth;
- when it is looking for shelter it holds its hands together over its head.

A deer can choose to look for any one of its needs during each round of this activity; the deer cannot, however, change what it is looking for mid-way through the round, i.e., when it sees what is available. It can change what it is looking for only in the next round - if it has survived!

The three groups in the middle are food, water, and shelter - the components of habitat. At the beginning of each round each student gets to choose which component he or she will be during that round. The students depict which component they are in the same way as the deer, i.e., with hands on stomach, mouth, over head.

The two Group 5 students at the end are predators of the deer.

The game starts with all players lined up on their respective lines. The deer all turn their backs on the middle habitat components. Students on the middle line turn their backs to the deer.

3. Have all deer and habitat students make their signs. Give all a few moments to get their hands into place. When everyone is ready, count "Ready, Set, Go!" At Go everyone can turn around to face one another. At first, there will be a lot of variety in the signals chosen. As the game proceeds the students will sometimes confer with one another and all make the same sign. For example, if all the habitat students decide to be shelter, this could represent a drought year with no food or water available. Don't encourage this collusion, as it is a quick way to wipe out the deer population!

4. When the deer see the habitat component they need, they run to it. Each deer must hold the sign of what it is looking for until it gets to the proper person. Each deer that reaches its necessary habitat component is then "safe" from being killed. He or she takes the "food", "water", or "shelter" back to the deer side of the line. This represents the deer satisfying its needs and successfully reproducing as a result.

Deer are only to take one habitat component in each round. Any deer that fails to find its food, water, or shelter dies and becomes part of the habitat. In the next round the deer that died joins the middle line and is available as food, water or shelter to surviving deer.

When more than one deer reaches a habitat component, only the student that gets there first can take that person. Habitat components are to stay in place on their line until a deer needs them. If no deer needs a particular habitat component during a round that component just stays where it is. The habitat person can, however, change which component it is from round to round.

5. Meanwhile, the predators start on the word "Go!" from their line. They try to consume a deer before it reaches the needed habitat component. They consume a deer by tagging it with two hands. If they catch a deer, that deer then becomes a predator in the next round. If a predator does not catch a deer, then the predator dies and in the next round becomes part of the habitat in the middle.

6. Optional. You can add man to the ecosystem by choosing two students to become hunter and a Resource Manager who can establish hunting limits to maintain the population. Give each hunter two volleyballs or Nerf balls to "hunt" with. They try to throw the ball and hit either a deer or a predator. You can alternate open season on one animal or the others. An animal that is hit is killed and becomes part of the habitat. Exchange hunters with other students in the ecosystem at times during the activity.

7. Continue the game for approximately 15 rounds. Keep records of how many deer there are at the beginning of the game, and at the end of each round. Do the same with the numbers of predators. Post the data on chalkboard or chart paper.

A brisk and lively pace will keep the game enjoyable.

8. At the end of about 15 rounds gather the students to discuss the activity. Encourage them to talk about what they experienced and saw. For example, they saw a small herd of deer begin by finding more than enough of its habitat needs. The population of deer expanded over two or three rounds of the game, until the habitat was depleted and there was not sufficient food, water, and shelter for all members of the herd. At that point some deer starved or died of thirst or lack of shelter, and they returned as part of the habitat. This mirrors the cycles as they occur in nature.

9. Refer to the data records. The number of deer at the beginning of the game and at the end of each round represents the number of deer in a series of years; similarly with the predators.

The students will see this visual reminder of what they experienced during the game: the deer population fluctuated over a period of years, and with it the predator population. This natural process will continue as long as the factors that limit the population do not become excessive to the point where the animals cannot successfully reproduce. The wildlife populations will tend to peak and rebuild as long as there is good habitat and

sufficient number of animals to successfully reproduce.

Culmination and Evaluation

Ask the students to summarize some of the things they have learned from this activity. What do animals need to survive? What are some of the limiting factors that affect their survival? Are wildlife populations static, or do they tend to fluctuate as part of an overall balance of nature? Is nature ever really “in balance”, or are ecological systems involved in a process of constant change? How do humans affect the balance of nature?

Evening Activities

Later in the day, perhaps in discussion around the dinner table or the campfire,

discuss how the game might be modified to relate to people. Are there factors that affect human populations in a particular area? How might this population change in the area over time? For what reasons? What are some of the survival needs of people?

This activity is an adaptation of “Oh Deer!”, Project Wild Elementary Activity Guide, 1986, Ottawa, ON: Canadian Wildlife Federation.

How We Can Use A Forest

Students examine an area of the forest and collect information needed to decide whether to harvest the marketable trees in it or not.

This activity is only recommended if the class has had a pre-camp visit from a professional forester who has explained forest science and management.

Curriculum

- language arts
- science
- mathematics
- social studies

Skills

- observing
- measurement
- number operations
- classifying
- predicting
- interpreting data
- critical thinking
- problem solving
- decision-making

Materials & Equipment

- felt pens
- binoculars (optional)
- metre sticks
- coloured ribbons
- clip boards
- copies of student datasheets:
"Number of Marketable Trees"
"Site Plan"
"Effects of Harvesting"
- pencils

Objectives

Students will understand that several factors determine the value of a forested area, including the number of marketable trees, its ecological worth to the plants and animals that live there, its recreational worth for humans, and its aesthetic worth.

Vocabulary

- d.b.h. (diameter at breast height)
- succession

Advance Preparation

Use coloured ribbons to mark off the study area, a section of the forest of about two

hectares (100 metres x 200 metres). Try to have the study area include forests in different stages of succession. On one of the 100m sides of the study area place a ribbon marker every 10m.

Recommended Time

120 minutes (60 minutes for each activity)

Background Information

Uses of Forests

Everyone knows that we need wood for fuel, paper-making, lumber, and a variety of wood products. But forests are much more than their monetary value. They help maintain ecological balance in an area. For example, they are the habitats for many plants and animals, and they help to control erosion of the soil by wind and water. People use forests for recreational activities such as camping, hiking, and bird-watching. Many people enjoy simply looking at large trees.

Introduction

Explain to the students that they are going to collect information on the number of marketable trees in a two-hectare section of the forest.

Because a forest has many values, many questions need to be considered when an owner is thinking about harvesting all or part of it:

- What different logging methods could be used?
- How many marketable trees are there?
- How will the removal of these trees affect the animal and plant ecology of the area?
- How long will re-forestation take?
- Will the harvesting upset the balance of tree species in the forest?
- What will be the future of the forest after harvesting? How will succession proceed?

- Will the harvesting eliminate certain tree species from the forest?
- How will other possible human uses of the forest be affected by the harvesting?
- Does the owner have an obligation to leave some large trees for future generations to use and enjoy?
- How much is the forest worth when left standing?

Suggested Approach

Divide the class in half, into Group A and Group B. Group A will determine the number of marketable trees. Group B will examine the effects that harvesting might have on plant and animal communities and on the recreational uses of the forest.

Group A: Number of Marketable Trees

In this activity students will calculate the number of trees that are large enough to be harvested and sold. Divide the group into pairs and have each pair stand at one of the ribbon markers. Have the students study the trees five metres on either side of their sight line through the stand.

Demonstrate the following procedure:

1. Find a tree that looks large enough to be marketable. Most areas have tree-cutting laws that prohibit cutting of trees smaller than a certain d.b.h. (diameter at breast height). The d.b.h. is usually measured about 1.4 m above the ground.
2. Find the d.b.h. of the tree by using a metre stick to measure its diameter. If it exceeds 10 cm, put the d.b.h. in the Data Sheet. Estimate the height of the tree and record that information as well. To estimate the height of a tree, students measure 2 metres up the tree from ground level. Using that height measurement, estimate how many times the distance will need to be repeated to reach the top. Once the height of one tree has been estimated, use that height to help estimate the height of other trees near it.
3. Repeat this procedure as many times as possible in the allotted time of 40 minutes.
4. Meet back with all of Group A. Share data and estimate how many trees in the two-hectare site are of marketable value.

Now meet together with the other group. One pair from Group A should meet and share data with one pair from Group B. Together, they should try to develop a harvesting plan for the two-hectare site. They should consider whether they think all or part of the site should be clear-cut, selectively logged, developed for active recreational use, or left untouched. The students should use the collected data to defend their choices.

Group B: Effects of Harvesting on Plant and Animal Communities, and on Recreational Uses

Plant and animal communities may also experience the effects of harvesting activity. These effects may be positive or negative, depending on the types of plants and animals, and on their habitat needs.

Have the students:

1. Walk slowly through the forest. From time to time sit down, listen, and observe. Try to imagine how harvesting of the large trees would affect the plant and animal communities they see around them. What positive changes might occur? What negative changes might occur?
2. Consider what would happen to the forest if it had a much larger number of visitors every day.
3. Make a list of their thoughts and feelings. Have them express and discuss their feelings with two or three other students.
4. Think of examples of plants and animals that may or may not benefit from harvesting activity. Discuss the effect that harvesting might have on each.
5. Make a list of ways in which harvesting might affect plant and animal communities of the future.

The term "recreation" includes active pursuits such as camping, hiking, and bird-watching. It also includes the enjoyment many people get by simply being among large trees. Remind students that society may have an obligation to provide future generations with such recreational opportunities.

Continue with the walk. Have the student:

6. Try to imagine how harvesting of the large trees would change the experience they are having. What positive and negative changes might happen?
7. Make a list of their thoughts and feelings. Have them express and discuss their feelings with two or three other students.
8. Think about active recreational activities that may or may not benefit from harvesting, such as skiing, hiking, tenting, bird-watching, hunting, fishing, etc.
9. Make a list of ways in which harvesting might affect recreational opportunities for future generations, for example, twenty years from now.

Now meet together with the other group and share data as described above. Together, students develop a harvesting plan for the two-hectare site.

Culmination and Evaluation

Gather both groups together and share the various development plans. Have the class now decide upon one final comprehensive program.

Have the class predict what this area of the forest will look like twenty years from now if their proposal is accepted and carried out. What might be some of the benefits to the owner? To the community? What will be the effect of the plan on plant and animal communities? On recreational usage?

Evening Activities

Later in the day, perhaps in discussion around the dinner table or the campfire, have the class consider how to encourage

people to make wise choices concerning resource management.

This activity have been adapted from Investigating Terrestrial Ecosystems, William Andrews and Donna Moore, 1986, Scarborough, ON: Prentice-Hall Canada Inc.

How We Can Use a Forest

Data Sheet: Number of Marketable Trees

Tree	d.b.h. (metres)	Height (metres)

How We Can Use a Forest

Data Sheet: Effects of Harvesting

List the effects you think harvesting may have. Remember to consider both positive and negative effects.

On Plant and Animal Communities

On Recreational Activities

Looking at an Ecosystem

Students work in small groups and inventory a pre-set forested area for all its resources: trees, wildlife, water, soil, minerals, fish, grassland, and parkland. They then predict the outcome of an event might have upon their area.

Curriculum

- language arts
- science
- social studies

Skills

- observing
- classifying inferring
- predicting
- critical thinking

Materials

- clipboards
- one small card for each pair of students
- photographs of natural growback and reforestation, obtained from the education Services Coordinator
- much of the equipment used in the previous at-camp investigations

Objectives

Students will demonstrate an understanding of interdependence within a mini-ecosystem by predicting possible results of change within that ecosystem.

Advance Preparation

Mark off an appropriate number of miniature forest ecosystems. The education Services Coordinator may already know of a number of sites to use. Make certain the sites can be investigated using the knowledge and skills the students have acquired in the Pre-Camp and At-Camp activities.

Select the questions the students will investigate and put each one on a small card. Place these into envelopes to be given to each pair of students. Pairs of students should be given more than one card. If possible, laminate the cards and envelopes.

Choose from the following questions, and additional questions based on the characteristics of your camp:

1. What would be the effect of a drought on your ecosystem?
2. What could be done to increase the small animal population in your area, and how would it affect the ecosystem?
3. How would you enhance the large animal population in the area, and how would this affect the ecosystem?
4. What might happen if the area had all trees greater than 45 cm in diameter harvested?
5. What might happen if only the sapling trees were removed?
6. What might happen if the area were clearcut and replanted?
7. What might happen if the area were clear cut and became a farm?
8. What might happen if the area remained untouched for the next 50 years?
9. What might be the effect of fire or blowdown in your ecosystem?
10. How could you enhance the area for quality timber production?
11. How could you enhance the area for the benefit of the sports fishery, and how would it affect the ecosystem?
12. How could you enhance the area for the benefit of cross-country skiers, and how would it affect the ecosystem?
13. What would be the effect of letting trail motorcycles use the area for recreation?
14. Is there anything about your area that would make it suitable for parkland or for wilderness development?

15. How would your ecosystem change if minerals were discovered and a mine was opened?

16. What would be more likely to alter your ecosystem: people or nature? Explain.

17. How might disease and/or pests alter your ecosystem? Explain.

18. Who should be involved in making the final decisions about how your ecosystem should be managed? In what ways should they be involved?

Recommended Time

90 minutes

Suggested Approach

Have the students observe a forested area. Have them imagine that they are planning to harvest all the trees on the site. Have them describe what the impact of this harvesting might be. Includes the economic, recreational, and environmental aspects of the decision.

Have the students describe what the harvested area might look like in 10 years and in 50 years, under the following circumstances:

- if they left reforestation to nature; or
- if they used some type of reforestation management.

Show the students the photographs of forest regeneration. One set shows pictures of natural regeneration and grow-back over time. The other set shows the growth over time of a reforested site. Discuss the similarities and differences of the two.

Divide the students into small groups of about six. Have students pair up, and give each pair a clipboard, a tally sheet, and a pencil. Assign each pair to inventory their area

Explain that when the pair has inventoried all areas of the forested ecosystem, they are to open the envelope and read the questions they are to answer.

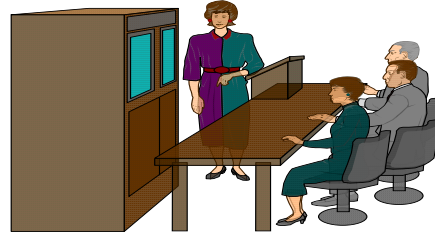
Stress that they will be expected to discuss the interdependence of an ecosystem considering the changes that will take place over time.

Give each group about 45 minutes to make notes and develop its answers. Each pair should make an oral presentation to the rest of the class, using their notes and pointing out specific examples within their area.

Evening Activities

Later in the day perhaps in discussion around the dinner table or the campfire, have the students share their information and what they have learned in doing the activity. Ask each student to distill what they have learned about interdependence until the class has a summary of major concepts.

Ecosystem Management



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Background Materials

Ecosystem management can be defined as any land management system that seeks to protect viable populations of all native species, perpetuate natural disturbance regimes on a regional scale, adopt a planning timeline of centuries, and allow human use at levels that does not result in long term ecological degradation. Note that “viable populations” is taken to refer to the naturally fluctuating populations within an ecosystem.

Biodiversity is a desirable goal of ecosystem management, but only on a cyclical scale. Diversity of a population will change over time through natural processes. The object is to understand biodiversity, its cycles and aim to use our forest so as to disturb these cycles as little as possible.

