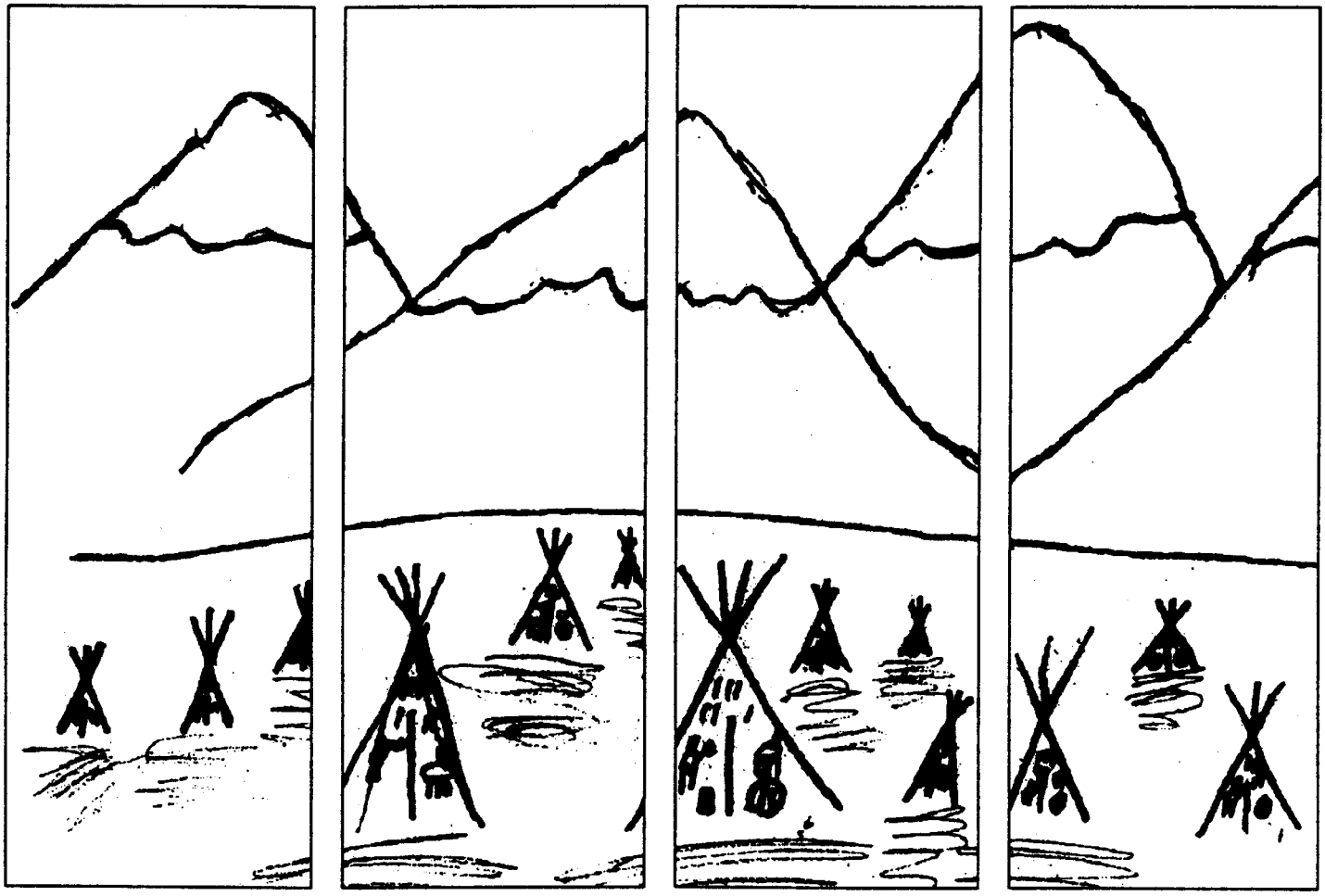
National Park Service
U.S. Department of the Interior

Glacier National Park

Work House

a Science and Indian Education Program with Glacier National Park



"Work House: ***Apotoki Oyis*** - Education for Life"

A Glacier National Park Science and Indian Education Program

Glacier National Park
P.O. Box 128
West Glacier, MT 59936
www.nps.gov/glac/

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Acknowledgments

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Sample Unit Organizer

Week 1 - Unit 1: People and Glacier				
Day 1 • Unit 1 People & Glacier • Stewards of the Land Student Reading 1- People and Glacier (Page 108)	Day 2 • Lesson 1 continued • Lonewalker Student Reading 2- Mountains and Mountain Building (Page 113)	Day 3 • Unit 2 Mountains and Mountain Building • Oral Histories and Glacier	Day 4 • Finish Stories • Plan for field trip	Day 5 • All day field trip or other extension activity or • Start work on mountain model
Week 2- Units 2 and 3: Mountains & Glaciers				
Day 6 • Unit 2 Work of Water • Build Model	Day 7 • Work of Water • Erosion and the water table • Formation of Mountains and Faults	Day 8 • Unit 3 Climate • Set up for Breaking it Down and • Carving Mountains	Day 9 • Breaking it Down and • Carving Mountains Student Reading 3- Glaciers, Glaciation, and Climate Change (Page 122)	Day 10 • Unit 3- Model Glaciers
Week 3- Unit 4: Native Plants				
Day 11 • Unit 4 • Plants Can't Move? Student Reading 4- Native Plants (Page 131)	Day 12 • Native Harvest	Day 13 • What's in a Name?	Day 14 • Continue Native Harvest and What's in a Name.	Day 15 • Forest Commun-ities
Week 4- Unit 5: Wild Animals and Habitats				
Day 16 • Unit 5 Animals • Painted Lodges • Start Research Student Reading 5- Wild Animals and Habitat (Page 141)	Day 17 • Animal research projects continue	Day 18 • Finish Stories • Plan for field trip	Day 19 • All day field trip or other extension activity	Day 20 • Finalize projects and lessons

Where did the name *Work House* come from?

This program was created in 1992 and updated in 1998, in consultation with members of the four primary American Indian Tribes associated with the Glacier National Park Region- the Blackfeet, Kootenai (or Ktunaxa pronounced tun-a-ha´ the name of the Kootenai Tribe in the Kootenai language), Salish, and Pend d'Oreille. It was designed with consideration for the history, cultural heritage, and traditional relationships of these tribes with what is now Glacier National Park.

Ktunaxa pronounced tun-a-ha´ is the name of the Kootenai Tribe in the Kootenai Language (Kootenai Culture Committee, Confederated Salish and Kootenai Tribes, 1997).

The title *Work House* is a translation of a positive Blackfeet language concept (apotoki [work] oyis [lodge or house]) for the way in which many American Indian children traditionally acquired the skills needed to become productive members of their society. Life skills were transmitted to the children on a continuing basis. 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. *Work House* activities are designed to be "hands-on" learning.

At Home In This Place Connections

This version of Work House is meant to be used digitally with access to the internet and the "At Home in This Place" DVD. Since *Work House* was first published, many wonderful materials have been developed and highlighted words throughout the text link to those on-line resources. For example the websites for the Blackfeet, Salish, Kootenai and Pend d'Oreille Tribes. Many resources are available for free from the Montana Office of Public Instruction (OPI). Montana schools have hard copies of OPI resources in their school libraries. The lessons and stories in *Work House* remain pertinent because of the enduring connection of these peoples with the area now known as Glacier National Park. From 2009-2011, representatives of all four tribes worked with park staff to create exhibits that would let park visitors know about these connections. Called, *At Home In This Place; Blackfeet, Kootenai, Salish, and Pend d'Oreille Perspectives on Glacier National Park*, the exhibits were installed in the St. Mary Visitor Center. The *At Home In This Place* DVD contains a collection of audio and video from the exhibit, with different tribal leaders and elders sharing their languages, stories, traditions, and contemporary values. We thank all of the people who had the courage, patience and foresight to participate in creating this wonderful resource. It is a perfect complement to the original *Work House* stories and lessons.

Two Themes of Work House:
1) Ecological succession - the process by which the species structure of an ecological community changes over time.

2) National Park resource protection and preservation.

The five units in *Work House* are: 1)People and Glacier ; 2) Mountains and Mountain Building; 3) Glaciers and Glaciation; 4) Native Plants; 5) Animals and Habitat. They are tied together by the themes of ecological succession and park resource protection. Each unit includes background information, student readings with traditional stories, a hands-on lesson, and extension activities. The classroom and park visits are aligned to state standards and address the Montana Indian Education for All (IEFA) Essential Understandings. Teachers should familiarize themselves with MT OPI's: American Indians 101:FAQ and Montana Indians: Their History and Location for the four primary tribes that are associated with Glacier - Blackfeet, Kootenai, Salish and Pend d'Oreille.

Lessons and Extension Activities

The *Work House* activities were originally designed with a "kit" of materials to assist with the lessons. In this update, the lessons have been revised to be conducted with materials from home or borrowed from libraries or other public agencies. Short instructional videos have been created to show what materials are needed and how the lessons could be structured. Links are included with each lesson to the on-line videos. Wherever possible, links have also been provided to contacts/sources for more information and materials. The teacher background information has been reviewed by local teachers, including those from schools both within the Flathead and in the Blackfeet Indian Reservations. A student reading guide has been created with the stories for each unit. Generally, the reading level is sixth grade.

Contact Glacier's Education Specialist at 406-888-7800 to obtain a free copy of the *At Home In This Place* DVD to use with the lessons.

The information from the St. Mary Visitor Center Exhibits for *At Home In This Place*, has been included throughout *Work House*. The *At Home In This Place* DVD from the exhibit is available for free by contacting the Education Specialist at Glacier National Park, 406-888-7800. Lessons note which audio and video sections from the DVD complement each lesson. Preview the videos in advance to ensure that the view points and perspectives expressed are at an appropriate level for your students.

Welcome to Glacier Hear Directly from the Tribes (St. Mary VC Project, 2010).

The National Park Service invites you to experience Glacier National Park from the perspectives of the American Indian Tribes that have called the park home for thousands of years: the Blackfeet, Kootenai, Salish, and Pend d'Oreille.

This land has been a national park since 1910 protecting scenic beauty, wildlife, and geologic history. In recent decades, the park has also embraced its mission of protecting the area's diverse cultural heritage. In *At Home In This Place* each tribe provides information about its relationship to this land. These diverse viewpoints expand our understanding about the significance of Glacier National Park.

Blackfeet in Two Medicine area, 1914, R.E. Marble photo (Glacier NP Digital Image Library).

The Wisdom in Spoken Words

Long before the Going-to-the-Sun Road, long before tourists trod beaten backcountry trails to reach scenic stone chalets, the Blackfeet, Kootenai, Salish, and Pend d'Oreille traveled the deep river valleys and traversed the high passes of what today we call Glacier National Park. These people still have a special connection to the rivers and valleys, the high peaks, the plants and animals that comprise the park area. Oral tradition and storytelling are an important means of communicating the history, traditions, values and ethics of their cultures.

The stories included in *Work House* have not changed since the original 1992 publication and were approved for use in the classroom through Cultural Committee review. We thank the Committees for allowing us to continue to publicize and share these stories. Not all traditional stories should be considered public domain. Be sincere and respectful in your use of any oral history stories.

Coyote stories are only told or discussed during winter, when snow is on the ground.

It is important to note that, out of respect for cultural values, Coyote stories are only told or discussed during winter, when snow is on the ground. They were taken out generally in November and put away February or March when the snow is gone. 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 when the snow is gone. Ideally teachers would do well to confer with local Cultural Committee authorities about Coyote story usage.

Both the traditional stories and the science explanations are offered with the understanding that neither is superior to the other. The stories are presented together so that they may engage students in wanting to know more about the wonders of this place where we live.

Here is what each of the tribes tells Glacier National Park visitors about story telling and oral history (St. Mary VC Project, 2010).

At Home In This Place Blackfeet Connection

Oral history is our culture. Our oral history holds the key to who we are. Our language is spiritual because it is taken from nature, and nature is spiritual. Our language doesn't need a verb to move the noun; it is in constant motion like the earth.

At Home In This Place Salish and Pend d'Oreille Connection

Oral tradition stands at the center of Salish and Pend d'Oreille cultures and histories. From generation to generation, the stories were passed on with rigorous discipline and accountability. Some of these stories reach back to the time when ice covered the land. Today the Salish and Pend d'Oreille are working to produce the first published histories that are centered around these important tribal voices.

At Home In This Place Kootenai Connection

It is through our oral history that we know of our proper relationships with the rest of creation. Human beings were the last of all beings to be created and so we are the youngest brother in all creation. The traditional Kootenai would have this realization in mind as they walked through life and would carry themselves as one would when walking among elders.

MT Office of Public Instruction (OPI)
The Essential Understandings of Montana Indians
2010, 2012

Essential Understanding 1
There is great diversity among the 12 tribal Nations of Montana in their languages, cultures, histories and governments. Each Nation has a distinct and unique cultural heritage that contributes to modern Montana.

Essential Understanding 2
There is great diversity among individual American Indians as identity is developed, defined and redefined by entities, organizations and people. A continuum of Indian identity, unique to each individual, ranges from assimilated to traditional. There is no generic American Indian.

Essential Understanding 3
The ideologies of Native traditional beliefs and spirituality persist into modern day life as tribal cultures, traditions, and languages are still practiced by many American Indian people and are incorporated into how tribes govern and manage their affairs.

Additionally, each tribe has its own oral histories, which are as valid as written histories. These histories pre-date the "discovery" of North America.

Essential Understanding 4
Reservations are lands that have been reserved by the tribes for their own use through treaties, statutes, and executive orders and were not "given" to them. The principle that land should be acquired from the Indians only through their consent with treaties involved three assumptions:

I. Both parties to treaties were sovereign powers.
II. Indian tribes had some form of transferable title to the land.
III. Acquisition of Indian lands was solely a government matter not to be left to individual colonists.

Essential Understanding 5
There were many Federal policies put into place throughout American history that have affected Indian people and still shape who they are today. Many of these policies conflicted with one another. Much of Indian history can be related through several major federal policy periods:

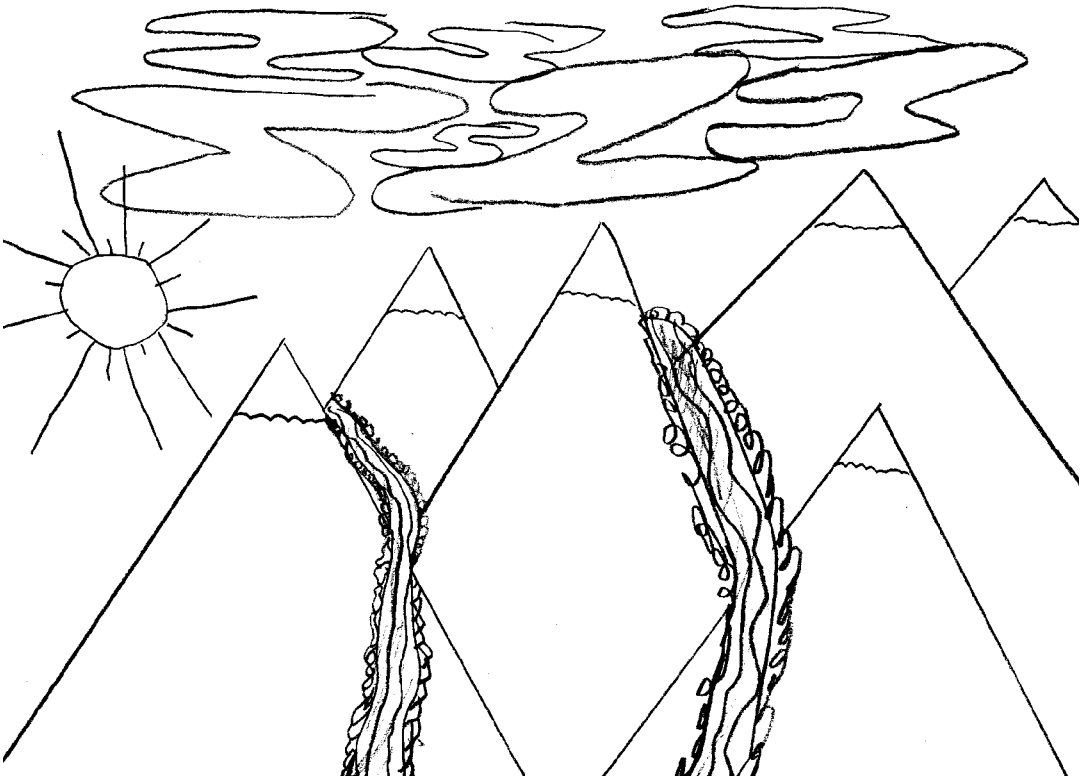
Colonization/Colonial Period 1492 – 1800s
Treaty Period 1789 - 1871
Assimilation Period-Allotment and Boarding School 1879-1934
Tribal Reorganization Period 1934 - 1958
Termination and Relocation Period 1953 - 1971
Self-determination Period 1968 – Present

Essential Understanding 6
History is a story most often related through the subjective experience of the teller. With the inclusion of more and varied voices, histories are being rediscovered and revised. History told from an Indian perspective frequently conflicts with the stories mainstream historians tell.

Essential Understanding 7
Under the American legal system, Indian tribes have sovereign powers, separate and independent from the federal and state governments. However, the extent and breadth of tribal sovereignty is not the same for each tribe.

Unit 1:
People and Glacier

- *It's Like Being Home*
- *One of Our Homelands*
- *A Sacred Place*



Mountains and Erosion
Student Artwork by
Chris Daley

People and Glacier Teacher Background Information

Work House begins with information about the history and people in Glacier National Park and discusses the human connection with the landscape. In combination with the videos and text from *At Home In This Place,* unit one introduces students to the significance of Glacier National Park for the Blackfeet, Kootenai, Salish, Pend d'Oreille and many other peoples.

The following "Educator Historical Narrative," is taken in its entirety from the MT Historical Society Footlocker (2010), "Land of Many Stories: The People and Histories of Glacier National Park" (15-18).
View pdf with Student version here

Educator Historical Narrative

Over time, people have experienced Glacier National Park many different ways. Personal experiences and many other factors shape peoples' values and beliefs. How a person or group of people relates to their surroundings depends on perspective. Perspective is how we think about the world around us. Perspective also shapes our ideas.

The people who have been a part of Glacier Park—living, working, visiting—may have had many different perspectives regarding the land. Sometimes these different points of view went together well. At other times they have led to actions that conflicted. To learn about Glacier Park's human history, we can study the many ways people have interacted with the environment and one another in this shared place.

A Familiar World

There were people here [for thousands of years] before the U.S. Congress declared this area "Glacier National Park" in 1910. These indigenous people (original inhabitants) were the Kootenai (pronounced KOO-ten-eye), Blackfeet, Salish, and Pend d'Oreille (pronounced Pon-dor-AY) tribes. Other tribes traveled through this area, but these four were already living here more than one hundred years ago. In fact, the Kootenai people's origin story (a tale about how a people came to be) tells that they "woke up" thousands of years ago at a place now called Tobacco Flats, along the Kootenai River.

In the summers, members of these four tribes resided in the cooler northern and western parts of what is now Glacier National Park. Here they could fish, hunt, and harvest plants. They returned each year to stay at favorite campsites, so we know they had trails and knew how to travel through the mountains. Oral histories tell of the creation of this landscape and its features; many aspects of this land are sacred to these tribes. (Sacred means very powerful in a spiritual sense.) It is very likely that groups from all of these tribes would have perceived this place as familiar—a place where they and their ancestors had lived, a place that was full of resources they knew how to find, a place about which they had stories and memories.

An Unknown Landscape

Newcomers came to this region in the 1800s. They were French, Métis (pronounced may-TEE), American, and Canadian (British) fur traders, trappers, explorers, and

map-makers. To them, this landscape was all new. They relied upon the indigenous people to show them how to get over the mountains. They might not have known which plants were edible, and they might never have seen a mountain goat. They did not have their own history of this place and came here with a different perspective. So, these newcomers generally would have understood the land in a very different way than its original inhabitants did. They would have seen a landscape that awed and inspired them, but one that was not "home," not sacred the way it was to the indigenous people.

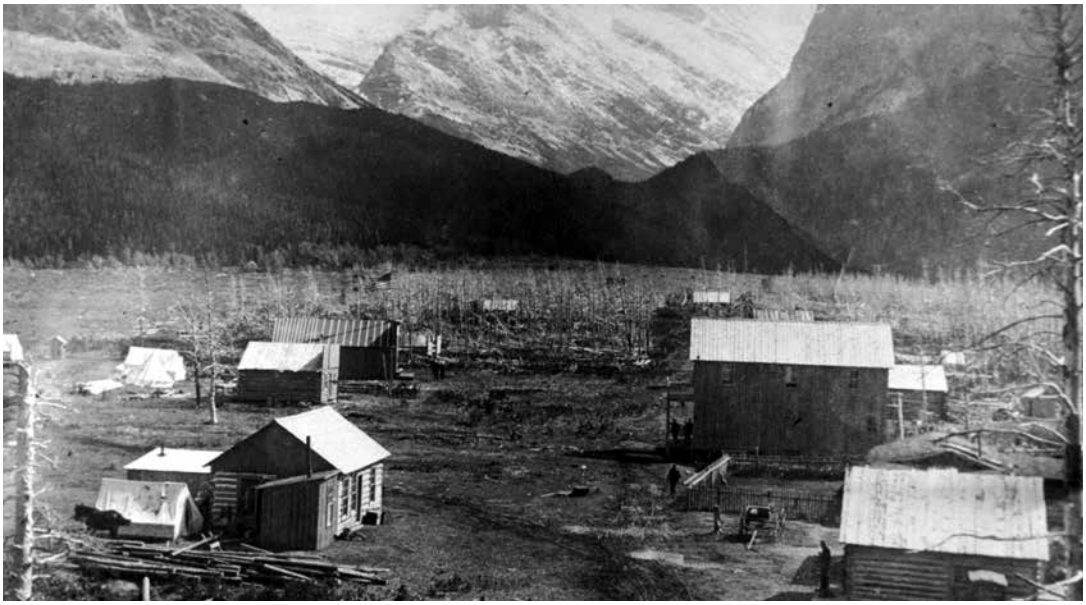
A Land of Resources

The growing nation wanted to make this new place its own. To do this meant exploring and mapping it. The American Indians and the Euro-Americans (non-Indians of European descent) had very different views of the natural environment. The United States government viewed the Indians as an obstacle to gaining control of this land. The government made treaties with the tribes to reach its goal of acquiring Indian lands.

Treaties had two main purposes regarding land: to assign Indians to reservations, and to decide what lands tribes would sell to the United States. An 1855 treaty between the United States and the Salish, Pend d'Oreille, and Kootenai created the Flathead Indian Reservation. That treaty also stipulated that the land that is now the western portion of Glacier National Park would become government land. In the same year, the Blackfeet set aside a portion of their former territory, which would later become the eastern part of Glacier Park.

At that time, Euro-Americans did not really think of people as part of the natural environment. They believed humans were greater than nature and that the land was something to be controlled. This view was very different from that of the Indians, the first people. Instead of sacred landscape and animals, Euro-Americans saw scenery, minerals to mine, animal hides for trading, and lumber for buildings.

In 1895, the United States government approached the Blackfeet for more land. The U.S. believed that there were valuable minerals in the mountains west of the Blackfeet Reservation. The tribe was very poor at this time. The bison on which they



Altyn- old mining townsite near Many Glacier, 1904 (Glacier NP Digital Image Library).

Adair Store owned by Bill and Emma Adair. Adair opened the Merc. in Sullivan meadow in 1904, and moved it to Polebridge in 1913 (Glacier NP Digital Image Library, photographer unknown, men in front, un-named).

had depended were almost gone, and smallpox and other diseases had killed many of their people. Tribal leaders tried to negotiate a fair price for the land, but the government representative said they would pay only half what the tribe requested. Tribal elders disagreed with one another. Some, such as Little Dog, said that the tribe should hold their ground. White Calf, on the other hand, felt they had no choice but to accept the offer. The government representatives pressured White Calf to encourage other tribal members to take the offer. After a day or so of negotiations, most of the tribal leaders signed the agreement because it included two important provisions. First, the tribe could continue harvesting timber and hunting on the land. Second, the treaty would be canceled if the U.S. divided the remaining Blackfeet Reservation land into allotments.

A Place Worth Preserving

For 15 years, the "ceded strip" (as the Blackfeet section was called) was part of the Forest Reserve. During this time, settlers established mines, homesteads, and small towns in parts of this area, and the tribe continued hunting and harvesting needed resources according to the agreement. For the most part, the land remained as it had been before the United States acquired it. To the newcomers in northwestern Montana, the absence of buildings, roads, railroads, cities, and industrial development, and the presence of the spectacular mountains, made them perceive this area as "wild." While some Americans thought that such places should be developed, others felt that they should be preserved. One such person was George Bird Grinnell, one of the men who had represented the United States in the 1895 negotiations with the Blackfeet.

The United States had only a handful of national parks at the end of the nineteenth century. The population was growing quickly and few places still seemed "wild." To George Bird Grinnell, the ceded (surrendered, or given up) Blackfeet land was a wild place unlike any other. Grinnell wanted it protected from development, so he and other conservationists convinced Congress to create a national park in northwestern Montana. The settlers who had recently moved into the area, however, did not want to lose access to

Going -to-the-Sun Road bed construction 1928, NPS photo (Glacier NP Digital Image Library).

Teaching with Historic Places has an on-line lesson with more historic photos about this engineering feat.

its resources. In the spring of 1910 a compromise was reached with landowners, and Congress passed a bill creating Glacier National Park. Creating the national park also meant creating a new way of thinking about the land as a place for conservation and recreation. This had a direct impact on the Blackfeet because the "ceded strip" from their tribe made up the eastern half of the new national park. When they had signed the agreement in 1895, the Blackfeet did not know that the United States would make it into a national park. Suddenly, the Blackfeet who depended on this land were told they could no longer hunt, gather, and camp there as they always had. This action by the United States set in motion a conflict between the Blackfeet nation and the U.S. government that continues today.

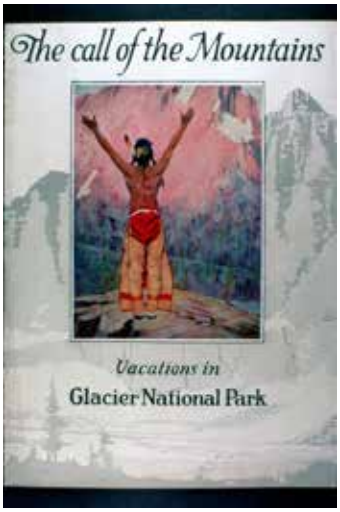
Glacier National Park: A Stage for the Imagination

Soon after the area was declared a national park, newspapers begin printing articles extolling this place where people could fulfill their desire for nature. For promoters and tourists, the park was a magnificent stage, beautifully set, and they were the actors. They did not think about the fact that the "old actors"—the indigenous people—had been removed or made to be "part of the scenery" for them to enjoy. Here, urban tourists could become cowboys or cowgirls, mingle with friendly Indians, and even get an "Indian name."

Artists were a very important part of Glacier Park's human history. The Great Northern Railway hired artists to create postcards, advertisements, posters, and art that showed off the park's attractions. Other artists came to the park to be inspired for their own work. This included filmmakers, novelists, poets, and painters. Local Indian people were a large part of the attraction for artists who wanted to create images of the "first Americans."

An Economic Opportunity

Recreation has often been at odds with conservation. Recreation involves people and development. Conservation is the limited use of the natural environment. For men like Louis Hill, chairman of the Great Northern Railway and owner of the Glacier Hotel Company, recreation required the development of railroads, automobile roads, bridges, hotels, and lodges for the tourists.



Great Northern Railroad brochure, E. Seeley photo (Glacier NP Digital Image Library, No Date).

Such development had a huge impact on Glacier's natural environment because it required using many natural resources, such as timber and water, and brought in services like electricity. It changed the landscape. Companies owning businesses in the park saw a chance to make money by offering services to tourists. Guided tours and camping facilities made it possible for more tourists to visit the park each year. As the number of visitors and services grew, so did the jobs.

Small roads and trails connected points within the park. Transportation became one of the main necessities if Glacier was going to attract more tourists, so Going-to-the-Sun Road was built to accommodate automobiles.

The new park needed to attract visitors, so Blackfeet tribal members were asked to be part of its attractions. "Our people were paid to camp at the lodges and dress in our traditional buckskin clothes," recalled a Blackfoot man, adding, "The authorities who had tried to eradicate our culture were now using us to promote their tourist destinations."

This meant that, during the summers, some tribal members could live, work, or perform where the same land their parents and grandparents had lived. However, they could no longer hunt, graze livestock, or gather needed resources there. A handful of tribal members were employed as construction workers, as were many of the landless Cree and Chippewa Indians living in the region at the time.

The growing park provided jobs for hundreds of laborers. In the 1930s, many Americans were out of work. President Franklin D. Roosevelt made a plan to get Americans working. One part of this plan was the government-run Civilian Conservation Corps (CCC), modeled after the U.S. Army. The CCC men worked on projects in the park, but the CCC ran its own camps. Many young and middle-aged men signed up to join one of the four CCC camps in Glacier Park. One camp was made up entirely of American Indian men. From 1933 until 1942, members of the CCC camps cleared trails, built roads, and repaired park buildings for the tourist business. World War II started in 1939, and the CCC was discontinued in 1942

Blackfeet tepees at Logan Pass with Mt. Reynolds in background during the dedication ceremony for the opening of the Going-to-the-Sun Road, July 14, 1933, George A. Grant photo (Glacier NP Digital Image Library).

CCC Camp #9 in winter, 1934 (Glacier NP Digital Image Library).

when many of its enrollees joined the military.

A Place for Learning

Recreation in the park has often been at odds with conservation, the other purpose of the park, because recreation involves people and development. Conservation, on the other hand, means the preservation or limited use of the natural environment. In the first years of the park, the administration encouraged its rangers to kill predators such as coyotes, wolves, and grizzly bears. These animals were thought of as a threat to other wildlife and to humans. The park's administrators viewed fire as another dangerous natural force, and for many years fires were put out before they could burn much of the forest. In more recent times, rangers and scientists have studied how predators and natural forces affect the overall health of the park. They have learned that predators and fire are very important to the park. This has required park managers to learn new perspectives.

Scientists have always been an important part of the park's human history. Morton Elrod, a science professor at the University of Montana, was Glacier's first official park naturalist. He studied many natural things in the park and started the first naturalist-guide program. He knew that many of Glacier's tourists were people who cared about the natural world, and he wanted them to learn about nature within the park.

Later, the scientific studies of nature focused on ecosystems and biospheres, two new ways of understanding the environment. This new focus encouraged the science of ecology, which is the study of living things. One recent study is called "Hair of the Bear." It studies the population and differences among the grizzly bears in Glacier by analyzing their hairs. Another research group is studying the effects of climate change on the park's glaciers. These glaciers are predicted to disappear entirely by as soon as 2030!

As you learn more about Glacier National Park, you will have a chance to discover more about the people and the landscape. You will also build your own appreciation of this place—an understanding that might influence the future of Glacier National Park.

Collecting bear hair from rub tree for DNA study, Jeff Stetz photo (Glacier NP Digital Image Library).

Use the *At Home in this Place* DVD to listen to the welcome greetings from each tribe to visitors to the park. Watch the videos created by the tribes to tell visitors about the park's cultural significance. Decide how you would like to share this information with your students (St. Mary VC Project, 2010).

