

Winter Ecology Post-Visit Activities

A visit to the Central Wisconsin Environmental Station can be a school-year highlight for both students and their educators. We feel the knowledge and concepts gained during a Station visit apply outside the Station as well. The following activities will allow students to expand their knowledge and help them incorporate those lessons into their everyday lives. Feel free to pick from and modify these activities as best suits your group.

Activity One: Foot Load Experiment

Materials

- ◆ Foot Load Data Sheet
- ◆ Pencils
- ◆ Foot Load graphing chart (11x17)
- ◆ snowshoe
- ◆ calculator

Preparation

Familiarize yourself with the foot load data sheets and the concept of foot load. Find a place outdoors at your school where you can demonstrate the effect snowshoes/big feet have on getting through the snow.

Activity

A great way to begin this activity is with your students outside, walking around in the snow. Have them walk in an area that has not been trampled flat and note how far they are sinking into the snow. Do they like to walk in deep snow? What is the difference about walking in snow thigh deep versus ankle deep? (*It slows you down, it is much harder, it takes a lot of energy, you get real warm and waste energy, you may fall down and have a hard time getting back up.*) Tell them that animals have to contend with snow everyday during winter. Many small mammals like mice live under the snow, while bigger mammals must travel on top of the snow. Bring your students back inside and brainstorm a list of how they think animals contend with deep snow. They will most likely come up with just big feet. Point out that big feet are an adaptation. What are some examples of animals that have big feet?

Introduce the concept of foot load. Tell them that how deep an animal sinks in the snow depends on how big their foot is and how much they weigh. This is called foot load and is the weight per area of foot. Animals that have a large foot load sink more than animals with a small foot load. Tell the students that today they are going to figure out how much foot load each of them has.

Divide the students into groups of four. Hand out the foot load graphing charts. Have each student trace his or her foot on the graph. Count the number of squares inside their shoe print, including $\frac{1}{2}$ and $\frac{1}{4}$ squares. Add up the total number of whole squares, plus $\frac{1}{2}$ times the number of $\frac{1}{2}$ squares, plus $\frac{1}{4}$ times the number of $\frac{1}{4}$ squares. This is the area of their foot in square centimeters.

Now have the students record their weight in the appropriate blank. They will need to divide by 2 to find the weight on one foot. Use the conversion table to figure out their weight in grams. To

Central Wisconsin Environmental Station

University of Wisconsin - Stevens Point
10186 County Road MM - Amherst Junction, WI 54407

Winter Ecology Post-Visit Activities

do this, they find their weight in pounds on the top of the line and read the number below it. This is in kilograms. Have them record this in the kilogram blank on their worksheet. Now have them take the number of kilograms times 1000. This is the number of grams. Have them fill in the grams blank on the worksheet, then have them divide the number of grams they weigh by the area of their foot. This is their actual foot load value.

Once they have figured out their foot load, look at the foot load index of different animals. Compare and contrast different animals – which are more likely to travel well in deep snow? Which would have a hard time? What are other adaptations that an animal with a large foot load might have to get around (long legs, strong chest to push through snow, etc.)? What type of animal would your students rather be to get around in snow?

Activity Two: A Day in the Life

Materials

- ◆ Board space
- ◆ Library/Internet access
- ◆ paper/pencils

Preparation

Be familiar with winter adaptation strategies of a variety of different Wisconsin animals.

Activity

While students were at CWES, they learned about a variety of different ways an animal can adapt to the winter environment. Review with the class the concepts of microclimate, adaptations, and predator/prey relationships and how they apply to the winter environment. Brainstorm with the class a list of animals that tolerate winters in Wisconsin. Have students pair up and pick one of these animals. Working together, students must find out everything they can about how that animal survives the winter at CWES. Information should include adaptations, preferred habitat (including any microclimate conditions it may be best suited for), how it finds food, etc.

