| **Indiana Dunes**  **Education** | National Park Service  U.S. Department of the Interior  **Indiana Dunes National Lakeshore**  **Education Department** | National Park Service Logo |
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**Reflections On Snow**

**Summary:**

Discover why Indiana Dunes has one of the largest diversity of plant species in the National Park System. Explore many habitats, such as open dunes, forested dunes,wetlands or oak savannas that support rare species and this abundance of life.

**Objectives:** students will be able to

1. Name ways to protect and respect park resources, including animals in winter.
2. Draw and explain a “story in the snow” using tracks and animal signs
3. Identify adaptations that enable animals to survive the winter.
4. Identify animal homes and animal tracks.
5. Name forest animals that are hibernating and that are active in the winter.



**What to expect on during your trip:**

Students will be presented with indoor winter ecology activities and an outdoor winter ski or hike if there isn’t enough snow. Often the groups split in two with half outside while the other half is inside. Rangers will also work with teachers to adapt the indoor/outdoor portions to specific requests.

**Setting:**

Paul H. Douglas Center for Environmental Education and Miller Woods. Trailis about one mile long

**Grade:**

5th – 12th grade.

**Ratio of students to ranger:**

up to 15 is ideal. However, due to staffing limitations, we will try to accommodate larger groups within reason and with teacher’sassistance.

**Safety Issues:**

Trips /falls while hiking/skiing, cold weather. It is important to have students dress appropriately for the weather.

**Background Information:**

Winter is a harsh time for plants and animals. Through specialized adaptations and features, nature survives the bitter cold, lack of available water and food, and diminished light supply during this challenging time. The presence or lack of snow has profound effects on specific species of plants and animals as well.

Since the beginning of time, the human species has had to deal with the weather and adapt to the conditions of the seasons. Perhaps winter has necessitated the need for the most creative functions. Examples of this can be seen by the use of snowshoes and skis.

**Prerequisite Classroom Activities:**

Prior to your visit to the Indiana Dunes National Lakeshore we suggest that you read over the following activities and incorporate them into your classroom teaching before or after your visit.

1. Have students draw a collage of winter scenes.

2. Cut out snowflakes and explain why each snowflake is unique.

3. Have students describe their room at home.

What would they need in this room to survive if they stayed there all winter?

4. Ask the class to make up an imaginary animal. They should draw it and its tracks. They might want to write a story about where it lives and what it eats.

5. Winter Scavenger Hunt Activity

Winter Scavenger hunts give opportunity for children to look closer at nature.

Have them look for signs of struggle, i.e. feathers, fur or blood on ground, predator/prey relationships, berries, ice formations, etc. Here are ideas you could put into your hunt:

* something that shows its winter

Something used for warmth in winter

Something that is asleep for winter

Something that tells us spring will come

Something this is the beginning of a food chain

Something an animal uses for its home

Something used by people today in winter

6. Temperature Adaptations:

When the ground is covered with snow, use a thermometer to compare the temperature above and below the snow. Discuss the insulating qualities of snow which will be demonstrated if the air temperature is well below freezing. Contrast air temperature between sun and shade.

7. People Tracking:

- Have two people, one relatively tall and the other short, walk side by side in snow. Have another person run alongside.

- Have the group notice the differences in the tracks.

- Now have two or more people make a “story in the snow: with the rest of the group not looking and then trying to figure out what happened.

- Use the information they figured out when you go out and look for animal tracks.

8. You’re one of a Kind: (sets the tone for exploration)

- Form a circle and hand out pinecones to each person.

- Tell them to examine it so carefully that they would be able to pick it out of a whole pile of pinecones.

- During the next minute or two they look at it, feel it, smell it, then put all the cones in a bag.

- Teacher dumps them out on the ground.

- Each person must find his or her pinecones.

- Afterwards ask them to explain what made their cone unique.

- Sum up mentioning even though all cones seem alike they are “one of a kind”,

Just like all other things in nature.

**Vocabulary:**

There were no words in the English language to adequately name the type of snowfall, so researchers use combinations of Northern Indian and Eskimo words.

**API (a-pee)** the entire body of snow on the ground.

**PUKAK (pu-cock)** -The bottom layer of **API.** The earth radiates heat that is trapped by all the snow. So the bottom snow melts and forms small caves and tunnels and prepares a habitat for lots of small creatures. Animals are protected from predators and seeds and water is available.