Over time natural disturbances occur as a part of the natural cycle of an ecosystem. Disturbances such as fire, disease, and insect infestation affect forest populations which changes the dynamics of the ecosystem continuously. Keeping these cycles of nature in mind, ecosystem management attempts to use these as guidelines when managing the forests. An example of such a cycle is the life expectancy of various species of trees. Ecosystem management suggests that instead of having one policy on the age of logging of all species of trees, have different policies depending on the individual life expectancy of each species and the area it is in.

Another goal of ecosystem management focuses more on the political aspects than the environmental or scientific. The two opposing views of biocentrism and humanism both have interests in the forests of North America and between them a compromise must be reached regarding their use. Biocentrism is the view that humans must interfere with the environment as little as possible; as nature will manage itself. This directly conflicts with the humanist view that humans should utilize the resources around them in order to further their own goals. Ecosystem management appears to be the best method of bringing the two opposing views to an agreement that is suitable for the majority of parties involved.

Almost everyone can relate to the fact that humans should not indiscriminately destroy the environment for their own uses. At the same time, it is clearly evident that humans rely on resources harvested from the environment for their survival. This poses a dilemma. Ecosystem management suggests that part of the answer to this dilemma lies in the fire cycle that naturally affects the forest.

Fire cycles, which have been repressed through fire control practices since the early twentieth century, are now fighting back with a vengeance. It has become apparent that through fire the forests were able to maintain a naturally replenishing cycle, which kept forest fire damage to a minimum. Because fires were more frequent, the pine beetle was controlled, fuel loads were kept lower, meaning that individual fires were less devastating. Today, through the use of fire control, the fuel loads within the forests are so large that should a fire break out it would be far more devastating than it would have been had we never repressed the natural cycle of fire.

The fire cycle is one important component of the Kootenays' natural disturbance regimes. A certain forested area may be studied in order to determine when the last large fire had completely burned it off. It may be determined then how long this area took to become completely replenished, giving some indication as to how many years in between that it can be logged. An example of this is found at the look out point. A fire burned this area completely in the 1920's, it has now fully grown back, giving an indication that this forest has a cycle of seventy years.

Sustained yield is the current policy in British Columbia for deciding annual allowable cut and the areas where these cuts will be. The problem with this is that our forest decisions are being based on what we need rather than what the forest can provide safely. Sustained yield is most often carried out through a two pass system, involving one major cut every eighty years. The current logging policies create many different political and environmental issues. For example within British Columbia there is one allowable cut given for the whole Province for one year. This means the Ministry of Forests dictates how much each region may log. However each region is different in its ability to contribute timber. An example is the coast as compared to the Kootenays. Each region should have its own limit set according to its ability to produce, as dictated by the ecosystems natural cycles and their fluctuations. Decisions such as these could easily be based on the natural environmental patterns such as old fire patterns, rather than on preset quotas.

The patterns left behind after a fire that occurs as part of the natural cycle have some very distinct characteristics. The smaller naturally occurring fires leave behind stands of trees that later become evident as being of a different age than the surrounding regrown forest. These stands support different species and are especially significant in the period after the fire as habitat. The fire also creates many irregular edges which has been shown to contain the majority of biodiversity. The fire leaves certain trees behind of different types and of different ages to allow for the growth of future forests. Without this variety of species and variety of ages in the trees, the forest would become a monoculture. A forest which is a monoculture creates some serious problems within the ecosystem. Different species rely on many different types of trees, therefore with only one type of tree, it is likely to assume that there would be very few animal and insect species. Fire also serves to removed dead trees or diseased trees from the forests to protect and encourage other growth. By understanding these natural occurrences within the forests, allows decision makers to create policies which would affect the environment less and leave the forests healthy.

Ecosystem management proposes to incorporate the concept of natural disturbance patterns into logging practices. This suggests that, by mimicking natural occurrences, logging companies are able to harvest the lumber needed as well maintain a healthy environment. Logging practices would then mimic the fire pattern of that specific area. Thus leaving irregular edges, stands of trees left all over, and variety of species and ages of the trees. It is noted that humans can not completely replicate nature, however

currently ecosystem management is the only system which incorporates the natural processes of the forest.

One very important aspect of ecosystem management is its use of a variety of ways of looking at things. Scale is one of the most significant of these views. From micro to macro, ecosystem management tries to look at things at all levels. The coarse filter approach (looking at the big picture) dictates that we should be managing our forests in much larger groupings than we currently do. Again, this coarse filter approach suggests that we are currently managing our forests incorrectly, and managing areas that are too small, using policies that were designed for other areas. British Columbia incorporates a variety of biomes for which one policy is not sufficient.

Be sure to read the information in the Driving Tour program as well, it contains a lot of other important information.

Ecosystem Management Introduction / Woodlot Tour

Objectives for this activity:

- a) Campers will learn about the history of the Kootenay Forests
- b) Campers will be able to look at our forests and understand the need for progressive forest management in the Kootenays
- c) Campers will learn the definitions involved with Ecosystem management
- d) Campers will understand fire patterns and how logging to mimic them creates biodiversity within the cutblock.

Lets Get Ready:

You will need to hike out to the Fisher-Maiden lookout so take a radio, first aid kit, and water. Make sure that all of the campers are dressed appropriately.

Lets Talk:

Site #1 – Fisher Maiden Look out Point

Start out by introducing the concept of ecosystem management, and defining several key terms. Ask the kids "who knows what ecosystem management is?" , "what is biodiversity?" etc.

Ecosystem Management may be defined as a long term management system which seeks to protect viable populations, perpetuate natural disturbance regimes on a regional scale, adopt a long term planning regime of centuries, and allow human use levels that do not result in long term ecological degradation. It takes into account societal, economical and environmental issues and needs.

Biodiversity may be defined as a variety of species within an area, species of all types including all living materials, and where species are organized at many different levels within a given ecosystem from macro levels to micro levels. (fungus's and lichen are just as important as deer and bears, which are just as important as shrubs and trees)

An **ecosystem** may be defined as an interdependency of organisms and their environment. (The chain is only as strong as the weakest link)

Discuss with the campers the various goals of ecosystem management. One of these goals is the political aspect. Ecosystem management seeks to be a tool to compromise between humanism and biocentrism; humanism being the belief that humans should utilize the resources in the environment to suit human needs. Biocentrism is the polar opposite being that humans should remove themselves from the ecosystem and allow nature to remain undisturbed. Both of these views have many valid points that our society needs to recognize. There is a very strong need for wood products and there is also a very strong need to protect our natural ecosystems.

Ask the campers to tell you what they see across the mountain. They will say trees. Then ask them what else they see. After they list off a few things, explain to them that for years we have been regarding forest management as tree management. However the forest involves much more than trees, as they just pointed out. Explain how everything in the forest falls under either a biotic or an abiotic classification. An ecosystem is the interdependency of biotic and abiotic levels in a forest. Therefore rather than looking at forest or “tree” management, shouldn’t we be looking instead at ecosystem management? Also point out to the campers the fire patterns on the other side of the hill.

Discuss with the campers some of the important concepts in ecosystem management. The first of these is the idea of fire control. Fires historically have played a major role in our ecosystems as a natural disturbance. Fires in the Kootenays happened on a cycle which served to keep the fuel loads low, clean out the underbrush and to take out the diseased trees. With this fires left our forest healthy; allowing the trees enough room, light and nutrients to grow. However fire cycles have been repressed in the Kootenays since the late 1920’s. This means that the fuel loads in our forests have increased dramatically. Due to the frequent cycle which fires worked on in the past the fuel loads always remained low creating small fires which were not devastating. With the large fuel load today should a fire break out it would not be easy to contain and could potentially be devastating.

A second important concept of ecosystem management is the fire pattern. Fires as mentioned before are a natural disturbance, which work to keep the forests healthy. When a fire burns a certain area it leaves a very specific pattern. Ask campers what sort of patterns they think a fire leaves behind; does it leave straight edges, clumps of trees etc? Explain that fire leaves a diverse landscape behind. Characteristics of a fire include clumps (or islands) of trees, single trees, snags, irregular edges, as well as stands of trees of different ages and species. After a fire the stands of trees which are left have irregular edges, this is very important as when studying a clear cut it had been suggested that the most biodiversity is found on the edge of the cut. Similarly in a fire pattern the edges of the stands are where the most diversity lays, therefore with irregular edges, there is the greatest amount of edge possible. Ask the campers how they think we can log to mimic fire. What sort of features could we leave behind to create the greatest amount of biodiversity? (Jagged edges, islands etc).

A third concept which is important to ecosystem management is the idea of the fire cycle. The fire cycle in the Kootenay area, can be used as an indicator for logging practices. If a fire goes through a certain area, then the regrowth period is studied. This information may be used to determine how often an area can be logged.

Site #2 – Overgrown area

Try and get the campers to guess what two things happened in the Kootenay forests for the first time ever, between the turn of the century and the 40's. Eventually with a few hints they will arrive at Forestry and Forest Fire Prevention. Have the campers tell you how old a tree gets. Your answers are going to vary from anywhere between 50 years and 2000 years. Both answers are right. Now try to get them to pinpoint where the trees that live to be 2000 years old grow. Here in the Kootenays where it's cold and dry, or down on the Coast where it's warm and wet? When they've figured out that trees in the Kootenays don't live for nearly as long as trees on the coast, introduce the forest fire return rate. Ask the campers how long it historically is between fires in the Kootenays. Lodgepole Pine. The Lodgepole Pine is the first tree to grow back in the Kootenays after a disturbance. It is a sun dependant tree. It also has serotinous cones. (Cones with seeds that only open in a fire.) However it's lifespan is generally only 50 to 80 years. So if a catastrophic fire came through the Kootenays 80 years ago, a forest of Lodgepole would grow back. However the forest fire return rate is 5-30 years so within a few years a fire would have come through and cleared some of the trees out. It would be a small fire, because the fuel load wouldn't be high enough to support a large fire. This would provide room for new trees to grow etc. etc. However what happens if we don't have a fire for eighty years? (The answer is that we get a fuel load so massive that it results in an extremely destructive fire.) So if we started an unnatural regrowth of a lot of our forests about 70 years ago, and then started to prevent fires, than what we've produced is a monoculture forest of Lodgepole pine that is ready to burn.

Activity:

Have the campers mimic a forest in three different scenarios. First have them all spread out within a few arms lengths. Now pick an elk. Ask the elk if it can run through all of the trees. Yes of course it can. What if a fire burned through here? Would it burn everything? No. What if no fires came through for a long time? The forest would get crowded. So all of the campers start moving closer and closer together. Now can your elk run through the trees? No. And what would a fire do now? It would take everything. So what can we do to prevent a fire from burning down everything? CUT!! (cut everything?) No just some. Now what does the forest look like? It looks like the first one that we did, Spread out. So can the elk get through? Yes. And fire won't take everything? NO! So maybe logging can be good sometimes. Sweet.

Stump Survey

Objectives for this activity:

- a) Campers will be able to understand what our forests used to look like through a look at stump spacing
- b) Campers will discuss old style forestry techniques and compare them to new practices
- c) Campers will be able to recognize old C.P. Rail tie sites in the forest
- d) Campers will understand the term biodiversity, the importance of different levels of biodiversity in the ecological cycle, and where high and low levels are traditionally found.
- e) Campers will see the possible effects of a skid trail on regrowth
- f) Campers will see the possible effects of fire prevention on the forest.

Let's get Ready:

You will be hiking down to the bottom of the flags area so you will need a first aid kit, and a radio if one is available. Make sure that the campers are dressed appropriately, have proper footwear, have used the washroom and have had something to drink.

Let's Talk:

Site #1 – Bottom of the flags area

Ask the campers which forest that they represented in the morning this stand of trees looks like. They should answer either the spaced forest before human intervention or the spaced forest after cutting. Then ask whether this stand is visually pleasing, and if so why. Introduce the term Biodiversity. Biodiversity means the amount of different life in any given area. Then ask whether they think that high levels of biodiversity are better than low levels. It's generally accepted that one of society's agendas is to have high levels of biodiversity everywhere. But if they also want old growth forest how is that possible? Old growth areas in the Kootenays have some of the lowest levels of Biodiversity. Ask how long ago this area was logged. There is a C.P. Rail tie site right off of the road at the bottom which is pretty good proof that this area was logged approximately 70 years ago, yet it's fully regrown. So it is possible to practice logging in the Kootenays keeping in mind important ecological aspects. Old style logging was some of the most ecologically sound logging ever. But no one knew it, and ecology certainly wasn't an issue back then.

Activity

Have the campers play a couple of games of camouflage. Camouflage is played when one camper stays at the bottom of a forested hill, and the rest run up and hide. The camper at the bottom counts until five as the rest of the campers start to run down the hill. When the camper at the bottom has reached five, he/she turns around and tries to spot the other campers who are hiding. If he/she is successful they are out. If he/she can't spot anyone, he/she must turn around and start to count again. Whoever makes it to the bottom of the hill without being caught wins. First play in the old spaced forest, and then

in a denser forest. It will be obvious to the campers that the old growth type forest doesn't provide a lot of cover.

Lets Talk Again

Biodiversity is important to everyone. Yet we've been struggling under the misconception that biodiversity only comes with old growth forests. That's not the truth in the Kootenays, in fact it is quite the opposite. Our old growth forests produce the lowest levels of biodiversity, whereas the highest levels occur just after a clearcut.

Standing by the CP rail tie site, look at the patch of trees

Forest Management Mountain

Objectives for this Activity:

- a) The campers will be able to apply basic ecosystem management principles.
- b) The campers will build an understanding of the different demands placed on an area by human activities.
- c) The campers will see the effects of natural disturbances and will be able to utilize skills which are ecologically appropriate to compensate for these disturbances.

Let's Get Ready:

You'll need: Sandboxes, clipped twigs (to represent trees), paint (to represent fire and disease), small shovels and water. You will also need to prepare a representation of a mountain (big pile of dirt) in the sandbox prior to the lesson.

Let's Talk:

Explain to the campers that it is their job to manage the forest in a way which will be economically and ecologically sound. Some questions which could be answered are: who are some of the forest users that you will have to manage for? (Hunters, recreationalists, logging industries, environmentalists, wildlife observers etc.) What are some things you will have to protect for the forest? (Habitat, wildlife, tree species, water areas etc.) What are some of the ecosystem management techniques you can use? (Stands, irregular edges, mimicking fire burning etc.). Discuss with the campers the needs in our society to have wood products and list a few of the products which are important.

Let's Do It:

Make a mountain. Add trees making sure there are clearly forested areas and untreed areas. Allow the campers to begin managing the area. Every round have them take out their lumber in whatever method they choose and after they have done so, add the new trees. If their fuel load becomes too high introduce fire (red paint). If they manage fuel load effectively, add insect/disease (blue paint). If disease goes unchecked introduce fire. Allow them to log as they choose and introduce the above problems which will interfere with the ecology and their logging practices should they log in a way other than what is called for in ecosystem management. Excess logging and not enough irregular edges will lead to decreased animal populations and angry hunters and wildlife observers. The loggers will be given a quota for how many trees they must harvest.

