EXPLORERS
Field Guide

Curiosity and a thirst for knowledge motivates humans to explore the unknown. Students in the explorers discovery group play a key role in the 'Corps of Discovery' at High Trails by learning orienteering skills, discovering new plants and animals, making important community decisions, taking risks, and recording their stories.

Soldiers like Powell and Clark, and scientists like Lewis were able to take skills they learned within their trades and apply them to the explorations they led. Students have an abundance of knowledge and access to information that can be shared in any venue to promote a healthy community and succees in their goals.

Revised to be field tested
Fall 2009

Contents

All-Day

Materials: explorer costumes, compass's, compass course cards, large teaching compass, copies of plant and animal discovery sheets, soil thermometers, pencils, journals

Explorers for Teachers and Staff

The explorer curriculum encompasses several active, fun and interesting activities designed to challenge students to analyze the real lives of the explorers who travelled these lands before them. Staff will choose the activities that best strive to reach the age and curricular specific goals of each school attending High Trails.

Students will investigate and discover how plants, animals and land are interrelated, and this understanding should result in a more careful decision about how the land should be used.

Colorado Standards Met:

Setting the Role	
Exploration Training	E/LA2, M1,2,4,5,6, H3,4,5, G1,2,4,5,6
Compass Course	
Making Maps	
Character traits of the Explorers	E/LA4, M6, H2,3,4,5, G1,2,3,5,6
Log Cross Challenge	
Plant and Animal Discovery Activity	M3,4, S1,3,6, G2,3,5,6
Communities Game	E/LA2, M3, S1,3, H4,5, G2,4,5,6
Ethnographic Analysis	
Life Zones	M4,6, S1,3,4,6, S1,3,5, H2,3,4,5, G1,2,3,4,5,6
Water in the West	M5,6, S4, H2,3,4, G2,3,4,5,6
Concluding Discussion	E/LA 2,4, H2,3,4,5, G2,3,5,6
Indians and Explorers	H2,4, G5,6
Bat Caves	M1,2,5,6, S2,4, H5, G3,4,5

Quotes from the Lewis and Clark Expedition of 1803-1807 are scattered throughout the curriculum unit and can lay a solid historical foundation for each activity if you choose to read them, or assign one student to be the expedition 'historian'.

There are more activities in the Explorers Discovery Group guide that can be used in a typical 2.5 hour block of time. Choose activities that complement each other, are cross-curricular, with differing activity levels based on the group participating.

Key to leading a successful discovery group is to facilitate the small 'expedition corps' groups that will be set up when setting the role. After each activity, when hiking to a new destination or in any transition period, it is important for students to get back with their small groups. Pose a question to the group to discuss until you arrive at the next destination. This will keep students and high school leaders on task and engaged throughout the discovery group.

Setting the Role

Students will: 1. Build anticipation and understand the historical context of the exploration of the West.
Approximate Time: 10 minutes

After taking roll at the stake, divide students into four high school leader led 'expedition corps' and move to a secluded area. Explain to students they have been called together because they have expressed an interest in joining an exploration party to the Western frontiers. Possibly the greatest of all Western explorations is about to begin, and they have been chosen from thousands of applicants as the most talented, the most knowledgable and the most likely to contrtibute to a successful exploration. Introduce the counselors, and explain they are the experienced guides of each expedition corps. High school students can introduce themselves to their groups as a famous explorers. The President of the United States has commissioned this exploration and the teacher or staff person can read the following letter to the group:

To Captain of the Explorers *Washington DC*

Dear Captain:
By my authority as President of the United States of America and by my authority as Commander in Chief of its military forces, I hereby consign, commission, and authorize you to obtain and select a small party of your own choosing who are strong, experienced in the wilds, share some expertise in Biology, Geology, Map-Making and Zoology, and who can scout, and communicate with Indians, and will willingly hazard the dangers of the trail. And for you to lead this small party forth from hence into the wilds, in order to assess the geology, timber resources, botany, zoology, and geography and to make friendly encounters with any Indian tribe which you may encounter and finally, make a report to me concerning these matters and thereby increase the knowledge and understanding of the people of the United States of America and the world. In good faith and with my authority I have written this order of consignment with my own hand and signed it with my own name.

The President

As groups are walking to the compass course, have group leaders test new explorers by asking:

Qualifying questions for Explorer Training...

Where does the sun rise and set?
How can you use nature to find North?
Identify 3 things you can eat, if you had to survive.
Find 3 different signs of animals living here.
If you were lost, what 4 things would you do to survive?
- Which of these 4 things would you do first?
Make one brilliant observation about your surroundings.

Compass Course - Explorer Training

Students will: 1. Practice using a compass by unscrambling a secret message.
2. Investigate how nature can provide clues to direction without a compass
Approximate Time: 25 minutes

The compass course is located directly above the water tower and near humpty dumpty rock. The starting point is marked with a wooden stake. There is a second compass course that is beyond the hidden campfire, with a wooden start sign nailed to a large Douglas Fir. Each course has 4 tracks marked with the symbols X,O,square and triangle.

