Dickinson County Nature Center
Glacial Landmark Tour
Grades 4-12

Field Trip Time

9:30 a.m.-2:10 p.m.

Program Overview

Background

The Iowa Great Lakes portion of Dickinson County resides in the Des Moines Lobe region of the state. Continental glaciers helped affect much of Iowa's landscape, but the Des Moines Lobe was the last part of the state touched by glaciers, and you can still see actual shapes that resulted from these. The landscape lacks a cover of windblown silt, so the remnants of glacial movement have not been filled in and are still obvious. For instance, large crevices within the ice were filled with deposits of sand and gravel when the glaciers melted, and those deposits remain as kames today. Bowl-shaped depressions called kettles, like the Freda Haffner Kettlehole outside Milford, were created when large, isolated blocks of clean ice melted slowly. Nearly all of Iowa's natural lakes are found in the Des Moines Lobe, including East and West Lake Okoboji and Big Spirit Lake.

While on this driving and hiking naturalist-led tour, students will be able to explore these glacial land features firsthand. Students will be able to hike around a kettlehole, walk on an esker, explore knob-and-kettle terrain, touch glacier erratics and observe a groundwater-fed fen.

Itinerary

10-40 students: Students will participate as one group and travel to the sites together. The bus route will follow the "Bus A" itinerary below.

40-80 students: Schools will divide their students into two groups. Itineraries for both groups is below.

Bus A	Bus B
9:30 A.M. Meet at Shucks Bait	9:30 A.M. Meet at Templar Park
9:35-10:35 Freda Haffner Preserve	9:35-10:35 Kettleson Hogsback
10:45-11:10 Cayler Prairie	10:50-11:20 Lunch at Dickinson County Nature Center
11:25-11:55 Silver Lake Fen	11:50-12:20 Silver Lake Fen
12:20-12:50 Lunch at Dickinson County Nature Center	12:35-1:00 Cayler Prairie
1:05-2:05 Kettleson Hogsback	1:10-2:10 Freda Haffner Preserve
Click for Google Map Route	Click for Google Map Route

Contact
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Development date: December 2018

Dickinson County
CONSERVATION BOARD

Dickinson County Nature Center
Glacial Landmark Tour — Freda Haffner Preserve

Activity Time

60 minutes

Program Alignment with Iowa Core Curriculum

Investigative questions

- How did glaciers help to form this land feature?
- Was the Little Sioux River formed by glacial movement?
- How many different habitat types are located in this area?

Investigative phenomena

- The naturalist will lead students through an interactive demonstration using teamwork and body movement during which students can see how a kettlehole was formed. After the demonstration students will be able to go a on hike around the kettlehole and see the Little Sioux River Watershed. While on their hike, students will observe the native flora and fauna of the area and the landscape.

Practices (SEPs)

- Students will make observations about the land formations around the kettlehole, such as the Little Sioux River Valley and the knob and kettle terrain.
- Students will explore the restored prairie as they hike to view the biodiversity of the area.

Cross Cutting Concepts students will identify

- Students will be able to describe the cause and effect relationship between glacial movement and the landforms that were left behind.
- Students will be able to describe the structure and function of glaciers and how they helped to form our unique landscape.
- Students will be able to describe the flow and movement of glacial recession.

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Dickinson County Nature Center
Glacial Landmark Tour — Freda Hefner Kettlehole
Side 2

Supplies

All supplies brought by the nature center unless otherwise arranged

- Game Pieces

Program Overview

Background

Northwest Iowa contains geological formations known as "kettleholes." These land formations were created when large blocks of ice and sediment broke off of a glacier and melted, making large, bowl-shaped indents in the ground.

Over time, these large indentations filled with precipitation and glacial melt, leaving behind three natural communities. First, there is a wetland ecosystem, which contains wetland vegetation such as cattails and sedges, aquatic invertebrates and even muskrats. Second, there is a dry gravel prairie on the ridgetops. Last, there is a wet mesic prairie, created in the floodplains. These three ecosystems work together to support life for more than 360 plants, 34 bryophytes and lichens, and numerous rare and endangered plants, mammals, birds and butterflies.