The rounds in this activity are very important. Each round represents a year, ensure that the campers understand this. Each year 3000 hectares are taken over by a new growth of trees. This means that farm, ranch and grazing land is encroached on every year. Make each round approximately four or five minutes. With each round introduce something

new. After the first round add in more trees, on the second round add in fire where there is a high fuel load, on the third round add in disease, on the fourth round ensure that it is obvious that the trees are growing in on the farm, ranch and grazing lands. The length of each round is flexible depending on the amount of campers in each group and how quickly they are working through the problems.

Let's Talk Again:

What were the most effective techniques for keeping the animal populations up, the logging quotas met and the other groups happy? Should we be managing for all our resources together rather than separately (Ministry of Wildlife, Ministry of Agriculture, Ministry of Environment, Land and Parks, Ministry of Forests)?

Plot Surveys / Oh Deer

Objectives for this activity:

- a) Campers will be able to see the difference in levels of biodiversity in different parts of the forest, ie in the middle of the cut, in the middle of the forest, and on the edge.
- b) Campers will be able to see the fluctuation in population levels .
- c) Campers will graph the results of both their plot surveys and the population levels of the deer, and will compare.

Lets get Ready:

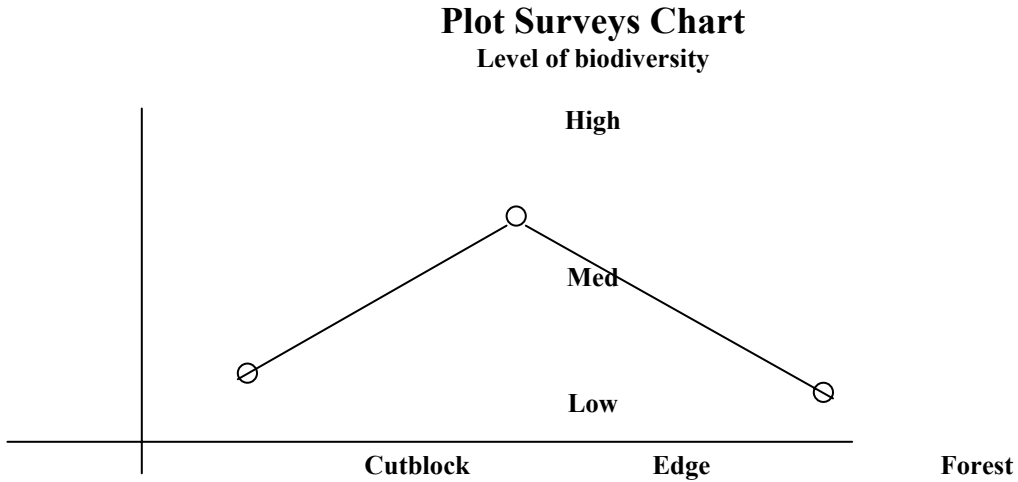
For the first part of this activity, you will be going over to the cutblock on the other side of the lake. You will need to be dressed appropriately, and you will need a first aid kit, and bear spray. You will also need the plot survey record sheets from the silviculture program, clipboards, pens, a metre stick, and the plot survey flags. For the oh deer part of the activity you will either need to use a flipchart, or the chalkboard in the cookhall.

Lets talk:

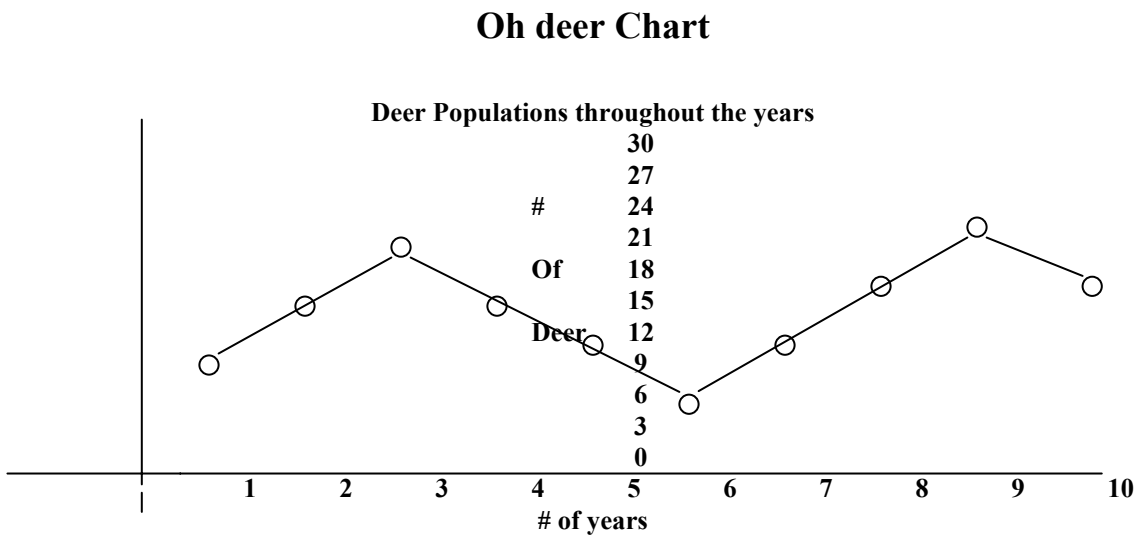
- 1) Bring the camper across to the other side of the lake and have them have a seat in the cutblock area. Explain what they are going to be doing. There are going to be three metre square plots. You are going to split the campers up into three groups, and have them each record how much life is in each plot. Explain the differences between all of the categories on the plot surveys sheets. (ignore the stems per hectare section on the top. That is for the silviculture program) You are going to set up the three plots. One is on the edge of the cutblock, the other is in the middle of the cutblock, and one is in the forest. You want the end results to show that the level of biodiversity is higher on the edge than in the middle, so put the plots where you know for certain that you will get the results that you want. Then let the campers go to work. Bring enough sheets so that you can rotate the campers to a few different plots. When you are done, collect the sheets and head back to the compound.
- 2) Put away the plot survey sheets for a while and set up a game of Oh deer. Oh deer is played when you split up the campers into two groups. One group is deer and one group is habitat. Explain what habitat is to the campers, and then show them the signs for all the different habitat. Hands on your belly shows food, hands on your mouth shows water, and hands on your head shows shelter. The two groups are going to line up opposite one another the deer on one side and the habitat on the other, facing away from each other. And then both groups will pick their sign, either food, shelter, or water. When you say go, both habitat and deer will turn around, and the deer will run toward the habitat. The habitat doesn't move. (have you ever seen a tree run.) If a deer picks food and is able to get to a habitat who has picked food also, then the habitat becomes a deer, and they both head back to where the deer line up. Only one habitat can go with only one deer. (no sharing) If the deer doesn't reach the habitat, or there is none of what they pick, then they die and become part of the habitat. Ask the campers to make sure that they don't cheat, or change their sign on the way across, as you are taking records of this game. This game doesn't work well with less than ten

people and works best with twenty or thirty. So if you have a small group, ask one of the other counselors if their ecofun group wants to join in for the game. For your records, record how many deer there are after every time that they run across.

- 3) After you are done playing oh deer, either graph your results of both activities on the flipchart, or inside the cookhall. Your graphs should look like this.

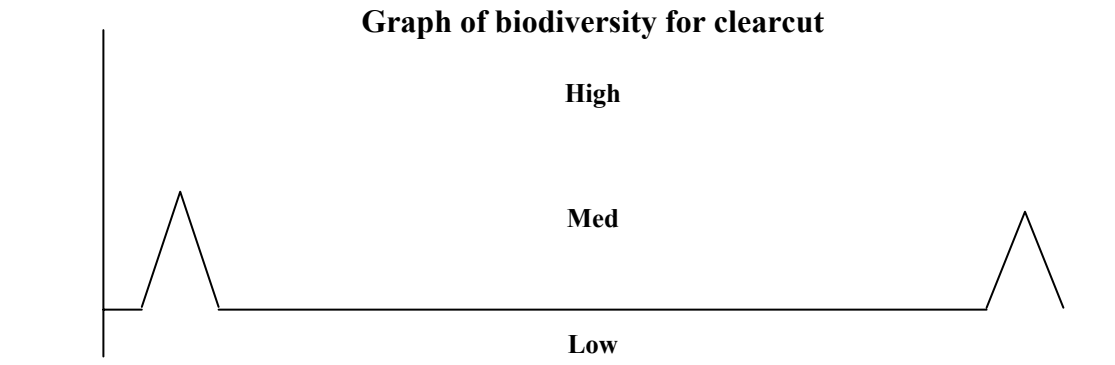
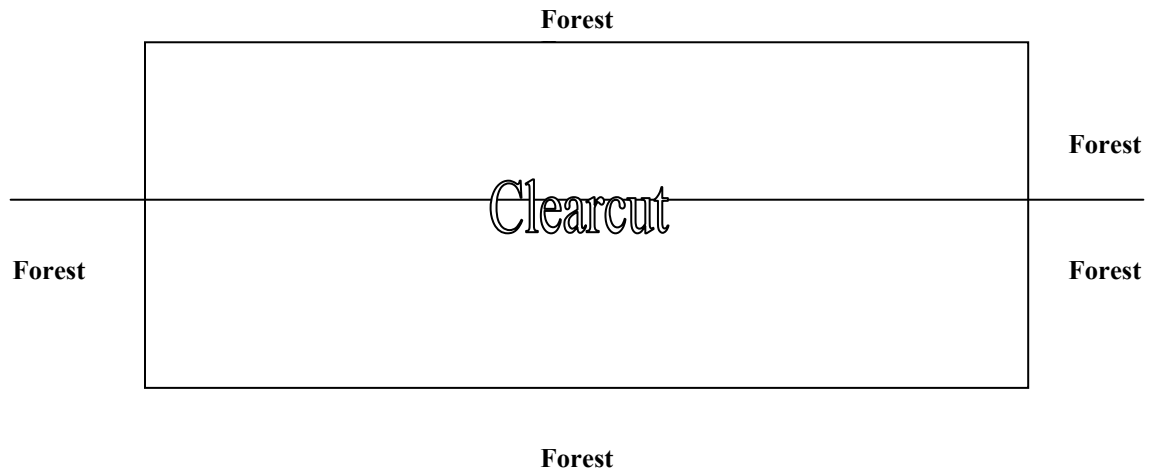


Notice the rise and fall of the graph. Now do the Oh deer graph.



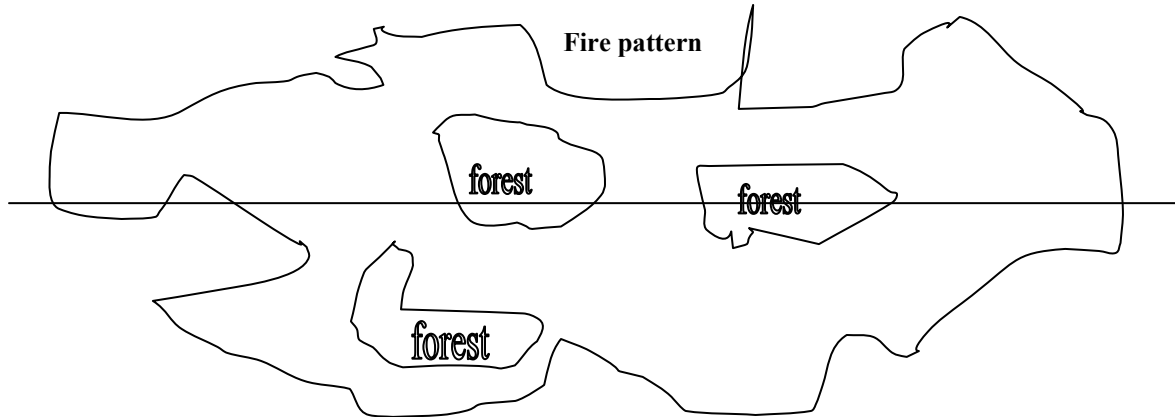
Notice the rise and fall of the population levels throughout the years

- 4) Now ask the kids where they have seen that up and down line before, how about in the hospital on the cardiograms. And what does it mean when you have a flat line? It means that there is no life.
- 5) Now draw a rectangle, It represents a clearcut. If you were to draw a line through it and graph the biodiversity of that it would look like this.

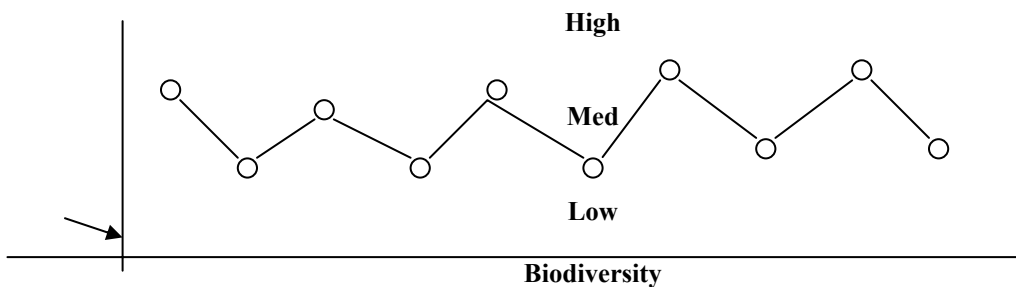


Biodiversity

Notice the flat line in the middle of the graph. Now ask them what a fire pattern would look like. It would have jagged edges and there would probably be patches of trees left inside of it.



Graph of Biodiversity for the Fire Pattern



You can compare the level of biodiversity graph for the fire pattern with the graph of deer populations and the graph generated from the plot surveys. This graph represents a healthy pattern of life. As change is constant and this graph represents that.

Wrap up:

If we start using a style of logging based upon the natural disturbance of fire, we might be able to attain natural levels of biodiversity in our cuts, and to some extent can replace the fire in the ecosystem with logging.

Plot Survey Record Sheet

1. Stems per Hectare. Spaced_____ Unspaced_____

2. Biodiversity

Classification: different kinds		How many on your plot		How many	
		Spaced	Unspaced	Spaced	Unspaced
Trees:					
	-With needles				
	-With leaves				
Shrubs					
	-Tall (knees or taller)				
	-Medium (ankles to knees)				
	-Creepers (below ankles)				
Plants:					
Grass:					
Moss:					
Lichens					
Total:					

What level of biodiversity does each area have?

(High or Low)

Spaced_____ Unspaced_____

Which site is healthier in your opinion_____

Silviculture

Objectives for this activity:

a) Through activity and discussion, campers will be able to recognize different management techniques, and their importance in the forest.

Let's get Ready:

This activity will be taking place 2.5 km. from camp, at the top of the 5 km. loop. There's a sign with "Not Spaced" written on it, and a sign with "1991 spacing trial conducted by C.F.I." written on it. If you are going to be hiking there, you will need the proper clothing for you and the campers, water, bear spray, a radio if available, and a first aid kit. You will also need the flags, clipboards, pens and the silviculture plot survey sheets (in the filing cabinet) for the plot surveys.

Background

The site is all natural regeneration (as opposed to replanting), after logging approximately 15-20 years ago. The trees are primarily Western Larch & Lodgepole pine. The cut left approximately 5% residual trees (all western larch). The forest fire return rate is approximately 70-120 years (as opposed to 3-30 in the trench). With such high fuel loads being generated between fires, the fires in this area were probably catastrophic with 0-5% residuals (either Western Larch or Doug Fir, as they are both fire resistant trees). Therefore this site is a good representation of natural regeneration of this forest after a catastrophic fire. The Lodgepole is all approx. 15 yrs. old, and the Western Larch is all between 30 and 50 yrs. old.

