



Curriculum Guide



Blair/DeSoto NWR Outdoor Education Partnership
Blair Community Schools
DeSoto & Boyer Chute National Wildlife Refuges

Revised 2019-2020



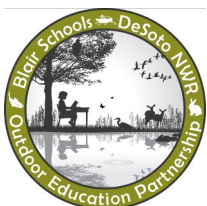


Blair DeSoto Environmental Education Partnership
Blair Community Schools and DeSoto National Wildlife Refuge



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Blair DeSoto Environmental Education Partnership

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Mission Statement

Creating a sense of wonder and stewardship through environmental education in an outdoor classroom, a partnership with Blair Community Schools, “Where All Students Learn,” and DeSoto National Wildlife Refuge, “Where Wildlife Comes First.”

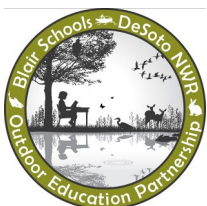
We achieve this mission by:

- Empowering students and teachers to have authentic, learning experiences in nature’s outdoor classroom
- Connecting students with the environment and related issues
- Provide an opportunity for education to be fun and challenging
- Creating a partnership for environmental education that meets Blair Community Schools and Nebraska State Standards
- Recognizing and sharing the accomplishments of the partnership with the community

This partnership would not be possible without The Friends of Boyer Chute and DeSoto National Wildlife Refuge. Their contributions of countless volunteer hours and financial support help us to succeed.



Friends of Boyer Chute
& DeSoto NWR





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Strategic Plan Goals

1. Provide every student with the opportunity to experience environmental education in the outdoor classroom.
2. Provide a diversity of inquiry-based, cross-curricular lessons.
3. Secure funding through diversified revenue streams.
4. Create an infrastructure to achieve quality and sustainability.
5. Evaluate and quantify program results.
6. Maintain a dedicated environmental education position at DeSoto National Wildlife Refuge.
7. Develop an advanced program.
8. Promote the program to families and the community.

Goal 1:

Provide every student with the opportunity to experience environmental education in the outdoor classroom.

Rationale: Joining students with nature in the outdoor classroom will instill a sense of wonder and broaden the students' natural curiosity to learn about the environment. This will build a stewardship with the students and the environmental issues we currently face. Learning in the outdoor classroom will help develop the students' observation, problem-solving, critical thinking, and communication skills.

Goal 2:

Provide a diversity of inquiry-based, cross-curricular lessons.

Rationale: Utilizing the outdoor classroom in conjunction with a traditional classroom can enhance student learning in core subject areas. Expanding the curriculum to follow the route of the migratory waterfowl allows the students to study geography as well as social studies and cultural studies of people along the flyway. Language arts skills are enhanced by writing about learning experiences. Fine arts are utilized through drawings, paintings, or pictures of their outdoor experience. Exploratory technology can be incorporated through digital photography, blogs, video storyboards, software, and computer use.

Goal 3:

Secure funding through diversified revenue streams.

Rationale: Funding is provided by Blair Community Schools, DeSoto National Wildlife Refuge, Blair Community Foundation Grant, The Friends of Boyer Chute and DeSoto National Wildlife Refuge, and various other grants. We will continue to actively seek alternative funding sources as well as local corporate sponsor to secure the future financial health of the program.





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Goal 4:

Create an infrastructure to achieve quality and sustainability.

Rationale: Build on the program to produce the highest educational standards while responsibly managing associated cost. Create learning resources to attract families to Blair Community School for education.

Goal 5:

Develop formal evaluation techniques.

Rationale: Utilizing the students' field notes and naturalist journals, writing assignments, blogs, fine arts, exploratory technology displays, and open discussions of the outdoor learning experiences, teachers will be able to evaluate the level of understanding the students have achieved.

Goal 6:

Maintain a dedicated environmental education position at DeSoto National Wildlife Refuge.

Rationale: In order to provide continuity and stability in the environmental education program a full-time Environmental Education Specialist will be placed at DeSoto NWR. This is currently in place.

Goal 7:

Develop an advanced program.

Rationale: Provide an opportunity for students who demonstrate interest, ability and task commitment to participate in advanced learning opportunities using the DeSoto outdoor classroom. This program was pilot tested during 2012-2013 school year and will expand for the 2013-2014 school year.