Tell your students that they are going to write a story about the animal they have researched. The story will be set in mid-February, on a day where temperatures are about 10 degrees Fahrenheit, and there is approximately three feet of snow on the ground. Have students write in the viewpoint of the animal, telling everything the animal must do to survive in a 24-hour period. Students should answer the following questions in their story. Where does it find shelter? How does it maneuver through snow? How does it find and get its food? What kind of habitat/microclimate does it prefer? When does it rest? Is it hunter or hunting? Does it have any run-ins with predators? Does it escape? If so, how?

Students can accompany their story with illustrations or artwork on the cover. Once finished, have students share their stories with each other. You may want to compile them into a classroom book.

Winter Ecology Post-Visit Activities

Activity Three: Microclimate Experiment

Materials

- ◆ Thermometers
- ◆ Meter sticks
- ◆ paper/pencils
- ◆ 4 or 5 outdoor sites with different microclimates

Preparation

Review the concept of microclimate and how it may affect animals' survival. Locate 4 or 5 outdoor sites around your school that have different conditions on a regular basis (by the school entrance, in a field/open area, under a shrub, etc.) Try to pick days that have similar conditions to those you had at CWES (temperature, wind, cloud cover, etc.)

Activity

This is a continuance of the Winter Severity lesson at CWES. Review with the students what a microclimate is and factors that can affect climate conditions (sun, cover, wind, snow depth, etc.) Divide students into groups and give each group a different site. Students should measure temperature, snow depth, wind, slope, and animal activity at their site. Record measurements on a sheet of paper. Bring the students back inside and compare their findings. Where was the most activity? The least? Are there other factors that might be involved (i.e. people around)? This can be very effective if you measure at least twice during the day – when students first get to school and when they are getting ready to leave. What are the major changes? Compare their findings with those that they got at CWES. Are there any similarities or differences?

You can extend this activity by having students take the same measurements at different places around the community (home, grocery store, park, etc.) Do they notice any major differences in temperature? It may be warmer if they are in a city than it was at CWES. The urban areas tend to produce more heat (cars, houses, businesses, all concentrated together) than more rural areas. Students can investigate the truth of this matter by comparing their findings with the measurements they did at CWES or at another rural site near them.

Activity Four: Winter Survival

Materials

Copies of a survival story for the class (Gary Paulsen's books *Hatchet* or *Brian's Winter* are excellent choices.)

Paper/pencils

construction paper

Internet and/or library access

Preparation

Make sure you are familiar with the survival story you choose. Review the survival needs covered at CWES and make sure the students will remember the survival scenarios they did before coming to CWES (Pre-visit Activities, Activity 6.) You may need to have those on hand.

Winter Ecology Post-Visit Activities

Activity

Review the survival concepts covered while students were at CWES. Have students read the survival story you have chosen. When students have finished reading, discuss with them the strategies that the character(s) used to survive. Were they ever not successful? Did they use techniques that the students learned about at CWES? Remind them of the survival activity they did before they went to CWES. Would they survive using the items they chose to bring? Did they cover all the survival needs?

Have your students use the information they learned at CWES as well as information from their story, from the library, or from the Internet to create a survival guide for children. The guide should include the seven basic survival needs (positive mental attitude, air, shelter, heat, rest, water, food) and ways that they can meet those needs if lost or stranded. The guide should cover ways to prevent becoming lost or stranded, as well. (For example, be familiar with territory, carry maps and compass, stay with your group, etc.) Ingredients for a survival kit could be included. Students may even want to create a survival kit for themselves, for trips with family or for field trips.

Good Internet Survival sites include:

Winter in the Wilderness: <http://www.nps.gov/yose/wilderness>

Survival Basics: <http://www.adventuresports.com/asap/product/mpi/basics.htm>

Kid's Kit: http://www.adventuresports.com/asap/product/mpi/kids_kit.htm

Safety and Survival: http://creativelinks.com/recreat/sfty_srv.htm

Activity Five: Salty Waters

Materials

- ◆ Bucket of rock salt
- ◆ Bucket of sand
- ◆ Three pieces of sheet metal, approx. one square ft. each and approx. 1-2 cm. thick
- ◆ Three plastic ice cream buckets
- ◆ Tablespoon for measuring

Preparation

Review the insert and familiarize yourself with the Four Laws of Ecology. Go into the activity with an open mind. This lesson encourages students to think of different possibilities.

