Dickinson County Nature Center
Winter Outdoor Education– Snowshoeing

Activity Time

45-60 minutes

Program Alignment with Iowa Core Curriculum

Investigative questions

- How did Native Americans use snowshoes?
- How do snowshoes help you walk through snow?
- How did snowshoes help Native Americans and European Colonists survive in the winter?

Investigative phenomena

- Students will be able to experience the use of snowshoes and how it makes moving across snow much easier.

Practices (SEPs)

- Students will be able to explore the world around them by the use of snowshoes.
- Students will be able to use snowshoes to play a series of games and also enjoy a nature walk.

Cross Cutting Concepts students will identify

- Students will observe how using snowshoes makes walking across snow easier.
- Students will be able to see how the use of snowshoes help distribute their weight and makes it harder to sink into the snow.

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Development Date: December 2018

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Dickinson County Nature Center
Winter Outdoor Education– Snowshoeing

Supplies

All supplies brought by the nature center unless otherwise arranged.

-Snowshoes

-Buckets or cones

-Relay items

Program Overview

Background

Snowshoes allow people to walk across deep snow. They help to distribute weight of the walker so they do not sink into snow. Snowshoes are an old invention that have allowed people all over the world to traverse winter landscapes to hunt, fish, and live in even the deepest of snow. Although there is no exact date of when snowshoes were invented, ancient people have recorded their use in paintings on rock walls.

In North America, native people lived in forests filled with soft fluffy snow. This made traveling hard, but they were able to make traversing the landscape easier by creating snow shoes out of wood, animal hides and other organic materials. Native Americans from all over North America, created snowshoes that worked in different snow conditions. Often times, the designs of these snowshoes were inspired by the animal kingdom. Snow shoes shaped like, bear paws, moose hooves, and beaver tails were very common to see.

During European Colonization, Europeans learned to craft snowshoes from the Native Americans. They quickly started to adapt and modify snowshoes into their own styles. Europeans would use snowshoes to explore the wilderness landscapes for food and resources. The use of snowshoes was a vital part of the French fur trade industry.

Snowshoes were vital in helping Native Americans and European Colonists survive in the harshest of landscapes. Snowshoes are still used today by both outdoor professionals and outdoor enthusiasts alike! Snowshoeing is a great activity that is very easy for most to pickup and learn.

Procedure

I find this process works the smoothest, if you have snowshoe pairs lined up on the ground from smallest pair to largest. I then have students line up from shortest to tallest to make sure smaller students get smaller snowshoes and larger students have larger snowshoes.

1) Naturalist will first introduce students to the basic parts of their snowshoes. Components such as the Decking, Frame, Bindings, and Crampons will be pointed out and their function will be discussed.

2) Students will be instructed to loosen their bindings as much as possible so their toes will fit into the toe holds of the binding.

3) After they have their toe holds in, they will be asked to slip the back of the binding around their heel.

4) Once they have their toes and heels in, they will be asked to get the snowshoes nice and snug around their toes and heel. We want them to fit snuggly, to insure they stay on and work properly.

5) Naturalist and teachers will go around from student to student to make sure all snowshoes are on nice and snug.

6) Once the snowshoes are secured, the naturalist will lead the students through a series of activities and a nature hike. Some activities may include a walk like an animal race, relay races, and obstacle courses. These are fun activities that help the students get acclimated to their new adaptation as well help the naturalist insure everyone has their snowshoes on before we adventure out on a nature walk.

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Dickinson County Nature Center
Winter Outdoor Education– Basic Orienteering

Activity Time

45 minutes

Program Alignment with Iowa Core Curriculum

Investigative questions

- What is a compass used for?
- Who were the first people to invent the compass?
- How can you use a compass when out hiking?

Investigative phenomena

- Students will be able to gain first hand experience in the correct use of a compass.

Practices (SEPs)

- Students will be able to learn how to use a compass correctly.
- Students will be able to use a compass and create geometric shapes in the snow.

Cross Cutting Concepts students will identify

- Students will be able to observe how a compass works while working as a team to create their geometric shapes.
- Students will be able to learn about a new navigation system they could use while recreating.

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Dickinson County Nature Center
Winter Outdoor Education– Basic Orienteering

Supplies

All supplies brought by the nature center unless otherwise arranged.