Each high school leader led groups with have a designated symbol and sheet of paper with the direction (in degrees) and distance (in paces) listed on it. Each group starts at the starting point, orients the compass, then counts out paces to find letters of a secret code word one by one. Each letter also has the correct track symbol on it to keep groups on the right track. Once all the letters have been found for one word (each group has 5-6 letters) the group unscrambles their word and puts it together with everyone else's to form a phrase: Course #1 = Sacred Indian Burial Ground. Course #2 =

Using a compass

Basic orientation skills training

Identify the parts of the compass:

- needle, cardinal directions, degrees, compass housing, line of direction.

How to hold the compass: Hold out your palm chest level and lay the compass flat.

How do I find North? Follow the direction of the magnetic red arrow.

Now, pactice by finding all the cardinal directions using the compass.

What landmarks do you see telling you which way is East? South? North? West?

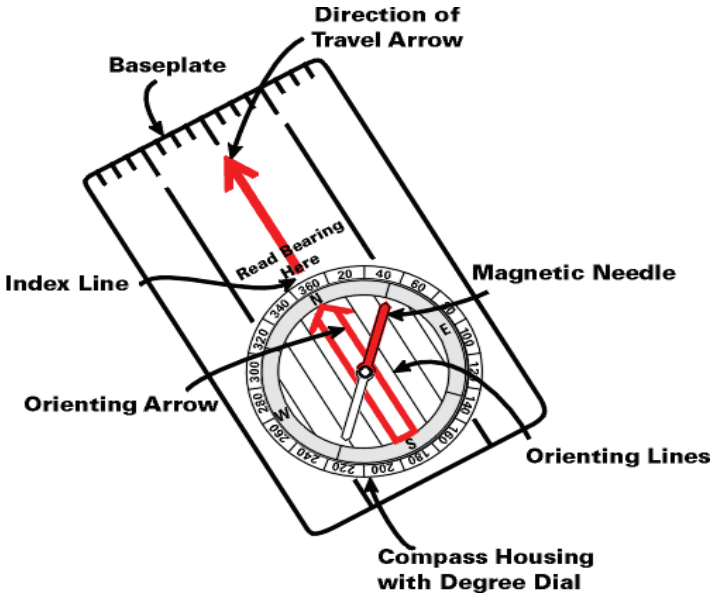
- Pikes Peak is East!

How can nature provide clues to the cardinal directions?

- Direction of the path of the sun, moss on trees are north facing

How do I find a specific bearing?

Try 240 degrees...spin the compass housing until 240 degrees is lined up with the compass line of direction. Then turn your body, while holding the compass until Red Fred is in the Shed!



Dangers of the Expedition

Students will: 1. Analyze the dangers early explorers faced and decide how they would have reacted.
2. Use teambuilding skills to overcome a log cross challenge
Approximate Time: 15 minutes

From Journals of Lewis and Clark...

"Left Pittsburgh this day (August 30, 1803) at 11 ock with a party of 11 hands 7 of which are soldiers, a pilot and three young men on trial they having proposed to go with me throughout the voyage. Arrived at Bruno's Island 3 miles below halted a few minutes.went on shore and being invited on by some of the gentlemen present to try my airgun which I had purchased brought it on shore charged it and fired myself seven times fifty five yards with pretty good success; after which a Mr. Blaze Cenas being unacquainted with the management of the gun suffered her to discharge herself accedentaly the ball passed through the hat of a woman about 40 yards distanc cuting her temple about the fourth of the diameter of the ball; shee fell instantly and the blood gusing from her temple we were all in the greatest consternation supposed she was dead by [but] in a minute she revived to our enespressable satisfaction, and by examination we found the wound by no means mortal or even dangerous;"

Questions to ask:

What were some of the dangers explorers faced daily?
- extreme weather and natural conditions (travel on rivers)
- unfriendly indian tribes
- getting lost
- risk of injury
- lack of food/water/shelter
- mutiny

How did they prepare for these risks?

What dangers do you face in your everyday lives?

How are you prepared?

Log Cross Challenge Activity

Create the image of a canyon crossing with students at the ditch that runs parallel to the tick-track road. Students work in teams to build a log bridge across the 'chasm' using the down and dead aspens.

Another fun activity is crossing the Sacred Indian Burial Grounds. In the Aspen grove below the compass course, students must navigate through the trees without touching the ground. They must work in teams to build platforms and help each other across the sacred land. If a student touches the ground the whole group must return to the beginning of the challenge. Use the teambuilding debreifing skills to work through any student issues.

Character Traits of Great Explorers

Students will: 1. Analyze qualities that make great leaders.
2. Apply character traits of explorers to their personal goals and community.
Approximate Time: 15 minutes

It took tremendous courage, intellect and decision making for the early explorers of North America to accomplish their goals. This discussion-based activity can come alive with the fantastic stories of these explorers.

Lead students into discussion by asking:

What does it take to be the leader of a successful expedition?	Bravery, skill, ability to communicate, preparedness, conviction, perserverence, curiosity, creativity, resilience, sense of higher purpose, cultural awareness
Who were some of the great explorers?	

Short Explorer stories:

Creativity - **Jedidiah Smith**, first to cross the Great Basin between the Rocky Mountains and Sierra Nevadas, buried himself in the sand daily to stay cool in the heat of the day. **Zebulon Pike**, who never summited Pikes Peak, built sleds to transport his men with frostbitten toes and feet, a skill he learned earlier on a sled expedition up the Mississipi River from St. Louis to Minnesota, its headwaters.