At Home In This Place
DVD Content

Play Videos:
Blackfeet
- *It's Like Being Home*

- *We Are The Owners of Glacier National Park*

Hear from the Blackfeet:

The mountains are the strength of the Siksikastapiwa People. **We are Pikuni (pee-CUN-nee), known in English as Blackfeet. We are the southern band of the Blackfeet people: Sik-sik-ai-sit-ta-api-wa. Blackfeet ancestral territory extends along the Rocky Mountains from the headwaters of the Yellowstone River in southern Montana to the North Saskatchewan River in Alberta, Canada. The east side of Glacier National Park is on the traditional lands of the Blackfeet. The Blackfeet people understand and believe that we still own the east side of the park.**

Bittersweet Meanings

The Blackfeet recognize the various ways in which people with different cultures, practices, and beliefs assign significance to the same piece of land.

The landscape of Glacier is the source of our oldest and most venerated ceremony, the Beaver Bundle. The inception of the national park concept preserved the landscape, but excluded Blackfeet cultural and spiritual practices. The Blackfeet still retain hope to use the park area, maybe through future cooperative agreements.

At Home In This Place
DVD Content

Play Videos:
Kootenai- *One of Our Homelands*

Hear from the Kootenai Ktunaxa-Ksanka:

Ya·qawiswiṫxuki *This is the land where the glaciers are.*

For as long as human beings have been speaking languages, we Kootenai have lived in the area known as Glacier National Park. Our tribal name is Ktunaxa-Ksanka (k-toon-A-ha k-SAHN-ka), which in English is Kootenai.

We traditionally followed a yearly cycle of movement, a way of life directed by the seasons. In the summers we fished by canoe on rivers and lakes, from near Lake Windermere in British Columbia, Canada to Edmonton, Alberta, Canada. In the cold winter months we moved south to the Sweetgrass Hills and Yellowstone, hunting bison on snowshoes. As the snows melted we moved west to Lake Pend Oreille, and then back to the north.

At Home In This Place
DVD Content

Play Audio:
Kootenai- *The Place Where They Danced*

There is a specific place in Glacier National Park near Lake McDonald called Ya·kiɬ Haqwiɬnamki which means "place where they dance." It is where a ceremonial dance was given to the Kootenai during our first winter on earth.

Bittersweet Meanings

In Glacier National Park, our elders are appreciative of a national desire to preserve the area in its pristine condition.

We are thankful for the preservation of an area that has 500-year-old cedar

trees who listened to our ancestors sing and dance long before the Kootenai were aware of Europeans. Yet, we are also aware that this place has not been preserved because of its significance to us. It is preserved because of the many visitors that come to the area.

At Home In This Place
DVD Content

Play Videos:
Salish & Pend d'Oreille
- *A Sacred Place*

- *A Hope for Future Generations*

Hear from the Salish and Pend d'Oreille:

Séliš and Qlispé

The long-ago people...called these highest mountains xʷ c̓xʷ c̓ut *because they are all just rocks.*

...łu tsqsi t sqélixʷ i še cuntm...xʷc̓xʷc̓ut...čmiʔú sšenš.

– Pete Beaverhead, Pend d'Oreille, 1975

We are the Séliš (Salish or "Flathead") and Qlispé (Pend d'Oreille), the easternmost tribes of the Salish language family.

Originally, we were one nation. Many thousands of years ago, as the population grew, we dispersed from here to the west, eventually forming many tribes and dialects reaching from Montana to the Pacific Coast.

We lived as hunters, fishers, and gatherers, with vast territories on both sides of the Continental Divide. The Flathead drainage system and the west side of Glacier National Park was part of the territory of the Qlispé band known as the Sł̓q̓etkʷmsčin̓t, meaning People of the Broad Water. This was the ancient name for Flathead Lake. A related tribe, the Tuṅáx̣n, lived along the Rocky Mountain Front.

Bittersweet Meanings

When natural areas start to disappear, cultures will disappear. National parks provide a means for keeping culture alive; they have become sacred places and sanctuaries.

We often conduct field trips with elders to record their knowledge of the land, traditional place names, and of tribal history. For the elders, these trips are often both joyful and sad. These trips record the tribal relationship with these places in Salish and Pend d'Oreille culture, but also their loss.

Salish couple, (no names listed) hides on ground, Going-to-the-Sun Chalet, Glacier National Park, N.A. Forsyth photo, 1903 (Glacier NP Digital Image Library).

Unit 1- People and Glacier
Lesson 1
Stewards of the Land

Materials:
- *At Home In This Place* DVD-free from Glacier National Park
- Student Reading, Unit 1
- Paper, pencils & colored pencils

Students on fire ecology program, NPS photo.

Lesson At A Glance

Students learn about the four main tribes associated with the Glacier area. Then watch videos with tribal leaders and elders talking about their tribe's relationship to Glacier National Park and why they feel it's important to take care of the park. Students will reflect/discuss messages in the videos and write a contemporary story that teaches about caring for the Earth. Homework: Student Reading 1: People and Glacier National Park.

Objectives

Students will be able to:
- Name the four tribes most commonly associated with the Glacier area.
- Compare and contrast perspectives about Glacier National Park from the Blackfeet, Kootenai, Salish, Pend d'Oreille, National Park Service and other park visitors.
- Use their language skills to write a contemporary story dealing with relevant environmental issues that affect their lives.

Time Required

50-60 minutes to view and discuss the videos and introduce writing assignment. (Extra time will be required for reviewing information about tribes). Additional 50-60 minutes to work in class on writing and sharing stories.

Vocabulary

Blackfeet, ceded strip, descendants, ecosystem, future generations, national park, spirituality, stewardship, walking lightly.

Teacher Preparation/ Background

Be familiar with the four tribes most closely associated with the Glacier region by reading the "Educator Historical Narrative" from the MT Historical Society Footlocker: "Land of Many Stories: People and Histories of Glacier National Park" reprinted in the unit introduction. You may choose to use the student version from the pdf with your class. It is important to also be familiar with MT OPI's: American Indians 101:FAQ. More information is available from each of the tribe's websites - Blackfeet, Kootenai, Salish and Pend d'Oreille, as well as the Montana Office of Public Instruction publication, "Montana Indians: Their History and Location."

Procedures

1. Make sure your students know the location of Glacier National Park and the background information about the four tribes - Blackfeet, Salish, Kootenai, and Pend d'Oreille. Share as you feel appropriate for your students, the audio greetings from the *At Home In This Place* DVD and the quotes from the tribes that are in the unit introduction.

At Home In This Place DVD Content

Play Videos:
Blackfeet - *The Park is a Living Creature*

2. Show students the *At Home In This Place* videos: Blackfeet- *The Park is a Living Creature*; Kootenai- *One of Our Homelands*; Salish and Pend d'Oreille - *A Hope for Future Generations*.

At Home In This Place DVD Content

Play Videos:
Kootenai- *One of Our Homelands*

3. After each video, discuss and record the main messages students felt were communicated about people and Glacier National Park today and in the past.

4. After watching all three videos and looking at the list of messages from each, circle any that were the same for all three. Did stewardship emerge as a message? Spiritual connections? Walking lightly? Ownership? Responsibility? Other?

At Home In This Place DVD Content

Play Video:
Salish & Pend d'Oreille- *A Hope for Future Generations*

5. Discuss with students the differences with what has gone on in the past with regard to their environment- particularly in their local area. How does the present reflect the impact of the past? What can be done to insure the best possible future for the Earth and all its creatures? What does it mean to be a good steward? Does being a good steward have the same meaning for all cultures- why or why not?

6. Have students do the student reading for unit one (silent reading, in class together, or as homework). Then have them write a story that deals with the environment and teaches a lesson about caring for the Earth in contemporary times. (Similar to the Lucy Lonewalker example story in the reading).

Group photo after helping with native plant restoration project in Glacier National Park, NPS photo.

Reflection and Assessment

When the stories are finished, have the students read their stories to the rest of the class or to let you read the stories to the class. Encourage the students to explain and discuss the issues behind their stories.

Writing Extension

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.

Action Project/ Field Trip Extension

- Ranger-Led Field Trips and Service Learning Projects in Glacier National Park.
- Self-Guided Field Trips in Glacier National Park.
- Glacier Institute - geology and other education programs.
- Flathead CORE - outdoor education guide for field trips in the Flathead. Guided Tours - various concession operated - in Glacier National Park.
- Flathead Community of Resource Educators Website - local resource providers, student action projects, and outdoor classrooms near you.

Additional Resources

- Glacier National Park Cultural Resource Guide- fact sheets, powerpoints, virtual tours, digital images, lesson plans.
- Land of Many Stories; The People and Histories of Glacier National Park- MT Historical Society Footlocker available for loan.
- Days of the Blackfeet: a Historical Overview of the Blackfeet Tribe for the K-12 Teachers in the State of Montana- created and produced at the Blackfeet Community College.
- Montana Skies Blackfeet Astronomy- lessons distributed by Montana Office of Public Instruction, Indian Education For All.
- Create A National Park Lesson -from Biscayne National Park, Florida.
- Locating Glacier National Park - mapping lesson.
- America's Best Idea - lesson plans from the PBS Ken Burns Series.
- Glacier National Park Conservancy Bookstores - variety of books specific to Glacier National Park.
- Before There Were Parks: Yellowstone & Glacier Through Native Eyes- MT PBS video, 30 minutes.
- Numerous Social Studies lessons from MT OPI, Indian Education for All.

MT Content Standards

Unit 1: Lesson 1

Montana Common Core Standards—English Language Arts

CCRA.SL.1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCRA.SL.2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

Standards for Literacy in History/Social Studies, Science, and Technical Subjects

CCRA.RH/ST.7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

CCRA.RH/ST.9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

CCRA.WHST.3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences.

CCRA.WHST.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCRA.WHST.5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

CCRA.WHST.7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

CCRA.WHST.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Montana Standards for Science

Science 1.1.6. Identify, compare, explain... how observations of nature form an essential base of knowledge among the Montana American Indians.

Montana Standards for Social Studies

Social Studies Standard 3. Students apply geographic knowledge and skills (e.g., location, place, human/environment interactions, movement, and regions).

Social Studies Standard 4. Students demonstrate an understanding of the effects of time, continuity, and change on historical and future perspectives and relationships.

Social Studies Standard 6. Students demonstrate an understanding of the impact of human interaction and cultural diversity on societies.

Indian Education for All Seven Essential Understandings Regarding Montana Indians

Essential Understanding 1 —tribal diversity

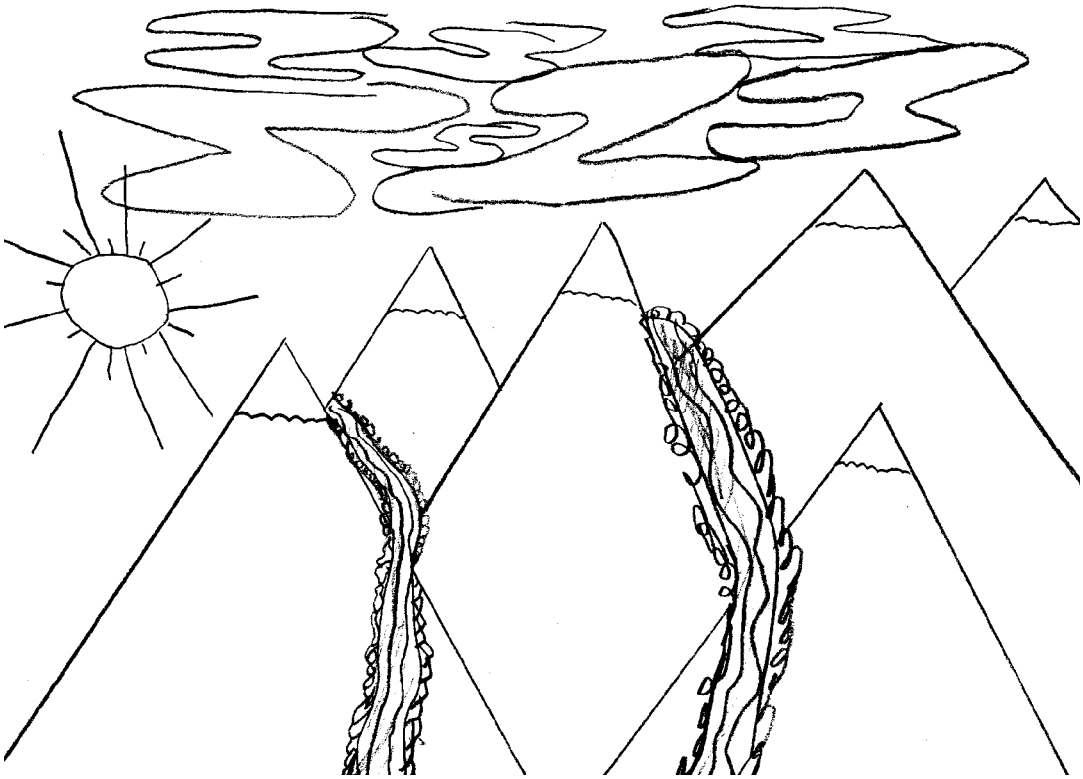
Essential Understanding 3 —importance of oral traditions

Essential Understanding 6 —history is subjective

National Park Service
U.S. Department of the Interior

Glacier National Park

Unit 2:
Mountains and Mountain Building
Backbone of the World



Mountains and Erosion
Student Artwork by
Chris Daley

Mountains and Mountain Building Teacher Background Information

Included below is the text from the St. Mary Visitor Center Exhibits in Glacier National Park. The exhibits were created in collaboration with the four tribes to tell visitors to the park what the mountains mean to them.

All mountains are sacred to the Blackfeet, Kootenai, Salish, and Pend d'Oreille Tribes. The mountains are part of who we are and who we will be.

The Blackfeet, Kootenai, Salish, and Pend d'Oreille have spiritually and culturally important sites among the mountains. Sometimes we leave special objects in the mountains and at times trails may be closed. Please respect our cultures - leave items in the mountains and obey signs.

At Home In This Place
DVD Content

Play Videos:
Blackfeet - *It's Like Being Home*

Blackfeet

- Mountains are significant to us because they provide knowledge.
- Mountains have a future value to us; we don't know what will be revealed in the future.
- All mountains have animal, bird, and water spirits. Roots, herbs, and plants have healing medicine and provide spiritual passage for vision quests.
- "Backbone of the World" is the Blackfeet name for the Rocky Mountains in Glacier National Park. The sacred water flows three directions at Triple Divide Mountain.
- Ninastako (Chief Mountain) in Blackfeet, means "the mountain that stands apart."

At Home In This Place
DVD Content

Play Audio:
Kootenai- *The Place Where They Danced*

-*We Ask That You Walk Lightly*

Kootenai

Glacier is significant to the people because so many of our physical and spiritual needs can be attained today in a relatively compact area between the high peaks and lower lakes and streams, as it always was for our ancestors. Medicinal plants and spiritual guidance can be attained here.

At Home In This Place
DVD Content

Play Videos:
Salish & Pend d'Oreille- *I Can Almost Hear our Ancestors*

Salish and Pend d'Oreille

The west side of Glacier National Park is part of the traditional homeland of the Pend d'Oreille people, and to the east, along the Rocky Mountain Front south of Glacier, lived the Tuṅáx̣n. The Salishan tribes call the entire Rocky Mountains Sntxʷeyčṅ - the Backbone. The highest peaks, the ones that are only rock, are called Xʷčxʷčut. The elders say these places should be respected and kept pristine for all generations to come.

Unit 2- Mountains and Mountain Building
Lesson 1
Oral Histories and Glacier National Park

Materials:
- *At Home In This Place* DVD
- Student Reading, Unit 2
- Paper
- Pencil
- Colored pencils

Triple Divide Pass and Peak, Clay Parcles photo (Glacier NP Digital Image Library).

Lesson At A Glance

Students read and compare/contrast the cultural stories about creation of land formations with "A Geological Story of Glacier National Park." The teacher will lead a discussion about story telling, oral history, and different explanations for the same phenomena.

Objectives

Students will be able to:
- Explain the importance of oral history and cultural stories.
- Compare and contrast it to a story their family tells over and over again.
- Use language arts and artistic skills to produce their own stories of environmental phenomena in their community.
- Speculate creatively and scientifically about natural phenomena in their lives.
- Consider compatibilities between Western science and Native knowledge.
- Realize there are multiple perspectives for the same landscapes.

Time Required

50 minutes (may need additional time to write their own stories).

Vocabulary

Environment, mountain, oral history, phenomena.

Teacher Preparation/ Background

Review the definitions for oral history and origin story.

- An oral history is a historical account recorded in the memories, legends, stories, songs, art, and languages of people who did not create written histories. Oral histories are passed from one generation to the next and are as valid as written histories. Indigenous languages are the key to the survival of oral histories, as they can seldom be translated accurately into other languages.
- Origin story – An origin story is a people's account of their own creation and beginning. Origin stories are part of tribes' oral histories. They do not always concur (agree) with archaeological or academic theories about the origins of humankind, or human migrations. However, this does not mean that such stories are not true or do not have value and importance.

Percy Bullchild in *The Sun Came Down: The History of the World as My Blackfeet Elders Told It,* writes,

> All of this story is true, because we Natives preserved our history in our minds and handed it down from generation to generation, from time unknown, orally. From the time human life began. It isn't any different from the stories our white friends tell about such as King Arthur of the Round Table and Joan of Arc, there are many other stories of the white legends that are written too. Some of these stories may sound a little foolish, but they are very true. And they have much influence over all of the people of this world, even now as we all live. (3)

This activity is designed to get students thinking about story telling and the importance of oral histories and origin stories. It should also get them to speculate creatively and scientifically about natural phenomena in their environment. It is best to have students choose phenomena that they have often wondered about. This is a warm-up writing activity and topics need not be limited to mountain building.

Procedures

At Home In This Place DVD Content

Play Videos:
Blackfeet - *It's Like Being Home*

At Home In This Place DVD Content

Play Audio:
Kootenai- *The Place Where They Danced*

-*We Ask That You Walk Lightly*

At Home In This Place DVD Content

Play Videos:
Salish & Pend d'Oreille- *I Can Almost Hear our Ancestors*

1. Share the information each tribe contributed to the St. Mary Visitor Center Exhibit: Wisdom in Spoken Words, as well as the unit introduction about the importance of the Rocky Mountains to the four tribes and to their oral history creation stories. Show the videos from each tribe: "It's Like Being Home," "The Place Where They Dance,"and "I Can Almost Hear our Ancestors." Discuss the connection each video relates about the stories and the area that is now Glacier National Park.
2. Have the students do the Student Reading for Unit 2 (use whatever works best - homework, silent reading, group reading, or teacher reading out loud). The Glenbow Museum, Canada, as part of their Niitsitapiisini- Our Way of Life, virtual exhibit has a video link for Okotoks, Alberta where one of the largest rock fragments associated with the Napi story is located.
3. Use the questions and vocabulary at the end of the reading for discussion. Then have students speculate creatively and scientifically about natural phenomena in their lives.
4. Have them use language arts and artistic skills to produce their own stories about environmental phenomena in their community. Have them illustrate their story with colored pencils.

Reflection/Assessment

Editing partners should practice reading their stories to each other, make constructive suggestions for revision, and rewrite a final draft.

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. How did it feel to share their story- easy, hard, scarey?

Writing and Art Extension

All stories and illustrations could 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. What might the cover of that book look like? Would students like to design a cover for one of the stories?

Action Project/ Field Trip Extension

- Ranger-Led Field Trips and Service Learning Projects in Glacier National Park. Earth Science and Forest Processes field trips about park geology.
- Self-Guided Field Trips as well as Guided Tours - various concession operated - in Glacier National Park.
- Glacier Institute - geology and other education programs.
- Flathead CORE - outdoor education guide for field trips in the Flathead.

Additional Resources

- Before There Were Parks: Yellowstone & Glacier Through Native Eyes- MT PBS video, 30 minutes.
- Listen to the Blackfeet, Salish , Pend d'Oreille and Kootenai stories on the "Audio" portion of the "At Home in This Place" DVD.
- Land of Many Stories; The People and Histories of Glacier National Park MT Historical Society Footlocker - available for loan from Glacier, has the CD "Blackfeet Legends of Glacier National Park" by Jack Gladstone.
- Montana Skies Blackfeet Astronomy- MT OPI-Indian Education For All, has Blackfeet speaker telling Blackfeet stories about the night sky and constellations.
- Contact the Tribal Culture Committees and request a native speaker to visit your classroom.
- Flathead Geoscience Education Project-investigating the geological history of the Flathead Indian Reservation through a combination of modern geological research, tribal knowledge and oral histories.
- Glacier National Park Conservancy Bookstores - variety of books specific to Glacier National Park.
- Flathead Community of Resource Educators Website - Flathead education resource providers, education trunk list.

Napi Student Artwork
by Mandy Horn

MT Content Standards

Unit 2: Lesson 1

Montana Common Core Standards—English Language Arts

CCRA.SL.1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCRA.SL.2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

Standards for Literacy in History/Social Studies, Science, and Technical Subjects

CCRA.RH/ST.1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

CCRA.RH/ST.2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

CCRA.RH/ST.4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

CCRA.RH/ST.7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

CCRA.RH/ST.8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.

CCRA.RH/ST.9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

CCRA.WHST.3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences.

CCRA.WHST.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCRA.WHST.5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

CCRA.WHST.7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

CCRA.WHST.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Montana Standards for Science

Science 1.1.6. Identify, compare, explain... how observations of nature form an essential base of knowledge among the Montana American Indians.

Montana Standards for Social Studies

Social Studies Standard 3. Students apply geographic knowledge and skills (e.g., location, place, human/environment interactions, movement, and regions).

Social Studies Standard 4. Students demonstrate an understanding of the effects of time, continuity, and change on historical and future perspectives and relationships.

Social Studies Standard 6. Students demonstrate an understanding of the

MT Content Standards Continued

impact of human interaction and cultural diversity on societies.

Indian Education for All Seven Essential Understandings Regarding Montana Indians
Essential Understanding 1 —tribal diversity
Essential Understanding 3 —importance of oral traditions
Essential Understanding 6 —history is subjective

Unit 2- Mountains and Mountain Building
Lesson 2
The Work of Water - INSTRUCTIONAL WORK OF WATER VIDEO

Materials:

- Trough-one can be built from 2' x 10's nailed together
- Clay from a stream bank or recycled potters clay
- Soil -garden or used potting soil
- Sand
- Small sized gravel from the schoolyard or aquarium gravel
- Several ping pong ball-sized rocks of different shapes
- A two-quart juice pitcher with a narrow spout
- A transparent container to collect runoff materials
- Optional: toy houses; Glacier raised relief map/eye dropper/ food coloring for extension activity

Middle Fork Flathead River
spring high water, NPS photo.

Lesson At A Glance

Students construct a river model. Then use a watering can or hose to observe the role water has in causing weathering, erosion, deposition and sculpting the landscape.

Objectives

Students will be able to:

- Construct a river model and observe the role water, erosion, and sedimentation can have in shaping the landscape.
- Describe how sedimentary rocks form.

Time Required

Two class periods -one to construct the model and one to observe erosion and deposition. Additional time to let sediments settle to see layers. Can be multi-day with students doing exploratory play.

Vocabulary

Banks, confluence, course, delta, drainage, excavates, mouth of the river, meanders, river source, sediment, terracing, topographical features, transports, tributaries.

Teacher Preparation/ Background

This activity gives the students a hands-on experience with the way water excavates, transports, and deposits material. Be familiar with erosion and background information on rivers and rocks. View the instructional video which shows one version of how to make a river model of erosion and water flow. Perhaps a sand box or other outdoor version would work just as well. Could older students build something? There are also models available through science stores and local Conservation Districts. Decide which you will use and obtain the materials. You will need to identify a place for students to go outdoors to create/use the stream model. For the science extension, it will be necessary to obtain a Glacier raised relief map. (An excellent river dynamics digital student resource to consider obtaining in advance is the Confederated Salish & Kootenai Tribes' Explore the River Interactive DVD-limited copies vailable for free from CSKT for educators.)

Procedures

1. Review with the Unit 2 Student Reading how stream erosion is one of the major agents shaping the topographical features in the environment. Be sure to relate the formation of the ancient sedimentary rocks comprising Glacier's mountains to this activity.
2. Take the students and materials outside and guide them in constructing a river model.
3. Arrange the trough so that the lower end hangs over the transparent glass cake pan.
4. Mold a bedrock base of clay in the bottom of the trough.
5. Have students sprinkle layers of gravel, sand, and soil along the length of the trough making sure that there is a top layer of soil.
6. Push rocks down into the soil near the center and along the course of the trough.
7. As an added touch the students may want to place little twigs and pine trimmings along the course to represent trees.
8. When the model is complete, slowly pour water (or trickle water from a hose) into the top center of the trough. Allow the water to percolate gently until it begins to make its own bed down the center of the trough. Rocks in the way will create meanders in the river bed. There is no need to overdo the water. When the cake pan is nearly full of water with its sediment load allow it to settle naturally.
9. At this point you may wish to casually teach a little river nomenclature. Point out and discuss the source, the banks, tributaries, confluence, meanders, the course, delta, and the mouth of the river. Add any other vocabulary and information that you are comfortable with.
10. Allow the contents of pan to sit for several hours or until the next day. Point out how the different materials have separated themselves into sedimentary layers.

Reflection/Assessment

If possible, leave these materials out so that the students can continue to experiment with them. Practicing their vocabulary and naming formations. Finally, save this model for further activities with the unit on Glaciers and Glaciation.

Science Extension

Watch the Video on how to do this Triple Divide Science Extension

- Take the small Glacier relief map and locate Triple Divide Peak to the south of St. Mary Lake. Suppose that for some reason you needed to dispose of some water on top of Triple Divide Peak. Where would that water go? Use an eye dropper to deposit water on the map until it finds its way down the three drainages into the Pacific Ocean, the Atlantic Ocean and into Hudson Bay.

Writing Extension

- For a writing and research assignment you might invite the students to write a story about a trip in a canoe, or as a drop of water or a stick, that begins at the top of Triple Divide. Which drainage would you take? What would you see and what would happen along the way? Where would you finally end up?"

Action Project/ Field Trip Extension

- Ranger-Led Field Trips and Service Learning Projects in Glacier National Park. Earth Science and Forest Processes field trips about park geology.
- Self-Guided Field Trips and Guided Tours - various concession operated.
- Glacier Institute - geology and other education programs.
- Flathead CORE - outdoor education guide for field trips in the Flathead.
- Water/Stream Monitoring - MT Watercourse.
- Confederated Salish & Kootenai Tribal Natural Resources Dept., River Honoring- contact the Tribes for updates.
- Flathead Conservation District , Flathead Audubon , Whitefish Lake Institute- variety of related education/outreach projects.

Additional Resources

- Explore the River, Interactive DVD - Confederated Salish & Kootenai Tribes, The DVD explores in detail the hydrology, habitat, fish, and Salish and Pend d'Oreille culture and history and their current efforts to restore the Jocko River.
- Flathead Community of Resource Educators Website - contains a resource link to the Flathead Watershed Sourcebook - information on cultural and natural history of the Flathead watershed and traveling trunks.
- Flathead Lake Biological Station- field research and education facility of the University of Montana located at Yellow Bay on Flathead Lake.
- Montana Watercourse - education trunks, water monitoring, and other water education programs and materials.
- Project Wet - water education activities and teacher workshops.
- Glacier National Park Conservancy Bookstores - books specific to Glacier.

MT Content Standards

Unit 2: Lesson 2

Montana Common Core Standards—English Language Arts

CCRA.SL.1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCRA.SL.4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Montana Standards for Science

Science 1.1.4. Use (create, analyze) models that illustrate simple concepts and compare those models to the actual phenomenon.

Science 1.1.6. Identify, compare, explain ... how observations of nature form an essential base of knowledge among the Montana American Indians.

Indian Education for All Seven Essential Understandings Regarding Montana Indians

*Essential Understanding 1 —tribal diversity

*Essential Understanding 3 —importance of oral traditions

*Essential Understanding 6 —history is subjective

* If connect lesson with Unit 2 stories and additional resources listed from the Confederated Salish & Kootenai Tribes

Unit 2 -Mountains and Mountain Building
Lesson 3
Erosion and Preservation of the Water Table- INSTRUCTIONAL VIDEO

Materials:
- Two large trays
- A watering can with a sprinkling spout
- A fresh square of sod
- A bucket of sandy loam

Spring Flooding Middle Fork of Flathead River, NPS photo.

Lesson At A Glance

Teacher will demonstrate or have students take turns, pouring water on different ground covers to observe which holds the sediments in place better.

Objectives

Students will be able to:
- Investigate why ground cover is of primary importance in reducing the rate of erosion in a natural environment.
- Create a model that shows the role of vegetation in retarding (slowing down) erosion and preserving the water table.
- Research local flooding events.

Time Required

50 minutes

Vocabulary

Agricultural activities, ecosystem, vegetation, water table.

Teacher Preparation/ Background

View the instructional video on how to set up the activity so that students can pour water on different ground covers. Be familiar with erosion and Glacier soils. Gather all the ground cover/soil materials needed. Identify a space to conduct the activity outside or inside (without creating a mess). Consider incorporating research and tie in annual flooding events, as well as the historic 1964 flood. (Starting on p. B59 of this USGS report is information and photo of the 1964 flood and Divide Creek at St. Mary, MT in Glacier National Park).

Procedure

1. Place the two trays so that one end is slightly higher than the other.
2. Put the clump of sod on one tray and an equal pile of sandy loam on the other tray.
3. Let the watering can rain for a period of time on each earth sample.

Reflection/Assessment

Invite the students to discuss what happened and why. At the end of the activity have the group examine the two specimens for retained water content. How does vegetation retard erosion and preserve the water table?

Many tribes in Montana followed a yearly cycle of movement, directed by the seasons. How were annual flooding events less of an impact on livelihoods at that time than how we are living today? What do the trees and plants, forests and meadows of Glacier National Park and other vegetated areas do for the ecosystem? Discuss how human activities such as logging, fire management, agricultural activities and development in the surrounding ecosystem can help or hinder the goals (preservation and protection of natural and cultural resources) of Glacier National Park.

Science Extension

Can they make accurate predictions of what would happen with changes to the amount of ground cover? Changes in the terrain? Changes in the speed and amount of water added?

Action Project/ Field Trip Extension

- Eco-enrichers- science lesson on plant and animal contributions to soil.
- Ranger-Led Field Trips and Service Learning Projects in Glacier National Park. Earth Science and Forest Processes field trips about park geology.
- Self-Guided Field Trips and Guided Tours - various concession operated
- Glacier Institute - geology and other education programs.
- Flathead CORE - outdoor education guide for field trips in the Flathead.
- Water/Stream Monitoring - MT Watercourse.
- Confederated Salish & Kootenai Tribal Natural Resources Dept., River Honoring- contact the Tribes for updates.
- Flathead Conservation District - spring Flood Awareness Days, riparian projects, Symphony of Soils video, and traveling Rolling Rivers Trailer.
- Flathead Audubon and Whitefish Lake Institute -education/outreach.

