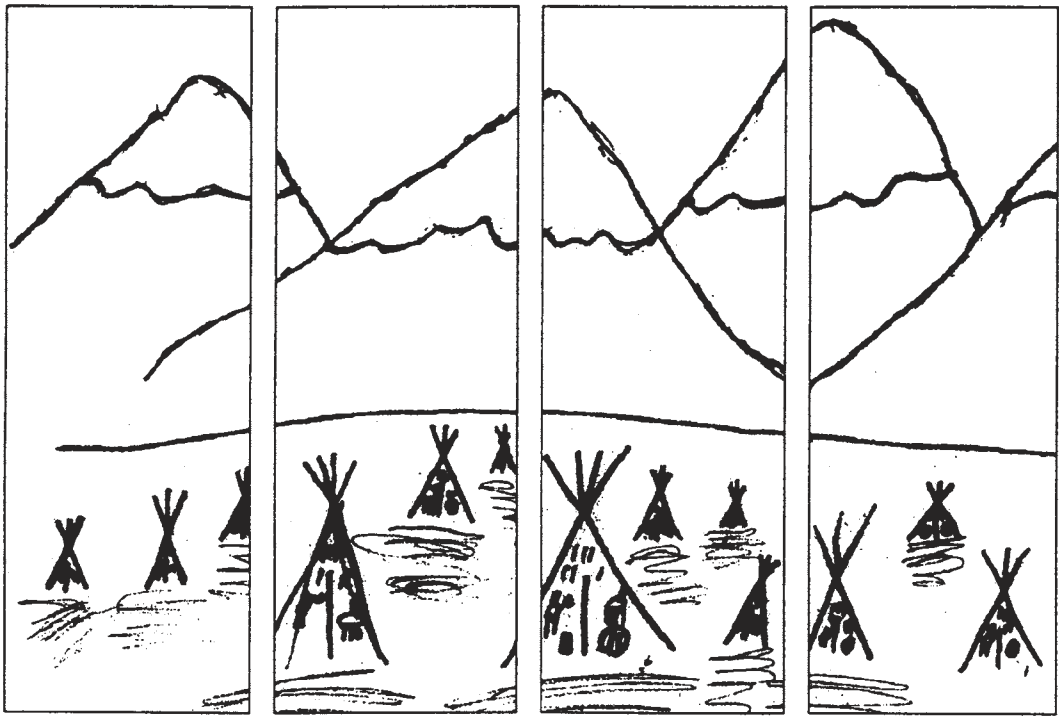
Work House



A Glacier National Park
Science Education Program

Work House

Science Education Program

By Terry Welder
with
the Division of Interpretation
Glacier National Park

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Designed by Bill Hayden

A Glacier National Park
Environmental Education Guide

revised 1998

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Acknowledgments

The creation of *Work House* has truly been a team effort. Many people within the National Park Service, the tribal cultural committees, and the reservation school systems have given freely of their time, advice, and editing skills to make this program possible.

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I am especially grateful to Darrell Kipp and Ed Little Plume of the Piegan Institute in Browning, Montana. Their collective sense of what traditional Native American life was like in the times before European immigration, their understanding of the dynamics involved in the interfacing of cultures today, and their willingness to help us all move into a constructive future have been an invaluable inspiration to the author.

Many teachers and administrators in the Salish/Kootenai and Blackfeet communities have shown interest and given encouragement and support to this project. Germaine White of the Salish Cultural Committee in St. Ignatius contributed valuable information, advice, reviewing and editing whenever the need arose. Elaine Johnson of the Pablo/Ronan Middle School was especially helpful in the planning and reviewing process and in helping her students contribute art for *Work House*. Dave Werdin, principal of St. Ignatius Schools, contributed valuable advice and review based on his lifetime association with the Salish/Kootenai and interest in Glacier National Park.

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Last, but certainly not least, *Work House* owes its tone and spirit to Jack Holterman, writer and long time teacher in reservation schools on both sides of Glacier National Park, and to Charlie Fisher and Hugh and Margaret Black of St. Mary, Montana. The bridges and corridors that are exemplified by their lifetime connections with Glacier National Park and with the local people who have always known the park are an inspiration to us all.

Terry Welder
January 16, 1992

Preface

The staff of Glacier National Park, in cooperation with the Blackfeet and Confederated Salish/Kootenai Tribes and the Glacier Institute prepared this packet of environmental education activities for Native American students and their teachers. Our goal was to develop environmental education materials relevant to the way of life, attitudes and cultural heritage of the Blackfeet, Salish and Kootenai who live in the vicinity of Glacier National Park.

As is often the case when you begin to teach, you learn more than the students. We learned many valuable lessons during the development of this education program. One of the most important lessons was that if you wish to develop a successful and culturally sensitive curriculum, you must not only establish good contacts in the local schools, but you must also work hard to establish and foster involvement of tribal representatives and cultural leaders in the project. Without such involvement your project will fail. It will lack both sensitivity and integrity. I feel that the greatest contribution of our Education Specialist and author of *Work House*, Terry Welder, was his ability to unlock these important informal communication pathways.

We also learned about serendipity and the creative process. Our decision to use both traditional stories and scientific explanations of natural phenomena grew out of a late afternoon discussion of the Blackfeet story *Napi Punishes a Rock* -- an explanation of glacial erratics. This proved to be an effective and popular approach; one which recognized the rich oral traditions of many Native Americans, and one which added life and color to our classroom activities. The visual arts are important in this education process as well. The students who participated in the pilot tests of this curriculum used personal art to interpret the stories and to assimilate the new lessons they learned about change in the environment, glaciation, wildlife habitat and natural succession. Their drawings illustrate this workbook.

Change or succession in the natural world is the major theme of all the lessons in this workbook. We welcome your suggestions for change to this workbook. It is a living document which we will continue to develop in the years to come by adding additional learning tracks, some already requested by teachers involved in the pilot program.

> In the end,
> We will conserve only what we love,
> We will love only what we understand,
> We will understand only what we are taught.
>
> Baba Dioum, African Ecologist

Cindy Nielsen,
former Chief Naturalist, Glacier National Park, 1992

Introduction

Welcome to *Work House,* an education program developed for use in the classroom and Glacier National Park. This program has been written in cooperation with tribal members and educators on the Blackfeet and Confederated Salish/Kootenai Reservations.

While the title *Work House* (apotoki [work] oyis [lodge or house]) may have negative connotations in an anglo context, it is actually a translation of a very positive Blackfeet language concept for the way in which American Indian children traditionally acquired the skills needed to become productive members of their society. Tribal heritage and culture were transmitted to the children on a continuing basis. There was no such thing as school as we know it today. School for Native American children was in fact a form of apprenticeship--education for life. Life was school or *work house.* By the time children were five years old and able to follow directions, they began helping the women with everyday activities. Young boys played games that developed skills preparing them for the day they would be invited on a hunt. Gradually, the children learned by doing until they were as adept at survival tasks as any adult.

Winter evenings around the family or community fires were particularly good times for the transmission of culture and heritage. All history was passed on through oral tradition and tribal elders and leaders were accomplished storytellers. Adults seldom lectured the children. Stories and legends were designed to preserve tribal history and culture, provide examples for righteous living, explain natural phenomenon, and, of course, entertain. An accomplished story teller would command a child's undivided attention. Most children remembered well and looked forward to the time when they would have the experience and prowess to be a storyteller.

Because of the cultural premium placed on storytelling, adults never lost their desire to listen to the stories and improve their own repertoire and presentation skills. Central to many of these narrations were tribal heroes and spiritual helpers such as Napi, Coyote, Raven, Blue Jay, and Old Grandfather Creator. Because of the tribes close geographic proximity, names of Blackfeet spiritual helpers like Napi, Old Man, and Creator Sun occasionally crept into the Salishan stories, and Coyote was occasionally featured in Blackfeet stories. Traditional stories and parallel secular scientific stories are central to the integrated structure of *Work House.*

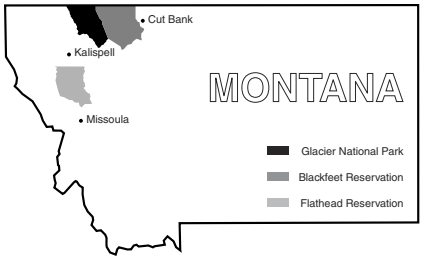
Educational philosophy of the Native American has always entailed learning by doing in the environment where the children were to apply their knowledge. Contemporary educators have reinvented this philosophy and call it hands-on education. The activities in *Work House* are designed to be hands-on.

A unifying theme for *Work House* is **succession**. Succession is a series of natural changes in topography, flora, and fauna taking place over time. Before humans developed the technology and numbers to impact and engineer the environment on a large scale, all succession was an inevitable outcome of evolution of species and natural phenomena like erosion, rainfall, fire, ice, or avalanche. An observer may have been saddened by the extinction of a plant or animal, or by the changing of the Earth's features resulting from flood or fire, but the change would have been accepted as natural and inevitable.

Prior to the arrival of Europeans, Native Americans had an impact upon the environment, but their way of life and philosophy precluded major changes to their world. Today technology is creating rapid change. Some of it good and some of it not so good. As a species, our actions have greatly accelerated the rate of change. While many of us might welcome some aspects of life as it was lived 500 years ago on this continent, few imagine that it would be possible. At the same time, only the very cynical accept all adverse changes that have occurred as irreversible. We can make an effort to heal the Earth; to regain positive aspects of the environment that existed in times past.

The Classroom and Park Visit Activities in this program are intended as a supplement to a school's curriculum. Background information and activities have been compiled and created with a consideration for the history, cultural heritage, and traditional relationships that Native Americans have had with the Earth. The activities are relevant to Glacier National Park and are designed to give dramatic impressions which will stimulate further interest, more detailed studies, and greater appreciation for Glacier National Park.

Glacier National Park was established to preserve the environment and provide for its use by park visitors. Active attempts have been made to keep the park as natural as it was when established in 1910. It is desirable to expand our role by being a part of an effort to heal the Earth -- to insure that humankind's influence on succession is truly for the better. *Work House* is designed with this ideal in mind. The more our children understand the workings of nature the more they can do to heal the Earth. What better, more natural place to learn about the world than in their own back yard --Glacier National Park.



Location of Glacier National Park in relation to the Blackfeet and Flathead Reservations.

How to Use Work House

Work House consists of five interrelated tracks that focus on geological and biological succession while utilizing local Indian tribal heritage as a background. The five tracks in this program are:

1. Mountains and Mountain Building
2. Glaciers and Glaciation
3. Native Plant Use
4. Animals and Habitat
5. Humans and Glacier National Park

Each track has a similar format. *Work House* includes cultural and scientific background information, traditional stories, Classroom, Park Visit, and Back in the Classroom Activities for use by program participants.

When using this program, teachers should read the tribal information and the section titled *The Way* and then select a track to follow. Be sure to review the background and activities provided. It is not necessary to be familiar with the entire program to use individual tracks; however, an activity from another track may supplement the unit you are studying.

A teacher may choose to do some or all of the Classroom Activities. If arrangements are made for a naturalist to conduct Park Visit Activities with your class, we recommend that some of the Classroom Activities be completed prior to coming to the park.

If possible, Classroom Activities should be conducted bilingually. Park naturalists are not fluent speakers of the area's native languages; however, the staff is interested in learning and incorporating as much of the language as they can. Naturalists also encourage teachers to participate in the Park Visit Activities.

Work House Activity Kit

The *Work House* Activity Kit is available on the Blackfeet and Confederated Salish/Kootenai reservations for use and contains presentation materials, background books, and other items to be used in your classroom (see list of kit contents in the appendix). Non-reservation teachers should call Glacier National Park staff to receive additional materials. Many of the kit materials are to be used for specific activities; however, some books, slide sets, videos, etc., are included for the teacher's use in designing their own classroom activities. The kit will be stored in your school district and you will need to arrange to pick it up from the current user or have it delivered to your school. After obtaining a few supplementary materials most activities can be implemented with minimal preparation.

Additional Classroom Activities for Track 4--Animals and Habitat, are provided in the Activity Kit. Classes wishing to do all Track 4 exercises would do well to obtain the kit before beginning.

Conducting the Activities

Review the background information for your chosen Track and decide how to adapt it for your class. Select Classroom Activities for use, locate any materials that are not included in the kit, and practice using the materials provided. It should be relatively easy to follow the procedures as they are detailed in the activities. You may wish to select your own stories from the supplemental books in the kit or from your own repertoire.

Arranging for a Park Visit

After selecting a tract for study, you may want to plan a park visit. If so, call the park naturalist at the number and location listed below. Allow at least 1 1/2 hours on-site for your park visit. Optimum class size for a visit is approximately 30 students. Special arrangements must be made for larger groups. Also, please be sure to provide chaperons to assist with classes. Teachers are responsible for class discipline. You may choose to visit the park on your own; however, we encourage contact with a park naturalist.

To arrange for a visit to Apgar, please contact:
District Interpreter
West Lakes Office
Glacier National Park
West Glacier, Montana 59936
(406) 888-7942

To arrange for a visit to St. Mary, please contact:
District Interpreter
Hudson Bay District
Glacier National Park
St. Mary Ranger Station
Browning, Montana 59417
(406) 732-7757

Park entrance fees are waived for educational groups and there is no charge for park naturalist activities.

Special Instructions

It is important to note that, out of respect for cultural values, Coyote stories may not be used until November. None are directly presented in this program but, if the decision is made to use them, please use them after the first snowfall and stop using them in the spring. Ideally teachers would do well to confer with local cultural authorities about Coyote story usage.

Before your park visit, be sure to discuss the field trip with the students. Be prepared for adverse weather and have the students dress accordingly. Also, use the materials in the Activity Kit to introduce the class to the National Park. Remember, everything in the park is protected. Students should know that they can not collect souvenirs. Students can help preserve Glacier by not picking the flowers, crowding the wildlife, or damaging the vegetation.

For teachers who would like additional information on how to implement the activities in this and other science programs there are two sections included in the Appendix titled *A Rationale for Teaching Science in an Integrated Format* and *Some General Considerations in Preparing Concrete Activities for the Study of the Environment*.

Program Evaluation

Your feedback on the effectiveness of *Work House* is wanted. Please take the time to fill out and return the evaluation form provided in the Activity Kit. Suggestions on improving activities or thoughts on additional tracks to be added to this program would be appreciated.

Getting to Know "The People"

It is not the purpose, nor is it within the scope of *Work House* to give a complete history of the bands and tribes of the Salish and Kootenai Confederation or of the Blackfeet Nation. Various cultural committees, historians and ethnographers may advocate somewhat different interpretations of the information provided in this section of the introduction. There will probably never be a version of this information that will perfectly satisfy all points of view. However; for the convenience of program participants, brief tribal histories are included. More complete accounts can be found in the books listed in the bibliography at the end of this work, or in your local library. **It would be most appropriate to invite a Tribal Cultural Committee spokesperson into your classroom to discuss Tribal history.**

Tipis at the Logan Pass dedication, 1933. (N.P.S. Photo)

The Blackfeet

The Blackfeet Nation consists of four subdivisions; the Siksika or Northern Blackfeet, the Kainah or Blood, the Northern Piegan, and the Southern Piegan or Pikuni. The neighboring Cree Indians began calling this tribe, the Blackfeet. It is unclear at this point in history why the name Blackfeet was chosen. Some historians feel that it is reference to blackened moccasin soles caused by walking through burned over prairie. Others think moccasin soles were intentionally painted black.

By the early nineteenth century the Blackfeet occupied and controlled most of the area from the North Saskatchewan River south to the Missouri and Yellowstone Rivers, and from the Rocky Mountain Front in the west to the mouth of the Milk River in the east. They dominated the entire eastern front of what is now Glacier National Park. The Piegan people formed the southwestern vanguard of the Blackfeet Nation and patrolled the gateways to the plains in an ongoing attempt to prevent the western tribes from using the area and its resources.

The tribes from west of the mountains often used northern passes on their journeys east to hunt the buffalo. During the eighteenth and nineteenth centuries the Blackfeet and the western tribes had their most frequent contact, and on occasions armed conflict, in and near these passes.

The Blackfeet are of the Great Plains culture. Some Blackfeet traditions claim that they have always occupied parts of Alberta, Saskatchewan, and Montana--that they "woke up here". Other traditions, heavily favored by Anglo anthropologists, preserve an ancient account of The Long-Ago People crossing over from Asia on the Bering Land Bridge as they followed game. Still other sources trace the Blackfeet to Algonquin sources in the northeastern Canadian forests. According to the latter tradition, the Blackfeet had migrated to the Great Plains long before the arrival of white men and had finished their migration to the Rocky Mountains by the beginning of the eighteenth century. A popular and quite recent theory, supported by archeological, linguistic and genetic arguments, suggests that the Blackfeet may have been a strong presence in the immediate area for a minimum of 5,000 years. The dialects of the Blackfeet language belong to the Algonquian family of languages. None of these accounts necessarily contradicts the others -- the Blackfeet have been a strong presence in the area for a long time.

People of the Plains culture followed a subsistence hunting and gathering cycle. However, since the Blackfeet were almost exclusively dependent upon the buffalo herds for every facet of their livelihood, they were much more nomadic and mobile than their western neighbors. Though they tended to camp in the same locations at certain times of the year, the Blackfeet seldom constructed permanent lodges of any kind. Their skin lodges were put up and taken down in a matter of minutes and could be readily trans-

ported through a cycle of camps even in the “dog days” before horses made moving so much easier.

Though the western tribes relied heavily on seasonally abundant roots and berries, the bulk of the Blackfeet diet consisted of buffalo meat. They gathered plants for food but went so far as to call it “nothing food”. Buffalo meat was “real food”. Nonetheless, the Blackfeet sometimes traveled to the western valleys to dig for bitterroot and camas where they were much more plentiful than on the dry plains.

Plains culture was dependent upon buffalo, limited use of roots and berries, virtually no fishing, no agriculture other than raising tobacco, highly moveable lodges, transportation by travois, either behind dogs or horses, and a highly developed use of buffalo and deer skins in the crafting of clothing, lodges, and other household items. Heavier items made of wood, stone, and bone were de-emphasized because of the need to travel light. The Blackfeet seldom needed water transportation; when necessary they constructed make-shift rafts to transport items across swollen rivers.

Aside from the heavy emphasis upon the buffalo hunt, the search for food was similar to other area tribes. Blackfeet men did most of the hunting while the women did most of the gathering and processed the harvests of both activities. Blackfeet children learned by doing, by example, and through apprenticeship to their elders. The Blackfeet had to find sheltered river valleys in which to spend the winter. They enjoyed the long winter evenings when their heritage and culture were transmitted and reinforced around the communal fire. Blackfeet stories had their heroes and spiritual helpers. Foremost among the creation heroes were Napi or Old Man and Creator Sun. Because the Plains culture of the Blackfeet overlapped with the Salishan Plateau culture of the western tribes, their stories influenced each other. Napi or Old Man is often the protagonist in a story that matches one about Coyote in the Salishan culture.

Blackfeet were completely dependent upon the buffalo herds for survival and were very protective of the territory in which the herds ranged. In order to insure their livelihood, it was necessary to keep other tribes from hunting the buffalo. Consequently, warfare became a way of life. Much of Blackfeet culture centered on becoming a warrior. Patrolling the borders of their territory required many good horses and excellent horsemanship. Being a warrior involved a great deal of skill raising and handling horses. Horses, in turn, became the primary spoils of war.

The skill of the Blackfeet warrior was legendary. In part, it was fear and respect that other tribes and white explorers had for the Blackfeet that kept the northern plains unchanged for so many years.

The Salish/Kootenai Confederation

The tribes and bands comprising the Confederated Salish/Kootenai were loosely associated long before confederation was forced upon them by the Hellgate Treaty of 1855. The Kalispel, Lower Pend d'Oreilles, and the Bitterroot Salish were all part of the Salishan Plateau culture which included many of the Indian tribes in the Pacific Northwest. They spoke dialects of a Salish language base which allowed them to communicate and trade with most groups in the Columbia drainage. It is likely that all of these groups were derived from common ancestors somewhere to the northwest of present day western Montana. Many Anglo historians, anthropologists and ethnographers suggest that Native American tribes are descended from aboriginal natives who crossed into the Americas on the Bering Land Bridge. Many oral traditions assert that The People have always lived in the Americas, and still others claim that the original ancestors came over the great waters to the west in large canoes. At any rate, the Salishan peoples have occupied the Northwest for a very long time.

The Kootenai, as they are commonly known today, prefer the name Ktunaxa and the Montana group most intimately related to the Glacier National Park area is called the Ksanka Band. In a translation of their native language, they are known as the Fish Trap People in reference to the numerous fish traps that they traditionally used on Flathead Lake. Ktunaxa territory once occupied much of present day Southern Alberta, British Columbia, Idaho, and Montana. Their language base is unrelated to the Salishan base of the Northwestern Plateau culture or to the predominant Algonquian base of the Blackfeet Plains culture. No one really knows where the Ktunaxan language base originated and there are no closely related languages in the Americas.

Native Americans at Lake McDonald in Glacier National Park. (N.P.S. Photo)

territory with the Salish groups known as the Kalispel and the Lower Pend d'Oreille. The confederated tribes respected each other's needs and rights, sometimes influenced each other's culture, and often cooperated in hunting expeditions to the east side of the mountains. The confederation was solidified by the necessity to marshal large forces for protection while hunting buffalo in areas where they were likely to encounter Blackfeet.

Up until the early eighteenth century, their territory extended out onto the prairies east of the Continental Divide which the tribes called The Backbone of the World. However, with the growing dominance of the Blackfeet, the western tribes were eventually confined to the west side of the mountains when not hunting. These western tribes were able to share what is now western Montana because their hunting-gathering life style was easily sustained in the woodlands and mountains of the area.

Today the tribes are collectively known as the Flathead Tribes. Flathead is actually a misnomer. When Lewis and Clark first encountered the Bitterroot Salish, the explorers mistook them for the west coast Flatheads.

The Bitterroot Salish contingent of the confederation traditionally made their home in the Bitterroot Valley. Most of their economy was centered in that area, though they ranged freely west of the Continental Divide. The Pend d'Oreilles and the Kalispel ranged throughout the western valleys from the Missoula area to the Canadian border. In early spring the hunting and gathering cycle began with root digging. The women dug for bitterroot, camas, wild carrots, and onions as well as for other roots and bulbs. They also gathered mosses and berries, medicinal plants, and herbs as they came in season. The gathering cycle was continuous from the first thaw in spring until the killing freeze in autumn. Until use of horses became common among people of the Plateau culture it was not unheard of for the men to help with the gathering although their time was occupied for the most part with fishing and hunting.

In late fall the women were busy drying and preserving meats and plants and processing hides for various uses while the men continued to hunt. The winter months were a little more relaxed, though the men continued to trap, go on occasional hunts, and ice fish. Women spent a good deal of their time making and repairing clothing. Everyone spent more time during the winter nights around the fire. It was a time for socializing and story telling.

Until the coming of the horse in the first half of the eighteenth century, hide-covered lodges were not common on the west side of the mountains. Even though Salish and Ktunaxa territory once extended out onto the plains east of the mountains, their primary home was west of the mountains where they often lived in semipermanent villages. When traveling, they had to move all of their belongings on their backs or with the help

of packing dogs. A buffalo hide lodge and the poles to support it were extremely heavy and cumbersome. Before horses, it was difficult to carry many hides over the mountains on a regular basis. Even after the introduction of the horse, the people found it more practical to construct a temporary lean-to of logs and branches when travelling into buffalo country.

Until horses became a common means of transportation, the usual lodge was likely to be covered by woven tule mats. Some lodges were partially sunken into pits and banked with earth. Some "long houses" for multiple family dwellings were built in lean-to fashion with a smoke slit running the length of the lodge peak. While these lodges were not as portable as the tipi, Plateau culture people were not required to move as often as Plains Indians.

As the white man's influence began to push the Blackfeet and other plains tribes closer and closer to the mountains, the people of the Salish and Kootenai Confederation were confined more and more to the west side of the mountains. Trade goods, horses, and weapons began to make their way into the area long before the local tribes actually saw white people. With horses, the plateau people became more mobile.

The Bitterroot Salish, the Kalispel, the Lower Pend d'Oreille, and the Ksanka Band of the Ktunaxa shared territory and exchanged useful knowledge and culture while retaining their tribal individuality and identity. The Bitterroot Valley was recognized as the home of the Salish. The Kalispel and Pend d'Oreille ranged from what is now western Washington, through the Pend d'Oreille Lake/Priest River area in what is now Idaho, to Camas Prairie and the present St. Ignatius area of western Montana. The Ktunaxa occupied an area ranging from the Tobacco Plains area in the north to the west shore of Flathead Lake. These groups were usually able to move freely through each other's home territories by observing certain courtesies and protocol.