Procedure

1) Hike up to the site, and ask the campers which site looks healthier. The spaced site or the not spaced site, but don't go over pros & cons of both until after the site surveys.

1st Measure stems per hectare for both

2nd Measure ground cover for both. (sheets are in the filing cabinet)

Compare the results

Now ask the campers which site that they think is healthier, chances are that they will choose the spaced site, however they are both

Talk with the campers about the different pros and cons of each site.

- The spaced site has higher levels of biodiversity and can support larger animals, (elk, deer, bear)
- The spaced site grows plant food for many animals.
- The unspaced site is the way that the forest would look naturally after a burn.
- The unspaced site provides habitat for smaller animals that need dense growth for cover from predators.
- The spaced site will provide better trees for logging in a few years.
- In a natural ecological system, the unspaced site would provide a fuel load for fires in order to keep the natural change in the forest constant.

2) Ask the campers to recall the stump surveys that they did earlier in the week, and to compare their results from their stems per hectare surveys that they just did. This is a good indication that there are more trees in the Kootenay ecosystem than before human interference.

3) There are two trees that have been cut down that are flagged. One of them is in the spaced area and the other is in the unspaced area. The tops of the trees have been interchanged. Ask the campers to compare the trees and tell you which one was older. They might be surprised to learn that they were the same age and the only reason that one is so much bigger is that it was in the spaced area, and didn't have as much competition for food, sunlight, etc.

Wrap Up:

Management can play an important role in our forests, however we need to start making smarter decisions on how we want our forests to be used. This area is an excellent example on how it is possible for human intervention to produce results that we want. But we need to start making sure that the results are based on ecological values more than societal values.

Stump Spacing

Objectives for this activity:

- a) Campers will be able to see the old forest pattern, by studying the stumps. Campers can use this knowledge to understand spacing practices which would create a healthy forest.
- b) Campers will also be able to learn about some old forms of logging, and see the markings left behind when the CP Rail company was logging to make railway ties.
- c) Campers will learn that fire is useful to remove pine grass and replace it with a form of grass which could be grazed.

Let's Get Ready:

Take the campers to the old CP Rail site using McIver's trail. It is important to use this trail for the hike rather than the road, so that the campers will have a chance to visualize some of the concepts of ecosystem management.

Let's Do It:

- a) Discuss with the campers the Western Larch on the left hand side of the road. Point out the chain/cable marking at the bottom of the tree. This marking was left by CP Rail, as this area was used as a mill site to make railway ties.
- b) Further down the road, discuss with the campers the large stump on the right hand side of the road. Point out that this tree was logged in the twenties, by horses. The part of the tree left (beside the stump), was left behind because it had suffered wind shock. Wind shock is damage done to the base of a tree over time as it is blown around. In the long term this makes the wood in the base of the tree unmarketable. Discuss with the campers the size of the tree, and why there are not many other living trees that size in the area. The tree's size is due to the availability of nutrients in the time when it was still growing, it obviously had had enough space to grow healthy and large. There are few other trees this size in the area, because, the trees are not as well spaced, therefore not allowing enough nutrients for the trees to grow that size anymore.
- c) Move further down the road to where the stumps, or the old forest growth, are most visible. Get the campers to count the stumps which they can see from where they are standing (generally the numbers for this have been from 15-20). Then get the campers to count the trees from standing in the same place. After this discuss with the campers the fact that the stumps represent the old forest pattern. This representation can be used today to manage this specific area of forest. If one was to space the trees so that the pattern reflects the stumps, than it is likely that they will create a healthy growing environment for the trees. Point out in the area the stands which are too close together, ask what the campers notice about these stands, what would they do to change these stands?

d) Ask the campers to feel the texture of the pinegrass around them. Point out its coarse characteristics. pinegrass can not be digested easily by grazing animals, this is important, because pinegrass over runs and chokes out other prime grazing vegetation. When a fire comes through an area, it burns all of this grass allowing for appropriate grazing food to grow up in its place. By repressing the fires in this area, ask how the campers think this affects the grazing populations such as elk. Secondly by repressing fires in this area, the Douglas Fir has been steadily taking over the Lodge Pole Pine, as there has been no fire to open the Lodge Pole Pine's serotinous cones, nor clean out the excess Douglas Fir.

Let's Talk:

Review with campers the various points which were discussed in this activity. Have the campers consider how it is they would manage this particular forested area, using the stumps as evidence to what would be best for the trees, vegetation and habitat.

Note:

The area was logged in the 1920's, then was burned five years later (that would mean 1925).

The sites are currently flagged with red flagging tape, these sites can be reached by following the McIvers road or trail. Once you reach the 'strawberry patch' (it's just a clearing from old logging with a road running through it), follow the dirt road away from the main McIvers road.

Treeline Hike

Objectives for this activity:

- a) Campers will be able to recognize different tree species.
- b) Campers will be able to understand basic spacing concepts and recognize natural and engineered spacing.
- c) Campers will get the opportunity to physically walk through and identify a variety of different forest conditions.

Let's Get Ready:

You'll need: First Aid Kit, Radio, Snack, Water, Appropriate Clothing, Big Squirrel Spray if you can find some, check with the senior staff before acting on this.

Let's Talk:

Bring the group together and make sure they are all properly dressed. Briefly go over the basics of ecosystem management. Finally do the head count thing (that's where you count heads to make sure of how many campers you have and that they are all there. You should do this a few times over the hike, especially after you walk past the McDonald's halfway up the trail. We're not sure why it's called a head count)..

Let's Do It:

Begin hiking. The beginning parts of the trail are unmarked but are as follows: up the "A" frame road, turn left at the road at the top and follow this road until you get to the heavily flagged location on the right hand side. This is the trail head. From this point on follow the red/white and blue/white flagging tape until you get to the treeline. There are a few, also heavily flagged areas along the way at which you should stop. The first is just above the steep skidder trail.

Site 1:

- Lodgepole pine/Western larch identification
- Deadfall
- Variety of age and species
- Stands
- Post cut cleanup (there should be a short length of very heavy wire lying around)
- Natural spacing.

The next site is just across the next road you come to.

Site 2:

- Spacing (engineered)
- Planting (monoculture)
- Pinegrass

The third site is the old mill site that you will come across as you continue to hike the trail.

Site 3:

- Animal habitat
- Decomposition and cyclical return of nutrients
- Post cut cleanup

The final site is the treeline.

Site 4:

- Rampant variety in species: Lodgepole
Western Larch
Douglas Fir
Deciduous shrubs
- Edge -straight, but should be jagged
- Spacing beyond treeline: too dense, fuel load very high
- VIEW:
 - Burn patterns on mountains
 - Open flatland in valley
 - Just let them relax and enjoy the view for a while.

Let's Talk Again:

Review with the campers what they have learned. Explain to them the concepts of sustained yield and the two pass system. Have them suggest what could have been done differently in terms of logging along the trail.

Dilemma

Objectives for this activity:

- a) Campers will be able to understand the conflicting positions surrounding ecosystem management.
- b) Campers will develop critical thinking skills, particularly in forest issues.

Lets Get Ready

You'll need: the sets of four instructional information cards, a set of area maps (the Canal Flats maps work very well), and dry erase pens.

Let's Talk

With the class, go over some of the ecosystem management concepts and explain the information on each group's card to everyone.

Let's Do It

Divide the class into four groups. Assign to each group an identity: Ecosystem management promoter, pulp and paper industry representatives, environmentalists, and alternative users. In their groups have them discuss how the people they are pretending to be would manage the area on the map. After letting them discuss this for a while, alter the groups so that each group now has one (or so, you'll have to cope with numbers) of each of the different viewpoints in it. Have the groups take up positions, debate, and arrive at an acceptable plan of action for managing the given area.

Let's Talk Again

Review the ecosystem management concepts and how they attempt to meet everyone's needs.

Notes for the educator:

- Be sure to provide lots of active guidance to the groups, but let them come up with the decisions on their own.
- When using the recommended Canal Flats maps (standard government), be aware of the lumber industry dependent community, the tourism resourceful lake, the flatlands in the valleys, and the large park in the northeast corner.
- Be very aware that the goal is not to carve up the area and give some to each group. You should promote joint use of the whole area. The parks should be protected, but they have too high a fuel load, which could be removed by logging. The flatlands in the valley must be shared between almost all groups.
- It is essential for this program that you have read and understand the introductory material.
- Make sure you clean the maps off right away or the ink will be harder to get off.

Games To Be Played

Fire Chaser

Choose one volunteer to be the fire control (you may need two fire control if the group exceeds nine).

All other players become sparks. The sparks have one point they are trying to get to which represents the fuel loads. If they reach this point and shout “Burn, fire burn!” before fire control tags them, then they are home free.

The game begins with the sparks out at predetermined distance from the tree.

The instructor shouts, “Repress the fires!” All sparks scatter. The fire control may want to stay near the fuel load but they will soon realize that if they do not pursue the sparks they will not be able to put out any fires.

After the game explain that the fuel load would not be a danger if fires had not been repressed for so many years beforehand. Go on to explain the natural role of the fire cycle in reducing fuel load. As well, explain how fire control is still essential to put out the fires but how areas can be logged in order to reduce the fuel load and still turn an economic profit.

Supported Circle

Campers will be able to see the delicate balance of our ecosystems. They will be able to make a comparison between the supported circle they have created and the balance which is found in the biodiversity of our forests.

Discuss with the campers what an ecosystem is and what biodiversity means. This instructor may want to use an example such as the forest’s need for fire.

Discuss with the campers what vegetation, wildlife, habitat and fire are, and discuss what the importance of each is in the ecosystem.

Divide the campers into four groups. Give each group a title out of vegetation, wildlife, habitat and fire.

Call each group up until all four are in the circle.

Get the campers to move in so that they are shoulder to shoulder. Once they are as close as they can, have everyone turn to their right. With everyone facing to the right get everyone to sit down. Each person should be supported by the person behind them. Once the circle is supported ask the campers what they think would happen if one of the four groups was removed from the circle.

Reiterate to the campers the definitions of biodiversity and ecosystem. Point out the comparison between the supported circle and the balance in our ecosystem. Discuss with them what happens in an ecosystem when one species or non living object is removed. The instructor may want to use an example such as what happens to the fuel loads when fire is removed. Compare this to the idea of removing one of the groups from the supported circle.

Recreational Activities

The games and activities described here will enhance the focus of school camp. They are usually planned to occur at the end of the day, and are easy to set up and run. All materials should be available at the camp, but your education Services Coordinator may have variations and alternatives so check first.

Choose and adapt activities based on the skills and the maturity levels of the students. Choose the site, game, or activity carefully and insist upon safe play. Your Forest Education Centre is a natural site - there are rocks to trip over, roots to twist an ankle on, branches to scrape skin, etc. - so students must use their common sense!

There are many other recreational games and activities that can be adapted for use at an outdoor school. Some of these activities are listed in the resource materials found in the Appendix.

Index of Activities

The Survival Game

Participants simulate a predator/prey food web and attempt survive. (up to 2 hours) p. 90.

Quick Frozen Critters

In this variation of freeze tag, students must evade capture while attempting to obtain food. (about 1 hour). P. 94.

Run, Young, Run!

Students, pretending to be adult animals with their young, hide to avoid detection by their predators until they can safely return home. The "adults" use signals to ensure that none of the young are captured. (up to 1 hour). P. 92.

Tree Touch

Students are led blindfolded to a tree, and later try to find it again. (about 0.5 hours). P. 96..

Listen to the Night

Students experience the sound of the night while on a night hike. (about 15 minutes). P. 96.

The Survival Game

Survival is a game for 30 to 60 players, played in a wide area of forest and meadow. Participants simulate a predator/prey food web and attempt to survive.

Curriculum

- language arts
- science
- physical education

Skills

- critical thinking
- problem solving
- decision making

Materials

All materials, including head bands, life tags, water and food stations with coloured markers, water cards, and food cards, etc., should be available at the camp by prior arrangement.

Vocabulary

- carnivore
- herbivore
- predator
- prey

Objectives

Students will understand that all animals play roles within a predator/prey food web, and use various adaptive behaviours to survive.

Advance Preparation

Set out the food and water stations throughout the playing area. Assign each participant a role in the proportions suggested by the diagram. Distribute the appropriate identification headbands, water, and food cards, and life tags. Do not give carnivores a food card. The water and food cards are used to record each visit to a water or food station.

Recommended Time

The activity can generally last for about two hours, including the 15 - 25 minutes required to prepare and explain.

Background Information

Survival in the animal world is a result of many factors. The animal must find enough food and water while avoiding disease, predators, natural disasters, and humans. Each player is assigned a role and is shown how he or she fits into a food web. Roles are assigned in the proportions as suggested in the diagram.

Suggested Approach

Have all the students sit on the ground in the form of the pyramid diagram so that they can visualize the food web relationship they are simulating. Players will see that they can only kill and eat the “animals” that are sitting in front of them. They cannot eat “animals” behind them or at the same level.

The Rules

The object of the game is to survive. Participants must avoid being killed or eaten by humans, predators, fire, and disease, while visiting water and/or food stations.

Explain their role and how they eat:

- Herbivores try not to become food for the carnivores or die from disease, fire, or humans. They must, as well, visit as many food and water stations as they can and mark their cards.
- Carnivores must try to avoid humans, disease, and fire while collecting water by marking their water card, and eating herbivores by tagging them and collecting a life tag. Carnivores may only survive off their own life cards; they may not use those of their prey.
- Disease carriers give disease to all animals they tag. An animal can spread disease by giving it to a predator that takes one of their life tags. Only humans can cure a disease. Any animal that ends the game with a disease card does not survive.
- Humans are unpredictable, and animals never know what a human will do. They

can heal an animal by taking a disease card, give out bonus life tags, or shoot the animal by pointing a finger at them.

- Fire is introduced into the game just before the end and takes all life cards with a simple touch.

Killing is simulated by tagging. No predator may tag the same player twice in a row; they must tag another player in between. Prey must be given a chance to get away before another predator tries to tag them. When an animal has lost all of its life cards it is out of the game.

Each food and water station may be visited only once by each player.

Playing the Game

1. Ensure that each person is an animal and has the proper number of life cards and a marker of food/water card.
2. Select a signal that will mark the end of the game.
3. Start the game by having the herbivores hide.

In 5 minutes send out the carnivores. Send out the disease carrier 15 minutes before the end of the game. Send out a well-identified human carrying life tags when there are 10 minutes to go. Just before the game ends send the player identified as "Fire" to run through the forest shouting "Fire!" and taking all the life tags of any animal touched.

Culmination and Evaluation

End the game with the predetermined signal. Gather all the participants for a follow-up discussion.

Initiate a discussion with the following questions:

- Who survived?
- How were you killed?
- How many were killed by a predator? By disease? By the human? By fire?
- What strategies did you use to try to survive?
- What happened when the human entered the game? Disease? Fire?
- Why does man only need to point to kill?
- What made the game difficult?
- What did you learn?

Extension

Have students write in their learning logs or journals three things that this game taught them about interdependence. As well, ask them to consider what would happen if the game was modified so that man doesn't play such an important role.

