

Night Hike

Concepts:

1. The low light environment can best be explored by using all senses.
2. Nocturnal animals have specific adaptations allowing them to succeed in the dark.
3. Darkness and nocturnal animals are unappreciated and misunderstood by many people.

Outline:

I. Preparation Before Activity (30 min.)

II. Introduction (10 min.)

- A. Greeting, Grabbing, and Purpose
- B. Names and Introductions
- C. Activity Description
- D. Behavior Guidelines
- E. Task Analysis/Learner Assessment

III. Sensory Observation (20 min.)

- A. Feel Your Way Around
 1. Featured Tonight
 2. Night Sensory Trail
 3. Blindfold Hike
- B. Don't You See It?
 1. Light and Color
 2. The Brightest Light in the Universe
 3. Lifesavers
- C. Natural and Un-natural Sounds
- D. Are You "Scent"sible

IV. Individual Exploration (10 min.)

- A. Solo Sit
- B. Story Telling

V. Nocturnal Animals and Other Creatures (20 min.)

- A. Eyes That Glow in the Night
- B. Animals of the Night
 1. Owls
 2. Bats
 3. Rattlesnakes
 4. Frogs
- C. Adaptation Games
 1. Owl/Prey
 2. Bat/Moth
 3. Firefly Tag

- VI. Star Gazing (20 min.)**
A. Using the Planisphere
B. Constellations of the Season
C. Make your own Constellation

VII. Conclusion (10 min.)

VIII. Clean Up (15 min.)

IX. Fact Sheet

- X. Appendix**
A. Equipment
B. Glossary
C. Activity and Safety Management
D. References/Resources
E. Selected Stories

Night Hike

I. Preparation Before Activity

Talk to your liaison before leading the night hike. If time permits, plan the route ahead of time and hike it during the day to look for potential problem areas (low branches, extremely uneven trails, roots, stumps, etc.) and interesting features along the planned route. If you don't have time for the day hike, there is a suggested route marked on an Eagle Bluff trail map included with the Night Hike kit. Choose and plan your activities from the suggested sections to make your night hike unique. (There are more activities than you will have time to do.) Because you will be stopping often to do activities, a short loop that ends where it begins is usually sufficient. The activity "Featured Tonight" requires a daylight walk to pick features. The leader will also want to have all materials gathered for the chosen activities.

Some of the activities require the use of the flashlight that is provided in the kit. Night hikes where students bring their own flashlights along generally end up being focused on the flashlights either by losing them, arguing about them, or shining them in each other's eyes rather than focusing on the night hike and the planned activities. The leader, however, should have a flashlight in case of emergency. The Dynamo winding flashlight is included in the kit and there are directions attached to the Night Hike kit. One minute of winding generates up to 30 minutes of light.

Because of seasonal daylight variation, some of your night hike may have to be done during daylight hours. For many of the activities, blindfolding students can simulate total darkness. However, the three sensory observation activities under the heading "Don't You See It?" should be done without blindfolds, and in as dark of conditions as possible. Save these activities until the end of the hike if daylight is an issue.

Here are a few tricks of the trade for leading hikes in the dark:

- Watch the sky. Wide trails have a slot opening in the treetops that can help you along the trail.
- Pay attention to the feel of the trail beneath your feet. Grass, leaves, dirt, twigs, and gravel all have their own feel.
- Appoint a "sweep" person. Pick an adult to be stationed at the back of the group. This person makes sure that no one has dropped behind or gotten lost. This also helps you know when everyone has caught up at a stopping point.
- Trail intersections are good places to stop for activities.

II. Introduction

A. Greeting, Grabbing, and Purpose. Introduce the "Night Fears Brainstorming and Poetry" activity by discussing some common fears about the night and how they might have come to be (i.e. some students may be afraid of the dark because they hear new, strange noises that they weren't aware of during the day). Have the students list one or two words or phrases on the board describing their feelings about the night. Read the words in random order as a poem. You may have some things like: spooky, scary, quiet, dark, can't see, scurrying creatures, vampires, peaceful, etc.

As an extension at the end of the hike, use all the thoughts and words on the board and have students write a piece of poetry or a short story incorporating all the things on the board.

B. Names and Introductions. Tell the class a little bit about yourself and then go around the group to become familiar with each student. Be creative: learn names all at once or a few at a time. Use a method that suits your style. Explain that you will be teaching the class and that the other adult chaperones may be assisting at times.

C. Activity Description. Explain to the class that they will be going on a hike along the trails at night. There will be times when we stop along the way to do activities that will help us to better understand and appreciate night time, our senses, darkness, and the creatures that are active during the night.

D. Set Behavior Guidelines. Discuss clearly and specifically which behaviors you expect from your students during the class. Explain the need for respect: for you, for each other, for the equipment, and for Eagle Bluff itself. Mention the importance of keeping quiet so all students can hear directions and so that we might hear evidence of some of the nocturnal animals. You might decide on whisper voices through the duration of the hike. Reinforce the idea that in low-light situations, and especially when a student is blindfolded, actions and behaviors that may be appropriate during the day can be dangerous. Instruct students to stop and stay where they are if they become separated from the group. The best way to keep the group together is to have adult chaperones in the front and back of the group and not allow students to be in front of or fall behind the adults.

E. Task Analysis/Learner Assessment. Ask students to list some reasons why they or others are afraid of the dark.

III. Sensory Observations

It is common that when one of our senses is diminished or taken away, the other senses are heightened to compensate for the loss. During a night hike, when sight (the sense we rely most heavily on to orient ourselves) is reduced, we must use our other senses to form a frame of mind in which we feel more comfortable. The following activities help students to use all of their senses to explore the nighttime environment and can enhance appreciation of the natural world around them.

A. Feel Your Way Around. Without our sense of sight, we often feel disoriented and have difficulty keeping a bearing of where we are. One way to compensate for the absence of sight is by using our sense of touch. If we can feel something with our hands or beneath our feet, it can be reassuring and provide us with a sense of where we are. Also, using our sense of touch can enhance our appreciation of the natural things around us. By feeling the texture of tree bark or a mossy rock, we can experience these natural objects in a way that is more intimate and insightful than simply looking at the object.

- 1. Featured Tonight (10 min.)** Find a strange geological or biological feature (tree bending around another tree, rock, rotting log). Have the students approach it, touch it, and see if they can figure out what it is or why it is as

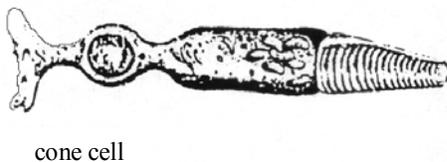
it is. This is a quick activity to get students to realize that they cannot always trust their eyesight, especially at night where they must use as many of the senses as possible for investigating around them.