Procedure

1) The naturalist will begin by welcoming students to the Freda Haffner Preserve and explain that this property is owned and managed by The Nature Conservancy. Before setting out on the hike, remind students to stay on the trail as they hike.
2) Next, students will follow the naturalist along the trail until they get to the kettlehole. Students will be asked to sit and quietly observe the kettlehole. Students will than be asked to share what they are observing.
3) After making observations about the kettlehole, students will be asked if they know how the kettlehole was formed.
4) Students will than be asked to participate in an interactive game, during which they can visually see how the kettlehole was formed.
5) Students will than go on a naturalist hike around the kettlehole to observe the it, the Little Sioux River, and the natural landscape.
6) If time remains after the hike, students will be given the opportunity to explore the prairies of the Freda Haffner Preserve.

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Dickinson County Nature Center
Glacial Landmark Tour — Cayler Praire State Preserve

Activity Time

25 minutes

Program Alignment with Iowa Core Curriculum

Investigative questions

- How was the landscape of this area formed?
- How has the landscape of this area changed over time?
- What plants and animals would live in this type of habitat?
- What is a virgin prairie?
- What is a National Natural Landmark?

Investigative phenomena

- The naturalist will walk students over to the National Natural Landmark dedication spot and explain the historical importance of the area.

Practices (SEPs)

- Students will investigate Cayler Prairie to discover the biodiversity of the area.
- During their investigation, students will obtain information about the prairie and what animals/plants live there, evaluate their findings and communicate the information they gathered to the rest of the class.

Cross Cutting Concepts students will identify

- Students will observe patterns in plants and animals of the area that make them uniquely adapted for living in a prairie.
- Students will identify the cause and effect relationship glaciers had on our landscape and how they created massive change in the area over time.

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Dickinson County Nature Center
Glacial Landmark Tour — Cayler Prairie State Preserve
Side 2

Supplies

All supplies brought by the nature center unless otherwise arranged.

- Optional: A knife to cut open goldenrod galls and find the larva inside

Background

With more than 1,000 acres, Cayler Prairie is one of Iowa's largest native prairies. Botanist Ada Hayden first discovered the prairie in 1944 when she recognized tallgrass plants growing in a hayfield. She recommended it be preserved as one of the last remaining patches of old-growth tallgrass prairie in Iowa. The Cayler family had owned the property since frontier settlement and in 1958 decided to sell the land to the Iowa Conservation Commission.

Cayler Prairie was designated as a National Natural Landmark in 1965 because of its increasingly rare virgin prairie landscape — meaning it has never been plowed or otherwise disturbed. National Natural Landmarks are areas that have been recognized for their outstanding displays of geological and ecological history of the United States. The program was created in 1962 to encourage the preservation and conservation of these historical sites. Tallgrass prairie used to cover about 70-80 percent of Iowa, and over the past 150 years has dwindled down to less than 1 percent, making Cayler Prairie a preserved example of the natural history of the state. Many native plant and animal species call this unique habitat home including the prairie rose, dickcissel, northern harrier and more than 40 species of butterflies!

Cayler Prairie's unique knob and kettle topography was formed as a result of the receding glaciers that were here 12,000-14,000 years ago. As the glaciers melted, they created various potholes and ridges on the landscape.

Procedure

1) The naturalist will begin by welcoming students to Cayler Prairie and leading them to the National Natural Landmark dedication area. They will discuss what a National Natural Landmark is, what a virgin prairie is and the importance of each.

2) Next, students will follow the naturalist along the mowed path to gain a clearer view of the prairie. They will be asked to make observations, and the naturalist will explain how glaciers left the knob and kettle terrain.

3) Based on their observations, students will be asked to hypothesize what plants and/or animals may live in Cayler Prairie. The naturalist will lead a short discussion on the biodiversity of the area. They will find a prairie rose — Iowa's state flower — to show the students and point out a few other plants or animal sign.

4) Students will then be given the opportunity to freely explore the area and discover what plants, animals, animal homes, scat, and other findings the prairie has to offer.

5) After about 15 minutes, the students will all rejoin the naturalist and share what they found/discovered while exploring the prairie. Students will then load the bus and continue to the next stop on the tour.

Dickinson County
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Dickinson County Nature Center
Glacial Landmark Tour — Silver Lake Fen

Activity Time

30 minutes

Program Alignment with Iowa Core Curriculum

Investigative questions

- What is a fen?
- How are fens formed?
- What minerals are found in the groundwater of the Silver Lake Fen?
- Why are fens fragile ecosystems?
- What is a flark?