The Ktunaxa, felt at home in what is now Glacier National Park. Their allied bands lived to the west, north, and east of the park and they probably hunted frequently in the area. Some traditions claim that the Ktunaxa actually held gatherings of the bands in the area. Not only did the North Fork Valley provide a convenient conduit for travel south by the northern bands, but the locations of Kintla, Bowman and McDonald Lakes provided inspiring central locations for gatherings.

Whether they gathered in the area, hunted, or just passed through, all of the groups of the Salish and Kootenai Confederation probably used some of the passes in what is now Glacier National Park for journeys east to hunt buffalo on the plains.

The Influence of European Immigrants

The European influence was felt by the tribes before the Blackfeet or the Salish and Kootenai ever saw a white person. The Spanish brought horses to North America early in the sixteenth century. By the middle of the eighteenth century Indians in the Northwest were breeding and trading horses extensively. Tribal culture was beginning to change. People could travel further and faster and carry more possessions with them. Soon after the arrival of horses came the fur traders. The pursuit of the beaver took them into every part of the Americas. With the trappers came trading posts and trade goods. At first, some tribes were pleased. It was convenient to have metal tools and weapons. Canvas made maintenance and transportation of lodges much easier. Some even welcomed large-scale agriculture and the white man's religion. While many Indians felt that European religions were evil and destructive of their native culture, others felt that the white man's god was a confirmation of their traditional beliefs. Some preferred the white version of heaven to their traditional destinations in the Spirit World.

Regardless of how the white influence was received, it appeared to be here to stay. Most Indians found it impossible to live according to the old ways because their territory and means of subsistence had been taken away. Blackfeet culture nearly collapsed when the last of the great buffalo herds was wiped out in 1883. The following winter more than a quarter of the Pikuni died of starvation.

The tribes on the west side of the mountains were able to manage longer because they were not dependent on the buffalo. The reservations grew smaller and the opportunity to survive in the old way was eventually eliminated. Some of the people agreed to be acculturated because they had no other choice if they were to survive. Fortunately for us all, some tribal members held on to the old ways and preserved what they could of their heritage.

Today there is a strong interest in preserving Native American culture. Even whites have come to realize that Indian people know things about ecology and medicine that modern technology has yet to understand. Although few Indians would choose to return entirely to the old days, Indians and whites alike want to restore what they can of the values and culture which made the "People One With the Earth".

The Way

There are many traditional differences among the individual tribes and bands that make up the Salish and Kootenai Confederation on the west side of the mountains and among the subgroups of Blackfeet on the east side. However, a mutual respect and an understanding that all Indians know a "way of life" that is in tune with the environment serves as a common bond.

Native Americans lived life in a highly spiritual manner. They were so intimately involved with *The Way* that it was not necessary to philosophize about how one should live. As children grew and learned survival skills by working with the adults, understanding and respect for their environment grew along with the skills. Children seldom needed to be told to respect living things. They learned through adult example and the values inherent in oral tradition. One Piegan elder called it living a "prayerful life". He was not talking about prayer as it is used in formal religions. He meant living a life that is thankful for what the Earth gave us and always giving back to the Earth.

Living according to *The Way* involved understanding that we are a species sharing the Earth with other equally important species. All animals are participants in the cycle of life, and all things on Earth have a spirit nature interdependent with everything else; be it a human, grizzly bear, mosquito, tree, or rock. In our interdependence we use, consume, and learn from each other. Today it may be necessary to eat the buffalo; tomorrow it may be our turn to be eaten by the grizzly bear. Neither of these actions is taken lightly. If we use the buffalo, we pay him honor. We thank him and waste nothing. The first and the tastiest morsels are given back to the Earth from whence they came. If we use berries, the first are buried in the soil in acknowledgment that they are a gift from the Earth we share.

Never do we accumulate or harvest more than we can use. Napi and Coyote stories about harvesting and preparing foods frequently end with the refrain: "But some were left for seed", or "The females were left to produce more of their kind so that there would always be food for future generations". There was no such thing as conspicuous consumption. There was no deliberate waste. Because people needed to be mobile, it was considered foolish to burden oneself with too many possessions. In fact wealth was measured by the capacity to be generous. The accumulation of horses was not considered greed because horses enabled persons of influence to provide for others.

Indian life-style impacted the land lightly. No one owned land, one simply lived on it for a lifetime. Most tribes were on the move during a large part of the year. Treading lightly upon the land was deliberate. Long before all of the wood in an area was depleted and before all the plants and animals were harvested, the elders would look around and announce that it was time to move the camp, time to let the Earth heal. When whites asked Indians to become farmers and plow the land, most were appalled. Plowing would be

like cutting your mother with a knife. When travelling, every effort was made to leave little trace upon the land. Offerings of tobacco were left to the water spirits at crossings and tribute was made to significant landscape features along the way. When camp was made, all doorways were oriented to the east. Upon rising each day one's first act was to pay tribute to the Sun, the force behind all that grew and was good in nature.

The elderly were treasured and treated with respect. If it was truly an "old one's" desire to pass on, respect dictated that they be allowed to go off and die. It was considered an honor to be able to provide for many. Even when food was scarce, it was considered dishonorable for someone in the community to have to beg. True sensitivity and power included the ability to recognize when someone was in need. A "great one" anticipated tribal members' needs and helped them before they asked. It was a privilege and a power to be in a position to help. Affluence was measured by the ability and willingness to share.

Indians did not consider themselves to be lords over the animals, but approached animals from a position of humility. After all, animals seem to be better equipped for survival in the world. Animals never waste and seldom impact the environment in a negative way. Nearly all animal homes blend into their environment.

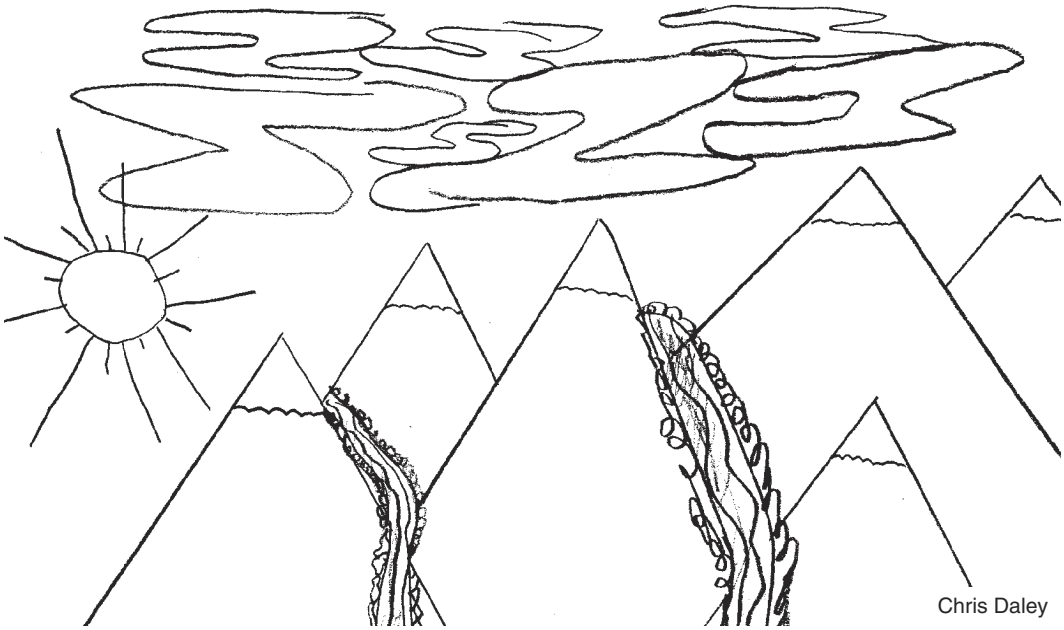
Native American encampment near Glacier National Park, circa 1930 (N.P.S. Photo)

Native Americans were aware that animals coexisted with every element of the environment. They believed that in many ways animals were as intelligent as humans. They observed the animals closely and looked to them for guidance. Though some had more to teach than others, all had something to teach humans. Different tribes looked more to some animals than to others depending upon the tribe's way of life. A very important "medicine" animal to the Blackfeet was the beaver. An important animal to the Ktunaxa was the grizzly bear. These two animals played important parts in their oral traditions. Both the beaver and the grizzly bear were important to the Salish and the Kalispel as well. Many stories attributed human characteristics to medicine animals.

For hundreds of years, the tribes on both sides of the mountains followed *The Way.* Their daily lives were in harmony with the world around them. They were truly living as if one with the Earth. The world as they knew it changed dramatically with the coming of the whites.

Track 1:
Mountains and Mountain Building

Directions and Background



Chris Daley

If you choose to follow this track, review all of the background, stories and activities included here. Reviewing the other three tracks is optional. Mountains and Mountain-Building begins with tribal cultural lore about the formation of the geological features of this region. You should review this information and adapt it for your use as you see fit.

It is natural that Mountain Building should be the first track in this succession of tracks. The formation of the mountains preceded the carving work done by the glaciers. The flora and fauna that occupy Glacier National Park today came after the work of the glaciers, and humans are relatively recent arrivals to the area.

With limited technology, it would have been difficult for the early tribes to understand the dynamics that were involved in the geologic formation of this area. Nonetheless, they had well developed observation skills and a kind of natural scientific method.

An important function of oral tradition in American Indian culture was to explain and speculate upon the why and how of natural phenomenon. Young Indians asked questions like, “How did the mountains get there?”. Parents did their best to give children answers. Many of the answers were based on what they knew from observation of natural phenomenon. Those observations were surprisingly accurate in scientific terms, but it was impossible for them to answer some questions. Some things just simply “were”. They were part of the Great Mysteries. Mysteries often became the source for Coyote, Creator Sun, or Napi stories. The elders attributed a phenomenon to the work of a spiritual helper and created a story to explain it. At the same time there were a number of stories that, like Bible stories, were considered to be inspired.

Over time, the stories were created to help explain phenomena and those that were considered to be inspired or revealed by a spirit had a tendency to blend together. Nevertheless, stories that explained natural phenomena or simply entertained often came close to reflecting scientific accuracy.

Many anthropologists theorise that the main ancestral source of Native Americans followed migrating herds across the Bering Land Bridge and gradually dispersed across the Western Hemisphere. Apparently this movement occurred several times beginning forty thousand years ago when sea waters were low enough to expose land. The sea was low because large continental glaciers held much of the water that ordinarily covered the area of the land bridge. Native American oral tradition was so effective that there remain a number of stories which indicate vague memories of the migration.

The migration is certainly part of Blackfeet oral tradition. At the time of the migration, the people would have had to travel south along temporary corridors between valley and continental glaciers. They may have been aware of the ice dynamics involved in the formation of topographical features. However, when the mountains were formed, there were no human witnesses to the dynamics. The origin of the mountains was one of the *Great Mysteries.*

Among the Salish, Kalispel, Ktunaxa, and Blackfeet there are a number of traditional stories involving spiritual helpers and *The Old People* which give location-specific explanations of how regional land forms came into being. The stories are characteristically a combination of observation and artistic creativity. Just how literally the people chose to receive these traditional explanations probably varied from tribe to tribe and from person to person.

It was obvious to the western tribes that the valleys had once been filled with water. The lake terracing and other evidence made this obvious to a people who were in touch with their surroundings. The Bitterroot Salish have a number of legends that deal with the formation of mountains, valleys, rivers, and lakes. These include *The Great Flood in the Flathead Country*, *Sheep Face Mountain*, and *Bluejay Brings the Chinook Wind.* Each of these stories has a Kalispel version as well. The Ktunaxa have their own version, *The Great Flood in the Kutenai country.*

In a Ktunaxa story called *The Origin of Flathead River* an immense beaver creates Flathead Lake. He dams the south end of the lake near present-day Polson but allows the water to overrun the Camas Prairie area above present-day Elmo and Big Arm. After some extremely hard winters and a subsequent warming period, the runoff from the mountains becomes overwhelming and the dam breaks through where Kerr Dam is today. The tired beaver gives up at this point but remnants of the beaver's dam and outlet channels exist today. This story is based on the interpretation of landforms that resulted from events that took place during the last Ice Age.

The following Ktunaxa story is one version of a creation story that has related versions in Salishan and Blackfeet traditions. Old Grandfather Creator, one of the protagonists of the story, is a Plateau culture equivalent of Old Man, the protagonist of the Blackfeet story that will follow. They are parallel stories that take place on opposite sides of the Continental Divide.

A Visit to the Sky World
(A west side creation story)

Among the Old People (the animal people), Muskrat was considered to be a sneaky character. When his brother died, Muskrat wanted to marry his sister-in-law. She refused him. In his anger he shot her with an arrow that could not be identified by his people. When friends came to investigate the murder, Muskrat cleverly told them that the arrow had come from the sky.

The Earth People were convinced that the Sky People had killed the woman and they were determined to go to the sky to make war on the Sky People. The Earth People shot an arrow up into a cloud and when it stuck they shot a series of arrows, each into the notch of the arrow ahead of it, until they had formed a chain of arrows all the way down to the ground. Then the Earth People began to climb up into the sky.

Wolverine, who had wanted to go on the raid, was left behind. In his anger he jerked the chain of arrows down from the sky so that the Earth People would not be able to climb down. When the arrows fell to the ground, they formed a chain of mountains to the south of Kootenay Lake.

When he reached the sky, Muskrat ran ahead of the others and constructed a large lake with many tipis around it. After the rest of the Earth People arrived, they searched the village for their enemies but were only able to find Muskrat in hiding. They killed him and returned to make their way back to the ground only to find that the arrow chain was gone. They went in search of Thunderbird who lived in the clouds. They captured him and plucked his feathers. Then they glued the feathers to their bodies and flew down to the ground.
Woodpecker, his brothers and sister, and his cousin Flicker decided to stay up in the sky and explore a little. They walked until they reached the place where the Earth meets the sky. There they sat down on the shore of a large lake to rest. As they sat, a huge wave rolled up on the shore and poor Flicker was swallowed by Water Monster.

Woodpecker and his siblings ran from bay to bay and danced until the fish came to see what was happening. Woodpecker asked them to help locate Water Monster so that he could save his cousin Flicker. The fish were only too happy to help. When they finally located Water Monster, Woodpecker tried to kick the monster but his foot only struck a glancing blow. He and his brothers chased Water Monster all the way up Kootenay River and then back to the south along Lake Windermere. At Longwater Bay the monster dug an underwater cave and hid from the woodpeckers.

Just about then, the woodpeckers saw Old Grandfather Creator of the Kutenais crawling up from the south and naming all the places as he went. As he crawled he left scratch marks on the land and rivers flowed in the furrows left by his belly.

"Quickly! Make a dam at the end of the lake to trap Water Monster", Woodpecker called to him.

Always obliging, Old Grandfather broke off a chunk of mountain, formed it with his knees, and created a portage between the Kootenay and Columbia rivers. Woodpecker was able to corner Water Monster until the rest of the Earth People came to help him slay the monster. They cut him open and out flew Flicker, a little thinner and weaker but still alive.

The animals cut the monster to pieces. They threw his ribs into the river where they formed cliffs. Then the animals dug hot springs around the area and cooked the blood and body parts until they were well done. The animals threw the parts around the land to become food for the New People.

The following Blackfeet account of *Old Man and the Beginning of the World* is one of many versions of the Creation:

Old Man and the Beginning of the World
(An east side creation story)

In the long ago, Old Man (Napi) came traveling up from the south. He was feeling lonely and a little bit bored. He needed something to do to keep him busy. As he traveled he made the mountains, prairies, and forests with birds and animals to live among them. He traveled constantly northward making the landscape as we know it today.

He made the Milk River and some fishes to live in it. By this time he was a little tired so he laid down to take a nap. Where he rested on the hill above the river you can see an outline of his body formed with large rocks.

Still a bit groggy from his nap, he started to the north again but soon tripped over a little hill. He fell heavily to his knees and this upset him a bit. Old Man clawed up the ground and piled up soil to make two large buttes which are still known as The Knees today. A little absent minded, Old Man carried some of the soil with him as he continued north. When he realized that he had the soil in his hands, he stopped, knelt, and formed the Sweet Grass Hills. When he was finished he still had a little material left over. So, Old Man reached over to the west and plopped the extra material down next to the mountains. Created as an afterthought, that little pile today is known as Chief Mountain.

So Old Man continued on his journey to the north. When he created mountains and prairies he experimented with making animals that he thought might enjoy living in those areas. If they didn't like where he put them, he would switch them around. For instance, the bighorn sheep and the antelope decided to switch places. The antelope's cousin, the mountain goat, however, decided that he wanted to stay in the

mountains. Old Man was agreeable. He just wanted all of his creations to be happy.

Old Man made grass on the prairies for grazers to feed on. In the foothills he planted trees and bushes with berries on them. He filled the soil with roots like camas, and bitterroot, wild carrots, and potatoes. He made many plants with different attributes that would be helpful to his creations. Everything that Old Man created had its own personality.

Still Old Man was lonely. He sat down beside a newly created river and began to play with a ball of mud. "Wouldn't it be nice", he said, "if there were creatures like me that I could talk to and play with." And the ball of mud in his hands began to take on a familiar shape.

Napi
Mandy Horn

The modern-day geological explanation for the origins of landforms in an around Glacier National Park is every bit as interesting as the traditional stories. Here is a story based on *Geology Along Going-To-The-Sun Road, Glacier National Park, Montana* by Omer B. Raup, Robert L. Earhart, James W. Whipple, and Paul E. Carrara:

A Geological Story of Glacier National Park

This is a story of changes over a long period of geological time. Some of the main characters in this story are Plate Tectonics, Water, Wind, and Ice. Water, wind, and ice are the principle agents for the processes of excavation, transportation, and deposition of sediments. Some folks simply call this erosion. The main plot of this story involves the force of gravity. With the assistance of the three main agents and some minor agents like humans and other animals, sedimentary material will work its way to the lowest point possible. The most efficient means of moving sediments is water.

Between about 1,600 million and 800 million years ago, the rocks of Glacier National Park were formed from sediments eroded from a North American continent with a very different shape than it has today. The sediments were deposited into a shallow sea covering present day eastern Washington, the Idaho panhandle, western Montana, and parts of British Columbia and Alberta. The Pacific Ocean was located just west of Spokane, Washington. More than 18,000 feet of sediments were deposited resulting in a down warping of the ocean floor. Depending upon the source, amount, and content of the sediments, there were variations in the amount of down warping that took place. Ultimately an interesting marble or layer cake design was formed by various colored layers of sand, silt, and limey mud. The oldest layers of rock having been deposited first were on the bottom of the sequence.

As compaction continued, deposited sediments became sandstone, siltstone, shale, limestone, and dolomite. Time, pressure, and heat associated with deep burial gradually metamorphosed these layers into other rock types. They became quartzite, siltite, shale, argillite, and recrystallized forms of limestone and dolomite. They were now much harder but

looked much the same as they had before. Between about 1000 million and 800 million years ago "pillow" lavas were extruded onto the shallow sea floor. Later magma was injected between some of the rock layers and up through faults in the formation's structure. These magma flows created sills and dikes. The igneous rocks are much darker than the surrounding limestone that has had organic matter literally "cooked" out of it. What you see today is like an Oreo cookie in reverse - the dark part in the middle with the cream filling on both sides. This igneous sill can be seen at some locations along the Going-to-the-Sun Road.

Sediment deposition continued after 800 million years ago but was not metamorphosed. These sedimentary rocks were not as hard as the older rocks. About 150 million years ago Plate Tectonics began to take an active role in the area. Two massive crustal plates began a collision that was to last until 60 million years ago. An ancestor of the present Pacific Plate moved to the east on a collision course with the North American Plate. The leading edge of both plates began to crumble and debris was pushed up at what was then the edge of the North American continent. Not much of the material could find its way down into the Earth's core. There wasn't much room. Material that did get forced down eventually heated up in the mantle, expanded, and erupted as volcanoes. In the process, numerous mountain chains developed. The battle of the plates continued until the western coast of North America extended several hundred miles to the west of where it was located before the collision began.

As the Rocky Mountains began to rise, the shallow inland sea began to drain to the east. As soon as the tops of the mountains were exposed, water, wind and perhaps some ice began to go about their work of excavating, transporting, and depositing eroded sediments to lower elevations. The sediments that were deposited on top of the present-day rock layers of Glacier National Park were eroded away. High in Glacier National Park there remain only a few sedimentary rock formations younger than 800 million years old. Much of the eroded sediment was laid down to the immediate east of the mountains and formed a relatively soft, loose bed of materials.

Fifty to sixty million years ago the pressure on the layers of uplifted rock became so great that a wedge of rock several miles thick faulted and slid more than 50 miles to the east over softer sediments. This action was a little bit like what would happen if you placed a thick layer of whipped cream on a slanted table with a layer cake on top of it. Eventually the cake would wind up on the floor. In the process, some of the cake layers would buckle into folds. This is what happened to the rock layers in the mountains. Billion year old rocks ended up on top of rocks that are less than 250 million years old. (It is just about as easy to imagine Napi doing the construction!)

Some 60 million years ago the great collision came to a virtual halt. Water and wind continued their relentless work. About two million years ago the Rocky Mountains were a bit higher than they are today, but they were rounded and cut by broad stream valleys. At this point ice became involved in the act. The Earth's climate cooled considerably and the Ice Age began.

Classroom Activities

Classroom Activity 1
Cultural "How Stories"

Objective:
Students will be able to explain the importance of cultural "How Stories". Using language arts and artistic skills to produce their own "How Stories", students will speculate creatively and scientifically about natural phenomena in their lives.

Background:
This activity is designed to get students to speculate creatively and scientifically about natural phenomena in their environment. It is best to have children choose phenomena that they have often wondered about. This is a warmup writing activity and topics need not be limited to Mountain Building. The emphasis should be on thinking about how they would explain "Mysteries" to their children if they were an elder.

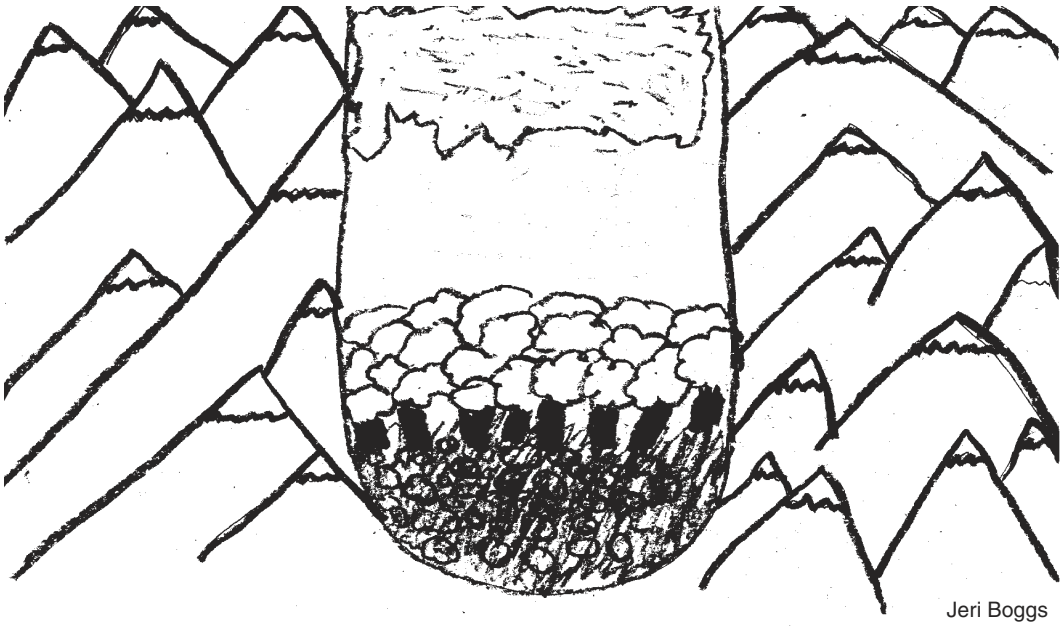
After presenting the preceding cultural stories about creation of land formations and the teacher's reading or rendition of *A Geological Story of Glacier National Park,* the teacher may choose to read or relate other Bluejay, Coyote, or Napi stories about how certain phenomena in nature came about.