Goal 8:

Promote the program to families and the community.

Use media, chamber of commerce, business and personal relocation companies and education websites to promote the partnership with Blair Community School and DeSoto National Wildlife Refuge.

At a Glance

Inspired by a visit of Blair Community Schools' teachers and administrators to the U. S. Fish and Wildlife's Prairie Wetlands Learning Center in Fergus Falls, Minnesota, the outdoor classroom partnership with Desoto National Wildlife Refuge was established in 2006. This partnership involves students in third grade, fifth grade, sixth grade, seventh grade, eighth grade and high school. These students will visit DeSoto National Wildlife Refuge six or more times in an academic year.

So far, the program has produced:

2006-07: 63 programs and 2,200 student visits

2007-08: 74 programs and 2,200 student visits and one educator workshop

2008-09: 89 programs and 2,954 student visits and one educator workshop





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- 2009-10: 79 programs and 2,887 student visits and one educator workshop
- 2010-11: 109 programs and 4,159 student visits and one educator workshop
- 2011-2012: 159 programs and 4,817 student visits and one educator workshop
- 2012-2013: 127 programs and 4,123 student visits and one educator workshop
- 2013-2014:

Programs

3rd Grade

- Late Summer Exploration
- Fall Exploration
- Winter Exploration
- Spring Exploration

5th Grade

- National Wildlife Refuge System Orientation
- Sense of Wonder
- Prairie Exploration
- Wetlands and Fall Migration
- Beavers
- Winter Tracking and Birding
- Eagles
- Sensory Awareness
- Outdoor Education Days

6th Grade

- Leaf Study and Inference Short Story
- Soil Composition, Erosion, Deposition, Floodplain
- Migrating Birds—The Canada Connection
- Physical Properties, Mass/Volume/Density Snow Study

7th Grade

- Habitat Lab Scavenger Hunt
- Insects
- Fish Sampling
- GPS Scavenger Hunt
- Bertrand Museum Tour and Artifact Conservation
- Bird Observation





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8th Grade:

- Descriptive Writing and Observation
- Five Themes of Geography
- Bertrand Site Measurements
- Leaf and Bark Rubbings
- Graphing Lesson Base on Data Collected at the Refuge

6th, 7th, and 8th Grades

- Exploratory technology after school program: teach digital photography, iMovie, Garage band, Photoshop, software producing movies, slideshows, podcasts, tripod and monopod use
- High Ability Learners– water quality labs

High School

- Ecosystem Observation Hike
- Biomes
- Use of Identification Books and Guides
- Soil Testing
- Water Quality
- Fire Ecology

Educator Workshops

- Various topics to enhance the teachers' knowledge of the refuge and the outdoor topics being taught
- Approximately twenty teachers, staff, and administrative personnel from Blair Community Schools, along with staff and volunteers at DeSoto NWR guide students in the outdoor classroom.





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Facilities and Resources

Blair Community Schools

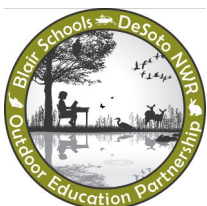
- Classrooms and auditoriums for lectures, and multi-media presentations
- Libraries
- Computer lab for research and enhancing technology skills

DeSoto and Boyer Chute National Wildlife Refuges and The Friends of Boyer Chute and DeSoto National Wildlife Refuge

- Visitor Center—wildlife displays, museum for the Steamboat Bertrand, and an indoor viewing gallery for wildlife during inclement weather
- Multipurpose Room— for optional classroom space
- Hiking trails and roads— explore all the major habitats on the refuge
- Open air shelter— rain or shine, the shelter can be used for lunch or class gatherings
- Thousands of acres of outdoor classroom include forest, prairie, and wetlands

Some examples of materials provided by DeSoto and Boyer Chute NWRs include:

- Bald Eagle Activity Kit—skull, talon and egg replicas
- Beaver Activity Kit—skull, pelt and tail
- Bird Activity Kit—binoculars, spotting scope and field guides
- GPS units—housed at Otte Middle School
- Insect Collecting Kit—nets, containers and field guides
- Library and Wildlife Films
- Pond Study Activity Kit—nets, magnifying viewers, trays, field guides and aquatic insect displays
- Tracking Activity Kit—field guides, rubbing plates, molds and stamps