Perserverance - **John Rae**, an English explorer, walked 23,000 miiles to find his friend **John Franklin**, who had embarked on a dangerous journey to find the North Pole, when his ship got stuck in the ice. He found John Franklin too late, as the crew of his stuck ship resorted to cannibalism to survive the winter.

Sense of Higher Purpose - Two spanairds who explored North America in the early 1500's had different motivations. Many early explorers were supported by church-run governments in Europe, and given the task of bringing Christianity to the 'heathen' tribes they encountered. **Ponce De Leon** mapped the Floridian Peninsula in search of a 'fountain of youth', and **Coronado** explored New Mexico, Arizona and part of Colorado in search of an "Otro Mejico", another source of Gold like his predecessor Cortex discovered in Mexico. The promise of riches and adventure was a major motivating force for many western explorers, who informally mapped the region.

Resilience - The ability to move past a failure is key to success in any endeavor.

Risk-Taking - **John Wesley Powell**, who led the first expedition to map the Colorado River drainage through the Grand Canyon, scaled cliff walls with one arm to take his bearing points at the top of the canyon. His other arm was crushed by a Mini-ball in the Civil War and later amputated.

Cultural Awareness - Kit Carson/Sacajewea - the practice of hiring local indian guides was common practice for the first frontiersmen in the West. Many trappers and explorers married into the tribes, with several wives in fact.

Skill - **Lewis and Clark** were experts use of technical instruments for measuring latitude and distance. In their search for an expedition corps, they looked for a variety of skilled men including oarsmen and hunters.

Follow up questions...

Which of these traits have you seen modern leaders use?
Can these qualities be developed? How?
Which one of the traits we discussed could you focus on to improve your life at home or in school?

Surveying the Land

Plant and Animal Discoveries

Students will: 1. Discover a new plant and scientifically document the traits of that plant.
2. Deconstruct journal entries to imagine life on the exploration trail.
Approximate Time: 15 minutes

Scientific research was a major impetus for government funding of exploratory missions across the west. Across the vast North American continent is a fantastic diversity of ecosystems and plant and animal life. Students will take this chance to accomplish two important missions of 'rediscovery' by closely examining the details of the plants and animals that live thrive in the Montane Life Zone, here at High Trails.

Mission One: Botanists

Begin by asking the students to make a circle around a shrub or tree. Explain that the President has asked us to investigate and describe all the plants in this area. We may name the plants we discover, but we have to describe them so well that someone else could recognize them.

Give students 2 minutes to investigate the center plant using hand lenses, rulers and all of their senses. Then have the students return to the circle and ask what they discovered.

Where are the flowers? What are the seeds like? What kind of soil does it grow in?
What are the leaves like? What could it be used for?

Use the Ponderosa Pine as an example:

The Ponderosa Pine is an irregularly shaped tree between 30 and 50 feet tall. Its leaves, which are called needles, are about 3-5 inches long and one-eighth inch wide. The bark grows in flat scaly plates and is almost black on younger trees but becomes reddish-yellow and smells like vanilla on older trees. The seeds are born by cones rather than flowers; these cones may be 3-6 inches long and are quite round and prickly. The seeds each have a thin papery wing so they can fly. These wings break off easily so that the seed can work its way down into the soil. The needls have a tart, bitter taste. Ponderosa prefer dry sunny slopes and usually grow in gravelly soil.

Now give the students a chance to describe and name their own plant in teams of two or three. Give each team one of the official new plant discovery cards (found in the resources pages) and ask them to find a plant that is interesting or unusual to them. Give them 5-10 minutes to answer questions on the card and to describe the plant on the back. When they return, have the teams exchange cards and see if they can find the plant that another team described. Ask the teams to bring back a small piece of the described plant. If they are right the part of the plant can be taped to the card and the new plant will be recorded in the official new plant discovery book.

Mission Two: Zoologists

Tell the students that the President has also asked us to investigate the animal life of the area. Read Thomas Jefferson's instructions to Capt. Lewis concerning the research aspect of the mission then continue with the activity.

The first thing we need to do is find out how many kinds of animal live here. Divide the group into two teams and explain the contest. Each team will get one point for each animal or animal sign that they bring back (things like birds, squirrels, gopher holes and ant hills may be claimed if the team either presents a written list of them or draws a representative picture) . Allow the students 5-10 minutes to collect, be prepared to help them get started since animal signs are not always obvious. Look under logs, stones, tree bark, up in branches, etc... there are hundreds of example. When they return have each tam sit together across from the other team. No points may be given if the students cannot explain or describe the animal which made the sign. If the finding team cannot explain, then the opposing team may take a crack at it.

The second part of the zoologist mission is the **Official New Animal Discovery**. Students, in teams of two or three, are given an animal discovery card found in the resources pages, and are asked to select some animal or animal sign they have found and fill out the card for that animal. If they describe it well enough and answer the questions on the card, then they may give the animal its official name. Allow about 10 minutes for the teams to finish their description cards. When they return to the discussion area ask each team to describe its animal to the group. As new animals are described, explore their interrelationships with the other animals which have been discovered.