This version of "The Survival Game" is adapted from *Science is ...*, Susan Bosak, 1986, Ottawa, ON: Youth Science Foundation, pp. 165-166.

Run, Young, Run!

This is a game in which groups of students, pretending to be adult animals with their young, hide to avoid detection by their predators until they can safely return home. The “adults” use signals to ensure that none of the young are captured. This game is best played in an open forest area with sufficient low growth to provide suitable cover.

Curriculum

- language arts
- physical education
- social studies
- science

Skills

- critical thinking
- problem solving
- decision-making

Materials

- four gym vests or ribbons of one colour for the predators
- four gym vests or ribbons of a second colour for the adult prey

Objectives

Students will understand that animals use various adaptive behaviours to survive and adult animals play a role in keeping their young safe from predators.

Vocabulary

- adaptive behaviours
- predator
- prey

Advance Preparation

Define the area where students may roam. If necessary, clearly mark the area. Before beginning the game ensure that students understand the importance of staying within the boundaries.

Identify an area as “Home”. Remind students about safety when running, watching for objects to trip over, etc.

Recommended Time

30 - 60 minutes

Background Information

Animals use different adaptive behaviours in order to survive in the wild. They include signaling to others, posturing in a fighting

position, scrambling for cover, and “playing dead” or “freezing” on the spot to escape detection and capture by their predators.

Proximity to the predator usually determines the behaviour chosen. If the predator is some distance away, the prey may signal a warning to other. If the predator comes closer, the prey may run away or run to a hiding place. If the predator is too close to escape the prey may “freeze” in place. This freezing occurs as a type of psychological and physiological shock in the animal. Often when humans chance upon an animal in the wild that “freezes”, they think the animal is unafraid. The animals actually are “frozen stiff” with fear.

Suggested Approach

Discuss with the class how adaptive behaviours of both predators and prey contribute to survival.

In this game, four predators try to capture the young of four individual adult animals. Each round will vary in length. The activity may last a pre-determined number of rounds or for a set time.

Main Activity

The object is for adult prey animals and their young to avoid capture by their predators.

Divide students into one group of four predator animals and four groups of six to eight prey animals. Each prey group should choose one person to be the adult animal. That individual has the responsibility of keeping the young safe. To protect the young the adult must make sounds that will warn the young of the predator’s approach and, when safe, signal the young to run for home. Each group must quickly decide which sound the adult will make to signal their instructions. Different sound should be chosen to signal such actions as “predator Near!”, “Stay Down!”, “Freeze!”, “Get Ready to Run for Home!”, and “Run Home!”

To begin the game the four predators cover their eyes and count to 100. During this time each prey group finds a safe hiding place and the adult moves away from it. When the predators have finished counting they should make a call to indicate they have begun hunting. The adult prey does not hide with the young, but tries to avoid detection while moving around and keeping watch for the predators. The young prey remains in the hiding place until signaled by their parent to run for the safety of home. While the adult is not in the young's hiding place, he or she needs to know where they are so they can be kept safe. Even if seen, the predator does not capture the adult but uses the adult's whereabouts and signals as a guide to where the young are hiding.

When each adult prey feels it is safe for their young to run for home, the signal is given. More than one prey group may run for home at the same time. When they are running for home the predators try to capture as many of the young prey as possible by tagging them.

The round is over when all the young prey groups have tried to run for home. The predators win the round if they manage to capture more young prey than make it safely home.

Select new predators and adult prey to start the next round.

Culmination and Evaluation

When play ceases, gather the students to discuss the game and consider what might happen in the wild when predators hunt for their prey.

The following questions may help guide discussion:

- What tactics did the adults use to keep their young safe? Discuss how different animals send signals to predators through posture or gestures.
- Which tactics were the most successful? Why?
- What tactics did the predators use to capture their prey? Which were the most successful? Why?
- In many ways students were all using adaptive behaviours to help them survive. What kinds of adaptive behaviours do animals in the forest use?
- What was the survival rate in your game? Explain.
- How do you think that might compare with the survival rate in the forest environment?
- What are some factors that determine the survival of prey animals?
- What are some of the other ways adult animals keep their young from being captured?

Extension

Play several more rounds of the game. This time, at the end of each round, all players continue with their same role, except that the young prey who have been captured join the predator group. Starting with round three, each predator must capture at least one prey to survive. Those predators who have not been successful hunters become prey in the next round.

After several rounds, discuss with the students how the survival rate changed when the number of predators increased. Have them consider how the survival rate in the forest environment might change if the number of predators continually increased. Have students consider why the number of predators and prey might increase or decrease over time.

Evening Activities

Later in the day, perhaps in discussion around the dinner table or the campfire, discuss what the students have learned about adaptive behaviour in this game. Review and extend the culmination discussion.

Quick Frozen Critters

In this game students must evade capture while attempting to obtain food. This variation of freeze tag may be played indoors in an activity room or outdoors in a playing field or tennis court.

Curriculum

- language arts
- science
- physical education
- mathematics

Skills

- critical thinking
- problem solving

Materials

- 100 or more food tokens
- prey identification flags
- hula hoops

Vocabulary

- adaptation
- predator
- prey

Objectives

Students will understand that animals use various adaptive behaviours to obtain food and remain safe.

Advance Preparation

Set up a large playing area with one end identified as the “shelter” end and the other end as the “food source” with all the food tokens spread about (about 3 per prey animal). Place 4 or 5 hula hoops as “cover” in the middle.

Select one of the following pairs of animals:

Prey

hares
squirrels
deer
mice
caribou
salmon

Predator

lynx
hawks
cougar
foxes
wolves
bears

Recommended Time

60 minutes (six to eight rounds of 5 - 7 minutes each)

Background Information

Animals display a variety of behaviours in their predator/prey relationships in order to survive.

Some prey:

- signal to others that there is a predator near but not near enough to catch them;
- run or fly away;
- try to find cover if it is available;
- “freeze” on the spot to escape detection when the predator is very close.

The purpose of this game is for students to realize the importance of adaptive behaviours for both prey and predator. Each animal has a threshold for threat levels. If a predator is far enough away for the prey to feel some safety, they may signal to others that a predator is near. If the predator comes closer, the prey may try to run away. If the predator is too close to make running or flying away feasible, the prey may attempt to scurry to hiding place. If the predator is so close that none of these alternatives are available, the prey may freeze in place. The closer the predator comes to the prey animal, the more likely it is that the prey will “freeze” in place. This “freezing” occurs as a type of physiological and psychological shock in the animal. Shelter or camouflage may also make them invisible to the predator when they freeze.

Suggested Approach

Identify students as either a predator or a prey, at a ratio of 4 - 6 prey to each predator.

The object of the game is for the prey animals to survive the round. They start the round from the permanent shelter end and move to the food source, collecting one food token, and then returning to the shelter.

To avoid being caught they can either “freeze” in place, or run for cover, placing at least one foot inside a hula hoop. Predators start the game in the open between the

ends of the field, and attempt to catch moving prey. Prey are caught by having their flag (a strip of cloth tucked into their waistband) taken by the predator.

Predators need to catch two prey to survive the round. Captured prey are taken to sidelines by the predator that captured them.

Signal the end of the round, set new roles, and start a new round. Allow five to seven minutes per round.

Culmination and Evaluation

After the game, discuss some of the way the student evaded capture when they were prey. Which were the easiest? The most effective? Which means did predators use to capture prey? Which worked the best? What did predators do when a prey “froze”? In what ways are adaptations important to both predator and prey?

Extension

To demonstrate the concept of dynamic balance between prey and predator, play the game for three or four rounds. Record the number of captures each playing period. Have students who are captured become predators, and each predator that doesn't get enough food in one round becomes prey in the next. Chart and graph the data.

Evening Activities

Later in the day, perhaps in discussion around the dinner table or the campfire, discuss what the student have learned about adaptive behaviour in this game. Review and extend the culmination discussion.

Adapted from Project Wild Elementary Activity Guide, 1986, Ottawa, ON: Canadian Wildlife Federation.

Tree Touch

This is an activity for small groups, and is best played in an open wooded area.

Have each student select a partner and distribute one blindfold for each pair. Blindfold one student of each pair.

Have each of the sighted students lead their blindfolded partner on a very circuitous path to a different tree. When everyone reaches their tree, have the blindfolded students use their senses of smell and touch to get a sensory image of the tree and the immediate surroundings. The blindfolded students are then led back to the starting point, again by a confusing or circuitous path.

The blindfolds are then removed and each student tries to find his or her tree. When (and if!) the tree is found, reverse the roles.

After waiting about 10 minutes, the leader at the back end will continue along the trail, collecting students along the way. Once all students have been gathered and are settled, discuss how they felt and what they heard. Continue with the night hike.

Listen To The Night

This activity can be used during any night hike with a small group. It requires an area where student can be spaced along a trail, out of sight and sound of each other. The leaders should bring a flashlight on a night hike, in case of an emergency, but none of the student should need one; eyes will adapt to the dark quite well. Your Education Services Coordinator will be able to supply a list of unique features and animals the students could try to spot on their night hike.

Time this activity so that the students are positioned along the trail just as the last vestiges of daylight disappear. In this way, the student will be aware of their surroundings and features of the trail.

You will need at least two leaders. One leader will stay behind with one student at the back end of the trail. The other leader proceeds along the trail with the rest of the group. Every 30 seconds or so, at intervals of about every 50 - 60 metres, drop off one member of the group to wait at each location. Move the group along quickly so that none of the students need to wait too long to be picked up.

Other At Camp Activities

Orienteering: There are 3 levels in orienteering. Level 1 includes information about the parts of a compass and shooting bearings, and an orienteering course. Level 2 includes information about declinations as well as a review of level 1, and an orienteering course (more difficult than level 1). Level 3 includes information about triangulations and a review of level 1 and 2.

Canoeing: The canoeing program includes teaching the participants about safety, parts of a canoe, and stroke development. For more advanced groups self rescue and canoe over canoe rescue can be taught.

Hikes: Blue Lake Centre has a variety of hiking trails. Educational activities can be incorporated into the hikes.

Survival Skills: The survival skills program includes teaching participants fire lighting (then boiling water in a paper cup), and shelter building.

Hydro-electric Tour: A tour of the on site hydro electric system is a unique opportunity for the participants. This system produces approximately 3000 watts of electricity, supplying the camp with limited amounts of power.

Post - Camp Activities

The days that follow a camp experience are quite important in drawing together and synthesizing the experience. As photographs are developed and displayed, as journals are read and shared, and as the last of the dirty and lost clothing is claimed, take the opportunity to bring the experience to a culmination and a celebration.

While at camp, discuss with your Program Manager the various activities that you are planning to do once you have returned to class. There are several opportunities for the Program Manager to work with you and provide assistance.

The following activities help bring closure to the camp experience, while providing an opportunity to assess the students' understanding of the concepts of interdependence within the forest ecosystem. Included is the culminating role-playing exercise that was introduced in the Pre-Camp Activities and further developed while at camp. This exercise asks students to take on different roles in order to consider the most appropriate use for an area of land.

An outline of other classroom activities, at the end of this section, provides ideas for additional or alternative lessons.

Index of Activities

Parent Workshop and Celebration

Organize an afternoon or evening workshop for students to share and re-live some of their experiences as they were learning about the forest environment. (1 hour)p. 99.

Class Newsletter

Publish a newsletter, with each student choosing an activity or section to report on. (3 class periods) p. 100.

The Town Meeting

Students take on the roles of people interested in gaining a lease on the camp properties. (3 class periods) p. 102.

Problems, Problems, Everywhere

Students make decisions based on an examination of basic personal attitudes toward environmental impact and land use. (2 class periods) p. 104.

Another Way of Thinking About Camp

Students use poetry to summarize their camp experience. (1 or 2 class periods) p. 111.

A Field Study In Interdependency

Students take roles of herbivores and carnivores and search for food. (1 class period) p. 113.

Additional Post-Camp Activities

p. 116.

Parent Workshop and Celebration

Organize an afternoon or evening workshop on the forest environment.

Curriculum

- language arts
- science

Skills

- using language in communication
- critical thinking

Objectives

Students will share and re-live some of their camp experiences.

Advance Preparation

Invite parents, school and district staff, and community members, e.g., the local community newspaper. A workshop of this type is often best done around the second week back from camp.

Suggested Approach

Keep the workshop short - an hour or a little longer should be sufficient. Organize

student-led stations that reflect the activities they experienced at camp.

Parents and guests move from station to station every five to ten minutes. At each station the students can use displays, demonstrations, and oral presentations to explain the concepts they learned. Include a handout for each station and a "passport" to be stamped.

Try to keep presentations short, and encourage students to anticipate the types of questions that parents will ask so that they can prepare thoughtful answers beforehand. Supplement the stations with a narrated slide show and a student-run refreshment area.

Consider having an evaluation form for parents and guests to fill out at the end of the workshop session.

Class Newsletter

Publish a newsletter for the parents of the class or school staff, with each student choosing an activity or section to report on.

Curriculum

- language arts
- social studies
- science

Skills

- communicating orally and in writing
- evaluating information
- organizing information
- critical thinking

Materials

- large sheets of newsprint paper

Objectives

Students will demonstrate their understanding of the concepts and principles of interdependence within the forest environment.

Advance Preparation

Collect a number of different newspapers to provide as examples of articles and editorials.

Recommended Time

Three class periods (120 - 180 minutes)

Suggested Approach

Using a number of examples of newspaper articles, discuss the format they follow. discuss the Who, What, Where, When, Why, and How method of writing an article.

Have the students look at newspaper editorials, discuss how they are written, and discuss how they differ from news stories.

Whole Class

The students will likely ask to model the newspaper after the sections of a daily paper:

- Front Page with an in-depth report on the camp experience;
- Sports section to report on the impact of hiking and fishing on the forests, and the games played at camp;

- Want Ads for missing clothing;
- Career Opportunities related to the forests now and in the future;
- Forest Living section to describe how our lifestyles are dependent upon the forests and wood products. Describe lifestyles of living things that have forest as their habitat;
- Opinion and Editorials on forest issues and the interdependence of the forest ecosystem;
- Business;
- Comics;
- Advertisements, including the names of any organizations and community groups that have sponsored the field trip;
- Pictorial or photo spread using student artwork and camp photos.

Set a format and decide how to publish the paper, e.g., should the articles be printed or word processed? Should they be on large newsprint or on lined paper? etc. Groups could illustrate their own articles, or there could be a group of students responsible for all the illustrations.

Consider publishing two or three different stories on each activity, so that each student is able to have his or her article published.

You might contact your Blue Lake Program Manager for an editorial article. Ask the principal to write a short article on the benefits of this learning experience. Invite your parents to submit articles on the knowledge and skills their child gained at camp, or on what they themselves learned through their child's experiences or at the parent workshop.

Small Group

Each student should choose an item to write about, and then join a group based on the newspaper section the article will appear in. When the individual articles are written, each group will decide how their pages will be laid out, write headlines, etc. Each group should appoint a representative to meet to compile the whole paper.

Whole Class

Present the first draft of the newspaper to the class for suggestions. The small group of representatives compiles the final copy and then distributes the newspaper.

Display the newspaper articles in the classroom or hallway on large sheets of paper for all to enjoy.