- 2. Night Sensory Trail (15-20 min.)** Along the suggested night hike route, (southwest of Discovery Center on night hike map) a length of rope that travels along a tree, across a log on the ground, around a stump, etc. has been set up along the trail. Have students pair off and instruct one student to put on a blindfold. This student will grasp the rope and follow it along its path. The student's partner will follow closely along to prevent the blindfolded student from injury. They need to use their sense of touch to discern where they are and how to get through the course. Other rules are posted at the entrance to the trail. Please follow all safety guidelines.
- 3. Blindfold Hike (20 min.)** Have the students pair off; the first student will be blindfolded (to explore and discover things in a new manner) and the other will be the guide (responsible for the safety of the blindfolded person). Lead the group over different types of terrain asking students to guess where they are going. Have them study a tree and tell all they can about it by using all their senses but sight, or ask them which direction they are traveling. Have the students switch roles.

B. Don't You See It? The human eye can see colors remarkably well during the day. Although our night vision is not as good as most nocturnal animals, our eyes are still able to adjust amazingly well to changes in light levels. These activities demonstrate some of the differences in how our vision works in light and dark conditions.

- 1. Light and Color (10 min.)** Give each student a small scrap of paper and a crayon. Have them examine the crayon and determine its color. (Stick to dark, basic colors like blue, orange, red, brown etc. that have the wrappers removed.) Tell them to write their answer on the piece of paper. They will most likely be wrong. Have the students keep their paper for the duration of the hike, but collect the crayons. You can check to see who was right and who wasn't at the end of the hike back at the building. (The guess will be written in the color of the crayon.)

Explanation: Colors are nearly impossible for humans to see at night. We have two types of cells in our eyes called rods and cones. Rods are light sensitive cells helpful with seeing at night and cones allow for seeing in color. Humans have many more cone (color) cells than rod (night vision) cells; therefore, our color vision is great (during the day) and our night vision is poor. The only other animals that can see colors nearly as well as humans are diurnal (active during the day) birds. How do we know this? Many female birds choose their mates by the bright coloration of the males. Owls on the other hand, have mostly rods in their eyes so their low-light vision is very good.



Structure of Rods and Cones. The photoreceptors of the vertebrate eye.

2. **The Brightest Light in the Universe (5 min.)** Tell the students that they are going to see the brightest light in the universe. Have them stand in a circle and cover one eye - it doesn't matter which one. (Tell them to cover it well so that no matter what, no light will enter that eye.) Students should leave the other eye open. Explain that you are going to light a match (or candle) and you want them to stare at the flame until you blow it out (10 - 15 seconds). Light the match. After you blow it out, have the students open and close each eye, switching from side to side. Ask students to describe any differences between what they can see with the eye that was covered and with the uncovered eye.

Explanation: Looking with what had been their covered eye, things should appear clearer and brighter. This is due to a chemical called rhodopsin. Our eyes produce this chemical in low-light situations to improve our night vision. In fact, within five minutes of being in the dark, we can see 1000 times better than when we initially went into the dark. When our eyes are exposed to light, all of the rhodopsin we have been producing is instantly destroyed, making our night vision poor again. Our eyes will not be able to produce the rhodopsin again until we are out of the light.

3. **Lifesavers (5 min.)** Have the students form a circle. Pass one (please use only one per student) wintergreen lifesaver to each student. Tell them to put the lifesaver in their mouth and chew with their mouths open! (Something they aren't allowed to do at home). Look in each other's mouths and observe what is happening.

Explanation: The lifesavers will spark. Why? The following explanation is from Discover Magazine, December 1988: The sparks, which are essentially bolts of lightning in your mouth, have been studied by Linda M. Sweeting, a chemist of Towson State University in Baltimore. Plenty of other substances (most you wouldn't want to put in your mouth) also give off light when they are rubbed, crushed, or broken.

This is called triboluminescence (try-bo-loom-in-es-cents; 'tribein' means "to rub" in Greek). Some crystals of quartz and mica triboluminesce. So does adhesive tape when torn from certain surfaces. (Have you ever peeled a wrapper off of a Band-Aid in the dark? Try it!)

When sugar is fractured (in the case of chewed lifesavers), separate patches of charge, either positive or negative, form on the new surfaces or on opposite sides of cracks. The difference in charge compels electrons to leap across the gap, back and forth, and neutralize the patches. When these jumping electrons come in contact with nitrogen in the air (our air is 78% nitrogen), they cause the nitrogen to emit tiny blue-white bolts of light at the same wavelength as natural lightning.

Sweeting discovered that when candies containing both sugar and wintergreen are crushed, an additional wavelength is emitted. Wintergreen, however, is not triboluminescent. It is fluorescent, like the paint on a black-light poster. It absorbs ultra-violet light and re-emits it as light our eyes can see. When the candies are cracked, some of the light emanating from the sugar is ultra-violet, which gets absorbed by the wintergreen and re-emitted as bright, blue-green light. A more simple way to explain this phenomena is when the sugar crystals break, they release a weak burst of ultra-violet energy. This energy excites the molecules of the wintergreen oil in the lifesavers and causes the oil to glow, or fluoresce. A similar effect can be seen when two pieces of quartz are struck together.

C. Natural and Un-natural Sounds (5 min.) For many animals, keen hearing is essential to their survival. Nocturnal animals, especially, often have a highly developed sense of hearing to help them locate prey or to warn them of approaching predators. In the dark, humans tend also to depend more heavily on sound. We are able to hear many things around us at night that we are not able to see. For example, it is common to hear the hooting of an owl in the woods around Eagle Bluff, but it is a rare treat to actually see one.

On the side of the trail, along the suggested night hike route, is a parabolic listening ear that allows us to hear even quiet sounds from a far distance (the location is marked on the night hike

map.) Allow students to listen through the ear for a short while, one at a time. The rest of the group should be assembled on the trail quietly listening. After identifying sounds, have the students decide whether the sounds are natural (made by animals or plants) or un-natural (made by people). Next, point out sounds the students may have missed. Listen for natural sounds like owls hooting, trees squeaking, wind in trees or grass, water gurgling, ice cracking, falling objects, etc. Some un-natural sounds are radios, cars, people talking, airplanes, etc. Another option is to define boundaries in a safe area that was selected in the daytime and have students determine where the sounds are coming from and follow them.

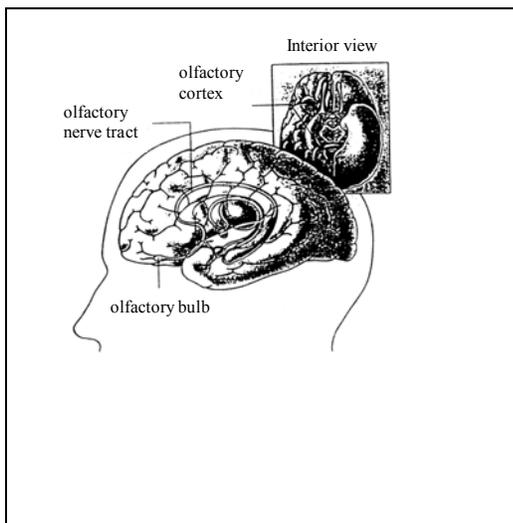
Explanation: Sound travels more easily through the cool, calm, moist night air. Also, we are more acutely aware of sounds as our attitudes and perceptions change due to the darkness.