If ice forms on top of snow, it restricts the air exchange - vegetation decaying in the **PUKAK** can cause too much hydrogen sulfide which in turn causes animals to get "drunk". They come out of their tunnels and run around in circles and often become dinner. Temperature is usually 33-34 degrees.

**SIQOQTAQ (sik-ak tuk)** -Icy covering over the top of **API** formed by melting and refreezing or by rain on the snow. Means "the snow that makes the caribou's legs bleed".

**UPSIK (up-sick)** -Snow that's been drifted over a wind-driven lake. It's hardpan snow and you cannot break through it. All the crystal edges have broken off. If you hit it with an anvil, the anvil would ring.

Wolves and moose use it to travel on in winter because it's much easier to traverse than deep powder.

**QALI (ka-le)** -Snow that collects on the trees above the ground. It eventually breaks the branches off the trees. (Some trees have evolved to have shorter branches.) Causes openings (forest windows) in the forest canopy, especially in the North Woods.

The tree breaks off and next spring surrounding trees grow bigger branches.

Those trees, of course, break off because there's more weight from the snow and the opening spreads.

This can increase to 5 acres and then it usually stops because the wind blows the **QALI** off the trees. The whole process of succession then begins.

**QALI** also bends over black spruce and cedar to form habitats for animals. Such as rabbit and deer.

**Adaptation** any alteration in the structure or function of an organism or any of its parts that results from natural selection and by which the organism becomes better fitted to survive in its environment.

**Ecology** the branch of biology dealing with the relations and interactions between organisms and their environment, including other organisms.

**Organism** a form of life composed of mutually interdependent parts that maintain various vital processes.

**Migration** to pass periodically from one region or climate to another, as certain birds, fishes, and animals

**Food Web** a series of organisms interrelated in their feeding habits, the smallest being fed upon by a larger one, which in turn feeds a still larger one, etc.

**Illinois Content Standards:**

The Reflections on Snow program can assist teachers in meeting the following Science Proficiencies.

**Late Elementary:**

11.A.2a Formulate questions on a specific science topic and choose the

steps needed to answer the questions.

11.A.2b Collect data for investigations using scientific process skills

including observing, estimating and measuring.

11.A.2d Use data to produce reasonable explanations.

12.A.2a Describe simple life cycles of plants and animals and the

similarities and differences in their offspring.

12.A.2b Categorize features as either inherited or learned (e.g., flower

color or eye color is inherited; language is learned).

12.B.2a Describe relationships among various organisms in their

environments (e.g., predator/prey, parasite/host, food chains and

food webs).

12.B.2b Identify physical features of plants and animals that help them

live in different environments (e.g., specialized teeth for eating

certain foods, thorns for protection, insulation for cold

temperature).

12.E.2a Identify and explain natural cycles of the Earth’s land, water and

atmospheric systems (e.g., rock cycle, water cycle, weather

patterns).

12.E.2b Describe and explain short-term and long-term interactions of the

Earth’s components (e.g., earthquakes, types of erosion).

13.A.2a Demonstrate ways to avoid injury when conducting science

activities (e.g., wearing goggles, fire extinguisher use).

13.B.2c Identify and explain ways that science and technology influence

the lives and careers of people.

13.B.2f Analyze how specific personal and societal choices that humans

make affect local, regional and global ecosystems (e.g., lawn and

garden care, mass transit).

**Middle/Junior High School:**

11.A.3a Formulate hypotheses that can be tested by collecting data.

12.A.3a Explain how cells function as “building blocks” of organisms and

describe the requirements for cells to live.

12.A.3b Compare characteristics of organisms produced from a single

parent with those of organisms produced by two parents.

12.A.3c Compare and contrast how different forms and structures reflect

different functions (e.g., similarities and differences among

animals that fly, walk or swim; structures of plant cells and animal

cells).

12.B.3a Identify and classify biotic and abiotic factors in an environment

that affect population density, habitat and placement of organisms

in an energy pyramid.

12.B.3b Compare and assess features of organisms for their adaptive,

competitive and survival potential (e.g., appendages, reproductive

rates, camouflage, defensive structures) .

13.A.3a Identify and reduce potential hazards in science activities (e.g.,

ventilation, handling chemicals).

13.A.3c Explain what is similar and different about observational and

experimental investigations.

13.B.3c Describe how occupations use scientific and technological

knowledge and skills.

13.B.3e Identify advantages and disadvantages of natural resource

conservation and management programs.

**Early High School:**

11.A.4a Formulate hypotheses referencing prior research and knowledge.

11.A.4b Conduct controlled experiments or simulations to test hypotheses.

