



Museum Field Trips

Lessons At-A-Glance

2017-2018

About our Field Trip Activities

Visitors to the Montana Natural History Center learn that naturalists use science, art, and writing to study and learn about the natural world. The subjects and skills highlighted in our museum field trips are hands-on, interdisciplinary, and encourage students to see themselves as naturalists.

Our goal is to encourage students to ask questions, make observations, and improve engagement and critical thinking skills. While each lesson has different objectives, the aim is to create learning environments where students can share their unique curiosity about nature.

Our field trip lessons are organized around a central question that students and instructors will answer together.

- ***Animals in Winter:*** How do animals adapt to winter conditions? They will learn the concepts “hibernator,” “tolerator,” and “migrator.”
- ***Bird Beak Bonanza:*** How does the shape of a bird’s beak affect its diet? Students will learn the terms “structure” and “function,” and about birds who are “generalists” whose beaks allow them to eat a variety of foods, and birds who are “specialists” with beaks adapted to specific types of food.
- ***What’s That I Hear?*** How do birds use sound for communication? Students will learn about differences between bird song and bird calls and explore sound waves and how sound travels.
- ***Lewis and Clark—Being Naturalists:*** How do explorers communicate their discoveries? Students will focus on communicating observations through scientific drawing and descriptive writing and will practice creating observational journal entries and map-making.
- ***Outrageous Owls:*** What characteristics do owls have that make them excellent nighttime hunters? Students will investigate owls through exhibit hall exploration and analysis of owl features.
- ***Skull Detectives:*** What can the characteristics of a skull tell us about the animal it belongs to? Students will explore skulls of familiar Montana animals, learn about traits that indicate animal behavior, and will use that knowledge to make inferences about unidentified skulls.

Please see the following pages for more information about activities, learning objectives, assessment, and Next Generation Science Standards embedded in each lesson.



Animals in Winter

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| <p>Curriculum Strands Addressed</p> | <p>Ecological Knowledge Connections Creative Arts</p> | | | | | | |
| <p>Essential Question</p> | <p>How do animals in Montana adapt to winter conditions?</p> | | | | | | |
| <p>Objectives</p> | <ul style="list-style-type: none"> ▪ Students will identify adaptive characteristics of Montana animals that indicate whether they are migrators, hibernators, or tolerators in winter, during an exploration of the museum exhibit hall. ▪ Students will draw a real or imaginary animal that migrates, hibernates, or tolerates winter, and will be able to clearly identify adaptive characteristics using words and drawings. | | | | | | |
| <p>Activities</p> | <ul style="list-style-type: none"> ▪ Exhibit hall exploration and animal categorization ▪ Montana winter animal drawing ▪ Adaptation dress-up activity (optional) | | | | | | |
| <p>Assessment</p> | <p><u>Formative:</u> Instructor will observe student understanding of the concepts <i>migrator</i>, <i>tolerator</i>, <i>hibernator</i>, and <i>adaptation</i> during the exhibit exploration, and adjust explanation of concepts accordingly.</p> <p><u>Summative:</u> Students can correctly identify and match adaptive characteristics to winter behavior in their final animal drawing.</p> | | | | | | |
| <p>NGSS Standards Met</p> | <table border="1"> <tr> <td data-bbox="521 1413 711 1528"> <p>Disciplinary Core Ideas</p> </td> <td data-bbox="711 1413 1279 1528"> <p>LS1.A: Structure and Function LS4.C: Adaptation ESS2.D: Weather and Climate</p> </td> </tr> <tr> <td data-bbox="521 1528 711 1633"> <p>Cross Cutting Concepts</p> </td> <td data-bbox="711 1528 1279 1633"> <p>Patterns Structure and Function</p> </td> </tr> <tr> <td data-bbox="521 1633 711 1766"> <p>Scientific and Engineering Practices</p> </td> <td data-bbox="711 1633 1279 1766"> <p>Asking questions and defining problems Developing and using models Constructing explanations and designing solutions</p> </td> </tr> </table> | <p>Disciplinary Core Ideas</p> | <p>LS1.A: Structure and Function LS4.C: Adaptation ESS2.D: Weather and Climate</p> | <p>Cross Cutting Concepts</p> | <p>Patterns Structure and Function</p> | <p>Scientific and Engineering Practices</p> | <p>Asking questions and defining problems Developing and using models Constructing explanations and designing solutions</p> |
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Bird Beak Bonanza

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| Curriculum Strands Addressed | Ecological Knowledge Naturalist Tools and Skills Connections | | | | | | |
| Essential Question | How does the shape of a bird’s beak affect its diet? | | | | | | |
| Objectives | <ul style="list-style-type: none"> ▪ Students will understand that different forms have different functions in relation to food collection during a “Fill the Bill” activity ▪ Students will match beaks with food examples in a group picture-matching activity ▪ Students will learn the terms “structure” and “function,” and describe the structure and function of a bird’s beak in an exploration of the exhibit hall, as well as classify the bird as a “generalist” or “specialist.” | | | | | | |
| Activities | <ul style="list-style-type: none"> ▪ Fill the Bill experiment ▪ Beak-to-food matching ▪ Exhibit hall scavenger hunt | | | | | | |
| Assessment | <p><u>Formative</u>: The extent to which students can draw conclusions in the beak-to-food matching activity.</p> <p><u>Summative</u>: Students can identify a beak’s structure, function, and whether it is a generalist or specialist given a worksheet and time to explore the exhibit hall birds.</p> | | | | | | |
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What's That I Hear? Exploring Bird Calls and Nature Sounds

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| Curriculum Strands Addressed | Ecological Knowledge Naturalist Tools and Skills Connections Creative Arts | | | | | | |
| Essential Question | What are the functions of bird calls and bird songs? | | | | | | |
| Objectives | <ul style="list-style-type: none"> ▪ Students will practice observational skills related to birding in the Fort Missoula Native Plant Garden (can be modified for other locations) ▪ Students will identify major functions of bird calls and bird songs ▪ Students will explore sound waves and how sound travels | | | | | | |
| Activities | <ul style="list-style-type: none"> ▪ Initial outdoor listening activity ▪ Interactive “bird song” matching game ▪ Native Plant Garden sound map | | | | | | |
| Assessment | <p><u>Formative</u>: Instructor will note student ideas about bird calls and bird songs during the engagement activity and adapt lesson content to this knowledge.</p> <p><u>Summative</u>: Instructor will note the clarity of observations and illustrations in the sound maps students create.</p> | | | | | | |
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Lewis and Clark: Being a Naturalist

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| Curriculum Strands Addressed | Naturalist Tools and Skills Connections Creative Arts | | | | | | |
| Essential Question | How do explorers communicate their discoveries? | | | | | | |
| Objectives | <ul style="list-style-type: none"> ▪ Students will use descriptive writing to record observations about the environment at the Native Plant Garden at Fort Missoula (can be modified for other locations) ▪ Students will use scientific illustration to record observations ▪ Students will practice orienting themselves in their surroundings in making a map of the Native Plant Garden ▪ Students will learn to use tools that are helpful in communicating observations, such as a loupe, a bug viewer, and a compass | | | | | | |
| Activities | <ul style="list-style-type: none"> ▪ Drawing activity from Lewis and Clark’s journals ▪ Observational journaling or map-making ▪ Peer exploration of student journals or maps | | | | | | |
| Assessment | <p><u>Formative</u>: Instructor checks in with individual students during journaling/map-making activity to offer help or clarify tool use.</p> <p><u>Summative</u>: Students will either successfully follow another student’s map around the garden, or guess the subject of a student’s journal entry based on descriptions and drawings.</p> | | | | | | |
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Outrageous Owls

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|--------------------------------------|--|-------------------------|--|------------------------|------------------------------------|--------------------------------------|---|
| Curriculum Strands Addressed | Ecological Knowledge Connections Creative Arts | | | | | | |
| Essential Question | What characteristics do owls have that make them excellent nighttime hunters? | | | | | | |
| Objectives | <ul style="list-style-type: none"> ▪ Students will be able to name the parts of an owl, given an owl specimen for reference ▪ Students will communicate the predatory function of owl characteristics, given visual examples and discussion | | | | | | |
| Activities | <ul style="list-style-type: none"> ▪ Owl exploration and drawing ▪ Hands-on explanation of owl characteristics ▪ Optional pellet dissection or exhibit hall exploration | | | | | | |
| Assessment | <p><u>Formative</u>: Instructor will take note of students' owl drawings to address what they know and do not know about owl characteristics.</p> <p><u>Summative</u>: As a class, students will identify traits and predatory function of an owl specimen at the conclusion of the lesson.</p> | | | | | | |
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Skull Detectives

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|--------------------------------------|--|-------------------------|---|------------------------|---|--------------------------------------|---|
| Curriculum Strands Addressed | Ecological Knowledge Naturalist Tools and Skills Connections | | | | | | |
| Essential Question | What can the characteristics of a skull tell us about the animal it belongs to? | | | | | | |
| Objectives | <ul style="list-style-type: none"> ▪ Students will identify parts of a skull and use these traits to identify the animal it belonged to from an identification key ▪ Students will draw conclusions about animal behavior given its skull structure | | | | | | |
| Activities | <ul style="list-style-type: none"> ▪ Skull feature exploration ▪ Mystery skull identification | | | | | | |
| Assessment | <p><u>Formative</u>: During the mystery skull identification, instructor will check in with groups to assess student understanding.</p> <p><u>Summative</u>: Students will successfully identify mystery skulls using observation and an identification key.</p> | | | | | | |
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Curriculum Strands at a Glance

There are four strands of learning present in MNHC’s Museum Field Trip curriculum:

Ecological Knowledge refers to learning about organismal structure and function, animal adaptations, species traits that allow for classification, and the relationship between animals and their habitat.

Naturalist Tools and Skills refers to learning about and practicing with instruments that allow us to observe the world quantitatively and qualitatively, as well as ask questions and analyze observations.

Connections refers to learning about our local environment and establishing a relationship with it using the senses.

Creative Arts refers to learning how to communicate observations, ideas, and feelings about the natural world as a writer and an artist.

See below for more information about which strands are addressed in each lesson.

| | Ecological Knowledge | Naturalist Tools and Skills | Connections | Creative Arts |
|--|----------------------|-----------------------------|-------------|---------------|
| Animals in Winter | X | | X | X |
| Bird Beak Bonanza | X | X | X | |
| What’s That I Hear? Animal Sounds | X | X | X | X |
| Lewis and Clark: Being a Naturalist | | X | X | X |
| Outrageous Owls | X | | X | X |
| Skull Detectives | X | X | X | |

Strand Learning Goals

Ecological Knowledge:

- Students will understand organismal structure and function
- Students will understand adaptation and evolution relating to animal species and characteristics
- Students will understand habitat characteristics as they relate to animals

Naturalist Tools and Skills

- Students will understand how to use basic naturalist tools and instruments to make observations
- Students will develop questioning and analytical skills relating to ecological knowledge

Connections

- Students will understand change over time in Montana, and current plant life and wildlife
- Students will interact with representations of local wildlife and plant life using their senses

Creative Arts

- Students will use language arts to communicate their observations of nature, flora, and fauna
- Students will use drawings to communicate their observations of nature, flora, and fauna