A third, extremely fun game for students is the **Predator-Prey Game**, which is described in the resources section of this guide.

Can students guess what Lewis + Clark were describing?

- "barking squirrels" were caught by digging out burrows and carrying buckets of water to flood them out.... ***(Praire Dogs)***
- Lewis and Clark received beautiful paintings on their hides from local Native American tribes ***(Buffalo)***
- a "most tremendous animal, and extremely hard to kill" ***(Grizzly Bear)***
- the expedition killed 375 of these animals, whose meat they prefered over all other animals ***(Elk)***
- "they usually associate in bands of ten or twelve sometimes more and burrow near some pass or place much frequented by game; not being able alone to take a deer or goat they are rarely ever found alone but hunt in bands ***(Coyote)***
- "they offered us a skin of a full grown animal which was quite as large as that of a common deer. these people informed us that these animal were found in great abundance on the hights and among the clifts of the adjacent mountains" ***(Bighorn Sheep)***
- "Jo killed & brought in an animal which the French call a barrow this animal Resembles our Ground hogs in colour & shape nearly but the head like a dogs. Four feet like a bear especially the claws. Inside like a hog long teeth. They live on flyes & bugs & C. and dig in the Ground like a G. Hog they Say they growl like a possum." ***(Badger)***

Did you know?? Lewis and Clark were the first to officially record many plant and animal species:

Sandhill Crane
Grizzly Bear
Elk
Red Breasted Merganser
Beaver
Pronghorn Antelope
Black Bear
Bighorn Sheep
Wolf
Buffalo
Clark's Nutcracker
Lewis's Woodpecker
Prairie Dog
Lupine
Prairie Flax
Prickly Pear
Wild Rose
Rhododendrum
White Alder
Yarrow
Indian Paintbrush

Life Zones

Students will: 1. Classify life zones by observing local flora and fauna
2. Compare north and south slope vegetation patterns
Approximate time: 20 minutes

Questions to ask:

What is a life zone and what factors determine which life zone an area is?

Life zones are areas of similar physical conditions which can support similar types of plants and animals. Life zones are not pure and distinct. Here are factors that define life zones...
altitude, temperature, amount of moisture, latitude (distance from the equator)

Can you think how each of these factors may contribute to the characteristics of a life zone?

How can you describe the land differently?

Try to picture Colorado Springs, Manitou, and Florissant (or come up with 3 towns with varied life zones according to the school groups hometown)

	Colorado Springs	**Manitou**	**Florissant**
	Plains	Sonorran	Montane
elevation:	4000-5999ft	6000-7999ft	8000-9999ft
moisture:	little	little to average	cooler temps, more precip
landforms:	flat	hills, valleys, canyons	larger mountains, valleys
plants:	rasses, trees near water	Oakbrush, Juniper, Pinion	Pine, Aspen Forests
animals:	have adapted to lond distance travel, lack of water	Deer migrate here for winter	grow thick fur in winter

North vs. South Slope Study

Stop students along the tick-track at the base of Little Blue to take a look at the difference between the North and South Slopes. Split students into two groups to investigate and answer these questions:

Record the temperature of the soil and the soil texture.
What are the different types of plants? What are the plants characteristics?
Where would you build your cabin in the winter?
Why are these two slopes, only 100 yards away, so different?

Students should find:

On the south slope, we find plants associated with the Upper Sonorran Desert Life Zone such as Yucca, Mountain Mahogany, Ponderosa Pine, varities of Cactus
On the north slope, we find spruce and douglas fir dominate. The soil is damp and rich in humus.
The south slopes are more exposed to direct sunlight year round. There is less water. The shady north slopes hold snow and water longer, contributing to a different microclimate than the south slope.

See the resources section for the Community Game, to reinforce concept of interconnectedness and importance of diversity within an ecozone.

Water in the West

Students will: 1. Observe how all water on earth is part of a continurous process.
2. Explain the importance of water and how water interacts with landforms.
Approximate Time: 15 minutes

How Old Is Your Water?

Ask students:

How old is the water in their water bottles? Look closely!
Is it older than the teachers water?
Is the water at High Trails older than the water they have at home?

To answer these questions, imagine this. They're at home and getting pretty hungry. They decide to order a pizza. They call up, order, sit back and wait. 5 minutes go by, then 10, 15, almost 30 minutes and where's that pizza?? Finally, the doorbell rings, the deliveryman explains he was lost and gives you the pizza for half price...nice! You pay, take the pizza to the kitchen and notice the box is cool and a little wet. When you open the box, there are droplets of water on the box top and around the edges. So you warm the pizza up, eat it, but can't help thinking why was that pizza box wet?

The box was wet because the pizza was hot when it was put in the box. Then, as the pizza cooled, it released steam which got trapped on the box cover. This is how water was formed here on Earth. Originally, the Earth was hot molten rock, like lava or the top of a hot pizza. Over time it cooled down and released steam. That steam got trapped in the early atmosphere which acted like the pizza box top and the water condensed and began to rain. It rained and rained and rained. It rained so much that the rain created our beautiful oceans, seas and lakes.

What we know is that the Earth has essentially the same amount of water as when water first was formed. So the answer is all water is essentially the same age. All of our water is essentially the same age as those first raindrops that fell what scientists estimate to be 3.8 billion years ago.