Additional Resources

- Explore the River, Interactive DVD - Confederated Salish & Kootenai Tribes, The DVD explores in detail the hydrology, habitat, fish, and Salish and Pend d'Oreille culture and history and their current efforts to restore the Jocko River.
- Flathead Community of Resource Educators Website - link to the Flathead Watershed Sourcebook - information on cultural and natural history of the Flathead watershed and traveling trunks dealing with water.
- Montana Watercourse - education trunks, water monitoring, and other water education programs and materials.
- Project Wet - water education activities, trunks and teacher workshops.
- Soil Science Society of America - educational materials kit.
- Crown of the Continent Research Learning Center - soils of Glacier NP.

MT Content Standards

Unit 2: Lesson 3

Montana Common Core Standards—English Language Arts

CCRA.SL.1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCRA.SL.4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Montana Standards for Science

Science 1.1.4. Use (create, analyze) models that illustrate simple concepts and compare those models to the actual phenomenon.

Montana Standards for Social Studies

Social Studies Standard 3. Students apply geographic knowledge and skills (e.g., location, place, human/environment interactions, movement, and regions).

Social Studies Standard 4. Students demonstrate an understanding of the effects of time, continuity, and change on historical and future perspectives and relationships.

Social Studies Standard 6. Students demonstrate an understanding of the impact of human interaction and cultural diversity on societies.

Indian Education for All Seven Essential Understandings Regarding Montana Indians

*Essential Understanding 1 —tribal diversity

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*Essential Understanding 6 —history is subjective

* If connect lesson with Unit 2 stories and additional resources listed from the Confederated Salish & Kootenai Tribes

Unit 2 -Mountains and Mountain Building
Lesson 4
Formation of Mountains and Faults- INSTRUCTIONAL FAULTS VIDEO

Materials:

- Student Reading, Unit 2, A Geological Story of Glacier NP
- An assortment of various colors of 12 inch felt squares
- Several 30 quart garbage bags
- A bucket of clean sand
- Several sheets of balsa wood, or a similar material (graham crackers can work), in various thicknesses and colors
- A utility knife
- Standard building blocks or 2” x 4” end cuts of various lengths
- Glacier NP Student Resource Guide CD free by request, call 406-888-7800 or online with Rocks & Glaciers Fact Sheet and Digital Image Library has an assortment of Glacier pictures

Fault in diorite sill, Danny On photo (Glacier NP Digital Image Library).

Lesson At A Glance

Stations are set up around the classroom for teacher to demonstrate and then for students to rotate through in small groups. Video and photos are available of mountains in Glacier NP for students to look at from the Student Resource Guide CD or other source.

Objectives

Students will be able to:

- Simulate with simple models geologic mountain building processes.
- Define geologic terms.
- Recognize the effects that weathering/erosion have on the mountains.
- Consider compatibilities between Western science and Native knowledge.
- Realize there are multiple perspectives for the same landscapes.

Time Required

50 minutes

Vocabulary

Rifting (other vocabulary defined in Student Reading).

Teacher Preparation/ Background

Make sure you and students are familiar with the basic geology of Glacier NP, especially the vocabulary. For handouts, you can use the geologic story from the Student Reading Unit 2 or download the "Rocks and Glaciers Fact Sheet." There are also three levels of explanations on the Glacier NP website: mountains (short & basic); geologic formations (longer and includes thrust fault, stromatolites), and the resource guide on geology (longer and more detail). Have available student access to a variety of photo's and maps of Glacier NP. (If you don't have internet, a free CD of the park's Student Resource Guide is available by request, call 406-888-7800.) Watch the Instructional Faults Video and obtain the materials to set up the four stations in your classroom. Create instruction cards for each station. This activity is designed to give students hands-on experience with some of the concepts involved in the geologic explanations for the formation of mountains.

Procedures

1. Discuss their homework (Student Reading, Unit 2) and have them work in small groups to share their answers for the "Checking for Understanding" questions. Did the students notice similarities between the Native knowledge and Western Scientific perspectives of how the mountains got their shapes?
2. To further explore the geologic perspective, a great podcast, "Glacier's Geologic History" can be accessed from the park's website or the Student Resource Guide CD.
3. Demonstrate each of the stations and point out the instruction card for the geologic concept being modelled. Identify and define any new vocabulary.
4. Have students rotate through each station and do the activities and discuss the dynamics that they demonstrate. Encourage them to experiment as long as they show interest and do appropriate activities. Don't be too concerned about proper technical language. The students should feel free to apply their own vocabulary to facilitate communication skills. When appropriate, supply technical vocabulary and nomenclature but not to the point where students become hesitant to discuss the dynamics.

Station 1 - Deposition and down- warping

Ask a student to inflate a garbage bag, leaving about a third of the available air space unfilled, and tie the end tightly so that no air can escape. Lay the bag flat on the table and slowly pour sand in the center of the bag. The weight of the sand deposited like sediment will cause the surrounding area of the bag to rise while the center sinks. Pour the sand on several different areas of the bag. Facilitate student discussion of how this deposition on a shallow sea floor might affect the surrounding area.

Station 2 - Sedimentary Layering and Folding

Take a stack of felt squares and begin to lay them in successive layers on the table. If the presenter is familiar with the rock formations of Glacier Park, they may wish to lay down a succession of colors that correspond to the colors of formations in the park. Any series of earth tones will do just fine. You may want to cap your felt sandwich with a layer of blue or green to represent water or vegetation. Facilitate student discussion of the sediments that make up the materials for mountain building.

Procedures Continued

Push the edges of the felt layered sandwich together as far as you can. This is an example of mountain formation by folding; even materials as soft as felt can only be folded so far before they are compacted as tightly as they can be. Certainly a great deal of folding was involved in the making of our mountains.

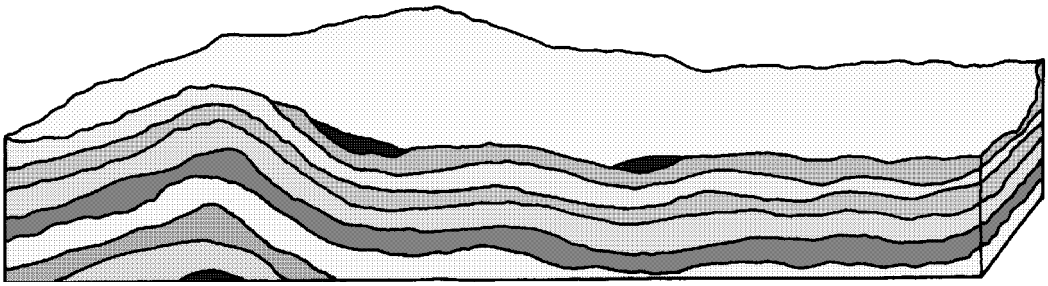
Some limited magma intrusions filled in space between rock layers and moved up through faults to form sills and dikes. Invite students to make suggestions about how they can demonstrate the intrusion of sills and dikes into your layered model.

Station 3 - Fault Blocking and Overthrust Slip

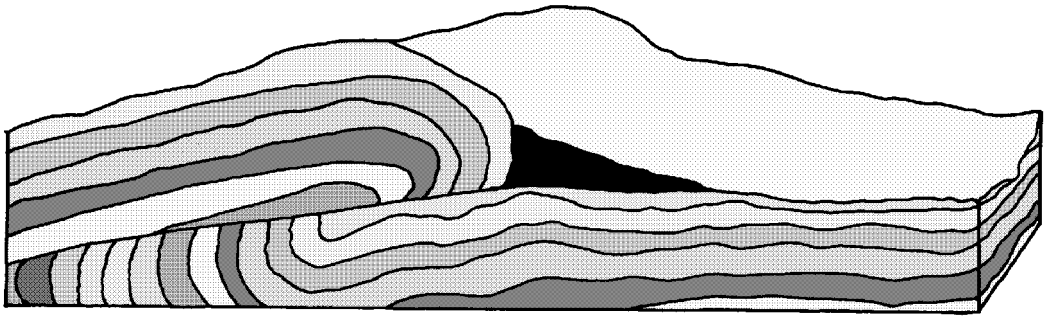
Make a short stack of balsa wood squares (could also use graham crackers and frosting). Have a student make an oblique cut through the materials. Have them push these layers together to demonstrate folding. The layers will pile up, shuffle, or even overturn. This is what happens in fault blocking dynamics when harder materials are compressed by plate tectonics.

Station 4 - Rifting

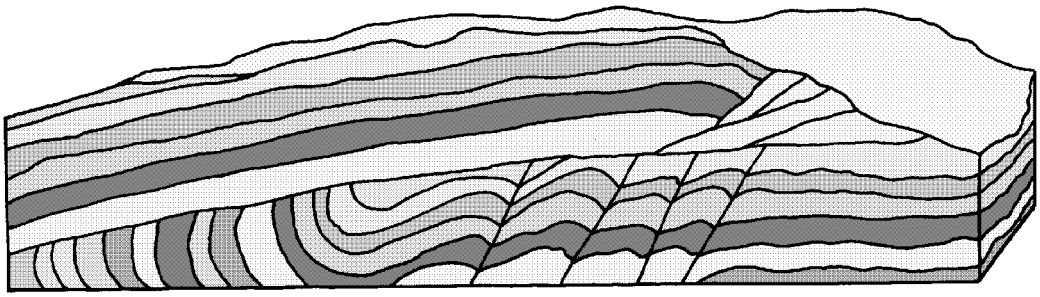
Pile several layers of various length building blocks together as if you were building a brick wall. Make sure that the bottom run is composed of your two longest blocks. Pull the two bottom blocks apart slowly until the upper layers collapse into the gap. This is known as rifting. Rifting occurs when subsurface intrusions spread the surface materials to the point of collapse,



Folding due to horizontal pressure.



Fold has developed into a thrust fault.



Thrust has over-ridden younger rocks.

Procedures Continued

when tectonic plates pull apart, or in rare cases when surface materials happen to slough or slide across subsurface materials. The North Fork and Flathead Valleys are actually a kind of rift valley that has been partially re-filled with sedimentary materials.

Reflection and Assessment

Making pudding is a good activity that can be used to illustrate the role of Plate Tectonics in mountain building. Have the class make a pot of chocolate pudding. After the pudding is done, pour it in a shallow glass cake pan to cool. When almost cool, carefully use a sharp knife to cut the film that formed on top of the pudding into two equal portions. Carefully tilt the pan so that half of the pudding film slides up and over the other half of the pudding. The film represents the lighter continental crusts colliding and forming folded mountains. Even if the mountains collapse into a heap, the pudding can still be eaten by a hungry class.

See if students can identify geologic concepts they learned in the pudding activity.

Extension

As a review and a treat have the students bake a layer cake using mixtures of food color to represent the various sedimentary layers comprising the Glacier National Park rock formations. Instead of putting frosting on top, spray a large layer of whipped cream on a clean piece of stiff paper. Place the cake on top of the whipped cream. Place the edge of the stiff paper on the edge of a baking sheet. Lift the back edge of the paper slowly until the cake slides over onto the baking sheet. Cut and serve the cake and top it with the whipped cream conveyor surface. This little procedure gives a rough impression of how the Lewis Thrust Fault may have operated. It may be healthier, though not as much fun, to make a large hero sandwich with the class, using ingredients that suggest the appropriate and corresponding sedimentary layers in the park. Either activity will make a lasting impressions on the students.

Action Project/ Field Trip Extension

- Ask a local geologist to come and speak to the class about the geology of your area.
- Ranger-Led Field Trips and Service Learning Projects in Glacier National Park. Earth Science and Forest Processes field trips about park geology.
- Self-Guided Field Trips in Glacier National Park.
- Glacier Institute - geology and other education programs.
- Flathead CORE - outdoor education guide for field trips in the Flathead.
- Guided Tours in Glacier National Park- various concession operated.

Additional Resources

- Flathead Community of Resource Educators Website - contains a resource link to the Flathead Watershed Sourcebook - which contains cultural and natural history of the Flathead watershed.
- Glacier National Park Conservancy Bookstores - books specific to Glacier.

MT Content Standards

Unit 2: Lesson 4

Montana Common Core Standards—English Language Arts

CCRA.SL.1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCRA.SL.2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

CCRA.SL.4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Standards for Literacy in History/Social Studies, Science, and Technical Subjects

CCRA.RH/ST.1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

CCRA.RH/ST.2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

CCRA.RH/ST.4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

CCRA.RH/ST.6. Assess how point of view or purpose shapes the content and style of a text.

CCRA.RH/ST.7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

CCRA.RH/ST.9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Montana Standards for Science

Science 1.1.4. Use (create, analyze) models that illustrate simple concepts and compare those models to the actual phenomenon.

Science 1.1.6. Identify, compare, explain ... how observations of nature form an essential base of knowledge among the Montana American Indians.

Montana Standards for Social Studies

Social Studies Standard 3. Students apply geographic knowledge and skills (e.g., location, place, human/environment interactions, movement, and regions).

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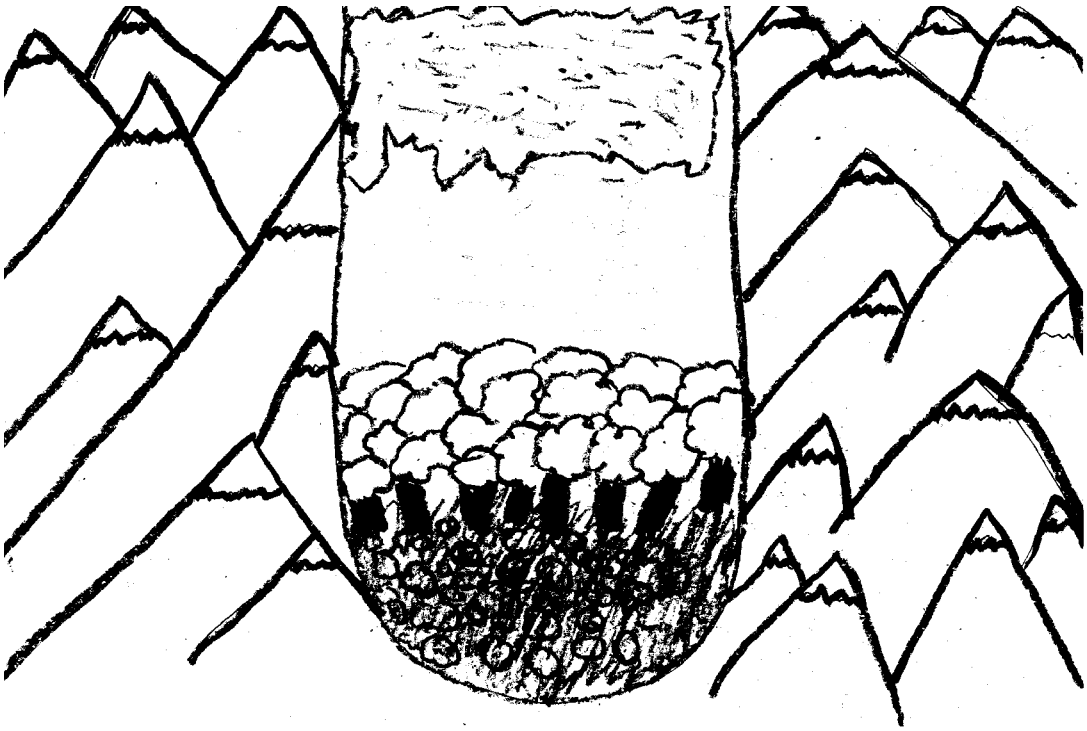
Unit 3:
Climate Changes
Glaciers and Glaciation



Glaciers and Erosion
Student Artwork by Jeri Boggs

Climate Changes Teacher Background Information

This unit is really a continuation of "Mountains and Mountain Building" (Unit 2) - helping students understand the concept of glaciation and its effect(s) on mountain ecosystems. Glacier National Park is named for the glacially carved valleys and features throughout the park-not for the current glaciers in the park (as many people believe). U-shaped valleys, moraines, and grooves abraded into bedrock are direct evidence that glaciers have come and gone. They are likewise evidence that Earth's climate has been dramatically different in the past.

The Student Reading for Unit 3 contains cultural stories dealing with climate change and glacial erratics. It also contains a story about glaciers - how they grow, move, and change the landscape. It contains a lot of glacial terminology, which is interesting, highly descriptive, and may seem a bit exotic to students not familiar with northern landscapes. Many of the terms have few applications outside the description of glacially carved terrain. The lessons in this unit will help students explore and internalize the vocabulary and concepts to enhance their understanding and appreciation of the topography of Glacier National Park and its uniqueness in the world.

Glaciation: The Ice Age – 2 million years ago

The geologic event that would define the landscape began with a global cooling trend approximately 2 million years ago. The Pleistocene Ice Age saw large ice sheets repeatedly advance and retreat throughout the temperate regions of North America until about 10,000 years ago. In the area that would become Glacier National Park, ice advanced and retreated until probably melting completely about 12,000 years ago. During the ice advances, the lower valleys were filled with glaciers and only the very tops of the higher peaks were visible. The "rivers of ice" sculpted the mountains and valleys into a variety of landforms associated with major alpine and valley glacial action. Even though the Ice Age glaciers are gone, the results of their passing are evident on the landscape. Massive U-shaped valleys, numerous cirque lakes or tarns, horns, cols, moraines, and aretes are but a few of the glacially carved landforms that contribute to the beauty of Glacier.

To view a map of where the remaining glaciers are in the park or see repeat photos visit the U.S. Geological Survey website.

Recent Glaciation – dating from about 6,000 years ago

Today, we are living in a relatively warm interglacial period. All remnants of the Pleistocene ice have disappeared. There are no active glaciers in Waterton Lakes National Park; however, the last survey in Glacier National Park resulted in 25 named alpine glaciers. They are of relatively recent origin, having formed in the last 6,000 to 8,000 years. They probably grew rapidly during the Little Ice Age that started about 400-500 years ago and ended about 1850. However, they work in the same way as larger glaciers of the past.

A glacier forms when more snow falls each winter than melts the next summer. With alternating freezing and thawing, the snow becomes granular ice. As these layers build up, the ice recrystallizes, becomes denser, and eventually forms a massive sheet. The ice needs to be about 100 feet thick for a glacier to form and have a surface area of at least 25 acres.

Ice near the surface of the glacier is often hard and brittle. Due to the pressure of ice above, the ice near the bottom of the glacier becomes flexible. This flexible layer allows the ice to move. Depending on the amount of ice, the angle of the mountainside, and the pull of gravity, the ice may start to move downhill. Once the ice begins to move, it is called a glacier.

As the ice moves, it plucks rock from the sides and bottom of the valleys. Rocks falling on the glacier from above mix with the glacial ice as well. Over long periods of time the sandpaper-like quality of the moving ice and rock scours and reshapes the land into broad U-shaped valleys, sharp peaks, and lake-filled basins.

Tree-ring studies indicate that retreat of the recent glaciation began about 1850. When Glacier National Park was established in 1910, there were more than 150 glaciers within the national park compared to about one fourth of that number now. Retreat rates appear to have been slow until about 1910. There was a period of rapid retreat during the mid- to late 1920s. This corresponds to a period of warmer summer temperatures and decreased precipitation in this region. Several of the larger glaciers separated into two smaller glaciers at this time. The Jackson and Blackfoot Glaciers separated as did the Grinnell and Salamander Glaciers. If the current rate of recession continues, it is estimated that there won't be any glaciers in Glacier National Park by 2030. How old will your students be then?

National Park Service Archeology Program-Ice Patch Archeology and Paleoecology in Glacier National Park

Ice Patch Archeology Study, www.glacieriepatch.org
Unlike glaciers, ice patches do not move at all, so encased objects remain in the same spot. Researchers studying ice patches identify and document artifacts and organic materials left behind as the ice melts. Such finds can include animal bones and scat, leaves deposited by wind, fragments of ancient wood, and lost Native American artifacts. From 2009-2013, a collaborative research team investigated 46 of Glacier National Park's ice patches. The Glacier National Park Ice Patch Project's purpose was to document ice patch melting, collect remains of ancient plants and animals, and to protect Native American cultural artifacts associated with hunting and travel in Glacier's high-elevation regions.

Glacier National Park has always been iconic for its beautiful mountain landscapes, and is now unfortunately the 'poster child' for climate change-related losses of glaciers, ice patches, and the values associated with alpine and sub-alpine landscapes, ecosystems, and heritage values. The Glacier Ice Patch Archeology and Paleoecology project has yielded scientific and cultural information about past climates and cultures that can inform resource stewards as well as capture the public imagination.

Archeologists survey ice patch edge for cultural artifacts, NPS photo.

A Trip to Glacier to look at Geology

Two of the most accessible valleys in the park - Lake McDonald and St. Mary- are both excellent sites to observe many glacially carved features and contain the two largest glacially formed lakes in the park. Apgar is located at the base of Lake McDonald and the village of St. Mary is at the base of St. Mary Lake. The glacial troughs in which they lie afford an uninterrupted view of the work of ice.

At Home In This Place
DVD Content
Play Videos:
Kootenai - *The Place Where They Danced*

Apgar

For a trip to Apgar, students will experience first-hand the role glaciers have played in shaping the scenery of the Lake McDonald Valley. They will be able to see; lateral and terminal moraines, U-shaped valleys, glacial striations, glacial outwash, till, and erratics.

At Home In This Place
DVD Content
Play Videos:
Kootenai - *We Ask That You Walk Lightly*

Additionally, a trip to the Apgar area will bring students to the setting for the Kootenai story, *The Place Where They Danced*. A video of Vernon Finley telling this story is on the *At Home in This Place* DVD. Also included on the DVD, W*e Ask That You Walk Lightly*, re-affirms the significance of this place to the Kootenai and reminds all visitors to be good stewards and respectful here.

The View Up-Valley from Apgar

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

Looking Up Lake McDonald Valley, NPS photo (Glacier Student Guide CD).

glacial outwash. Apgar Village is located on the terminal moraine of the McDonald Valley Glacier.

St. Mary

St. Mary Lake is not impounded by a moraine like Lake McDonald. 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 continuing 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.

The view Up-Valley from St. Mary

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, this 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 inter-layered 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 inter-layered with valley glacier till. At this location a large glacial lake, formed by melt water from a retreating continental ice sheet, had its western shoreline along the edge of the mountains.

Looking Up St. Mary Lake, B.R. McClelland photo (Glacier NP Digital Image Library).

Unit 3 -Climate Changes: Glaciers and Glaciation
Lesson 1
Breaking it Down

Materials:
- Student Reading Unit 3
- Access to a freezer
- A tray
- A glass bottle or jar with a tight lid (thin glass on the jar, may help dramatize the demonstration)

Crevasses-Jackson Glacier, J. Mohlhenrich photo (Glacier NP Digital Images Library).

Lesson At A Glance

Students observe a concrete example of water weathering rocks by freezing a jar of water and then letting the broken jar with ice, un-thaw to illustrate power of ice in weathering rocks.

Objectives

Students will:
- Infer what will happen if a jar filled with water is put in the freezer overnight.
- Observe that as water freezes, it changes form, expands and produces force.
- Relate how water expanding when it freezes, weathers rocks.
- Identify moving ice as the primary component of a glacier.

Time Required

50 minutes. Additional time if field trip added to this unit.

Vocabulary

Bergschrund, expand, freeze, glacier, ice patch, thaw (additional vocabulary in Student Reading.)

Teacher Preparation/ Background

This activity is designed to have students think about the power of water as it changes from liquid to a solid state when it freezes and expands. Teacher must get access to freezer, students bring jars from home or teacher provides. Make sure you have safety guidelines in place for dealing with broken glass!

Procedures

1. Have students complete the Student Reading, Unit 3 - individually, in groups, or together as a class and complete the "Checking for Understanding Questions." Discuss vocabulary and any new concepts. You may want to show the podcast about the unique geology of Glacier National Park and discuss how the glacially carved valleys of Glacier National Park are what give the park its name. Also, how the vastness of these valleys is one of the park's most awe-inspiring features to many visitors. Review some of the words from the Blackfeet, Kootenai, Pend d'Oreille and Salish about their connection to these mountains and valleys.
2. Tell students you are going to do a short experiment to try to find out how water could break rock. This can be done as a demonstration, or each team could bring in an unneeded, thin glass jar from home. Have teams make sure to label their jars. Fill each 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(s) 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(s) carefully back to the classroom. Note what happened to the jars. The jar lid should be bulged out and the glass should be cracked. If not all the jars cracked, try to figure out why -lid not tight enough, not enough water, glass too strong and thick.

Reflection and Assessment

Have students make careful observations -but NOT touch their jars. Let the tray sit in a safe place and have them make more observations throughout the day of what happens as the ice melts. How did the shape of the jar change once all the ice was melted? (The glass collapsed in a heap.) Have they ever seen a similar phenomena happen in nature with snow/ice? (This is what actually happens when glacial melt water 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.) The description of the work of glaciers in the student reading mentioned how melt water 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.

Writing Extension

Use Views of the National Parks (Views) - a program of the National Park Service designed to present the natural, cultural, and historical resources of our national parks and select the topic of glaciers. There are narratives and images on glaciers and glacially carved features from numerous national parks, including a slide show about Glacier National Park.

Have groups of students work together in presenting the information from the different national parks to the class. Compare and contrast the parks

Bergschrund on Sperry Glacier, NPS photo (Glacier NP Digital Image Library).

that have glaciers currently, with those that don't. Make a list of what features can be found in both. Students can email, research on line at www.nps.gov for each park, or write to the different parks to get more information for this discussion.

Action Project/ Field Trip Extension

- Ranger-Led Field Trips and Service Learning Projects in Glacier National Park. Earth Science and Forest Processes field trips about park geology.
- Self-Guided Field Trips in Glacier National Park.
- Glacier Institute - geology and other education programs.
- Flathead CORE - outdoor education guide for field trips in the Flathead.
- Guided Tours in Glacier National Park- various concession operated.

Additional Resources

- Climate Change Resource Guide- includes Facing the Future Lessons.
- Glacier NP Cultural Resource Guide - Fact Sheets, Digital Images, Lessons.
- USGS Repeat Photography Project and Repeat Photo Education Trunk.
- Ice Patch Archaeology Resource Brief, Crown of the Continent Research Learning Center.
- Glacier National Park Ice Patch Project Interactive Website with Kids Page - Confederated Salish and Kootenai Tribes of the Flathead Reservation, the Blackfeet Nation, the Univ. of Wyoming, Univ. of Colorado Boulder, Univ. of Arizona, Glacier National Park's cultural resources program and the Rocky Mountains Cooperative Ecosystem Studies Unit (CESU).
- Flathead Community of Resource Educators Website - contains a resource link to the Flathead Watershed Sourcebook - cultural and natural history.
- Glacier National Park Conservancy Bookstores - books specific to Glacier.

MT Content Standards

Unit 3: Lesson 1, page 43

Montana Common Core Standards—English Language Arts

CCRA.SL.1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

Standards for Literacy in History/Social Studies, Science, and Technical Subjects

CCRA.RH/ST.1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

CCRA.RH/ST.4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

CCRA.RH/ST.9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

CCRA.RH/ST.10. Read and comprehend complex literary and informational texts independently and proficiently.

Montana Standards for Science

Science 2.2.4. Model and explain that matter exists as solids, liquids, and gases and can change from one form to another.

Science 1.1.6. Identify, compare, explain ... how observations of nature form an essential base of knowledge among the Montana American Indians.

Montana Standards for Social Studies

Social Studies Standard 1. Students access, synthesize, and evaluate information to communicate and apply social studies knowledge to real world situations.

Social Studies Standard 3. Students apply geographic knowledge and skills (e.g., location, place, human/environment interactions, movement, and regions).

Social Studies Standard 6. Students demonstrate an understanding of the impact of human interaction and cultural diversity on societies.

Indian Education for All Seven Essential Understandings Regarding Montana Indians

*Essential Understanding 1 —tribal diversity

*Essential Understanding 3 —importance of oral traditions

*Essential Understanding 6 —history is subjective

Unit 3- Climate Changes: Glaciers and Glaciation
Lesson 2

Carving Mountains - INSTRUCTIONAL CARVING MOUNTAINS VIDEO

Materials:

- Research materials to include Earth Science texts, books dealing with the geology of Glacier National Park and Montana
- Images of geological features of Glacier National Park, acquired online (request park's Student Guide CD)
- 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 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 in general
- Good dictionary

Alpine Meadow at Logan Pass, NPS photo (Glacier Student Guide CD).

Lesson At A Glance

Through individual and group research, students create a clay model of a mountain range with glacial features labelled.

Objectives

Students will be able to:

- Compile team dictionaries of mountain and glacial terms.
- Work cooperatively to design and build a mountain range out of clay that contains glacial features.
- Optional: build models to scale.
- Identify landforms in their clay models that have cultural significance.

Time Required

Two class periods - one to do research on glacial terms. The second to construct clay models. Additional time if students want to paint or use models for other presentations.

Vocabulary

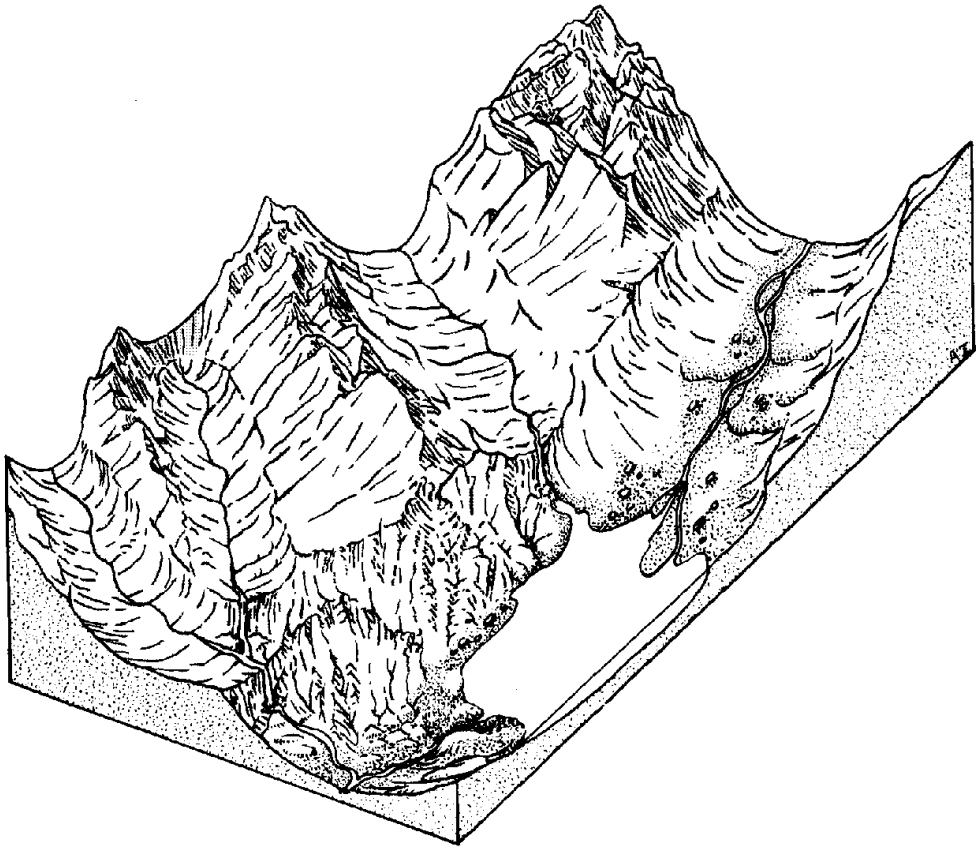
Alpine meadow, avalanche, col, crevasse, esker, fold, glacial trough, glaciation, hanging valley, kettle lake, lateral moraine, medial moraine, moraine, mountain pass, mountain range, outwash plain, peak, plateau, terminal moraine, tree line, valley glacier.