KWHL In the Outdoor Classroom

A KWHL chart (**Know-Wonder-How-Learned) is type of graphic organizer that serves as matrix for planning and gathering information. It is an instruction activity developed by Donna Ogle (1986, National Louis University) which serves as a model for active thinking during reading. We adapt it for use in science. KWHL charts are excellent tools for identifying prior knowledge, developing a plan for investigation of a problem or topic, and summarizing newly acquired knowledge and skills. They are also an excellent tool to plan for field investigations in training students as scientists. A KWHL inquiry chart can include questions about predictions and/or implications. Additionally, these charts can be used as a basis to formulate a hypothesis, or research question, resulting in confirmation or denial as your research progresses.**

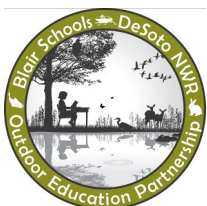
The use of KWHL charts engages students in active thinking as they determine:

What do we already Know? In this section students identify, share, and make connections to their existing knowledge. Misconceptions and disagreements may emerge that result in the formulation of questions for further investigation.

What do we Want or need to find out? Students determine what they want to learn. What do they **Wonder** about the topic? These statements can be easily revised into questions to be investigated in the field. Instructors may need to guide students in eliminating less relevant or practical questions from the brainstormed list which cannot be answered by the parameters of field work. Students develop essential questions and may also identify areas of disagreement for further investigation.

How are we going to find out? Students identify resources and develop a plan for gathering the information needed to answer their essential questions. Investigation processes, protocol, and tools can be included here. Primary and secondary methods can be identified. Primary resources could include ponds, prairie, observation, measurement, etc., while secondary resources may include field guides, Internet, encyclopedias, interviews, and other methods to be used after the investigation to extend the experience.

What have we Learned? In this section students identify and summarize their newly acquired knowledge and skills. These statements can be adapted for answers to their questions. What they have learned often leads to the development of additional essential questions for future investigation and/or a consensus of opinion.





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KWHL In the Outdoor Classroom

Additional columns may be added to fulfill the scientific process, such as Conclusions, New Questions for further investigation, and Recommendations. A column expressing **Why** the specified outdoor resource is important helps link their field work with the mission of the U.S. Fish and Wildlife Service (e.g. why is the prairie important?) With this framework, students can then write a scientific report or present a speech with all or many of the sections commonly used by scientists in communicating their results with other scientists and ultimately the public. The KWHL process naturally leads to continued investigation, increasing validity of results and/or expanding research.

Why Use KWHL?

KWHL allows students to discover more for themselves without front-loading of information and direction by instructors.

KWHL helps students find purpose in their learning. Students direct their learning and build on past knowledge, which seems to increase their loci of control, motivation for learning, and ownership in the investigation. Organizing information and making the process visible helps student tap into and possibly revise their organization of prior knowledge as they gain skills in thinking about thinking.

KWHL promotes higher-order thinking for both students and instructors, allowing for a genuine two-way exchange of ideas and thinking between both. Instructors may be pleasantly surprised by the type of knowledge and by the critical thinking students demonstrate.

KWHL parallels the scientific method and may directly support state and national academic standards for inquiry-based learning and use of the scientific method.

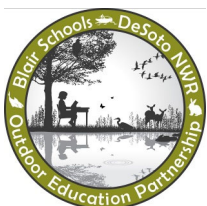
Training students as scientists in their use of the scientific method through investigation of the outdoor classroom supports the mission of the National Wildlife Refuge System and the vision of the U.S. Fish and Wildlife Service.

Challenges to Using KWHL

Instructors may experience fear and resistance because of inherent risk-taking involved in experimenting with a different and less familiar teaching approach.

KWHL may involve more “seat time” for students if time is not carefully managed.

Instructors need to be attentive to integrating the mission of the Refuge System where most appropriate. Consider adapting the chart with an additional column to ensure making this critical link.





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KWHL In the Outdoor Classroom

Resources

"The K-W-L: A Teaching Model that Develops Active Reading of Expository Text" by Donna Ogle. *The Reading Teacher* 39 (1986): 564-70.