D. Are You "Scent" sible? (5 min.) Many animals, especially predators, have developed an acute sense of smell to help them locate prey. Predators that are active during the night such as wolves and coyotes depend heavily on smell to locate food or prey that may be too far away to see. At night, we may be able to recognize the smells of familiar natural features to help give us a sense of where we are. The refreshing smell of pine or the infamous scent of a skunk are just a few of the familiar scents you may encounter on your night hike.

Encourage students to smell the night air and see if they can identify any scents. Be alert for the scent of animals such as skunk or even deer musk. Have them find and describe various smells around them such as soil, a rotting log, or different plants.

Pass around the numbered scent containers in the night hike kit. When all of the students have had a chance to test the scent, have the group share their guesses. An answer card is included with the scent containers.

Explanation: The following explanation is from National Geographic, September 1986: Odors are volatile molecules. They float in the air. When you sniff, they rush through your nostrils, over spongy tissue that warms and humidifies the air, and up two narrow chambers where, just beneath the brain and behind the bridge of the nose, they land on a pair of mucus-bathed patches of skin the size of collar buttons. Here, in a process that's still a mystery, the molecules bind to receptors on tiny hair-like cilia at the ends of the olfactory nerves, or neurons, which fire the message to the brain. The signal crosses a single neural connection, or synapse: at the olfactory bulbs. (Sensations of sight, sound, and touch reach the limbic lobe less directly, across more synapses.) The amount of brain tissue in humans devoted to smell is still very great. Although we don't seem to be very aware of smells, they have a very privileged and intimate access to those parts of the brain where we really live. (Dr. Michael Shipley, a neurobiologist at the University of Cincinnati College of Medicine.) (See appendix E.4.)



The Sense of Smell. The sensory pathway leading from olfactory receptors in the nasal cavity to primary receiving centers in the brain.

Assessment: The low light environment can best be explored by using all senses.

- Listen to student comments as the group first goes out into the dark. Are students afraid? Disoriented? Uncomfortable?
- During sensory activities, does the group rely on senses other than sight to explore and learn about their surroundings?

IV. Individual Exploration

Many times, the most profound and meaningful experiences that we have are due to the time spent alone. We all know the satisfaction of solving a problem or discovering something on our own. In addition, solitude in nature provides a more intimate connection with the environment around us. These activities encourage individual discovery and introspection.

A. Solo Sit. (10-15 min.) Spread the students along the trail, sitting them alone in a place away from other students. Place a chaperone at the beginning of the group and at the end. Have them sit quietly for 5 to 10 minutes. Gather the students in a circle and ask each to share what they saw, heard, and how they felt.

B. Story Telling. (5-20 min.) Story telling is one of our oldest and most sacred human traditions. Be creative. There are many Native American legends dealing with stars, the moon, owls, night, etc. Use props and involve listeners for a more complete sensory experience. People of all ages LOVE stories. Tell a story that you know or share one of the stories included in the appendix. A story can be told along the hike or at the beginning or end. If there is time during the day, select a spot along the route that could serve as a natural theatre or backdrop for the story.

Perhaps you have a favorite story of your own to share or have students make up a story by going around in a circle and allowing each student to add a few sentences as you go. Start the story with an introduction such as ..."It was a dark and stormy night...", "It was a long time ago, in a place not unlike this...", or even the famous "Once upon a time...". (If you have students that are very uncomfortable in the dark, you might want to remind students that the night hike is not a time for ghost stories and scaring people.) A few stories are provided in the Appendix. (X. E.)

V. Nocturnal Animals and Other Creatures

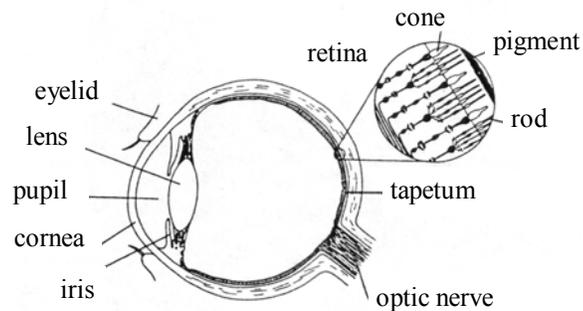
Spending time outside at night can make many people nervous, uncomfortable, or even afraid. This may be due to the fact that humans are not physically adapted to dark environments. Nocturnal animals, however, have developed specific physical and behavioral adaptations that allow them to be successful in the dark.

A. Eyes That Glow in the Night. Throughout the hike, periodically use a flashlight to try and catch the eyeshine of different animals. (Be aware that the use of a flashlight will affect the night vision of the whole group.) Eyeshine is the ability of the tapetum lucidum (a part of the

retina) to reflect light. (See Appendix E.3.) The light is reflected off of the back of the eye and passes back through the retina to increase the eye's efficiency in low-light levels. Eyeshine is stronger in nocturnal hunters than in diurnal ones. The following is a chart of relative eyeshine strengths:

<u>Iris Color</u>	<u>Animal</u>	<u>Color of Eyeshine</u>	<u>Relative Strength</u>
yellow	Screech Owl	red	weak
yellow	Great Horned Owl	red	medium
yellow	Long Eared Owl	slightly red	strong
yellow	Snowy Owl	slightly red	medium
brown	Barred Owl	red	strong
brown	Barn Owl	red	weak
Various	White-tailed Deer	silver-white	strong
Various	Fox	red	medium
Various	Rabbit	red	medium
Various	Cat	red	strong

Cross-section of the mammalian eye. The retina contains the rod and cone photoreceptor cells allowing us to see light and color. The tapetum lucidum reflects light back over the retina to improve night vision. This reflected light is what causes the eyeshine seen in nocturnal animals.



B. Animals of the Night. Nocturnal animals have all developed adaptations that help them to survive in low-light conditions. These adaptations may allow an animal to find prey, avoid a predator, find a mate, or succeed by avoiding competition with an animal that is active during the daytime (ex. owls and hawks).

1. **Owls.** Owls localize sound in an amazing but fairly simple manner. Of all land animals, owls are the best at locating a moving target in three-dimensional space. While a human is as good as an owl at identifying the source of a sound in one plane (e.g. to the right or left while standing on the ground), owls are far better at localizing sounds that come from above or below. This superior ability is based on the asymmetrical positions of the owl's outer ears. A person can tell if the sound comes from the right, left, or straight ahead because a sound from the left strikes the left ear first, and the brain interprets this as direction. Owls can do the same, but can also localize sounds above or below their heads because the left ear is much higher on the head than the right. Sounds from above will thus strike the left ear first while sounds from below will strike the right ear first. The brain compares the difference and interprets the source of the sound as above or below the owl.