Materials:
Paper, Pencil, Colored pencils

Procedure:
1. The teacher gives the students some background on cultural why and how stories, asks them to think about the process that went into creating the stories, and tells them that they will be invited to write their own stories after the teacher has read a few examples to them.
2. The teacher has the students write their own "why or how" stories and illustrate them with colored pencils.
3. Editing partners should practice reading their stories to each other, make constructive suggestions for revision, and rewrite a final draft.
4. Those students who feel secure enough should tell their stories without the paper. Others could read their story to the class or have the teacher read the story for them.
5. All stories and illustrations should be collected and bound into a book by one or two of the students who would like to create a cover and table of contents.

Follow Up:
Arrange for your classes' stories and art to be displayed at a local bank, grocery store or tribal center. The students will enjoy seeing their work displayed for friends and relatives to see.

Track 2
Glaciers and Glaciation



Jeri Boggs

Directions and Background

If you choose to follow this track, review all of the background, stories, and activities included. It is recommended that you review *A Geological Story of Glacier National Park* from Track 1. You should also do Activity 1--Cultural How Stories from Track 1 with your class. Glaciers and Glaciation is really a continuation of Mountains and Mountain Building. Glaciers and Glaciation begins with local tribal cultural lore dealing with the ice carved features of this region. You should review this information and adapt it for your use as you see fit.

While the mountains in the area that is now Glacier National Park have been present and obvious as long as Blackfeet, Salish, and Kootenai have lived here, large, conspicuously active glaciers have not been obvious in the last 10,000 years. Native oral tradition manifests a phenomenal memory. Some Native American oral histories preserve traces of a Bering Land Bridge migration from the Asian continent. However, there are not many traditional stories that deal directly with either continental ice sheets or large valley glaciers. Certainly the people who passed through the mountains during the middle of the nineteenth century encountered relatively large glaciers and may have even crossed over them in the Red Eagle Pass area. Those early travellers must have seen enough of the work of ice to speculate that the glaciers were larger in the past. Whether Indians knew that the glaciers had completely filled the mountain valleys and that ice sheets had extended over much of the North American continent is uncertain. There is no doubt that the power of *Ice Spirits* was awe-inspiring. It is certainly conceivable that a memory of interglacial corridors was preserved over more than 13,000 years. These traditions are obviously more common to native peoples who live further to the north.

There are a number of stories among the Salishan, Ktunaxa, and Blackfeet people that indicate an understanding of the glacial dynamics of the area. *The Great Flood In The Flathead Country* and *The Origin Of Flathead River* both give accounts of Glacial Flathead Lake although they do not directly mention the source of all the water. *The Origin Of Flathead Lake* is especially interesting in the context of this program because of its wonderful treatment of beaver habitat. One of the most interesting stories, comprising many accurate observations about the origins of natural phenomena, is the Flathead-Salish account *Bluejay Brings The Chinook Wind.* The following is a paraphrase of the story as it is recorded by Ella E. Clark in *Indian Legends Of The Northern Rockies:*

Bluejay Brings the Chinook Wind
(A west side glacial story)

In the very earliest times, Amotken, The Creative High Mystery, gave part of the North Crow Creek Canyon of the Mission Range to Thunderbird. Coyote was forbidden to enter the area and so Thunderbird was free to raise her young in peace. It was in the canyon that she gave birth to her three daughters: Bluejay, Crow, and Magpie.

Thunderbird was happy to let her friends from the Bitterroot Valley hunt and gather in the canyon. If bad weather was approaching from the East Pass, Thunderbird would make deep growling noises to warn her friends away. After many, many years of this friendly arrangement, a careless hunter neglected to put out his campfire and a huge fire destroyed all life in Thunderbird's beautiful canyon. With no trees and vegetation to hold the water, even the little creek dried up.

Thunderbird was understandably extremely upset about this careless act, and she was determined to punish the Salish people. She invited the cold Northeast Wind to drive the people back to the Bitterroot. The Northeast Wind set up permanent camp in the East Pass. He blew his frosty breath into the Salish country for many endless winters. The great lake of the Salish people froze to the bottom and all the animals were driven with the people to the Bitterroot Valley where they shivered with the cold. Even Thunderbird's daughters: Bluejay, Crow and Magpie followed the people to the south. Alas, the plants were unable to move on their own and they withered away and died.

Finally, after many, many winters the heart of Thunderbird was softened. She grew lonely; she missed her daughters, the other animals, and even the people. Thunderbird went to the Northeast Wind and asked him to leave. Thunderbird said, "The People have suffered enough now. Perhaps if you leave my daughters will come back to visit me".

Reluctantly, the Northeast Wind left the East Pass and returned to his home. A wandering scout was startled by the sudden stillness to the north and rushed to tell the chief of the Salish who was huddled with his people around the Sleeping Child Hot Springs. "Northeast Wind no longer blows and from the north one can hear a gentle rumbling as if Thunderbird were weeping. "

The chief was very pleased and told his people to prepare to move to the north again. He asked Coyote if he knew of a way to please Thunderbird so that she might hasten the warming of the old country. Coyote, was still upset that Amotken had forbidden him to enter North Crow Creek Canyon, and refused to help.

Bluejay had always loved the Salish people, and longing to see her mother, offered to help. She flew to the west and asked her friend Chinook Wind to help her friends return to their old hunting grounds. Chinook Wind, always warm and kind, readily agreed to go and warm the valley. "Show me the way my little friend", he whispered and away they flew.

When they finally reached the little canyon beneath the Mission Range, Chinook Wind settled in for a long steady blow. His warm moist breath melted the thick ice and, as it receded, beautiful flowers and long grasses sprouted up along its margin. Soon there were trees once again in the Mission Valley.

Thunderbird was pleased and asked Bluejay what she could give to her to show her gratitude.

"In the future, Dear Mother", Bluejay said, "Do not get so angry. It is not right that the considerate people should suffer for the offenses of the careless. "

Though the Northeast Wind returns to the East Pass each winter to remind us to live a thoughtful life, he always returns to his home when the Chinook Wind comes back to stay in the spring. For that we can thank Bluejay and a mother's love.

This story gives a fascinating mythical account that closely parallels the physical events as they occurred during the Ice Age. Humans in North America did not see fluctuations as dramatic as the above story indicates but some of the traditions assume that humans had been part of the landscape almost forever. The people who lived along the margins of the mountains spent their lives among the works of ice. They camped by kettle lakes, witnessed the uniformity of drumlins, and understood the composition of various kinds of moraines. They carefully examined the rocks of the mountains in their determination to make the best possible tools. They scratched their heads in wonder when they came across mountain boulders lying in isolation miles from their origin. They needed to find explanations. They needed to answer their children's how and why questions.

Every tribe in the area has a version of the story *Napi Travels With Fox and Punishes a Rock.* The story teaches the animism of seemingly inanimate objects and attempts to provide an explanation for glacial erratics. There was simply no way to explain how huge boulders could find their way miles out onto the prairie when their obvious origin was in the mountains. We now know that they were either deposited by glaciers or that they were rafted there on rotting icebergs in a glacial lake.

Napi Punishes a Rock
(An east side glacial story)

One beautiful Indian Summer day in the long ago times, Napi was walking with his friend Fox in the mountains above Cut Bank Creek. Although it was beyond the Moon of the Falling Leaves, the day was unusually warm. Napi, who always carried his buffalo robe, grew hot as they walked along. He and Fox stopped by a large black rock to rest and look at the scenery.

"Ah, Old Rock, you poor thing", said Napi, "You have to spend the long cold winter up here all by yourself with nothing to keep you warm. Here, take my robe." With that, Napi gently placed his robe over the rock and the two friends continued on their way.

Soon, however, as often happens in Indian Summer, there was a sudden change in the weather. Steel gray clouds began to roll in from the northwest. The wind howled and stinging flakes began to pelt the two hikers.

"Fox, old friend", asked Napi, "would you mind running back to get my robe?"

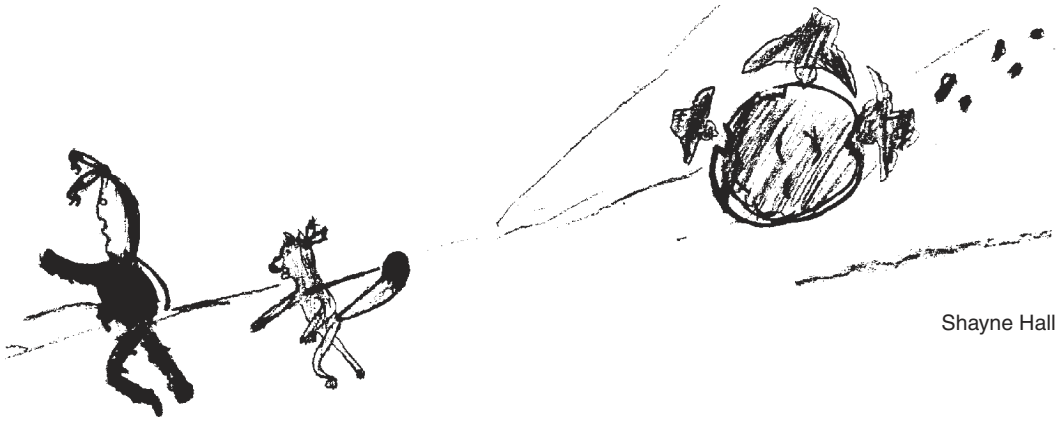
The kind Fox ran back but soon returned with the message that the rock was not willing to part with the robe and that he was quite angry that Napi would have the nerve to take back a gift. Just then they felt the earth shake and heard a loud rumble. Napi looked over his shoulder and saw the boulder rolling down upon them along the path.

"Oh, oh." yelled Fox, "We had better hightail it out of here. I think he is really angry!"

The two fugitives ran out of the mountains and out onto the prairie, but they could not out-distance the rock. Just as they felt they could run no farther, Napi spotted his friends the Nighthawks. "Quickly", he shouted, "stop that rock before it squashes us."

The fast-flying Nighthawks dove at the rock again and again. Each time they pecked at it, another large piece of rock broke off. Soon there was nothing left but a widely scattered trail of smaller rocks. The two friends collapsed upon the ground and thanked the Nighthawks between gasps. "In commemoration of this great deed you will always wear bright white slashes of honor across your wings."

It is because of this memorable chase that you still see these strange rocks from the mountains scattered far out onto the plains.



Shayne Hall

It is uncertain how literally Native Americans received the ancient legends which everyone loved to hear and tell. Many native peoples have an abiding faith and belief in Old Man, Coyote and Napi as superhuman spiritual helpers that once roamed the Earth and did great deeds. Most adults were aware of and appreciated the employment of metaphor and other creative language devices to convey the essence of an oral tradition. Some people regarded the stories as instructive mythology. While the great majority of Native Americans were highly spiritual, all of The People understood that some of the traditional stories were simply meant to provide good entertainment.

A Glacier Story: The Work of Ice

Many people who visit Glacier National Park for the first time expect to see large glaciers with snouts that come right up to the edge of the road. Instead, they catch long-distance glimpses of small glaciers high in the mountains. Visitors who hike have an opportunity to examine the remnants of glaciers that were much larger in times past.

Since the Ice Age began approximately two million years ago, at least four major continental ice sheets have advanced into this area and then receded. As the continental glaciers approached from the north and east, glaciers began to grow and advance in the mountains. The ice got so deep that it nearly covered the tops of the mountains and on several occasions the resulting valley glaciers joined with continental ice sheets on the east side of what is now Glacier National Park.

Glacier National Park was named for the glacially-carved features that give character to the mountain landscape. Today fewer than fifty small glaciers still exist in the park. By studying and comparing the small remaining park glaciers with large glaciers that are still dynamic agents in other parts of the world scientists are able to understand what occurred in this area so many ages ago.

What is the work of ice? What is a glacier? The term "glacier" is derived from the French word "glace", meaning ice. Some two million years ago the climate in this area began to grow cooler. More snow accumulated in the mountain valleys than melted during the warmer months. After a time the accumulated snow began to contribute a

further chilling effect to the weather. As the snow got deeper, it compressed. The underlying snow began to metamorphose or recrystallize into a dense form of ice called firn. By the time the firn reached a depth of about 150 feet it was solid ice.

Because the snow accumulation was heaviest at the higher ends of the mountain valleys, most of the growth originated there. Pulled toward a lower elevation by gravity, the newly formed glaciers began to move slowly down the valleys.

As the front of the glaciers moved to lower elevations, snow continued to accumulate at the head of the valley. Soon the small glaciers became giant valley glaciers. Eventually the accumulation of snow and ice became so extensive that at times only the highest peaks in the park remained above the glaciers.

The base of a glacier is under so much pressure that it behaves like soft plastic, oozing around and sliding over the underlying bedrock and soil. Glacial ice fills every crack and moves house-sized boulders with ease. Once a rock or boulder has been enveloped in the base of a glacier, it becomes a tool for carving and abrading the surface over which it moves. The net result is a relatively straight and flat U-shaped valley where an uneven V- shaped, stream-carved valley previously existed.

Not only does a glacier carve the valley floor, it also plucks material from the surrounding valley walls. While the base of the glacier excavates deep into the bedrock, and the flanks of the glacier pluck and gouge the surrounding slopes, the tail of the glacier continues to pluck away at the headwall. Seasonal temperature fluctuations cause the glacier to melt against the headwall leaving a narrow gap between rock and ice in summer. The gap fills with meltwater that turns to ice each winter eroding the rock by expanding in tiny cracks. This bergschrund, or gap area, undercuts the headwall to the point where the top of the headwall actually overhangs its base. Eventually, the overhang collapses onto the glacier and the process begins again.

Many glaciers move as slowly as a few centimeters a day, while a few large Alaskan glaciers can travel as fast as 150 feet in a day. The glacier does not move as a solid unit. Because of resistance at the base and along the valley walls, the flow of ice near the surface and center of a glacier is often faster than at the bottom and sides. The cracks that result when upper layers of the ice move faster than lower layers are called crevasses. They can be hundreds of feet deep and many feet wide.

Eventually, the snout or toe of a glacier reaches a point where lower elevation or warming temperatures create an equilibrium between annual snowfall and snowmelt. The glacier can advance no further. In the event of a climatic warming trend, the annual snow melt may exceed the amount that falls, and a glacier begins to recede. Most of Glacier National Park's glaciers have shrunk dramatically in the last century.

A glacier carries a tremendous load of eroded material in a constant conveyor process toward the toe and edges of the glacier. Ice at the toe melts and runs off as glacial outwash. New ice is constantly being replaced near the head of the glacier. Rocks break up much more slowly than ice eventually ending up at the toe or sides where they are deposited as glacial till. Till consists of a jumble of rocks, gravel, dirt or other debris that may have been picked up by the glacier. Piles of till along the margins of a glacier are called moraines.

If the moraine occurs at the point of farthest advance of a glacier, it is called terminal moraine. Sometimes a glacier will retreat up a valley and stabilize temporarily at various stages of the recession. In such a case it may leave a series of what appear to be terminal moraines, but are referred to as recessional moraines. If a glacier retreats steadily, it leaves a variety of till and outwash formations along the path of recession back up the valley. While a glacier is moving, till tends to work its way to the sides of the valley and be deposited along the glacier's flanks. During the lifetime of a glacier, the amount of till that builds up along its sides can be impressive. The resulting long, fertile hills, called lateral moraines, are conspicuous along major valley edges in Glacier National

Park. The lateral moraines are most often recognized by dense conifer forests that cover them.

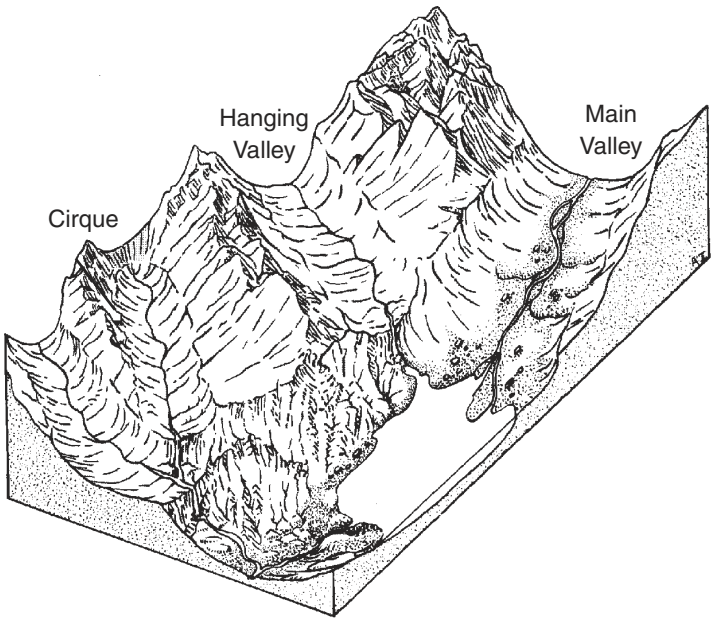
All glaciers have melt water running from their snouts during warmer seasons. The melt water carries a load of sediment for deposit along an outwash plain. Depending upon the volume and speed of the outwash stream, sediments are sorted and deposited along the floor of the plain. Respective weights of the various particles determine where they will be deposited-- near the snout of the glacier or further downstream. Outwash streams are frequently forced to change their courses because they fill with these sediments. The net result is a network of braided streambeds on the outwash plain.

The lightest, smallest sedimentary particles may be carried a long way until the stream has slowed considerably. This pulverized rock is appropriately called glacial flour. Glacial flour is particularly evident in the remnant tarns or mountain lakes that lie in the abandoned cirques near the headwalls of glaciers. The flour is actually the grist left from the grinding force of the glacier. Remnant icefields beneath the headwalls in Glacier National Park continue to color the lakes with their flour. In the park every lake has a slightly different color depending upon the makeup and mixture of rocks. Some lakes have a white tint that actually suggests flour, but more often they are various shades of blue and green.

A number of curious formations left by retreating mountain glaciers are found on both sides of Glacier National Park. Many of the lakes among the foothills on the Blackfeet Reservation and in the Flathead Valley are called kettle lakes. They were formed when a melting mass of glacial ice remained in a depression after the main body of the glacier had retreated further into the mountains. When the mass finally melted, a depression remained. In time, it filled with water. Teardrop-shaped drumlins, or hills, were left where the bedrock resisted the gouging of an advancing glacier. Softer, surrounding rock was worn away and this elevated nuclei collected sediments that built up around them as the glacier retreated. Eskers, elongated hills, were formed by sediments deposited by streams flowing in tunnels beneath the ice. Kames, another form of

depositional hill, were formed when openings developed in stagnating ice. Glacial erratics, the probable source of the matched legends of Coyote and Napi punishing a rock, have long been a source of fascination. Erratics, often found in open country many miles from any possible source, are either unusually large boulders found among smaller till or large rocks that were ice-rafted and deposited on the floor of glacial outwash lakes.

The most dramatic and obvious glacially carved features are found along the courses of U-shaped troughs left by the now-departed valley glaciers. The high sharp peaks are called horns. Serrated narrow ridges left between the headwalls of two adjacent glaciers are called aretes. Along the sides of the main glacial troughs, hanging valleys are often found where smaller tributary glaciers once abutted the main glacier. Beneath the headwalls of each of these tributary glaciers, one often finds a depression called a cirque which may hold a tarn or cirque lake. Along the course of the main glacial trough there are a series of truncated spurs, cliffs bulldozed into the sides of gradual mountain slopes.



Landforms created by glacial action
from *Geology Along Going-to-the-Sun Road, Glacier National Park, Montana*
courtesy Glacier Natural History Association

Classroom Activities

Glacial terminology is interesting, highly descriptive, and exotic. Many of the terms have few applications outside the description of glacially carved terrain. The following exercises will help students explore and internalize some of the vocabulary and concepts that will enhance their understanding and appreciation of the topography of Glacier National Park.

Classroom Activity 1
Breaking it Down

Objective:
Students will learn that as water freezes, it changes form, expands and produces force. Students will also identify moving ice as the primary component of a glacier.

Background:
The description of the work of glaciers in the preceding story mentioned how meltwater in a glacier seeps into cracks in rocks and then expands and breaks up the rocks. Erosion of rock by ice expansion is most dramatic near a glacier headwall, but the process takes place anywhere that ice accumulates in the winter and thaws in the summer.

Materials:
Access to a deep freeze
A tray
A glass bottle or jar with a tight cap

Procedure:
1. After presenting the oral portion of “The Work of Glaciers”, have the class do a short experiment.
2. Fill a jar with water to the point where there is no room for air in the jar, then close the jar tightly.
3. Place the filled jar on a tray and have someone place it in a deep freeze.
4. The next time the class meets to work with glaciers, have someone bring the tray with the jar carefully back to the classroom. The jar lid should be bulged out and the glass should be cracked.
5. Show the tray to the class and set it aside to let the ice melt.
6. Go on to Activity 2; look at the jar on the tray at the end of class or at the end of the day. The ice will be melted and the glass will have collapsed in a heap. This is what happens when glacial meltwater seeps into headwall rocks and freezes. When the bergschrund gap moves slightly away from the headwall and melting occurs, the surface rocks of the headwall collapse onto the glacier.

Classroom Activity 2
Carving Mountains

Objective:
Through individual and group research, students will define specialized glacial terms and learn to recognize the landforms they represent. Students will be able to illustrate the landforms using clay modelling.

Background:
This activity is designed to give students tactile and research experiences by building scale models of mountains with glacially carved features so that they can understand and discuss the topography and dynamics of a mountain environment. This activity will make any visit to Glacier National Park more meaningful and more interesting. Regardless of an individual student's mastery of special terms and vocabulary, he or she will look more closely at the environment after this activity.
This activity will be most meaningful if the students have been exposed to the previous activities in the project dealing with mountain building and the work of water. However, even without previous background and experience, students can still internalize most of the learning implicit in this activity.

Materials:
Research materials to include Earth Science texts, books dealing with the geology of Glacier National Park and Montana in general, and a very good dictionary
Slides or pictures of geological features of Glacier National Park
One or more raised relief maps of Glacier National Park
Paper for recording research
Several recycled 4' by 4' plywood boards
Moist, recycled pottery clay or a large supply of modeling clay
Tools for working clay
An appropriate ruler to establish a reference scale for elevations
Paper or light cardboard for labels
Pins to hold labels
Scissors
Fine-point pens
Plastic covering to prevent drying out of models

Vocabulary:
The following list of terms is supplied as a guide for students to use in compiling team dictionaries of mountain and glacial terms:

Alpine Meadow (Tundra)
Kettle Lake
Lateral Moraine
Arete
Avalanche
Bergschrund
Medial Moraine
Moraine
Cirque
Col

Crevasse
Esker
Mountain Pass
Mountain Range
Fold
Outwash Plain
Peak
Plateau
Glacial Trough
Glaciation
Valley Glacier
Continental Glacier
Tarn
Hanging Valley
Terminal Moraine
Horn
Tree Limit
Kame

Procedure:

1. Divide the students into cooperative learning groups; give each group fresh balls of clay and tell them to sculpt mountain formations on a team board until they are satisfied with what they have done.
2. An appointed or chosen team chairperson hands out labels (or definition cards) provided by the teacher and asks individuals to identify or remold specific features into the group of mountains. This requires alterations of the original mountains. When there is some question about a formation to be labeled, students may use available books and other resources for immediate research.
3. When the labeling and remolding are complete, the students should be able to define and discuss their work. Using the vocabulary and other terms they come across in their research, each team should generate a dictionary of mountain and glacial terms.
4. When models and dictionaries are completed, students should examine other teams' models and help each other refine formations and definitions. This process will help them to internalize their research.

Follow Up:

The next obvious question should be, "What do we do with the clay models when the students finish?". Ask the students! Maybe they would like to paint them, show them to another class or parents, write an adventure story that takes place in the mountains, generate some appropriate weather in their models, pour water over them to trace natural drainage, or make models of indigenous animals and plants to put in their created environments.

Classroom Activity 3
Model Glaciers

Objective:
Students will learn that glaciers are major forces in changing the landscape and were major contributors to the scene we see today. Students will identify terminal and lateral moraines, the headwall, cirques, tributary glaciers, and hanging valleys.

Background:
This activity is designed to give the students a graphic hands on impression of the work that glaciers do.

Materials:
A small sandbox or the trough that was used in the river model activity from Mountains and Mountain Building, A supply of sand, gravel and assorted small rocks, A variety of sizes of elongated plastic containers, Access to a deep freeze

Procedure:
1. Freeze gravel and small rocks into ice blocks so they will have a rough bottom when they start to melt.
2. Keep the sand, gravel, and rocks in the sandbox damp enough to mold into mountains.
3. Have the students form mountains and river valleys in the sand.
4. Produce a large ice block to represent a large mountain glacier and several smaller blocks to represent smaller tributary glaciers.
5. Place the large block at the head of the valley and slowly bulldoze a path down the river valley. Point out the gouging and plucking along the way. When you reach the terminal point of the valley, point out the terminal moraine. Be sure that you are gouging nearly to the bottom of the sandbox or trough. Point out the lateral moraines along the glacier's path.
6. Give some of the students small glaciers and invite them to work a few tributary glaciers. Ask if they can produce hanging valleys, cirques, etc. . . . When they have finished have them leave their remnant glaciers against the headwalls.
7. Some time later have the students look at the debris left in the cirque as the ice block melts. Ultimately there will only remain a little pile of till and a small tarn.