Thematic Unit—Owls, by Fran Van Vorst, Teacher Created Materials, 1999.

Graphic Organizers, Enchanted Learning, <http://www.enchantedlearning.com/graphicorganizers/KWHL>

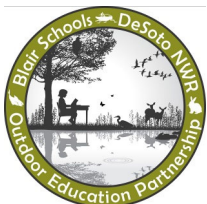
Inquiry 101, Thinking Like a Scientist, <http://www1.extension.umn.edu/environment/fwce/conservation-education/citizen-science/docs/fwce-thinking-like-a-scientist.pdf>

KWHL Chart Maker, <http://www.worksheetworks.com/miscellanea/graphic-organizers/kwhl.html>

K-W-L-H Technique, North Central Regional Educational Laboratory, <http://www.ncrel.org/sdrs/areas/issues/students/learning/lr1kwlh.htm>

Metacognition, an Overview, by Jennifer L. Livingston, <http://www.gse.buffalo.edu/fas/shuell/CEP564/Metacog.htm>

What are the benefits of constructivism? http://www.thirteen.org/edonline/concept2class/constructivism/index_sub6.html

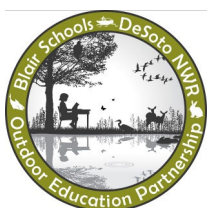




Nature Journaling

This nature journaling lesson contains the fundamentals of our philosophy towards nature journaling and the importance of journaling to environmental education. By reading this lesson, it will help inform the understanding of all other lessons where nature journaling is a component.

Overview	After a mini-lesson on nature journaling, students participate in a field activity, investigation, or lab, recording their observations, data, and discoveries in their field journals. Students share their results and reflect upon their discoveries, then determine how they will use their material in order to share their experience with others. Suitable for novice and experienced journalists alike.
Subjects Covered	Science, Language Arts, Math, Art
Skills Used	Observing, writing, sketching, sequencing, data collection, reflecting, and others depending upon the activity
Performance Objectives	<p>After completing this activity, students will be better able to...</p> <ul style="list-style-type: none"> • Define the word journal (a daily record of observations) • Correctly sequence the steps to using a nature journal (go outside, observe, record, reflect, use) • Name three ways of recording observations in a nature journal (words, numbers, pictures) • Recognize that observations are made using multiple senses (sight, sound, touch, smell) • Name four kinds of things that could be recorded in a nature journal (title, date, location, weather, observations, wonder, questions) • Suggest two reasons why to keep a nature journal (history, polished writing or art, connect with land, slow down, fun, relax, reflect) • Enjoy using a nature journal
Vocabulary	Journal, sketch, observation, reflect





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Nature Journaling

Background Information

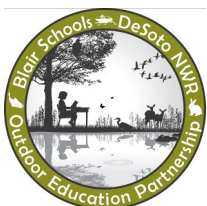
“The student may wonder at the time what good it all is. One answers that, first, it is always useful to have a record of one’s doings; but, more important, writing a fact makes one observe it better.”

-- Ernest Thompson Seton

The purpose of this lesson is to introduce nature journaling to elementary students. “Nature journaling is the process of keeping a place-based, personal record of events, observations, and experiences in the outdoors.” (Hofmann and Passineau) That process is typically an ongoing one and may start at the PWLC or continue and expand here for those who have already learned how to journal. Or, perhaps the school teacher simply wishes to allow students to dip into in a different method of keeping records and recording thoughts. Students learn journaling best, however, by journaling on a repeat basis as part of an ongoing process.

Compared to journals in general, a nature journal is unique in that *place* takes on a central role as the main subject along with the journalist as observer. “There is a deeper awareness of the setting, seasons, and other species.” (Hofmann) A journal may be a phenology log; a field guide to animals, plants, geology; and an explorer’s log of journeys and findings. It may also be a collection of reflections about a place and connections with it. Its content is not just intellectual or just emotional – it is *both*.