Encourage the students to think of everyday occurrences that they witness that may or may not affect our environment.

Activity

Students will look into the ways that salt affects both humans and wildlife during the winter. Ask students if they have ever seen snowplows shooting salt out behind as they drive around? Why are they doing that? Where does the salt go? (It may end up in waterways, dissolve, or be consumed by wildlife.) How can an excess of salt affect our natural environment? Introduce them to the four laws of ecology if they were not learned at CWES and ask them how these

Winter Ecology Post-Visit Activities

apply to salt use in the winter. Make sure you discuss the positive effects salt has for humans during the winter months as well (it melts snow and ice, making streets and sidewalks safer for us all).

Have students conduct an experiment that will explore the effect salt has on our automobiles. Do the experiment outside to imitate natural conditions. Place three pieces of sheet metal outside in a location where they may be readily observed (the outside part of a windowsill may work nicely if accessible). Spread two tablespoons of salt evenly over one of the pieces. Do the same with sand to the other piece of metal. Leave the third piece completely void of salt or sand. Add more salt or sand to the metal whenever it appears that either one has dissolved or run off. Observe the appearance of the metal sheets during the next couple of weeks. Ask students to consider which piece is rusting first? Is one rusting more than the others? Which ingredient had to be replaced the most? The salt used had to have gone somewhere after it dissolved – where did it go?

Freeze two ice cream buckets solid with water. Place the containers outdoors to imitate natural conditions. Spread two or three tablespoons of salt over one bucket, sand over the second bucket and leave the third as is. Check the buckets at hour intervals throughout the day to observe the effects of salt and sand. Have the students add two tablespoons to each bucket during each observation. Record the times that it took for each bucket to melt completely. Salt should turn the ice to water fastest. Sand will have little effect on the ice, unless the sun is out or it is below freezing. It mainly provides traction. Have students imagine that the bucket with salt is the Wisconsin River or any river near you during the winter. Notice there is salt build-up all along the bottom of the bucket. How will this salt affect the fish in the river? Think ahead twenty, thirty, or even one hundred years. What would the bucket look like then? What happens to the aquatic wildlife over time? NOTE: At what concentration salt begins to have an effect on fish is not well known. This activity is mainly to have students look at the positive and negative effects of their actions (salt use) on the environment.

Pull the activities together by reviewing the positive and negative effects of salt use. How can students affect how much salt is used in their neighborhoods? How *might* the continuous dumping of snow (with salt in it) affect the future of the Wisconsin River (or your neighborhood rivers)? Think of alternatives to salt use during the winter or other ways to help reduce the amount of salt that affects the environment.

Winter Ecology Post-Visit Activities

The Four Laws of Ecology

Everything is connected to everything else

All things that exist in our natural environment are connected to all other things in some way. A person cannot dump toxic waste into the river without affecting the fish and the animals that feed on the fish – possible leading back to humans that dumped the toxic waste in the first place.

Everything must go somewhere

When something is placed into the environment, it does not simply disappear. A dead animal decomposes and becomes part of the nutrients in the soil. When salt is discharged onto our streets and sidewalks, that is not the end of its cycle. It must go somewhere when it is dissolved.

Nature Knows Best

All things that occur naturally without human influence tend to be best for the environment. That is not to say that humans have no business in nature. This law is implying that major changes in nature caused by humans usually tend to be detrimental to the natural environment. Any time someone alters the natural state of a plant, animal, or human, there is likely to be some sort of negative effect rather than a positive one.

There Is No Such Thing As a Free Lunch

In nature, every gain has some sort of cost associated with it. This law goes along with the first one, following the idea that everything is interconnected.