Allow students time to digest this information. Then ask them to take a deep breath and hold it. Ask them which is older - the air in their lungs or the water in their water bottles? The answer is still the water, because water supported life on Earth long before the air did. There was life in the water first.

Water Maze

This activity is a variation of tag. Stopping at a slope, divide the students into two groups. One group will stand at them top of the hill as raindrops. The others will be vegetation and will spread out down the slope forming a pathway - this will be the streambed. The raindrops should try to walk swiftly to the streambed. The students who are plants try to tag the raindrops by pivoting on one foot and using their arms and legs as 'roots' to catch the raindrops. If a raindrop is tagged, it must circle the plant 5 times and then crawl down the streambed. The rocky portion of the slop represents the 'rapids' and students can tumble over the rocks in a white water fashion.

To contrast the rate of water flow downhill on a slope with no plant cover, ask all the raindrops to go back to the top. This time the other students are small rocks and pebbles. The raindrops once again head towards the streambed, but this time skipping over the rocks. As the rocks have no roots this time to catch the water with, they cannot slow the water down by tagging them. Ask which rate was faster of slower and how this might affect the geology of the slope. Then have students switch roles.

Watersheds

We all live in a watershed - the area that drains to a common waterway, such as a stream, lake, wetland and ultimately, the ocean! A water shed is the area of land where all of the water that is under it or drains off of it goes to the same place. John Wesley Powell described watersheds as "that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded they become part of a community". Watersheds come in all shapes and sizes, cross county, state and national boundaries. No matter where you are, you're in a watershed! The Hayden Divide is a great example, as is the Continental Divide.

If you dumped a bottle of your water on the Continental Divide, half would go to the Pacific Ocean via the Colorado River drainage and half would go to the Atlantic Ocean via the South Platte and Mississippi Rivers. The Hayden Divide runs North/South just West of Little Blue. It divides the water into the Arkansas River and South Platte River. It was named after the great explorer, Ferdinand Hayden, who did many geologic surveys of the West and was the first to map the local area.

Watersheds...predict observe and describe patterns.

As you continue hiking, ask students to look for 1 or 2 intersting rocks for this next activity. You will need to stop near a water source such as the Indian Meadows spring tank.

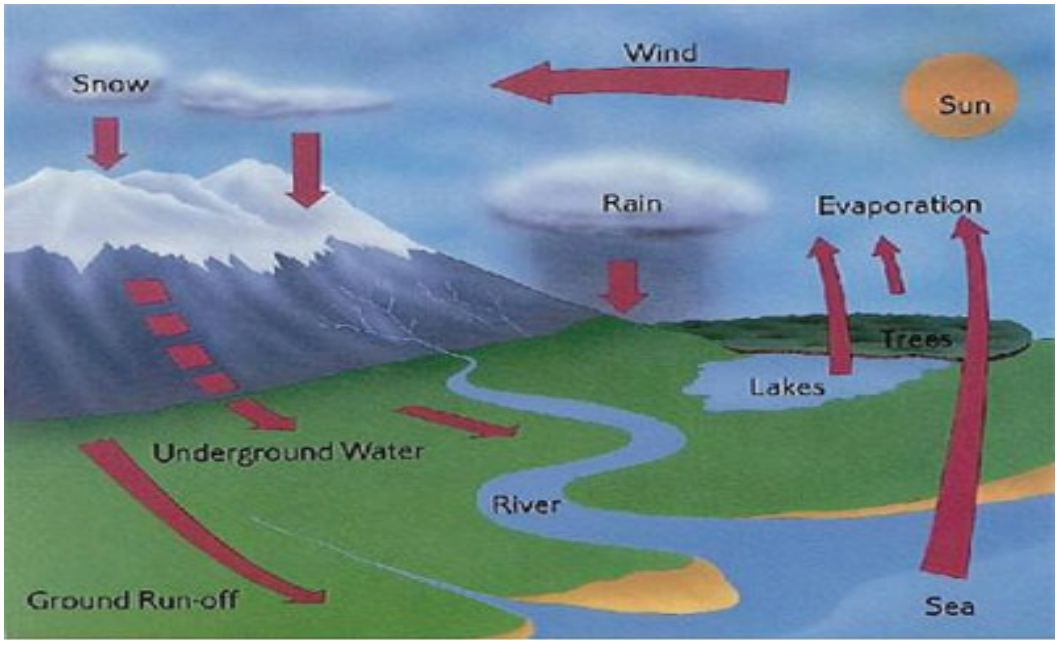
After selecting their rock, students should take a few minutes to investigate where the watershed on their rock will be. Then demonstrate, using a fairly large rock, by pouring water over it slowly and allowing it to create patterns. Explain that on a small scale, this is how mountains and geographic features create what we call watersheds. Not a small house in your backyard where your parents store water, but rather a flow pattern where precipitation and melt off is channeled.

Give students water to pour over their rock, very slowly for the best results. Students can check their predictions against what actually happened.

Why is water so important? Consider these facts:

Water is what _____% of earths surface .
- 70% ocean, 2% fresh, 1.6% polar ice, .36% aquifer
Water is what_____% of human body? (2/3)
How long can a human live without water? (5 days)
An elephant can smell water up to 3 miles away.
Trees are 2/3 water.