As learning tools, nature journals can serve a broad spectrum of purposes. A nature journal is a flexible teaching tool which is easily integrated with most academic subjects. It is adaptable to all learning styles and abilities and a source of endless individualization possibilities. Nature journaling provides opportunities for authentic learning which incorporates writing and drawing as major elements and therefore uses verbal, nonverbal, analytic, logical, spatial, and synthetic abilities. Using a journal allows students to lead their learning with their own questions making it student and inquiry driven. Journals can include both personal expressions and objective observations. Objective information might include scientific experiments, weather, wildlife behavior, and seasonal changes. Keeping a nature journal can be a powerful experience because it helps the observers slow down, carefully take note of their surroundings, make first-hand, concrete observations of nature, and become better observers. Good science depends upon keen observations, and nature journaling is an effective way to develop that skill.





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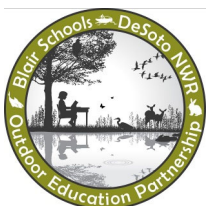


Nature Journaling

John Muir wrote in his journals “about the beauty he saw in nature. He also drew sketches detailing information about plants, animals, mountains, glaciers, and landscapes. He used his journals to compose letters to friends, articles, and books to share his love of nature, and to enlist people's support to preserve wilderness. Muir's journals gave him a wealth of recorded experience from which 10 books and over 200 articles were published. People continue to gain insight into nature's beauty and importance in our lives from his writings.” (Sierra Club) Likewise student journals can be a source of raw data and information from which to write poems, reports, and speeches or develop posters, songs, art, and other polished work.

Intertwined with its value as a learning tool, keeping a journal allows time for reflection and relaxation. It allows thinking and feeling with both head and heart as a naturalist, a combination of intellectual learning about the environment and emotional connection and attachment to a place. Rather than rushing through a natural area, students have personal time and a direct experience which can help them feel more connected to the land and develop a sense of place. A nature journal provides an opportunity to study the natural world, to grow a deeper relationship with the earth, to develop a greater awareness and caring for it. “For many students, life in the artificial environment of climate-controlled schools, malls, and automobiles make the natural environment seem peripheral and irrelevant. In addition, formal learning is increasingly based on electronic, prepackaged information transfer.” Yet science teachers know there is no substitute for direct experience to motivate and engage students. Done repeatedly over time, nature journaling offers sustained contact with neighborhood nature. Further, personally created nature journals provide students with ownership of their experiences and reinforces active learning. (Dirnberger, McCullagh, and Howick) Students capture and claim moments with the world around them.

Journal keeping is historical, used by individuals who left wisdom and knowledge through their journals. Through the ages, scientists, artists, authors, poets, explorers, and many others have kept journals to record their observations and experiences including Leonardo da Vinci, Carl Linnaeus, Thomas Jefferson, Meriwether Lewis and William Clark, John Muir, and more recently, Olaus Murie, Aldo Leopold, and Rachel Carson. Some naturalists even started a lifelong practice of journaling in childhood, including John James Audubon and Ernest Thompson Seton. Numerous occupations today require documentation in journals. Horticulturalists keep phenology journals to record plant growth. Museum exhibit curators keep a journal account of a specimen collection. Biologists rearing and releasing the endangered whooping cranes record daily observations of health information such as diet and weight as well as daily distances traveled following an ultra light aircraft. As a tool of many jobs, journaling is a valuable skill for students to develop.





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Nature Journaling

Journals can be started using a few simple tools: several sheets of loose leaf paper, a hard writing surface (a clipboard will suffice in the field), and a writing utensil. Consider binding papers together with a staple or two, providing multiple pages to use over a period of time. At the start of each journal entry, record the date, time of day, location, and weather (air temperature, wind speed and direction, description of the sky, etc.).

After recording this basic information, a student can choose something more specific to study. While in the field, students should be encouraged to record information without using field guides or other textbooks because this encourages them to improve their own observation skills. Back in the classroom, students can refer to their journal entries to research and find more information about what they observed. With advanced training and practice, they may even use their journals as a tool to accurately identify unknown plants and animals.

Although many students will need some help getting started, one need not be an expert naturalist, writer, or artist to guide others in nature journaling. Enthusiasm, a wide range of field activities, and journaling and discovering alongside students draws them in, inspires them, demonstrates the value of journaling, and allows instructors to enjoy the benefits of journaling, too. The instructor is more aptly named the collaborator, guide, coach, or facilitator.