Follow Up:
Be sure to do some glacial visualization with the large relief maps in the Apgar and St. Mary Visitor Centers when you visit the park.

As a special treat and review, get several half gallon blocks of neapolitan ice cream, marshmallow cream topping, ground nuts to represent rocks, and whatever else you might find tasty and relevant. Put the ice cream blocks together, slide them around to talk about the Lewis Fault Thrust, then get down to business with an ice cream scoop. While reviewing glacial terminology and carving formations with the scoop, fill cups for the students who can correctly identify the latest formation. Of course early winners need to give others their chance once they have been served.

Park Visit Activities

Much of the Park Visit for Glaciers and Glaciation will involve investigation of mountain topography. The naturalist will point out features of the landscape that you have researched in your classroom and will answer questions that may have occurred to you during your activities. St. Mary and Apgar are both excellent sites to observe many glacially carved features. These two sites are located at the base of the two largest glacially formed lakes in the park. The glacial troughs in which they lie afford an uninterrupted view of the work of ice.

Park Visit Activity 1
In Winter's Lair
Glaciation in the St. Mary Area

Objective:
Students will define the role glaciers have played in shaping the scenery of the St. Mary Valley. Students will recognize glacially carved features including; lateral and terminal moraines, U-shaped valleys, glacial striations, glacial outwash, till, and erratics.

Background:
The naturalist in the St. Mary area will take the group on a hike and discuss the glacial features and dynamics that are readily visible from St. Mary.

The view up the St. Mary Valley represents a moment of geologic time. It was only about 20,000 years ago that the glaciers began their retreat up the valleys. They have come and gone at least four times in the last 2 million years.

From St. Mary you can look up the length of the glaciated valley toward Logan Pass where many smaller tributary glaciers joined with the main valley glacier. Other tributaries left hanging valleys along the length of the lake. To the southwest, you can see where Red Eagle Mountain tapers into a medial moraine which separated a branch of the main glacier that had worked its way down Red Eagle Valley. At one time, the medial moraine may have extended further along the south side of Upper St. Mary Lake but river erosion has cut some of it away in the last 20,000 years. The thick forests, which lie below Curly Bear Mountain and along the southeastern shore of the lake, grow in a fertile lateral moraine left on that side of the glacial trough. A lateral moraine was deposited along the base of Singleshot Mountain extending along the west side of Lower St. Mary Lake and the west side of Highway 89 into Canada. The terminal point for one of the advances of these glaciers may have been as far to the northeast as Lethbridge, Alberta. The moraine tapers considerably as you move north and has been cut through by a number of tributary glacial/river valleys along the way.

When you look to the east you can see the impressive St. Mary Ridge, a lateral moraine that extends along the eastern side of the St. Mary Valley into Canada. On several occasions during the last two million years, the valley glaciers on this side of the park interfaced with continental ice sheets that advanced from the northeast. Further to the north of St. Mary, there are many sites where continental glacier till is interlayered with valley glacier till. In the road cut across Divide Creek from the park employee housing area, geologists have found lake bottom silts that are interlayered with valley glacier till. At this location a large glacial lake, formed by meltwater from a retreating continental ice sheet, had its western shoreline along the edge of the mountains.

Upper and Lower St. Mary Lakes, known as the “Lakes Inside” or the “Walled in Lakes” by the Blackfeet, were formed when glacial outwash sediments originating further up the valley were deposited on top of a partially melted valley glacier. Deposition on the lateral margins was heavier than over the top of the remnant ice mass. When the ice in the center of the trough finally melted completely, the “Lakes Inside” were left as kettle lakes on an extensive outwash plain. The lakes were probably one continuous lake to begin with, but continued outwash materials from Wild and Divide Creeks filled in the waist of the continuous lake to make two lakes with a short river between the two. The river between them continues to cut down through the outwash materials.

Park Visit Activity 2
Home of the Northeast Wind
Glaciation in the Apgar Area

Objective:
Students will define the role glaciers have played in shaping the scenery of the Lake McDonald Valley. Students will recognize glacially carved features including; lateral and terminal moraines, U-shaped valleys, glacial striations, glacial outwash, till, and erratics.

Background:
The naturalist in the Apgar area will take the group on a hike and discuss glacial features and dynamics that are readily visible from Apgar.

The view of the McDonald Valley trough from Apgar is so ideal for observing the results of glacial dynamics that it could be something a geology professor would design as a teaching prop. Because Lake McDonald lies to the west of the main block of mountains that make up Glacier National Park, and because it was carved out of younger, softer sediments than those in the St. Mary Valley, the McDonald Valley trough is almost straight. When you look up the lake you can see the back of Mount Gould which also overlooks the Many Glacier Valley on the east side of the park. Mount Gould is a horn in the middle of an extensive arete called The Garden Wall. The Garden Wall was part of the headwall for the McDonald Valley Glacier. The back side of the Garden Wall formed the headwall for the Many Glacier Valley. Directly behind The Garden Wall, just to the left of Mount Gould, lies Grinnell Glacier, a young glacier unrelated to the massive Ice Age glaciers.

While occupying the long valley in front of you, the McDonald Valley Glacier also filled an equally large area to the left of the Garden Wall-- the extensive McDonald and Mineral Creek drainages. Near the far end of the valley and to the right, there are two dramatic hanging valleys carved by the Hidden Lake and Avalanche Lake glacial tributaries. The two long ridges to the left and right of the lake are lateral moraines. Howe Ridge is on the left and Snyder Ridge is on the right. You are standing near the end of the valley. The lake is nearly 500 feet deep and has been partially filled with a great deal of glacial outwash material. Imagine how thick the McDonald Valley Glacier must have been in order to deposit that much material along its flanks!

The Apgar Mountains, behind and to your left, and the Belton Hills, to your right, forced the snout of the glacier to squeeze through the narrow valley. Glacial outwash extends far into the Flathead Valley from this point but all of the moraine materials along both sides of the lake are glacial till. Lower McDonald Creek flows over the valley floor formed of glacial outwash, but the outwash materials are most dramatically exposed near West Glacier in cuts made by the Middle Fork of the Flathead River. Apgar Village is located on the terminal moraine of the McDonald Valley Glacier.

Back in the Classroom

Take the time to reinforce the Park Visit experience. Discuss the field trip with the students and decide what worked and what didn't work. Be sure to fill out and return the trip evaluation form. Some follow-up activities for the Glaciers and Glaciation Track include:

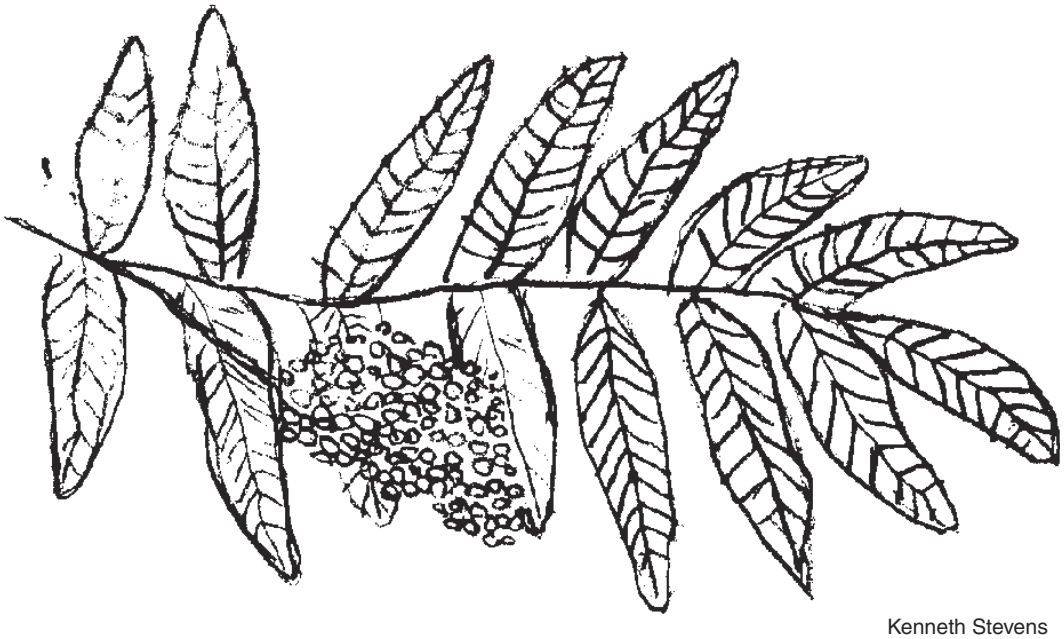
1. Have the students write a report about the trip and share it with classmates.

2. Slides and narrative on glaciers are included in the Activity Kit. Have groups of students work together in preparing a slide program for the class.

3. Ask students to collect pictures of glaciers from around the world. Use the materials they gather to put together a bulletin board. Have students write to other parks that have glaciers for information. Mount Rainier National Park, North Cascades National Park, Glacier Bay National Monument, Denali National Park, and Rocky Mountain National Park are good places to start in the United States. Jasper National Park in Alberta, Canada is also noted for its easily accessible glaciers.

4. Write a letter to the naturalist that led the Park Visit Activity. Have the students tell the naturalist a fact learned during the activity.

Track 3
“Our Medicine... Our Food”
Native Plant Use



Kenneth Stevens

Directions and Background

This Track focuses on the importance of plants to the economy and culture of Native peoples. If you choose to follow this Track, review the background stories and activities included. There are useful books and supplementary materials included in the *Work House* Activity Kit; however, most Track 5 activities can be implemented without it. We recommend that teachers review the general introductory information for *Work House* and integrate activities with other tracks studied.

When doing plant studies in Glacier National Park, or in any other environment, it is important to emphasize minimum impact activity. When visiting Glacier National Park, remember that plants may not be collected. Perhaps of more concern is the impact that plant gathering might have on Native American values and resources. These concerns have been raised by tribal advisers. As one tribal adviser passionately pointed out, "Non-Indians simply have no concept of how important these plants are to native peoples. They are "Our Medicine.... Our Food!"

Native Americans going into the forests for traditional gathering expeditions have found trees, that their people have respectfully and carefully harvested bark and sap from for generations, girdled and killed. Pop culturists, knowing that natives ate cambium or constructed containers from bark, but unaware of proper harvesting techniques have often been responsible. Other native groups have gone to their traditional bitterroot or camas gathering sites to find that bulbs have been harvested out of season. These activities are insensitive to Native American culture. As a result, the trust and willingness of native peoples to share their knowledge with educational and scientific communities has suffered. Our actions must not contribute to this problem.

Native Americans and Plant Use

Traditional Native Americans have always been in touch with the Earth and its dynamics. Hunting and gathering are not simply activities done in order to make a living, they are a religion and a way of life. It is important to respect Native American beliefs within their cultural context.

In the old days, the tribes and bands of the Blackfeet, Ktunaxa (Kootenai), and Salish were dependent upon plants and animals for their livelihood. They knew the habitat and uses of most plants in their territory. If they came upon an unfamiliar plant in their travels, it was subjected to scrutiny and experimentation. It was, after all, a new gift from the Creator.

Knowledge of traditional plant use has been passed from generation to generation. That knowledge base continues to grow today. If a skilled native botanist is not able to find a use for a plant in a relatively short time, it is assumed that a use will eventually be discovered. Plant uses are sometimes revealed to worthy individuals through visions, dreams or as a gift from a spirit guardian; but most uses are determined through observation and testing. Typically, a person known for powers as a medicine woman or medicine man will carefully test the properties of a plant. A new species of mint reveals a use to the sense of smell and taste. While nettles and thistles might have seemed a simple nuisance to the uninformed, upon observation of animals eating them and after testing, native botanists found uses for them as medicines, food, dyes and even material for fabric.

Sometimes Native Americans resort to an observational technique called the "doctrine of signatures" by early Europeans. This method of experimentation assumes that a plant resembling an ailing body part will be useful in healing its ailments. An eye wash prepared from a brown eyed Susan might be useful in treating sore eyes, or a tea made from the secretions of milk weed might induce the flow of milk for a new mother. While this method was suspect to many early peoples, coincidental or placebo cures sometimes led to the continued use of specific plants for specific remedies.

Plants used as medicines are most often used individually. However, several plants with related curative properties are sometimes used in combination. Indian tobacco, for instance, while a specific species of plant, *Eriogonum heracleoides*, is more commonly a combination of as many as 20 plants mixed to the taste of individual users. Many medicinal plants are burned and inhaled, cooked and used in the form of a poultice, or simply rubbed on the ailing portion of the body, but the great majority of medicines are boiled and consumed as a tea.

Many medicines are also food. Native Americans always believed that one must eat right to stay fit. Unbalanced or unhealthy diets were most often due to a scarcity of food rather than poor eating habits. Given the opportunity to gather in peace in a bountiful environment, the people enjoyed a rich and balanced diet.

Whether used for construction, medicine, food, or for all three (as the lodgepole pine was), living close to the Earth necessitated intimate involvement and understanding of plants. It is from such a point of view that we can attempt to appreciate Native American plant use. There is little doubt that Native people regard plants as having spirits; that they gather plants with social and religious ceremony; that they consume plants in a preservationist and prayerful manner; and that they thank the spirits for everything they are given.

While the early Blackfeet, the Ktunaxa, and the Salish peoples were all plant-dependent, the degree of dependence varied between cultures and locations. There was also variation in the extent to which bands and tribes gathered plants and traveled for trade within the area that is now Glacier National Park.

The Early Blackfeet

The Blackfeet prided themselves on being hunters living primarily off the large herds of buffalo roaming the plains, but they were as familiar with the plants in their environment as any other Native American tribe. The Blackfeet referred to meat as “natapi waksin” or “real food” and to anything else edible as “kistapi waksin” or “nothing foods”. Nonetheless, they made use of at least 185 species of plants for food, medicine, ceremonial, and construction purposes.

The Blackfeet tribes made extensive use of lodgepole pine, camas, bitterroot, serviceberries, chokecherries, sages, and many other plants. Some of the most desirable plants brought the Blackfeet into present-day Glacier National Park for gathering or trading.

Lodgepoles for tipis had to be replaced yearly. Lodgepole pine is thin, strong, straight and lightweight. The cambium can be eaten and the sap used medicinally. The Cut Bank Creek area was a favorite collection site for lodgepoles. Because the area also provided access to a major pass over the mountains into the Flathead Valley, the Blackfeet would come to replenish lodgepoles in late June and July when camas was also ready for harvesting. The mountains provided a respite from the summer heat on the prairie. The people would stay to gather huckleberries, hunt elk and mountain sheep, and attend social and ceremonial gatherings.

Because bitterroot was relatively rare east of the mountains, the Blackfeet often traveled across the passes to gather, trade, or raid for the precious plant. The Salish and Ktunaxa people were especially wary of attack during the seasons for gathering bitterroot and camas in the western valleys. Several of their traditional stories give accounts of Blackfeet raids during the harvest.

Before the coming of Europeans, agriculture was little known to the Plains and Plateau cultures. However, the cultivation of various smoking materials was so important to the tribes in the area that they ceremonially planted gardens to insure supplies of the sacred substances. Because the mountains were sacred to the spirits to whom the tobacco was offered, cool moist areas in the foothills were favorite spots to cultivate tobacco gardens. Important tobacco gardens reportedly existed near the foot of Lower St. Mary Lake, near present day East Glacier, in the Spotted Bear area, and along the North Fork of the Flathead River.

Although the Blackfeet tribes were not exclusively dependent upon the area that is now Glacier National Park, it was a favorite forage area for plants.

The Early Ktunaxa (Kootenai)

More at home in the foothills and mountains than either the Blackfeet or Salish tribes, the Ktunaxa continued to make buffalo hunting excursions onto the plains even after the Blackfeet had asserted dominance there. However, buffalo were never the chosen game animal of the Ktunaxa. They preferred the hides and meat of mountain animals like big horn sheep, elk, moose, and woodland caribou. Known as the "fish trap people" or "the fish eaters" by neighboring tribes, the Ktunaxa balanced their diet of fish with red meat and vegetation. Their cultural stories abound with tribute to the Grizzly Bear, protector of berries and roots. One of their most important cultural heroes, Chief Yankekam, was responsible for bringing the gift of the all important serviceberry to the people.

From the serviceberry, the Ktunaxa obtained a reliable and basic food and also the raw materials for arrows. From the western red cedar tree, they obtained material for bows, canoes, lodges, baskets, and containers. There were staple plants that the Ktunaxa used extensively and many others that played a lesser role in their culture. In addition to serviceberries, they were heavily dependent upon chokecherries, and huckleberries. Roots such as kouse or biscuit-root, blue camas, bitterroot, wild carrots or yampa, and an assortment of wild onions. The Ktunaxa considered black tree lichen to be a staple food and ate as much as 25 pounds per person per year in various mixtures.

The Ktunaxa also used lodgepole pine extensively for construction, food, and medicine. In the days before skin tipis, lodges were constructed from lodgepole, western red cedar, willow, birch, and tule or rushes. Ktunaxa canoes were made from cedar and birch. Various containers were woven and built from cedar roots and bark, birch bark, tules, and hemp. Many dyes were also prepared from plants.

The Ktunaxa planted tobacco gardens in the foothills. Proximity to the sacred mountains was an important part of the religious ceremonialism connected with sacred pipes and daily smoking rituals that assured constant connection with the Creator.

Early non-Indian visitors to the area that was to become Glacier National Park frequently encountered the Ktunaxa in and around the mountains. Oral tradition and contemporary accounts of the traditional and ceremonial importance of the Glacier National Park area are numerous. Archaeological evidence of the regular presence of Native peoples for hunting, gathering, and ceremonial purposes is well-established.

The Early Salish

The Salish were most at home in the intermountain valleys. Often allied with the Ktunaxa for mutual protection from the Blackfeet, the Salish and Ktunaxa shared hunting grounds. The allies also exchanged plant use knowledge and traded plant commodities. Before the horse made skin tipis portable, the Salish peoples used similar building materials and constructed lodges similar to those of the Ktunaxa. The Flathead Salish were not dependent upon fishing and built fewer canoes than their neighbors to the north. The Salish did build fish weirs and traps and did some cooperative fishing with the Ktunaxa.

The Salish had a well-balanced diet of plant foods and meat. They occasionally hunted in the mountains and spent time hunting buffalo on the plains. With slightly different emphasis in quantities, the Salish used the same plants as the Ktunaxa. The Salish resided mainly in the valleys and had access to such root crops as bitterroot, camas, biscuit root, wild carrots, and onions.

Good sources of smoking materials were universally important to people of Plains and Plateau cultures. Tobacco was given to the Salish by Amotkin, the creator, along with instructions for cultivation and ceremonial smoking. The Salish made a daily practice of offering prayer and tobacco to the great spirits.

Ceremonialism surrounding plant use was important to both Salish and Ktunaxa peoples. They practiced many of the same rituals at virtually the same time of the year. There were ceremonies to pray for a good harvest, a ritual before gathering the first bitterroot, and another before consuming the first bitterroot of the year. Similar elaborate ceremonies surrounded the use of camas, berries, and tobacco. In addition to a general giving of thanks ceremony at the end of the gathering season, important rituals were held in thanksgiving for “first fruits”. While both tribes were serious and devout in their ceremonials, Salish ceremonials were generally a bit more solemn and lasted longer than those of the Ktunaxa.

Salish oral tradition contains many stories of medicine trees with spirits that grant gifts, protection, and visions. These trees serve as shrines where offerings were left and spiritual guidance sought. There are also stories of tree people able to transform themselves as need dictated. There is clearly a strong awareness of the spirits associated with trees in Salish culture.

The early Salish people were able to integrate Christian religious practice with their own traditional beliefs. They were less opposed to cultivating the soil than other native peoples. Some even saw the plow as a more efficient way to gather roots until it became evident how quickly it depleted their traditional gathering places for the coming years. Symbolic of the Salish ability to assimilate elements of European culture, agriculture, and

religion into their own culture is the practice of combining palms with cedar and sweetgrass to hang by the door on Palm Sunday.

The Salish made regular use of the Glacier National Park area for passage to the plains for hunting, gathering, and for ceremonial and social purposes. The Nyack Valley, for instance, was so important to the Salish that it is specifically mentioned in traditional stories.

Common Harebell
Aaron Connelly

Among the important Salish stories is *The Origin Of Bitterroot*. Tobacco was important to all of the tribes and bands on both sides of the mountains. The Blackfeet have many tobacco stories. *Nawak'osis: The Sacred Herb* is included because it contains so many of the cultural values implicit in tobacco ceremonials. The west and east side stories are followed by a botanical account of Glacier National Park.

The Origin of Bitteroot
(A west side plant story)

Long ago, when the Salish people still lived to the south in the area that is now called the Bitterroot Valley, there was a time of severe famine. In those sad days there lived a righteous old woman, the wife of a medicine man. The old woman grieved for her children who were slowly starving. With no meat and no fish to eat, her sons were doing their best to get by on some old dried up shoots of balsamroot. Even those were nearly gone.

"My sons have nothing to eat and will soon be dead", she sobbed. So she took herself down to the banks of the creek we call Little Bitterroot and laid herself down to mourn for her children. With her face to the ground and her old gray hair spread about her head she wept bitter tears as she wailed a song of death.

As The Sun rose up over the mountains and peered down into the valley, he was greatly sorrowed to hear the old woman's death chant. The Sun called forth the guardian spirit of the woman and said, "Your daughter is in need. Go to her; give her comfort and bring forth food and beauty from that which is dead."

Assuming the form of a beautiful red bird, the guardian spirit flew down to the old woman and gently spoke to her. "Your bitter tears have soaked the earth beneath you. Even now they are mingling with the dead vegetation below to form the roots of a new plant. Its fleshy leaves will lay upon the ground and a beautiful flower will rise up to the Sun. Its blossom will share the silver-white color of your hair and the rosy hue of my wings. Your children will dig the roots of our gift plant.

Though they will find its taste as bitter as your tears have been, they will know that it is good food and they will grow to love it.

Each year, in the moon of deep water, they will see the return of the blossoms and say, "See, there is the silver hair of our mother upon the ground and there are the rosy wings of the spirit bird. The love and bitter tears of our mother have provided us with food for all generations.""

Pink Fairies
Sam

Nawak'osis, the Sacred Herb
(An east side plant story)

In the long ago there were four brothers with great spiritual power. They were chosen by the High Ones to bring tobacco, its pipes, prayers, songs, dances, and ceremonials to the people. When these things had been revealed to them by the spirits and after the brothers had found the sacred herb, made their pipes of bone, learned the proper songs, prayers, and dances; they sat down to smoke. The four medicine men prayed together, inhaled, exhaled, and watched the smoke rise up to the sky. The fragrant smell filled the lodge and surrounded them with calm and peace.

The oldest brother, feeling powerful, wise and clear-headed, said to his brothers: "This thing we will call nawak'osis. It is good. It is strong medicine. We will keep it to ourselves and we will have even greater power". So the four of them formed a Tobacco Society. They crept off into the foothills to plant the sacred plant in a secret garden and they kept the sacred prayers, songs, and rituals to themselves.

The spirits had meant for the gift of tobacco to be shared with the people. Tobacco would encourage peace, calmness, control, unity, and prayerful life. Without it there was anger, war, discord, and impiety among the people.

In the same village there lived a just man named Bull by-Himself. He saw that the four medicine men had received a gift from the spirits and that they had refused to share. To his wife, Bull-by-Himself said, "This discord is a result of selfishness on the part of these men. We must find this plant called nawak'osis and we must learn the sacred ways so that we can share them with the people."

The man and his wife took themselves to a sacred lake where they put up their lodge and began the search for the sacred herb. Everyday Bull-by-Himself went in search of nawak'osis and everyday he returned with plenty of game but no sacred herb.

One day, as his wife knelt by the tipi door scraping a hide, she heard beautiful music coming from the shore of the lake. She looked high and low for the source of the beautiful voices, but could find nothing until she came to the site of a beaver lodge. When her husband returned she took him to the lodge to hear the music but he could hear nothing.

In her frustration, the woman took her knife and cut into the side of the lodge. The couple peered in to see a family of beavers singing and performing a graceful dance.