- 2. Bats.** Some bats employ the technique of echolocation to determine where things are in relation to themselves. They emit a steady stream of approximately ten clicking noises each second called ultrasounds. Bats hear extremely faint echoes of ultrasounds as they return from distant objects. When the bat hears a pattern of echoes from an airborne insect, it increases the ultrasounds to as many as 200 per second. There are only a few milliseconds of silence between clicks, but in that blip of silence the bat's receptors detect the echoes. The signals are sent to the brain where they are processed and decoded. The brain creates a "sound map" that the bat uses to maneuver and capture the insect without even seeing it.
- 3. Rattlesnakes.** The rattlesnake and other "pit" snakes use thermoreceptors to help them hunt at night. The thermoreceptors are located in pit areas around the snake's mouth. The receptors are sensitive to the body heat (infrared energy) of its prey, which are much warmer than the night air. They notify the brain, which assesses the signals and determines the location of the prey. The snake can then strike with precise accuracy without even seeing the prey. The same snake, however, may slither past a motionless but edible frog. The frog's skin is cool and blends in with the background colors. The snake does not have receptors to detect it or a neural program responding to it.
- 4. Frogs.** Certain species of frogs use sound frequency to communicate with local populations, even in the dark. The ears of the female cricket frog are sensitive only to a very narrow band of frequencies specific to their locality. The calls of the males also vary geographically (similar to different groups of humans having a particular dialect). A female's lack of response to a distant male's "dialect" may be due to a mismatch between her ears and his call. She may be deaf to the frequency of his calls. Thus, the males and females of the same locality are able to locate one another and communicate without disturbance or interference from frogs in a different locality even if they are the same species.

C. Adaptation Games. The adaptations of nocturnal animals are sometimes difficult to understand because they are so different than what we are used to experiencing as humans. Several of the unique strategies used by animals to survive in a dark environment can be modeled through games. These games can provide a break for students who have been quietly experiencing the nighttime world.

- 1. Owl / Prey.** Discuss how owls use sound in locating prey. Have two people designated as owls. They stand facing each other on opposite sides of the trail with flashlights. The other people are mice and will try to sneak past the owls that are blindfolded. When they hear a mouse, owls flash their light on the sound. If the "mouse" is hit by the flashlight beam, they have been caught. (You may have to act as the official for any decisions.) This activity can also be done in the daylight if students point rather than use a flashlight. Discuss how different environmental conditions (rain, wind, snow, etc.) would affect the catch rate. Also, discuss the impact of noises from different ground cover (i.e. dry leaves versus hard-packed trail).
- 2. Bat / Moth.** Choose a flat, open area free of obstructions for a playing area. Have three or four students designated as bats and the rest as moths. Bats and moths will have to make some sort of sound (clicking noise, hand clapping, finger snapping). Have the moths scatter over the area. The bats (blindfolded) will make the sound and then the moths return the sound to simulate the sonar effect. After each click, the moths can take one step. The bats can move freely and must close in on the moths for the capture. Touching the moth completes the capture.
- 3. Firefly Tag.** Choose an open area for play. One player with a flashlight is the firefly and everyone else tries to catch them. The firefly must occasionally reveal its position by flashing the light. Whoever catches the firefly becomes the firefly in the next round.

Assessment: Nocturnal animals have special adaptations allowing them to succeed in the dark.

- Does the group search for any nocturnal animals? Are they especially quiet? Do they search for eyeshine?
- Ask the group to compare and contrast the senses and adaptations of nocturnal and diurnal predators.
- Review the adaptations the students used in the preceding games. Have the class connect the adaptations to the senses they are enhancing or for which they are compensating.

VI. Star Gazing

If the weather and time of year permits, star gazing can be a terrific addition to the Night Hike. If the stars are visible pick a spot to stop along the way free from lights and trees where much of the sky is unobstructed. The field by the Sensory Awareness Trail or the trail intersection by the boot shed are two suggestions.

A. Using the Planisphere. (From the back of the planisphere)

The Planisphere displays the positions of the stars on any day of the year at any time you choose. To use:

1. Rotate the Top Disc to align today's date with the time at which you want to observe. The Planisphere shows the sky as it will then appear.
2. Hold the Planisphere high in front of you. The gold border surrounding the map of the sky represents the horizon. Turn the **entire** Planisphere so that the direction you're facing is now at the bottom of the Planisphere.
3. Compare the map to the sky. The center of the map shows the stars directly overhead. The larger the star's symbol on the map, the brighter it appears in the sky.

Example: Face North. Hold the Planisphere over your head so that the arrow labeled *North* is pointing North. Can you find the seven-star pattern called the **Big Dipper (in Ursa Mayor)**? Or try **Cassiopeia**, the five-star pattern that resembles the letter "W"? *Don't forget:* Between April and October, when Daylight Saving Time is used, Planisphere times are one hour behind your clocks!

The Planisphere also has a chart that predicts the location of the visible planets. Venus, Jupiter, Saturn, and sometimes Mars can be very bright and easily stand out among the stars in the sky.

B. Constellations of the Season. Due to the rotation and revolution of the Earth, the stars seem to change with the seasons. From our perspective the stars seem to rotate around the star Polaris (the North Star). The constellations closest to Polaris can be seen year round and are called the circumpolar (because they circle the pole star, Polaris). Other constellations rise and set with the changing seasons.

Circumpolar constellations

(visible year round):

- Ursa Minor (the Little Dipper)
- Ursa Major (contains the Big Dipper)
- Cepheus – SEE-fee-us
- Cassiopeia – KAS-ee-oh-PEE-ah
- Draco – DRAY-ko

Winter Constellations:

- Orion – oh-RYE-un
- Taurus – TOR-us
- Auriga – oh-RYE-gah
- Gemini – GEM-in-eye
- Canis Major – KAY-niss MAY-ger
- Canis Minor – KAY-niss MY-ner
- Pleiades – PLEE-ah-deez

Spring:

- Leo – LEE-oh
- Bootes – bo-OH-teez
- Corona Borealis – kor-OH-nah bo-ree-ALICE
- Hercules – her-Q-lees

Summer

- Sagittarius – saj-ih-TAIR-ee-us
- Scorpius – SKOR-pee-us
- Cygnus – SIG-nus
- Lyra – LYE-rah
- Aquila – A-quill-ah

Fall

- Pegasus – PEG-uh-sus
- Andromeda – an-DROM-eh-du

C. Find Your Own Constellation. While looking through the sky the imagination can easily pick out other shapes and patterns in the stars. Ask the students to be creative and make their own constellation. Have them give their constellation a name and ask them to come up with their own story to share with the rest of the group.

VI. Conclusion

One of nature's most spectacular daily events takes place as day turns into night. When the sun sinks down below the horizon, the familiar becomes something mysterious. A large number of seemingly strange and unfamiliar animals awaken and begin their preparations for the night's activities of gathering food, hunting, mating, or calling to one another. These nocturnal animals live in a world that may seem frightening or unusual to us, but they are superbly adapted to life in the dark of night. Their bodies and habits are perfectly suited to survival at night.

Human exploration and observation of the nocturnal world can lead to insight and appreciation of nature. However, it can be a challenging task as we find ourselves in a dark and uncomfortable world that we are not used to experiencing. Our sight is diminished and we must use all of our other senses to simply walk, let alone observe the creatures of the night and their habits.