Teacher Preparation/ Background

Make glacial feature labels and or definition cards for each group. Have boards/trays for models to be built on, clay ready and place to put models out. This activity is designed to get students research experience on glaciers and the tactile experience of building a scale model of mountains with glacially carved features.

Procedures

1. Use the vocabulary list provided (and add others of your choosing) as a guide for students to use in compiling team dictionaries of mountain and glacial terms.
2. 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. It will add relevance if students are encouraged to replicate an area of the park with which they are familiar. The raised relief maps of the park are a great resource for this. A math component can be added if students must do it to scale! (1 inch = 1000 feet elevation for example, so a 10,000 foot peak would be 10 inches high).
3. Provide glacial feature labels (or definition cards) to an appointed or chosen chairperson for each team. Ask 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.



Glacial Features- can you find a hanging valley? Glacial trough? (Glacier NP Digital Image Library).

Reflection and Assessment

When the labeling and remolding are complete, the students should be able to define and discuss their work.

Writing and Other Extensions

Using the vocabulary and other terms they came across in their research, each team should generate a dictionary definition of mountain and glacial terms. When 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.

The next obvious question might 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.

Action Project/ Field Trip Extension

- Ranger-Led Field Trips and Service Learning Projects in Glacier National Park. Earth Science and Forest Processes field trips about park geology.
- Self-Guided Field Trips in Glacier National Park.
- Glacier Institute - geology and other education programs.
- Flathead CORE - outdoor education guide for field trips in the Flathead.
- Guided Tours in Glacier National Park- various concession operated.

Additional Resources

- Climate Change Resource Guide- includes Facing the Future Lessons.
- Glacier NP Cultural Resource Guide - Fact Sheets, Digital Images, Lessons.
- USGS Repeat Photography Project and Repeat Photo Education Trunk.
- Ice Patch Archaeology Resource Brief, Crown of the Continent Research Learning Center.
- Glacier National Park Ice Patch Project Interactive Website with Kids Page - Confederated Salish and Kootenai Tribes of the Flathead Reservation, the Blackfeet Nation, the Univ. of Wyoming, Univ. of Colorado Boulder, Univ. of Arizona, Glacier National Park's cultural resources program and the Rocky Mountains Cooperative Ecosystem Studies Unit (CESU).
- Flathead Community of Resource Educators Website - contains a resource link to the Flathead Watershed Sourcebook - cultural and natural history. Education Trunks related to geology.
- Use Views of the National Parks (Views) - a program of the National Park Service designed to present the natural, cultural, and historical resources of our national parks and select the topic of glaciers.
- Glacier National Park Conservancy Bookstores - books specific to Glacier.
- Tall Tales, (Mechanical Weathering, Glacier Features, Mountain Names, OPI-Indian Education for All Lesson, 5th grade.

MT Content Standards

Unit 3: Lesson 2

Montana Common Core Standards—English Language Arts

CCRA.SL.1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

Standards for Literacy in History/Social Studies, Science, and Technical Subjects

CCRA.RH/ST.4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

CCRA.RH/ST.9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

CCRA.WHST.7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

Montana Standards for Science

Science 1.1.4. Use (create, analyze) models that illustrate simple concepts and compare those models to the actual phenomenon.

Indian Education for All Seven Essential Understandings Regarding Montana Indians

Essential Understanding 1 —tribal diversity

Essential Understanding 3 —importance of oral traditions

Essential Understanding 6 —history is subjective

Unit 3 -Climate Changes: Glaciers and Glaciation
Lesson 3

Model Glaciers - INSTRUCTIONAL MODEL GLACIERS VIDEO

Materials:
- Small sandbox or trough from Unit 2
- Sand, gravel and assorted small rocks
- Variety of sizes of elongated plastic containers for freezing water in.

Mokowanis River drainage- a popular hiking trail today - was used throughout history for travel across the Continental Divide. Can you pick out any glacially carved features? NPS photo.

Lesson At A Glance

Using river trough from Unit 2, students place/move frozen ice blocks with gravel/rocks in them through the sand to form glacially carved valleys, cirques, tarn lakes, etc.

Objectives

Students will be able to:
- Form glacial features in a sand box model river valley.
- Identify glacial features on the landscape - terminal and lateral moraines, the headwall, cirques, tributary glaciers, and hanging valleys.

Time Required

Overnight to freeze "glacier" containers. One class period to form glacial features in sand. Additional time to have ice blocks melt to see tarn lakes and till.

Vocabulary

Till, tributary, U-shaped valley, V-shaped valley, valley glacier.

Teacher Preparation/ Background

Freeze gravel and small rocks into ice blocks so they will have a rough base when they start to melt. Then thaw them enough day of class to get them out of the containers. Keep the sand, gravel, and rocks in the sandbox damp enough to mold into mountains.

Procedures

1. Have the students form mountains and river valleys in the river sand trough.
2. Take out the prepared ice blocks that have stones frozen into them. Use a large ice block to represent a large mountain glacier and several smaller blocks to represent smaller tributary glaciers.
3. Place the large block at the head of the valley the students have created in the sand 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 side of the glacier's path.
4. 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.

Reflection and Assessment

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" lake if the clay layer in your trough keeps the water from all draining out.

Culinary Extension

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. 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.

Action Project/ Field Trip Extension

- Ranger-Led Field Trips and Service Learning Projects in Glacier National Park. Earth Science and Forest Processes field trips about park geology.
- Self-Guided Field Trips in Glacier National Park.
- Glacier Institute - geology and other education programs.
- Flathead CORE - outdoor education guide for field trips in the Flathead.
- Guided Tours in Glacier National Park- various concession operated.

Additional Resources

- Climate Change Resource Guide- includes Facing the Future Lessons.
- Glacier NP Cultural Resource Guide - Fact Sheets, Digital Images, Lessons.
- USGS Repeat Photography Project and Repeat Photo Education Trunk.
- Ice Patch Archaeology Resource Brief, Crown of the Continent Research Learning Center.
- Glacier National Park Ice Patch Project Interactive Website with Kids Page - Confederated Salish and Kootenai Tribes of the Flathead Reservation, the Blackfeet Nation, the Univ. of Wyoming, Univ. of Colorado Boulder, Univ. of Arizona, Glacier NP cultural resources program and the Rocky Mountains Cooperative Ecosystem Studies Unit (CESU).
- Flathead Community of Resource Educators Website - contains a resource link to the Flathead Watershed Sourcebook - cultural and natural history. Education Trunks related to geology.

Additional Resources Continued

- Use Views of the National Parks (Views) - a program of the National Park Service designed to present the natural, cultural, and historical resources of our national parks and select the topic of glaciers.
- Glacier National Park Conservancy Bookstores - books specific to Glacier.

MT Content Standards

Unit 3: Lesson 3, page 49
Montana Standards for Science
Science 1.1.4. Use (create, analyze) models that illustrate simple concepts and compare those models to the actual phenomenon.

Indian Education for All Seven Essential Understandings Regarding Montana Indians
Essential Understanding 1 —tribal diversity

Unit 4:
Native Plants
Our Medicine... Our Food

Glacier Lily Student Artwork by Kevin Racine

Native Plants Teacher Background Information

This unit focuses on the importance of native plants to the economy and culture of American Indian peoples, as well their ecological importance in general. Discussing native plant significance and use requires that students are familiar with what native plants are, their life cycles, their inter-relationships with insects/wildlife, how they colonized the glacially carved slopes of this area, and how they are adapted to different habitats. Knowing this will help students understand why a plant's (or group of plants') growing location was such an influence on the movements of the tribes. In this day and age when for most of us, our food gets delivered to us (via grocery stores or local markets, and even our houses) it may be very hard for students to relate to a lifestyle of moving to where the plants (and/or animals) were.

While the early Blackfeet, Salish, Pend d'Oreille, and Kootenai 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 area that is Glacier National Park today, is just a small portion of the much larger homelands that each tribe lived in and used in their yearly movement patterns (see the introduction and text from each of the tribes about their relationship with Glacier). It is also worth re-iterating that many traditional plant collecting areas of North America have been changed and no longer support native plant communities- further adding to the importance of protecting the native plant communities in Glacier. *People Before the Park: The Kootenai and Blackfeet Before Glacier National Park* is recommended for more specific information on plant use than can be related here (Thompson, 2015).

The Student Reading for Unit 4 contains the important Salish story about the bitterroot. Today, there additional resources available to use with this story. There is a YouTube video, "Story of the Bitterroot"directed by Steve Slocomb that is 64 minutes and divided into eight sections. The video focuses primarily on Montana Salish Indian culture with tribal elders being the predominant source of information. Sections directly related to this unit include: "Botany" (6 minutes);"When We Were Children" (11 minutes); and "The Future" (6 minutes-examines the issues of the plant's continued existence and ethics of propagation- a similar situation for many of Montana's Native Plants). There is also an OPI Social Studies lesson for the movie (8th grade). An education trunk is available for teachers in the Flathead Valley. Flathead Audubon, Flathead National Forest and the Northwest Montana Educational Cooperative teamed up to develop an education trunk with this story. It is "The Indian Education for All, Youth Book Club Trunk, Gift of the Bitterroot and Crown of the Continent Ecosystem." It is free to borrow from Flathead Audubon Chapter (Contact the NW MT Educational Coop Office at 406/752- 3302 or auduboneducator@gmail.com). The trunk includes a class set of the book *Gift of the Bitterroot*, and additional materials. Finally, a quick on-line search found another lesson using the story with a downloadable copy of the book. The Gift of the Bitterroot - K-2 Lesson plan uses the book Illustrated by Antoine Sandoval with story as told by Johnny Arlee.

Also included in the Student Reading for Unit 4 is a Blackfeet story about tobacco. Teachers reviewing the lessons have pointed out the importance of

making sure students understand the difference between traditional tobacco use versus smoking cigarettes. The powerpoint, Traditional Use of Tobacco, from the University of Montana helps point out these differences. The National Native Network's, keepitsacred.org has additional information.

The Student Reading for Unit 3 includes a botanical account for Glacier National Park. This can be supplemented with information from the park's website about plants and forests and fire. The Crown of the Continent Research Learning Center has a number of 2-page, resource briefs pertaining to fire . The park's student guide has a number of 2-page fact sheets, including one on plant and animal diversity.

At Home In This Place
DVD Content
Play Video:
Kootenai - *We Ask That You Walk Lightly*

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 American Indian values and resources. These concerns have been raised by tribal advisors. Many people simply have no concept of how important these plants are. As one tribal advisor pointed out, "They are our medicine.... our food!"

In "Gathering Moss," Robin Wall Kimmerer describes her struggle with her experiences with cultural differences in regards to plants,

> In college, the two perspectives on the life of plants, subject and object, spirit and matter, tangled like the two cores around my neck. The way I was taught plant science pushed my traditional knowledge of plants to the margins. Writing this book has been a process of reclaiming that understanding, of giving it its rightful place...
>
> In indigenous ways of knowing, we say that a thing cannot be understood until it is known by all four aspects of our being: mind, body, emotion, and spirit. The scientific way of knowing relies only on empirical information from the world, gathered by body and interpreted by mind. In order to tell the mosses' story I need both approaches, objective and subjective. These essays intentionally give voice to both ways of knowing, letting matter and spirit walk companionably side by side. And sometimes even dance. (vii)

Finally, in the National Park Service Report, "Our Mountains Are Our Pillows: an Ethnographic Overview of Glacier National Park," Dr. Brian Reeves and Dr. Sandra Peacock recognize that Indian peoples throughout North America actively managed critical plant resources. They point out the importance of oral histories to plants,

> Our study also highlights the value of traditional ecological knowledge... [Oral traditions] represent an intimate and sophisticated understanding of the natural world. Oral traditions indicate which plants were utilized, the specific harvesting times, preparation techniques, resource management strategies, and the benefits accruing from the proper use of each plant" (254).

The book "People Before the Park" includes a detailed account from the Blackfeet of their seasonal rounds in connection with Glacier National Park (Thompson, 2015).

The Early Blackfeet

University of Arizona and Blackfeet Community College (BCC) students researched the nutritional value of native plant foods in 2005-2006 and described the importance of recognizing the connection between a nomadic lifestyle and a diet relying on many native plants. They begin with information about the difference between the names Blackfoot and Blackfeet,

> The Blackfeet are comprised of four bands: Southern Peigan (Blackfeet), North Peigan, Siksika, and the Kainah (Bloods). Today some regard the "Blackfoot" to be the nations to the north in Canada while the term "Blackfeet" is applied to the natives south of the border in the United States, although, this term is controversial as to how it is applied amongst tribesmen. The term Blackfoot at one time, and still does, represent all four bands regardless of geographic location. For the purposes of this paper the tribe is referred to Blackfeet and inclusive of all four tribal bands. In the past, before the 49th parallel or the Canadian/United States border, there were considered 3 branches: the Pikunni or Peigan, Siksika, and Kainah (Blood). Pikunni is the original name that the Blackfeet called themselves before Peigan was given to them by the European people. This is also true of the words Blackfeet and Blackfoot.
>
> Before treaty negotiations, mid 1800's, the Blackfeet Nation inhabited a large land base from the North Saskatchewan River, Alberta Canada; south to Yellowstone, Montana, and into northern parts of Wyoming; east to the Dakotas and; west to the Montana Rocky Mountains, Bitterroot Valley and beyond. Some say as far west as the Bigfork in western Montana (Senior Blackfeet Honorary Advisory Council Minutes 11/29-2005). This is a very large land mass of the Blackfeet tribes. The health and survival of the Blackfeet demanded a large land base for their subsistence on big game, bison, and foraging for important plant foods from roots, leafy greens and stems, berries, and the like. The hunting of wild game and gathering of wild plant foods determined their nomadic way of life...
>
> It is important to recognize the seasonal movements of a nomadic hunter-gatherer tribe because it strengthens the identification of food resources, when planted, harvested, and how it may be stored" (8-9)

The students found references to Blackfeet use of 100-185 plant species (for numerous uses) and over 50 species used specifically for food (Univ. Az & BCC, 2006). Similarly, Information from the Blackfeet Section of Trailtribes.org shows how the yearly cycle and patterns of movement reflected the location of important foods.

> The buffalo was most important, but particular camp locations were selected with other resources in mind as well. Each location was known for the resources it held, whether they were plant, animal, or mineral, and year after year, the people returned to these locations....Before they left winter camp, just after the snow disappeared, the ground of the tobacco garden was prepared for planting. The seeds would grow while they were off hunting the buffalo. Some of the important men who were responsible for the well-being of the tobacco, would return to the garden to tend the plants

Culturally scarred tree, NPS photo.

several times during the growing season. At the right time, everyone would gather near the garden for harvesting the tobacco in a ceremonial manner.

Reeves research also revealed over 80 plants traditionally utilized by the Blackfeet occur within the current park boundaries. Of these, 41 were used for food, 66 prepared as medicine, 25 used for spiritual reasons, and 48 used for a variety of purposes (212). It goes on to say that settlement on the reservation curtailed many of the traditional activities of the Blackfeet. Loss of access to the resources of Glacier NP aided in this decline. Evidence from interviews with elders points to the importance of major river valleys as access corridors to the resources of GNP. These areas have high cultural significance for these three main reasons: 1) the purity and power of the plants found in the mountains of the park; 2) many important plant resources do not occur elsewhere; 3) the mountains are the last remnant of traditional Blackfeet territory not disturbed by modern economic activities. (245)

The Early Kootenai

We traditionally followed a yearly cycle of movement, a way of life directed by the seasons. In the summers we fished by canoe on rivers and lakes, from near Lake Windermere in British Columbia, Canada to Edmonton, Alberta, Canada. In the cold winter months we moved south to the Sweetgrass Hills and Yellowstone, hunting bison on snowshoes. As the snows melted we moved west to Lake Pend Oreille, and then back to the north" (St. Mary VC Exhibits, 2010).

At Home In This Place
DVD Content

Play Video:
Kootenai- *The Place Where They Danced*

Listening to the Kootenai video clip, "The Place Where They Danced" is a clear reminder of the significance of the Lake McDonald area too the Kootenai. Oral tradition and contemporary accounts of the traditional and ceremonial importance of the Glacier National Park area are numerous (Thompson, 2015).

A survey of culturally scarred trees in Glacier National Park - on which the bark has been peeled to remove the cambium layer– identified approximately 70 scarred trees. Culturally scarred trees are indicators of prehistoric and historic travel corridors and campsites. The inner cambium layer of Ponderosa Pine is edible and extremely rich in nutrients. In the vicinity of Glacier National Park, this has been an important food source for Kootenai, Salish and Pend d'Oreille people for thousands of years.

Reeves recorded an ethnobotanical study that revealed more than 90 plant species utilized by the Kootenai people in their traditional range are the same species that occur within the boundaries of Glacier National Park. Of these, 48 species were used for food, 43 as medicines, 16 for spiritual purposes and 45 as materials for various purposes (64). A lack of ethnobotanical detail is recognized because of the inability of the researchers to interview elders directly. Also, that the Kootenai and other Tribes "essentially lost access to the resources of this portion of their traditional territory about 100 years ago when the park was established; thus, much of the ethnographic information pertains to the former use of the region by the ancestors of today's elders" (Reeves, 65).
As hunter-gatherers, the Kootenai relied extensively on plant foods to

supplement wild game in their diets. They collected and consumed at least 50 plant species, including fruits and berries, edible roots, greens, pine seeds, tree cambium, and tree lichen. Black tree lichen (Bryoria fremontii) available year round, is described as a valuable food source in times of scarcity. The collection of plant foods was seasonally patterned. They used the leaves, bark, roots, and pitch of a wide variety of plants for medicines. They also mixed a variety of other plants with tobacco for smoking, including kinnikinnick, pipsissewa, and the bark of red osier dogwood. Plants were used in all aspects of technology- for containers, canoes, houses, sources of fibers and dyes, and for fuel and cooking (Reeves, 65).

People Before the Park includes a information from the Kootenai of their seasonal rounds in connection with Glacier National Park (Thompson, 2015). Below is information from the MT Office of Public Instruction of Kootenai history and location in general,

> Ktunaxa subsistence was based on seasonal migrations that followed plant and animal production cycles, and coincidentally served to prevent an environmental degradation of aboriginal lands. Food preservation was an integral part of the Ktunaxa life cycle.
>
> Seasonal migrations for hunting and harvesting began in the early spring when bitterroots ripened and fisheries were bountiful. In early summer, they traveled east of the Rockies to hunt buffalo, returning in mid-summer to process and store the meat. In summer, camas, huckleberries, serviceberries, chokecherries, and other plants were harvested. By fall, big game expeditions were organized and some of the hunters returned to the plains for more buffalo. The people preserved and processed food for the winter cache.
>
> The Ktunaxa life cycle also depended on a commerce sector, which involved agriculture and aquaculture. The Ktunaxa cultivated a unique species of tobacco for personal use and trade with other tribes. They specialized in water, fisheries, bird hunting, trapping, and other aquacultural activities that were ongoing in Kootenai society.
>
> The most prominent distinction of the Ktunaxa is the isolated language they speak. While scientists classify most indigenous languages into family groups to determine origin and migratory patterns, the Kootenai language has never been likened to any other language in the world. It is an anomaly that effectively contradicts any migration theory for Ktunaxa. Other distinctions of the Ktunaxa include their portable tulle-styled summer lodges called Tanat. They also held the distinction of being avid canoeists, trappers, and anglers. They excelled in engineering light craft to expedite navigation on some of the most treacherous waterways in the Northwest. Their hunting and fishing techniques were superior even by modern standards. They developed and utilized devices to augment their technique. Traditional Kootenai fish weirs and bird traps were widely sought after for their utility.(25)

The Early Salish and Pend d'Oreille

We are the Séliš (Salish or "Flathead") and Qlispé (Pend d'Oreille), the easternmost tribes of the Salish language family.

Originally, we were one nation. Many thousands of years ago, as the population grew, we dispersed from here to the west, eventually forming many tribes and dialects reaching from Montana to the Pacific Coast.

We lived as hunters, fishers, and gatherers, with vast territories on both sides of the Continental Divide. The Flathead drainage system and the west side of Glacier National Park was part of the territory of the Qlispé band known as the Sł̓q̓etkʷmsčin̓t, meaning People of the Broad Water. This was the ancient name for Flathead Lake. A related tribe, the Tuṅáx̣n, lived along the Rocky Mountain Front. (St. Mary VC Project, 2010)

At Home In This Place
DVD Content

Play Videos:
Salish & Pend d'Oreille-
I can Almost Hear our Ancestors

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 (*Work House*, 1992).

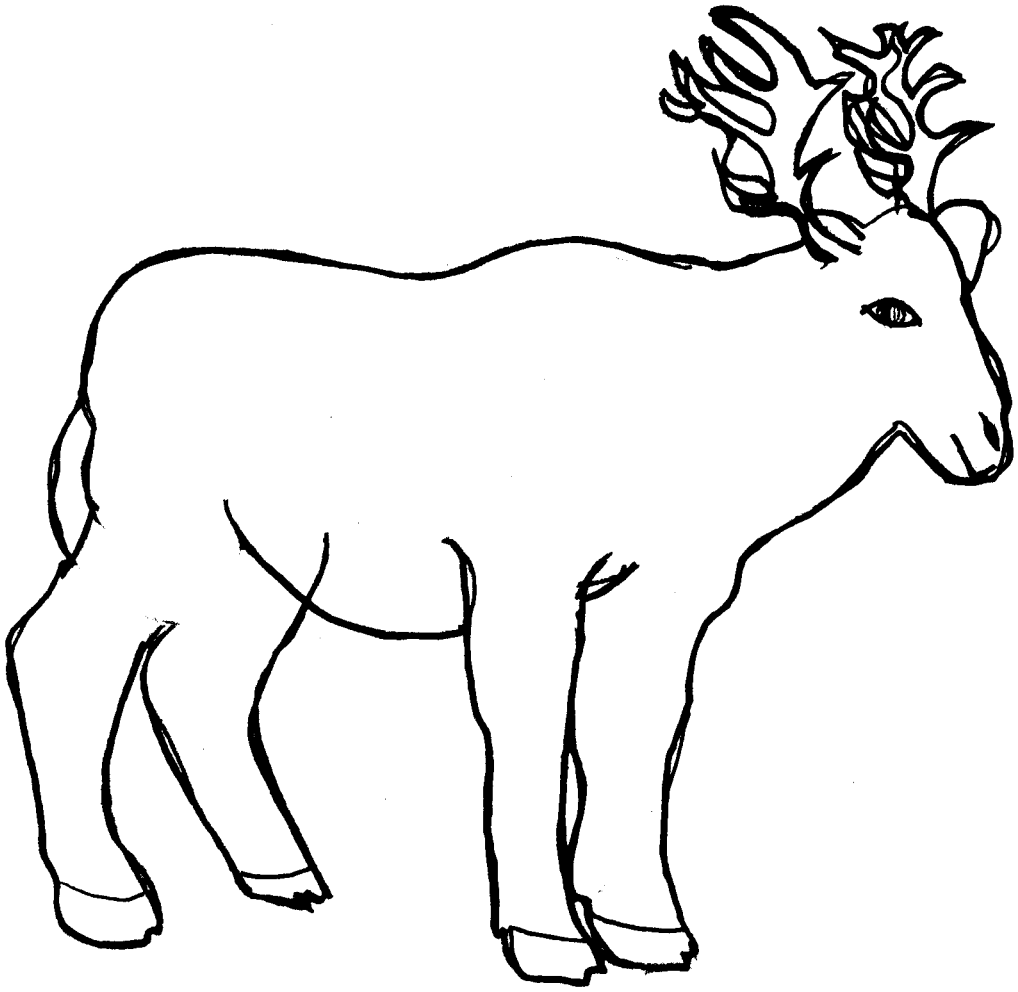
Information from the MT Office of Public Instruction provides a short overview of Salish and Pend d'Oreille history and location in general,

From the beginning of time, the Salish and Pend d'Oreille people made their living off the land through a complex pattern of seasonal hunting and gathering activities. The land provided all that the people needed. Elders say that life was hard, but good. Spring would yield a plentiful bitterroot harvest, followed by sweet camas bulbs in June.

The bloom of the wild rose signaled the people that the buffalo calves had been born and that it was time for the summer buffalo hunt. Throughout the rest of the summer, berries and fruits, including serviceberries, huckleberries, and chokecherries would be gathered, dried and stored. The Salish and Pend d'Oreille regularly gathered hundreds of different plants for food and medicinal uses.

In the fall, hunting began in earnest. Men hunted for large game, which the women butchered, dried and stored for winter. As the hunters brought home elk, deer, and moose, the women tanned hides for clothes, moccasins and other items such as a parfleche. A parfleche is a rawhide container used for storing a variety of things like dried foods and clothing.
Fishing was also important throughout the year. Both fishhooks and fish weirs were used to catch fish. Elders tell of days when the fish were so plentiful that you could almost cross the creeks walking on their backs.

The winter season involved trapping, ice fishing, and some hunting. Cold weather brought families inside and women made and repaired clothing while the men made and repaired tools and weapons. Coyote stories were brought out with the first snow. This was a sacred and happy time when ceremonial dances would be held" (24-25).



Elk Student Artwork by
Rachel Marie Deming

Unit 4 -Native Plants
Lesson 1
Who Says Plants Can't Move?

Materials:
- Balloons (green, brown, purple and red are preferable)
- Frozen or fresh berries (huckleberries, blueberries or raspberries are most appropriate)
- 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
- Optional: magnifying glasses to look at seeds

Douglas fir cone, NPS photo (Glacier Student Guide CD).

Lesson At A Glance

Student volunteers move around the classroom and role play different techniques to model the various ways plants can distribute their seeds. They observe a variety of seeds/berries from their neighborhood.

Objectives

Students will be able to:
- Role play how plants spread their seeds and populate new areas.
- Think about plants as organisms that are adapted to their environment and contribute to the well being of other plant, animals, and people.

Time Required

50 minutes

Vocabulary

Fungi, mushroom, nectar, pollen, pollination, pollinator, proboscis, seed, seed dispersal, spore.

Teacher Preparation/ Background

If doing the review on pollination, prepare powdered sugar and marshmallows in a paper bag ahead of time. Review pollination and how flowering plants produce seeds in order to reproduce. Gather seed examples for the different types of dispersal mechanisms and photos of plants that you can show as students do the role plays for seed dispersal.

Photos and information can be found on-line at Montana Plant Life. If students are able to use Apps, there is a Glacier Wildflower App available

Teacher Preparation/ Background Continued

for download. The two plant books that were included in the original *Work House* kit are available from most school and public libraries: 1) *Montana Native Plants and Early Peoples*, by Jeff Hart, Montana Historical Society Press; and 2) *Plants of Waterton-Glacier National Parks and the Northern Rockies*, by Richard J. Shaw and Danny On, Missoula: Mountain Press, 1979, which describes and illustrates with colored photographs over 200 species of trees, shrubs, flower and plants.

Consider borrowing Glacier's Plant Invaders education trunk as it has laminated, printed photos of native plants. The "Great Race for Survival" activity about plant competition includes how some non-native, invasive plants can out compete native species by having higher seed creation and dispersal techniques.

Procedures

1. You may want to start out by doing the following role play to review pollination (needed for plants to produce seeds). 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).
2. Discuss the relationships that flowering plants have with pollinating insects. Explain that this is one of the most sophisticated arrangements for pollination of flowers. 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 and other insects to the process of pollination and seed production.
3. 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. That process is still happening today. There is footage of Bitterroot's ability to spread its seeds in the "Botany" section of the online video (7 minutes).
4. Choose a student to be a burr bearing plant. Examples include large leaved avens, (Geum macrophyllum), stickseed (Hackelia micrantha), mountain sweet cicely (Osmorhiza chilensis) or the notorious non-native invasive plant with burrs- houndstongue (Cynoglossum officinale L.) . 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. 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

Procedures Continued

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.

5. 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?

6. 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. Can they think of other seeds they've seen that float on the wind?

7. Have another student be an early blue violet (Viola adunca). Have the student inflate a dark balloon and hold it, waiting patiently until another student touches the balloon-and then let it go! The balloon will rocket out into the room and settle on the floor some distance away. Some plants (and fungi/ mushrooms) use pressure from inside or outside forces to propel their seeds or spores out away from the parent plant. Richardson's geranium is noted to send its seeds 3 feet away. On a related note, spores from mushrooms also are forcibly ejected and because of their ability to be carried by wind have travelled from Northern Mexico to Canada. They have also been found thousands of feet up in the air! Students may be familiar with puffball mushrooms.

8. Select students to be a pine tree and a stream. Explain that conifers (trees with cones) use several mechanisms for seed and pollen dispersal. Give the tree student a green balloon and have the stream student 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.

Reflection and Assessment

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.

Writing Extension

Have students choose a seed dispersal mechanism and report on plants using that method. Put the reports together in a class book on propagation (natural dispersal) methods in plants. Donate the book to the school library.

Action Project/ Field Trip Extension

- Invite an herbalist from the Blackfeet, Salish, Pend d'Oreille, or Kootenai to visit your class and talk about plant uses.
- Plant a native garden at your school - the Montana Native Plant Society Flathead Chapter has native plant lists, nursery locations and much more.
- Flathead Audubon, Flathead National Forest, and Flathead Conservation District - offer native plant gardening and restoration projects.
- Partner to do a Master Gardner project with Montana State University Extension.
- Visit a native plant nursery or have a speaker from one visit your class.
- Ranger-Led Field Trips and Service Learning Projects in Glacier National Park. The park's native plant restoration program has service learning

Action Project/ Field Trip Extension Continued

field trips for middle and high school students; the Forest Processes and Fire Ecology field trips can be modified for 3rd - 8th grade.

- Self-Guided Field Trips in Glacier National Park.
- Glacier Institute - fire ecology and other education programs for students and adults.
- Guided Tours in Glacier National Park- various concession operated.
- Flathead Community of Resource Educators (CORE) - outdoor education guide for field trips in the Flathead Region.

Additional Resources

- Salish -Pend d'Oreille Culture Committee- 81 Blind Barnaby Street, P.O. Box 550, St. Ignatius, Montana 59865, Phone: (406) 745-4572.
- Kootenai Culture Committee - Kootenai Culture Committee, PO Box 278, Pablo, Montana 59855, Phone: (406) 849-5541.
- Blackfeet Community College Cultural and Language Division -Browning, MT 59417-0819, Phone (406) 338-5441.
- "Seasons of the Salish" DVD. Produced by Confederated Salish and Kootenai Tribes' Tribal Preservation Office and distributed by OPI to every elementary school library. It is also included in the PlaceNames: Building Worldviews Using Traditional Cultures and Google Earth, distributed by OPI to every middle and high school library.
- Glacier's Plant Invaders Traveling Trunk -contains hands-on materials and lessons to learn about non-native, invasive plants.
- Glacier National Park Fact Sheet, "Culturally Scarred Trees".
- Bitterroot Adaptations and Salish Traditions, MT OPI-IEFA Science, gr. 4.
- There is a Season- Salish Seasonal Rounds, MT OPI- IEFA, grade 2.
- Montana Project Learning Tree, Montana State University Extension.
- Flathead CORE Education Traveling Trunk List and Field Trip Sites.
- Explore the River Curriculum CD- CSKT Tribal Fish & Game; the Habitats Native section has information about traditional uses of native riparian plants and their Salish -Pend d'Oreille names.
- Niitsitapiisini Our Way of Life; The Story of the Blackfoot People - Blackfoot First Nations and Glenbow Museum of Calgary, teacher toolkit.
- Flathead Watershed Sourcebook; A Guide to an Extraordinary Place.
- "Avalanche Basin Audio Tour" created by students from the Univ. of MT.
- Pollinators Curriculum -United States Forest Service.
- National Park Service, Biodiversity Bee Week, Middle School Lessons.
- Project Learning Tree - Have Seeds, Will Travel Lesson.