11.A.4e Formulate alternative hypotheses to explain unexpected results.

12.B.4a Compare physical, ecological and behavioral factors that influence

interactions and interdependence of organisms.

12.B.4b Simulate and analyze factors that influence the size and stability

of populations within ecosystems (e.g., birth rate, death rate,

predation, migration patterns).

13.B.4b Analyze a particular occupation to identify decisions that may be

influenced by a knowledge of science.

13.B.4c Analyze ways that resource management and technology can be

used to accommodate population trends.

**Late High School:**

11.A.5a Formulate hypotheses referencing prior research and knowledge.

12.A.5a Explain changes within cells and organisms in response to stimuli

and changing environmental conditions (e.g., homeostasis,

dormancy).

12.B.5a Analyze and explain biodiversity issues and the causes and effects

of extinction.

12.B.5b Compare and predict how life forms can adapt to changes in the

environment by applying concepts of change and constancy (e.g.,

variations within a population increase the likelihood of survival

under new conditions).

13.A.5c Explain the strengths, weaknesses and uses of research

methodologies including observational studies, controlled

laboratory experiments, computer modeling and statistical studies.

13.B.5e Assess how scientific and technological progress has affected other

Fields of study, careers and job markets and aspects of everyday life.

**Extension or Follow-up Activity**

Class reflection paper or writing sample:

Ask each student to write a short essay, letter or story about what they learned on their field trip to Indiana Dunes National Lakeshore. Rangers love receiving mail from their students. Send the ranger the packet of essays from your class (or a copy of them), and your ranger will send your class a certificate from the dunes. Send your essays to:

Indiana Dunes National Lakeshore

1100 N. Mineral Springs Road

Porter, IN 46304

Attn: Your ranger’s name or just Education Department

If you are using this essay as a class assignment for a grade, we would like to suggest that each essay contain the following elements. Use the rubric below to score them.

\* The name of the park and the location of their field trip—for example: Douglas Center, Indiana Dunes National Lakeshore

\* Three facts they learned on the field trip about the habitats of the dunes.

\* A brief explanation of why Indiana Dunes is unique and therefore a national park.

\* At least two things the student can do to help take care of his or her national park.

\* Fill in the blank of this statement and provide an explanation:

I would like to learn more about \_\_\_\_\_\_\_\_\_\_ at Indiana Dunes.

\*\*\* For advanced groups, add the following element:

Tell the park rangers if you would like to bring your families and friends to the dunes and if so what would you do here and where would you go.

**Assessment:**

**Grading for Class reflection writing assignment:**

1. **Writing and organization**- ***4 points*** the writing sample is very well written and organized by the elements provided. It has a strong introduction, middle and conclusion. ***3 points*** the writing sample is well written and organized by the elements provided. It includes an introduction, middle and conclusion. ***2 points*** the writing sample is choppy and is not well organized. It lacks an introduction or conclusion. ***1 point***the writing sample is very short and unorganized.
2. **Grammar & Spelling-** ***4 points*** Mistakes in spelling and grammar are minor or non-existent. ***3 points*** Mistakes in spelling and grammar are minimal—about 4-5. ***2 points*** mistakes in spelling and grammar are numerous—5-10. ***1 point*** mistakes in spelling and grammar are more than 10.
3. **Facts and content**- ***4 points*** the writing sample demonstrates the student’s learning on the dunes program and includes three or more facts provided by the park staff. ***3 points*** the writing sample demonstrates the student’s learning and includes only two facts provided by the park staff. ***2 points*** the writing sample does not demonstrate much learning and only includes one fact provided by the park staff.***1 point*** the writing sample does not demonstrate any learning and does not include any facts provided by the park staff.
4. **National Park Service theme** - ***4 points*** the writing sample clearly demonstrates the student’s understanding of the role of the NPS in preserving the dunes by explaining why Indiana Dunes is such a unique treasure.***3 points*** the writing sample mentions the NPS and its role in preserving the Indiana Dunes. ***2 points*** the writing sample mentions the NPS and Indiana Dunes. ***1 point*** the writing sample does not mention anything about the NPS or its role at Indiana Dunes.
5. **Stewardship-** ***4 points*** the writing sample lists three things the student can do to assist in taking care of the Indiana Dunes. ***3 points*** the writing sample lists two things the student can do to assist in taking care of the Indiana Dunes. ***2 points*** the writing sample lists one thing the student can do to assist in taking care of the Indiana Dunes. ***1 point*** the writing sample does not list anything about what the student can do to take care of the Indiana Dunes.