Review the activities in class. Ask the group how they feel about the night and the dark. Did some students' personal feelings change? Encourage students by telling them that it is natural to feel uneasy when you are in an environment that you are not accustomed to. However, understanding the night time and nocturnal animals can open doors to a new world full of wonder, mystery, and enjoyment that most people do not take the time or effort to understand and appreciate.

Assessment: Darkness and nocturnal animals are unappreciated and misunderstood by many people.

- Does the group's comfort level seem to increase as the hike progresses?
- After the last activity, tell the group to search for as many signs of nocturnal animals as they can find. Do the students look in different places than before? Do they listen quietly without moving?

VII. Clean Up

Make sure that all materials taken along on the hike are accounted for and haven't been left on the trail. This may involve walking the trail the next day if anything is missing. Return all the materials to the Night Hike kit. Inform the liaison of any of the supplies that are low (i.e. wintergreen lifesavers, paper squares, matches, etc.) If you've used classroom space, be sure to stack chairs, erase the board, etc.

VIII. Fact Sheet

- Although we cannot hear bat cries, the sound waves produced are not weak. The cries have been measured at 100 decibels (about the same intensity as thunder booming overhead or a freight train rumbling past.)
- Unlike brain neurons, which last a lifetime, olfactory neurons turn over every one or two months.
- How We Hear - Sound waves vibrate the eardrum, then three small inner ear bones, and finally, fluid in the coiled cochlea. Stereocilia on the hair cells of the cochlea move in response to sound, and the hair cells convert this mechanical movement into an electrical signal that crosses a synapse and triggers a sensory neuron. This neuron, in turn, sends a message to the brain that a sound has been received.
- One might suspect that the large eyes are responsible for the owl's hunting prowess (the great gray owl in particular). In fact, the owl's night vision is no better than that of some people with particularly good night vision. A simple experiment disproves the primacy of vision in the owl: If an experimenter ties a dry leaf to a mouse's tail and places the rodent in a dimly lit room with an owl, the rodent will scurry about and the bird will pounce - not on the prey but on the rattling leaf.
- An experimental subject tends to recall the visual details of a given painting with almost 100 percents accuracy, but will forget the details within three months. The same subject will recall a series of odors with only 80 percent accuracy, but the accuracy remains at that level for a year or more. An odor, once remembered is rarely forgotten!
- Different senses and different behaviors can be localized to specific regions or groups of regions in the brain. The human brain is the most intricately organized entity in the universe, and it is this structural organization that allows the brain to work.
- Sense organs contain bare nerve cell endings modified in ways that increase their sensitivity to one physical aspect of the environment.
- Sensory Reception and the Brain - Some brain regions that play key roles in memory include sensory reception areas. Sensory input is processed by the cerebral cortex and sent to parts of the limbic system and the forebrain. The limbic system, or "emotional brain," includes regions called the thalamus, hypothalamus, amygdala, and hippocampus.
- Rods and Cones are the photoreceptors of the vertebrate eye
- Sense of Smell can be defined as the sensory pathway leading from olfactory receptors in the nasal cavity to primary receiving centers in the brain.

IX. Appendix

A. Equipment

- Dynamo flashlight
- Blindfolds (10) in bag
- Eagle Bluff trail map (with suggested route)
- Scent containers (4) in bag
- Plastic box containing:
 - Crayons (at least 25; various colors)
 - Lifesavers (2 rolls of 14)
 - Paper squares (at least 25)
 - 1 Candle
 - 2 Matchbooks

Also in Tub:

- Folder with paper squares
- Lesson plans (5)

B. Glossary

Cones: light receiving cells found in mammalian eyes that respond to bright light and contribute to sharp daytime vision and color reception.

Diurnal: relating to the daytime, referring to animals that are active during the daytime.

Echolocation: process of sending out signals and receiving their echoes to determine the location of an object.

Electrons: very light particle associated with the charge of negative electricity, a part of an atom.

Eyeshine: the ability of an animal's eyes to reflect light frequency (the number of vibrations or cycles in a unit of time).

Olfactory: of, pertinent to, or connected with the sense of smell.

Neuron: nerve cell with all of its processes, basic unit of communication in the nervous system.

Nocturnal: relating to the night time, referring to animals that are active at night.

Retina: sensitive membrane of the eye that receives the image formed by the lens and is connected with the brain by the optic nerve.

Rhodopsin: chemical created in the eye to increase the clarity of night vision.

Rods: long rod-shaped sensory bodies in the retina, sensitive to faint light and responds to coarse reception of movements (by detecting changes in light intensity across the field of vision).

Synapse: the point at which a nervous impulse passes from one neuron to another.

Tapetum lucidum: clear membranous layer found at the back of the eye that reflects light back over the retina to improve night vision (responsible for the reflection of light that we see as eyeshine)

Thermoreceptors: sensory cell that can detect radiant energy associated with temperature.

Triboluminescence: luminescence resulting from friction.

Ultrasounds: sounds emitted by bats, higher frequency than humans can hear.

C. Activity and Safety Management. Check students for proper clothing before leaving for the hike. Bring at least two bottles of water. Check the Dynamo flashlight before class. Set clear and concise boundaries. Encourage students to remain within sight of you while exploring. Choose a route within your group's abilities. Have adults in the front and back of the group. Instruct students to stay where they are if they become lost and to call out so that people can follow the sound. Periodically count the number of students to make sure that all are present. Emphasize the need for safety precautions due to the dark. If students are blindfolded there should always be someone assigned to keep the person away from danger. Keep track of equipment you are using during the hike and make sure that it is returned to the liaison when you are finished.

D. References/Resources

Caduto, Michael and Bruchac, Joseph; Keepers of the Earth; 1989

Caduto, Michael and Bruchac, Joseph; Keepers of the Night; 1994

Discover; "Mouth Lightning"; December 1988

Eagle Bluff ELC; Night Hike Ideas; Lesson Plan, 1997

Gibbons, Boyd; "The Intimate Sense of Smell"; National Geographic, September 1986

Novick, "Alan; Bats Aren't All Bad"; National Geographic, May 1973

Postlethwait, John; The Nature of Life; 1989

Sanborn Western Camps; A Bag of Tricks: Creative Activities

Starr, Cecie; Biology: The Unity and Diversity of Life; 1992

Tiser, Gene; Night Hikes; Lake Michigan District Naturalists

E. Selected Stories

1. Chipmunk and the Owl Sisters
2. How Coyote Was the Moon
3. How Fisher Went to Skyland: The Origin of the Big Dipper
4. How Bat Came to Be
5. The Great Lacrosse Game
6. Stلالuna by Janell Cannon (available at Eagle Bluff's library)

The following story can be found in Keepers of the Night
By Michael J. Caduto and Joseph Bruchac.

Chipmunk and the Owl Sisters

(Okanagan [Colville] – Plateau)

Glossary and Pronunciation Key:

Okanagan (On-kah-nah'-gun). Name for a Native people of the Pacific Northwest. The Colville are a division of Okanagan. Okanagan is usually translated as "People Who See to the Top." The traditional territory of the Okanagan people is located in present-day eastern Washington. The contemporary Colville Reservation, in Nespelem, Washington, incorporates Okanagan and nine other Native tribal nations.