** If it is a rainy day or if there is some observable melt off, students can respond to what they see happending naturally as water collects and flows together off rocks, down tree trunks, off their noses!



Ethnographic Study

Students will: 1. Define culture and provide personal examples
Approximate Time: 15 minutes

Think of the difficulties in exchanging information between peoples whose environments and technologies were as different as those of the European explorers and the native peoples whose environments they were trying to navigate. An ethnographer studies a particular human society.

Ask the students:

What elements make up culture?

-religion, language, gender roles, symbols, myths, artifiacts, stories and jokes, legends, clothes, history, ceremonies and celebrations, heroes, attitudes, values, rules, norms, ***examples?***

What artifacts would you want to leave for a future generation, to give them a full picture about your community and everyday life?

If you were a Mandan Indian, would you be hospitable to the Lewis and Clark Expedition? Why or why not?

-yes, Lewis and Clark had many valuable trade items!

Why does Jefferson mention commerce in his request?

Part of President Jefferson's request of Lewis and Clark concerning Indian tribes:

"The commerce which may be carried on with the people inhabiting the line you will pursue, renders a knowledge of those people important. You will therefore endeavor to make yourself acquainted . . . with the names of the nations & their numbers; the extent & limits of their possessions; their relations with other tribes of nations; their language, traditions, monuments; their ordinary occupations . . . and the implements for these; the diseases prevalent among them, & the remedies they use; moral & physical circumstances . . . peculiarities in their laws, customs & dispositions, and articles of commerce they may need or furnish . . . . . the state of morality religion, & information among them;" "Some account too of the path of the Canadian traders from the Mississippi . . . In all your intercourse with the natives, treat them in the most friendly & conciliatory manner which their own conduct will admit ..."

Activities:

Non-Verbal Introduction Game - Sitting in a circle, students pair up with the person sitting next to them and introduce themselves, giving their partner some information about themselves that they believe is interesting, incommon or unknown. When done, the must introduce their partner to the group, but they cannot use words or props...only actions. There can be some hilarious moments, but draw comparisons to how the early explorers must have had a difficulut time communicating with new people they met along the way. For the best use of time, this game should be played in small groups.

For the All-Day:

Social Agility - In this anthropographic observation game, divide students into their four exploration groups. They will be paired with groups from the Indians discovery group when you meet. The Indians will play a game of Staves without communicating. Explorer groups must observe, then determine the rule of the game.

Concluding Discussion

Students will: 1. Discuss and review major concepts in the Explorers discovery group.
2. Recommend ideas for future explorations and resolve to be explorers in their own way.
Approximate Time: 15 minutes

Think about the explorers we have talked about and their accomplishments. So far we have been thinking about exploration in terms of the western United States. Certainly, Lewis and Clark, Fremont, Hayden, Powell, Jedidiah Smith and Pike were great explorers.

Can you think of other explorers before them?

Marco Polo, Columbus, Balboa, Leif Erickson, Magellan, etc... There have also been explorers since then like Perry, Scott and Byrd. All of these people had the courage and strength to explore the unknown reaches of the Earth.

Can you think of any scientific explorations which are going on today?

Space - men have landed on the moon; we have sent satellites to Mars, Venus, Mercury, Jupiter and Saturn and have only begun to explore space.
Oceans - men like Jacques Cousteau and others are beginning to explore depths never before investigated by humans.
Alternative Energies - scientists are beginning to harness the power of wind, sun and biofuels as the specter of the non-renewable resource oil, which we have depended on for over years, diminishes.
Medical technology - Edward Jenner discovered the vaccine which almost eliminated small pox from the Earth. Johan Salk developed the Polio vaccine. Cures for AIDS and cancer are the next in a long line of medical issues.

Can you think of other types of explorers?

Consider explorers in the realm of human relations.

The men who wrote the US Constitution explored new ways for people to work together. People like Mahatma Ghandi, members of the United Nations and Martin Luther King Jr. have helped bring about importatn changes among people.

We are all explorers. Any one of us could go to Mars, or the bottom of the sea; perhaps we could make an important scientific discovery, or maybe become a leader who would show new ways to live together. But whether we become famous or not, we can at least try some new possibilities. Sometimes we feel like the world is out of our control, but in new ways, then nothing can change. If I can't get along with you, how can the whole world get along? We are living in a time when nothing is impossible if we work hard, and work together to make it possible. The exploration of a new age starts with each of us.

After the final discussion the students should have some time to write in their journals. What do they think an explorer is? In what way are they explorers everyday? What, or where would they like to explore?

Explorer All-Day

For the Explorer All-Day, follow the half-day activities as usual but instead of hiking up the candy cane, head down Olin Gulch on the way to the Bat Caves, the final destination for the All-Day. It is not a particulary long walk, but you will need to keep moving in this drection as the students pursue their "Missions". On the way to the Bat Caves, the explorers' missions can be interrupted for a pre-arranged encounter with area Native Americans, outside the Tipi Village.