Culmination and Evaluation

Individual articles can be assessed for the understanding they demonstrate of the concepts of interdependence within the forest environment.

The Town Meeting

This is the culmination of the strand of core activities in FOREST INVESTIGATIONS AND RESEARCH. In it, students take on the roles of people interested in gaining a lease on the Blue Lake property. They make up a presentation to a “Town Council” of peers, school staff, and parents, who are to decide the best use of the property based on the reasons presented.

Curriculum

- language arts
- social studies
- science

Skills

- communicating orally and in writing
- evaluating information
- organizing information
- career awareness
- critical thinking
- problem solving
- decision making

Equipment

- video camera

Objectives

Students will develop rational arguments supporting the objectives of their assumed roles, based on the knowledge and understanding gained during previous classroom and camp activities.

Advance Preparations

While still at camp, discuss with your Education Services Coordinator how the students were prepared in the Pre-Camp Activity, “Who Will You Be?”, and how they have been able to take on different roles and perspectives while at camp.

Once back at school, get in touch with your Education Services Coordinator to discuss any possible assistance and involvement in the Council Meeting.

Pre-select the Council and familiarize them with the scenario and their responsibilities.

Recommended Time

Two class periods for preparation, one period for presentations
(120 - 180 minutes)

Background Information

The Town Meeting is a simulation activity where the students take on the roles of members of certain interest groups; in this case, groups interested in using the forest at the camp property. Each group makes a presentation to a Town Council made up of adults and peers, who represent the town government. The Town Council decides which group will get access to the resource. The Town Council will often give the land to two groups and ask them to share the resource.

The Scenario

The lease on the land now occupied by Blue Lake has now ended. The local government wishes to have the camp property go to the group that will use the forest in a way that is most beneficial to the whole community. Their priorities are for jobs, the environment, and for shared use of the resource. The group that presents the solution most beneficial to the community will be able to lease the camp property for ten years at \$1.00 per year, and will be responsible for all taxes, costs, etc. No government grants will be available so the camp property must generate its own revenues.

Suggested Approach

Small Group

Assign each student to an interest group. The groups can be the same as those generated in the pre-camp lesson, “The Forest - Who Needs It?” As well, each student should tell the group which field of expertise he or she researched during the pre-camp lesson, “Who Will You Be?” Each interest group should review the needs of the different aspects of the community. Pay very close attention to how the needs and objectives of each interest group will affect the ecosystem and the needs of others in the community.

Individual

Have each student take on the role of a member of a user group, and write a short essay explain the needs and objectives of the group. The essays should be written in the first person, and should be shared with the group before work starts on the presentations.

Whole Class

Re-examine the scenario and explain the Town Meeting format. Explain that each group will need to get the support of other groups, as the Town Council wishes as many people as possible to use the area. Discuss the use of lobbying and how it might help, but explain to the students how they might need to compromise some of their needs and objectives and support those of others. Recognize that the students now have a strong understanding of the interdependencies of the forests and they should carefully consider how to have as little detrimental effect as possible on the area over the long term.

Decide if presentations should be strictly oral, or if they should be accompanied by maps and displays. Presentations should be very positive and not rely on being negative toward other groups, their objectives, or their presentations.

Arrange to videotape the Town Meeting.

Small Group

Have each group prioritize its needs and consider whether other groups will support

them. What other groups could we easily share the resource with? Where will we have difficulty gaining support?

Each group should develop its presentation with only references to other groups that support its needs. Each group should be ready to acknowledge the groups they support and be prepared to explain why.

Culmination and Evaluation

When all presentations are ready, assemble the Town Council to consider the proposals.

Following all the presentations the Town Council must report its decision. The council should explain its decision, including why it felt the selected proposal is most beneficial to the needs of the community.

After the Town Council meeting is over, lead a class discussion comparing the strengths of each proposal and its presentation. Discuss the rationale given by the Town Council for its decision. What needs and objectives did the Town Council seem to consider most highly? Why? Review the videotape of the Town Meeting to confirm and modify these opinions.

Extension

Students may go on a field trip to a real Town Council meeting, whose agenda features a land development proposal. The real-life experience should reinforce the lessons learned in the classroom.

Problems, Problems, Everywhere

Students make decisions based on an examination of basic personal attitudes toward environmental impact and land use.

Curriculum

- language arts
- social studies

Skills

- evaluating information
- critical thinking
- problem solving
- decision making

Materials

- make enough copies of the Problem Cards so that each student can be presented with three or more scenarios.

Objectives

Students are presented with real-life problems related to the environment. In determining a response to the Problem Card the student will:

- examine his or her basic system of belief;
- make a decision, and defend that decision to a group;
- have the opportunity to challenge the decisions of other students about the decisions they have made;
- understand that decisions are personal, often difficult, and can have short and long-term effects;
- develop a sensitivity to the problems facing other decision makers;
- understand that management decisions are frequently interdependent.

Recommended Time

Two class periods (80 - 100 minutes)

Background Information

Emphasize that there are no “right” or “wrong” answers on any of these cards. Remind students to make decisions that they feel are the most responsible and be able to defend their choices.

Suggested Approach

1. Duplicate, cut apart, and laminate if possible, five or more sets of the Problem Cards. The last several cards have been left blank and are available for teachers to

make up your own problem cards, possibly based on your class’ camp experience or on an issue relevant to your class.

2. Divide the class into groups of four or five. Mix the cards, and place an equivalent number of problem cards face-down in the middle of the group.

3. Have the students turn themselves. Have player #1 select a card from the top of the pack, take a minute to study the card silently, and make a decision on how to solve the problem.

4. The player is to read the card to the rest of the group, make a decision, and briefly describe how the decision was reached.

5. Without discussing with any other members of the group, each listening group member now must rate the decision on a scale of one - five, i.e.,

- 1 strongly disagree
- 2 disagree
- 3 need more information
- 4 agree
- 5 strongly agree

6. Have each participant defend his or her rating. All comments should relate to the decision itself; there should be no criticism of the person who made the decision. Add up the scores for the answer.

7. The next player now selects a card and the game continues for several rounds.

8. When all students have had the opportunity to contribute in the small group, ask each group to select one discussion question and answer to present to the entire class. The discussion question can be one that was given the greatest range in points, the highest number of points, or lowest number of points, etc.

9. These rounds can be played over again simply by changing around the cards.

Students may also wish to make up new problem cards for the game.

Culmination and Evaluation

Have each student write a short essay telling how he or she felt about playing the Problem Game. What kinds of problems were the easiest to find solutions? What kinds of problems were harder? Why?

What kinds of problems did the group find easy to reach consensus? What kinds of problems were more difficult? Why:

Extension

Have the class brainstorm the topic, "How are decisions made in our society". Students should call upon their experiences with this game to give their responses. List the responses on the chalkboard, to be copied into student notebooks for future reference.

This activity is adapted from Project Wild Elementary Activity Guide, 1986, Ottawa, ON: Canadian Wildlife Federation.

What Will You Do? (Problem Cards)

1. You have worked at building highways all of your life. A new highway is planned to join two cities, but it will be built right through a marsh that is a waterfowl nesting area. Some of the birds are of a very rare variety. You have been offered the contract to build the highway. Do you:

1. Accept the contract?
2. Refuse the contract?
3. Accept the contract but build the road around the marsh and make little or no money?
4. Other?

2. You are a contract writer for a non-profit organization that wants to have its materials used in the classroom. You have been asked to write a series of lessons that you believe do not represent a balanced picture of forest management in the province. Do you:

1. Refuse the contract and resign?
2. Write the lessons anyway?
3. Write the lessons with a more balanced view and risk being fired?
4. Try to get the non-profit organization to change its attitude?
5. Other?

3. You have decided to put in a swimming pool in your back yard and need to take out a number of trees to make room. While inspecting the trees and preparing to cut them down you suddenly discover the nest of a very rare owl. Do you:

1. Cut the trees and say nothing?
2. Use the community swimming pool instead?
3. Alert the Ministry of Environment office?
4. Call an environmental group with the good news?
5. Other?

4. You have been hired as a tree planter for the summer. You have been working long days in the blazing sun. The boss of your planting crew has a miserable temper and no one can stand him/her. One afternoon the boss decides to take off early. You know this is the last day of planting in this

area and because it is quite remote, the chance of anyone coming back to check your spacing and planting is very slim. Do you:

1. Continue planting the same as you always do?
2. Hide as many seedlings as you can behind a huge log?
3. Continue planting but forget about spacing?
4. Other?

5. You are a member of a First Nation Tribal Council. In negotiating a very large land claim with a number of different levels of government, you are suddenly presented with a proposal that gives you very little of the land that you were asking for but a much larger sum of money to compensate. The Tribal Council is split in its vote and you are asked to cast the deciding ballot. Do you:

1. Vote to reject the money?
2. Vote in favour of the money?
3. Refuse to vote and break the tie?
4. Continue negotiations for a different deal but worry that the proposal might be withdrawn?

6. You own a small pharmacy in a small town. The last of the old growth forest in your area is going to be harvested and a golf course will bring a lot of extra business to town and should really help your store. A group of citizens is proposing that the site be preserved as a nature park. Do you:

1. Support the golf course proposal?
2. Support the nature park proposal?
3. Stay out of the decision-making process altogether?
4. Move your business to another town?
5. Other?

7. You are walking in the woods and you suddenly come upon a young fawn. There is no sign of any other deer. Do you:

1. Leave it where it is?
2. Move it to a sheltered area?
3. Take it home?
4. Try to chase it away?
5. Other?

8. You have been living in the same home for more than thirty years. The provincial government has been buying up land all around you to put a road through. Without your land the plan cannot go ahead. A number of your neighbours, whom you have known for years, are urging you to refuse the offer as it will ruin the whole beauty and tranquillity of the area. The offer the government has made will allow you and your family to retire comfortably and live the rest of your days in luxury by a beautiful lake. Do you:

1. Accept the offer?
2. Turn down the offer?
3. Hold out for a better offer?
4. Ask your friends to buy you out:
5. Other?

9. You are the head of a union of employees working for a large manufacturing company. You really believe in pollution control. At the present time the company is just barely meeting the government requirements for pollution emissions. The company wants to install some very sophisticated anti-pollution devices that would significantly reduce pollutants, but it would mean that they could not pay your union members a salary raise this year or next. Do you:

1. Try to convince the company to forget about the equipment?
2. Get the company to add the equipment and to pay for it by laying off some of the employees?
3. Get them to add the equipment and raise their prices?
4. Wait for a few years and see if the cost of the equipment drops?
5. Other?

10. You are a member of a very exclusive country club that has put forward a proposal to expand its facilities. The piece of land they are planning to purchase is the best agricultural land in the valley. You don't really believe that the club needs to be expanded. Do you:

1. Stay in the club and say nothing?
2. Stay in the club and speak out strongly against the expansion?
3. Resign from the club?
4. Other?

11. You are fishing on a very secluded lake with a fishing license that allows you to catch 12 fish. On the first day you catch seven average-sized fish. In the first hour of the second day you have already caught five large fish. Do you:

1. Just continue fishing and keep everything you catch?
2. As you catch bigger fish as the day goes on, throw back the smaller fish?
3. Keep the five biggest fish you catch today?
4. Eat fish for lunch?
5. Other?

12. You have to make a decision about a very rare species of lizard that exists in your area. A number of zoos in various parts of the world would like your committee to capture some of these lizards and send them to different zoos. It is hoped that these animals will be able to reproduce in captivity. Do you:

1. Capture some of these lizards and send them to the zoos?
2. Leave the lizards in their natural habitat?
3. Open up your own zoo in the area?
4. Other?

13. You have just won a prize in a lottery and your family will now be able to build the dream home that you always wanted. After you begin construction you realize that you will not be able to afford all the features that you would like. You can only put in one of the following. Do you:

1. Put in a recreation room with a wood-burning fireplace?
2. Put in solar heating?
3. Put in a swimming pool?
4. Put in a hot tub and sauna?
5. Other?

14. You have inherited a piece of wooded property in the hills where you are planning to build a beautiful home. On the site with the best view there is a tree that contains the nest of a bird that is a protected species. The bird is very sensitive to any disturbances. Do you:

1. Sell the property?
2. Cut down the tree and build your home?

3. Change the site of your house to a site that doesn't have quite such a good view?
 4. Try to get the bird to move?
 5. Other?
15. You have been to the local auditorium and have just heard a leading environmentalist give a lecture about resource management in your area. You feel that his presentation was very biased and that he really does not understand the situation in this region. After the lecture you are introduced to him and he asks you what you thought of his presentation. Do you:
1. Tell him how you really feel?
 2. Try to explain a few of the concerns you had about his lecture?
 3. Tell him you found his talk "interesting"?
 4. Tell him you think he is a wonderful speaker and that you agree with his conclusions?
 5. Other?
16. You are on a field trip with your class to the zoo. There are signs posted all around saying that the animals are not to be fed. One of your friends starts feeding marshmallows to the bears. Do you:
1. Say nothing?
 2. Tell your friend not to do it any more?
 3. Tell your teacher?
 4. Tell the zoo staff?
 5. Other?
17. You have been issued a permit to hunt one bighorn sheep. You have been scouting the area for two months before the season started and you have seen a ram that is of a record size. The hunting season opens and there is no sign of the ram. On the very last day of the hunting season you spot a very large ram. but not the prize one. You shoot the ram, and just then the prize ram walks out of a ravine just a few metres away. Do you:
1. Take a picture of the big ram and keep the smaller ram?
 2. Shoot the big ram and leave the smaller one for the coyotes?
 3. Shoot the big ram and bury the smaller ram?
 4. Shoot the big ram, cut its head off and hide it where you can come back in the spring to get the dried head and say you found it?
5. Other?
18. You live in an apartment and have raised a young owl to maturity. You can no longer keep the owl. Do you:
1. Offer to give it to the local zoo?
 2. Release it back to the wild?
 3. Give it to someone else to keep as a pet?
 4. Call the province's Fish and Wildlife Branch and ask their advice?
 5. Other?
19. A local conservation group has asked for volunteers to spend one weekend cleaning up a local nature trail in your area. You and your family often take this nature walk and you sometimes take family visitors on the trail as well. Your friends have asked you to go to the mall with them this Saturday and you have a soccer game on Sunday. Do you:
1. Help the group and forget your plans for the weekend?
 2. Spend one day working on the trail and the other doing something else?
 3. Forget about helping on the trails?
 4. Suddenly come down with a "medical problem" so that you will not be able to help?
 5. Other?
20. You are the Chief Forester of the province. You have determined what the Annual Allowable Cut should be for the upcoming year, and you notify the Minister of Forests. At a press conference a few hours later the Minister announces a totally different set of figures. Do you:
1. Grab the microphone and tell the press what has happened?
 2. Resign as Chief Forester?
 3. Smile and say nothing?
 4. Tell the Minister what you think of him/her privately after the press conference?
 5. Other?
21. You are on your way to the nearest landfill with a truckload of old tires and rusted automobile parts. The landfill is more than 10 Km from your house, and you are going to miss the first and second periods of

the hockey game on television. On a remote stretch of road you suddenly come across a pile of trash that has been dumped down the side of a stream bank. Do you:

1. Dump your garbage at the same spot and go home and watch the game?
2. Continue on to the landfill?
3. Notify the local authorities about the illegal dump?
4. Other?