Investigative phenomena

- Students will learn about the Silver Lake Fen and how it was formed as they explorate flarks and the bouncy terrain the fen as to offer.

Practices (SEPs)

- As a group, students will plan and carry out an investigation to test how deep a flark is at the Silver Lake Fen.
- Students will construct an explanation as to why the fen has a bouncy feeling as you walk across it.

Cross Cutting Concepts students will identify

- Students will identify the effect retreating glaciers had on the landscape and how these changes caused the formation of the Silver Lake Fen.

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Dickinson County Nature Center
Glacier Landmark Tour — Silver Lake Fen

Side 2

Supplies

All supplies brought by the nature center unless otherwise arranged.

- Meter stick

Program Overview

Background

A fen is a peat-forming wetland dominated by sedges, grasses and rushes where calcium and magnesium-rich groundwater flows out onto the land surface creating a constantly saturated, but not flooded, habitat. Due to the peat in the fen, the surface will become bog-like over time and the ground will bounce as you walk across it. At the Silver Lake Fen the peat ranges in depth from 16-19 feet with pools of water up to 10 feet in length. These pools are called flarks and are depressions or hollows in a fen that have filled with water. Flarks are thought to form when the peat at the base of the fen becomes so thick it slides down due to its own weight, leaving a window into the peat.

The Silver Lake Fen was formed thousands of years ago by ancient glacial activity. As the glaciers melted, sand and gravel were deposited on top of glacial till. This created an underground path, allowing groundwater to seep to the soil surface. Due to their constant source of water and nutrient-rich soil, fens are able to support a very diverse plant and animal community.

According to the Iowa Natural Heritage Foundation, among 200 plant species found on fens, 5 percent are listed as threatened or endangered. The Silver Lake Fen is home to 108 different plant species, including many rare species such as grass of parnassus, arrowgrass, lesser bladderwort and hooded ladies tresses. The rare Baltimore checkerspot butterfly calls this fen home as do seven different snail species. Additionally, the area provides nesting and feeding habitat for the upland sandpiper, sage wrens, snipe and sora rails.

Procedure

1) The naturalist will begin by explaining to students what a fen is, how it is formed, and why it is a fragile habitat. Students will be reminded to be respectful of nature, especially at this location, and to take care and be cautious when walking through the fen.

2) The naturalist will lead the students in a single-file line to the fen and will point out the flarks to the students and remind students not to step in them, because they are a lot deeper than they appear. The naturalist will give students the opportunity to guess how deep the flarks are, then they will use a meter stick to get an estimate of the depth.

3) Next, the naturalist will split the students into two groups. Groups A and B will separate themselves so they are about 20-30 feet apart. Group A will then be asked to jump on the count of three, while group B stands still. The students will notice how the water ripples when all the students jump and group B will notice they feel the ground move, even though they are several feet away from group A. Next, group B will jump and group A will feel the ground move. Students will then be asked to make guesses as to why the ground feels bouncy.

4) After the students make their guesses, the naturalist will remind students what peat is — a soil-like material made of partially decomposed plant matter — and will ask if they think it would be firm or bouncy to walk across.

5) Next, students will be asked to take a deep breath in. Some of the students may have noticed the fen has a rotten egg-like smell. This smell is thanks to the peat and the partially decaying organic matter they are walking on.

6) The naturalist will continue to lead students through the fen in a single-file line. Students will follow the naturalist in a zig-zag fashion and will be given plenty of opportunities to make observations about the fen, discover what animals live there, and enjoy the bouncy terrain.

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Dickinson County Nature Center
Glacial Landmark Tour — Kame

Activity Time

30 minutes

(If time permits after lunch)

Program Alignment with Iowa Core Curriculum

Investigative questions

- What is a kame?
- What substrate makes up this kame?
- How many habitat types do you see from the kame?

Investigative phenomena

- Students will be able to climb the kame and explore the substrate that was moved here by glaciers.

Practices (SEP)

- As a group, students will be able to explore what substrate has created the kame.
- Students will construct an explanation as to why the kame is formed from a gravel and rock substrate rather than a rich soil.

Cross Cutting Concepts students will identify

- Students will identify the effect of melting and retreating glaciers and how this land formation was created.
- Students will be able to identify the soil type that makes up the kame and how it differs from the soil in the prairie.