MT Content Standards

Unit 4: Lesson 1, page 59
Montana Standards for Science
Science 3.3.1 Identify that plants and animals have structures and systems that serve different functions for growth, survival, and reproduction.
Science 3.3.3 Describe and use models that trace the life cycles of different plants and animals and discuss how they differ from species to species.
Science 3.3.4 Explain cause and effect relationships between nonliving and living components within ecosystems.

Indian Education for All Seven Essential Understandings Regarding Montana Indians
Essential Understanding 1 —tribal diversity

Unit 4 -Native Plants
Lesson 2
Native Harvest

Materials:
- Student Reading, Unit 4
- Art paper
- Theme paper
- Colored pencils
- *Native Plants and Early Peoples*, Jeff Hart and Jacqueline Moore

Field of blue camas, NPS photo.

Lesson At A Glance

Discussion of the value of native plants and plants as cultural resources. Students have access to materials, library, internet to do plant research. Best if can also do field trip to park or other wild area to see native plants in their natural setting.

Objectives

Students will be able to:
- Research uses and characteristics of a plant native to the Glacier NP area.
- Define what it means to be a native plant.
- List two reasons why native plants are important to the Blackfeet, Salish, Kootenai, and Pend d'Oreille as well as other people in Montana.

Time Required

50 minutes. Some students may need additional time for plant research.

Vocabulary

Ceremony, native plant, protocol, scientific name.

Teacher Preparation/ Background

Preview the student reading for unit 4 and assign as homework or incorporate into class time. (See the unit introduction for resources to discuss traditional tobacco use versus smoking cigarettes). Jeff Hart's, *Native Plants and Early Peoples*, written from his interviews with elders from different tribes around the state, contains histories and stories about major plants used in this area. Pages 82-85 describe the use of kinnikinnick's leaves as a smoking mixture.

Teacher Preparation/ Background Continued

Photos and information about plants can also be found on-line at Montana Plant Life. If students are able to use Apps, there is a Glacier Wildflower App available for download. The *Plants of Waterton-Glacier National Parks and the Northern Rockies*, by Richard J. Shaw and Danny On, Missoula: Mountain Press, 1979, describes and illustrates with colored photographs over 200 species of trees, shrubs, flower and plants found in the park.

Procedures

At Home In This Place
DVD Content

Play Videos:
Salish & Pend d'Oreille-
I can Almost Hear our Ancestors

1. Discuss the student reading for unit 4 from the homework assignment. Share answers (as a class, in pairs, or small groups) for the "checking understanding questions). Why are native plants important? What is a native plant? Both teacher and students supply as much personal information about plant uses as possible. This is a good place to re-listen to the Salish and Pend d'Oreille video clip, "I Can Almost Hear Our Ancestors" from the *At Home in This Place* DVD as it mentions getting plant medicines and how the park is a reminder of what things were like years ago and the lifestyle of that time.
2. Emphasize the importance of respecting and preserving native plants in our environment and the respect we need to show for local tribes. It is not legal to pick plants in Glacier National Park. 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 the importance of these plants to the Blackfeet, Salish, Pend d'Oreille, Kootenai (and other American Indian) cultures.
3. Explain that the class is going to do some individual research and put together another book. This time it will be about native plants.
4. 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* book, 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. (They could also select a plant from the Glacier NP Coloring book. Then they could print and color in the drawing of their plant).
5. Supply the students with the following "Questions for Plant Research". Add additional questions that might be appropriate. There are similar online lesson examples from Missouri Headwaters State Park and Cut Bank Public School on-line lesson (grade 7) for identifying native plants and their use by local tribes.

Field Trip Option: tell students to keep in mind that they will be trying to locate and photograph as many of the plants as they can on their field trip and that it may be hard to identify plants depending on the season, as they may not all have flowers. They should think about this during their research.

Student Page

Name:

Date:

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 are used and how are they prepared for use?

3. Are there any special ceremonies or protocols observed when gathering, preparing and using this plant?

4. Are there any 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?

Common Harebell
Student Artwork by
Aaron Connelly

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?

Writing Extension

When the students have finished writing, editing, and rewriting; ask them to do illustrations of their chosen plants.

Reflection and Assessment

Have the students present their research to the class and then bind the papers and illustrations into a class book. Take the book on your field trip and use it as a reference during your visit. Present the book to the school library when completed.

Action Project/ Field Trip Extension

- Invite an herbalist from the Blackfeet, Salish, Pend d'Oreille, or Kootenai to visit your class and talk about plant uses.
- Plant a native garden at your school - the Montana Native Plant Society Flathead Chapter has native plant lists, nursery locations and much more.
- Flathead Audubon, Flathead National Forest, and Flathead Conservation District - offer native plant gardening and restoration projects.
- Partner to do a Master Gardner project with Montana State University Extension.
- Visit a native plant nursery or have a speaker from one visit your class.
- Ranger-Led Field Trips and Service Learning Projects in Glacier National Park. The park's native plant restoration program has service learning field trips for middle and high school students; the Forest Processes and Fire Ecology field trips can be modified for 3rd - 8th grade.
- Self-Guided Field Trips in Glacier National Park.
- Glacier Institute - fire ecology and other education programs for students and adults.
- Guided Tours in Glacier National Park- various concession operated.
- Flathead Community of Resource Educators (CORE) - outdoor education guide for field trips in the Flathead Region.
- Family Forestry Expo and River Honoring - organized annually, target specific grades and include information about native plants.

Additional Resources

- Aboriginal Tobacco Program - Cancer Care Ontario, Canada.
- Salish -Pend d'Oreille Culture Committee- 81 Blind Barnaby Street, P.O. Box 550, St. Ignatius, Montana 59865, Phone: (406) 745-4572.
- Kootenai Culture Committee - Kootenai Culture Committee, PO Box 278, Pablo, Montana 59855, Phone: (406) 849-5541.
- Blackfeet Community College Cultural and Language Division -Browning, MT 59417-0819, Phone (406) 338-5441.
- Glacier National Park Fact Sheet, "Culturally Scarred Trees".
- Montana Project Learning Tree, Montana State University Extension.
- Explore the River Curriculum CD- CSKT Tribal Fish & Game; the Habitats Native section has information about traditional uses of native riparian plants and their Salish -Pend d'Oreille names. It also has an interactive section to make tools like a fish spear.
- Niitsitapiisini Our Way of Life; The Story of the Blackfoot People - Blackfoot First Nations and Glenbow Museum of Calgary, teacher toolkit.
- Flathead Watershed Sourcebook; A Guide to an Extraordinary Place.
- "Avalanche Basin Audio Tour" created by students from the Univ. of MT.
- "Seasons of the Salish" DVD. Produced by Confederated Salish and Kootenai Tribes' Tribal Preservation Office and distributed by OPI to every elementary school library. It is also included in the PlaceNames: Building Worldviews Using Traditional Cultures and Google Earth, distributed by OPI to every middle and high school library.

MT Content Standards

Unit 4: Lesson 2, page 63

Montana Common Core Standards—English Language Arts

CCRA.SL.1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCRA.SL.4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

CCRA.SL.6. Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

Standards for Literacy in History/Social Studies, Science, and Technical Subjects

CCRA.RH/ST.1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

CCRA.RH/ST.4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

CCRA.RH/ST.6. Assess how point of view or purpose shapes the content and style of a text. (Identify aspects of a text, including those by and about American Indians, that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).)

CCRA.RH/ST.7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

CCRA.RH/ST.9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

CCRA.RH/ST.10. Read and comprehend complex literary and informational texts independently and proficiently.

CCRA.WHST.2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

CCRA.WHST.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCRA.WHST.7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

Montana Standards for Science

Science 1.1.6. Identify, compare, explain... how observations of nature form an essential base of knowledge among the Montana American Indians.

Montana Standards for Social Studies

Social Studies Standard 1. Students access, synthesize, and evaluate information to communicate and apply social studies knowledge to real world situations.

Social Studies Standard 3. Students apply geographic knowledge and skills (e.g., location, place, human/environment interactions, movement, and regions).

Social Studies Standard 4. Students demonstrate an understanding of the

MT Content Standards Continued

effects of time, continuity, and change on historical and future perspectives and relationships.
Social Studies Standard 6. Students demonstrate an understanding of the impact of human interaction and cultural diversity on societies.
Indian Education for All Seven Essential Understandings Regarding Montana Indians
Essential Understanding 1 —tribal diversity
Essential Understanding 3 —importance of oral traditions
Essential Understanding 6 —history is subjective

Unit 4 -Native Plants
Lesson 3
What's In A Name?

Materials:
- *At Home In This Place* DVD
- Marking pens
- Note cards
- Dictionary Of Word Roots And Combining Forms by Donald J. Borror

Girls looking up plant name ("Parks in Focus" photo, Glacier trip 2013).

Lesson At A Glance

Students decipher scientific name meanings and use native plant field guides, information from the tribes, or links to online resources provided to create a chart of the different names for the same native plant.

Objectives

Students will be able to:
- Use prefix, suffix and word root definitions to decipher the meaning of the scientific name.
- Use a field guide (or wildflower App.) to discover plant family characteristics.
- Research common, scientific (genus and species), Blackfeet, Kootenai, Salish-Pend d'Oreille names for a few plants occurring in Glacier NP.

Time Required

50 minutes. Some students may need additional time for plant research.

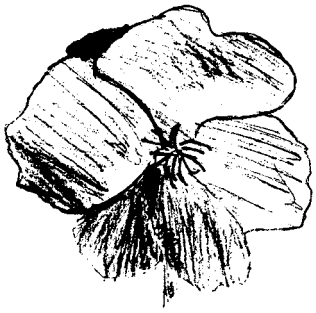
Vocabulary

Genus, prefix, pronunciations, species, suffix.

Teacher Preparation/ Background

Practice using the Dictionary of Word Roots and Combining Forms to show students how to decipher scientific name meanings. Contact the local Tribal Cultural Committees for suggestions for speakers and see the list of additional resources for on-line websites that provide language connections. Each Tribe may have several words that indicate the same plant at different times of the year or when used for different purposes. Ideally, local dialect

Teacher Preparation/ Background Continued



Wild Rose Student Artwork by K.A.B.

and proper pronunciations should be provided by elders and language enthusiasts in your area.

Be prepared to discuss the importance of language and of knowing native plant names and place names, to understanding culture and for nurturing sense of place. Robin Wall Kimmerer, writes in *Gathering Moss; A Natural and Cultural History of Mosses*,

> The sanitized suburban life has succeeded in separating us from the plants that sustain us. Their roles are camouflaged under layers of marketing and technology. You can't hear the rustle of corn leaves in a box of Froot Loops. Most people have lost the ability to read the role of a medicine plant from the landscape and read instead the "directions for use" on a tamper-proof bottle of Echinacea. Who would recognize those purple blossoms in this disguise? We don't even know their names anymore. The average person knows the name of less than a dozen plants and this includes such categories as "Christmas Tree." Losing their names is a step in losing respect. Knowing their names is the first step in regaining our connection" (101-102).

Below is the information in the St. Mary Visitor Center Exhibits from the Tribes about place names in Glacier National Park.

Most of our place names have been used by our people from time immemorial - for many thousands of years, before there ever was a Glacier National Park.
-Tony Incashola, Pend d'Oreille

Salish and Pend d'Oreille

The ancient spiritual and material importance of the area to the tribes is reflected in its many Salish-language place names, a number of which are still known. The Flathead River, including its various forks and branches, is of such seminal importance that it is known simply as Ntx̣ʷétkʷ - The River.

- The Belly River is Olín Seẇłkʷs in Salish - literally, "Waters of the Digestive Tract," referring to bison.
- Chief Mountain. The mountain has always been known as S?ilm̓łxʷsc̓ut in Salish - Chief of the Sharp-edged Mountains.

Kootenai

A place is usually named for a significant event that happened there or for a person or family that lived in the area. This means that a river or stream may not have the same name its whole length from glacier to ocean.

- Ya·kiɬ Haqwiɬnamki means the place where they dance in Kootenai and is the site of important winter dances. It is also the site for Apgar Campground.
- Sina ʾA·kłam̓ ʾA·kuq̓nuk (Avalanche Lake) is named after a Kootenai family who traditionally camped in the area.

Blackfeet

Ninastako (Chief Mountain) in Blackfeet, means "the mountain that stands apart."

Procedures

At Home In This Place
DVD Content
Play Audio:
Blackfeet, Salish, Pend d'Oreille, Kootenai
- *Greetings*

1. Discuss with students how language is an important part of cultural identity. Have them listen to the different greetings from the Blackfeet, Salish, Kootenai, and Pend d'Oreille so they can hear the differences in the language sounds. Do any of them speak another language?
2. Today, there is one common naming language for plants that is used by the entire world. Why would it be helpful for everyone to be using this same language instead of their own for plant names? Why would you want to preserve the name in your own language as well?
3. Start a class chart of "plant names and meanings" from the list provided. Include columns for: common name, scientific name, Blackfeet, Salish/Pend d'Oreille, and Kootenai name with space to write the meaning or translation of that name. Using one of the scientific plant names from the list provided, demonstrate how to use the Dictionary of Word Roots and Combining Forms to find the meaning of the scientific name. Can the students do the same and fill in the meanings of the scientific names for the rest of the plants? What other plants in the field guide are in the same family (related) to their plant? What similarities are there for the plants grouped together with that same family name?
4. Have them continue to work individually or in small groups and research the Blackfeet, Kootenai, Salish-Pend d'Oreille names and meanings. Ideally, have a native language speaker come to your classroom. How do names compare? Did they notice that Salish-Pend d'Oreille and Kootenai Languages have different letters in their alphabets?

Salish language resources:
www.cskt.org/hc/salish.htm ; www.salishaudio.org; www.salishworld.com
www.thesalishinstitute.org; www.kalispeltribe.com; www.interiorsalish.com
www.skc.edu

Kootenai language resource:
Plant names - http://www.firstvoices.com/

Blackfeet language resources:
Piegan Institute-Language
Blackfeet words from the Native Languages of the Americas.

Reflection and Assessment

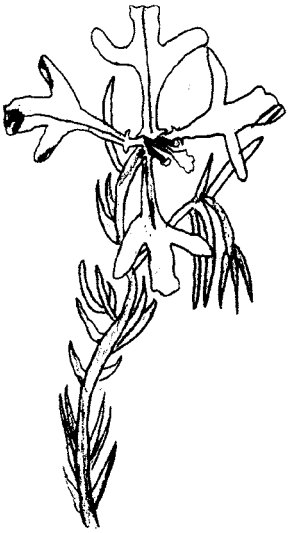
Knowing plant names and being able to recognize/identify plants in the past was a common skill and necessary for everyday survival. Today, for most of us, it is not necessarily a survival need but it is a great way to reconnect with the place where we live. See if students can add some of these plants names (or better yet, ones from their neighborhood) to their vocabulary. 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.

Writing Extension

Provide a forum to demonstrate or apply their vocabulary. For instance; labeled drawings could be displayed as part of an open house. One school made a field guide for their own school native plant garden!

A List of a Few Native Plants of Glacier National Park

Common Name	Scientific Name	Blackfeet Name (names can vary by region)	Kootenai Name	Salish-Pend d'Oreille Name
Biscuit-root coos-root	Lomatium cous	koos	ʔakuḱaʔɬak	pčl̓u
Bitterroot	Lewisia rediviva	eks-ix-ix	naqam¢u	sp̓éλ̓m
Blue Camas	Camassia quamash	miss-issia	xapi	sx̣ʷéʔli (uncooked raw)
Chokecherry	Prunus virginiana	pukkeep	ʔa·kiʔɬmaḱ	ɬx̣ʷɬo
Huckleberry	Vaccinium globulare	apa-oapspi	nupxamuɬ	st̓šá
Lodgepole pine	Pinus contorta	manistami	ʔiɬti·t'	qʷqʷliʔt
Serviceberry Sarvisberry Saskatoonberry	Amelanchier alnifolia	ok-kun-okin	sq̓umu	sɬaq
Western red cedar:	Thuja plicata	sixinikok	ʔi¢'nat'	astqʷ
Yampa wild carrot	Perideridia gairdneri	nitzi-katasi	niʔ¢na	sλ̓úḱʷm



Pink Fairies, Student Artwork by Sam

Action Project/ Field Trip Extension

- Invite an herbalist from the Blackfeet, Salish, Pend d'Oreille, or Kootenai to visit your class and talk about plant uses.
- Plant a native garden at your school - the Montana Native Plant Society Flathead Chapter has native plant lists, nursery locations and much more.
- Flathead Audubon, Flathead National Forest, and Flathead Conservation District - offer native plant gardening and restoration projects.
- Partner to do a Master Gardner project with Montana State University Extension.
- Visit a native plant nursery or have a speaker from one visit your class.
- Ranger-Led Field Trips and Service Learning Projects in Glacier National Park. The park's native plant restoration program has service learning field trips for middle and high school students; the Forest Processes and Fire Ecology field trips can be modified for 3rd - 8th grade.
- Self-Guided Field Trips in Glacier National Park.
- Glacier Institute - fire ecology and other education programs for students and adults.
- Guided Tours in Glacier National Park- various concession operated.
- Flathead Community of Resource Educators (CORE) - outdoor education guide for field trips in the Flathead Region.

Additional Resources

- Salish -Pend d'Oreille Culture Committee- 81 Blind Barnaby Street, P.O. Box 550, St. Ignatius, Montana 59865, Phone: (406) 745-4572.
- Kootenai Culture Committee - Kootenai Culture Committee, PO Box 278, Pablo, Montana 59855, Phone: (406) 849-5541.
- Blackfeet Community College Cultural and Language Division - 504 SE Boundary St., Browning, MT 59417-0819, Phone (406) 338-5441.
- "Seasons of the Salish" DVD. Produced by Confederated Salish and Kootenai Tribes' Tribal Preservation Office and distributed by OPI to every elementary school libraries. It is also included in the PlaceNames: Building Worldviews Using Traditional Cultures and Google Earth, distributed by OPI to every middle and high school library.
- Glacier National Park Fact Sheet, "Culturally Scarred Trees".
- Montana Project Learning Tree, Montana State University Extension Forestry.
- Niitsitapiisini Our Way of Life; The Story of the Blackfoot People - Blackfoot First Nations and Glenbow Museum of Calgary. A virtual tour with teacher toolkit.
- The Gift of the Bitterroot - K-2 Lesson plan using the illustrated children's book Illustrated by Antoine Sandoval with story as told by Johnny Arlee.
- Indian Education for All, Youth Book Club Trunk, Gift of the Bitterroot and Crown of the Continent Ecosystem. - free from Flathead Audubon Chapter (Contact the NW MT Educational Coop Office at 406/752- 3302 or auduboneducator@gmail.com).
- Flathead Watershed Sourcebook; A Guide to an Extraordinary Place.
- Place Names In Glacier NP, lesson 2, p. 45 in "The Land of Many Stories: The People & Histories of Glacier National Park" MT Historical Society Footlocker.
- Jesse Nenemey, Nkwusom instructor wrote a tree and plant book with many photos, Salish and Latin names, and traditional preparations and uses. It is teacher and student friendly.

MT Content Standards

Unit 4: Lesson 3, page 67

Montana Common Core Standards—English Language Arts

CCRA.SL.1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCRA.SL.4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Standards for Literacy in History/Social Studies, Science, and Technical Subjects

CCRA.RH/ST.4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

CCRA.RH/ST.5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.

Montana Standards for Science

Science 1.1.6. Identify, compare, explain... how observations of nature form an essential base of knowledge among the Montana American Indians.

Science 3.3.1 Identify that plants and animals have structures and systems that serve different functions for growth, survival, and reproduction.

Science 3.3.5 create and use a classification system to group a variety of plants and animals according to their similarities and differences.

Montana Standards for Social Studies

Social Studies Standard 3. Students apply geographic knowledge and skills (e.g., location, place, human/environment interactions, movement, and regions).

Social Studies Standard 6. Students demonstrate an understanding of the impact of human interaction and cultural diversity on societies.

Indian Education for All Seven Essential Understandings Regarding Montana Indians

Essential Understanding 1 —tribal diversity

Essential Understanding 3 —importance of oral traditions

Essential Understanding 6 —history is subjective

Unit 4 -Native Plants
Lesson 4
Forest Communities

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
- Magnifying glasses
- Poster board
- Marking pens
- Scissors
- Glue
- Optional: Dichotomous tree key for Glacier NP
- Optional: Glacier NP coloring book of trees and plants

Students hike the Huckleberry Nature Trail, NPS photo.

Lesson At A Glance

Students collect conifer tree needles and cones (not in the national park but from locations where it is permissible) and make displays from them. They identify trees and take note of where their samples were collected.

Objectives

Students will be able to:

- Ethically collect tree needles, cones and leaves.
- Identify local native trees from their needles and cones.
- Be able to associate tree species with climate, terrain, elevation, and successional state.

Time Required

50 minutes with two to three additional class periods if adding the "Mystery Trees" lessons from FireWorks or time to use the "Fire on the Land" DVD information.

Vocabulary

Botanists, conifers, deciduous, disturbance, naturalist, specimens, understory.

Teacher Preparation/ Background

Since this *Work House* lesson was created, two amazing resources have been developed that bring the concepts from this lesson to life.

1) the FireWorks Education Trunk (Missoula Fire Sciences Lab) -available to borrow for free from numerous locations in Montana, Idaho, and Colorado. 2) the Fire on the Land DVD (Confederated Salish & Kootenai Tribes Fire History Project). This should be in all school libraries.

Teachers may want to gather example needles, cones, leaves and seeds to show students what you want them to collect. The FireWorks trunk has pressed specimens of native: black cottonwood; Douglas-fir; Engelmann spruce; lodgepole pine; ponderosa pine; quaking aspen; subalpine fir; western larch; and whitebark pine. They are used with the "Mystery Trees" Activities 4-3, p. 79-81 (elementary grades) and 4-4, p. 82-89 (middle school grades), of the FireWorks Curriculum along with worksheets and felt boards (also supplied in the trunk) to help students to identify trees. These would be perfect "warm-up" activities before students went out to collect their own specimens.

The pertinent sections of the "Fire on the Land" DVD for students to look at (homework, group work, or individual work when finished with other assignments) are under the heading "Fire Ecology" and then "Fire Concepts." The interactive "Forest Succession" (especially the "burn the forest link) and "Disturbance" sections will provide background information for students about how forests change over time and with natural disturbance. As the DVD indicates, "for thousands of years the Salish, Pend d'Oreille, and other tribes of the Northern Rockies periodically set fire to the land, profoundly shaping plant and animal communities." All four tribes associated with Glacier National Park, the Blackfeet, Salish, Pend d'Oreille and Kootenai were intimately familiar with the plant communities. Then and today, being able to recognize and identify the successional stages of native plant communities provides a great deal of information about the soil conditions, moisture availability, and history of natural disturbances. A field trip to either the St. Mary or Lake McDonald Valleys will allow students to see first hand these native plant communities.

Plant Communities in the St. Mary Valley

St. Mary Lake, NPS photo (Glacier NP Digital Image Library).

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 (not in the Plant Kingdom, but a combination of two organisms-a fungus and an alga-living together) can be found in various growth forms throughout the park, including crustose forms growing tight against the substrate on the highest peaks. Algae occur on the surface of glaciers and snowfields.

Plant succession is influenced by natural disturbances such as flood, snowslides, drought, fire, insects, plant disease, 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 and the more recent, Red Eagle (2006) and Reynolds Fires (2015).

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 15 years and only open in extreme heat. Thousands of lodgepole seeds released after a fire thrive in burned oversoil. 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.

Plant Communities in the Lake McDonald Valley

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. A hike along the Rocky Point Trail from the Fish Creek Campground starts out in cedar-hemlock forest, but then enters into the area burned in the 2003 Robert Fire, a lodgepole pine forest. 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.

Avalanche Lake, NPS photo (Glacier Student Guide CD).

Western Red Cedar, Thuja plicata, NPS photo.

In the absence of natural and human-caused disturbances, the Lake McDonald 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 seedlings. 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. Theoretically, this climax community can maintain stability for hundreds of years if there is no disturbance. (*Work House*, 1992, 1998)

Procedures

1. Review the information on Glacier's plants from the student reading. Incorporate the FireWorks /and or Fire on the Land lessons.
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 and to only collect in areas where they have permission. 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 (soils, sun/shade, wet/dry, etc.).
4. Students should use the tree guide to identify their specimens and to research its characteristics and habitat.
5. Then students can make leaf, cone, and needle displays.

Reflection and Assessment

Discuss where the trees they identified might occur in Glacier National Park.

Writing Extension

Have students display their tree guides and consider making a neighborhood field guide to trees.

Action Project/ Field Trip Extension

- Complete more activities in the "FireWorks" education trunk.
- Invite someone who had extensive experience with a wildfire in your area. Have them come into your classroom and discuss conditions before the fire, management of the fire, and conditions in the area after the fire. For the Blackfeet and Flathead Reservations, contact the Divisions of Fire Management.
- Ranger-Led Field Trips and Service Learning Projects in Glacier National Park. The park's native plant restoration program has service learning field trips for middle and high school students; the Forest Processes and Fire Ecology field trips can be modified for 3rd - 8th grade.
- Self-Guided Field Trips in Glacier National Park.
- Glacier Institute - fire ecology and other education programs for students and adults.
- Guided Tours in Glacier National Park- various concession operated.
- Flathead Community of Resource Educators (CORE) - outdoor education guide for field trips in the Flathead Region.

Additional Resources

- Salish -Pend d'Oreille Culture Committee- Phone: (406) 745-4572
- Kootenai Culture Committee - Phone: (406) 849-5541 .
- Blackfeet Community College Cultural and Language Division - Phone (406) 338-5441.
- Explore more of the "Fire on the Land: Native Peoples and Fire in the Northern Rockies" DVD. Confederated Salish and Kootenai Tribes, Fire History Project- the traditional and contemporary use of fire by the Salish and Pend d'Oreille Tribes of the Flathead Indian Reservation.
- Play more video clips from the "At Home in This Place" DVD to tell students about traditional tribal use of the Glacier National Park area and encourage a sense of pride in the historical associations and wise stewardship by tribal ancestors.
- Use the Kid's Discover Montana's Ecosystem to learn more about the plant community types across the state.
- Take an e-hike on Glacier's Avalanche or Dawson-Pitamaken Trail.

At Home In This Place
DVD Content

Play Videos:
At Home in This Place

MT Content Standards

Unit 4: Lesson 4, page 72

Montana Common Core Standards—English Language Arts

CCRA.SL.1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCRA.SL.2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

CCRA.SL.4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Standards for Literacy in History/Social Studies, Science, and Technical Subjects

CCRA.WHST.2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

CCRA.WHST.7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

Montana Standards for Science

Science 1.1.6. Identify, compare, explain ... how observations of nature form an essential base of knowledge among the Montana American Indians.

Science 3.3.1 Identify that plants and animals have structures and systems that serve different functions for growth, survival, and reproduction.

Science 3.3.5 create and use a classification system to group a variety of plants and animals according to their similarities and differences.

Montana Standards for Social Studies

Social Studies Standard 3. Students apply geographic knowledge and skills (e.g., location, place, human/environment interactions, movement, and regions).

Social Studies Standard 4. Students demonstrate an understanding of the effects of time, continuity, and change on historical and future perspectives and relationships.

Social Studies Standard 6. Students demonstrate an understanding of the impact of human interaction and cultural diversity on societies.

Indian Education for All Seven Essential Understandings Regarding Montana Indians

Essential Understanding 1 —tribal diversity

Essential Understanding 3 —importance of oral traditions

Essential Understanding 6 —history is subjective

National Park Service
U.S. Department of the Interior

Glacier National Park

Unit 5:
Animals and Habitat
Animals Are People Too

Beaver Student Artwork by Cory McLean.

Animals and Habitat Teacher Background Information

This unit focuses on the role animals play in Blackfeet, Kootenai, Salish, and Pend d'Oreille culture, and in the Crown of the Continent Ecosystem. Students who have done the other units will have an understanding of the connection between the mountains/valleys/water with the plants, and how those features influence the wildlife. This unit includes two lessons: 1) Painted Lodges- about tipi design and animal symbolism; and 2) Animal Research -for doing research on a Glacier animal.

The *At Home in this Place* DVD, in the Kootenai Audio section, has Vernon Finley, telling a grizzly story .

The Student Reading for Unit 5 begins with a paragraph from the St. Mary Visitor Center text about the Salish and Pend d'Oreille relationship with animals. The reading then contains a Blackfeet story about beavers and Kootenai story about grizzly bears. (The *At Home in this Place* DVD, in the Kootenai Audio section, has Vernon Finley, telling a grizzly story.) The students will also read about the wildlife of Glacier.

There are numerous park websites that can supplement the wildlife reading information. The park's mammals web page has a list of the over 60 species of mammals present in the park. It's just recently been discovered that there are three more species of bats that need to be added to that list! There are over 260 species of birds, numerous species of fish, six amphibians, three reptiles, an unknown number of insects, and spiders which are all part of the park's animal kingdom. For photos of some of these animals, the park's student guide has a digital library of copyright free images.

Since bears are such a charismatic animal that many people ask about, there are web pages about bear safety, bear lessons and facts, and the bear research in the park. The park's bear trunk is free to borrow (but has to be picked up in person) and contains pelts, claws, skulls, and other hands-on materials for K-12 grades. (Other park education trunks that may complement this unit include: wolf trunk, mammal skulls kit, and a songbird kit.)

At Home In This Place DVD Content

Play Videos:
Blackfeet - *It's Like Being Home*

For beavers, use the *At Home in this Place* DVD to re-listen to the Blackfeet "It's Like Being Home" video clip about the triple divide watershed, the buffalo, and the beaver bundle. The online Glacier Activity Guide has a Beaver Succession Mural Activity, with background information about beavers. Likewise, the Meadow Madness activity explores the changes in a beaver created meadow.

For the study of all wildlife and habitat types in Montana, the state's office of Fish, Wildlife & Parks has an animal field guide and a Kid's Guide to Discover Montana's Ecosystems. It contains a section on wildlife use of major Montana forest habitat types.

Although it is not focused on a river in the park, the concepts and ecological information about riparian habitats, bull trout life cycles, and habitat restoration, in the Explore the River Curriculum CD (by CSKT Tribal Fish & Game focused on the Jocko River,) are definitely pertinent to Glacier National Park fish habitat, cultural resources, and ecology. Similarly, *Bull Trout's Gift*, discusses reciprocity and stewardship.