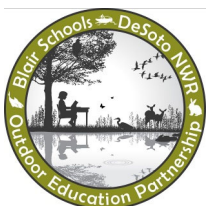
Nature is the true source of inspiration for a nature journal. Observing nature is more important than writing and is the heart of the journal. Students should observe first and write second because observing is what gives them something to write about. Once writing begins, it may be helpful to look back and forth between the page and the subject. Journals can also include sketches, rubbings, maps, colors, tables, measurements, questions, wonder, surprise, mystery, delight, and beauty. Avoid editing for spelling, grammar, and punctuation in the field. However, editing for accuracy in content is a valuable use of time and essential to the field journaling process. Key to deeper thinking, reflection time allows students to process their experience intellectually and emotionally, infer meanings, and draw connections and conclusions.

After students have completed their journal entries, providing an opportunity to share their observations with others in their group can further increase learning. Sharing provides students with the opportunity to show what they saw and learned. It can help students see the diversity of observations that can be made in nature and the diversity of journaling styles among students. Further, teachers are afforded a valuable glimpse at students' metacognition. Such is the journey that journaling can lead as students make discoveries about their home biome and also about themselves.

"I write to record the truth of our time, as best as I can see it...."

I write to make a difference....To honor life and praise the divine beauty of the world. For the joy and exultation of writing itself. To tell my story."

Edward Abbey, *One Life at a Time, Please*





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Nature Journaling

Teacher Preparation

To maximize outdoor classroom time at the PWLC, teachers may

Conduct steps 2-4 in the section “Nature Journaling Procedure” at school. Upon arrival at the PWLC, teachers may provide PWLC staff with a written list of what students know and wonder for quick review before heading out into the prairie.

Organize students into small groups at school, each led by a chaperone, and everyone wearing nametags.

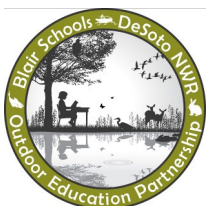
Please help save paper. Bring your students’ science notebooks or journals to record their field data and discoveries in. To make journals, see section “Make a Nature Journal,” visit http://www.sierraclub.org/education/nature_journal_template.pdf for a booklet template, or simply staple half sheets of paper together. If science notebooks or journals are not available, please inform the PWLC staff that you will need paper and clipboards when booking your date.

- Select which field investigation, activity, or lab your class will participate in. Please see section “Field Activity Options.” Please inform PWLC staff of your choice when booking your date.

We highly recommend conducting one or more of the suggested extensions before your visit in order to integrate this field investigation into the classroom study of nature, scientists, naturalists, writing, journals, animals, prairie, wetlands, habitat, or other topics. We believe such integration enhances student motivation for learning in other curricular areas. See section, “Teacher-Led Extensions/Adaptations/Assessment Ideas.” For suggested literature launchers, see section, “References and Resources.”

Staff Preparation

Gather materials and appropriate equipment depending upon the grade and topic selected. Choose which field site to use.





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Nature Journaling

Nature Journaling Procedure

1. In the classroom, welcome students, teachers, and chaperones to the Prairie Wetlands Learning Center.
2. Begin a mini-lesson on nature journals. Ask students to tell you what a nature journal is. Write down their responses as a list on the board. Appropriate responses might include a book with words, sketches, numbers, and observations that are honest and true. Add any items to the list that they did not mention.
3. Ask them how someone starts a nature journal – what steps would they follow? Write down their responses as a separate list on the board. Appropriate responses might include go outside, make careful and first hand observations, record observations such as weather, beauty, feelings like wonder and surprise, questions, meanings. Record what you find, the truth, not something imagined. Add any items to the list that they did not mention.
4. Ask student why someone would keep a nature journal? Write down their responses on the board as a third list. Appropriate responses might include to keep a record, to record history, to relax, to slow down, to reflect, to connect with the land, to use later for polished writing or art.
5. Show students examples of nature journals, yours and/or others. Show them examples of Ernest Thompson Seton's journals and read excerpts from page 87 of [By a Thousand Fires](#) by Julia M. Seton.
6. Ask students to open their own science notebooks or field journals to the next blank page. Depending upon the grade and field activity, show them how to set up their page as a data sheet with a title, date, location, and quadrants to collect and record information about their given topic.
7. Allow them to suggest what kinds of things they will record on this page for three of the quadrants, and provide each quadrant a subtitle accordingly. For example, if the class will go outside to observe birds, in one quadrant they might record how many different kinds of birds they see; in another, they might sketch their favorite bird; and in the third, they might write down as many adjectives as possible to describe their favorite bird. In the fourth quadrant, they do a contour sketch.
8. Explain and demonstrate how any necessary field equipment will be distributed and used. Provide that equipment to each chaperone to distribute to their small group of students.
9. Line up at the door and remind students that they are naturalists. How do naturalists behave outside? (respectful, quiet, in the moment, etc.)
10. Start by demonstrating how to do a contour sketch and allowing them time to do one in their journals. Lead a brief discussion on what they discovered about themselves and journaling from this exercise. (it captures the essential quality of the subject; it makes you slow down and observe more carefully; journaling is about the process or journey not the product or destination)