- Compasses
- Cones or Cups
- Shape Cards

Program Overview

Background

A compass is a tool used in navigation and shows direction in relation to the geographic cardinal directions (N,S,E,W). The invention of a compass had a huge impact on early explorers, sailors and navigators of the world. Early explorers used the sun and the stars to guide their way, however when weather was poor and these were not visible this made their journey across land or sea very difficult!

The Chinese were the first to discover that magnetized iron ore, or lodestone if uninhibited by gravity and friction would orient itself to point north. Although the invention of the compass revolutionized travel and exploration the first uses of a compass were for spiritual purposes such a fortune-telling.

A compass works by detecting the Earth's natural magnetic fields. The compass points north due to the fact that all magnets have a north pole and south pole. The north pole is always attracted to the south pole of magnets. The earth is a natural magnet that can interact with other magnets in this same way. So the north end of the compass is always going to align with the earth's magnetic field (Earth's south pole).

Procedure

1) The naturalist will start by going over the parts and pieces of a compass. (base plate, housing, read bearing marker, red, shed, direction of travel arrow (FRED).

2) After students are familiar with the parts of a compass, the naturalist will direct them on how it used.

1) Students hold the compass flat (parallel to ground), with Fred pointing away from their belly button. KEEP FRED POINTING AWAY FROM YOU AT ALL TIMES!

2) Once Fred is positioned correctly. The students will need to turn the dial to set a bearing.

Example: If they want to go east they will need to set their bearing to 90 degrees. They must turn their dial until 90 degrees is lined up perfectly with the Read Bearing Here marker.

3) Now that the bearing is set, students must keep their compass nice and flat with FRED pointing their way. They must than slowly turn their whole body until RED is the SHED. Do not turn the compass or dial or just turn at your waist. Slowly turn your WHOLE BODY until RED is in the SHED!

4) Once RED Is in the SHED! You follow FRED!

5) At this point, the naturalist will give the students some bearings to find. The Naturalist will call out the bearing and students must correctly use the compass to point in the direction they would travel.

6) After doing this a few times. The naturalist will give the student groups two or three shape cards, cones, or cups. The students will have to set the bearing and then walk a certain number of paces. If they set their bearings correctly and walk the correct number of paces, students make a shape. If you do this in the snow. They should be able to clearly see their shape in the snow. (See following sheet for bearing and paces)

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COMPASS SHAPES GAME

Bearing	Paces
120°	10
210°	10
300°	10
30°	10

COMPASS SHAPES GAME

Bearing	Paces
120°	5
210°	10
300°	5
30°	10

COMPASS SHAPES GAME

Bearing	Paces
30°	5
90°	5
150°	5
270°	10

COMPASS SHAPES GAME

Bearing	Paces
60°	10
180°	10
300°	10

COMPASS SHAPES GAME

Bearing	Paces
30°	5
150°	5
270°	5

COMPASS SHAPES GAME

Bearing	Paces
74°	10
144°	10
216°	10
288°	10
360°	10

COMPASS SHAPES GAME

Color	Shape
blue	square
green	rectangle
orange	triangle
yellow	triangle
pink	pentagon
purple	trapezoid

Dickinson County Nature Center

Winter Outdoor Education– cozy critters

Activity Time

30 minutes

Program Alignment with Iowa Core Curriculum

Investigative questions

- How do animals stay warm in the winter?
- Do all animals stay in Iowa during the winter?
- What are some methods animals use to create shelter?
- Do you think that snow helps insulate animal dens?

Investigative phenomena

- Students will be able to find and modify a small den site for their "mammal"
- Students will be able to use tools to measure the external temperature of their den site and mammal.

Practices (SEPs)

- Students will be able to explore the environment and choose what (where?) would make a great den location for their mammal.
- Students will explore what it means to be warm blooded and the needs of a warm blooded animal.

Cross Cutting Concepts students will identify

- Students will identify what will make a good den site for their mammal.
- Students will work in groups to find and modify a great den site for their mammal.

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Dickinson County Nature Center
Winter Outdoor Education– Cozy Critters

Supplies

All supplies brought by the nature center unless otherwise arranged.

-Thermometers

-Film canisters or small jars with lids

-Warm water

Program Overview

Background

A typical winter in Iowa is cold, dark, snowy and a bit blustery. So how do animals survive these tough weather conditions? Well, animals have adapted over time to have many ways to survive these harsh conditions. Some of our wildlife are snow intolerant meaning they migrate to warmer temperatures across the globe. Some animals are snow tolerant meaning they adjust with no special adaptations. They generally stick around but are much less active. They will either go into hibernation or torpor. Then there are of coarse our snow lovers. They are well adapted to living in winter environments.