" My brothers", she called, do not keep this wonderful medicine to yourselves. Teach us to sing and to dance."

"Close the hole. You are letting the cold in." they replied. "We will come to visit you in your lodge."

That very evening four beavers came to visit the worthy couple. Immediately upon entering the lodge they transformed themselves into four handsome young men. The oldest turned to Bull-by-Himself and asked, "Why have you come to this place?"

"I have come in search of the sacred herb nawak'osis and its ceremonies."

"You have come to the right place worthy brother. Nawak'osis is water medicine and we are water people. We will give you the sacred herb and instruct you in the ways of its use."

For many days the beaver people instructed the young couple in the rituals that surrounded tobacco. The husband hunted and his wife prepared the skins of all the water animals. "You must do this", said the head beaver, "because these animals represent the life force of water. The Sun begets life, and water is the source of its growth."

Every evening Bull-by-Himself and his wife practiced the ritual songs, prayers, and dances with the beavers. Together they prepared the Beaver Medicine bundle. On the final night of their instruction the beavers presented them with a plant that looked like a common weed. The stalk was topped with a bundle of tiny round seeds. The beavers placed the seeds into the medicine bundle that the woman had prepared.

"Now it is time to plant the seed", said the beavers. "Do not touch these seeds until you are ready to place them in the ground. Locate your garden in a balance of shade and sun. Mix the soil in equal portions of brown and black and till it often. Then say the prayers that we have taught you."

"When all this is in readiness, Bull-by-Himself, take the antler of a deer and make holes in the earth. You, woman, must use a buffalo-horn spoon to drop a single seed in each hole. As you plant, sing the songs we have taught you; dance the dance you have learned as you tamp the soil over the seeds. Then watch patiently and nawak'osis will come. Now you know all and it is time for us to go." With that the four young men turned and as they trailed through the door of the lodge they resumed their beaver shapes.

Bull-by-Himself and his worthy wife cultivated their garden in a prayerful manner as they had been instructed. The four selfish medicine-men saw them at their work and wondered what they were doing. They listened to their songs and found them familiar. But they laughed to themselves, secure in the knowledge that only they possessed the sacred plant, knew the appropriate rituals and had the power that came from the spirits.

Just before the time arrived to harvest the sacred herb a terrible storm came in the night. Early the following morning the four brothers slipped away to their secret garden only to find that their crop had been devastated by hail. Not so much as a seed could be salvaged from the washed out remnants of their garden.

Dejected, the four selfish men returned to the village in time to see Bull-by-Himself and his wife presenting their gift to the village people. In disbelief they looked at the plants and were forced to acknowledge that this was indeed the sacred herb they had tried to keep to themselves.

This is the way in which Bull-by-Himself and his wife brought the gift of the beaver people to the tribes. Their ancestors have always shared the gift of nawak'osis and followed its rituals in a sacred manner.

Glacier Lily
Kevin Racine

The Plants of Glacier National Park

There may have been human eyes watching the gradual unveiling of the land as valley glaciers receded at the end of the last ice age. Archaeological evidence indicates that early people had migrated into North America in pursuit of animal herds as long as 40,000 years ago. An ancient site on Black Tail Ranch close to Wolf Creek, Montana, near the Old North Trail, makes unofficial claims to 32,000 year-old cultural artifacts.

Archaeologists from The Museum of the Rockies are currently excavating an extensive complex of early hearth sites along the Ruby River in southern Montana that have been confirmed to be 9,400 years old. Pollen and food remnants indicate that the plant resources used then are virtually identical to plants available in the area today. An archaeological survey of the immediate environs of Waterton Lakes and Glacier National Parks have confirmed a long and significant history of presence and use by the tribes that reside in the neighboring area today and by many other Native groups. The oldest positively dated artifacts in the area are 10,500 years old and a great deal of evidence indicates high country usage by Native People as early as 8,500 years ago.

Glacier National Park's unique location, climate, and terrain provide an unmatched laboratory and gathering point for plant species and communities. Over 1400 plant species occur in the Park. Of those, forty-one species are rare in Montana and twenty-eight species are not found anywhere else in the state. Glacier's native flora are one measure of the high level of biodiversity present in this protected area. Due to unique interactions of elevation, moisture and prevailing temperatures, Glacier National Park contains the eastern most extension of a Pacific Coast forest community characterized by western red cedar and western hemlock. The North Fork prairies harbor an island of vegetation including Palouse grasses characteristic of grasslands to the south and west in Idaho, Oregon and Washington. Plant communities characterized by aspen groves and Canadian and Great Plains prairie grasses reach no further west than the northeastern margins of Waterton Lakes and Glacier National Parks. Some of Glacier's alpine plant species occur in the central Rockies and range little further north than here, while some boreal tundra species reach their southern limits in the alpine environment.

A drive across the Going-to-the-Sun Road passes through life zones that can only be duplicated by travelling 1800 miles north at a constant elevation. Naturally within this huge continuum of habitat there is also a great diversification of life forms. Although there are no two places in the Park which provide precisely the same habitat and resultant biotic communities, there are some general community types that can be examined at various elevations and locations throughout the Park.

Vegetation Zones & Common Trees Along the Going-to-the-Sun Road

Alpine Zone (above 6600')
Vegetation similar to treeless Arctic Tundra

Sub-Alpine Zone (between 6600' and 5900')
Stunted subalpine fir; limber pine; whitebark pine

Montane Zone (below 5900')
Douglas fir; lodgepole pine; Engleman spruce; western larch; and, in the lower, wetter Lake McDonald Valley, western red-cedar and western hemlock

Prairie (below 3900')
Fescue grasslands

West **East**

graphic is missing

Forests Born of Fire

An important agent in forest succession is fire. The mosaic pattern of plant communities characteristic of Glacier National Park and the surrounding ecosystem results from a succession of fire-related events that impact most northern Rocky Mountain forests over a cycle of 100-300 years. Some fires have less impact on a plant community than others, and the natural fire cycles have been altered and interrupted by human intervention.

Until recently, all fire was viewed as having predominantly negative effects upon the environment, but plant ecologists now realize that fire is an essential agent to healthy diversified plant communities. Park and forest managers are now studying and implementing prescribed burn and controlled burn policies in order to promote more natural patterns of plant succession and diversification.

Seeds of some plants survive in the soil for many years but germinate and bloom only after a major fire prepares the environment. Some species spread seed into an area year after year without successful germination. A fire clears away the forest canopy or the carpet of leaves and needles on the forest floor, allowing plants to grow where they could not previously survive. In fact, were it not for fire, certain seral species (plants which have an intermediate role in forest community succession) might completely disappear from an area. Species such as wild geranium, wild hollyhock, dragonhead, and snowbrush appear in a given area for a short period every 100-300 years if the fire cycle follows a natural course. One of the most ubiquitous and persistent colonizers in Glacier National Park is the lodgepole pine. Lake bottom core samples indicate that lodgepole pine proliferated in the wake of receding Ice Age glaciers.

Plants on the Move

While we are aware of the ability of animals to move and adapt to changes in their environment, there is a tendency to think of plants as stationary organisms with little ability to adapt or move. In fact plants have evolved many devices and techniques for protection, proliferation, and transportation.

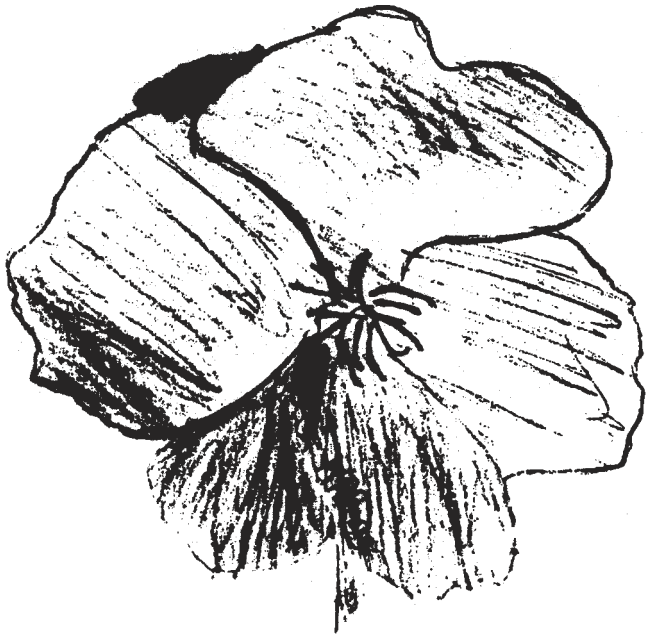
While trees do not get up and walk to a more hospitable location, looking at a record of botanical succession over time would make it clear that plants change locations based on climatic factors. A time lapse film set for a period of 2,000 years might show forests moving up and down the slopes of Logan Pass several times as climactic changes occurred. In fact evidence indicates that the dwarfed groves of trees at Logan Pass did extend higher up the mountains in the recent past. Currently they may be in the process of moving up the mountain side again.

Native American Influence

Before the European emigration to North America, Native Americans had relatively little long-lasting impact on the land. Generally migratory in their life style, they lived within the natural limits of their environment rather than altering it to suit their needs. Though they often set prairie and forest fires to clear pathways, herd game, and stimulate new growth, the impact was short-lived and of less significance than changes stimulated by todays technological society.

The Future

The ecological importance of the Glacier National Park area for the future cannot be overemphasized. The surrounding areas and most of the country in general are under intensive management for the production of food, lumber, and mineral resources. Protected areas like national parks must continue to provide a refuge for plant and animal species and communities that can no longer flourish outside the area. In a time when the last remnants of native wilderness are quickly being absorbed by civilization, it is extremely important to preserve, protect, and restore Glacier National Park and as much of the surrounding area as possible. The biological diversity of the Glacier ecosystem must be maintained for future generations.



Wild Rose
K.A.B.

Classroom Activities

Classroom Activity 1
Who Says Plants Can't Move ?

Objective:
Students will learn how plants spread their seeds and populate new areas. Students will be encouraged to think about plants as organisms that are adapted to their environment and contribute to the well being of other plant and animal species.

Background:
Modern cultures tend to think about plants as organisms that are subject to the whims and uses of humans and other animals. Traditional Native American cultures have seen plants in a very different light. According to their perception, plants have spirits and are able to communicate among themselves and occasionally with other beings. Such a view of nature may be viewed as primitive by scientists and other "modern" people. Native Americans, however, are relating very personally with their environment. The intimacy of that relationship seldom, if ever, distorts the basic soundness of their understanding of plants. Their perspective certainly adds a more personal dimension to the study of plants. In fact, plants do have a number of defense mechanisms and many techniques for pioneering new living space.

Materials:
Balloons (Green, brown, and red are preferable)
Frozen or fresh berries (huckleberries, blueberries or raspberries are most appropriate, purple or red balloons will suffice)
Grocery bags (preferably painted bright red, pink or white)
A yellow or black stocking cap
Powdered sugar
Marshmallows
velcro strips
A collection of locally gathered seeds such as dandelion, maple, poppy, cockle burrs, pine cones, and mushroom spores.

Procedure:
1. Discuss the concept that plants are rooted in the ground and spend their entire lives in one spot, but have active mechanisms with which to spread their seeds into new territory. It is through these mechanisms that plants were able to invade the barren areas of Glacier National Park as the ice age glaciers receded.
2. Choose a student to be a burr bearing plant. Explain that a burr is a seed designed to stick to animals that pass by. Mention that burrs were an inspiration for the invention of velcro (Natures Velcro). Show the students the velcro and burrs you've brought to class. Choose another student to be a large mammal that lives in Glacier National Park. Give the plant an inflated balloon. Ask the student to rub the balloon against clothing to generate static electricity. The

mammal comes walking down the trail, stops to scratch, and the plant places the balloon on the mammal's back. The balloon stays attached until the mammal has traveled some distance. Eventually the seed drops by the wayside.

3. Choose another student to be a huckleberry plant. Have the student hold some berries while standing by the trail. Another volunteer becomes a grizzly bear and eats the berries. The grizzly continues on down the trail and deposits seeds complete with fertilizer. A purple balloon is not as much fun as berries, but is more graphic in the deposit demonstration. Did you ever wonder why huckleberries seem to line so many of the trails in the Park?
4. Have another student be a mountain maple tree. Have the student inflate a green balloon, tie it, and use the wind to transport it as far away from its parent as possible.
5. Have another student be a puffball. Have the student inflate a dark balloon and release it. The balloon will rocket out into the room and settle on the floor some distance away. Some plants and mushrooms use gases to propel their seeds or spores out away from the parent plant.
6. Select students to be a pine tree and a stream. Explain that conifers use several mechanisms for seed and pollen dispersal. Give the tree a green balloon and have the stream meander by. As the stream passes by the tree, the tree drops a cone into the open arms of the stream. The stream continues down its course and deposits the cone ashore some distance below. It is important that students understand that this is only one of several ways that conifers spread their seeds.
7. Discuss the relationships that flowering plants have with pollinating insects. Explain that this is the most sophisticated arrangement for pollination of flowers.

   Before the presentation begins, sprinkle powdered sugar in the bottom of a colored grocery bag so that it sticks to the sides after shaking. Place a marshmallow in the bag with the sugar. Place another marshmallow in a second colored grocery bag (no sugar). Choose a student to represent a honey bee. Put the black or yellow stocking cap on the student's head and say there is a treat in the first bag. Explain that bees use their proboscis to obtain nectar from flowers.

   Hold the bag (blossom) and have the bee get its treat. The bee must stick its head in the bag. In the process of gathering nectar (marshmallow) the bee will pick up a coating of pollen (powdered sugar) on its head (cap). Ask the group what the bee has on its head. Tell the bee that you have another treat in the other blossom. In the process of bobbing for more nectar (marshmallow) pollen (powered sugar) will be deposited in the other bag. Show the small amount of pollen at the bottom of the second blossom to the group. Discuss the importance of bees to the process of pollination.

Follow Up:

Ask the students to explore their neighborhoods in search of various seeds and have them demonstrate and explain the mechanism for dispersal. Interesting seed variations are available during all seasons of the year. Have students choose a seed dispersal mechanism and report on plants using that method. Put the reports together in a class book on propagation methods in plants. Donate the book to the school library.

Classroom Activity 2
Native Harvest

Objective:
Students will become familiar with some of the Glacier National Park plants used by Native Americans for food, medicine, and construction.

Background:
After introducing the general background, supply as much personal information about plant uses as possible. Jeff Hart's *Native Plants and Early Peoples* is an excellent source of information, history, and stories about major plants used in this area. This book is included in the Activity Kit.

Materials:
Art Paper
Theme Paper
Colored Pencils
Native Plants and Early Peoples: Jeff Hart and Jacqueline Moore

Procedure:
1. After providing introductory information on Native American plant use, explain that the class is going to do some individual research and put together a book.
2. Emphasize the importance of respecting and preserving native plants in our environment and the respect we need to show for local tribes. We are not encouraging people to gather these plants, but rather to learn about them so that we might understand more about our environment and Native American cultures.
3. Read and discuss the background information provided by Jeff Hart for one or two interesting plants. Ask the students to each select a plant from *Native Plants and Early Peoples* or from their own experience that they would like to research. Explain that they will have to use at least two sources, oral or written, to make this research their own.
4. Ask students to keep in mind that they will be trying to locate specimens of as many of the plants as they can when they visit the Park.
5. Supply the students with the "Questions for Plant Research" listed below. Add additional questions that might be appropriate. The questions will provide students with some direction for their research.
6. When the students have finished writing, editing, and rewriting; ask them to do illustrations of their chosen plants.
7. Have the students present their research to the class and then bind the papers and illustrations into a class book. Take the book to Glacier and use it as a reference during your visit.
8. Present the book to the school library when completed.

Questions for Plant Research

1. List the common and scientific names and your local tribe's name (if available) for the plant you have chosen to research. Give a physical description of the plant.
2. How is this plant used by native peoples? What parts were used and how were they prepared for use?
3. Were there any special ceremonies or rituals observed when gathering, preparing and using this plant?
4. Are there any special legends or traditional stories involved with the use of this plant?
5. How does the plant reproduce? How does it spread into new territory?
6. In what sort of environment would you look for this plant? Does it have special requirements for soil, moisture, elevation, shelter, etc.?
7. Is this plant usually found in association with other plants?
8. Does your plant have any special relationships with other plants or animals?
9. What special contributions does your plant make to its habitat?
10. Are there any plants or animals that make life difficult for your plant? Is it a rare or threatened species?
11. What other interesting information can you supply about your plant?

Classroom Activity 3
What's in a Name ?

Objective:
Students will learn tribal names, as well as the scientific names (genus and species) for plants occurring in and near Glacier National Park.

Background:
Tribal members that have participated in the development of this program have expressed a strong desire to use bilingual teaching. Culture is difficult to understand, share, disseminate, and preserve without knowledge of native languages. Each tribe may have several words that indicate the same plant at different times of the year or when used for different purposes. There are dialect differences in pronunciations even within the same bands of each tribe. To make matters even more difficult, some sounds in native languages are not readily reproducible with phonetic symbols.

Local dialect and proper pronunciations can only be provided by elders and language enthusiasts in your area. This activity is designed to bring tribal elders into the classroom for language appreciation and study. Pronunciation and accompanying hand signs can only be communicated orally and visually. The presence of elders in a capacity to teach specific terms will stimulate language side trips and other enrichment.

Materials:
Marking pens
Note cards
Dictionary Of Word Roots And Combining Forms by Donald J. Borror

Procedure:
1. Ask a Native language speaking elder or tribal member to come to the classroom and work with the students on pronunciation and meaning of native terms for commonly used plants. A partial list is provided (contact the local tribal cultural committee for suggestions for speakers).
2. Concentrate on the common name, genus, and species and native term for your tribal area; but encourage the students to become familiar with other tribal languages as well as their own.
3. Demonstrate the use of the Greek and Latin root and suffix guide: *Dictionary Of Word Roots And Combining Forms*. Have students look up meanings of the scientific names for each plant.
4. Hand out markers and note cards, pick study pairs or teams, and have the students make their own flash cards to study as they would any other language flash cards.
5. Provide a forum to demonstrate or apply their vocabulary. For instance; labeled drawings could be displayed as part of an open house.

A List of Names for a Few Familiar Plants (add your own)

Serviceberry (sarvisberry, Saskatoonberry): ***Amelanchier alnifolia***

Blackfeet: ok-kun-okin	Kootenai: squmu	Salish: s saq

Black tree lichen: ***Alectoria fremontii***

Blackfeet: e-simatch-sis	Kootenai: a a	Salish: sawtamqan

Blue Camas: ***Camassia quamash***

Blackfeet: miss-issia	Kootenai: xapi	Salish: ltxʷe?

Biscuit-root (coos-root): ***Lomatium cous***

Blackfeet: koos	Kootenai: Naptnuquku	Salish: pcLu

Chokecherry: ***Prunus virginiana***

Blackfeet: pukkeep	Kootenai: A ki'lmak	Salish: txʷLo

Bitterroot: ***Lewisia rediviva***

Blackfeet: eks-ix-ix	Kootenai: Naqam¢u	Salish: spe> am

Lodgepole pine: ***Pinus contorta***

Blackfeet: manistami	Kootenai: I ti t'	Salish: qʷqʷLi?t

Western red cedar: ***Thuja plicata***

Blackfeet: sixinikok	Kootenai: I¢'nat'	Salish: astqʷ

Huckleberry: ***Vaccinium globulare***

Blackfeet: apa-oapspi	Kootenai: awiya	Salish: stsa

Yampa (wild carrot): ***Perideridia gairdneri***

Blackfeet: nitzi-katasi	Kootenai: Ni'¢na	Salish: s>ukʷam

Classroom Activity 4
Forest Communities

Objective:
Students will gain familiarity with local trees and learn to see them as indicators of prevailing climate, terrain, elevation, and stage of succession.

Background:
In the old days it was important for native peoples to be able to identify plant communities from a distance. Recognition of trees was a quick and usually accurate indication of the kinds of understory herbs, berries, and roots to be found in a given area. Skilled native botanists used these observations to lead their people to food sources. Today naturalists and botanists are able to tell a great deal about land, soil conditions, moisture availability, and history of natural disturbances in an area by identifying the dominant and incidental tree species.

Materials:
Easy Field Guide To Trees Of Glacier National Park by Dick and Carol Nelson
Plants Of Waterton-Glacier National Parks And The Northern Rockies by Richard J. Shaw and Danny On
(books are in Activity Kit)
Magnifying glasses
Poster board
Marking pens
Scissors
Glue

Procedure:
1. Review the background information in this track with the students. The background information for Park Visits is particularly relevant to this exercise.
2. Ask the students to gather samples of conifer branches and cones, and leaves and seeds of common deciduous trees from the areas around their homes. Discuss ways to minimize damage to trees while making collections. Emphasize that they should be looking for trees that they believe to be native to the area.
3. Have the students write descriptive notes of the physical environment from which each specimen was gathered.
4. Have the students use the tree guides to identify their specimens and to research their characteristics and habitat.
5. Have the students make leaf, cone, and needle displays.
6. Discuss where the trees they identified might occur in Glacier National Park.

Park Visit Activities

Visits to St. Mary and Apgar will involve naturalist guided investigations of plant communities studied during classroom activities. The St. Mary Valley and the Lake McDonald Valley offer fantastic visual laboratories for a wide range of activities. Visits to both sides of the park provide dramatic contrast in climate and representative plant communities.

Park Visit Activity 1
Plant Communities in the St. Mary Valley

Objective:
Students will examine plant succession stimulated by natural disturbances and examine transitional communities influenced by local climate and elevation. They will have an opportunity to locate some individual plants that they have researched, observe ways in which plants left in a natural setting interact with their environment, and see how plants pioneer and propagate in new areas. Finally, classes will be able to investigate efforts made by Park Service personnel to preserve native plant communities, restore areas impacted by human activity, and eradicate exotic plants that have been inadvertently introduced by human activity.

Background:
We know that Native Americans came to the St. Mary area for gatherings and ceremonials, to visit neighbors, to hunt, and to gather lodge poles and seasonal roots and berries. The people also tended secret tobacco gardens in cool moist areas near the mountains where the Great Spirits made their home. Many came to the mountains to make contact with the Spirits in vision quests.

St. Mary Lake is situated at the terminal point of a vast prairie that continues onto the open grasslands of Alberta. Rough fescue *(Festuca scabrella)* is the dominate native grass in the St. Mary Valley. Though the valley has been invaded by some exotics like spotted knapweed *(Centaurea maculosa)*, it remains one of a few refuges for native grassland communities.

The small lateral moraines on both sides of the valley display a gradual progression of plant communities as elevation increases. Moving up the St. Mary Valley, the grasslands quickly narrow to borders of shrub communities. As the valley edges climb, there is a gradual transition from grassland-shrub communities to aspen groves with understories composed of grasses and shrubs.

Near the valley floor, intermittent groves of conifers occur on stream banks. For the most part, however, individual conifers are interspersed within aspen groves. The quaking aspen *(Populus tremuloides)* and black cottonwood *(Populus trichocarpa)* that make up the groves are an extension of the southwestern Alberta aspen grove communities. Isolated conifers along the St. Mary Valley floor tend to be predominantly Douglas fir *(Pseudotsuga menziesii)*, lodgepole pine *(Pinus contorta)*, Engelmann spruce *(Picea engelmanni)*, and limber pine *(Pinus flexilis)*.

Further up the moraines and on the mountain slopes, aspen groves gradually give way to stands of fire-influenced lodgepole pine. Further into the St. Mary Valley where fire has not been severe, seral communities of Douglas fir and Engelmann spruce are more common.

Throughout the continuum of plant communities, moisture and elevation are the most important determinants of species composition: however, other minor climatic and terrain variables can be responsible for unexpected plant communities.

Higher up the mountain slopes (between 4-6000 ft.), lodgepole and Douglas fir gradually make a transition into stands of Engelmann spruce and subalpine fir *(Abies lasiocarpa)*. The higher the elevation, the more dominant the subalpine fir becomes. Above 6000 feet, especially at the head of the valley near Logan Pass, Engelmann spruce becomes less common, subalpine fir becomes more common, and white bark pine *(Pinus albicaulis)* makes a strong showing. At these elevations most species begin to take on krummholz or dwarfed characteristics because of the severity of the climate and the extremely short growing season. Above the alpine meadows, isolated flowers and grasses appear on moist barren ledges. Lichens can be found on the highest peaks in the park and algae occur on the surface of glaciers and snowfields.

Plant succession is influenced by natural disturbances such as flood, snowslides, drought, fire, and erosion. Fire is the greatest influence upon plant succession and accounts for the predominance of lodgepole pine at the lower elevations where it occurs most often.

