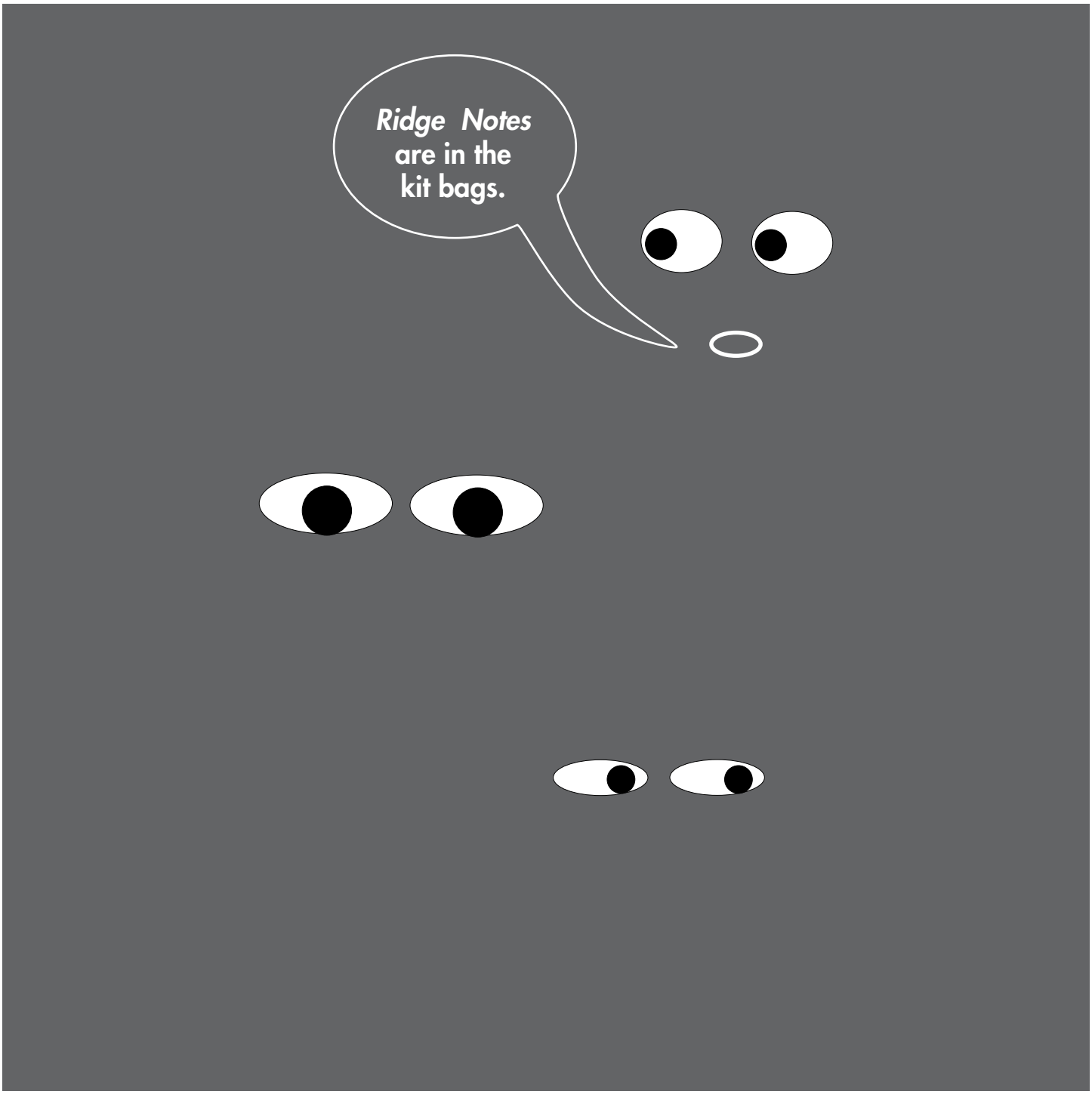
NIGHT HIKE
LESSON PLAN



WOLF RIDGE℠
ENVIRONMENTAL LEARNING CENTER

NIGHT HIKE

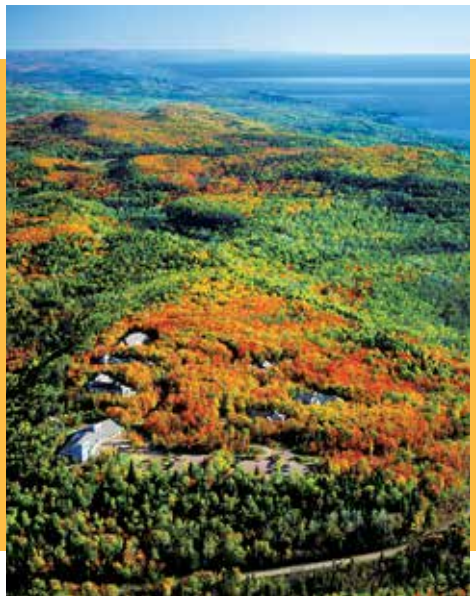
CLASS DESCRIPTION: A Personal Growth and Team Skills Class *(offered September through March)*
Students will hike a designated route, stopping at various points to do activities. These activities will lead to a better understanding of night time communications and senses. Students will have the opportunity to sit alone and experience the night environment.

Total time: 1 1/2 hours (flexible length)
Audience: 6-20 students, any age
Activity level: strenuous
Travel: 1 1/4 mile
Total uphill travel: 320 feet

PURPOSE
To explore our senses and our environment in the dark.

CONCEPTS
1. All living things acquire physical and behavioral adaptations to be successful in their environment.
2. People can overcome their fear or discomfort of the darkness through knowledge of and familiarity with it.
3. Humans learn about their world through their senses, investigation and experimentation.

OUTCOMES
Upon completion of Night Hike class students will be able to:
- Compare how use of our senses differs in the darkness and light.
- Describe something about the night experience that was new and surprising.
- Discuss how their emotions about the night have changed following the hike and activities.



NIGHT HIKE

Updated January, 2025

Equipment

Night Hike:

- 6 different scent jars
- 3 blindfolds
- colored paper squares
- wintergreen Lifesavers
- sound CD
- CD player
- candle
- matches
- quote card
- Night Hike Ridge Notes

Appendices

- Optional Activities
- Resources
- Possible Routes

Set-up (15 min.)

- Classroom/class prep description
- Safety Management

I. Introduction to Night Hike (10 min.)

A. Greeting
B. Class Overview
C. Assess Learner Level

II. Listen to Night Sounds (5 min.)

III. Night Hike (65 min.)

A. Night Vision - color squares (stop 1)
B. Triboluminescence - Lifesavers (stop 2)
C. Smell - scent jars (stop 3)
D. Communication - bat & moth game (stop 4)
E. Hearing - animal calling (stop 5)
F. Solitude Solo - (stop 6)

IV. Conclusion (10 min.)

A. Discuss Solitude Solo
B. Check Colored Paper Squares
C. Review

Clean-up (2 min.)

Set-up (10 min.)

Classroom/class prep description

From the kit room pick up a night hike equipment kit which includes all the supplies needed for the hike and a CD player. Bring your own flashlight(s).

Safety Management

Adhere to and be familiar with all general safety practices designated by Wolf Ridge. Be aware of any student's special needs (medical, etc.) and adjust the activities as needed to maintain safety.

- First aid kits are located in all the buildings and at the canoe landings.

I. Introduction (Night Hike) (10 min.)

Grabber

Greet the students as they enter and make sure all the students are appropriately clothed. Explain that you do not want them to use flashlights if they brought them because that will distract from everyone's experience. Let them know you will confiscate them for the remainder of the evening if they use them. Read the following quote:

"To go in the dark with a light is to know the light.
To know the dark, go dark. Go without sight,
And find that the dark, too, blooms and sings,
and is traveled by dark feet and dark wings."

~ Wendell Berry

Overview of the Class and Outcomes

People are rarely outside at night purposefully to simply enjoy the night's beauty. Since most people live in cities, many of us may have never had the opportunity to experience total darkness. Fear of the night is somewhat justified when we realize that humans rely mainly on sight, which diminishes at night. The ability to see is also lessened for other animals; however, their sense of hearing or smell may be much more acute than ours. Our fear comes from the idea that something might know about us before we realize it is there. We will use our senses tonight to experience a new place - the darkness. During our hike we will stop at various places to participate in some activities that help us better understand the night.

Assess Learner Level
During the introduction, find out what the students already know about night life and discuss night fears. "Who has ever been camping or out at night in a dark place?" "Were you scared?" "Why?" Have students share stories. Tell them tonight's hike should help them understand some new things about the night. Knowledge is key in overcoming fear.

II. Listen to Night Sounds Tape (5 min.)

Before starting on the hike, listen to the CD with common natural night sounds. The CD contains owl, wolf, woodcock, ruffed grouse, and frog songs. Play the CD once just listening. Then play the CD again stopping after each call to practice. You can expect to hear the bird and wolf calls year around. The chart shows peak seasons.

III. Hike (65 min.)

Head away from the buildings and lights following one of the designated night hike trails. Refer to map and suggested hikes at the end of the lesson plan. Let the students know that it may be difficult to see at first but their eyes will adjust.

A. Night Vision - Colored Paper Squares (Stop 1)

Once the group is out of sight of the lights, stop and discuss how vision works.

Lining the retina are two kinds of cells, cones and rods. Cones can perceive color, but need much light to do so. Most nocturnal animals have only rods, which pick up trace amounts of light, but not color. We see "ghosts" because rods detect movement from the corners of our eyes, but when we turn to look, cones can't pick up enough light to see clearly. To get a clear picture at night, try focusing next to the object and using peripheral vision instead of looking directly at it.

Rhodopsin is the chemical in rods that is sensitive to light, but it breaks down in strong light, and must be manufactured each time we go back into the dark. Our rods become 100 times more sensitive in 5 minutes of darkness, and pupils 10 times as large. Therefore, we can see 1000 times better in 5 minutes. Within an hour we can see 1 million times better. Vitamin A is a precursor to rhodopsin, so a diet deficient in Vitamin A (from liver and yellow and red vegetables) may cause night blindness. In order to gather more light, nocturnal animals also have a tapetum, or reflector, on their retinas (dogs, cats, deer, raccoons, rabbits, beaver, etc.), making their eyes shine at night. They also have larger pupils or slit pupils if they are active both day and night (cats, snakes).

To demonstrate how rhodopsin breaks down in the presence of light, try the following activity: Candle stare - Have all the students close both eyes while you light and place a candle in the center of the group. Then have the students uncover one eye and stare at the candle for 1-2 minutes. Blow out the candle. Cover and uncover each eye to see which eye has better vision. The eye that was covered should have much sharper vision because the rhodopsin is still present.

To demonstrate that humans cannot see color as well at night, try the following activity:

Color squares - Give each student a square of different colored construction paper. Have the student guess what color they think it is. Once they decide on a color have them place the paper square in a pocket. At the conclusion of your hike when you are back by the lights, have the students look at the pieces of paper and see if their guesses were correct.

INSTRUCTOR NOTE: Peak Sounds by Month

Boreal Owl
Feb. & March
Saw-whet Owl
Feb. & March
Great-horned Owl
Feb.
Barred Owl
All winter
Woodcock
May & June
Ruffed Grouse
Early spring through fall
Spring Peeper
End of April through June
Wood Frog
May
American Toad
May
Western Chorus Frog
End of April through May

B. Triboluminescence - Lifesavers (Stop 2)

Occasionally when people are out at night they will see lights or glowing coming from places where there is no electricity. Perhaps they are seeing a UFO, but more likely they are seeing one of the numerous plants or animals that naturally produce light. This is called bioluminescence and it works differently in each species. Unlike most familiar lights that are accompanied by heat, bioluminescence is a cold light.

Fireflies are common insects that give off light. There are about 50 different kinds of fireflies in the United States with different colored lights, and different rhythms of flashing their lights. The "fuel" in the firefly's light is a substance called luciferin. It reacts when it comes in contact with oxygen, but only when another substance, luciferaseis present. Also produced by the firefly, luciferase acts as a catalyst or "trigger" that enables luciferin to consume oxygen and thus give off light. The light is used to attract mates and may serve other purposes as well.

Foxfire (glowing wood) is the result of infestation by luminescent fungi. Depending on the season, chances are you'll not get to see any naturally created bioluminescence, but using wintergreen lifesavers each student can make some personal sparks.

Sparkies - Pair up and give each participant a lifesaver. Demonstrate how to chew them with your mouth open. If the kids watch closely they should be able to see some sparks! If the lifesaver gets too damp before chewing it will not spark.

How it works:
Wintergreen sparking is not bioluminescence, since lifesavers are not alive. It is a way to make light without electricity. Wintergreen sparking called "triboluminescence", is actually a three-step process. Step one: When you shatter the sugar crystals with your teeth, electrons (which are negatively charged) break free. As a result, the atoms in which the electrons were formerly embedded become positively charged. In what amounts to a subatomic game of musical chairs, the free electrons dash around madly trying to find a new home. Step two: Meanwhile, as the sugar crystals disintegrate, nitrogen molecules from the air attach themselves to the fractured surfaces. When the free electrons strike the nitrogen molecules, they cause the latter to emit invisible ultraviolet radiation, along with a faint visible glow. Step three: The UV radiation is absorbed by the wintergreen flavoring, methyl salicylate. This then emits the fairly bright blue light you see. Even without the wintergreen flavoring, virtually all crystal sugar candy will emit some visible light when crushed, although it's usually pretty faint. The effect was first describe in 17th century Italy, and since then it's been discussed in numerous papers and articles.

C. Smell - Scent Jars (Stop 3)

Since vision is diminished at night for both humans and animals we start using our other senses to compensate for this loss. Humans can smell about 5 million different scents. Each scent has its own receptor cell in our noses. Canines have 220 million smell cells. One can usually estimate the importance of the sense of smell to a particular animal by comparing the size of its nose to its head.

To focus on our sense of smell, have students guess some scents that vary in difficulty to identify. Have the students close their eyes when smelling so they can concentrate on the scent and aren't cheating by looking into the container if it is light enough to see. Hold the film container under each student's nose for a few seconds. After all have had a chance to smell have them guess what it was.

Scent jar 1 - crayon
Scent jar 2 - pepper
Scent jar 3 - cedar

Scent jar 4 - wintergreen
Scent jar 5 - orange/citrus
Scent jar 6 - money

D. Communication - Bat & Moth Game (Stop 4)

The importance of hearing to a particular animal can be estimated by comparing the size of the ear to the size of the head. The outer flap of the ear works as a receiver for sound. Canines and other animals have much larger "receivers" than we do. They also have the ability to move them independently of each other which allows them to pinpoint a sound with ease. Owls, which do not have outer ear flaps, have an acute sense of hearing, because their ears are located asymmetrically on their heads. This allows them to triangulate quickly on a sound. Bats use echolocation to help them navigate and find prey. They send out high frequency sound waves (which are too high pitched for people to hear) and these sound waves are bounced back to them off their prey. Try the following game to get a sense of how echolocation works.

Moth and Bat - Have the kids stand in a circle. Pick about four or five kids to be moths. Choose one or two kids to be bats. Blindfold the bats. Place the bats and moths in the circle of the remaining kids. The object is for the bats to catch the moths by tagging them using echolocation. When the bats say "bat" the moths must respond by saying "moth". When all the moths are eaten (tagged), exchange players so all the students get a chance to be a bat or moth.

INSTRUCTOR NOTE:
The Bat & Moth Game requires an open area of about 20 to 30 feet in diameter for playing.

E. Hearing - Animal Calling (Stop 5)

Most animals use sound to communicate. They may be marking their territory, having a pep rally for an upcoming hunt, looking for a mate, or alerting others of dangers. Try hooting for owls. Four common owls in the Wolf Ridge area are the great horned, barred, saw-whet, and boreal owls.

Barred Owl - "Who cooks for you? Who cooks for you all?"
Great Horned Owl - Deep, soft, resonant six-noted hoot.
"Whoo! Whoo-whoo-whoo! Whoo! Whoo!"
Boreal Owl - Single melancholy note repeated at one or two minute intervals.
Saw-whet Owl - Sounds like the beeper of a truck backing up.

Ruffed grouse make the "drumming" noise you may hear during their breeding season. By rapidly beating their wings in the air they produce a whirring noise that attracts mates and marks territory.

You can also try howling for wolves. Listen to the CD in the kit at the beginning of class to learn the wolf's howl. Start on a low note and go high.

If the lake is frozen you might get to hear other worldly sounds. Water contracts as it cools. It is unique among elements in that once it cools to 39°, it starts to expand again, with maximum expansion being reached at 32° when it becomes a solid. As temperatures drop below 32° the ice contracts, pulling away from the shore and cracking. Water fills these cracks and freezes. If the temperature is -20°, and then it begins to warm up, the ice expands and cracks, or wells up having no place to expand into. The blooming sound you hear is the ice cracking with expansion or contraction.

F. Solitude Solo (Stop 6)

Now that the students have a better understanding of night and have spent time out as a group, it is time for them to have a chance to experience the solitude and beauty of night alone. Leave an adult or competent student at the starting point and take the rest of the class along the trail with you leaving a student every 30-40 feet along a trail or in a field and have them sit in silence for five to ten minutes absorbing the night. Instruct

the adult or student to start up the trail ten minutes after you leave them picking up each student along the way until the whole group is back together. Double check to make sure you have everyone. Discuss things you may have heard or felt.