All-Day Activities

Meet with Indians Discovery Group - Ethnographic Study
Hike to Bat Caves - Decision Making Scenarios
Mapping Activities
Journal Writing

Meeting with the Indians

We have been travelling for some time now when we see the Indian village on the horizon. We know that most encounters between the Indians and early explorers and trappers were peaceful. In fact, Indians helped the Europeans in many was: Providing information about routes, food, dangers, etc... Many explorers relied on Indian scouts at times and spent short periods of timeliving in Indian villages.

Perhaps we too will be able to trade with them for food, clothing or information. What will we be able to offer them in exchange? We have heard that Indians value their bright color and shape for their weavings and decorative dress. Still, we will want to approach cautiously, and show the Indians they have nothing to fear from us. ***What will we do if they surprise us instead? (drop our weapons, show them we are peaceful). Why would they try to ambush us? (Indians had to be cautious - they did have enemy tribes - and would think that it was better to surprise than be surprised). Once our trading is complete, we may want to exchange information about what we have discovered, and ask the Indians what we might expect further down the valley. Are there hostile tribes? Holy ground? What about the animals and any natural hazards? We have heard of amazing cabves - have they seen them?***

Coordinate with the staff person leading Indians to develop the Ethnographic study using the Staves game.

Hike to the Bat Caves

The Bat Caves offer a terrific opportunity for exploring. They are actually crevices and passageways formed by large granite boulders from which the surrounding rocks and soil have eroded away. It's fun to crawl around in the spaced created by these boulders because it feels like you are in a cave.

The best entrance to the caves and tunnels can be found where the stream enters the rocks. Every time you enter the cave a different route can be found. The little pools inside the caves are great for cooling off on a warm day.

Student must be carefull supervised as they explore the passages and a high school leader, teacher or staff member should be with them at all times. Do not allow anyone to leap from rock to rock or climb on dangerous exposures. Remember these boulders are extremely smooth and slick, especially when they are wet.

Decision Making Scenarios...

Break up the hike to the Bat Caves by proposing student solutions to these problems Lewis and Clark encountered on their expedition....a fun way to approach this is to have high school leaders ahead of you on the trail with news of the problematic situation. Cut these sheets up and hand them out to the high school leaders.

Challenge #1

- **A lookout in your expedition party falls asleep on duty. While asleep a flock of ravens steal all your food stores for the next two weeks. How do you deal with the lack of discipline in your troops?**

* In Spring 1805, John Newman, a member of the Lewis and Clark Expedition, begged forgiveness for his mutiny the week before and asked to be permitted to continue on the voyage. After a court hearing on the voyage where he pled not-guilty to 'having uttered repeated expressions of a highly criminal and mutinous nature', Newman was sentence to 75 lashes and discarded as a permanent member of the expedition party. These are harsh punishments. What would you do in the situation above today?

Challenge #2

- Everyone feels like they may be lost. Some members of the expedition want to go back, others want to continue along the trail and a few want to set up camp for the night. There is a need for the expedition party to vote. But who is allowed to vote?

***** On November 24, 1805, Meriwether Lewis allowed all members of the expedition to vote on their winter camp location on the Columbia River, including Clark's African American slave York and Sacagawea, a young Shoshoni woman.

Challenge #3

- One member of the expedition is extremely ill and cannot go on. How do you deal?

Challenge #4

- Support for your mission is drying up. The federal government no longer believes you have the right stuff to get the job done. How can you convince your superiors that what you are doing is worthwhile? What methods do you take to convince others?

Mental Maps and Map-Making

Students will: 1. Analyze how the human brain interprets landform onto paper.
2. Draw maps of the local area.
Approximate Time: 15 minutes

How people recognize, organize, and symbolize familiar territory is called mental mapping. These visual displays of information are unique for each individual There are two basic human methods of mental mapping that we use every day to get around, to locate ourselves: one is by recognizing the real world with its landmarks, the other is by abstracting or imagining what the world looks like from high above the earth's surface--in other words, looking at the world as if we were looking at a map.

The view from the ground...
- Most people
- locating themselves in terms of personal space--left, right, front and back, up or down.
- give and understand directions in terms of landmarks
- How this person would give directions:"See that hill? If you go to that hill and turn left through the woods and across the river, you'll get to where the wooly mammoths live."
- concrete rather than abstract
- make pictographic representations of the world
- When the person with a horizontal perspective wishes to map a forested area, he will most likely draw a bunch of tiny trees. And in demonstrating the third dimension of terrain, he will draw hills and valleys as "flat" features in two dimensional form.
- See Indian Map in Resource Section
- Meriweather Lewis saw the world this way and learned to convert his perspective into a vertical one for purposes of naviigation and mapmaking.

The view from above...
- A minority of people, but can be learned
- The world they carry around in their heads is the same world that they see on a conventional map.
- interpret aerial photographs, satellite images, and conventional maps easily.
- How this person would give direcctions: "Go two miles north, then 0.8 miles west, and the shopping mall will be to the north."
- better at abstract and symbolic mapping rather than pictographic mapping.
- The person with a vertical perspective will show a forested area on a map by surrounding the area with a boundary and then filling it with a pattern or color that symbolizes "forest."
- William Clark, mapmaker for the famous western expedition, constructed his mental maps before his actual maps, fitting everything into an imaginary grid system in his head before putting it down on paper.