Fire control during much of Glacier's history has altered the patterns of plant succession; however, it is difficult to assess the impact of Park fire control policies on plant communities. A major fire swept through the west side of the St. Mary Valley from Rising Sun to Babb in 1885. Before the 1885 fire, a more mature forest existed. Pioneer communities of lodgepole and aspen have dominated the valley since and have been aided in their dominance as late as the mid-1980's by the Napi Point fire.

Lodgepole are adapted to a natural fire regimen and produce two kinds of cones. One kind opens to spread seeds on a regular basis, while serotinous cones can lie dormant for years and only open in extreme heat. Thousands of lodgepole seeds released after a fire thrive in burned over-soil. Aspen have a similar pioneering advantage. They can reproduce by vegetative means spreading suckers in an ever-increasing island. While established aspen groves normally spread slowly through both vegetative and sexual means of reproduction, explosive vegetative sprouting occurs following fires severe enough to destroy the parent plants.

Elk, moose, deer, beavers, rabbits, ground squirrels, and mice feed on young pioneer saplings along the edges of groves during the coldest part of winter. In earlier times, large populations of buffalo provided a natural pruning service in the mountain valleys, resulting in more and larger open grassy areas than we see today. The spread of lodgepole and aspen communities into surrounding meadows is slowed by the feeding activity. Plants and animals, along with the occasional intercession of fire, have created a healthy mosaic of plant communities over time.

Park Visit Activity 2
Plant Communities in The Lake McDonald Valley

Objective:
Students will examine an area where prevailing climatic conditions support very localized and distinctive plant communities. Students will have an opportunity to locate some of the plants they have researched, observe ways in which plants left in a natural setting interact with their environment, and see how plants pioneer and propagate in new areas. Finally, classes will be able to observe efforts made by Park Service personnel to preserve native plant communities, restore areas impacted by human activity and eradicate exotic plants that have been introduced by human activity.

Background:
Lake McDonald was an important gathering place for the Kootenai and Salish. In spite of the impact of modern civilization, archaeologists have found evidence of seasonal paleo-Indian occupation near many streams and lakes on the west side of Glacier National Park.

The Lake McDonald Valley is a unique place in terms of its plant communities. The largest number of plant species in Glacier National Park occurs in the Lake McDonald valley. The western red cedar *(Thuja plicata)* and western hemlock *(Tsuga heterophylla)* forest is the eastern most extension of the Pacific Coast floristic peninsula. This forest is similar to the Pacific Coast temperate rain forest community.

As a result of fire and early settlement in the Lake McDonald area, the forest reveals a complex mosaic of plant communities. Today, cedar and hemlock are not abundant in the West Glacier and Apgar areas. However, historical records and existing isolated pockets of trees indicate that the cedar-hemlock dominance evident in the Avalanche Campground area extended to West Glacier near the beginning of this century. Due to fire and other disturbances, lodgepole pine *(Pinus contorta)* and western larch *(Larix occidentalis)* are currently more prevalent along the lower reaches of the Lake.

While lodgepole pine is generally the most common pioneer species after fire, western larch is also a very successful invader of newly burned areas. Lodgepole have amazing adaptive mechanisms that favor their propagation in newly burned territory. While they have some cones that release seeds on a continuous seasonal basis, they also have serotinous cones that remain closed and dormant until exposed to temperature extremes produced by fire.

Lodgepole and their accompanying understory plants do not thrive once a significant forest canopy has evolved. In fact, barring a second fire, the very success of lodgepole inhibits the success of their offspring, allowing opportunities for shade tolerant species to thrive. Lodgepole pine have a maximum life expectancy of about

150 years, while western larch, because of thick fire resistant bark, can often survive relatively cool fires and live as long as 800 years. As a result of this resilience, larch are often significant components of pioneer, seral, and climax forests.

In the absence of natural and human-caused disturbances, the McDonald Lake area would likely support a climax cedar-hemlock forest today. In fact, the Trail of The Cedars, near Avalanche Campground, approximates an ideal climax forest and all of its dynamics. The forest exists at an ideal elevation between 3200 and 3500 feet and many of its trees have survived for over 400 years. A short distance up the trail to Avalanche Lake, (elevation 3500 to 4000 feet), cedar and hemlock share dominance with subalpine fir *(Abies lasiocarpa)* and Engelmann spruce *(Picea engelmanni)*. As the elevation increases and average temperature decreases above 4000 feet, the spruce-fir community becomes more dominant and the cedar-hemlock community all but disappears.

Above the 4000 foot level Along the Going to the Sun Road north of upper McDonald Creek, the fire of 1967 has created a pioneer community dominated by mixed larch and lodgepole. Between the Loop and the alpine meadows of Granite Park, the terrain is populated by alternating stretches of subalpine fir, dense stands of alder *(Alnus sp.)*, and open meadows dominated by herbaceous plants ideal for grazing animals. Below the highway and near the head of Logan Creek, there are patchy stands of subalpine fir and various shrubs in subalpine meadows.

Western red cedar is a seral dominant within fire established lodgepole-larch communities along the lakeshore between Avalanche Campground and Apgar. While ample light is available in a newly established lodgepole canopy, cedar will readily spread seedings. Cedars once established also utilize asexual or vegetative reproduction. Low hanging branches make contact with soil and establish adventitious roots to produce new trees. Broken branches can fall to the ground and establish roots. It is not at all uncommon to see young trees maintaining their original connection with the parent tree.

While cedars are in the process of replacing lodgepole and larch, the environment becomes more receptive to their successional partner, western hemlock. Hemlock seedlings thrive in the moist organic debris of dying pioneer species. These seedlings can remain in a slow growth pattern for many years until an opening appears in the canopy. Hemlock go into a surge of growth to fill the space in the canopy. Eventually hemlock and cedar are able to assert dominance with only a smattering of other tree species interspersed among them.

Once a cedar-hemlock canopy is established, the understory tends to remain organically rich and moist, but too dark for the establishment of other tree species. Cedar saplings and shade tolerant hemlock seedlings can thrive in the environment prepared by parent plants. The moist understory provides some protection against fire. This climax community can maintain stability for hundreds of years under ideal conditions.

Back In The Classroom

Take the time to reinforce the Park Visit experience. Discuss the field trip with your students and decide what worked and what didn't. Be sure to fill out the trip evaluation form and return it to the park.

Some follow up activities for this Track include:

1. Have students write a letter to the naturalist who conducted your visit. Ask the students to tell the naturalist what they learned and what they enjoyed.
2. Invite someone who had extensive experience with the great westside fire of 1967, the Napi Point Fire, or the Red Bench Fire to come into your classroom and discuss conditions before the fire, management of the fire, and conditions in the area after the fire.
3. Invite elders into the classroom to tell students about traditional tribal use of the Glacier National Park area. Encourage a sense of pride in the historical associations and wise stewardship of the area by tribal ancestors.
4. Invite tribal elders to speak to the students about tobacco use and abuse. In the process of researching this track, many of the advisers expressed concern about difficulties involved in communicating the differences between traditional ceremonial use of tobacco and habitual tobacco abuse.

Track 4
Animals and Habitat

Joe Welker

Directions and Background

If you choose to follow this Track review all of the background stories and activities included. Additional background and activities are available in the Activity Kit (available on the Blackfeet and Salish and Kootenai reservations) under the titles *Beaver Habitat Nature Trail* and *Bears: Imagination and Reality*, a publication of the Science Museum of Minnesota. Review of the other three Tracks is optional. Animals and Habitat begins with some generalized Native American cultural lore about beavers and bears. Review this information and adapt it for your use as you see fit.

You may decide to focus on beavers when doing this track. If so, read the background information, do the activity entitled Animal Research under classroom activities and then go to the booklet called *Beaver Habitat Nature Trail* for further activities. If the group chooses to focus on bears, read the background information, do the Animal Research activity and go directly to *Bears: Imagination and Reality*. A special classroom activity on Native American Habitat called *Painted Lodges* is provided. This activity is appropriate for study of either bears or beavers.

Once you have arranged with a naturalist for a park visit, review the Classroom Activities and practice with the materials in the Activity Kit. Because there are so many Classroom Activities in the beaver and bear programs, you may choose to do only some of them. Tell the naturalist what you have done in preparation for your visit.

For program users that do not have access to a kit, please call Glacier National Park staff for additional materials.

Beavers and bears are important medicine animals to the tribes. In the past, Indians were extremely dependent upon the health of the habitat of beavers, bears, and other wildlife. Immigration by whites and the resulting changes in land use jeopardized the Indians' ability to meet their basic needs for food, water, shelter, and space.

Beavers and bears were by no means the only creatures that felt the pressure of westward expansion. Many other species of animals and plants that were important to local tribes as food, clothing, and medicine were also driven to near extinction. As their more extensive original habitats were altered or destroyed, some species managed to survive in and around the mountains. Today Glacier National Park is a last bastion for some of those species. Although it may be economically inconvenient at times to make room for grizzly bears, gray wolves, and bald eagles (to name only those species with the highest profiles), it has become necessary to protect what remains of their habitat. Without habitat--a place big enough to provide all the space, food and shelter that an animal needs--wildlife will not survive.

The Activity Kit contains classroom activities for examining beaver and bear habitat. The following background information is designed to contribute extra dimension, tone, and a special way of looking at succession and habitat.

Beaver Business

Initially, it might seem strange to make such a fuss about an animal like the beaver. A first question might be, What do beavers have to do with endangered species? They are thriving nearly everywhere. Many people are surprised to learn that beavers were the first endangered species in North America. By the middle of the nineteenth century they were nearly extinct. There is hope for other endangered species!

Next to humans, there is no other animal that has as much obvious impact upon the environment as do beavers. The work they do and role they play in Nature's plan impact their surrounding environment. Sometimes, people don't appreciate the flooding and terrain alterations produced by the largest of all North American rodents. Prehistoric species stood nearly eight feet tall and weighed more than a bear. Full-grown beavers now weigh as much as 60 pounds and can chew through a three inch diameter tree in little more than a minute.

Glacier National Park has been formed by a succession of dramatic natural events. Mountain-building forces have proceeded for more than a billion years. The glaciers that carved the surface topography of the park did their work in about two million years. After valley glaciers receded, a seemingly minor force, beavers, contributed to the finishing touches of what we see today. Beavers have had a significant impact upon the topography of most of the valleys in Glacier National Park. After the glaciers retreated ten to twenty thousand years ago, mountain streams caused erosion along mountainsides and valleys. Beavers worked their way up most streams in the area. They ate the cambium layer or inner bark of trees and cut them down to build dams and lodges. Before long they had cleared most of the trees they liked to eat such as cottonwood, birch and aspen along the stream bed and moved on to find more.

The beaver dams slowed the fast-running streams and backed them into the valleys. Instead of running quickly onto the prairies with their load of sediments, each little pond collected silt and sand. The V-shaped stream bed flattened out with a fertile bottom formed by the sediments. Sometimes the abandoned dams held water back for years after the beaver had moved forming extensive terraces along the sloping valleys. Sometimes the water formed a meander around the dam and slowed the stream even more. As the dams filled and spread, trapping more and more sediment, other water-loving animals built their homes in and around the edges of the ponds. Trees, grasses, and brush estab-

lished footholds in the sediments trapped by the dams. Deciduous trees that could not grow on the thinner, drier soils of lateral moraines were able to flourish along the edges of ponds where they helped stabilize the soil.

Long after the beavers had moved, other animals that didn't depend directly on trees for their food continued to live in the beaver-built habitat. Eventually silt filled in the ponds or the dams broke and water drained. The creek still ran through the middle of the valley, but it ran slower and the water table and soil profile were altered. Soon tall meadow grasses flourished in the fertile soil left behind. The pond lovers followed the beavers to a new location and made room for a new succession of animals that thrived in marshy meadows. In time, the tall grasses gave way to a new generation of trees and brush. Meadow-loving animals once again moved in behind the departing pond animals, and forest animals found new shelter where the ponds had once stood. Eventually a new pair of beavers would come along, find the little forest stream, and start the cycle over again. This time the little valley had a more mature profile than the one the original beavers had found.

It didn't take many generations of beavers to turn the barren, glacier-scoured land into habitat for other animals and plants. The streams no longer ran straight through the U-shaped troughs left by departed glaciers. Now they meandered over and around terraces covered by a variety of grasses and deciduous and coniferous forests. Many plant seeds were carried in by the wind. Animals entered the newly vegetated areas and helped to spread seeds.

Beaver attracted the ultimate predator--humans. Always curious and never totally content with the bounty of the prairies, humans wandered into the mountains to explore, hunt, and trap.

Cory McLean

Native Americans were interested in hunting some animals, as a source of food and clothing and also for survival knowledge and spiritual power. Indians were aware that animals were in harmony with the rest of nature. Life seemed to come easier to the other animals. They needed no clothing or fire to survive the winter. There were rarely more animals in an area than there was food to feed them. They seemed to have instincts for what to eat and do when they became sick. Humans could reflect, and what they knew was that there were many powers that other animals possessed which humans did not. Humans stalked the animals to observe them and gain what knowledge they could. Indians regarded the animals as superior beings. American Indians went to great lengths to ask those superior beings to share their power.

Local tribes admired the beaver including it in their traditional legends. To the Blackfeet, the beaver is one of the most important medicine animals; it serves as a spiritual medium for the powers of all the other medicine animals. The Beaver Medicine Bundle and the Beaver Medicine Ceremonial celebrate all the animal spirit powers.

A special interest in beavers seems natural considering how complicated their behavior appears. Typical beaver habitat includes dams, lodges, dredged canals complete with terraced locks and slides, elaborate underwater storage pantries, and an incredible amount of logging work. Beaver families spend a lot of time nurturing their young. Early Indians watched beavers with a sense of awe and respect for their family values. An extremely quiet observer who gets close to an active lodge might be fascinated to hear the beavers having subdued but elaborate conversations inside. Beaver language has many different sounds and inflections. What you hear isn't simply muttering and whimpers-- something more complicated is going on in there. No wonder native peoples referred to beavers as Little Indians or Little People.
The tribes on both sides of present day Glacier National Park were aware of the impact beavers had on the land. The Ktunaxa (Kutenai) story summarized in the Mountains and Mountain Building Track called *The Origin of Flathead River* is really a macrocosmic account of what beavers do on a smaller scale. The net result of all the beaver projects is easily equal to that of the monstrous beaver that supposedly dammed the Flathead Valley. At the same time, the Ktunaxa were aware that the beaver story was really a metaphoric *How Story* to account for the work done by glaciers.

The Blackfeet have a number of important stories that support the Beaver Medicine Ceremonial. Very old tradition gives an account of how Blackfeet once lived in domed stick lodges modeled after the beaver lodge until Napi taught them to build skin tipis. The Salish learned to build skin tipis from Bluejay, and the Ktunaxa learned from Coyote. According to the Blackfeet Legend of *Oo-chi-scub-pah-pah* or *Dragging Entrails Full Of Dirt,* twin boys, called Ashes Near The Fireplace Man and Behind The Tipi Wall Liner Man, were raised by beavers. The twins taught their father how to build a sweat lodge and the

proper ceremonials involved in purification rites. The sweat lodge was thus designed after the beaver lodge. *Dragging Entrails Full of Dirt* is a long story in comparison to others referred to in this program.

The most important beaver legend for the Blackfeet was one about two brothers. Nearly all American Indian cultures have origin legends about twin brothers who are instrumental in the heritage of their people. One of the brothers is always bad or mischievous and one is always good and responsible. The following is an abridged version based on several variations of *The Origin Of The Beaver Medicine:*

The Origin of the Beaver Medicine

In the long ago there were two orphaned brothers named Akaiyan and Nopatsis. They lived with the evil-hearted wife of Nopatsis who didn't like having Akaiyan around the lodge. She plotted to make Nopatsis believe that she had been assaulted by Akaiyan so that Nopatsis would do away with him.

Nopatsis convinced his brother to build a raft and float out to an island where many birds nested so that they could gather feathers for arrows. Akaiyan was a trusting soul and was always pleased to do things with his brother. When he returned to the shore with a load of feathers, he was shocked to see his brother far out in the lake on the raft. He yelled to Nopatsis to come back for him. Nopatsis replied that Akaiyan deserved to be abandoned because he had insulted his brother and abused his sister-in-law. He promised to come back for Akaiyan's bones in the spring.

Akaiyan wept in despair, but he prayed to the animals and the underwater spirits for help. He also prayed to the Sun, Moon, and Stars; and after a time he felt a little better. He went to work preparing himself for winter. He made a lodge of sticks, clothing from feathers, and killed many of the island birds for food. He was fairly well prepared, but still he was hurt and lonely.

One day he came across a beaver lodge and sat watching it and feeling sorry for himself. Before long, a little beaver came out and asked Akaiyan to come into the lodge with him. Inside Akaiyan found a huge white beaver whom he knew to be the chief of all beavers. The Chief Beaver listened to Akaiyan's tale of woe and invited him to winter with his family. He told Akaiyan that the beavers would give him great power and knowledge with which he would become a leader of his people.

So Akaiyan spent the winter with the beavers. They cuddled him to keep him warm and treated him like one of the family. They taught him to live according to their simple and harmonious relationship with nature. They taught him the uses of roots and herbs for medicine. They taught him where to find sacred paints and how to use them in healing ceremonials and as protection for their bodies and dwellings. They gave him the first tobacco seeds to take to his people and taught him the ceremonials of smoking. They taught him to measure time, what to call the various Moons, and how to keep a calendar. Most important, they taught him the proper dances, songs, and procedures to do ceremonials so that he could heal his people when they became ill. Finally the Chief Beaver instructed Akaiyan to make the sacred Beaver Medicine Bundle to be used in the ceremonials when he returned to his people.

When seven moons had passed and the ice began to breakup, the Beaver Chief offered his adopted son a choice of anything in the lodge to take with him. Akaiyan, who had grown very fond of the youngest beaver, who had invited him into the lodge, asked if he could take the youngster with him. The Beaver Chief was reluctant to part with his youngest child, but Akaiyan repeated his request four times. The Beaver Chief taught him that four times is the sacred number of repetitions for any ceremonial. The Beaver Chief could not refuse the request. Soon after this, the Beaver Chief spotted Nopatsis searching the shores for Akaiyan's bones and hurried to the lodge to tell Akaiyan. Akaiyan put the young beaver under his arm and dashed to the raft. When Nopatsis finally saw him he was far out on the lake.

Akaiyan and the beaver returned to his people and told their story. Together they assembled the Sacred Beaver Bundle as they had been instructed to do by the Beaver Chief. They spent the following winter teaching The People the sacred songs, dances, and ceremonials. They cured many people using their new powers. In the spring they went out into the forests and prairies and asked all the animals to contribute their mysteries and power to the Beaver Bundle. The animals were honored to take part and offered their skins to be included in the bundle. They also taught Akaiyan and Little Beaver their own power songs and dances to be shared with the people.

After a year, Akaiyan returned to the island to give Little Beaver back to his family and to visit his friends. On the shores of the island he found the bones of his brother Nopatsis. The beavers had not helped him. So pleased was the Beaver Chief to see his adopted son and to have his child back, that he gave Akaiyan a sacred pipe in which to smoke the sacred tobacco he had given him. He taught him more smoke prayers and instructed him to add the pipe to the Beaver Medicine Bundle. Every year Akaiyan returned to the island to visit his father the Beaver Chief. Every year his father taught him more of The Way to live and to heal. Every year something new was added to the sacred bundle. Akaiyan became the leader and the teacher of his people. He lived in the Sacred Beaver Lodge and he taught his son the great mysteries and powers of The Beaver Medicine Ceremonial. Akaiyan's son passed the knowledge on to his son and so on until this very day.

There are many Blackfeet legends involving beavers including an account of how beavers taught the Blackfeet to kill and take scalps rather than counting coup in war.

Ironically, it was the beaver, the special medicine animal of the Blackfeet, that was instrumental in bringing about the decline of the Indians. The first white visitors to the area came in search of beaver pelts to satisfy a European craving for the warm and beautiful fur used to make waterproof felt for fashionable top hats and other finery. So valuable were the pelts that trappers and traders risked their lives in the relentless quest for beaver. They trapped many creeks in the west and offered the natives trade goods in exchange for beaver pelts. Eventually the beaver were near extinction.

By the time the craving for beaver fur subsided, the beaver had nearly disappeared. It was not profitable to pursue the few isolated pockets of beaver that remained. The lack of demand for beaver pelts was critical for beaver population recovery. Also farmers and ranchers began to notice a decrease in vegetation along stream valleys and the surrounding water tables began to drop. Cattle began to erode the soil along the streams. The streams were stripping away the topsoil faster than it could build up. Some folks made the connection and efforts to protect existing beaver populations and to import beaver pairs into some areas were started.

The good news is that people were able to recognize the value of the beaver before it became extinct. Today there are beavers over most of North America. The beaver story should serve as an example that all species should be respected and preserved. It is difficult to know what will happen when a species becomes extinct. It is impossible to bring a species back after the last one dies. The beaver story is a positive story. Beavers came full cycle. Once so numerous that we never dreamed we could wipe them out, they nearly disappeared. Now they are plentiful again. Could we do the same with animals as imperiled as the Gray Wolf? What do we know about the fate of an ecosystem without bears, wolves, and eagles? What do all the threatened and endangered species with lower profiles mean to our environment? Will we have to wipe them out to find out?

Grizzly Matters

Bear habitat is not immediately recognizable. Bears are solitary animals and require a lot of territory to make a living. All of Glacier National Park is bear habitat. Everywhere you go in the park you are sharing bear habitat. Share it thoughtfully. Look carefully. Like the early Indians, bears make little impact upon the land.

For a number of reasons, humans have long been fascinated by bears. Bears, in general, and grizzly bears, in particular, have been exceptionally strong medicine for American Indians in the vicinity of the Rocky Mountains. The grizzly bear is venerated by the Blackfeet as an animal that gives power and courage in battle and healing power to medicine people. The Salish, Kalispel, and Ktunaxa honor the bear as a guardian and tutelary spirit, as a prophetic power, and as a food source. The Ktunaxa practiced elaborate Bear Ceremonials to pray for the bear spirit's mercy and protection during the hunting and gathering seasons, for its guidance and blessing in finding food, and for its ability to predict the fortunes of the tribe. They also asked that the bear offer itself as food and they observed appropriate rituals and care in thanksgiving.

According to tradition, the bear was always an animal that valued privacy and space and was reluctant to share its medicine with the Indians. Most other animals were pleased to offer their spirits to deserving humans. Tribes persisted in asking the bear for his blessings until he could no longer refuse. The bear's mysteries were to be taken very seriously; to do otherwise meant a punishment of death.

The bear was singled out for its exceptionally humanlike qualities. Bears were venerated because of their intelligence and because they were omnivorous and could walk upright leaving tracks like a human. The bear's excrement was similar to that of a human; they exhibited a range of reactions that reminded the Indians of human behavior, and the skinned-out carcass of a bear resembled a human. Indians were also amazed by the bear's ability to hibernate through the winter without having to eat, drink, or defecate.

The ability to hibernate gave rise to many legends about the bear's annual cycle of apparent death in the autumn and rebirth in the spring. The central importance of Ursa Major (The Big Dipper) in American Indian cosmology and symbolism is due in part to these legends and the bear's gift of the sky clock. An observer watching the changing position of Ursa Major could tell the time of night and the precise season of the year. The sheer size and strength of bears inspired awe; humans tend to show great respect for that which they fear.

The grizzly bear has always been the focus of much attention among all people. Interest in grizzly bears has increased as their habitat and numbers have declined. The grizzly is listed on the Threatened and Endangered Species List, legal recognition that we want

to preserve the bear. Since bears might do physical damage to humans, some people feel they should be eliminated. Many people, however, feel that the grizzly has a right to some of its ancestral territory. Glacier and Yellowstone National Parks provide some of the last remaining grizzly habitat in the contiguous United States. American Indians generally respect the grizzly's right to its territory. The National Park Service is struggling to protect the ecosystem within which grizzlies can thrive. This is a constant juggling act of dealing with special interests, protecting the existing population, and keeping bears out of trouble.

Some people believe there is no room in modern civilization for animals like the grizzly bear. It may be difficult to convince people that preservation of bears and wolves is essential to the well-being of our environment. The grizzly benefits from the feeling that we are somehow kindred souls with the bears; an intuition that if grizzlies disappear from the land, something wild and special will have been lost.

Among the Blackfeet legends dealing with bears is the story of *The Friendly Medicine Grizzly* who feeds, heals, and cares for a wounded warrior given up for dead. There is also the legend of *Sokumapi and the Bear Spear* in which a young boy is taken into the den by a great Medicine Grizzly. The bear feeds and cares for the boy, teaches him bear survival lore, gives him healing powers and the sacred Bear Medicine Pipe along with its appropriate ceremonials. Most important, it gives him the sacred Bear Spear and its power in order to make the Blackfeet indomitable warriors. Sokumapi became a great leader and shared his power with his people. His Sacred Bear Lodge, Bear Spear, Medicine Pipe, and the appropriate ceremonials were handed down through his descendants. All of these stories can be found in Walter McClintock's *The Old North Trail*, which is included in the Activity Kit.

The legend that best embodies the tradition behind the Ktunaxa Bear Ceremonial rituals involves a small boy who is cared for by a grizzly family in much the same way that Akaiyan was cared for by the Chief Beaver and his family. In the Ktunaxa story it is the grizzly who teaches the boy *The Way*, how to heal, and how to properly and sincerely perform Bear Ceremonials. When the boy has been educated, he is sent back to show his people *The Way* and share the power. Just as the Chief Beaver did with Akaiyan, the grizzly gives the young boy the gift of tobacco, a sacred pipe, and ceremonials to go with it:

The Grizzly Chooses a Stepson

Once in the old days, when a band of Ktunaxa were moving camp, a young boy was inadvertently left behind. He tried to catch up with his family but soon gave up and laid down on the trail in his despair and loneliness. Soon a large grizzly and two cubs happened across the miserable boy who immediately gave himself up for dead. "Move off the trail!", commanded the great sow, but the young boy held his head down and refused to move. "Oh well", said the great grizzly and moved on around the boy. The smaller cub, however, begged his mother to keep the human for a playmate. The kind mother complied. She cuffed the boy lightly on the stomach with her left paw and said, "Come along now, I'll teach you to live like us".

In the Moon When Leaves Fall and the Geese Fly South, the mother bear instructed her children to empty their stomachs and prepare to den for the time of snows. With each new moon she awakened the three little ones and told them to roll onto their other side. One night the young boy awoke to the sound of a chinook wind outside the den. The mother grizzly sat on her haunches and sang softly along with the wind. "Arise, my little ones", she whispered, "The People are asking for our help. "She explained that the People in their encampment were gathering with their medicine bundles and pipes to pray to the bears that they might be granted food, safety, and good fortune in the upcoming hunting and gathering season. During their ceremony the People sang their power songs to the accompaniment of a deer-hoof rattle staff. "We must go now and listen to their prayers", said the great grizzly. She and the cubs left the boy alone in the den.

Early in the morning the bears returned laden down with the stems from the sacred medicine pipes of the People. One by one they examined the stems. From their smells, the bears could tell whether an individual was sincere and truly in need or merely going through the motions and making a mockery of the bears. The stems of those with good hearts were placed in a large pile to the left; the stems of those who were insin-

cere were isolated on the right. The insincere would have bear trouble during the coming year. Then the four of them laid down to sleep until awakened by the first thunder of the new season.

Mother grizzly instructed the young ones to mend their moccasins and to fill up on the fresh green shoots of grass along the snowbanks. All that season, the young boy continued to make the rounds with the grizzly to learn their ways and absorb their power. When the snows came again, he returned with them to the den. When the bears awoke and went to attend the ceremonial, the boy found that he now had the power to hear the singing and dancing of the People. When the bears returned with the stems, he was able to help in reading them. It was with great pleasure that the boy recognized his own father's stem and saw that the great grizzly placed it on her left with those of the sincere.

This time, when the bears were awakened by the First Thunder When the Grass Begins to Grow, the great grizzly told him that it was time to return to his people. "Now you know the truth of these ceremonies. Tell the People to pray hard in order to please us. Some of them are not sincere." The boy was told that he would become a great leader of his people, that he would live in the Sacred Bear Tipi, and that he should raise his son to carry on the ceremonial tradition for the People. Before he returned to his people, the bear gave him a special root to chew in order to control his wild nature. As the boy chewed, he walked down from the mountains and toward the valley where he knew the People to be encamped.

For many years, as he grew up, the young boy kept his experience to himself. When he finally married, he painted the Sacred Bear Lodge as the grizzly had instructed him. The People then recognized his supernatural power and came to him for instruction. He told them "I have this power from the grizzly. I will show how to properly take part in the ceremonial. Take care that you are sincere in your need and in your prayers. If you are sincere the bear will help you, but woe to him who has no faith."

Just as it was the beaver that drew the white culture to the west and accelerated change, it was the prophetic power of the grizzly that led to acceptance of the new ways. In a version of a story from the Ktunaxan and Salishan cultures, the spirit of the grizzly foretells the coming of white men and proclaims the power of their medicine. In Ella Clark's rendition of *Things Are Changing*, Sowatts, the leader of a Ktunaxa band, hunts fresh meat for his people. Because of an offense to the bears by one of his people, he is attacked by a grizzly and torn to pieces.

After three days his people find him and carry the pieces back to camp. To their surprise Sowatts is able to relate a vision that was given to him by the grizzly. He tells his people that the times are changing and that the animal spirits can no longer help them as powerfully as they had in the past. He also says many people were coming from the east and a powerful man in a black robe would be among them. Finally, Sowatts tells his people it is as time to make peace with the Blackfeet. As proof of the authenticity of the vision, Sowatts sent his dog into the brush to flush out the grizzly. The grizzly rushed into the encampment and sacrificed itself to the arrows of the Ktunaxa. That year they made peace with the Blackfeet and several years later Father De Smet arrived to build a mission.

This and related stories may help to account for the openness with which the people of the Salish and Kootenai Confederation were able to adapt their own culture to an acceptance of white religions. This was more difficult for some than for others. Many held on to the old ways until a time when others were able to open their minds to traditional ways. Others found the white religion to be a confirmation of their own way of life. No matter how they adjusted, everyone knew that things were changing and would never be the same. Few have resigned themselves to the idea that the old ways can be allowed to be lost.

Classroom Activities

Classroom Activity 1
Painted Lodges

Objective:
Students will learn to think about themselves as individuals and members of a social group of animals sharing an environment with other species. Students will recognize that traditional American Indian shelter was as much a part of the surrounding environment as a beaver lodge. Students will also recognize and explain the personal and traditional culture behind the design and decoration of tipis.

Background:
This activity helps students identify themselves as significant members of an important culture.

Much of the background information provided has been gleaned from generalized readings on lodges and the traditions behind painted lodges. Symbolism and design varies significantly from tribe to tribe, band to band, and from individual to individual. Some people take offense when they come across randomly designed tipis and sacred designs that have been inappropriately copied out of ignorance or arrogance. This activity has no intent to do such a thing.

It would be a mistake to think that all tipis in the Plains culture and the adjacent Plateau culture were painted tipis. In fact only about ten percent of lodges were painted and the design was considered to be something deserved by the individual who used it. Often the design was given to a deserving and distinguished individual through a vision from a medicine spirit. Just as often, the design was passed on by a distinguished individual through his family. It was sometimes possible to purchase a tipi or design from one who had earned it, but the purchaser had to be worthy of the design and had to honor the responsibilities and ceremonials that came with it. Never did someone casually say, “I guess I’ll paint the tipi today, Honey. What color do you like?”

The pigments for the paints used on the tipis were obtained by gathering, manufacturing, and trading with tribes from all over the west. One tradition tells how the Chief Beaver gave the knowledge of the locations, methods of preparation, and symbolism behind all of the pigments to the people. Clearly each substance, hue, and shade did have special meaning. The paint itself was valuable and significant.

Every painted lodge reflected a harmony with the surrounding environment even when individual themes and totems predominated. Some lodges made a clear and simple statement about their particular significance. The Blackfeet Thunder Tipi, for instance, was painted sky blue with a Thunderbird on the back. Most tipis, however, reserved the central surface for individual themes. All lodges were decorated according to a consistent and logical formula. The bottom of the tipi was encircled by a dark earth toned-band. The design of the bottom band of the tipi often depicted familiar

terrain, mountain peaks, rolling foothills, or gently undulating prairies. Sometimes the bottom band would include one or two rows of bright circular shapes called dusty stars. These represented the puffballs that sprang up overnight like magic on the prairies. Some believed that the puffballs were fallen stars. Some saw them as a kind of manna sent down from the Above Ones.

The broad central portion was reserved for portrayal of sacred medicine animals, medicine objects, or other protective spirit powers that were important to the family that occupied the lodge. Sometimes family history and important exploits or events were depicted on the central band.

A dark band around the top and including the ear flaps represented the night sky. Within that band, the Sun, the crescent Moon, the Morning Star, and important constellations were depicted. For the Blackfeet, the Morning Star was represented by a symbol resembling a Maltese cross. The cross looked like a butterfly or a buffalo vertebra. Both the butterfly and the vertebra were considered to have the power to bring protected sleep and powerful dreams. Occasionally a buffalo tail was appended to the center of the cross.

The Great Bear (Ursa Major or the Big Dipper) was an extremely important constellation to all Indians because it served as a daily clock and a year-round calendar. The legends of the constellation varied a great deal from tribe to tribe. For the Salish and Ktunaxa, it usually represented a hunted bear. Legend tied in with death and rebirth of the seasons. To some Blackfeet, the Big Dipper represented the Seven Sons of Creator Sun being pursued across the sky by their vengeful mother, the Moon.

The Pleiades or the Lost Children were also frequently depicted in the sky band - a reminder to the people to always take special care of children who are orphaned or not as privileged as others in the community.

Whatever the decorations might be on a lodge, one could be assured that they were of extreme cultural and probably spiritual importance to the occupying family.

There was a great deal of protocol with regard to the placement of tipis, the internal arrangements, how they were put up, taken down, and transported. The tipi was circular at its base. Within the community, the lodges were arranged in a circle. At large gatherings like the Sun-Dance Ceremonial, the tipis of individual bands would be arranged in circles which collectively made up a larger circle. In the center of that circle stood the Sun-Lodge. All doorways were positioned to face the east where the sacred circle, the Sun, rose each morning.

It was the Sun that gave all life and set all cycles in motion. All of the spirit animals received their power directly from the Sun. American Indian life and habitat was centered on the Sun and its cycles.

Materials:
Art paper
Theme Paper
Colored Pencils

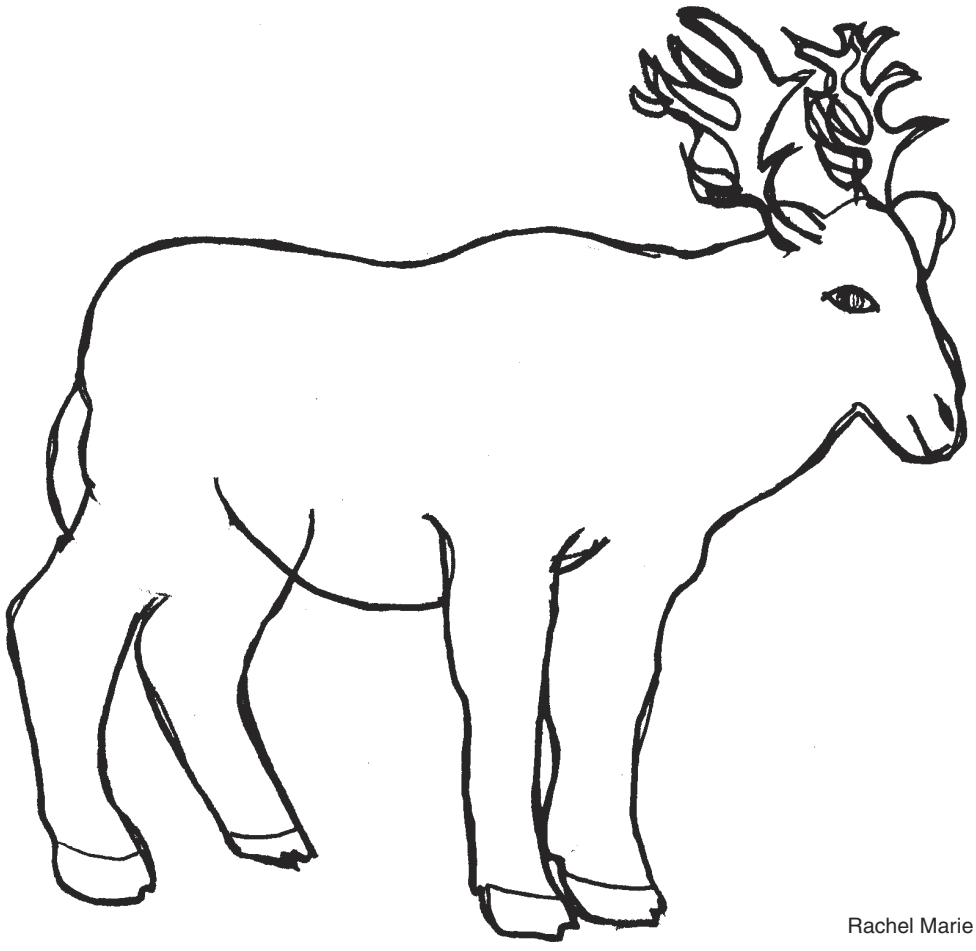
Procedure:
1. Provide the background information and any other you might want to add for the students. Stress the individual importance of each person in the world and their potential and responsibility to be and become someone who is genuinely and positively influential upon the future of the Earth and its creatures. Stress the fact that we are all very important people and deserving of our own sacred lodge.
2. With the background information provided and with respect to American Indian culture, have each child design and draw a lodge that depicts those things of special importance to them and their families. Encourage the students to include traditional symbols of importance to their tribe or band and to use the central band of the tipi for their personal histories, values, and ambitions. Students who have trouble getting started can be reminded to think about personal hobbies like music, dance, or athletics. They could picture important symbols having to do with their avocations (i.e., musical instruments, books, or basketballs). Ask students if there isn't some special animal with which they identify. Perhaps that animal could be a theme on their special lodge. Remind them to place their lodges in an appropriate setting emphasizing their harmony with the Earth.
3. When the students have finished their drawings, have them write short essays explaining the significance of the traditional and personal symbols they have included on their lodges.
4. Encourage the students to show and explain their lodges to the rest of the class.
5. If students are willing, collect the pictures and essays, put them into a binder or book and bring them along on your visit to the park to share with the naturalist.

Follow Up:
Some students may be interested enough in this idea to build a three-dimensional diorama, putting tipis and other kinds of lodging in a natural setting. It would be interesting to see local topographical features and indigenous plants and animals included.

Classroom Activity 2
Animal Research

Objective:
Students will conduct effective research about animal species living in Glacier National Park. During the course of their research, students will answer the questions provided in the background section of this activity.

Background:
After students have been presented with the specific information from this track concerning beavers, bears, and buffalo, the instructor can explain to them that it is also important to know basic information about all animals who share the habitat. There are certain basic questions which help us gain a useful understanding of any animal. The following questions are a guide in doing and organizing animal research writing:



Rachel Marie Deming

Questions for Animals Research

1. Give the common name and, if you wish, the scientific name of the animal you have chosen to research. Give a physical description of the animal.
2. How does this animal reproduce? Are the young born alive? Are they hatched from eggs?
3. How does this animal care for its young? Do parents supply food directly? Do they nurse them? Are the young taught to find food or are they left on their own?
4. What does this animal eat? Does it eat plants and animals (omnivorous)? Does it eat plants (herbivorous)? Does it eat animals (carnivorous)?
5. How does this animal move about? Does it fly, walk, crawl, etc.?
6. In what kind of environment does this animal live? Does it live on the ground, in the air, in water, or in a combination environment?
   Does this animal prefer special terrain such as alpine tundra, marsh, open meadow, forest, stream, etc. ?
7. What other interesting observations can you make about this animal?
8. Draw the animal in an appropriate environment on a separate sheet of art paper.

Materials:

Theme Paper, Art Paper, Pencils, Colored Pencils, Encyclopedias, wildlife books, and particularly books about the animals of Glacier National Park

Procedure:

1. Ask each student to research a favorite animal that they are certain lives in Glacier National Park and that they would like to see on their visit. Be sure that they have a second choice so that there are not duplicates. The instructor may wish to specify animals that would frequent beaver habitat, or that would live on the alpine tundra, or conform to some other precondition.
2. Help the students to find resources in the library, list the guide questions, and help them to begin their research.
3. Ask students to illustrate their writing on a separate piece of art paper. Some find research more to their liking if they are allowed to draw the picture first.
4. When writings have been edited and drawings are completed, have the students present their reports and pictures to each other in order to share knowledge of all the animals they will be looking for on the trip.
5. Choose a title and help students assemble their reports and art in a book to be taken along on the park trip.

Follow Up:

Play the Animal Story Guessing Game. After students have presented their stories, have them take turns telling animal stories that give vital information, except name and physical description, about some animal that lives in the park. The other students ask for clues and guess which animal is being described.

Play an animal pantomime game. Have students take turns doing a silent imitation of animal behavior until the other students successfully guess which animal they are imitating. Both of these activities are fun for students and provide a good review.

Park Visit Activities

The *Beaver Habitat Nature Trail* packet lists specific activities the park naturalist may use during your visit to Apgar or St. Mary. Activities for *Bears: Imagination and Reality*, include a Habitat Hike and Skins and Skulls talk. Movies and slide presentations can be shown on request.

There are a variety of Park Visit experiences that can be tailor-made for classes. When arranging for a park visit, be sure to discuss available options.

Anita & Heather

Back in the Classroom

Take the time to reinforce the Park Visit experience. Discuss the field trip with the students and decide what worked and what didn't. Be sure to fill out the trip evaluation form and return it to the park. Some follow-up activities for the Animals and Habitat Track include:

1. Have each student write a report on the trip. Ask students to share their report with classmates.

2. Have students work in cooperative learning groups to develop class reports on the trip and park wildlife. The Activity Kit contains some wildlife slides and narrative. Have the students use these materials in report preparation.

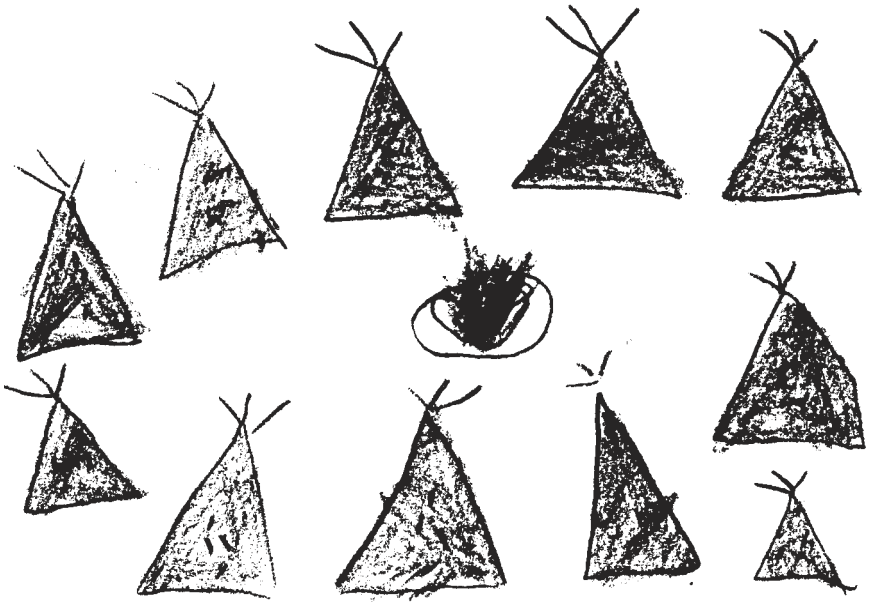
3. A copy of Glacier National Park's Bear Management Plan is included in the Activity Kit. Have the class look over the plan and discuss it.

4. Have each student write a letter to the park naturalist that conducted the Visit Activity. Have the student tell the naturalist one fact that was learned during the trip.

5. Invite someone from the local community or tribal government to discuss wildlife management on the reservation. Compare local management objectives with the National Park objectives.

6. Invite an elder to your class to talk about wildlife experiences he/she may have had in the past.

Track 5
Humans and Glacier National Park



Katie Rolfing

Directions and Background

This track can be done without the Activity Kit. It is designed for groups that have reviewed parts or all of the other tracks and are interested in learning about the impact humans have had on the park. The Park Visit Activities for this track consist of naturalist walks in the vicinity of St. Mary and Apgar. These activities will focus on past, present, and future human impact on Glacier National Park.

Humans and Glacier National Park is actually a summation of the theme behind *Work House.* All of the tracks in this program are concerned with succession. Mountains and Mountain Building traced a continuous cycle that takes place over millions of years. Glaciers and Glaciation followed another continuous cycle that takes place over thousands and millions of years. Following each major glacial recession, plant life reestablished a tentative foothold in the region. Following the recession of the last major ice advance, approximately 12,000 years ago, a variety of plant communities established habitat for a myriad of animals. These plant and animal communities have coexisted continuously since the end of the Ice Age.

Animals and Habitat was concerned with more immediate succession dynamics. It examined cycles that have occurred over and over again throughout the history of life on Earth. Species of plants and animals evolve on the Earth. They interact with other plants and animals and with the Earth itself. They have constructive and destructive impacts upon each other. The Earth, like a living organism, constantly changes and some species of plants and animals disappear with those changes. Plants and animals react to climate or topography and impact each other. In some rare cases a species on the verge of extinction has survived until people have made an effort to save it. Cases like the beaver are rare.

Beavers made a comeback because trapping pressure ended and their value in the ecosystem was recognized by people. Like beavers, humans are animals, but there is something different about our species. Beavers are able to engineer the environment for their own needs and for the good of many other species. Beavers don't have conventions to discuss the impact of their work upon the environment. We reflect on the environment. We can anticipate the results of our actions. We usually consider the impact and then act. We don't always make the most responsible decisions. After all, we are a relatively new and inexperienced species. We are bound to make mistakes, but we should be able to learn from those mistakes.

We are the only species that is introspective. We can actively plan the future. We don't just prepare for winter because instincts tell us we will die if we don't. Humans also engineer the Earth to suit our needs rather than finding or adapting to an environment.

We also make decisions for other species. This has never happened before. Maybe we can survive as a species and conscientiously strive to heal the Earth.

American Indians with limited technology were traditionally respectful stewards of the Earth. They lived according to *The Way.* They were aware that there were some special features about humans that distinguished them from other animals, but they never regarded themselves as separate from the plants, animals, or even the seemingly inanimate objects that together make up the Earth. They saw themselves as part of a Sacred Circle within which all things were interdependent and interconnected. To treat any object within that circle with disrespect or disregard was sacrilegious. One automatically considered the consequences of one's actions upon the environment.

Things were not perfect. Life was sometimes hard. Nature didn't always seem kind and people fought. But there was generally a sense that things were under control. If everyone did their job and looked out for their neighbors, everyone would get by. If everyone paid their respects to Creator Sun, Mother Earth, and the animal spirits, everyone would get enough to eat and there would be time to play. If everyone gave a little back to the Earth and left some for seed, the Earth would keep on giving.

With the coming of the white people, things began to change. New ideas and new technologies crept into the culture faster than Indian people could process them. Some of the new culture seemed good and helpful. But as quickly as the new ways were introduced, the habitat in which to apply them disappeared. The tribes knew about hunting territories and using the gifts of nature, but the idea that someone could own the land seemed absurd. People could no more own the land than the land could own them. They were part of the land. They came and went as hunting and gathering cycles demanded. Now they were forced onto reservations. Some times the boundaries were actually marked with fences.

The tribes were told to stay on those reservations and make a living there. How could they make a living without buffalo and other game animals and no access to the areas in which their staple plants grew. Some were given plows and cows and told to become farmers, but they could not cut their mother, the Earth, with a plow blade. Many felt that you might as well ask a wolf to be an eagle as ask an Indian to be a farmer. To make matters more difficult, most of the territory they were told to live on wasn't good farmland. Some tried to be farmers; they had to feed their children. Many of their spirits were broken. Some succumbed to acculturation, but many kept the old ways in their hearts.

When the Blackfeet sold the mountainous western part of their reservation to the U. S. Government in 1895, they did so to feed their people. They didn't see how the mountains could be of value to the United States. There was little consolation to be derived from retaining hunting, fishing, and logging rights within the area. Even those rights would be altered in the future. When signing the agreement Chief White Calf said *"Chief Mountain is my head. Now my head is cut off. The mountains have been my last refuge. We have been driven here and now are settled. I shake hands with you because we have come to an agreement, but if you come for any more land we will have to send you away."*

The establishment of Glacier National Park in 1910 saved the land from the development that was the fate of many other lands that were taken from Native Americans. The newly formed Glacier National Park was put into the hands of people who would do the best they could to preserve the land with the same spirit and respect that the Blackfeet had for so long.