As indicated in Unit 4, the early Blackfeet, Kootenai, Salish and Pend

d'Oreille in their yearly cycles of movement, regularly used the area that is now Glacier National Park. Information in the introduction for Unit 4 also includes references from each tribe to their hunting and uses of wildlife -for food, tools, clothing, etc... The importance of animals for each tribe varied in degree depending on the species. (The importance of bison/buffalo to the Blackfeet is a good example.) Again, resources developed by the tribes and the MT Office of Public Instruction, IEFA are good sources for this. A new resource in 2015, the book "**People Before the Park,**" has detailed information from the Blackfeet and Kootenai about their connection and use of park resources. As the Kootenai Culture Committee, CSKT writes in *Ktunaxa Legends*,

> The sun and the Moon transformed all beings who chose to lie on this Earth into physical forms and assigned them a domain where they all had complementary roles. The concept of interdependency which maintains the delicate balance of the natural world is basic to our culture. The Ksanka have always relied on the laws of nature for survival and they continue to cherish and respect animals as equals.(xiii)

Wild animals are protected in Glacier National Park. Today, there is no hunting allowed in the park. For the millions of visitors who come to the park each year, seeing wildlife is the impetus and highlight of their trips. Here is the information from the St. Mary Visitor Center exhibits from the tribes for visitors to learn a bit about wildlife's cultural significance. Combined with the videos from *At Home in This Place*, some animal connections are described.

At Home In This Place
DVD Content

Play Audio: **Blackfeet**
- The Story of the Wolf's Tail

Blackfeet

Animals were the original managers of this land, not people.
- Rusty Tatsey, Blackfeet

A band of Blackfeet wintered along the east side of the mountains. The mountains provided refuge from the plains' blizzards and gave us access to the herds for hunting. We are Ni-tsi-ta-pi-ksi - this means "real people" and distinguishes us as human beings from the rest of Creation. We share the earth with four-legged animals, plants, rocks, and the earth itself. We call these ksahkomi-tapiksi (Earth Beings).

Wolf: to us, the wolf is not a predator. He was made for a reason, to help thin out the sick animals. We look to the wolf as a helper in this way.

At Home In This Place
DVD Content

Play Audio:
Kootenai Story
- The Grizzly Bear Story

Kootenai

Animals are people too.
- Vernon Finley, Kootenai

There were basically three "periods" of time in Kootenai history: the spiritual period, the animal period, and the human period, after the creation of people. Inhabitants of the earth were interchangeable and time was not considered to be linear-sequential. Spirits, animals, and humans coexist and have shared experiences in the history of the earth. There is no hierarchy.

Elk, Kiɬq̓aɬɬi (mature bull elk): we have many names for elk - for every variation of age and gender, because it is so important to us.

At Home In This Place
DVD Content

Play Audio:
Salish and Pend d'Oreille Story
- The Coyote's Role

Salish and Pend d'Oreille

Animals are on a human-level relationship. There are songs to call them, thank them, praise them. . .for things that they taught you.
- Tony Incashola, Pend d'Oreille

The Salish and Pend d'Oreille draw upon a profound knowledge and understanding of our homeland, and upon a deeply spiritual relationship with plants and animals. Salish oral historian Pete Beaverhead said: "The people of long time ago ate roots, they ate berries, and they ate the meat of the animals. . .This is why the Indians were like the animals. They are close to the animals."

Listen to Tony Incashola, Salish Cultural and Educational Leader, tell a Salish origin story of a time before the people were in this area. "The animals spoke for the land," and when the people came to the land, these people became the speakers for the animals.

Coyote, NPS photo (Glacier Student Guide CD).

Unit 5 -Animals and Habitats
Lesson 1
Painted Lodges

Materials:
- Art & theme paper
- Colored pencils
- Suggested books: *People Before the Park* by Sally Thompson, Kootenai Culture Committee & Pikunni Traditional Association; *Tipi: Home of the Nomadic Buffalo Hunters* by Paul Goble; *The Tipi: Traditional Native American Shelter* by Adolph Hungrywolf

Blackfeet Chief (no name recorded with photo) on horse (Glacier NP Digital Image Library).

Lesson At A Glance

Students learn about the uniqueness of lodge designs and connection with animals. They use art skills to design their own lodges, write explanations of, and share designs. An optional activity is to construct a scale model lodge.

Objectives

Students will be able to:
- Listen to audio recordings of tribal leaders and elders telling traditional animal stories.
- Discuss difference between cultures with relation to animals.
- Recognize the special significance and variation of painted lodge designs within Indian cultures and discuss why wild animals might be portrayed on a lodge.
- Name the three animals that occur in the traditional Blackfeet, Kootenai, Salish, and Pend d'Oreille stories from the student reading and give a unique characteristic of each of those animals.
- Explore what requirements a lodge had to have for the lifestyle of peoples who moved seasonally and the design to meet those requirements.
- Optional: use math skills to construct a scale model lodge.

Time Required

Two 50 minute periods - one for reading and discussion, one for drawing, writing and presenting. Additional time if making models.

Vocabulary

Maltese Cross, Medicine Lodge, pigments, Plains Culture, Plateau Culture, protocol, symbols, tipi.

Teacher Preparation/ Background

Assign student reading (could also wait and do reading with Lesson 2). Collect books and photographs of tipis. Decide if the math option is to be included and set aside time/materials for that. Have audio recordings ready to play.

For Kalispell area schools, the Hockaday Museum has a Traveling Medicine Show and a "Home on the Plains" traveling trunk which includes a model tipi, prints of tipi designs, reference materials, and several tipi activities (including a drawing lesson similar to this one). The Glenbow Museum has a short video of a tipi being set up. The introduction for the video on the Glenbow website says, "Tipis are incredible structures. They are warm in the winter and cool in the summer. They can withstand winds that blow at over 100 kilometers an hour. Tipis are portable and can be easily set up and taken down. Although we live in houses today, we still put up our tipis for special ceremonial occasions." In addition, the Glenbow website has a searchable database to find collection items that can be used to find tipi images/artwork.

The MT Office of Public Instruction IEFA has a "Long Ago in Montana" video and lessons. It includes Blackfeet, Kootenai, Salish, and Pend d'Oreille talking about lifestyles in the past. One section is specifically about shelter. In it, Vernon Finley talks about the tule mat shelter. For older students, the Havre Public Schools has a lesson, Mathematics with Native American Tepees focused on the mathematical/engineering design of the tipi.

Much of the background information provided below was from the original *Work House* lesson, and came from generalized readings on lodges and the traditions behind painted lodges (see bibliography). Thank you to Hockaday Museum for sharing their "Draw Your Own Tipi Design" lesson for confirmation and comparison. Symbolism and design varies significantly from tribe to tribe, band to band, and from individual to individual. This activity is intended to make students aware of the special significance of painted designs within Indian cultures.

It would be a mistake to think that all tipis (also spelled tepee and teepee) 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.

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

Porcupine Student Artwork by Joe Welker.

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.

The Blackfeet have design elements specific to certain parts of the lodge. The bottom of the tipi represents the Earth. The design of the bottom band of the tipi might have 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.

The broad central portion is reserved for portrayal of sacred medicine animals, medicine objects, or other protective spirit powers. The top represents the heavens. Within that band, the Sun, the crescent Moon, the Morning Star, and important constellations are depicted. For the Blackfeet, the Morning Star was represented by a symbol resembling a Maltese cross. The cross looks like a butterfly or a buffalo vertebra.

Whatever the decorations might be on a lodge, one can be assured that they are of cultural and spiritual importance. In addition, a great deal of protocol goes along with the placement of tipis, the internal arrangements, how they are put up, taken down, and transported. Contact the tribes for someone to visit your school to do a presentation about tipis. The *People Before the Park* book has Blackfeet tipi information on p. 140-141 (Stormmaker's Tipi story), and pp. 152-155 with information on making and setting up lodges (Thompson, 2015).

The Kootenai tipis today are not painted as they were years ago. The Kootenai Indians painted animals and birds on their tipis+. The kind of animal painted on a tipi meant the owner's spirit was like that particular animal. It may have been a bear, deer, buffalo or some other animal or bird.

Some tipis were painted with a ripple design, a symbol of green grass. Other designs were mainly for decorative purposes, more or less to beautify the tipi.

-*People Before the Park,* p. 88 notes: adapted from the Kootenai Culture Committee's *How Marten Got His Spots,* n.p.

Procedures

1. Assign students the reading for unit 4 and use the discussion questions to begin a conversation about how different cultures relate to animals. Do students have pets? Livestock? Are they hunters? Are animals important to them? In what way (s)?
2. Play the audio recordings from the Tribes of these animal stories. How does each of the stories relate that animal's importance to the people?
3. With the background information provided and any other you might want to add (with respect to American Indian culture about tipis) have each child

Procedures Continued

draw a lodge with a design that depicts a place or an animal of special importance to them. They should use symbolic designs to represent the animals. Remind students not to copy an actual tipi design since they are considered sacred by many tribal members. (Optional: challenge for older students is to have them do the math to create their tipis to scale and then add designs.)

Writing Extension

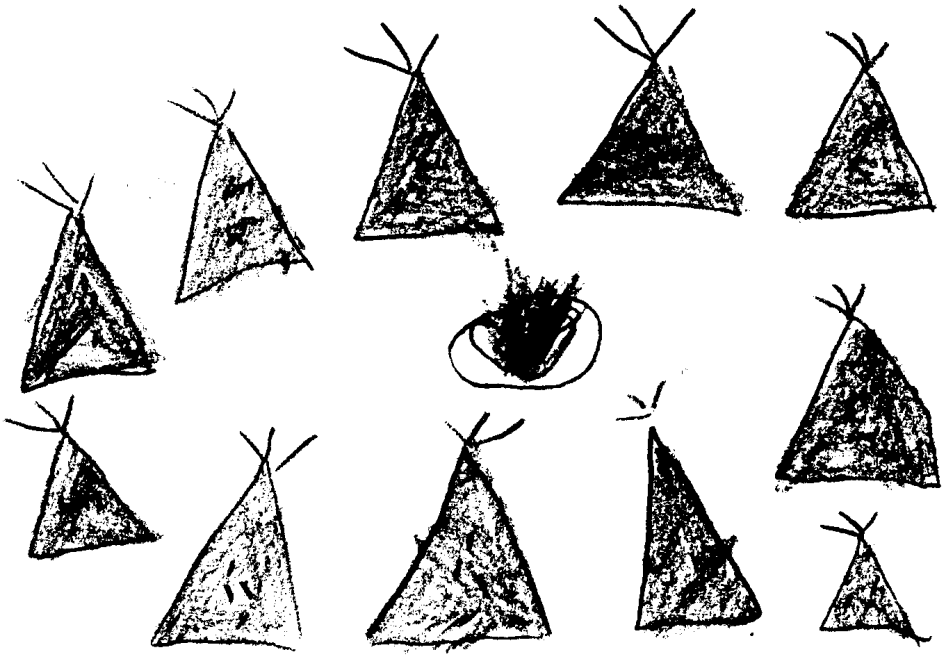
When the students have finished their drawings, have them write short essays explaining the significance of the personal symbols they have included on their lodges.

Reflection and Assessment

Encourage the students to show and explain their lodges to the rest of the class. If students are willing, collect the pictures and essays, put them into a binder or book to share. Could they make a school-wide display? Could they compare and contrast tipi design and construction in the past with modern tipis? Other tent/shelter designs used today? How have the materials changed and why?

Action Project/ Field Trip Extension

- 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.
- Many schools have purchased their own tipis and put them up at their schools.
- Visit a tribal business or organization that uses tipis and can give students a demonstration of tipi etiquette and other information.
- Glacier Institute - fire ecology and other education programs for students and adults. Both education sites have tipis.
- Guided Tours in Glacier National Park- various concession operated.
- Flathead Community of Resource Educators (CORE) - outdoor education guide for field trips in the Flathead Region.
- Family Forestry Expo and River Honoring - organized annually, target specific grades and include information about native wildlife.



Tipi Student Artwork by Katie Rolfing.

Additional Resources

- Contact the tribes for speakers or more opportunities to learn about tipis and shelters. Salish -Pend d'Oreille Culture Committee- Phone: (406) 745-4572. Kootenai Culture Committee - Phone: (406) 849-5541 . Blackfeet Community College Cultural and Language Division - Phone (406) 338-5441.
- Hands on History Footlockers, MT Historical Society, especially pertinent are the "Land of Many Stories" Footlocker - about Glacier NP with 4th grade lessons on mapping, place names, and art. Also the "Lifeways of Montana's First People" - has a trading activity that highlights the importance of beaver pelts.

MT Content Standards

Unit 5: Lesson 1, page 83
Montana Common Core Standards—English Language Arts
CCRA.SL.1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
CCRA.SL.2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
CCRA.SL.4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
Standards for Literacy in History/Social Studies, Science, and Technical Subjects
CCRA.RH/ST.1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
CCRA.RH/ST.2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
CCRA.RH/ST.4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
CCRA.RH/ST.6. Assess how point of view or purpose shapes the content and style of a text. (Identify aspects of a text, including those by and about American Indians, that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).)
CCRA.RH/ST.7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.
CCRA.RH/ST.9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.
CCRA.RH/ST.10. Read and comprehend complex literary and informational texts independently and proficiently.

Montana Standards for Science
Science 1.1.6. Identify, compare, explain ... how observations of nature form an essential base of knowledge among the Montana American Indians.
Science 3.3.1 Identify that plants and animals have structures and systems that serve different functions for growth, survival, and reproduction.

MT Content Standards Continued

Montana Standards for Social Studies
Social Studies Standard 1. Students access, synthesize, and evaluate information to communicate and apply social studies knowledge to real world situations.
Social Studies Standard 3. Students apply geographic knowledge and skills (e.g., location, place, human/environment interactions, movement, and regions).
Social Studies Standard 4. Students demonstrate an understanding of the effects of time, continuity, and change on historical and future perspectives and relationships.
Social Studies Standard 6. Students demonstrate an understanding of the impact of human interaction and cultural diversity on societies.

Indian Education for All Seven Essential Understandings Regarding Montana Indians
Essential Understanding 1 —tribal diversity
Essential Understanding 3 —importance of oral traditions
Essential Understanding 6 —history is subjective

Unit 5 - Animals and Habitats
Lesson 2
Animal Research

Materials:
•Theme and art paper
•Pencils, colored pencils
•Internet access, encyclopedias, wildlife books, and particularly books about the animals of Glacier National Park, as well as *People Before the Park* by Sally Thompson, Kootenai Culture Committee & Pikunni Traditional Association

Mountain Goat at Logan Pass ("Parks In Focus" photo, Glacier trip, 2010)

Lesson At A Glance

Students discuss human-animal relationship, choose animal for research, answer animal research questions, illustrate and share research.

Objectives

Students will be able to:
- Discuss difference between cultures with relation to animals.
- Use guiding questions to conduct effective research about animal species living in Glacier National Park.
- Illustrate their animal research.
- Communicate the results of their research with others.

Time Required

Two 50 minute class periods - one for reading/discussion, choosing animal and starting research. One to finish research and write report with animal illustration. More time needed for extension activities.

Vocabulary

Carnivorous, environment, herbivorous, omnivorous, reproduction.

Teacher Preparation/ Background

Assign student reading. Get books for student research. Mark specific reference pages in suggested books. Arrange internet access and download the "Animal Field Guide, Flathead Reservation Riparian Species" App if applicable. Review the websites referenced in the introduction for this unit. You may want to compile a list for students to use in their research or make it into more of a "webquest" with the websites provided. Have questions for research ready to handout/display and a completed example (or grading rubric if applicable) to show students of the expected report results from their research.

Procedures

1. Students should do the Student Reading for Unit 5 before starting this lesson. Use the "Checking for Understanding" questions to focus on the lesson objectives of exploring how people relate to animals, especially wild animals and the idea of sharing the Earth with other creatures. Included in the objectives is for students to realize that different people and cultures all relate differently to animals. In doing their animal research, they should be thinking of their relationship or beliefs/feelings toward wild animals and why they feel that way. How do the different ways people feel about animals influence national parks?
2. Let student know that they are going to learn more about the wild animals in Glacier National Park by creating research reports of a favorite animal that they are certain lives in Glacier National Park (and if going on a field trip, one 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 in a burned forest, or that appear in a traditional Blackfeet, Kootenai, Salish or Pend d'Oreille story (or that conform to some other precondition). There are numerous references to uses and importance of specific animals found in Glacier National Park by the Kootenai and Blackfeet in the book, *People Before the Park*. There are also a variety of books in the Blackfeet Reading Series and from the Salish and Kootenai Culture Committees of animal stories. The Fire on the Land DVD from CSKT has a section on wildlife, and Bull Trout's Gift and Explore the River from CSKT has information on animals. If students have access to Apps, the CSKT Riparian Animals Field Guide is a result of CSKT putting all their animal research together in one place for people to use- could your students make an App for Glacier?
3. Go over the "Questions for Animal Research" to make sure students understand what they should be trying to find out about their animal. (Perhaps having a sample to show or one from a previous year's student will help). Show the students how to find resources in the library, and walk through the Montana Field Guide on-line to help them begin their research.
4. Ask students to illustrate their writing on a separate piece of art paper. Some students may find research more to their liking if they are allowed to draw the picture first. (There are animal coloring book pages on the park website.)
5. For advanced students, have them make a movie documentary of their animal research. Here is an example the park received from a student who did research on wolverines.

Questions for Animal Research

Questions for Animal Research

1. Give the common name and scientific name of the animal you have chosen to research (and if you wish, the Blackfeet, Kootenai, Salish-Pend d'Oreille name). 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 only plants (herbivorous)? Does it eat only animals (carnivorous)? The Glacier National Park Teacher's guide has a chart of "Who eats Whom" other activities to learn about Glacier's wildlife.

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.

Writing Extension

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. Choose a title and help students assemble their reports and art in a book - maybe even a field guide for a trip to Glacier!.

Reflection and Assessment

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.

Action Project/ Field Trip Extension

- Play traditional American Indian games. Contact the International Traditional Games Society to obtain lesson plans and game kits. How did these games help children learn the skills needed to improve their observation skills of animals?
- Family Forestry Expo and River Honoring - organized annually, target specific grades and include information about wildlife.
- Invite someone from the local community or tribal government to discuss wildlife management in your area. Compare local management objectives with the National Park Service objectives.
- Invite an elder to your class to talk about wildlife experiences he/she may have had in the past.
- Contact the wildlife division for one of the Reservations and ask it it's possible to arrange a speaker or a field trip.
- Ranger-Led Field Trips and Service Learning Projects in Glacier National Park. The park's Citizen Science program has service learning field trips involving wildlife observation for high school students.
- Self-Guided Field Trips in Glacier National Park.
- Glacier Institute - fire ecology and other education programs for students and adults. Both education sites have tipis.
- Guided Tours in Glacier National Park- various concession operated.
- Flathead Community of Resource Educators (CORE) - outdoor education guide for field trips in the Flathead Region.

Additional Resources

- Research the ten thousand acre Grizzly Bear Conservation Area in the Mission Mountains Tribal Wilderness by contacting CSKT's Division of Fish, Wildlife, Recreation, & Conservation.
- Fire on the Land DVD - contains information about wildlife and fire.
- Glacier Education Trunks available to borrow that have wildlife connections: Songbird Trunk, Fire Works Trunk, Mammals Kit, Bear Trunk, Wolf Trunk.
- Glacier NP Student Resource Guide - has copyright free images of Glacier wildlife, fact sheets about the plants and animals, podcasts about bear research and Citizen Science, resource bulletins about various animals, coloring books, alphabet books, and much more.
- What's for Dinner?- MT OPI- IEFA, Science grade 1
- Browning Public Schools has a *Blackfeet English Language Animal Coloring Book*.
- Montana Skies, Blackfeet Astronomy - Lesson about Milky Way and more Blackfeet Stories.
- Look at a copy of Glacier National Park's Bear Management Plan and Bear Management Guidelines and discuss them.
- Montana State Park's Indian Education for All Lesson plans associated with state parks in Montana.
- Flathead Community of Resource Educators (CORE) - list of education trunks available from various organizations across the state. Also links to various education resource providers in the Flathead Region.

MT Content Standards

Unit 5: Lesson 2, page 87

Montana Common Core Standards—English Language Arts

CCRA.SL.1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCRA.SL.4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

CCRA.SL.6. Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

Standards for Literacy in History/Social Studies, Science, and Technical Subjects

CCRA.RH/ST.1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

CCRA.RH/ST.4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

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CCRA.RH/ST.7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

CCRA.RH/ST.9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

CCRA.RH/ST.10. Read and comprehend complex literary and informational texts independently and proficiently.

CCRA.WHST.2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

CCRA.WHST.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCRA.WHST.7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

Montana Standards for Science

Science 1.1.6. Identify, compare, explain ... how observations of nature form an essential base of knowledge among the Montana American Indians.

Science 3.3.1 Identify that plants and animals have structures and systems that serve different functions for growth, survival, and reproduction.

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Social Studies Standard 4. Students demonstrate an understanding of the

MT Content Standards Continued

effects of time, continuity, and change on historical and future perspectives and relationships.
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Essential Understanding 3 —importance of oral traditions
Essential Understanding 6 —history is subjective

National Park Service
U.S. Department of the Interior

Glacier National Park

Student Reading

Unit 1: People and Glacier National Park

National Park designation- What does it mean for people?

Glacier National Park is an awe-inspiring place. Many aspects of this land are also sacred to the Blackfeet, Salish, Kootenai and Pend d'Oreille Tribes.[1,2] George Bird Grinnell and other conservationists lobbied Congress for seven years to protect the area as a national park. Grinnell felt that the establishment of Glacier National Park in 1910 would save the land from the development which was the fate of many other American Indian territories. With the discovery of minerals west of the Continental Divide, demand for more Blackfeet land increased. Not everyone agreed that this area should be made into a national park. Even today, there are people who do not think it was the right thing to do. What do you think?

Today, Glacier National Park is managed by the National Park Service. It is a federal agency whose mission is to preserve and protect the natural and cultural resources of the United States.

In 2014, over two million people from all over the world visited Glacier National Park. Most of those visitors come to the park in the summer. The park has roads, trails, campsites, and buildings.

These things were developed to make Glacier National Park accessible to visitors. 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.

How do you protect and preserve a wild place that has so many visitors? The National Park Service relies on people to be good stewards of the country's public lands. Still, this may mean creating regulations for where people can camp or hike. It also may limit the type of activities people can do in the park. In Glacier National Park, regulations forbid taking anything out of the park - rocks, flowers, sticks or firewood. Hunting is also not allowed in the park.

One way to teach people about caring for the earth is through story telling. Here is an example of a contemporary story that teaches about caring for the Earth.

"Glacier in Focus" student group at Apgar Campground, (Parks in Focus Photo, 2010).

Cover: "Parks in Focus" photo from student group at Logan Pass.

Lucy Lone Walker - An example of a contemporary story about caring for the Earth

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

Beaver, NPS Photo (Glacier Student Guide CD).

Lucy Lone Walker
An example of a contemporary story about caring for the Earth

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

Beaver lodge, NPS photo (Glacier NP Digital Image Library).

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." [3]

[1] Montana Historical Society Education Office. *Land of Many Stories: The People & Histories of Glacier National Park*. Helena: Montana Historical Society Footlocker, 2010. PDF file.

[2] Glacier National Park. *At Home in This Place*. St. Mary: National Park Service Visitor Center Exhibits, 2010.

[3] Glacier National Park. *Work House: A Glacier National Park Science Education Program*. West Glacier: National Park Service, 1992, 1998. This story appears as it was written from the original version of Work House.

Vocabulary

Federal - having or relating to a system of government in which several states form a unity but remain independent in internal affairs.
Generation - the average length of time between the birth of parents and the birth of their offspring.
Gnawed - worn down from being bitten or chewed on.
Manage - to coordinate functions of people to reach goals and objectives.
National Park - a federally designated area set aside and managed to preserve and protect the natural and cultural resources present there for current and future generations.
Pelt - the skin of an animal with the fur or hair still on it.
Preserve - to keep something for a long time.
Protect - to keep something safe from harm or injury.
Ridge - a long, narrow hilltop.
Sacred - very powerful in a spiritual sense.
Wilderness - an area where the Earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain.

Checking for Understanding

1. How is the concept of stewardship related to Glacier National Park?
2. List three things you could do to be a good steward for Glacier. How could the concept of stewardship have different meaning for different people?
3. Why do you think the park has rules against hunting or taking things out of the park?
4. Imagine yourself 12 years from now like Charlie. What do you want the Earth to look like in 12 years? Glacier National Park?
5. Do you support places being designated as national parks? Why or why not?
6. Can peoples' actions make a difference with whether wild and special places like Glacier endure? Why or why not?

National Park Service
U.S. Department of the Interior

Glacier National Park

Student Reading

Unit 2: Mountains and Mountain Building; Backbone of the World

Blackfeet:
Our traditions and values were given to us by the Creator and the spirit of the Other Beings in our world.

In many stories we have Old Man- Napi - who came from the south, making the mountains, the prairies, and the forests as he passed along, making the birds and animals also, arranging the world as we see it today. [1]

"Old Man and the Beginning of the World" a Blackfeet 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.

Oral history is our culture. Our oral history holds the key to who we are. Our language is spiritual because it is taken from nature, and nature is spiritual. Our language doesn't need a verb to move the noun; it is in constant motion like the Earth. [1]
- Blackfeet

Oral History and Origin Stories[2]
An oral history is a historical account recorded in the memories, legends, stories, songs, art, and languages of people who did not create written histories. Oral histories are passed from one generation to the next and are as valid as written histories. Indigenous languages are the key to the survival of oral histories, as they can seldom be translated accurately into other languages. Kootenai oral histories tell of times when ancient animals such as woolly mammoths lived on this earth, indicating that the tribe's inhabitance in this region is indeed very long.

An origin story is a people's account of their own creation and beginning. For example, the origin story of the Kootenai tribe tells that they "woke up" (were created) at what we now call Tobacco Flats, along the Kootenai River. Origin stories are part of tribes' oral histories. They do not always concur (agree) with archaeological or academic theories about the origins of humankind, or human migrations. However, this does not mean that such stories are not true or do not have value and importance.

Chief Mountain, NPS photo.

Kootenai:
We only share the details of the creation stories within the tribe. Our creation stories help us understand that everything that is perceived by humans is actually a spirit with a purpose and a place in creation.*[1]

** This version of the creation story was approved for Work House.*[3]

"A Visit to the Sky World" a Kootenai 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.

It is through our oral history that we know of our proper relationships with the rest of creation. Human beings were the last of all beings to be created and so we are the youngest brother in all creation. The traditional Kootenai would have this realization in mind as they walked through life and would carry themselves as one would when walking among elders. [1]
- Kootenai

"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.

A Geological Story of Glacier National Park

This is a story of changes over a long period of time described in "The Geology Along the Going-to-the-Sun-Road" by Omer B. Raup, Robert L. Earhart, James W. Whipple, and Paul E. Carrara.[4]

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. The break up of rocks into smaller particles is called "weathering." The the movement of the particles is "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. One of the most efficient means of moving (eroding) 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

View from Gunsight Pass of sedimentary layers and sill (dark layer close to top in furthest mountain) Danny On photo (Glacier NP Digital Image Library).

Prominent folding and layers, J.A. Tyers photo (Glacier NP Digital Image Library).

"The legacy of traditional ecological knowledge, the intellectual twin to science, had been handed down in the oral tradition for countless generations...But where did it come from?

...Like scientific information, traditional knowledge arises from careful, systematic observation of nature, from the results of innumerable lived experiments. Traditional knowledge is rooted in intimacy with a local landscape, where the land itself is the teacher." [5]

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.

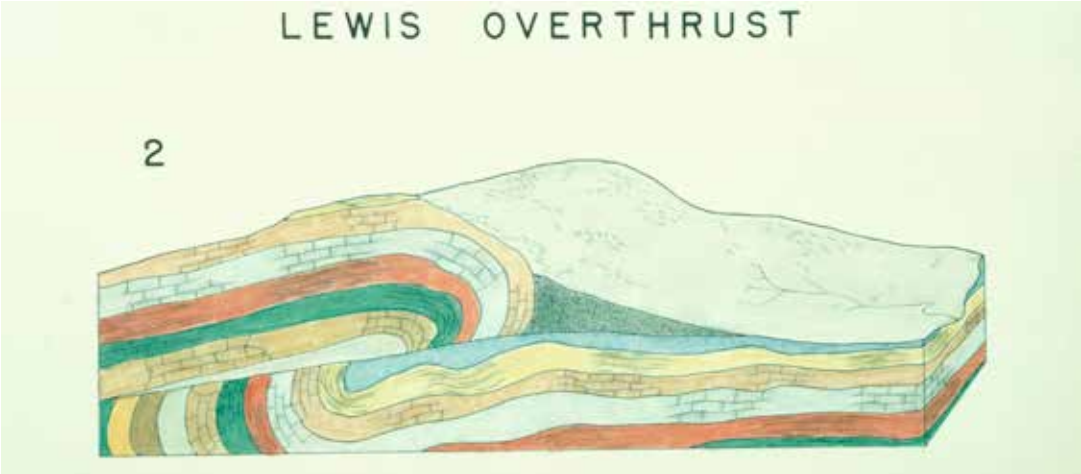
As compaction continued, deposited sediments became sandstone, siltstone, shale, limestone, and dolomite. Time, pressure, and heat associated with deep burial gradually metamorphosed these layers into other rock types. They became quartzite, siltite, shale, argillite, and recrystallized forms of limestone and dolomite. They were now much harder but looked much the same as they had before. Between about 1,000 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 weathered 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 (fractured or broke apart) 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.

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,

Napi Student Artwork by Kent Monroe and Joe Conelly.



(Glacier NP Digital Image Library).

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.

[1] Glacier National Park. *At Home in This Place*. St. Mary: National Park Service Visitor Center Exhibits, 2010.

[2] Montana Historical Society Education Office. *Land of Many Stories: The People & Histories of Glacier National Park*. Helena: Montana Historical Society Footlocker, 2010. PDF file.

3 Glacier National Park. Work House: A Glacier National Park Science Education Program. West Glacier: National Park Service, 1992, 1998. This story appears as it was written from the original version of Work House.

[4]Raup, Omer B. *Geology Along Going-to-the-Sun Road*, Glacier National Park, Montana. West Glacier, MT: Glacier National History Association, 1983.

[5]Kimmerer, Robin Wall. *Gathering Moss; A Natural and Cultural History of Mosses*. Corvallis: Oregon State University Press, 2003.

Vocabulary

Argillite - very hard mudstone. The Precambrian mudstones in Glacier National Park are hard enough to be called argillites.
Belt Sea- an environment recorded by ancient rocks as a shallow sea that opened and closed over many millions of years. The origin of Belt series sedimentary rocks dates from about 1,600 to 800 million years ago.
Climate - the meteorological conditions, including temperature, precipitation, and wind, which characteristically prevail in a particular region.
Debris - broken pieces of rock.
Deposition - the process in which rock moved by water, wind, or ice is dropped in a new place.
Dike - a steeply-inclined sheet of igneous rock formed when molten magma is injected across the beds/layers in sedimentary rocks.
Dolomite - similar to limestone with considerable magnesium.
Downwarping - a broad depression in the Earth's surface.
Erosion - the movement of weathered rock by water, wind, or ice.
Extruded - to thrust or force out.
Faults - a break in rock which the opposite sides have been displaced.
Folding - a bend in rock from compression.
Geology - a science that studies rocks to learn about the history of the Earth and its life.
Ice age - a cold period marked by episodes of extensive glaciation alternating with episodes of relative warmth.
Igneous rock - formed by solidification of molten magma materials.
Intrusion - forcing of molten rock into pre-existing rock.
Lewis Overthrust Fault - action that folded older rock above younger rock in the northwest United States.
Limestone - sedimentary rock composed of calcite (mineral form of calcium carbonate).
Magma - molten lava beneath the Earth's surface.
Mantle - the interior of the Earth between the core and the crust.
Metamorphosed - rock transformed within the Earth's crust by heat and pressure.
Pillow lava - lava that has solidified as rounded masses, characteristic of eruption under water.