Questions to ask:

How do you view the land, from the ground or above?
How do perspectives change?

Activities: Analyzing the Geographic Perspective

People with different experiences see spaces differently. A person's age, educational background and socio-economic status all contribute to the mental maps formed in a person's brain. Ask students to take 5 minutes to draw a picture of their community. Keep your direction for this activity simple and to the point. Some students will draw the entire map of the US, others just their neighborhood. This is a great way to illustrate how we define community.

Mapping practice: students looking across the Valley at Little Blue or in Olin Gulch should try to draw the land in both ways...from the ground and from above...which is more natural to you?

Writing on Nature...

Analysis of Change on the Environment

Leaders ask students to consider how one distinguishes between natural change and human-induced change in the natural environment. Examples from the ranch can be solicited (roads, grazing, fences, trails, buildings) and discussed. Leaders read a few excerpts fout of prominent nature texts such as Walden, Sand County Almanac, Silent Spring, and Desert Solitaire. The group can then examine an area they are hiking through, where there is significant human impact present along with natural change. Student would be prompted to reflect on these influences as a group and then individually and creatively in their journals. Posing the question, "is this change good or bad?" and "How can we tell the difference?" is very thought provoking.

Differing Perspectives....Stephon Long and Charles Fremont

Write a positive or negative appraisal of the land based on your goals...How can your goals shape your life?

Stephen Long, explorer of the Platte River and Long's Peak, called the Great Plains, "the Great American Desert" and discouraged settlement of the West due to indian menace, lack of water, food and resources. Charles Fremont, first to see Lake Tahoe, coined the term Manifest Destiny and promoted settlement of the west. Their writings to the media and friends in politics differ vastly, although they were observing the same regions. Try your hand at writing or arguing from a biased or slanted point of view.

Explorer Resources

Official New Plant Discovery

Plant height _____ ft. _____ in. Leaf length _____ Leaf width _____

Draw a picture of a leaf. Be sure to show the shape, size, stem, edges and any hair.

Draw a picture of a seed.

Is your plant's stem woody? What kind of soil is your plant growing in? (gravel, sandy, clay?)

What kind, where, and how many flowers or seed pods does your plant have?

How do you think your plant spreads its seeds?

What could animals use this plant for?

What could man use this plant for?

Official New Animal Discovery

How large is your animal? Is it an insect, mammal, bird, reptile, amphibian or fish?

What do you think it eats?

What kind of teeth does it have? Biting? Pinching? Crushing?

What do you think might eat your animal?

How fast can your animal move? How many legs does it have?

What color is your animal? Is it camouflaged?

How does your animal affect other animals and plants in the area?

Resources for Zoologist Mission:

PREDATOR-PREY GAME

Materials: blindfolds, film canisters with beans/gravel

Ask students:
What is an animal that hunts other animals called?
Predators - an animal that hunts, kills and eats other animals.
Prey - an animal that is killed and eaten as food.
*Some animals can be both predator and prey...Can you think of any? (snakes)
What are some examples of predators and prey found in the Montane Life Zone?
Predators = Coyote, Raptors, Badger, Mountain Lion
Prey = squirrels, rabbits, prairie dogs, birds, frogs, etc...

Let's use the Bat and Moth as examples of Predator and Prey for the game.

1. Select an open area and form a circle.
2. Choose two students, one to be the bat and the other to be the moth.
3. Blindfold the bat, give both noise shakers, and place both in the middle of the circle.

Bats 'see' by something called ecolocation. They will make a faint sound and the sound waves will bounce back to them, enabling them to discern objects like trees, rocks, even food. Moths have adapted to ecolocation over time by developing a light layer of dust on their bodies to smother the sound waves.

4. How the game works is that the bat is trying to tag the moth. Everyone in the circle needs to be quiet.
5. To figure out where the moth is, the bat must shake his/her shaker. The moth must respond.
6. When the moth is eventually tagged, switch roles with volunteers from the circle.

Debrief:
- During review and at the end of the game, ask students to define a predator; could also do drawing.
- During review and at the end of the game, ask students to define a prey animal; could also do drawing. - -
- During game, review with students how the prey animal can avoid being caught.
- During game, review with students how the predator can become more successful.

Supplement for Life Zones:

COMMUNITY GAME

Questions to introduce game:
What is a community? Have you heard the term Niche? What is your role in the different communities you are a part of? Does your role change? How?
Somebody give me the name of a business in your town....how does it fit the needs of your community?
What does the term niche mean?

- a niche is the ecological role of an organism in a community

1. Hand out organism and community cards. (Make these out of notecards using the organism/community lists below as a guide.
2. Instruct students to find a match. Explain why they are a match and what role the organism has in that community (in other words, what is the organism's niche). *You may need to help talk students through the connections and roles of their organisms
3. Student pairs then need to find another pair that would be 'in their community'.
4. Repeat until all students are one big group to emphasize the idea of interconnectedness.

Organism	**Community**
Red-Tailed Hawk	Montane Life Zone
Human	City
Fungus	High Alpine
Mosquito	River
Coyote	Desert
Mango Tree	Tropical Rainforest
Grass	Plains
Deer	Island
Water	Coastal
Earthworm	Soil
Bat	Cave

Mapping supplements: