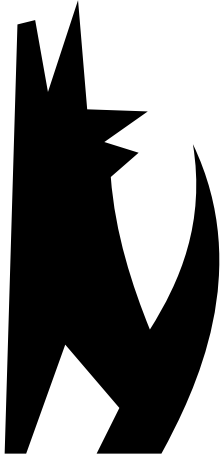


Night Hike



I. Preparation



II. Warm-Up



III. Activities

A. Sight

B. Scent

C. Touch

D. Sound

E. Taste

F. Other



IV. Assessment



V. Background

VI. Vocabulary





Night Hike



Subjects: Science, Physical Education

Skills: Comparison, Description, Discussing, Experimenting, Identifying, Listening, Observing.

Outcomes: Students will be able to:

- Feel more at ease in a night setting.
- Understand how senses work at night.
- Explain three ways the night differs from the day.

“Trees” Major

Messages:

- Humans rely on natural resources.

Wisconsin Academic Standards for Environmental Education:

- Questioning and Analysis
- Processing of Environmental Processes and Systems

Grade: 4th - Adult

Time: 1 hour

Materials: Colored paper squares, black paper, chalk, flashlight with red paper cover, candle and matches, scent jars, wintergreen lifesavers, rocks, star charts, tape player and tape with animal calls, unique feeling objects.

Setting: Press Forest or any dark quiet outdoor setting.

Season: Spring, Summer, Fall

Resources:

- *Keepers of the Night* - Michael Caduto and Joseph Bruchac
- *Astronomy Curriculum* - Trees For Tomorrow
- *Night Hike and Astronomy program files* - Trees For Tomorrow

Overview: In this activity students will explore a night environment using their five senses.

Outline:

I. Preparation

II. Warm up

III. Activities

- Sight
- Scent
- Touch
- Sound
- Taste
- Other

IV. Assessment

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I. Preparation:

Gather all materials needed together in a backpack.

Announce to students before leaving that they must be silent for the duration of the hike, flashlights and flash cameras are not allowed, and it is usually

cooler at night, so they should dress accordingly.

II. Warm-Up:

Make sure to do a head count before beginning the hike, and check periodically throughout the hike to make sure you have not left someone behind. Start by explaining that you will be hiking for about an hour in the

darkness. Flashlights and flash cameras are not allowed. You may want to reiterate that if any talking or horseplay occurs they will be sent back to the bus with a chaperone with no warning. The pace will be slow and the mood will be mellow and quiet. A good way to set the tone is by reading Wendell Berry’s poem “To Know the Dark.”

Some students may be very

uncomfortable going into the woods at night. One way to alleviate some fear is to ask your group what are some reasons that they or other people are afraid of the dark. Discuss the fear and explain how that fear can be dealt with so it is no longer an obstacle to the enjoyment of the night hike. For

example, “We don’t need to be afraid of bears and wolves because they will see, hear or smell us before we get close to them and they don’t bother people anyway.” Remind them that the biggest thing they have to fear in the woods at night is their own imagination.

“To Know the Dark” by Wendell Berry

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.

STALKING

For silent movement, teach students how to stalk.

1. Lift foot high and maintain balance.

2. Come down on outside ball of foot.

3. Roll to inside ball of foot.

4. Lower heels and toes.

5. Evenly apply weight.

See Tom Brown's [Field Guide to Wilderness Survival](#) for more details.

Other topics to bring up are the concepts of animals that are nocturnal, crepuscular or diurnal and their differences.

Even though it may seem obvious, ask the students about the differences between night and day. Some things they may come up with are: dark versus light, temperature differences, moisture content of the air, they may be able to smell and hear better. This does often happen at night because the moist air tends to transmit sound and smell better than drier air during the day.

III. Activities:

A. SIGHT ACTIVITIES

Night Vision

Discussion - The eye's retina is lined with two kinds of cells - rods and cones. Cones detect color, but require a significant source of light to do so. Rods work well with dim light, and detect shapes in black, white and shades of grey. Most nocturnal animals have eyes packed with rods but very few cones, allowing them to see fairly well at night. Humans see fairly well at night - it just takes a little time for our eyes to adjust from bright light to dim light. Rhodopsin is a chemical in rods which is sensitive to light, it breaks down in strong light, so it must be manufactured each time we go into darkness. After 5 minutes of darkness our rods become 100 times more sensitive and our pupils become 10 times as large allowing us to see 1000 times better. After an hour we can see 1 million times better.



Try the following activities to demonstrate the differences in human vision at night.

Colored Paper Squares - Pass out small pieces of paper of various colors and have the students silently figure out what color it is. Because we can not see color well at night, it is difficult to determine the paper's color, so students should see if they guessed correctly when they have a good source of light after the hike. This is a good time to discuss rod and cone cells if you have not already.

A variation of this activity is to have the students write their names on sheets of paper with colored crayons or markers and try to guess the color with which they wrote.

Disappearing Heads - Have the students form two lines about three feet apart and facing each other. Have each student stare at the head across from him or her. After a few seconds the heads should seem to disappear. This happens because the concentration of cones in the center of the eye creates a blind spot when there is insufficient light for the cones to function. The rod cells, which sense light at night, are located on the periphery of the retina and are not used when staring directly at something.

One Eye Blind - In a circle have the children cover one eye with a hand and keep it covered until they are instructed to do otherwise. Warn them that you are going to shine a bright light into their exposed eye and then do so. Shine each child 3 or 4

times for the best effect. Once you have extinguished the light, instruct the students to uncover their veiled eyes. Have them cover one eye and then the other and compare the sight in each eye. Discuss any sight differences between the two eyes.

Hint Do this activity at the end of the hike. Give the students the option of covering both eyes if they would like to keep their night vision.

Drawing the Light - Take along some pieces of black construction paper and chalk on the hike. Have the students sit down and draw everything they see that appears white or grey on their paper with the chalk. Leave everything else black. White areas may include the sky, the horizon, spaces between tree branches, snow or other ground cover.

B. SCENT ACTIVITIES

Scent Jars - Have several film canisters each with a different scent inside (i.e. balsam fir needles, cinnamon, wintergreen leaves, sweet fern, various food extracts). Have the students stand in a circle. Pass the canisters around one at a time and tell the students to guess to themselves what the scent is. After each student has smelled the canisters, discuss what the scents were.

C. TOUCH ACTIVITIES

Individual Rocks - Gather the students into a circle and give each student a rock small enough to fit in his or her hand. Tell them to get to know their rock using their sense of touch. After about one minute, collect the rocks from each student in your hand. Pass the rocks slowly around the circle having the students hold onto their rocks when they come and pass the others on. Ideally, each student will end up with his or her original rock.

Discuss how many of our senses are under-developed because we rely so much on our sense of sight. It is important for us to be

aware and develop these senses to discover the world around us.

Just as the rocks are unique, so are each of us. Rocks in the gravel on the side of the road may seem like “just a bunch of gravel” until we take the time to get to know an individual rock and its unique features. People can seem to be “just a bunch of middle schoolers”, for example, until we take the time to get to know them and their unique qualities and individual differences.

Touch Me, Feel Me - Have an assortment of random, unique feeling objects such as pine cones, fungi, bark, and pelts, each in its own paper bag. Pass the bags around a circle one at a time having the students reach inside to feel the object. After each student has felt an object have them describe it and try to guess its identity.

D. HEARING ACTIVITIES

Deer Ears - Have students form a single file line facing you. Gradually back away from the line asking every few yards in a low voice, “Can you hear me?” Have the students answer “Yes” if they can and remain silent if they cannot. Remember where you end when you no longer get a reply. Next, have the students hold their hands cupped behind their ears and repeat the process. You should be able to go quite a distance further with them still hearing you. Discuss how some animals such as wolves, owls and bats have special adaptations such as large ears or rounded faces to help them hear better.

Listening Lines - Have the students form two lines about six feet apart, facing each other. Tell them to close their eyes. Explain to them that if you tap them on the shoulder they should walk up and down between the two lines of people and then go back to their original spot. When they have completed this task, ask the students to raise their hand (while keeping their eyes closed) and tell the rest of the group something they

heard from that person. Examples may be: squeaky shoes, loud clothing, beads in someones hair, a short person, a tall person, a fast walk, a slow walk or heavy footfalls. Try tapping more than one person on the shoulder and see if the group can determine how many people are walking at one time.

Animal Calls - Take a tape player and a tape with animal calls you might hear at night such as frogs, owls, or coyotes. Discuss reasons that animals call such as mating, defining territory and socializing. Try calling in owls or yipping like a coyote to see if you get a response.



E. TASTE ACTIVITIES

Lifesavers – Stand in a circle and give each student a wintergreen lifesaver, telling them not to eat it until you give them the instructions to do so. When you say “Go” have the students put the lifesavers in their mouths and chew with their mouths open while facing other students. Enjoy the sparks and giggles. This is a nice ending activity.

One theory on why this happens: Energy is released in the form of light when you shatter the sugar crystals with your teeth. Electrons break free and positively charged atoms are left. Nitrogen molecules in the air are attracted to the positively charged atoms. When free electrons strike the nitrogen molecules, they cause the latter to emit invisible ultraviolet radiation. This UV radiation is absorbed by the wintergreen flavoring, methyl salicylate, creating the bluish light we can see. This is called triboluminescence.



F. OTHER ACTIVITIES

Star Gazing - Have the students point out any constellations they can identify, and add any you can find. Use a seasonal star chart for help. Tell a myth or two about how the stars and or constellations came to be (see the astronomy program for stories). Have the students pick out stars to make a constellation of their own and make up a

story about how it came to be.

Bring as many pairs of binoculars out with you as you can comfortably carry and have the students look at things like: planets, the moon, double stars, star clusters, red stars, satellites, meteors or any other interesting celestial objects.

Quiet Time - Have the students find a place of their own within your visibility to sit quietly for 5-10 minutes and absorb the night. After the quiet time, get together and discuss things the students may have thought, heard or felt. This is another time when you can do the “Individual Rock” activity with your group.

Animal Tracks - A day or two before the night hike place a quarter cup of peanut butter at the base of a tree and sprinkle florescent powder in a three foot radius around the bait. Bait several trees in an area. Take a blacklight along for the hike and shine it on the baited areas. If an animal has eaten any of the food there should be flourescent tracks going away from the bait. Blacklights do not ruin night vision, but they can be hard on the eyes, so caution students not to look directly at the light.

Blind Walk – Students will line up behind you in a single file line. Have them place their hands on the shoulders of the person in front of them and close their eyes. Be sure to reassure them that you will not lead them anywhere unsafe. Instruct the students to walk slowly with their eyes shut for a few minutes and end with a clear “Stop.” Afterwards, ask the students if they noticed any changes in their senses. What kinds of things did they hear, smell, or feel? This activity is good at the beginning of the hike before night vision is fully developed.

IV. Assessment:

Briefly discuss the hike with the students as you do a final head count. What did they learn? How did they feel being in the woods at night? What was their favorite part of the night hike?

V. Background:

The Blue-green Glow of Wintergreen Lifesavers

C. E. Knapp

The Blue-green glow from the crackling candy is called triboluminescence (from the Greek word *tribein*, to rub). The phenomena occurs with most hard candies that are made with granulated sugar. The molecules of gaseous nitrogen associated with certain kinds of sugar account for the glow.

Wintergreen lifesavers give off more of a blue-green light than other flavors because the ultraviolet radiation of the nitrogen is absorbed by the methyl salicylate (oil of wintergreen) in the candy. The glow is a composite of the light spectrum from molecular nitrogen and methyl salicylate.

Experiments have shown that damp sugar gives off a fainter glow, so keep your lifesavers dry until you put them in your mouth. You can also experiment with other substances to see the triboluminescence. Saccharin, and crystals of tartaric acid and rock salt will work too. To save your teeth, you may want to use a pair of pliers to crack the substances.

The glow from hard candy results from a separation of charges brought about by the stress on the material. Stress liberates ions and semifree electrons and the glow may be produced from the recombination of positive and negative ions or when the semifree electrons combine with positive sites in the material. Another theory is that electrons are accelerated by electric fields between the charged sites and collide with molecules.

Night Vision

from Keepers of the Night

As night sets in, the eyes gradually adjust to decreasing light. Since the rod cells of the eye's light-catching retina are sensitive to even dim light, the eyes of many nocturnal animals are packed with rod cells. Most animals, therefore, can see well enough at night to find and catch food, flee from predators and navigate around objects. Few wild animals go bump in the night.

Many nocturnal animals, however, have only a few color-sensing cone cells because there is usually not enough light present for color to be detected at night. As a result, and because their cone cells are insensitive to the long wavelengths of red, few animals can see red light, which affects cone cells, but not rod cells. A bright red light, such as a flashlight covered with red acetate or cellophane, cannot be detected by many vertebrate animals. Since human beings can detect the red end of the spectrum, we can see animals at night by using a red beam of light that they, apparently, cannot perceive. Interestingly, the lighter colors by day, such as reds and yellows, appear as darker greys by night, whereas blue, which is not as bright during the day, appears as a brighter shade of grey after dark. Human eyes are especially sensitive to blue at night.

VI. VOCABULARY:

Cone Cells - The color-sensing cells located on the retina of the eye.

Crepuscular - Of the twilight, refers to animals that are active at dusk and dawn.

Diurnal - During the daytime (as opposed to nocturnal), refers to events that occur only during daylight hours or to species that are active only in daylight.

Eyeshine - The phenomenon that occurs when a bright light is shined into an animals eyes and they seem to “glow in the dark”.

Methyl Salicylate - Oil of wintergreen. The substance found in wintergreen lifesavers that causes them to give off a blue-green glow. This occurs because the ultraviolet radiation of nitrogen is absorbed by the methyl salicylate.

Nocturnal - During the night (as opposed to diurnal), refers to events that occur only during the night or to species that are active only at night.

Retina - The sensitive membrane of the eye which receives the image formed by the lens and is connected to the brain by the optic nerve.

Rhodopsin - A chemical found in the rod cells that is sensitive to light, it breaks down in strong light and must be manufactured each time an animal goes into darkness.

Rod Cells - The light sensing cells located on the retina of the eye. The eyes of many nocturnal animals have a large number of rod cells to help them see at night.

Tapetum - The reflective layer of tissue at the back of the eye, behind the light sensing cells of the retina, which sends light back over those cells to increase the eye’s efficiency in low light levels.

Triboluminescence - The blue-green glow from the cracking of most hard candies that are made with granulated sugar.



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Notes:

Notes:



The Trees For Tomorrow Mission

Is to deliver balanced, objective information on the management and use of trees, forests and other natural resources. Our field-based programs, which place people in direct contact with resources which support human needs, teach knowledge and skills leading to responsible lifestyle choices. This experience inspires informed participation in policymaking and promotes stewardship and renewal of natural resources for use by future generations.

Major Messages

- Humans rely on natural resources for survival and quality of life.
- Our natural resource base is limited, and demand is increasing, so proper management and responsible use is essential.
- The Great Lakes forest ecosystem is resilient and is sustainable when properly managed.
- Natural resources - forest, water, wildlife, soils and others - are globally interdependent. One resource cannot be managed without considering the effect on all others.
- Forest resources must be managed for multiple uses for the long-term benefit of every one. These multiple uses include forest products, recreation, aesthetics, wildlife, wilderness and others.
- Individuals have a responsibility to make informed decisions and take positive action on natural resource issues.

Center Goals

Trees For Tomorrow programs will help participants develop:

- Awareness, knowledge and understanding of natural resources and related issues, including the social and economic impacts now and for the future.
- Skills needed to understand and make informed decisions regarding the management and wise use of natural resources.
- Attitudes and values for the motivation to actively participate in the management and wise use of natural resources.



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