Vocabulary Continued

Plate Tectonics - theory that Earth's outer shell is made of large slabs of rock (plates) that float on and travel independently over the mantle.
Quartzite - metamorphic rock which was originally pure quartz sandstone.
Rifting - to cause to split open or break.
Sand- fine pieces of rocks, consisting of small, loose grains, often of quartz.
Sandstone - sedimentary rock of sand or quartz grains cemented together.
Sedimentary Rock - has formed through the deposition and solidification of sediment, especially sediment transported by water (rivers, lakes, and oceans), ice (glaciers), and wind. Sedimentary rocks are often deposited in layers, and frequently contain fossils. Note : Limestone and shale are common sedimentary rocks.
Shale - a fine-grained sedimentary rock that forms from the compaction of silt and clay-size mineral particles that we commonly call "mud".
Sill - a layer of igneous rock injected as a molten magma between beds (layers) of sedimentary rock.
Siltstone - is a sedimentary rock which has a grain size in the silt range, finer than sandstone and coarser than claystones.
Weathering - the breaking down, dissolving, and wearing away of rock.

Checking for Understanding

1. Are there any similarities between these three stories of the origin of the mountains? What differences are there in the stories?
2. How do these origin stories affect the Blackfeet, Kootenai, Salish and Pend d'Oreille peoples' relationship to Glacier National Park? Why would it be important to protect these stories?
3. Do you have a story that your family tells over and over again? How is it different or similar, to these stories?
4. Is there a place that means a lot to you and your family but doesn't have a lot of significance for someone else? Why?
5. Have you ever wondered how a land formation or something in the environment came to be?

National Park Service
U.S. Department of the Interior

Glacier National Park

Student Reading

Unit 3: Climate Changes; Glaciers and Glaciation

There are a number of stories among the Salish, Pend d'Oreille, Kootenai, and Blackfeet people about 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. Two interesting stories, indicative of the accuracy of observations from traditional ecological knowledge, are the Salish story "Bluejay Brings the Chinook Wind" and the Blackfeet story, "Napi Punishes a Rock." [1]

"Bluejay Brings the Chinook Wind" a Salish story - a paraphrase of the story as it is recorded by Ella E. Clark in *Indian Legends of The Northern Rockies*.

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

"Bluejay Brings the Chinook Wind" a Salish story - a paraphrase of the story as it is recorded by Ella E. Clark in *Indian Legends of The Northern Rockies*.

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.

"Napi Punishes a Rock" a Blackfeet Story

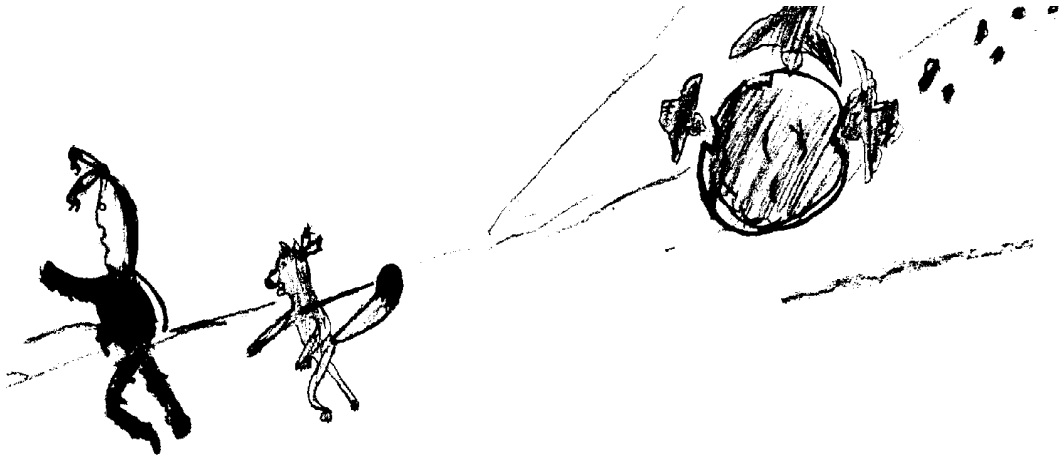
One beautiful Indian Summer day in the long ago times, Napi was walking with his friend Fox in the mountains above Cut Bank Creek. Although it was beyond the Moon of the Falling Leaves, the day was unusually warm. Napi, who always carried his buffalo robe, grew hot as they walked along. He and Fox stopped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



Napi Punishes a Rock
Student Artwork by Shayne Hall.

"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 outdistance 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.

"The Work of Ice" a Glacier Story

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. As of the turn of the millennium, fewer than twenty-five 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. On going research in Glacier National Park and models predict that these remaining glaciers will be gone within the next decade. Ecologists and climate scientists are grappling with how that may affect the plant and animal communities in the park.

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 (rubbing away) 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 (digs) deep into the bedrock, and the flanks (sides) 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 melt-water 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

U-shaped valley, Ken West photo (Glacier NP Digital Image Library).

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 end 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 snowmelt may exceed the amount that falls, and a glacier begins to recede (melt back). 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 (front) 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 a 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

Roped up hikers at bergschrund in foreground, NPS photo (Glacier NP Digital Image Library).

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 these 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 (not moving) ice. Glacial erratics 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.

[1] Glacier National Park. Work House: A Glacier National Park Science Education Program. West Glacier: National Park Service, 1992, 1998. All of the stories here and the background information comes from the original version of *Work House* with some updates for the Glacier story section.

Vocabulary

Arete - a knife-edged ridge gouged by glaciers on both sides.
Cirque - a bowl-shaped hollow scooped out of the side of a mountain at the head of a glacier.
Continental ice sheets - big continental glaciers are called ice sheets. Greenland and Antarctica are almost entirely covered with ice sheets.
Continental glaciers - continuous masses of ice that are much larger than alpine glaciers.
Firn line - the lower limit of the area on a glacier in which the previous winters snowfall survives the next summer.
Glacial erratics - a piece of rock that differs from the size and type of rock native to the area in which it rests having been carried there by a glacier.
Glacier headwall - the steep rock rising above the floor of a glacial cirque.
Horn peak - a mountain that has been carved away by glaciers (usually on 3 sides) to a pointed shape. Many of the prominent peaks in Glacier are horns.
Kame - a small hill of water-sorted and layered glacial debris in a moraine of unsorted till. Most kames consist of debris that washed into a hole or crack in the ice.
Tarns - an alpine lake occupying a basin hollowed out of solid bedrock by glacial erosion. A cirque lake.
Truncated spurs - spurs that projecting into the original river valley are cut short (truncated), their lower ends being destroyed by the moving ice.

Checking for Understanding

1. How can a glacier be evidence of climate change?
2. What observations of the landscape were included in the Salish and Blackfeet stories?
3. How do these oral histories provide evidence of climate change?
4. How can the glaciers and ice sheets we have on the Earth today show us what to look for in order to find places where glaciers or ice sheets may have been before?
5. What lesson(s) can we learn from all three of these stories?

National Park Service
U.S. Department of the Interior

Glacier National Park

Student Reading

Unit 4: Native Plants; Our Medicines, Our Food

How Did Early Peoples Use Native Plants?

Jeff Hart, who spent two years talking with elders from tribes across Montana and then wrote, "Montana Native Plants & Early Peoples," says in his introduction,

> Although we think of wild game as the source of the Indians' primary sustenance in Montana, we often overlook the significant role played by plants. From the plant kingdom Indians gathered berries, seeds, and nuts, dug roots, bulbs, and rhizomes; brewed various teas; cut young green shoots to eat raw; peeled trees for their sweet inner barks, and found spices for their foods. From plants they got most of their medicines to heal the sick and injured. Some plants possessed magical properties to ward off malefic spirits or summon beneficent one. In some they found scents which perfumed their lodges and sweathouses. Others they smoked in their pipes, made into shampoos and tonics for their hair, or used as insecticides for unwanted bugs. They discovered remedies for ailing horses, dyestuffs, and materials used in the manufacture of such items as bows, arrow shafts, and tipi poles." [2]

Plants As Cultural Resources

Among the cultural resources protected in Glacier National Park are certain native plants like -bitterrroot, blue camas, western red cedar- as well as culturally scarred trees (trees that have been scarred by the American Indian practice of peeling back the bark to expose the cambium layer). What is a cultural resource and what makes some plants or trees more in need of protection than others?

Cultural Resources

Think about the types of clothes you wear, the style of house you live in, or the model of car your family drives. Will they be the same fifty years from now? What does it tell people about your culture- your lifestyle, family background and available materials or resources?

Cultural resources are grouped into five main categories: archeological resources, cultural landscapes, historic structures, museum and archive collections, and ethnographic resources (significant to a specific culture). In Glacier National Park ethnographic resources include sites associated with creation stories, prayer and fasting sites, and certain plants -like the ones mentioned earlier- valued by the Blackfeet, Salish, Pend d'Oreille, Kootenai, and other Tribes.

The physical parts of cultural resources are, with few exceptions, nonrenewable. A primary concern of cultural resource management is to minimize the loss or degradation of culturally significant material.

Because the park contains these cultural resources, consultation with local Tribes is necessary when work is proposed that may affect those resources. Management of ethnographic cultural resources acknowledges that culturally diverse groups have their own ways of viewing the world and a right to maintain their traditions.

Plant Gifts

In "Gathering Moss," Robin Wall Kimmerer, Associate Professor at the State University of New York College, writes about combining her perspectives as a university professor and an American Indian when looking at plants,

> The knowledge I have of plants has come from many sources, from the plants themselves, from my training as a scientist, and from an intuitive affinity for the traditional knowledge of my Potawatomi heritage. Long before I went to university to learn their scientific names, I regarded plants as my teachers...(vii)

There is more than what you see here.[1]
-Tony Incashola,
Pend d'Oreille

In Indigenous ways of knowing, it is understood that each living being has a particular role to play. Every being is endowed with certain gifts, its own intelligence, its own spirit, its own story. Our stories tell us that the Creator gave these to us, as original instructions. The foundation of education is to discover that gift within us and to learn to use it well.

These gifts are also responsibilities, a way of caring for each other. Wood Thrush received the gift of song; it's his responsibility to say the evening prayer. Maple received the gift of sweet sap and the coupled responsibility to share that gift in feeding the people at a hungry time of year. This is the web of reciprocity that the elders speak of, that which connects us all. I find no discord between this story of creation and my scientific training. This reciprocity is what I see all the time, in studies of ecological communities...

If each plant has a particular role and is interconnected with the lives of humans, how do we come to know what that role is? How do we use the plant in accordance with its gifts? The legacy of traditional ecological knowledge, the intellectual twin to science has been handed down in the oral tradition for countless generations....(100)

Our ancient teachers tell us that the role of human beings is respect and stewardship. Our responsibility is to care for the plants and all the land in a way that honors life. We are taught that using a plant shows respect for its nature, and we use it in a way that allows it to continue bringing its gifts (110) [3]

"Nawak'osis, the Sacred Herb" a Blackfeet 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

"Nawak'osis, the Sacred Herb" a Blackfeet Story

Kinnikinnick, Arctostaphylos uvi-ursi, the dried leaves were used in tobacco mixtures, NPS photo (Glacier NP Digital Image Library).

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.

"Nawak'osis, the Sacred Herb" a Blackfeet Story

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.

"The Origin of Bitterroot" a Salish 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.' "

The Native Plants of Glacier National Park

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.

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 crown fire can clear away the forest canopy, increasing the amount of sunlight able to reach the forest floor. Fire can also burn through the carpet of leaves and needles on the forest floor, exposing the soil which allows some 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.

Before the European emigration to North America, American Indians lived within the natural limits of their environment and managed it to suit their needs. They often set prairie and forest fires to clear pathways, herd game, and stimulate new growth.

Plants Succession

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. Looking at a record of botanical succession over time, it is clear that plants do 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.

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

Researchers documenting culturally scarred tree, NPS photo.

The Native Plants of Glacier National Park Continued

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.[4]

[1] Glacier National Park. *At Home in This Place*. St. Mary: National Park Service Visitor Center Exhibits, 2010.

[2] Hart, Jeff. *Montana Native Plants & Early Peoples*. Helena: Montana Historical Society Press, 1976.

[4] Kimmerer, Robin Wall. *Gathering Moss; A Natural and Cultural History of Mosses*. Corvallis: Oregon State University Press, 2003.

Vocabulary

Alpine - type of habitat above tree line with short summers, long winter.
Biodiversity - the variety of different species in an area.
Biotic community- all of the living things that occupy a habitat.
Boreal - relating to the forest areas of the Northern Temperate Zone.
Culturally scarred trees- trees that have been scarred by the American Indian practice of peeling back the bark to expose the cambium layer.
Ceremonial - an established system of rites or formal actions connected with an occasion.
Culture - patterns, traits, and products of a particular period, class, community, or population.
Cultural resource - physical evidence or place of past human activity: or natural feature of significance to a group of people traditionally associated with it.
Degradation - a decline to a lower condition, quality or value.
Ecological - concerned with the relation of living organisms to one another and to their physical surroundings.
Elevation - height above a given level, especially sea level, altitude.
Endowed - provided with a quality, ability, or asset.
Ethnography - the scientific description of the customs of individual peoples and cultures.
Ethnobotany - the study of a culture's use of plants.

Vocabulary Continued

Flora - the plants of a particular region, habitat, or geological period.
Germinate- to begin to grow or develop.
Herb - any seed-bearing plant that does not have a woody stem and dies down to the ground after flowering.
Heritage - features belonging to the culture of a particular society, such as traditions, languages.
Indigenous - used to describe a plant, animal or person that is native or original to an area.
Mosaic - composed of a combination of diverse elements.
Non-renewable - cannot be replaced once used up or gone.
Perspective - a particular attitude toward or way of regarding something; a point of view.
Potowatomi - an Indian people of the lower peninsula of Michigan and adjoining states.
Prescribed burn - the process of planning and applying fire to a predetermined area, under specific environmental conditions, to achieve a desired outcome.
Proliferation - a rapid increase in numbers.
Reciprocity - mutual exchange where each enjoys an equal benefit.
Refuge - a place providing protection or shelter.
Resource - something that is used within an environment and upon which people have placed or assigned value.
Righteous - in accordance with accepted standards of morality, justice, or uprightness; virtuous.
Ritual - a religious or solemn ceremony consisting of a series of actions performed according to a prescribed order.
Sacred - related to religion or something treated with great respect.
Stewardship- management or taking care of something.
Succession (forest, plant) - process of following in order or sequence.
Terrain - the specific physical features of an area of land
Value - the importance, worth, or usefulness of something.

Checking for Understanding

1. Do you think people will follow the request that Coyote stories only be told in winter- why or why not?
2. How might this information be useful to all people today?
3. How is traditional tobacco use different from smoking cigarettes?
4. How similar/different do you think are the views about plants that Robin Wall Kimmerer describes from her Potowatami heritage with the views about plants from Montana Tribes ?
5. How does fire influence plant succession and biological diversity?

National Park Service
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Glacier National Park

Student Reading

Unit 5: Animals and Habitats

"Animals were the original managers of this land, not people." [1]
-Rusty Tatsey, Blackfeet

Salish and Pend d'Oreille
In many of the sqʷlllum̓t - the ancient stories of the creation and transformation of the world and its creatures - Salish and Pend d'Oreille elders tell of Snčl̓é, Coyote, who traveled across the land, killing the naɬisqélixʷtn - the people-eaters or monsters. Coyote prepared the world for the human beings who were yet to come. He showed that by living the right way - with the land and with each other - the people would always have sustenance and good fortune. These sacred stories of Coyote and the other animal people, and of the world's creation, are told only during winter.[1]

The Origin of the Beaver Medicine

(Blackfeet Story abridged version based on several variations[2])

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.

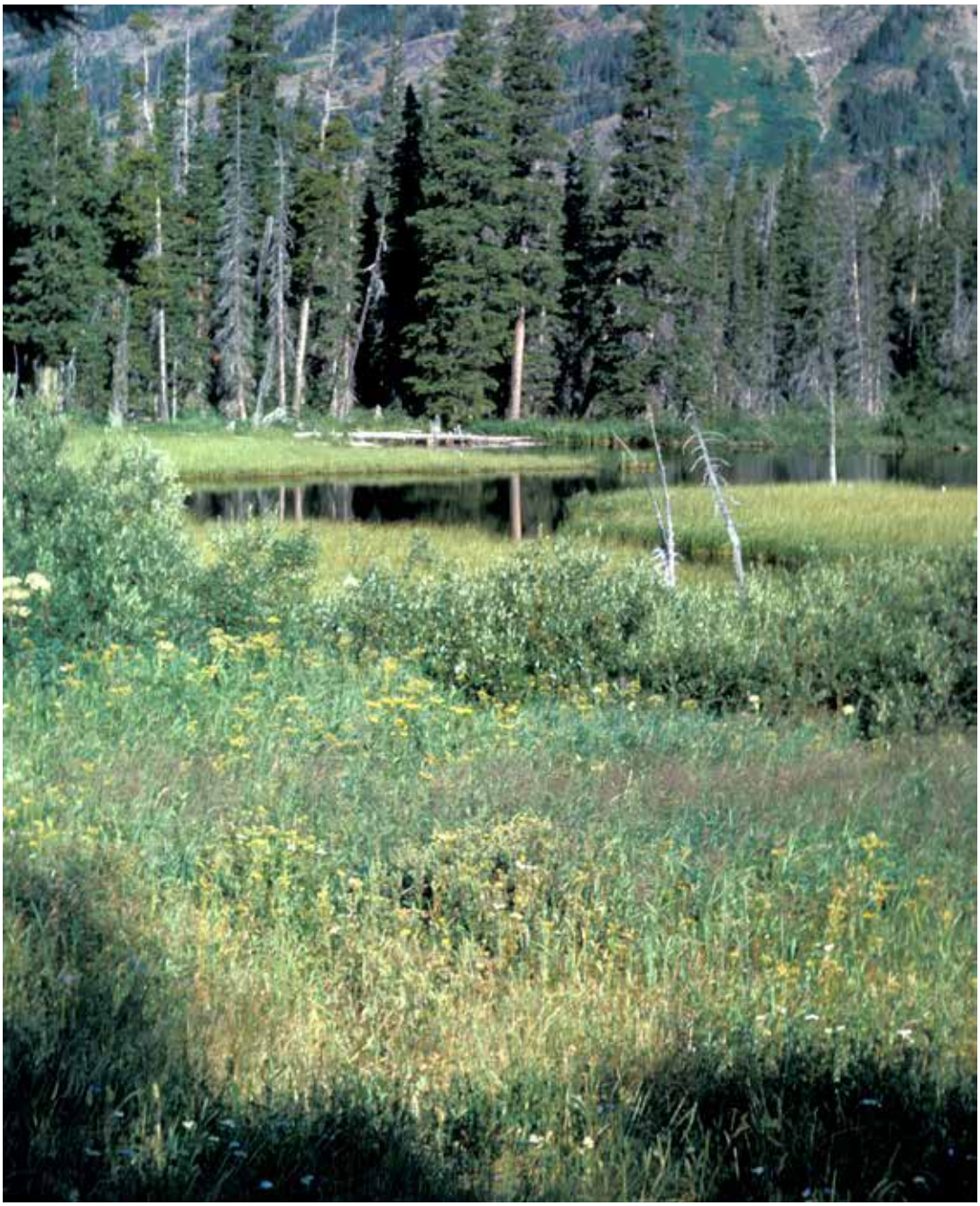
One day he came across a beaver lodge and sat watching it and feeling sorry for himself. Before long, a little beaver came out and asked Akaiyan to come into the lodge with him. Inside Akaiyan found a huge white beaver whom he knew to be the chief of all beavers. The Chief Beaver listened to Akaiyan's 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 break-up, 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



Beaver Pond Succession, NPS photos (Glacier NP Digital Image Library).

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.

The Grizzly Chooses a Stepson [3] (A Kootenai Story)

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 Grizzly Chooses a Stepson[3] (A Kootenai Story) Continued

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 insincere 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 grizzlies 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

Female Grizzly with three cubs of the year, Don White Jr. photo (Glacier NP Digital Image Library).

The Grizzly Chooses a Stepson[3] (A Kootenai Story) Continued

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."

The Wildlife of Glacier National Park

Like plants, animals are affected by environmental influences such as landforms, climate, and availability of food and water. The great diversity found in the Glacier National Park area is mainly due to the overlap of habitats between the mountains and the prairie - and the great junction of five floristic provinces.

As human developments continue to fragment wildlife habitat, Glacier and other national parks have become more important to wild animals that require space, prey, and human tolerance. Nevertheless, even within the refuge of large parks, many species are so far ranging (birds, bears, wolves and ungulates, to name a few) that the long-term reality is the need for interagency cooperation in ecosystem management planning. The baseline information that the parks offer through monitoring and research comes to play once again. Review of the earliest records suggests that wildlife composition, at least for mammals and birds, has changed little since the park was established. Species known to have been extirpated include mountain bison and mountain or woodland caribou. Nonnative species include the ring-necked pheasant, rock dove, starling and house sparrow; however, none of these species is widespread or abundant. Raccoons and blue jays have expanded their ranges into the Glacier area as have the turkey (introduced in different areas of the state/province).

The park provides important year-round habitat for many wildlife species. Grasslands, shrub lands and riparian areas provide winter range for deer, elk and moose. Grasslands and forest environments provide spring range for deer, elk and grizzly bears. As spring progresses into summer, deer and elk move to higher elevations following the green-up of vegetation. The higher elevations also provide summer habitat for grizzly bears, bighorn sheep and goats. Low elevation valleys in the fall and spring provide habitat for almost all terrestrial wildlife species.

There are many documented migration routes for raptors (birds of prey) that follow mountain ranges and ridges in Glacier. These are significant travel corridors through which, using rising thermals and updrafts from the mountains, thousands of birds make their semi-annual migrations to winter or summer ranges. A vast majority of the birds are golden eagles, with some bald

eagles and hawks mixed in. During the autumn of 1996, over 3,000 raptors were counted at one site during September, October and November as they crossed high above the upper McDonald Valley. The parks may be along one of the largest golden eagle migration corridors in North America. This needed air space, a necessity for what some researchers indicate are declining populations of raptor species, is an interesting and no less important "habitat" requirement that must not be compromised by inappropriate human activities, especially within the protected "domain" of a national park. This is an excellent example of a management concern that requires cooperation among varying interest groups and managing agencies.

[1] Glacier National Park. *At Home in This Place*. St. Mary: National Park Service Visitor Center Exhibits, 2010.

[2] Glacier National Park. *Work House: A Glacier National Park Science Education Program*. West Glacier: National Park Service, 1992, 1998.

[3] Schaeffer, Claude E. *Bear Ceremonialism of the Kutenai Indians*. Browning, MT: Indian Arts and Crafts Board, 1966. The Grizzly story version printed here varies only slightly from "The Bear Foster Parent" as written in Schaeffer's book. He said the story was related to him by Abraham Bullrobe. The Kootenai Culture Committee, in *Ktunaxa Legends*, has a written version, called "Three Years with the Grizzly Family."

Bald Eagle, NPS photo (Glacier Student Guide CD).

Vocabulary

Abandoned - to leave and never return to (someone who needs protection or help).
Baseline Information - information or data gathered at the beginning of a period from which variations that subsequently develop are compared
Diversity - a range of different things.
Ecosystem - a group of interconnected parts, formed by the interaction of a community of organisms with their environment.
Extirpation - to remove or destroy totally; do away with; exterminate.
Floristic provinces - classifying regions by their relatively uniform composition of plant species.
Inadvertently - accidentally.
Interagency - something that involves two or more agencies.
Mountain bison - American bison taxonomy has been a controversial issue for many years and classification to the subspecies level remains a matter of debate [11,53]. However, most authorities recognize two subspecies, the plains bison (Bos bison bison) and the wood bison (B. bison athabascae Rhoads) [11,34,53].
Plotted - secretly make plans to carry out.
Raptors - a bird of prey, e.g., an eagle, hawk, falcon, or owl.
Riparian - of, relating to, or situated or dwelling on the bank of a river or other body of water.
Sacred lodge - tipi with a painted design that has special significance or power and that is treated with great respect.
Spring range - the region where a free wondering animal is normally found in the springtime.
Supernatural - attributed to some force beyond scientific understanding or the laws of nature
Terrestrial - living or growing on land or on or in the ground; not aquatic, arboreal, or epiphytic.
Thermals - an upward current of warm air, used by gliders, balloons, and birds to gain height.
Woodland caribou - a large, dark brown caribou (Rangifer tarandus subsp. caribou) of forested areas of Canada and the northern United States.

Checking for Understanding

1. Do you think people will follow the request of the Salish to only tell Coyote stories in winter- why or why not? If not, how could that be improved?
2. What do beavers and people have in common? How do people treat beavers today?
3. What similarities are there between the beaver story and the grizzly bear story?
4. Why is it necessary for Glacier National Park to work with other agencies (such as national forests, state lands, tribes, international wildlife agencies, and others) to manage wildlife?
5. How can the great diversity of wildlife in Glacier National Park be preserved and protected?

Vocabulary

- **1895 Agreement** – In 1895, the Blackfeet Indians and representatives of the United States agreed that the United States could purchase land from the tribe. This agreement was ratified (made official) by Congress in 1896, and the land eventually became the eastern half of Glacier National Park. Not all of the Blackfeet signed the agreement, however, and members of the tribe have disputes with the U.S. government concerning certain provisions (conditions) within the Agreement. See "Ceded Strip."
- **Agricultural activities** - Related to producing crops or livestock and other domestic animal products for sale or use.
- **Allotment** - Something given out in portions.
- **Alpine Meadow** - Type of habitat above tree line with short summers, long winters, and composed mainly of grasses and wildflowers.
- **Avalanche** - A large mass of snow or ice that suddenly falls from a mountain slope.
- **Bergschrund** - A deep crack near the head of a mountain glacier.
- **Bison (buffalo)** - Bison are part of the family Bovidae, to which Asian buffalo, African buffalo and domestic cattle and goats belong. Because American bison resembled in some ways old world buffalo (Asian and African buffalo), early explorers to North America began to call them buffalo. The name buffalo is still used interchangeably with bison.
- **Blackfeet** – The Blackfeet are a group of tribes in the United States and Canada, including the Piegan/Pikuni, Blood/Kainai, Blackfoot, and Siksika. Today these bands or tribes have reserved lands in Montana and Canada, but recently their historical homeland included northern Montana east of the Continental Divide and south-central Alberta. Many Blackfeet tribal members have been part of Glacier Park's activities since its beginning. The land now in the park is very important in the history and culture of the Blackfeet, and certain places, such as Chief Mountain, are sacred to the tribe.
- **Botanist** - A person who studies plants.
- **Carnivore (carnivorous)** - An organism that eats other animals. A meat-eater.
- **Ceded Strip** – This term is used for the land that the Blackfeet sold to the United States in an 1895 agreement, and which now forms Glacier National Park. To "cede" means to give up possession of something. In this case, it meant giving up both possession and occupation of the mountainous region that later became Glacier Park. The 1895 Agreement specified that the Blackfeet would be permitted continued use of the area for hunting, gathering timber, and other needs, and that reserved tribal lands would not be allotted (divided among tribal members). The United States has not upheld this portion of the agreement, and to this day it remains a point of contention (disagreement) between the Blackfeet and the U.S. government.
- **Ceremony** - The procedures and activities performed at a formal occasion.
- **Civilian Conservation Corps (CCC)** – In the 1930s, the United States was in the middle of the Great Depression and many Americans were out of work. President Franklin D. Roosevelt implemented a plan to get Americans working. One part of this plan was the government-run Civilian Conservation Corps, modeled after the U.S. Army. Many young and middle-aged men joined. The CCC camps were stationed throughout

the country, but mostly in the West. From 1933 until 1942, CCC workers in Glacier Park cleared trails, built roads, repaired park buildings, built lodging for the tourist business, and shoveled snow off roofs. Park administrators designated the main projects the CCC men worked on, but the CCC ran its own camps, was responsible for its own food, cooking, and lodging, and carried out its own disciplinary measures, following the army model. The CCC was discontinued when the U.S. entered World War II in December 1941, because many of its enrollees joined the military.

- **Col** - A notch cut in a divide where glaciers have bitten into it from both sides. Logan Pass is an example.
- **Concessionaire** – A concessionaire (now often referred to as a "concessioner") is a person or entity who is given permission to operate a business in a national park or at another location or event. For example, in Glacier National Park, concessionaires include the companies that own and operate hotels, tour guides, fishing guides, backcountry camps, and so on. These concessionaires pay a certain amount of money to the park in order to operate their businesses within the park.
- **Conifer** - A cone-bearing tree or shrub.
- **Confluence** - The junction of two rivers.
- **Conservation** – The idea or process of limiting the use of resources. National parks are established to conserve areas of natural beauty or uniqueness, thereby limiting the amount and kinds of development in these areas. Conservation of natural assets sometimes conflicts with recreation, another purpose of the national parks.
- **Course (of a river)** - The path or channel the water moves through.
- **Crevasse** - A deep open crack in a glacier.
- **Deciduous** - Shedding leaves annually.
- **Delta** - A mass of sediment deposited at the mouth of a river. They form when rivers flow into a body of standing water (sea or a lake) and deposit sediment.
- **Descendant** - Someone who is related to a person or group of people that lived in the past.
- **Dialect** - A regional variety of a language.
- **Disturbance** - The state of being interrupted, or changed in condition temporarily.
- **Drainage** - A natural or artificial removal of water from a given area.
- **Drumlin**- An extended, oval hill of compacted sediment deposited and shaped by a glacier.
- **Ecosystem** -A group of interconnected parts, formed by the interaction of a community of organisms with their environment.
- **Elevation** - Height above a given level, especially sea level; altitude.
- **Environment** - All of the surroundings of a living organism are considered its environment.
- **Eskers**-A long, narrow, steep-sided ridge of coarse sand and gravel deposited by a stream flowing in or under a melting sheet of glacial ice
- **Ethnographer** – An anthropologist who records the cultural characteristics of a group of people, such as a tribe or ethnic group. The job of an ethnographer is to create a description of the culture, historical culture, beliefs, and activities of the population being studied. In the nineteenth century and early twentieth century, many Euro-Americans

were convinced that American Indians were going to become extinct, so anthropologists felt they needed to observe and record the cultural and spiritual customs of American Indian tribes before they were lost forever. As late as the 1930s, the Blackfeet Reservation and Glacier National Park attracted many professional and amateur ethnographers who believed they were witnessing the last of a "vanishing race" (see "Vanishing race").