V. Conclusion (10 min.)

A. Discuss Solitude Solo

Ask them how they felt out there alone and why. Ask them how they would have felt if they had done the solo experience at the beginning of class instead of the end.

Assessment Concept 2 - *People can overcome their fear or discomfort of the darkness through knowledge of and familiarity with it.*

B. Check colored paper squares

Have the students pull out their color squares and see if their color guess was correct. Collect the color squares.

C. Review

Review the various activities. Discuss what the students may have heard, smelled or seen.

Assessment Concept 1 *- All living things acquire physical and behavioral adaptations to be successful in their environment.*

Concept 3 *- Humans learn about their world through their senses, investigation and experimentation.*

Clean-up

Collect colored paper squares from students and clip them together. Stack chairs. Return the kit and CD player to the kit room.

Appendices

Optional Activities

1. Constellations/Meteors/Northern Lights/Moon

Point out common constellations such as the Big and Little Dippers, Orion, Taurus, Draco, Casseopia, etc. Tell constellation stories. Watch for meteor showers especially in August and December. Meteors are small sand-size particles (nickel or iron) that burn up as they begin to enter the earth's atmosphere leaving a trail of light. Sometimes they are called 'falling stars.' Northern lights are caused by charged particles coming from solar storms. These charged particles enter our atmosphere near the poles and excite molecules of oxygen and nitrogen. As the oxygen and nitrogen 'relax', they emit that energy in the form of light energy. Northern lights are also called aurora borealis. The moon takes 29.5 days to complete a full cycle of phases around the earth. The phase we sees depends on the relative locations of the moon, sun, and earth. A full moon is when the moon is on the far side of the earth from the sun. A new moon is when the moon is between the earth and the sun. The moon rises an average of 50 minutes later each day.

Resources

The Sixth Sense of Animals, Maurice Burton, Taplinger Co. NY 1972.

The Audubon Society Encyclopedia of North American Birds, John K. Terres, Alfred A. Knopf, Inc., NY 1980.

Peterson First Guide to Astronomy, Jay M. Pasachoff, Houghton Mifflin Co., Boston MA 1988.

Nature's Living Lights: Fireflies and Other Bioluminscent Creatures, Alvin and Virginia Silverstein, Brown Little Publications 1988.

Sharing Nature with Children, Joseph Bharat Cornell, Ananda Publications 1979.

Possible Routes (See attached map)

Make up your own route (please stay off the roads and ski trails) or use one of ours!

Purple Route: This longer hike brings students down to Sawmill Creek. It begins down the North Stairs and continues down the hill and across Sawmill Creek Bridge. You can stop at the bridge or continue to the Forest Ecology Building before returning to the ridge.

Orange Route: The orange route also begins down the North Stairs, but hangs a left at the giant rock and benches. At "Raspberry Site," go down the hill to Sawmill Creek. As you wind your way back upstream, look for beavers, birds, or other wildlife along the way. (Don't forget to take a right at Sawmill Creek Bridge to get back to Wolf Ridge!)

Yellow Route: Once again, this route begins down the North Stairs. This time, take a right at the bottom of the stairs. Stay to the right until you come to "Big Trees" site. Check out the huge yellow birch trees, then turn left. At Wolf Hill, take a right. Another right up the hill will lead you past the old 1909 homestead before you come to the next intersection. A right turn will lead you to the bottom of the stairs, or a left will lead you back to Wolf Ridge.

Pink Route: If you want to surprise your students with the North Stairs at the end of your hike, take the pink route. Take the trail that leads you behind Summit Lodge. This trail will continue past both ropes courses and the Birch Ojibwe Site. At the bottom of the "double bump hill," take a left. Another left at the benches will lead you past "Gully Wash" and "Big Trees Site" and to the bottom of the North Stairs. This is a relatively short hike.

Green Route: If you feel like wandering to Raven Lake take the green route. From the Education building, head out across the volleyball court and down the hill. Follow the signs to the lakes to listen for frogs or other wildlife. The night sky from the shores of the lake is beautiful. Note that Marshall Mountain is an unsafe trail in the dark. Don't hike it without lights.

Blue Route: The blue route takes you to Wolf Lake. If you wander past the canoe dock, you will come to the Wolf Ridge beach, were you can watch for loons and ducks in the summer or listen to the ice crack in the winter. Note that Marshall Mountain is an unsafe trail in the dark. Don't hike it without lights.

NIGHT HIKE ROUTE MAP