Although animals have adapted to living in winter environments in many ways, winter can be a very challenging time for all animals. When winters get unusually harsh- winterkill can happen. Winterkill is the combined effect of starvation, harsh weather, disease spread and predation.

Animals that decide to stay and live have many adaptations such as thick fur, fat storage, warm blood and camouflage. They also have the ability to cache food and find shelter. In today's lesson students will be able to explore the phenomenon of microclimates. In this lesson students will be able to discover a surprising array of varied temperatures as they find a den for their mammal.

Procedure

1) The teacher and naturalist will create groups of 2 or 3 students. Students will be told to go find the perfect place for their "mammal" to rest.

2) During this time, students can select, create and modify a small den site for their small mammal. They may use natural, non-living, materials to insulate their den site.

3) Once all the dens are ready, get the students back together, and create a control small mammal. Fill one container with water, take its temperature, and set it out in the open without a den.

4) Assemble and fill all the remaining containers with warm water. Make sure the caps are secure. Have students run out to their dens and place their mammal in the den. (Leave for 10-15 minutes)

5) Once all students have reassembled, take the students on a den site tour. Have the students explain their reasoning for location and material used.

6) After all the dens have been toured, have students retrieve their mammals.

7) Collect the control and all vials. Take the temperature of all the vials. The mammal with the highest temperature wins! Temperatures within 5 degrees of the winner, survive! Those with temperatures more than 5 degrees below the winner perish due to hypothermia.

8) When finished ask some follow up questions. How many microclimates did we create today?, Which microclimates where the warmest? Coolest?, What factor(s) helped the dens to be warm or cool?, Would different weather conditions alter the effectiveness of the dens that were created?

Modified from Wolf Ridge Environmental Learning Center- Finland, MN

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Dickinson County Nature Center

Winter Outdoor Education– How much Water is in Snow?

Activity Time

30 minutes

Program Alignment with Iowa Core Curriculum

Investigative questions

- How much water is in snow?
- How can we figure out how much water is in snow?
- Why is it important to know how much water is in snow?

Investigative phenomena

- Students will be able to find the answer to our question, "How much water is in snow?" by collecting snow in different conditions and melting the snow to see how much water is located in snow.

Practices (SEPs)

- Students will learn why it is important to know how much water is in snow.
- Students will be able to learn through hands on investigation.

Cross Cutting Concepts students will identify

- Students will be able to identify how different snow types may have different water content.

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Winter Outdoor Education– How Much Water is in Snow?

Supplies

All supplies brought by the nature center unless otherwise arranged.

- Jars or tins
- Rulers
- Shovels
- Markers
- Warm water bath, hot plate, or fire to melt the snow

Program Overview

Background

Snow Water Equivalent (SWE) is a very common snowpack measurement. It is the amount of water that is found within the snowpack. The measurement is essentially the depth of water that would present if you instantaneously melted all of the snow.

The Snow Water Equivalent is used by the Natural Resource Conservation Service (NRCS) and the United States Forest Service (USFS) to help forecast streamflow measurements in the spring of the year. This measurement is used to help determine the amount of water that will be found in the lakes, rivers, and streams. By finding this measurement, scientists are able to make management suggestions, plan their research and help forecast flooding in areas.

Today, we will use a simple experiment to find out how much water is found in our local snowpack. Students will take snow from different levels of the snow pack and from various locations to see if the amount of water located in snow varies by location and which level of snow you are taking it from.

Procedure

1) Explain to students what Snow Water Equivalent is and why it is used by scientists. Explain that they will be finding SWE of different areas of the Nature Center property.

1) The top of the snow in full sun

2) The top the snow in a shaded area

3) Collect snow from 6 inches below the surface in full sun

4) Collect Snow from 6 inches below the surface in a shaded area

5) Find a snow drift and collect snow from the snow drift

2) Divide the students up into groups of 2 or 3. Depending on group size you may assign a couple groups the same snow collection perimeter.

3) Give each group their jar or tin can, small shovel, and ruler (if needed). Have them go fill their jar with snow

4) Have students mark off with a dry erase marker the fill line from the snow in the jar.

5) Place the jars full of snow in a warm water bath in the sinks of the Nature Center. If you used a tin can you could potentially place near or above fire. Leave until snow is melted.

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