- **Excavates** - Make a hole by digging.
- **Expand** - To spread or stretch out, get bigger.
- **Fold** - A bent or curved rock surface resulting from compression or opposing forces acting on the rock layers.
- **Forest Reserve** - Area of forest set aside and preserved by the government.
- **Freeze** - To change into a solid because of a loss of heat.
- **Fungi** - Consumer organism that decomposes living and dead organisms by digesting their tissues and absorbing the nutrients they contain; Mushrooms and mold are examples. They are spore producing organisms of the Kingdom Fungi. Singular form is "fungus."
- **Future Generation** - Any people born after you.
- **Genus** - In taxonomic classification, this category is above species and below family, and is written with a capitalized Latin name.
- **Glacial Trough** - A U-shaped valley formed through glaciation with steep sides and a flat bottom similar to a bathtub shape.
- **Glaciation** - The process, condition, or result of being covered by glaciers or ice sheets.
- **Glacier** - A body of ice (created when snow crystals change under pressure) flowing on a land surface; A body of ice that flows under its own mass due to gravity.
- **Habitat** - A plant or animal's home.
- **Hanging Valley** - A shallow valley carved by a small glacier (once connected to a larger valley glacier), so the elevation of the valley floor is "hanging" high above the elevation of the valley floor carved out by the larger glacier.
- **Harvest** - The time of year when crops are mature and ready to be gathered and stored.
- **Herbivore (herbivorous)** - Animals that eat only plants.
- **Ice Patch** - Accumulations of windblown snow in alpine and subalpine areas that have existed for thousands of years.
- **Indigenous** – Original to a particular place. Indigenous people, for example, are the people who were here before Europeans arrived and who have origin stories that tell of their cultural beginnings here. The term "indigenous" can also be used for other kinds of life, such as plants and animal species native to this continent. Sometimes the word "native" is used to mean "indigenous," as in the case of Native Americans. Native literally means "born to," so it is not quite the same as "indigenous." (Pronounced – "in-DIJ-en-us.")
- **International Peace Park** – The Waterton-Glacier International Peace Park was established in 1932 to honor the peaceful international relationship between Canada and the United States. The Rotary Club was instrumental in creating the Peace Park, which acknowledges the contiguous (uninterrupted) ecosystem of the two joined parks.
- **Kettle lakes** - Small pond formed where a block of ice buried by glacial

deposits melts, leaving a hole. The plains east of Waterton Glacier Park are liberally dotted with kettles.

- **Kootenai (Kutenai, Kutenay)** – The Ktunaxa people, referred to by neighboring tribes as the "Lake People" or "People Who Walked Out of the Forest." The Kootenai origin story tells that the tribe originated in the Tobacco Flats region around northwestern Glacier Park. The Kootenai are perhaps the longest continuous inhabitants of northwestern Montana, southeastern British Columbia, and northern Idaho. Ancestors of today's Kootenai people were familiar with the park and its geographic features, as this was a much-used landscape for them. The 1855 treaty designating the Flathead Reservation removed the Kootenai from the Glacier region, although many Kootenai continued to use the area for traditional purposes.
- **Maltese Cross** - Associated with the Knights of Malta, it has four equal arms that get wider as they go out from the center.
- **Meanders (of a river)** - The winding curves or bends in a river.
- **Medicine Lodge** - A special tipi used for religious ceremonies.
- **Metis** - A person of mixed American Indian and Euro-American ancestry.
- **Moraine - (lateral, medial, terminal)** - A ridge-like accumulation of debris deposited by glaciers. Lateral is deposited on the side. Medial is in the middle and terminal is at the endpoint or furthest extent of the glacier.
- **Mountain** - An area of land that rises to a peak or summit, and is higher than a hill, usually more than 2000 feet high.
- **Mountain Pass** -A route through the mountains that is lower than the surrounding peaks.
- **Mountain Range** - A group of mountains located close together with the similar form, size, and age.
- **Mouth of the river** - The end of a river, where it flows into an ocean, lake or wetland.
- **Mushroom** - The fruiting body of a fungi or any fungus.
- **National park** – The idea of a national park—a place where the natural environment could be preserved for the enjoyment of the people—began in the mid-1800s. Several individuals, including naturalist John Muir, President Theodore Roosevelt, and National Park Service founder Stephen Mather, contributed to the creation of national parks. Today, national parks in the United States encompass more than 84 million acres. To learn more about our national parks, visit this PBS website at http://www.pbs.org/nationalparks/ or obtain a copy of Ken Burn's history series "The National Parks—America's Best Idea." A very short video clip about Glacier Park from the series can be viewed online at http://www.pbs.org/nationalparks/watch-video/#805.
- **Native Plant** - A plant that occurs naturally, and has existed for many years in an area.
- **Naturalist** – A person who studies nature. In Glacier, naturalists studied and documented the natural phenomena of the park, such as its glaciers, geological formations, plants, and wildlife. These scientist-naturalists also taught park visitors about the natural aspects of the park. Morton J. Elrod, who wrote guidebooks on Glacier's natural history, was one of Glacier's earliest naturalists. You can read more about Morton Elrod in the "Amazing Montanans" biography in this footlocker.
- **Nectar** - A sugary liquid made by plants, especially inside flowers, that

attracts insects and other animals. It is collected by bees to make into honey.

- **Omnivore (omnivorous)** - An animal that eats both plant and animal material.
- **Oral history** – An oral history is a historical account recorded in the memories, legends, stories, songs, art, and languages of people who did not create written histories. Oral histories are passed from one generation to the next and are as valid as written histories. Indigenous languages are the key to the survival of oral histories, as they can seldom be translated accurately into other languages. Kootenai oral histories tell of times when ancient animals such as woolly mammoths lived on this earth, indicating that the tribe's inhabitance in this region is indeed very long.
- **Origin story** – An origin story is a people's account of their own creation and beginning. For example, the origin story of the Kootenai tribe tells that they "woke up" (were created) at what we now call Tobacco Flats, along the Kootenai River. Origin stories are part of tribes' oral histories. They do not always concur (agree) with archaeological or academic theories about the origins of humankind, or human migrations. However, this does not mean that such stories are not true or do not have value and importance.
- **Outwash Plain** - A large area of glacial sediment deposited by meltwater streams.
- **Peak** - Top of a mountain.
- **Pend d'Oreille** – The Pend d'Oreille are relatives of the Salish. Their ancestral homeland includes northwestern Montana. Today the Pend d'Oreille tribes have reservations in Idaho and Montana (where they share the Flathead Reservation with the Salish and the Kootenai). Glacier National Park remains an important place in the culture and history of the Pend d'Oreille. (Pronounced "pon-dor-RAY.")
- **Phenomena** - Something that can be observed by the senses but may be difficult to explain.
- **Pigments** - A substance used to make a certain color.
- **Plains Culture** - Refers collectively to the similarities association with the various American Indian peoples occupying the Great Plains of the North American continent (most of the center).
- **Plateau (Plateau Culture)** - Refers collectively to the similarities associated with the American Indian peoples inhabiting the high plateau region between the Rocky Mountains and the coastal mountain system of the North American Continent.
- **Pollen** - The fine powdery material from the male reproductive parts of plants.
- **Pollination (pollinator)** - The way "pollen" from the male part of a flower gets to the egg in the female part of a flower to form a seed. The insect, bird, or organism that moves the pollen is the pollinator.
- **Prefix** - Letter(s) added to the beginning of a word to change its meaning.
- **Pristine** – To be "pure" or "untouched." Pristine is often used to describe Glacier's beautiful environment. That is not completely accurate. During the era when Glacier Park was established, Euro-Americans imagined that the landscape was unused by humans and overlooked the ample evidence that showed the area's indigenous inhabitants had lived, hunted, fished, traveled, fought, held ceremonies, and harvested plants here for

many centuries. Perhaps it is because the environment was unpolluted and sparsely settled that newcomers perceived it as "pristine," because by this time much of the U.S. was already deforested, developed, and contaminated with pollutants.

- **Proboscis** - The mouthpart of an insect used for sucking.
- **Pronunciation** - The way of saying a word.
- **Protocol** - A standard procedure or way of doing things.
- **Recreation** – A national park is managed to meet several objectives. One objective is recreation, such as hiking, climbing, sight-seeing, fishing, and enjoying the outdoors. Trails, lodging, transportation systems, tour services, and interpretive programs contribute to the recreational possibilities of a national park, but because such developments impact the environment, recreation often conflicts with the goal of conserving natural areas.
- **Re-crystallize** - To form crystals again.
- **Reproduction** - How living things have offspring.
- **Rifting** -The process by which the continental lithosphere (Earth's crust and upper mantle) stretches.
- **River source** -Headwaters or original point where the water starts to flow.
- **Romanticize** – To romanticize something is to create an overly positive stereotype, or to have the impression that something is completely good or pure. For instance, it was not uncommon for Easterners to romanticize life in the West. They imagined that the life of a cowboy must be wonderfully exciting and adventurous, that Indians were primitive "unspoiled" people, and that the West was "pristine."
- **Salish (Selís)** – In Montana, the Salish ("SAY-lish") are the inland Salish tribe. There are coastal Salish along the Pacific Coast of Washington state. The Salish historically occupied western Montana on both sides of the Continental Divide. Historically, they were familiar with parts of the Glacier region, although they primarily lived south of that area. Today they share the Flathead Reservation with Kootenai and other tribes.
- **Scientific name** - The common language naming system of binomial nomenclature used to give every living thing a two-part name. These names are important because they allow people throughout the world to communicate about species.
- **Sacred** - Very powerful in a spiritual sense.
- **Sediment** - Natural material broken into smaller pieces and moved and deposited by water, air or ice.
- **Seed** - Small object made by a plant to create new plants.
- **Seed dispersal** - The way seeds are spread away from the parent plant.
- **Snout (of a glacier)** -The end of a glacier at any given point in time.
- **Species** - The basic unit of classification in taxonomy.
- **Specimens** - An individual used as an example of its type.
- **Spirituality** -A process of personal transformation, either with traditional religious beliefs or on a personal level not specific to any religion.
- **Spore** - Typically a one-celled reproductive unit of some plants, fungi, and other micro-organisms.
- **Succession** - The process of change in an ecological community over time.
- **Suffix** - Letter(s) placed at the end of the stem of a word to make a new word.

Vocabulary Continued

- **Symbols** - A thing that represents or stands for something else.
- **Terracing** - Make into a series of flat sections that look like steps.
- **Till** - Unsorted material deposited directly by glacial ice.
- **Thaw** - To become soft or liquid because of warming.
- **Tipi** - A portable conical shelter with a cover on a frame of poles, traditionally used by American Indians of the Plains and Plateau regions.
- **Topographical features** - The surface shape of the Earth.
- **Transports** - Moves.
- **Treaty** - A contract or formal agreement between two states or countries.
- **Tree Line** - The upper limit of habitat in the alpine where trees can grow.
- **Tributaries** - A river or stream that does not flow directly into the ocean but goes into another stream or into a lake.
- **U-shaped Valley** - A valley formed through glaciation with steep sides and a flat bottom similar to a bathtub shape.
- **Understory** - The layer of vegetation beneath the main canopy of the forest.
- **V-shaped valley** - A narrow valley with steeply sloped sides that look like the letter "V" from a cross-section.
- **Valley Glacier** - A glacier that flows down through a valley.
- **Vanishing race** – Many Euro-Americans believed that the indigenous peoples would gradually become fewer and fewer until they ceased to exist. This nearly did happen to many tribes when infectious diseases (including smallpox) killed millions of the indigenous peoples of North America over the course of three or four centuries. The destruction of the bison herds in the latter 1800s led to the impoverishment and starvation of Plains Indian tribes, including the tribes in Montana. In addition, the United States government and other institutions made efforts to erase the cultures, languages, and beliefs of American Indians and replace them with "American" cultural characteristics, the English language, and Christianity.
- **Vegetation** - All the plants in an area.
- **Walking Lightly**- To leave very little impact to an area.
- **Water table** - In the ground, the level where everything below it is full of water.

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Additional Resources

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---. *Talking Without Words In the Old West*. Missoula: Regional Learning Project, University of Montana, Center for Continuing Education, 2009. DVD & Teacher Guide. Grades 5th-6th.

Additional Resources Continued

---. *Long Before We Were Born*. Missoula: Regional Learning Project, University of Montana, Center for Continuing Education, 2009. DVD & Teacher Guide. Grades 2nd-3rd.

---. *Tribal Perspectives on American History, Volume II*. Missoula: Regional Learning Project, University of Montana, Center for Continuing Education, 2010. DVD & Teacher Guide Grades 7-12.

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Human Resources List From Original *Work House*

The people listed below are from the original 1992 list. Most of the people listed were contacted during the research, writing, and original 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 would not have been put together.

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. Many, many thanks to those people who took the time to advise and edit for the writer.

Arlee:
- Adams, Carol, Sixth Grade Teacher.
- Brinton, Cindy, Fifth Grade Teacher.
- Espinoza, Carmen, Sixth Grade Teacher.
- Felsman, Kathy, Indian Studies Director.
- Grier, Paul, Third Grade Teacher.
- Howlett, Ronda, Fifth Grade Teacher.
- McCay, Sue, Fourth Grade Teacher, Arlee Coordinator.
- For Work House and Activity Kit.
- Pitts, Terry, Fourth Grade Teacher.
- Sumner, Jay, Junior High Science Teacher.
- Vanderburg, Francis, Salish Cultural Committee.
- Walawander, Dolly, Third Grade Teacher.

St. Ignatius:
- Beaverhead, Chauncey, Flathead Cultural Committee.
- Faust, Lisa, Fifth and Sixth Grade Teacher.
- Flemming, John, Fifth and Sixth Grade Teacher.
- Incashola, Tony, Director of the Flathead Cultural Committee.
- Ligas, John, High School Science Teacher.
- Smith, Thompson, Historian For The Flathead Cultural Committee.
- Werdin, Dave, Principal of St. Ignatius Schools.
- White, Germaine, Cultural Preservation Office.

Pablo-Ronan:
- Adams, Arlene, Office, Two Eagle River School.
- Adams, Webley, Flathead Head Start Program.
- Addison, Allen, Ronan High School Title IX Aide.
- Anderson, Larry, Principal Of Two Eagle River School.
- Auld, Francis, Kootenai Cultural Preservation Office.

Human Resources Continued

- Beaverhead, Gene, Salish Cultural Preservation Office.
- Becker, Dale, Salish/ Kootenai Tribal Wildlife Program Manager.
- Big Crane, Jo Anne, Ethnobotanist/Native Studies, Two Eagle River School.
- Boyer, Bob, Ronan High School/Middle School Native American Studies Teacher And Indian Dance Club Sponsor.
- Bristol, Bob, Ronan Fourth Grade Science Teacher.
- Buckless, Tracy, Ronan Middle School Counselor.
- Cross, Marsha, Director Of Cultural Preservation Office.
- Cajune, Julie, Tribal Curriculum Director.
- Charlo, Louis, Two Eagle River School.
- Dos Santos, Joe, Fisheries Program Manager, Tribal Natural Resources Department.
- DosSantos, Wendy, Fifth Grade Teacher, Ronan Middle School, Pablo/ Ronan Coordinator For Work House And Activity Kit.
- Finley, Vernon, Bilingual Education Director, Salish Kootenai Community College.
- Gallagher, Dick, Ronan High School Principal.
- Gilhouse, Jim, K. William Harvey Elementary Principal, Ronan.
- Gerski, Larry, Seventh Grade Science Teacher, Ronan Middle School.
- Howlett, Kevin, Tribal Education Director.
- Irvin, Ben, Ronan/Pablo Indian Education Coordinator.
- Johnson, Andrea, Pablo Elementary School Principal.
- Koetter, Lisa, Two Eagle River School Librarian.
- Koetter, Eric, Two Eagle River School Art And History Teacher.
- Lipscomb, Brian, Fish, Wildlife, Recreation, And Wardens Division Manager, Tribal Natural Resources Department.
- McDonald, Tom, Wildlife Recreation Program Manager, Tribal Natural Resources Department.
- Mattson, Peggy, Ronan Middle School Explore Teacher.
- Matt, Clayton, Tribal Education Committee.
- Minard, Donna, Ronan Middle School Vice Principal.
- Quequesah, Alex, Cultural Heritage Instructor, Salish/Kootenai Community College.
- Ruhman, Doug, Ronan Fourth Grade Teacher.
- Schaeffer-Blake, Maria, Pablo Elementary School.
- Seivert, Regina, Eighth-Twelfth Grade Science, Two Eagle River School.
- Swaney, Rhonda, Chairman Of Tribal Government.
- Tanner, Marilyn, Ronan Middle School Principal.
- Tanner, Terry, Tribal Education Office.
- Therriault, Ron, History Department, Salish/Kootenai Community College.
- Vrooman, Nicholas, Folklorist And Metis Specialist, College of Great Falls.
- Weiser, Rusty, Alternative Learning Teacher, Ronan Middle School.
- Whiting-Sorrell, Anna, Director of Alcohol and Substance Abuse Program (ASAP) Ronan-Pablo.
- Wing, Terri, Curriculum Director For The Mission Valley Educational Consortium.

Human Resources Continued

Polson:

- Atkinson, Luan, Third Grade Teacher, Linderman Elementary School.
- Baker, Carole, Polson Middle School Librarian.
- Bishop, Marcy, National Buffalo Range.
- Caffrey, Debra, Kindergarten-Fourth Grade Resource Teacher, Cherry Valley School.
- Cox, Garth, Third Grade Teacher, Linderman Elementary School.
- Davis, Mary, Third Grade Teacher, Cherry Valley School.
- Efinger, Bev, Special Education Teacher, Cherry Valley School.
- Fischer, Chris, Second Grade Teacher, Linderman Elementary School.
- Fischer, Ruth, Second Grade Teacher, Cherry Valley School.
- Kelly, Lynn, Seventh Grade Life Science Teacher, Polson Middle School, Plathead Valley Loon Program, Project Eagle Watch, Polson Coordinator For Work House And Activity Kit.
- Gunderson, Karen, First Grade Teacher, Linderman Elementary School.
- Harding, Kim, Fifth Grade Teacher, Polson Middle School.
- Heinz, Carolyn, Fourth Grade Teacher, Linderman Elementary School.
- Hoffman, Dawn, First Grade Teacher, Cherry Valley School.
- Lott, Jake, Superintendent Of Polson Public Schools.
- Meeks, Elaine, Principal Of Cherry Valley Elementary School.
- Newgard, Karol, First Grade Teacher, Linderman Elementary School.
- Orchard, Melinda, Third Grade Teacher, Cherry Valley School.
- Ratzburg, Mary Lou, Linderman School Librarian.
- Teggeman, Nancy, Third Grade Teacher, Linderman Elementary School.
- Torgeson, Paul, Special Education Teacher, Linderman Elementary School.
- Witts, Lynn, Special Education Teacher, Polson High School.

Elmo:

- Antiste, Susan, Plant Specialist.
- Auld, Francis, Cultural Resource Protector (Pablo).
- Bufton, Sarah, Language Specialist.
- Burke, Clarinda, Cultural Resource Protector.
- Caye, Loraine, Cultural Resource Protector.
- Clairmont, Amelia, Language Technician.
- Hewankorn, Alice and Charlie, Kootenai Cultural Committee.
- Hewankorn, Patricia, Program Director.
- Joeseph, Leonard, Secretary/Receptionist.
- Kenmille, Agnes (Oshanee), Cultural Heritage Instructor.
- Left Hand, Adeline and Alex, Kootenai Cultural Committee.
- Left Hand, Naida and Pat, Kootenai Cultural Committee.
- Michel, Linda, Data Entry Technician And Bookkeeper.
- Nichols, Richard, Language Technician.

Kalispell:

- Bangeman, Johanna, Montana Fish, Wildlife And Parks Educational Specialist.
- Blood, Lex, Glacier Institute, President, Board Of Directors.
- Bruninga, Chris, Business Director For the Glacier Institute.
- Davis, Pam, Coordinator For Flathead Environmental Education Consortium.

Human Resources Continued

- Wagner, Rob, U. S. Fish And Wildlife Service Liaison Between The Service And Montana Tribes.
- Welder, Terry, Education Specialist and Author of Work House, Kalispell Montessori Center.
- Decker, Joe, West Lakes District Naturalist, Project Director for Work House.
- Fladmark, Bruce, Glacier National Park Historian.
- Frederick, Larry, Chief Of Interpretation.
- Holterman, Jack, Glacier National Park Historical Advisor and Native Culture Advisor.
- Kliner, Lynn, Glacier National Park Librarian.
- Landry, Clair, St. Mary Interpretation.
- Murdock, Lynn, Hudson Bay District Naturalist.
- Walters, Lucy, St. Mary Interpretation.
- Weatherwax, Calvin, St. Mary Interpretation.

Browning:

- Arrow Top, Barbara, Kindergarten through Eighth Grade Cultural Studies Director For Heart Butte School.
- Bird, Dolores, Napi Elementary School Teacher.
- Bremner, Dona, Middle-School Guidance Counselor, Browning Middle School.
- Calf Bags Ribs, Frosty, Cultural Advisor, Heart Butte School.
- Calf Looking, Cassi, Blackfeet Cultural Instructor, Heart Butte High School.
- Carpenter, Les, High School Science Teacher, Browning High School.
- Comes At Night, Gary, Cultural Resource Advisor For Heart Butte, Blackfeet Tribal Gas and Oil Office.
- Conway, Jackie Ray, Third Grade Teacher.
- Croft, Jean, Cultural Dance Interpretation Specialist.
- Croft, Raymond, Fourth And Fifth Grade Physical Education Instructor, Cultural Dance Interpretation Specialist.
- Day Rider, Earl, High School Blackfeet Studies Teacher, Browning High School.
- Fassy, Pepion, Cultural Instructor, Blackfeet Community College, 338-7755.
- Fish, Wilbur, Traditional Roots And Plants Specialist, Blackfeet Community College.
- Gladstone, Jack, Blackfeet Cultural Committee.
- Ground, Gene (Mary Ground's Son), Cultural Advisor, Blackfeet Community College.
- Higgens, Jim, Blackfeet Cultural Games Instructor, Part Time Teacher.
- Horn, Burton, Blackfeet Cultural And Modern Day Issues Advisor, Heart Butte.
- Kennedy, Jim, Blackfeet Tribal Program Director For Natural Resources.
- Kipp Darrell, Piegan Institute Inc., Native American Studies and Bilingual Instructor for Blackfeet Community College.
- LaFromboise, Conrad, Blackfeet Cultural Advisor, Blackfeet Community College.
- Little Plume, Ed, Piegan Institute Inc., Bilingual Instructor for Blackfeet Com. College, Blackfeet Language Teacher, Browning Middle School.

Human Resources Continued

- Lowrentz, Elma, Assistant Director Of Blackfeet Tribal Council.
- McKay, Joe, Blackfeet Cultural Narrator.
- Murray, Carol, President Of Blackfeet Community College.
- Murray, John, Blackfeet Language Instructor, Blackfeet Community College.
- Nichols, William, Natural Sciences Instructor, Blackfeet Community College.
- Norman, Darrell, Blackfeet Cultural Advisor.
- Parision, Barbara, Principal of Heart Butte Schools.
- Pilling, Charles R., Curriculum Director For Browning Public Schools.
- Potts, Al, Cultural Advisor, Blackfeet Community College.
- Prarie Chicken, Rosella, Blackfeet Cultural Advisor.
- Rides At The Door, Thelma, Blackfeet Tribal Culture Department.
- Running Fisher, Mable, Elementary Teacher, Napi Elementary School.
- Schultz, Rosalynn, Principal of East Glacier Schools.
- Sharp, Lois, Second Grade Teacher, Vina Chattin School.
- Sharp, William, Sixth Grade Language Arts Teacher, Browning Middle School.
- Shepard, Carlona, Work House Activity Kit Coordinator, Elementary School Teacher, East Glacier School.
- Skunk Cap, Darcy, Middle School Teacher.
- Skunk Cap, Leona, Bilingual Teacher for Browning Public Schools, Head Start Teacher.
- Smith, Wayne, Blackfeet Tribal Cultural Department.
- Spoonhunter, Joyce, Blackfeet Tribal Culture Department Director.
- Spoonhunter, Marlin, Creative Alternative Program, Browning Middle School.
- Still Smoking, Dorothy Ph.D., Piegan Institute Inc., Director of Head Start, Director of Native American Studies.
- Johnson-St. Goddard, Kristin, Librarian and Elementary School Teacher, School/ Community Liason.
- Swims Under, Mike, Blackfeet Cultural Committee.
- Wagner, Curly Bear, Blackfeet Cultural Committee.
- Weatherwax, Calvin, Native American Culture Instructor, Vina Chattin School.
- Weatherwax, Ken M., Blackfeet Travel Routes Specialist.
- Weatherwax, Theadora, Middle School Math and Science Teacher, Browning Middle School.
- Whitright, Terry, Blackfeet Native American Studies Director For Browning Public Schools.
- Wilcox, Karen, Babb Elementary School Teacher,Waterton Lakes And Cardston, Alberta,
- Eagle Speaker, Kenneth, Chief Of Interpretation, Head Smashed In, Fort McLeod.
- Jarvis, Laura, Blackfeet Bilingual Program Director, St. Mary's School, Cardston.
- Jellicoe-Smith, Janice, Interpretive Specialist, Waterton Lakes.
- Olson, Thane, Principal of Cardston Public Schools.
- Piling, Noel, Cardston Elementary School Teacher.
- Reeves, Brian, Professor of Anthropology/Archaeology, Calgary University.

Original *Work House* Activity Kit Contents

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 narratives 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

MT Common Core Standards for English Language Arts and Literacy in History/ Social Studies, Science, and Technical Subjects

The Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects ("the Standards") are the culmination of an extended, broad-based effort to fulfill the charge issued by the states to create the next generation of K–12 standards in order to help ensure that all students are college and career ready in literacy no later than the end of high school.

The Montana Content Standards for English Language Arts reflect the constitutional mandate that all educators must provide instruction including the distinct and unique heritage and contemporary contributions of American Indians in a culturally responsive manner.

As a natural outgrowth of meeting the charge to define college and career readiness, the Standards also lay out a vision of what it means to be a literate person in the twenty-first century. Indeed, the skills and understandings students are expected to demonstrate have wide applicability outside the classroom or workplace. Students who meet the Standards readily undertake the close, attentive reading that is at the heart of understanding and enjoying complex works of literature. They habitually perform the critical reading necessary to pick carefully through the staggering amount of information available today in print and digitally. They actively seek the wide, deep, and thoughtful engagement with high-quality literary and informational texts that build knowledge, enlarge experiences, and broaden worldviews. They familiarize themselves with varied literary perspectives, including those by and about American Indians, to gain a better understanding of themselves and their fellow citizens.
They reflexively demonstrate the cogent reasoning and use of evidence that is essential to both private deliberation and responsible citizenship in a democratic republic. In short, students who meet the Standards develop the skills in reading, writing, speaking, and listening that are the foundation for any creative and purposeful expression in language.

College and Career Readiness Anchor Standards for Speaking and Listening

Comprehension and Collaboration
1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.
Presentation of Knowledge and Ideas
4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
6. Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

College and Career Readiness Anchor Standards for Writing for Literacy in History/ Social Studies, Science, and Technical Subjects 6–12 [WHST]

Text Types and Purposes

1. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences.

Production and Distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build and Present Knowledge

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, or ideas develop and interact over the course of a text.

Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.*

Montana Common Core Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects
College and Career Readiness Anchor Standards for Reading Literacy in History/ Social Studies 6–12 [RH]/ Science and Technical Subjects 6–12 [RST]

8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.
Range of Reading and Level of Text Complexity
10. Read and comprehend complex literary and informational texts independently and proficiently.

Note on range and content of student reading:
Reading is critical to building knowledge in history/social studies as well as in science and technical subjects. College and career ready reading in these fields requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in history and science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. In history/social studies, for example, students need to be able to analyze, evaluate, and differentiate primary and secondary sources. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in these fields with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction. It is important to note that these Reading standards are meant to complement the specific content demands of the disciplines, not replace them.

For a complete listing of all Montana Common Core Standards English Language Arts go to: http://opi.mt.gov/curriculum/montcas/MCCS/index.php?gpm=1_3#gpm1_2

Montana Standards for Science, OPI

Science is an inquiry process used to investigate natural phenomena, resulting in the formation of theories verified by directed observations. Inquiry challenges students to solve problems by observing and collecting data and constructing inferences from those data. In doing so, students acquire knowledge and develop a rich understanding of concepts, principles, models, and theories (National Research Council, National Science Education Standards 214). Inquiry requires the use of scientific thinking skills to address open-ended problems through non-prescriptive procedures and allows students to construct their own knowledge of the specific concepts. This validates different ways of gathering, synthesizing and communicating knowledge. Scientific theories are challengeable and changeable. Data used to support or contradict them must be reproducible.

The unifying concepts and processes of science provide connections between and among traditional scientific disciplines. The unifying concepts and processes woven into the
Montana Standards for Science include: systems, order, and organization; evidence, models and explanation; constancy, change, and measurement; evolution and equilibrium; and form and function. These concepts and processes must be experienced in a developmentally appropriate manner during K-12 science education.

Content Standards indicate what all students should know, understand and be able to do in a specific content area.

Benchmarks define our expectations for students' knowledge, skills and abilities along a developmental continuum in each content area. That continuum is focused at three points—at the end of grade 4, the end of grade 8, and grade 12. Detailed Science Content Standards can be found at: http://opi.mt.gov/Curriculum/CSI/AS.html

Content Standard 1. Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate the results and form reasonable conclusions of scientific investigations.

Content Standard 2. Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.

Content Standard 3. Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.

Content Standard 4. Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.

Content Standard 5. Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.

Montana Standards for Science, OPI

Content Standard 6. Students understand historical developments in science and technology.

Pursuant to Article X Sect 1(2) of the Constitution of the state of Montana and statutes §20-1-501 and §20-9-309 2(c) MCA, the implementation of these standards must incorporate the distinct and unique cultural heritage of Montana American Indians.

Montana Standards for Social Studies

Social studies is an integrated study of the social sciences and humanities designed to foster citizenship in an interdependent world. Social studies provides coordinated, systematic study of such disciplines as economics, history, geography, government, sociology, anthropology, psychology and elements of the humanities. Social studies addresses political, economic, geographic, and social processes that allow students to make informed decisions for personal and public good.

Social studies develops the knowledge, skills, and processes necessary to understand historical and present day connections among diverse individuals and groups. A study of Montana's rich past and geographic diversity includes the distinct cultural heritage and contemporary perspectives of Montana's American Indians and other cultural groups.

Content Standards indicate what all students should know, understand and be able to do in a specific content area.

Benchmarks define our expectations for students' knowledge, skills and abilities along a developmental continuum in each content area. That continuum is focused at three points—at the end of grade 4, the end of grade 8, and grade 12. Detailed Social Studies Content Standards can be found at: http://opi.mt.gov/Curriculum/CSI/AS.html

Content Standard 1. Students access, synthesize, and evaluate information to communicate and apply social studies knowledge to real world situations.

Content Standard 2. Students analyze how people create and change structures of power, authority, and governance to understand the operation of government and to demonstrate civic responsibility.

Content Standard 3. Students apply geographic knowledge and skills (e.g., location, place, human/environment interactions, movement, and regions).

Content Standard 4. Students demonstrate an understanding of the effects of time, continuity, and change on historical and future perspectives and relationships.

Content Standard 5. Students make informed decisions based on an understanding of the economic principles of production, distribution, exchange, and consumption.

Content Standard 6. Students demonstrate an understanding of the impact of human interaction and cultural diversity on societies.

Montana Standards for Social Studies

Pursuant to Article X Sect 1(2) of the Constitution of the state of Montana and statutes §20-1-501 and §20-9-309 2(c) MCA, the implementation of these standards must incorporate the distinct and unique cultural heritage of Montana American Indians.