Like the Salish, Kalispel, Ktunaxa, and Blackfeet, it is the desire of the National Park Service to promote the healing and preservation values that Indians have always fostered for the area that is Glacier National Park. Perhaps with the help of the tribes on both sides of the park, suitable habitat for endangered species will be preserved.

There is little doubt that local tribes respected the park area just as they did all of their homeland. There is now ample archaeological evidence to support the oral traditions that the local tribes and bands made extensive use of the area that is now Glacier National Park. Certainly there were even winters when large groups camped within the immediate mountain valleys. Naturally the Native People left little conspicuous evidence; Indians made a point of treading lightly wherever they lived and traveled.

The Glacier area was, and still is, a sacred and awe-inspiring place. Tribal members came here on vision quests. Vision quest cribs (low rock walls ritually arranged for protection) can be found near the peaks of more than thirty mountains in the immediate vicinity of Glacier National Park. They came for ceremonials and reunions. They came during favorable weather to hunt animals and plants that were unavailable in the western valleys and on the eastern prairies. They passed through on their way from one side of the mountains to the other. They came to escape the sometimes oppressive heat of the summer prairies. The Glacier area was a pleasant oasis in summer and there was plenty to do in terms of hunting and gathering during their stays.

The Indians didn't make roads to get from one side of the mountains to the other; they used game trails. People didn't pass over the trails on a daily basis. Small and large bands used some of the trails several times a year.

In the lower elevations of the park, archaeologists have located many temporary camp-sites that predate the European immigration. There is little there for the public to see and access to them would destroy the remains of the sites. The local tribes know of many sites within the park that their ancestors used and that are still used. They keep these sites a secret. The passage of time has helped to conceal, preserve and sometimes destroy other remnants of Native culture. The last known remnants of Kootenai war lodges in the St. Mary area were flooded out by Wild Creek in l975.

Blackfeet, Salish, and Kootenai used the area, but in most cases they left only footprints long erased. That is the ideal which the National Park Service wishes to inspire. When you visit the park you will see the impact that humans have had since the coming of the white people. Some of that impact was unavoidable if we were to make Glacier National Park accessible to visitors. The impact that you see most readily is in the form of roads, trails, campsites, and buildings.

There is actually less visible impact on Glacier National Park now than fifty years ago. It is Park policy not to expand the developed areas within park boundaries. If a facility is updated, new construction must be done in existing developed areas. In fact, there are fewer roads and maintained trails in the park now then there were fifty years ago. Most of the park, over one million acres, is managed as wilderness.

Kent Monroe &
Joe Conelly

Classroom Activities

Classroom Activity 1
Stewards of the Land

Objective:
Students will use their language arts and science knowledge to write a contemporary cultural "How Story" dealing with relevant environmental issues that effect their lives.

Background:
This writing activity is designed as a follow up exercise after participating in a part or all of this program. Students are asked to consider their part in the healing and preservation of the Earth and particularly their surrounding ecosystem. They will be asked to demonstrate their understanding of what has gone on in the past with regard to their environment, how the present reflects the impact of the past, and what can be done to insure the best possible future for the Earth and all its creatures. These ideas will be developed in the form of a contemporary Cultural Tradition Story. Cultural Tradition Stories attempt to preserve culture, instruct, explain natural phenomenon, model appropriate behavior, and entertain.

Materials:
Theme paper
Art Paper
Pencils
Colored Pencils

Procedure:
1. Review the background information on How Stories that was provided for Activity 1 in the Mountains and Mountain Building Track.
2. Have students write a story that deals with the environment and teaches a lesson about caring for the Earth in contemporary times. An interesting approach would be to use Bluejay, Coyote, Napi, Creator Sun, or any other cultural hero, as they might behave and feel about the Earth in modern times. Also encourage students to create their own characters. (An example story is provided below).
3. Ask the students to illustrate their stories with art work.
4. When the stories are finished, encourage the students to read them to the rest of the class or let you read them to the class. Encourage the students to explain and discuss the issues behind their stories.

Follow Up:
Students usually enjoy having their stories and pictures collected and bound into a class book. It gives them a real feeling of being published and of being a part of a group effort.

Lucy Lone Walker
(Example contemporary "How Story")

As near as she could tell, Lucy Lone Walker was almost 90 years old. She hadn't always thought of life in terms of years. She seemed to remember her father talking about the days before the white men came and took the land away. Her father had enjoyed hunting in the area that was now the park. After the tourists began to come by the hundreds on the train, he never went back in again. But they kept the cabin on the ridge overlooking the park. Even when she was very young, she remembered, her father would take her small hand in his big hand and walk along the ridge, looking down onto the string of beaver dams on the one side, and off into the park on the other side. Every now and then he would stop, lift her in his arms and gaze off toward the mountains. He would sigh a deep sigh occasionally, but he never said much.

Her father had been gone for many years now. Even one of her own children had passed on, but she didn't feel particularly old. She had seldom missed her evening walk along the ridge. She was sure that the walking had kept her young.

Lucy seldom looked up into the park. She had always enjoyed watching the beavers at their work among the ponds. Lucy had been so familiar with some of the beavers in the past that she had given them names. She even spoke to them at times. The beavers looked at her and were always aware when she was watching, but she never got the feeling that they cared to interact with her. At least they had grown to trust her. They seldom dove or even sounded an alarm when she came around, but they were much more skittish on the few occasions that she was joined in her walk by her daughter or her grandchildren. Lucy sometimes felt that the beavers were more a part of her life than even her children and grandchildren were.

It had almost killed her that evening twelve summers ago when she stood over the dam and saw the scattered limbs and mud, and saw what was left of the lodge standing nakedly above the silty bottom of the

pond. When she had heard the dynamite in the morning she had been a bit upset, but she attributed it to road work in the park. It was several days before she learned that it was the Looks Back boy who had blown up all the dams in the string just to gather a few pelts worth less than thirty dollars each.

When she had gone to the boy's mother, the woman had told Lucy that she was sorry that the beavers had been so important to her, but it was really hard to raise boys these days. The son had told her that he needed to learn to hunt if he was going to be a provider and a warrior.

"No warrior ever used dynamite to catch a defenseless animal!" retorted Lucy. She hadn't regretted making such a scene. She had never gotten used to the sight of the dried-up ponds. The trees and vegetation along the creek had clearly thinned out over the years. The birds had been gone since just after the dams went. Lucy hadn't even seen a brook trout in the creek in the last three years. They used to pop the surface like rain in the years before the dynamite.

Then one evening Lucy's heart jumped into her throat. There beneath her were two beavers and the creek was beginning to back up over the old pond bottom. Lucy had never dreamed that beavers would return to the drainage. She got so excited she was afraid she'd have a stroke.

Then the thought struck her, "It won't be long and there will be another generation of young warriors nosing around here. What can I do. I couldn't bear to see it happen again." She hoped against hope that nobody would come along and see the new dam and the newly gnawed tree stumps.

The next evening and every evening after that Lucy carried a small paintbrush with her. Along the edges of the pond she rubbed the newly gnawed tree stumps with grass and painted them with mud. She scattered the chips among the deeper grass and heavy brush. The stumps actually looked like they had been there for years. She would just have to hope that no one would notice that the pond had ever drained.

One evening as Lucy bent over her work near the pond, a deep voiced chuckle sounded immediately behind her; "What are you doing Little Grandmother?"

"You nearly killed me Young Man. Can't you cough or something? Don't you know better than to sneak up on an old person like that?"

The young man held a young girl in his arms. The child looked down when the old woman turned to her. The young man chuckled again, "I'm sorry Grandmother. I thought you heard us coming through the grass. "

"But who are you? I've never seen you here before. "

"But you have; a long time ago. I am called Charlie; Charlie Looks Back. Years ago I killed your beavers. I could never tell you how badly I felt. I brought this pair back from the Fish and Game in Missoula. They've got extra on Lolo Creek. I wanted my daughter to see you and them. "

On the way back to the cabin that evening Lucy gazed off into the park and sighed; "I guess I'll probably be able to walk around up here for another 90 years now".

Park Visit Activities

Park Visit 1

Footprints on the Land

St. Mary

Objective:
Students will recognize the impacts of people on Glacier National Park and St. Mary and discuss ways to preserve the area for future generations.

Background:
The naturalist will take the group on a walk to examine the impact people have had on the land around St. Mary. The focus of the walk will be on past, present, and future uses of the land in and around Glacier National Park.

As soon as you cross Divide Creek near the park entrance, you will be on the Divide Creek floodplain. Serious flooding of Divide Creek occurred in 1964, 1975, and 1991. In order to minimize structural damage to park and private facilities a plan was implemented to intervene with heavy equipment.

Red Eagle Valley runs to the southeast of Upper St. Mary Lake. Until 1975, a well-developed fire road was maintained for about four miles into the park. In October of that year, the road was permanently closed. Access was blocked off and the road bed has been allowed to deteriorate naturally. The previous road is now little more than a hiking trail. A distributary of Divide Creek is currently attempting to reestablish its old route along the roadbed and down to the lake. The National Park Service is trying to accommodate the creek with culverts and other adjustments while maintaining existing access to the area. About two miles up the trail, the road forks along an old bed that once connected Red Eagle Road with Highway 89 at a point just below the Hudson Bay Divide. This old road has been abandoned for many more years and, because it is not a regular hiking route, the trail has nearly disappeared.

Within easy walking distance of the St. Mary Visitor Center, along the former Red Eagle Road, you can visit the 1913 Ranger Station which has been restored and preserved as a reminder of the early days in Glacier National Park.

On the edge of St. Mary Lake, further up the road, are the almost invisible remnants of docks that once serviced lake tour boats. As you continue up the trail, it takes a sharp eye to locate the St. Mary Chalet building sites. Below the old roadbed and about two hundred yards beyond the old docks, you can find the area where the ground was leveled for the foundations of the buildings. Along the shore of the lake, occasional artifacts emerge from the sloughing soil. After World War II the old chalet buildings were pushed out onto the ice in winter and burned. Any ruins are at least eighty feet below the surface of the lake. An old road once connected St. Mary Campground with the road just above the KOA Campground on Lower St. Mary Lake. That road has been abandoned and the bed is nearly invisible now. The maintenance and housing area for the Hudson Bay District Headquarters once

contained a fairly well established village with a mixture of private and Park Service structures. There are even some old gravesites here.
After Glacier National Park was established in 1910, the Park Service cleaned up the old townsite and erected maintenance buildings and facilities. Although structures like sewage treatment plants are not a particularly attractive sight in a National Park, they are necessary to prevent ground and water pollution that would occur without them. The National Park Service also maintains a plant nursery at Park Headquarters where native plants are grown for revegetating construction and visitor-impacted sites.

A recurring problem is the deliberate or inadvertent introduction of exotic species into the park. An example is spotted knapweed, an exotic plant that has spread across Montana and into Glacier National Park. Chemicals secreted from knapweed roots prevent native plants from growing nearby. Eventually knapweed spreads and dominates a field or roadside. The Park Service has expended a great deal of time and money in an effort to control this invader.

Preserving the natural integrity of Glacier National Park is not easy nor is deciding management policies.

Park Visit Activity 2
Letting It Take Its Natural Course
St. Mary

Objective:
Students will analyze a complex park management situation, discuss the situation, come to a consensus, and make a decision on the action to be taken. Students will become familiar with a decision-making process that is used by land managers.

Background:
To illustrate how complicated preservation and restoration decisions can be, the naturalist will recount the history of Divide Creek and invite the students to role play the decision making process involved in dealing with the creek at flood stage.

It is mid-June and there is still a great deal of snow in the mountains. The temperature is in the high 70's, and it has been raining steadily for the last 48 hours. The forecast is for continued rain during the next 48 hours and Divide Creek is nearing flood level. Several large logs have already lodged themselves against the Divide Creek bridge.

The official policy of Glacier National Park is to let nature take its course as much as possible. Divide Creek marks the Glacier National Park border and the Army Corps of Engineers monitors and controls activities that may effect the natural flow of the creek. Generally the Corps does not allow interference with waterways without due process and special permits. During past floods, substantial damage has been done to park maintenance facilities, private property to the immediate east of Divide Creek, and to homes and businesses down stream from St. Mary. In l964 several local people were killed while trying to save private property in the immediate area.

There are several options available that may reduce damage to park and private facilities. The bridge (a National Historic Structure) might be blown up to prevent water backup due to log jams. The creek could be diverted into the St. Mary River by bulldozing across the meadow and through the road. Everyone could sandbag and hope that the bags will protect people and property. Or all parties could get away from the area until the water level subsides and hope that there is no major damage done. History has indicated that there will probably be damage.

Procedure:
1. Assign groups of students to represent various parties affected by the outcome of the situation: the National Park Service, the Army Corps of Engineers, private owners of the lodge, the people living downstream, the heavy equipment operators who might be called upon to do hazardous duty, and a conservation group who feel that natural waterways should not be tampered with for any reason.

2. Give the students a few minutes to prepare their arguments and then call them back together to discuss the issue and come to a decision. Someone other than the naturalist or the teacher should serve as chairperson and several people should be appointed as a jury to decide upon the best solution after arguments have been presented.
3. Upon completion of the discussion process, the naturalist can explain to the group what actually took place in the summer of 1991.

Park Visit Activity 3
Footprints On the Land
Apgar

Objective:
Students will recognize the impacts of people on Glacier National Park and the Lake McDonald region and discuss ways to preserve the area for future generations.

Background:
The naturalist will take the group on a walk to examine human impacts on the land around Apgar. The focus will be on past, present, and future uses of the Park.

White Americans had been living, developing, and even logging in the Apgar area before Glacier National Park was established in 1910. There were and still are many privately-owned cabins along the lake and in the vicinity of Lake McDonald. It has been park policy to acquire private property within park boundaries when it becomes available. In the meantime, private owners follow park codes with regard to their private property. Whenever private property is acquired, a decision has to be made whether or not to return the land to a natural condition. This is sometimes a difficult decision, such as when the park acquired a private lodge just east of Lake McDonald Lodge in the late 1970's. The private lodge blended in well with the natural surroundings. Nonetheless, the buildings were hauled away and the land was restored to its natural state. In this case the Park Service gave land back to nature. In another situation, a beaver family built a dam and lodge in part of Sprague Creek picnic area. The Park Service decided that the beavers had first rights to the land. A couple of tables were moved and now the picnic area is a little smaller.

In fact, it is park policy to use only land that is already committed to development. New structures must conform to construction patterns that blend in with the natural environment. This kind of construction is often expensive and time-consuming but necessary to maintain Glacier's cultural heritage.

The Apgar area is heavily used by park visitors. Visitors are often unaware of the impact that they have on the environment when they cut across a meadow, stand on a creekbank, or chop a small limb off a living tree for firewood. The cumulative impact is obvious over time. Park personnel spend a lot of time putting up signs and enforcing rules for preservation of the natural environment. The park maintains a nursery at Park Headquarters where native plants are cultivated for revegetation of heavily impacted areas and near construction and maintenance projects. If the Park Service did not restore such areas, the damage would very soon change the character of the park. Many native plants, especially in alpine areas, are highly sensitive to heavy visitor impact. So, if you see blacktopped pathways and chained-off meadows, please understand that they reduce the impact on the land. Please stay on the trails.

You can ask to see the nursery and other examples of National Park Service efforts to restore and preserve the park.

Park Visit Activity 4
Giving It Back to Nature
Apgar

Objective:
Students will analyze a complex park management situation, discuss the situation, come to a consensus, and make a decision on the action to be taken. Students will become familiar with a decision-making process that is used by land managers.

Background:
To illustrate how difficult preservation and restoration decisions can be, the naturalist will present a hypothetical situation for the group to consider and resolve.

Suppose, as sometimes happens, that the last living member of a family that pioneered in the Apgar area has died and left the family cabin to Glacier National Park. The cabin has not been used for years and would be expensive and difficult to restore. The donating family was not well known, but they were in the area before the park was established. It is unlikely that anyone would know or object if the cabin simply disappeared.

Our committee has a number of options to consider. We could demolish the cabin and restore the land to a natural state. We could leave the cabin to deteriorate on its own. We could leave it to deteriorate and put a historical site sign by it to encourage people to respect it and leave it alone. We could do a minimal upgrade on it for use as a Park Service facility. We could restore the cabin to its original condition and open it to visitors.

Procedure:
1. Assign groups of students to represent the various points of view presented in the options above. Ask them how they would feel if they were Park Service managers, a Sierra Club member, a descendent of an Apgar pioneer family, or a descendent of an American Indian tribe that once used this area as a ceremonial gathering place
2. Give the students time to prepare the points of view for each group, and then call them together for a meeting to reach a decision about the cabin.
3. Have someone other than the naturalist or the teacher act as chairperson for the meeting and appoint a small group of non-debaters to act as a jury to hear the positions and make the final decision.
4. After the debate, the naturalist will explain how park policy usually works in such cases.

Back in the Classroom

Back in the classroom, take the time to reinforce the Park Visit experience. Discuss the field trip with the students and decide what worked and what didn't. Be sure to fill out the evaluation form and return it to the park. Some follow-up activities for the Humans and Glacier National Park Track include:

1. Invite a National Park representative to come to your class and talk about management issues (anything from bears and wolves to managing 2 million visitors).

2. Write a letter to the park naturalist that led the Park Visit activity. Have the students tell the naturalist at least one fact learned during the visit.

3. When the class returns to school, invite someone who had extensive experience with the 1964 flood to talk to the class. The Blackfeet Tribal Council has many copies of *Flood*, the story of the 1964 Blackfeet disaster, that they may share with your class.

4. When the class returns to school have the students interview elders and other community old-timers about life in the area when they were children. Have the students write up the elders' stories and share them with the class. It is sometimes easier to do oral history interviews with a tape recorder and transcribe the interview later. The University of Montana archives and the state archives in Helena are interested in receiving and preserving oral histories compiled by students.

Appendix I
A Rationale for Teaching Science in an Integrated Format

American Indian languages have little sense of gender, and the concepts of animate and inanimate tend to be a continuum rather than a distinction. A rock, a plant, and an animal all have a spirit worthy of respect. Some people feel they can talk to trees. Modern technology has verified that plants are able to communicate with each other in some way. With respect to American Indian thought, it is helpful to think of the Universe as a living organism. In contemporary curriculum implementation, there is a tendency to separate the sciences into convenient subject areas like botany, zoology, geology, geography, chemistry, and physics. This policy makes it convenient to isolate distinct bodies of knowledge for mastery. We all know that part of the scientific method involves being concise and exacting, however, natural phenomena seldom occur in a vacuum. When something happens to any one element in an environment, every other element of that environment is affected. Ideally, if we want to understand what has happened to the particular element in question, we need to understand the context. When we study beaver habitat, for instance, we study the topography of the immediate area and the ways in which all of the plants and animals interact with each other. Because this project, *Work House,* is concerned with succession within the entire ecosystem, we want to look at a whole cycle of changes that take place over time.

Throughout the history and development of our planet, changes in the Earth's crust have affected the evolution of animals and plants. Life could not get established on land until geological and atmospheric conditions had evolved to a certain stage. Animals could not get established on land until plants had prepared the way for them. Once plants and animals moved onto the land, they began to alter the land. Presently people have begun to affect the evolution of the planet and the other life forms on it.

At an elementary grade level, science is most constructively studied with these kinds of interrelationships in mind. Science at this level is also learned best in a story format. Children of all ages love a story and memory thrives on themes. A good teacher is a great story teller and the best stories are true and scientifically accurate. Four true themes that give meaning and continuity to the study of science are:

1. The absolute interdependence of everything in nature.
2. The indispensable importance of the universal role that all living things play or have played in the evolution of our biosphere.
3. The evolution of landforms, plants and animals is inseparably interrelated and provides a natural order and continuum for the study of science.
4. The individual child is an indispensable entity with a role to play which can profoundly influence the health and direction of Earth's evolution.

If you can instill this kind of positive approach to the study of science in children, you will have helped to equip and inspire a student for life and have created a lifetime student.

Appendix II
Some General Considerations in Preparing Concrete Activities for the Study of the Environment

Directions are provided for all of the activities in this program. However, the teacher may wish to design his or her own activities to illustrate dynamics that are not featured in track activities. It is easy to create an activity to illustrate scientific dynamics with the use of common household and classroom materials. The following are some suggestions for building your own activities.

1. Consider the age of your students. An activity presented on a level below or above the abilities and understanding of the students will bore them.
2. Focus as specifically as possible on the points which you are instilling with the activity you are designing.
3. Understand and communicate to your students that the lesson and activity are designed to demonstrate approximate dynamics. You can seldom reproduce natural phenomena in the laboratory but a hands-on activity that begins to clarify a natural dynamic is far more instructive than a picture or reading from a textbook. Scientific accuracy is important in these activities. We don't teach inaccurate information and dynamics, but failure to try to provide meaningful activities is far worse than an inadvertent inaccuracy.
4. Consider what materials can best be used to approximate the dynamic you wish to demonstrate. Get the materials together, practice, and refine your demonstration of the activity.
5. Be sure that there are enough suitable supplies for the students to work with the activity independently for as long as it holds their interest.
6. Prepare a short introductory lesson to precede the concrete demonstration. Include charts, pictures, or some other illustration of the phenomenon in question. Do not overexplain. The research and exploration are the students' work.
7. Before turning the activity over to the students, if necessary, be sure to demonstrate a full cycle of activity including clean-up and preparation for the next students.
8. End the presentation with a "hook" -- leading questions or ideas that will get them going in their research.

Remember, to help students learn, you cannot do the work for them. People internalize and own information when they have gotten their hands on it and processed the experience on their own. That is how American Indian children learned in the old days.

Appendix III
Human Resources

The people listed below are resources in their communities. It is important to note that not everyone on this list is in total agreement with all of the content of the Work House curriculum. All agree that it is important to work together to promote constructive education and communication efforts for our students. We encourage discussion and ongoing constructive exchange between all educators. The Interpretive Staff of Glacier National Park can only be responsible for information that we are able to obtain through research and solicited advice. Please refer to local tribal authorities if you have any questions or reservations about the accuracy or appropriateness of any information or activities provided in the Work House program.

Most of the people listed were contacted during the research, writing, and advisory process for this project. They are tribal elders, cultural committee members, school administrators, educators, and human services personnel. Most of them were contacted by the writer, but some were recommended by others and contacted by cultural committee members and administrators. Many of them served voluntarily as readers and advisors. Without their generous help this program could not have been put together and implemented. Hopefully the list will grow along with Work House. Most of the people on this list would be willing to help in whatever way they can when it comes to the education of the children in their communities. Many, many thanks to those people who took the time to advise and edit for the writer.

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Appendix IV
Activity Kit Contents
Available on the Blackfeet and Salish/Kootenai Reservations only

1 trough (stream erosion/sedimentation activity)
1 glass cake pan
10 felt squares
2 rubber balls
1 package balloons
balsa wood strips
1 package garbage bags
10 packages modelling clay
1 wildlife video
1 general park introduction video

slide sets and narrative on the following:

a) Survey of Erosional Elements
b) Diagrams of Glacial Features
c) Features of Alpine Glaciation
d) Topographic Maps--Alpine Glaciation
e) Large Scale Structures- Western U.S.
f) Glaciers and Their Tracks
g) The Drifting Continents
h) The Geologic Time Scale
i) The Beaver World
j) The Bison and the Prairie
k) Glacier National Park Scenes
l) Glaciers Grizzlies

1 copy of *The Beaver Habitat Nature Trail* education activities
1 copy of *Bears: Imagination and Reality* education activities

reference books:

a) *Roadside Geology of Montana*, Alt and Hyndman
b) *Geology Along the Going to Sun Road*, Raup
c) *The Sun Came Down*, Bullchild
d) *The Old North Trail*, McClintock
e) *Keepers of the Earth*, Cadato and Bruchac
f) *Indian Legends from the Northern Rockies*, Clark
g) *The Tipi*, Yue
h) *Dictionary of Word Roots and Combining Forms*, Borror
i) *Easy Field Guide to Trees of Glacier National Park*, Nelson
j) *Montana Native Plants and Early Peoples*, Hart
k) *Plants of Waterton-Glacier National Park*, Shaw

1 Glacier National Park Raised Relief Map
1 Glacier National Park Topographic Map
1 beaver pelt
1 black bear skull
1 beaver skull
1 coyote skin

Bibliography

The following books and documents were read in preparation for the writing of *Work House.* None were directly quoted, but all are good resources for instructors using the program. Some are only available through the Glacier National Park Library. A few are included in the *Work House* Activity Kit.

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