22. Your friends at school have all decided to become vegetarians. They have done this because they believe that this is the only way to save domestic animals from terrible living conditions and slaughter. You don't really believe in this as strongly as they do. Do you:

1. Become a vegetarian in public and eat meat in private?
2. Cut out beef and pork and only eat chicken and fish?
3. Become a vegetarian?
4. Tell your friends that you want to stay friends but that you won't become a vegetarian?
5. Other?

23. You are the news editor for a local television station. There has been a lot of discussion and debate in your community about the best use for a nearby valley, and most of the townspeople think the best thing to do would be to harvest the trees. A famous movie star has come to your town on a holiday, and when doing an interview for your TV station says that the whole area should be turned into a park. Do you:

1. Show that part of the interview in your news report?
2. Edit that part of the interview out of the news?
3. Include some "on-the-street" reactions to the comment from local townspeople?
4. Other?

24. You are a judge and must decide the case of a woman who has been caught shooting a deer out of season. You learn from the woman that she has been unemployed for a long time and that she was planning to use the meat to feed her family. Do you:

1. Give the woman the maximum penalty?
2. Let her off with a small fine?
3. Give her a warning and let her go?
4. Sentence her to do community work?
5. Other?

25. You are playing with your friends in a forested area. The weather has been very hot and the woods are very dry. One of your friends starts to collect some branches and leaves and begins making a small fire. Do you:

1. Say nothing?
2. Tell your friend to put the fire out?
3. Leave?
4. Try to convince your friends to find a safer place to build a fire?
5. Other?

26. You and your classmates are raising salmon fry in an aquarium at school. As part of your project you have

taken a field trip to a stream near your home. Two weeks after your field trip you notice strange "soapy"-looking material floating in the water, and you think that someone may be dumping some chemicals into the stream. Do you:

1. Tell the local newspaper to run a story about the pollution?
2. Go to your neighbours and tell them about it?
3. Walk up the stream bank and try to find out where it has come from?
4. Get your class to select another stream to put your fish into?
5. Other?

27. You are on the planning committee for a community event and you have a very small budget to work with. Although you believe in recycling, you have learned that the cost of buying styrofoam cups is a lot less than renting china cups for the event. Do you:

1. Buy the styrofoam cups?
2. Rent the china cups?
3. Ask everyone to bring their own cup?
4. Don't serve any hot drinks at all?
5. Other?

28. You work in the water department of your municipality. The town is growing rapidly, and a large number of new houses are being built. Pretty soon the existing water plant will not be able to keep up with all the new people moving in. Do you:

1. Recommend that the town build a new water plant and raise everyone's taxes to pay for it?
2. Recommend that the town not allow so many new houses to be built?
3. Recommend that the town build a new water plant and charge a special fee for any new houses being built?
4. Look for ways for the town to conserve water?
5. Other?

29. You are about to begin a new job working in an office. You live on the outskirts of town, and will need to go about 10 km to the town center each day. You would like to drive your car and use it for errands after work, but parking is expensive. The bus goes close by, but doesn't run too often. Do you:

1. Take your car and find a way to park on the street?
2. Take the bus, adjust your schedule, and do your errands on your lunch time?
3. Ride your bike?
4. Find a way to use your computer to work at home?
5. Other?

30. write your own card

31. write your own card

32. write your own card

Another Way of Thinking About Camp

Students can summarize their camp experience in a variety of different ways. This lesson should hold particular appeal to those students who have an interest in the humanities.

Curriculum

- language arts

Skills

- using language in communication
- critical thinking

Materials

- copies of the student handout, "Poetry Information Sheet"

Objectives

Students will represent their camp experience in three poetry forms: acrostic, haiku, and cinquain.

Vocabulary

- acrostic
- cinquain
- haiku

Recommended Time

One or two class periods (40 - 80 minutes)

Background Information

The Poetry Information Sheet provides information on each poetry form. Teachers are encouraged to write poetry along with their classes and to share their creations once the assignment is completed.

Suggested Approach

Hand out the Poetry Information Sheets. Spend time with the class discussing each of the three poetry forms introduced on the sheet. Explain to the students that they are to write one "pleasant" and one "unpleasant" poem, using any combination of the three poetry forms.

When the assignment is finished, students should be asked to volunteer to read their poetry to the class. The other students should be encouraged to critique and analyze the presentations. All finished poems can be decorated and displayed.

Culmination and Evaluation

Have students comment in their journals or learning logs on whether they feel that poetry is a personally appropriate way for them to express their feelings about forests and about their camp experience. Ask them to identify other ways they feel they would like to express themselves.

Extension

Have the students choose a novel way to represent the information about interdependence. They might choose to create a dance, design a bumper sticker, write a jingle or a slogan, draw a cartoon, sing a song, create a television show, perform a skit, produce a video, invent a game, etc.

Poetry Information Sheet

(These are only examples, and students should choose their own topics)

"pleasant"

"unpleasant" examples

Acrostic

Verses where the first letter of each line tells a message about camp or about the forest.

Fish
Options
Relaxing
Ecosystems
Shade
Tranquil

Lonely
Ordeal
Sorry
Terrified

Haiku

Line 1 has five syllables
Line 2 has seven syllables
Line 3 has five syllables

Small mice scurrying,

Chewing berries from a tree-
Forest scamperers.

Keen eyes focusing,
Movement on a forest trail;
Talons ending life.

Cinquain

Line 1 a one word title
Line 2 two words describing the title
Line 3 three words showing action
Line 4 four words showing a feeling about
the title

Line 5 another single word for the title

Rain
Wet, clouding
Dripping, drizzling, pelting
Life for living things
Miracle

Fire
Hot, crackling
Races, burns, alarms
Kills along its paths
Death

A Field Study In Interdependency

A field is a fascinating habitat to study because of the diversity of life and the interdependence of that life. The interdependency of the plants and animals found in a field illustrates the concepts basic to all successful habitats, including food chains and food pyramids. The field is also a beautiful place to sit quietly, listening and watching.

Although this activity can best be done in an unmown grassy field, a school playground can serve as a substitute site. A variation of this activity can be done in any urban school setting.



Curriculum

- language arts
- science
- social studies

Skills

- critical thinking
- problem solving

Materials

- Forty-two laminated cards, about 20 cm x 20 cm.
- Eighteen of these cards will be Animal Cards. They will be of one colour and are numbered from 1 - 18. These cards will have the names of the eighteen animals on the list. These cards will also have the number of the food card(s) that must be found by the students in order to satisfy the rules of the game.

- The other 24 cards will be Food Cards and will be of a second colour. They are numbered to correspond to the numbers on the animal cards.

18 Animal Cards

Team #1 Animal Cards

1. Fox (1 food card with #1 on it)
2. Bee (1 food card with #2 on it)
3. Deer (1 food card with #3 on it)
4. Butterfly (1 food card with #4 on it)
5. Snake (2 food cards with #5 on them)
6. Skunk (2 food cards with #6 on them)

Team #2 Animal Cards

7. Owl (1 food card with #7 on it)
8. Mole (2 food cards with #8 on them)
9. Coyote (1 food card with #9 on it)
10. Rabbit (2 food cards with #10 on them)
11. Hawk (1 food card with #11 on it)
12. Mouse (1 food card with #12 on it)

Team #3 Animal Cards

13. Grasshopper (2 food cards with #13 on them)
14. Woodchuck (2 food cards with #14 on them)
15. Robin (1 food card with #15 on it)
16. Cricket (1 food card with #16 on it)
17. Spider (1 food card with #17 on it)
18. Earthworm (1 food card with #18 on it)

24 Food Cards**Team #1 Food Cards**

1. Rodents
2. Nectar
3. Grass
4. Nectar
5. Mice
5. Frogs
6. Insects
6. Fruit

Team #2 Food Cards

7. Mice
8. Insects
8. Worms
9. Small Animals
10. Grass
10. Plants
11. Mice
12. Seeds

Team #3 Food Cards

13. Grass
13. Plants
14. Grass
14. Plants
15. Worms
16. Plant Foods
17. Insects
18. Dead Plants

Objectives

In this game each of the three groups need to find the eight Food Cards that correspond with the six numbered Animal Cards that they have been given. They will need to match the cards by number, share with the large group the information on the cards, and participate in a group project to build a food pyramid by using all forty-two cards. continue looking for their own numbered cards. When they find all of their cards they are to return to a designated location for

Vocabulary

- carnivores
- habitat
- herbivores
- photosynthesis
- primary consumers
- producers
- secondary consumers

Recommended Time

One class period (40 minutes)

Background Information

The more diverse the plant life in a field, the wider the variety of animals that can live there. Most mammals cannot find all of their habitat requirements in a field, but a great many rely on the field for food.

Survival of the plants and animals that inhabit a field depends directly on the sun's energy. Plants produce their own food using a process called photosynthesis, and are therefore called food producers. The herbivores eat the plants for food, and are called primary consumers. The carnivores eat the herbivores, and are called the secondary consumers. It takes about 100 Kg of plants to support 10 Kg of herbivores, that it turn will support 1 Kg of carnivores.

Suggested Approach

Scatter the 24 Food Cards randomly all over the field before bringing students to the field site.

Divide students into three teams as they arrive at the field site. Give each team six Animal Cards each:

- Team #1 - Animal Cards #1 - 6
- Team #2 - Animal Cards #7 - 12
- Team #3 - Animal Cards #13 - 18

Tell the students that each team is expected to find their eight Food Cards somewhere on the field. If they find cards for other teams they are not permitted to help them, but are to simply con

each team and match up their Animal Cards and Food Cards.

When all three groups have returned each student will read their Animal and Food Cards to the entire group. The group will then “assemble” a food pyramid using all 42 cards.

Culmination and Evaluation

Have the students summarize what they have learned about food chains, food pyramids, and interdependency. What natural events could take place to upset the food chain on this field? Where would they place people on this pyramid? What events do people cause to upset the field’s food chain?

Variation

Students select a particular local ecosystem, e.g., classroom aquarium, classroom,

school building, school grounds, kitchen, driveway, local park, city block.

They are to identify and study the interactions among the living and non-living parts, and record the observations. Return to the site one week later and record any changes that are observed.

Extension

Have the class discuss the effect each of the following events would have on this field habitat:

- fire
- drought
- application of herbicides
- mowing

Additional Post-Camp Activities

- Have students research some of the hundreds of products that are made from trees. Give prizes to students who can find the most unusual uses.
- Have the class create a wall chart of forest resources. Cut pictures from catalogues and magazines of products that are related to forest resources.
- Have a biologist or plant specialist visit the classroom and discuss the importance of plants in forest ecosystems.
- Have the class imagine that they are about to enter a forest biome that will be sealed for two years. Have them brainstorm for everything they will need to take in with them to ensure their survival.
- Have students research how people of different cultures use forest resources to satisfy their needs. Interesting groups to study would include the First Nation peoples of the Pacific coast and farmers of the Brazilian rainforest.
- Have students interview parents, grandparents, and other family members. Record the impressions they had as children about the forests they experienced. These interviews could be audio taped or video taped.
- Have the class research careers in the forest industry.
- Have the class create a two-minute television commercial about some aspect of decision-making in the forest industry.
- Have the class create bumper stickers, T-shirt graphics, a poster, or a slogan about the issues of the many demands on limited forest resources.
- Write letters to members of Blue Lake staff that they met at camp.
- Have the class plan ways in which the school grounds might be made to look more attractive. Have the class plan a school garden.
- Have the students plan a field trip or a nature walk with one of the primary classes. Each student could escort one primary child and describe some of the things that were learned at camp.
- Have the class create an ecosystem in a terrarium or an aquarium. Put in soil, sand, gravel, etc. Add ants, beetles, spiders, and organic matter. Water only occasionally. Have the class observe the ecosystem daily and study it for information about interdependence.
- Have the class plan and construct a weather station to be used at the school.
- Have the class make a class scrapbook about camp experiences.
- Plan a display, for the school display case or a local store window, showing some of the interesting events that took place at camp.

Appendices

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Student Photocopy Masters

You may choose to have students keep a journal or notebook to record their experiences at camp. The following sample journal pages may be suitable for student use. Students may also enjoy preparing artwork, photos, maps, autographs, creative writing, etc., for inclusion in these journals.

Biography of _____

You will be assigned a partner. Your biography of your partner may contain the following information:

Physical Appearance

- colour of eyes, hair, height, etc. - focus on the “good” things

History

- age, birthday, and place of birth
- address
- places resided
- other schools attended
- medical history (illnesses, operations, broken bones, allergies, etc.)
- important events in past
- special holidays and trips

Family

- brothers and sisters (names, ages, etc.)
- family background
- family traditions
- special celebrations
- special relatives
- family emblem

Personal

- favourites: sports, subjects, music, food, TV shows, movies, etc.
- hobbies
- part-time jobs
- special skills
- friends
- activities enjoyed
- activities disliked
- future plans

Lists and Forms - Appendix A

The following pages provide samples of lists and forms that can be modified for use in planning activities. Check for wording, etc., to ensure the ones you use will satisfy your needs and any requirements of your school or district.

i -- Sample Consent Form

It is particularly important that a consent form be worded properly. Check yours thoroughly before using, and ask your principal or district for direction.

Blue Lake Camp Consent Form

I / We, _____ permit
name of parents / guardians

_____ to take part in the forest education
 program
name of child

at Blue Lake on _____
dates of the camp

I / We understand that transportation to the camp will be by chartered bus [include here any other type of transportation, i.e.. private car, school bus, etc.].

I / We understand that my daughter / son will be involved, under supervision, in activities in a forested area and on water.

Date: _____

Signed: _____

ii -- Sample Student Equipment List

Encourage families to borrow or buy these items as economically as possible. Outdoor school is not the time for brand new ski wear or other expensive items. Emphasize the need for sturdy, serviceable outdoor clothing that will keep students (and adults!) comfortable in all kinds of weather. The main criteria for outdoor clothing are that it be warm, comfortable, and waterproof. Wool is an excellent choice. Each student should have no more than two pieces of luggage - one for each hand. Remember to label everything!

Clothing

This list does not include the clothes that the students will be wearing on the day they leave for camp.

1. waterproof boots
2. shoes (1 pr of running shoes)
3. socks (4 or 5 prs.) wool socks are good for warmth when wet
4. Pants (2 prs.) sweat pants are better than jeans if wet
5. rain jacket-waterproof material with sealed seams, rain pants and rain hat are optional
6. shorts (2 prs) and bathing suit
7. underwear (4 or 5 prs.) - lots!
8. T-shirts (3)
9. sweater - woolen; otherwise the warmest available
10. jacket - warm ski or fleece
11. mitts and toque - depending on weather
12. hat
13. pajamas - nightgowns are not recommended for sleeping bags

Equipment

1. large duffel or kit bag to carry all clothing and equipment except for sleeping bag
2. sleeping bag - a good "3-season" dacron or down filled bag
3. small pillow
4. sunscreen and lip salve - no oil please!
5. towels (2), soap, shampoo, toothbrush, toothpaste, hairbrush
6. flashlight - with extra batteries

Might Want To Bring

1. small day pack
2. indoor shoes or slippers
3. sunglasses
4. insect repellent
5. novel to read
6. small game. e.g. cards, checkers
7. musical instrument
8. a fuzzy friend
9. camera - know how to use it (inexpensive disposable camera is recommended)
10. binoculars
11. "Ziploc" bags for keeping camera, etc., dry
12. compass
13. fishing gear
14. small plastic bags for wet clothes

Do NOT Bring

- ✗ anything that operates with electricity or batteries, except your flashlight
- ✗ food - candy, gum, snacks, etc.
- ✗ toys or jewelry
- ✗ matches
- ✗ knife, hatchet, etc.

iii -- Sample Teacher Equipment List

Teachers require most of the items on the suggested student equipment list, plus the following extra items. Some of these should also be included on an equipment list for any other adult supervisors.