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Dickinson County Nature Center
Glacier Landmark Tour — Kame

Side 2

Supplies

All supplies brought by the nature center unless otherwise arranged.

- Garden shovels

Program Overview

Background

Kames are hills or mounds made of sand, gravel and glacial till — otherwise known as soil — that accumulated in a low spot on a glacier that was melting and retreating. When the glacier melted, all the sediment on top of it landed of the surface of the ground and created a hill-like mound.

Kames can be easy to identified because of what they are made of. They are generally sandy and rocky instead of being made up of the main soil type of the land on which they sit. They are also usually just one mound on flat ground instead of part of rolling hills.

Procedure

1) The naturalist will lead students to the top of the Kenue Park kame. From here, the students will be directed to silently make observations about the habitats, land features and man-made structures they can see.
2) After students have made observations, students will be able to share what they have seen and point out what they have seen to the class.
3) After students have been able to enjoy the view, the naturalist will divide them into groups. Students will be given a garden shovel and bucket. They will be asked to dig a small hole and discover what the kame is made of.
4) After students have been given the opportunity to dig up soil, they will be asked to describe what their soil is made of. The naturalist will show students soil from the prairie and wetland, and students will be able to hypothesize why the soil makeup of the kame is so different than the surrounding area.
5) After evaluating the soil and talking about how a kame formed, students will hike down the kame to the bus.

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Dickinson County Nature Center
Glacial Landmark Tour – Kettleson Hogsback WMA

Activity Time

60 minutes

Program Alignment with Iowa Core Curriculum

Investigative questions

- What is an esker?
- How did glaciers form this landscape?
- What different habitat types can be found at Kettleson Hogsback?
- Why is the water level of Sunken Lake lower than the nearby lakes?

Investigative phenomena

- Students will discover what an esker is by walking along one and observing the steep slopes that were formed as glaciers retreated through the area.

Practices (SEPs)

- Students will be able to use evidence in the landscape to construct an argument that thousands of years ago glaciers moved through the area and formed the landscape we see today.

Cross Cutting Concepts students will identify

- Students will identify patterns in land features created by glaciers.

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Glacier Landmark Tour — Kettlesone Hogsback WMA
Side 2

Supplies

All supplies brought by the nature center unless otherwise arranged.

Program Overview

Background

Kettleson Hogsback is a 2,040-acre wildlife management area home to six lakes, various marshes, a native prairie, an oak forest and grasslands. The variety of the habitat types make it rich in biodiversity and an excellent place for wildlife viewing. Almost 300 bird species have been recorded at Kettleson Hogsback, including various waterfowl species, shorebirds, pelicans, grebes, osprey, vireos, rose-breasted grosbeaks and 28 species of warblers. Additionally, the area provides much needed habitat to more than 30 species currently listed as either threatened or endangered.

The "hogsback" that Kettleson Hogsback was named after is an esker that was formed by glaciers more than 10,000 years ago. An esker is a long, winding ridge. It was created when a glacier left behind melt water and sediment as it retreated. Streams that flowed through tunnels in and below the ice left the sediment behind in long ridges, like upside down river beds. The hogsback ridge rises 40 feet and narrowly separates Marble Lake on the east and West Hottes Lake on the west.

Procedure

1) The naturalist will begin by walking students to the area between West Hottes and Sunken lakes and ask students to make observations about the two lakes. The naturalist will then ask students to specifically look at the water level. Does one lake seem higher or lower than the other? Why does Sunken Lake have a lower water level? It's because it's a glacial kettlehole!
2) The naturalist will then explain to the students what an esker is and how it was formed.
3) Next, the naturalist will guide students down the trail on the esker and will encourage students to make observations and take notice of the steep slopes on the esker.
4) After students have time to hike the trails of Kettleson Hogsback, the naturalist will lead the group in an activity about mindfulness. Each student will be released, one at a time, to silently walk back to the bus. There will be about a 15-second spacing between students, and students will be asked to not try and catch up with the student in front of him or her. Students will be encouraged to take this time to enjoy the peace and quiet nature has to offer and make observations without any distractions. They may notice something they did not notice before.
5) After all the students have hiked back to the bus, the naturalist will ask a few students to share their experiences of walking in nature by themselves. What did they hear, smell, see or feel?

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