Chipmunk lived with her grandmother in a lodge near the woods. Her grandmother was old and weak and could not gather food for herself. So she sent Chipmunk to pick berries.

"Grandchild," she said, "go into the forest and pick twelve berries. That will be just enough for us. Do not eat any until we have thanked the Creator for giving us our food. And do not stay too long among the berry bushes. When night comes, the Owl Sisters hunt near there. If they catch you they will eat you."

"I will do as you say, Grandmother," Chipmunk said and she went into the forest with her berry basket. Soon she reached the berry bushes. She climbed up into them and began to pick. Before long she had picked eleven berries. But just as she picked the twelfth berry, she dropped it. When she reached down to pick it up, she brushed against some berries which were so ripe that the sweet juice covered her arm.

"Ah," Chipmunk said, "I must clean myself off." She licked off the berry juice. It was so sweet! "This is good," Chipmunk said. "I must have more." Then she put down her basket and climbed higher into the berry bushes and began to eat berries. She ate and she ate and the sun moved further toward the west. Now it was dark and the forest was filled with shadows, but still Chipmunk did not stop eating.

Suddenly Chipmunk heard a sound. She stopped eating and listened. For the first time she realized how dark it was in the forest and she was afraid. The sound grew louder. It was the sound of leaves rustling and twigs breaking. Someone was walking toward her and the footsteps were coming closer. Then the sound stopped. Chipmunk looked down and what she saw was so frightening that she almost screamed. There was the oldest of the Owl Sisters right below her.

"Little One," the Owl Sister said, "come down to me." She lifted her arms up toward the Chipmunk. There were long sharp claws on the Owl Sister's hands and on her back was a basket full of the little ones she had caught. She was taking them home to eat them with her sisters. She wanted to put Chipmunk in her basket, too, but Chipmunk was too high up in the bushes for Owl to reach her. Chipmunk did not move.

"Come down, Owl said. "Your mother wants you to come home."

Chipmunk was not fooled. "My mother has been dead for many winters," she said and did not move.

Owl thought for a moment. "Come down," she said again. "Your father wants you to come home."

Again Chipmunk was not fooled. "My father has been dead for many winters," she said and did not move.

Owl thought again. Come down,” she said. “Your grandfather wants you to come home.”

Chipmunk shook her head. “My grandfather has been dead for many winters,” she said and did not move.

Owl thought for a long time. Then she tried once more. “Come down,” she said. “Your grandmother wants you to come home.”

Now Chipmunk did not know what to do. Perhaps her grandmother had called her. “I will come down,” she said to Owl, “but you must cover your eyes.”

“I will cover my eyes,” Owl said and raised her arms over her face, but she peeked between her fingers.

Chipmunk did not climb down, though. Instead she took a great leap, right over Owl’s head! Owl grabbed at her as she went by and scraped Chipmunk’s back with three of her long claws. Ever since then, all Chipmunks bear those scars on their backs. But Chipmunk got away and ran home to her grandmother’s lodge.

“Hide me,” she said. “Owl is after me.”

Grandmother looked for a place to hide her grandchild. Up in the pine tree, Meadowlark sang.

“Put her in the basket, put her in the basket.”

Grandmother put Chipmunk in the basket and sat down on top of it. Then she took her white necklace and threw it to Meadowlark as a present.

Soon Owl arrived at Grandmother’s lodge. “Where is the little one?” she said. She began to look, but she could not find Chipmunk. She was about to give up when Meadowlark began to sing.

“If you pay me, I will tell you. If you pay me, I will tell you.”

Owl took off her white breastplate and threw it to Meadowlark. Meadowlark put it on along with the white necklace Grandmother gave her. Ever since then, all Meadowlarks have worn that necklace and breastplate. Then Meadowlark sang again.

“In the basket, in the basket, you will find her in the basket.” Owl pushed Grandmother aside, grabbed Chipmunk and put her into her pack basket with the other little ones. She left the lodge to look for her sisters. They would have a feast that night.

Grandmother sat alone in her lodge for a time. Then she began to sing.

“Coyote, Coyote, come and help the little ones.

Coyote, Coyote, come and help the little ones.”

Owl was walking along when she met Coyote.

“Let us walk together,” Coyote said. “Then we can make a campfire and feast together on those little ones. Why should we share them with your sisters?”

Owl was pleased to walk with Coyote. His idea sounded good to her. They walked along until they came to a good place to make a fire.

“Let the little ones out of your pack. They cannot escape us. We will have them gather the wood for the fire,” Coyote said.

Owl agreed. It was a good idea. Then Coyote began to tell the little ones what to do in a harsh voice. But when he leaned close to Chipmunk he whispered, “Do as I tell you. Gather wood with a lot of pitch in it to make the fire. I will help you and the others escape.”

Before long, a great fire was burning.

“Let us cook the little ones now,” Owl said.

“No,” said coyote. “We must let the fire burn down to coals. Let us have the little ones gather roasting sticks.”

Owl agreed. Coyote leaned close to Chipmunk again and whispered, “Be ready for my signal.”

Then Coyote turned to Owl. “Let us dance while we are waiting. This will be a special feast, so you should make yourself look as fine as possible. You should decorate yourself with this charcoal and put a lot of pitch on your face and on your arms so the charcoal will stick.”

Owl thought that was a good idea. She put pitch on her arms and face and decorated herself with the charcoal. Then she and Coyote began to dance. They danced for a long time and Owl grew tired.

“Keep dancing,” Coyote said. “You are such a fine dancer! I like to watch you dance.”

Owl danced and danced. She was so tired she began to stagger. Coyote pushed her, as in fun.

“Keep dancing,” he said and pushed her again.

Owl kept on dancing. Coyote pushed her again and now she was close to the fire. “Keep dancing,” he said, and pushed her a third time. Owl danced right at the edge of the fire. Then Coyote pushed her hard. She fell right into the fire.

“Now,” Coyote said to Chipmunk and the other little ones, “run to your homes. Her sisters will soon be here. They are following her tracks.”

Coyote hid and watched. Soon Owl’s three sisters came along.

“Our older sister has been here,” one of them said. “Here are her tracks.”

The youngest sister poked the fire. “Look,” she said. “Our sister has left something for us to eat.”

The three Owl Sisters began to eat. They ate and ate. Then one of them held up a claw. Her eyes became very wide.

“Hooooo!” she said. “Hooooo! We have done something very wrong. This is our older sister’s finger! We have eaten our sister!”

All three of the Owl Sisters began to weep. They could not stop weeping. They wept and wept and they turned into owls like the owls of today. Their arms became wings and their eyes grew large and they flew off in shame. That is why the owls no longer come out in the daytime. It is only in the night that they hunt for the little ones now because they are ashamed to be seen during the day. That is how it happened, long ago.

The following story can be found in Keepers of the Earth
By Michael J. Caduto and Joseph Bruchac.

How Coyote Was the Moon

(Kalispel – Idaho)

A long time ago there was no moon. The people got tired of going around at night in the dark. There had been a moon before, but someone stole it. So they gathered together and talked about it.

“We need to have a moon,” they said. “Who will be the moon?”

“I will do it,” said Yellow Fox. They placed him in the sky. But he shone so brightly that he made things hot at night. Thus they had to take him down.

Then the people went to Coyote. “Would you like to be the moon? Do you think you could do a better job?”

“I sure would,” Coyote said. Then he smiled. He knew that if he became the moon he could look down and see everything that was happening on Earth.

They placed Coyote up in the sky. He did not make the nights too hot and bright. For a time the people were pleased.

“Coyote is doing a good job as the moon,” they agreed.

But Coyote, up there in the sky, could see everything that was happening on Earth. He could see whenever someone did something they were not supposed to do and he just couldn't keep quiet.

“Hey,” he would shout, so loudly everyone on Earth could hear him, “that man is stealing meat from the drying racks.” He would look down over people's shoulders as they played games in the moonlight. “Hey,” he would shout, “that person there is cheating at the moccasin game.”

Finally, all the people who wished to do things in secret got together. “Take Coyote out of the sky,” they said. “He is making too much noise with all of his shouting.”

So Coyote was taken out of the sky. Someone else became the moon. Coyote could no longer see what everyone on Earth was doing, but that hasn't stopped him from still trying to snoop into everyone else's business ever since.

The following story can be found in Keepers of the Earth
By Michael J. Caduto and Joseph Bruchac.

How Fisher Went to the Skyland: The Origin of the Big Dipper

(Anishinabe – Great Lakes Region)

Glossary and Pronunciation Key:

Anishinabe (Ah-nish-ih-nah'-bey). Correct name of people known as Ojibway or Chippew.
Means "The People."

Gitchee Manitou (Gih-chēē' Man'-ē-too). [Anishinabe] the Great Spirit.

Fisher was a great hunter. He was not big, but he was known for his determination and regarded as one with great power. Fisher's son wanted to be a great hunter also. One day the son went out to try to catch something. It was not easy, for the snow was very deep and it was very cold everywhere. In those days it was always winter on the Earth and there was no such thing as warm weather. The son hunted a long time with no luck. Finally, though, he saw a squirrel. As quietly as he could he sneaked up and then pounced, catching the squirrel between his paws. Before he could kill it, though, the squirrel spoke to him.

"Grandson," said the squirrel. "don't kill me. I can give you some good advice."

"Speak then," said the young fisher.

"I see that you are shivering from the cold. If you do what I tell you, we may all enjoy warm weather. Then it will be easy for all of us to find food and not starve as we are doing now."

"Tell me what to do, Grandfather," the young fisher said, letting the squirrel go.

The squirrel climbed quickly up onto a high branch and then spoke again. "Go home and say nothing. Just sit down in your lodge and begin to weep. Your mother will ask you what is wrong, but you must not answer her. If she tries to comfort you or give you food, you must refuse it. When your father comes home, he will ask you why you are weeping. Then you can speak. Tell him the winds are too cold and the snow is too deep. Tell him that he must bring warm weather to the Earth."

So the young fisher went home. He sat in the corner of the lodge and cried. His mother asked what was wrong, but he did not answer. She offered him food, but he pushed it away. When his father returned and saw his only son weeping, he went to his side.

"What is wrong, son?" Fisher said.

Then the young fisher said what the squirrel had told him to say

"I am weeping because the wind is too cold and the snow is too deep. We are all starving because of the winter. I want you to use your powers to bring the warm weather."

"The thing you are asking of me is hard to do," said Fisher, "but you are right. I will do all I can to grant your wish."

Then Fisher had a great feast. He invited all of his friends and told them what he planned to do.

"I am going to go to the place where the skyland is closest to the Earth," he said. "There in the skyland the people have all the warm weather. I intend to go there to bring some of that warm weather back. Then the snow will go away and we will have plenty to eat."

All of Fisher's friends were pleased and offered to go with him. So when Fisher set out, he took the strongest of his friends along. Those friends were Otter, Lynx and Wolverine.

The four of them traveled for a long time through the snow. They went toward the mountains, higher and higher each day. Fisher had with him a pack filled with dried venison and they slept at night buried under the snow. At last, after many, many days, they came to the highest mountain and climbed to its top. Then Fisher took a pipe and tobacco out of his pouch.

"We must offer our smoke to the Four Directions," Fisher said. The four of them smoked and sent their prayers to Gitchee Manitou, asking for success.

The sky was very close above them, but they had to find some way to break through into the land above. "We must jump up," said Fisher. "Who will go first?"

"I will try," said Otter. He leaped up and struck the sky but did not break through. Instead he fell back and slid on his belly all the way to the bottom of the mountain. To this day all otters slide link that in the snow.

"Now it is my turn," said Lynx. He jumped too, striking hard against the sky and falling back unconscious. Fisher tried then, but even he did not have enough power.

"Now it is your turn," said Fisher to Wolverine. "you are the strongest of us all."

Wolverine leaped. He struck hard against the sky and fell back, but he did not give up. He leaped again and again until he had made a crack in the sky. Once more he leaped and finally broke through. Fisher jumped through the hole in the sky after him.

The skyland was a beautiful place. It was warm and sunny, and there were plants and flowers of all kinds growing. They could hear the singing of birds all around them, but they could see no people. They went farther and found many long lodges. When they looked inside, they found that there were cages in the lodges. Each cage held a different bird.

"These will make for fine hunting," Fisher said. "Let us set them free."

Quickly Wolverine and Fisher chewed through the rawhide that bound the cages together and freed the birds. The birds all flew down through the hole in the sky. So there are many kinds of birds in the world today.

Wolverine and Fisher now began to make the hole in the skyland bigger. The warmth of the skyland began to fall through the hole and the land below began to grow warmer. The snow began to melt and the grass and plants beneath the snow began to turn green.

But the sky people came out when they saw what was happening. They ran toward Wolverine and Fisher, shouting loudly.

"Thieves," they shouted. "Stop taking our warm weather!"

Wolverine jumped back through the hole to escape, but Fisher kept making the hole bigger. He knew that if he didn't make it big enough, the sky people would quickly close the hole again and it would be winter again in the land below. He chewed the hole larger and larger. Finally, just when the sky people were very close, he stopped.

The hole was big enough for enough warm weather for half of the year to escape through, but it was not big enough for enough warm weather to last all the time. That is why the winter still comes back every year. Fisher knew that the sky people might try to close the hole in the sky. He had to take their attention away from it and so he taunted them.

"I am Fisher, the great hunter," he said. "You cannot catch me." Then he ran to the tallest tree in the skyland. All the sky people ran after him. Just as they were about to grab him, he leaped up into the tree and climbed to the highest branches, where no one could follow.

At first the sky people did not know what to do. Then they began to shoot arrows at him. But Fisher wasn't hurt, for he had a special power. There was only one place on his tail where

an arrow could kill him. Finally, though, the sky people guessed where his magic was and shot at that place. An arrow struck the fatal spot. Fisher turned over on his back and began to fall.

But Fisher never struck the Earth. Gitchee Manitou took pity on him because he had kept his promise and done something to help all the people. Gitchee Manitou placed Fisher high up in the sky among the stars.

If you look up into the sky, you can still see him, even though some people call that pattern of stars The Big Dipper. Every year he crosses the sky. When the arrow strikes him, he rolls over onto his back in the winter sky. But when the winter is almost ended, he faithfully turns to his feet and starts out once more on his long journey to bring the warm weather back to Earth.

The following story can be found in Keepers of the Night
By Michael J. Caduto and Joseph Bruchac.

How the Bat Came to Be

(Anishinabe – Eastern Woodland)

Glossary and Pronunciation Key:

Anishinabe (Ah-nish-ih-nah'-bey). Correct name of people known as Ojibway or Chippew.
Means "The People."

Long ago, as the Sun began to rise one morning, he came too close to Earth and became tangled in the top branches of a tall tree. The harder Sun tried to escape, the more he became caught. So, the dawn did not come.

At first, the birds and animals did not notice. Some woke, then went back to sleep thinking that they had been mistaken and it was not yet time for morning. Other animals which love the night, like the panther and the owl, were happy that it remained dark and continued to hunt. But after a while, so much time had passed that all the birds and animals knew something was wrong. They gathered together in the dark to hold a council.

"Sun has become lost," eagle said.

"We must search for him," said the bear.

So all of the birds and animals began to look for Sun. They looked in caves and in the deep forest and on the mountains and in the swampy lands. But Sun was not there. None of the birds or animals were able to find Sun.

Then one of the animals, a small brown squirrel began to go from tree to tree, going further and further toward the east. At last, in the top of a very tall tree, he saw a glow of light. He climbed up and saw that it was Sun. Sun's light was pale and he looked weak.

"Help me, Little Brother," Sun said.

The small brown squirrel came close and began to chew at the branches in which Sun was caught. The closer he came to Sun, the hotter it became. The more branches he chewed free, the brighter Sun's light grew.

"I must stop now," said the small brown squirrel. "My fur is burning. It is all turning black."

"Help me," said Sun. "Do not stop now."

The small squirrel continued to work, but the heat of the sun was very great now and it was even brighter.

"My tail is burning away," said the small squirrel. "I can do no more."

"Help me," said Sun. "Soon I will be free."

So the small brown squirrel continued to chew. But the light of the sun was very bright now.

"I am going blind," said the small squirrel. "I must stop."

"Just a little more," said Sun. "I am almost free."

Finally the squirrel chewed free the last of the branches. As soon as he did so, Sun broke free and rose up into the sky. Dawn spread across the land and it was day again. All over the world the birds and animals were happy.

But the small squirrel was not happy. He was blinded by the brightness of the sun. His long tail had been burned away and fur he had left was now all black. His skin had stretched

from the heat and he clung there to the top branches of that tree which had held the sun, unable to move.

Up in the sky, Sun looked down and saw the small squirrel. It had suffered so much to save him. Sun felt great pity and he spoke.

“Little Brother,” Sun said, “you have helped me. Now I will give you something. Is there anything that you have always wanted?”

“I have always wanted to fly,” said the small squirrel. “But I am blind now and my tail has been burned away.”

Sun smiled. “Little Brother,” he said, “from now on you will be an even better flyer than the birds. Because you came so close to me, my light will always be too bright for you, but you will see in the dark and you will hear everything around you as you fly. From this time on, you will sleep when I rise into the sky and when I say goodbye to the world each evening you will wake.”

Then the small animal which had been a squirrel dropped from the branch, spread its leathery wings and began to fly. He no longer missed his tail and his brown fur and he knew that when the night came again it would be his time. He could not look at the sun, but he held the joy of the sun in his heart.

And so it was, long ago, that Sun showed his thanks to the small brown squirrel who was a squirrel no longer, but he first of the bats.

The following story can be found in Keepers of the Night
By Michael J. Caduto and Joseph Bruchac.

The Great LaCrosse Game

(Menominee – Eastern Woodland)

Long ago, the birds and animals had a dispute. No one remembers for sure what their argument was about, but it went on for a long time. At last it was agreed that they would play a game of lacrosse to decide it. The first to score a goal would win.

They set up a great playing field with the animals on one side and the birds on the other. The center of that field was the Place Where the Sun is Marked on the Rock, Kesosasit on the great inland sea called Michigami. Today those waters are called Lake Michigan. One goal was placed at the south end of Michigami. Today, that is where the city of Chicago stands. The other goal was far to the north, near the place where the city of Green Bay is today.

It seemed that everything was set. All of the birds, those with wings, were on one side. All of the animals, those with fur, were on the other. But, just as they were about to begin, a small voice was heard.

“Which side will I be on?” it said.

There, on the ground was a small brown creature, no larger than a mouse. It had fur, yet it did not look quite like an animal. It had wings, yet those wings were not like those of a bird.

“You have wings, you cannot be on our side,” said the animals. “Not only that, you are the smallest of all.”

“You have no feathers. You cannot join us,” the birds said. “And how can one so little be of any help?”

Then Otter spoke up for the little creature. “Let us not leave anyone out,” Otter said. “Even if this little one cannot help much, it can still encourage our better players.”

So a tiny lacrosse stick was fashioned for the little brown creature, and it was allowed to join the side of the animals.

Then the two sides lined up to face each other, with the best players in front. On the north side were the animals. The bear and the deer, the wolf and the fox, the rabbit and woodchuck, the otter and beaver, the snakes and lizards and all the other creatures who walked on Earth, even those who spent much of their time in the water, were there. On the south side were the birds. The eagle and the hawk, the owl and duck, the gull and the stork, the crow and the jay, the hummingbird and kingfisher and all of the others who flew in the sky were there.

As soon as the ball was put into play, the deer scooped it up and began to run swiftly toward the southern goal. But before Deer went far, Stork hooked him with his stick and the ball fell free. Wolf scooped it up and passed it toward beaver. But Red-tailed Hawk flew. The animals tried to jump up to reach him, but none could leap that high. The other birds flew up and began passing the ball back and forth over the heads of the animals. As they headed toward the northern goal, the sun was beginning to set and the animals below them were falling farther and farther behind.

Suddenly, the little brown creature, which had been riding on the back of Otter, leaped up into the air. It spread out its legs and unfolded leathery wings. It flew up into the darkening sky and grabbed the ball away from the birds with its little stick. The birds tried to get the ball back, but the little brown creature darted and dodged among them. It was so quick that no bird could catch it and even the owl could not move as well in the growing darkness as that little brown

creature. It flew and flew toward the southern goal, carrying the ball over the line to score. The animals had won!

“What is your name?” the animals asked the little brown creature.

“I am Bat.”

“You are the best lacrosse player of all,” said the animals. Then the animals talked about what could be done to reward Bat for helping. It was decided that Bat would be allowed to sleep all during the day, when many other animals were awake. Then, when Bat came out at night, there would be plenty for Bat to eat as insects filled the night sky.

So it is to this day. And the story of how Bat helped the animals win the great lacrosse game is still told to remind people never to overlook anyone, even if they are the smallest of all.