1. medical forms for each student and adult
2. teaching materials
3. feminine napkins
4. facial tissue
5. sunscreen
6. sunburn lotion
7. insect repellent
8. flashlight - large and bright
9. pocket knife
10. sewing kit
11. garbage bags - large and small kitchen types (large bags make emergency raincoats)
12. extra sleeping bags
13. extra rain coats
14. clipboards - one for each student and adult
15. pencils, erasers, felt pens, paper, glue, scissors, etc.
16. one small pencil sharpener
17. star charts
18. read-aloud stories
19. skit ideas - some for the students, and one good one for the adults
20. campfire songs
21. musical instrument and a person to play it
22. sports equipment
23. comfort food for the adults
24. awards and prizes

iv -- Sample Camp Pledge

Well ahead of the camp experience, use the Sample Blue Lake Camp Pledge Form to introduce the idea of “making a commitment”. In a positive manner, go over each point and discuss what it will mean. You may wish to use the samples as a starting point, and involve the students in developing their own pledge form. Have them sign as their personal commitment to the agreed-upon decisions. The form can also be used at the pre-camp meetings.

Blue Lake Camp Pledge

1. I will listen carefully to and carry out all requests and instructions given by adult supervisors, promptly and cheerfully.
2. I will undertake all activities and duties assigned to me and complete them in a satisfactory and safe manner.
3. I will use courtesy, cooperation, and friendliness in all my dealings with Blue Lake & school staff, students, volunteers, and guests.
4. I will use my common sense and consider the safety of myself and others at all times.
5. I will not leave the camp boundaries without adult supervision.
6. I will respect the property of others and treat all facilities with care.
7. I will abide by all rules of camp.
8. I will not leave my cabin unnecessarily between lights-out and morning wake-up.
9. I will know the daily routine for my group and report promptly to the assembling area.
10. I will not bring battery-operated toys, portable radios, food, matches, knives, or other items specified “not suitable”.

I understand that if I fail to conduct myself in a reasonable manner to fulfill my obligations as noted above, it may mean that my parents / guardians will be contacted and I will be sent home early.

Date: _____ Signed: _____

Parent's Signature: _____

v -- Sample Medical Form
BLUE LAKE CAMP
General Health Information Form

Camper's Name: _____ Date of Birth: _____
 Address: _____ Sex (M/F): _____ Age: _____
 City: _____ Home Phone #: _____
 Prov.: _____ Postal Code: _____ Business Phone #: _____
 Parent/Guardian: _____
 Alternate Contact, name and phone #'s: _____
 Family Doctor: _____ Phone #: _____
 ***Medical Plan Number & Province (i.e. BC Care Card): _____

Out of province, please ensure you have adequate medical coverage.

Health Information

This child is subject to the following (yes or no):

- | | |
|---|--|
| <input type="checkbox"/> colds | <input type="checkbox"/> sinus infection |
| <input type="checkbox"/> sore throat | <input type="checkbox"/> bed wetting |
| <input type="checkbox"/> bronchitis | <input type="checkbox"/> motion sickness |
| <input type="checkbox"/> ear infections | <input type="checkbox"/> sleep walking |
| <input type="checkbox"/> fear of the dark | <input type="checkbox"/> fainting |

Please describe and/or attach any other necessary information with regard to health, food limitations, etc.:

Medication: I would like my child to be given the following medications, (which are labeled and accompany child), while at camp.

Name of medication: _____
 Why is it being taken: _____
 Quantity to be given: _____
 Times to be given: _____

MEDICATION WILL BE COLLECTED BY THE FIRST AID PERSON DURING REGISTRATION UPON ARRIVAL. PLEASE HAVE MEDICATIONS WITH YOU.

Is your child allergic to: Penicillin Yes No Don't know
 Sulpha Yes No Don't know
 Bee/Wasp Stings Yes No Don't know
 Others? (specify) _____

General Health Information Form (con't)

Is there any reason for restricting your child's participation in:

- Canoeing Hiking Jumping Other sports
 Swimming Running Climbing (specify) _____

Please explain:

Is your child's immunization shots up to date? YES or NO

Has your child been exposed to any communicable disease in the past month? If yes, please explain:

If there is any other information which you feel would be of value to us concerning your child, and/or any concerns/problems that your child has regarding camp, please use this space to let us know:

YOU HEREBY GIVE YOUR PERMISSION to have anaesthetic, blood transfusion, or necessary surgery (stitches, etc.) administered to your child, under suitable medical supervision, (i.e. Hospital) in case an emergency should arise and acknowledge that you accept financial responsibility in the event that your child is transported to the nearest medical facility (i.e. Physician costs, ambulance, etc.) And give permission to administer Tylenol to your child in case of headaches or muscle aches from such things as growing pains, etc.

- Anaesthetic? Yes _____ No _____
 Blood Transfusion? Yes _____ No _____
 Surgery? Yes _____ No _____
 Tylenol Yes _____ No _____
 **Model Release? Yes _____ No _____

Signature of Parent or Guardian: _____

Date: _____

Note: All attempts will be made to contact Parent/Guardian in the event of an emergency.

**On occasion the Blue Lake Forest Education Society uses pictures taken during camp for promotional purposes, i.e. Brochures, newspapers and trade show displays. If model release is given Blue Lake reserves the right to publish these photographs without incurring debt or liability of any kind.

vi -- Sample Responsibilities

These checklists describe the main responsibilities of camp staff and visiting school staff for planning and leading a successful outdoor school. Discuss the list with your Program Manager, making revisions as necessary to ensure you are both satisfied with your arrangements.

Blue Lake Responsibilities

- Maintain the physical plant and the outdoor site in a safe condition.
- Ensure the site and equipment is ready to run the school camp.
- If pre-arranged, provide forest education lessons to support the teacher's curriculum.
- Present an orientation talk to students regarding camp rules, regulations, and boundaries upon their arrival at camp.
- Prepare meals on time as arranged.
- Organize food serving and dining hall procedures.
- Remove garbage from the camp.
- Have firewood available, if offered at this camp.
- Provide canoes, lifejackets, etc.
- Provide an adequate First Aid kit and a qualified attendant.
- Schedule and supervise the evening campfire activities.
- Instruct teachers and other adults in cleaning procedures.
- Assign chores to duty. Chores include the following:
 - a. dishes
 - b. dining room clean-up
 - c. bathroom clean-up
 - d. firewood
- If pre-arranged, organize and conduct other camp activities such as:

Visiting School Staff Responsibilities

- Book the Centre well in advance - the deposit must be paid and the rental agreement signed and returned in order to confirm a booking at The Blue Lake Centre.
- Ensure that a fulfilling educational, personal, and social experience is provided for your students.
- Plan the camp experience and design a daily timetable for camp activities to allow for meals and camp chores.
- Arrange study groups and cabin allocations before arrival - check with the Program Manager for physical layout.
- Arrange enough adult supervisors to assist with teaching lessons and the supervision of chores, cabins, and dining hall.
- Provide completed medical forms for students and adults at camp.
- Arrange for the supervision of "free-time" activities.
- Arrange for the supervision of early morning walks, runs, swims, etc.
- Arrange "mug-up" if available; snacks may or may not be included in fee.
- Conduct bed checks at night.

Blue Lake Forest Education Centre

Cabin Placement

Top Row Cabins

(1) Spruce Cabin

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

(2) Birch Cabin

- 1.
- 2.
- 3.
- 4.

(3) Larch Cabin

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

(4) Willow Cabin

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

(5) Maple Cabin

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

(6) Fir Cabin

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

(7) Hemlock Cabin

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Bottom Row Cabins (nearer to Cookhall)

(8) Aspen Cabin

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

(9) Pine Cabin

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

(10) Juniper Cabin

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

(11) Alder Cabin

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

(12) Cedar Cabin

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

(13) Cottonwood Cabin (Tent Cabin, No Wood Stove)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

vii -- Sample Timetable

The following sample timetable is for a three-day school camp. It is suitable to be used for a one- or two-class group of 30-60 students. Teachers should consult with Blue Lake staff or other experienced teachers for assistance in finalizing the timetable.

TIME	DAY ONE	DAY TWO	DAY THREE
7:00		Early morning activity Cabin clean-up	Early morning activity Cabin clean-up
8:00		Roustabouts 7:45 Breakfast & duties	Roustabouts 7:45 Breakfast & duties
9:00	Leave school	Study Session #3	Evaluation Session
10:00	Arrival, unload bus Cabin assignments	Study Session #4	Pack up & clean up
11:00	Welcome Tour	Roustabouts 11:45	Roustabouts 11:45
12:00	Bag Lunch	Lunch & duties	Lunch & duties
1:00	Study groups & Introd'n Study Session #1	Study Session #5	Load bus & inspection Leave camp
2:00		Study Session #6	Arrive at school
3:00	Study Session #2		
4:00	Free Time	Free time	
5:00	Roustabouts 4:45 Dinner & duties	Roustabouts 4:45 Dinner & duties	
6:00	Journal Group activity	Journal Group activity	
7:00			
8:00	Night activity or Campfire	Night activity or Campfire	
9:00	Prepare for bed Lights-out	Night hike	
10:00		Prepare for bed Lights-out	

Sample Duty Schedule - Appendix D

Based on 3 duty groups (up to 30 students)

↓ Time / Group →	#1	#2	#3
Day 1 Noon	* ROSE	ROUSTABOUTS	* K.P.
p.m.	K.P.	ROSE	ROUSTABOUTS
Day 2 a.m.	ROUSTABOUTS	K.P.	ROSE
Noon	K.P.	ROSE	ROUSTABOUTS
p.m.	ROSE	ROUSTABOUTS	K.P.
Day 3 a.m.	ROUSTABOUTS	K.P.	ROSE

* Remember: Roustabouts takes place before the meal, but K.P. and Rose take place after the meal

Based on 4 duty groups (more than 30 students)

↓ Time / Group →	#1	#2	#3	#4
Day 1 Noon	ROSE	ROUSTABOUTS	K.P.	GROUNDS
p.m.	ROUSTABOUTS	K.P.	GROUNDS	ROSE
Day 2 a.m.	K.P.	GROUNDS	ROSE	ROUSTABOUTS
Noon	GROUNDS	ROSE	ROUSTABOUTS	K.P.
p.m.	ROSE	ROUSTABOUTS	K.P.	GROUNDS
Day 3 a.m.	ROUSTABOUTS	K.P.	GROUNDS	ROSE

Glossary

abiotic factors - all the non-living factors in an ecosystem, e.g., water, soil nutrients, minerals, temperature, sunlight, wind, and others.

adaptive behaviours - the way in which an animal instinctively responds to circumstances in their habitat or environment.

aspect - the direction one is facing, e.g., north, uphill, etc.

biome - very large ecosystems, e.g., temperate forest biome.

biosphere - the living world's ecosystems and biomes.

biotic factors - all the living elements in an ecosystem, e.g., animals, plants, and micro-organisms.

capillary action - a phenomenon of some liquids that cause them to rise in a narrow tube through the action of surface tension.

carnivore - animals that eat other animals; predators.

clearcutting - a silviculture system that generally removes an entire stand or crop of trees in a single harvest, creating a fully exposed area with a distinct microclimate.

chlorophyll - the green chemical compound that uses light energy to product carbohydrates in plants.

community - all plants and animals living in a given area.

consumer - organisms that get their food by consuming other organisms; all animals are consumers.

contour interval - the vertical difference in metres between each contour line on a topographical map.

contour line - a line on a topographic map connecting all points that are at the same elevation.

d.b.h. - a tree's diameter measured at breast height.

decomposer - organisms that consume dead plants and/or animals.

dependence - the state of relying on someone or something.

dissolved oxygen - the amount of oxygen in the water dissolved in water, commonly used as a guide to describe general water quality.

dynamic equilibrium - a state of fluctuating balance.

ecosystem - a functional unity consisting of all the living organisms (plants, animals, and microbes) in a given area, and all of the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow.

ecotone - an area of transition between ecosystems with characteristics of each (p
elevation - height above sea level.

food chain - the relationship of predators and prey in a habitat, e.g., mice, snakes, owls.

food pyramid - a pyramid shape showing the interrelationship of producers, primary consumers, and secondary consumers in a habitat.

food web - a diagram showing the interrelationship of producers, primary consumers, and secondary consumers in a habitat.

fungi - mushrooms, toadstools, or allied plants including molds.

habitat - the environment where a plant or animal is normally found.

hectare - a metric measure of land area, equivalent to 100 metres x 100 metres.

herbivore - animals that eat plants.

humus - the black layer of soil that includes decomposing and decomposed organic matter.

insect aspirator - a device for collecting small insects by inhaling them through a straw to be captured in a small vial; also called a "suck-a-bug" or "pooter."

interdependence - relying on one another.

larvae - an immature stage of an insect.

legend - a key to the set of symbols used on a map.

limiting factors - circumstances that limit growth or development.

litter - leaves, twigs, etc., that are decomposing on the forest floor.

niche - the place or role of an organism in a habitat.

non-renewable resource - a resource that cannot be regenerated, e.g., minerals, petroleum.

omnivore - animals that eat both plants and animals.

organic pollution - pollution from decaying organisms, and not from chemical sources.

pH - a measure of the relative acidity or alkalinity.

photosynthesis - the process by which plants manufacture carbohydrates from carbon dioxide, inorganic salts, and water using sunlight acting upon chlorophyll .

plot - a defined area of land under study.

population - the total number of a species in a given area.

predator - animals that eat other animals; carnivores.

primary consumer - consumers that get their food from producers, i.e., from plants.

primary succession - succession that begins in an area that has not supported life within recent time.

producer - organisms that make their own food by using the sun; most plants are producers.

protist - organism not distinguished as animal or plant e.g., bacteria.

psychrometer - an instrument to measure humidity, using a dry and a wet bulb thermometer.

recreation - includes active outdoor pursuits such as camping, hiking, and bird-watching.

renewable resource - a natural resource that grows or can otherwise be regenerated with careful management, e.g., fish, forests, hydroelectricity.

secondary consumer - consumers that get their food from other animals.

secondary succession - succession that begins in an area that once supported life, e.g., after a fire.

succession - the process of natural change of ecosystems over time, e.g., how one plant community replaced another because soil conditions favour its growth.

terrain - the physical geography of an area of land.

topographic map - locates both natural and man-made features.

transpiration - the process by which plants emit oxygen through pores (stomata) in their leaves.

turbidity - "cloudy" appearance caused by stirring up nutrients and organic matter of water.

watershed - the land area that drains into a specific stream, river, or lake.

Suggested Teacher Resource Materials

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