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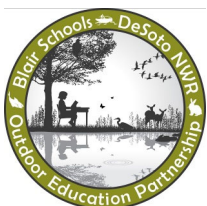
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Nature Journaling

Nature Journaling Procedure

11. Conduct the chosen field activity. Move from group to group to provide assistance and answer questions. Model good naturalist behavior for them to follow.
 - a. Encourage students to use their powers of observation to look slowly and closely.
 - b. Prompt them with questions to help them truly perceive (notice using senses, especially something others miss): *What do you notice? What does it remind you of? Is there a mood? What does it mean? What does it make you wonder about? What questions do you have about it?*
 - c. Record your own observations and data in your own field journal. Your example validates their journaling activity as important and demonstrates that learning is a lifelong pursuit.
12. Back inside, collect equipment and ask students to share their discoveries with each other in their small groups. Ask a few students in the class to share their discoveries with everyone.
13. Explain that naturalists usually use their nature journals as a source of information for polished writing or art. Ask students to think of one way they could use their journals to share their experience with someone who wasn't here today. Who will they share it with and how? Some possibilities include sharing it with a friend or relative by writing an email or letter, by making a card or picture. They might share with others at school by creating a mural, play, poem, story, or song.
14. Encourage them to keep going outside anywhere they are to explore and to use their journals; it is free and interesting and keeps them occupied. Thank them all for coming to the PWLC and invite them to return again.





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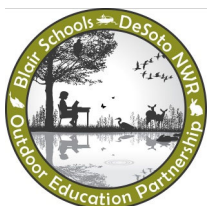
Nature Journaling

Field Activity Options

Teachers choose one of the following options for their field activity and inform PWLC staff when booking.

Kindergarten – 2nd Grade

Topic	Field Activity	PWLC Materials
1. Snow crystals (December through March)	Observe falling snow crystals with hand lenses, describe, sketch, measure, and identify them	Hand lenses/loupes, microscopes, rulers, snow crystal charts
2. Wetland Invertebrates	Collect, examine, describe, measure, sketch, and release wetland “bugs”	Nets, hand lenses, bug boxes, colored pencils, keys/ cards
3. Nature journaling sampler	Use several tools to aid in prairie wetland journaling such as hand lens, cloud chart, view finder, compass, thermometer, and binoculars	Let’s Go Outside backpacks
4. Nature detectives (December through March)	Search for evidence of animals, describe, sketch, infer, and tell a story about what happens	
5. Weather Trek	Practice using a thermometer, ruler or meter stick; record data and sky observations	Thermometers, rulers, meter sticks, cloud charts
6. Patterns in Nature	Look for numbers, letters, and shapes in the prairie and wetlands	<u>ABCs Naturally</u> by Lynne Diebel and Jann Kalscheur





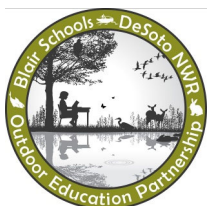
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Nature Journaling

3rd – 6th Grades

Topic	Field Activity	PWLC Materials
1. Reading the land (December through March)	Search for evidence of animals, describe, sketch, infer, and tell a story about what happened	<u>A Sand County Almanac</u> , identification cards
2. Snow crystals (December through March)	Observe falling snow crystals with hand lenses, describe, sketch, measure, and identify them	Hand lenses/loupes, rulers, snow crystal charts
3. Winter ecology (December through March)	Measure and observe the snow pack, record temperatures, find and observe pond ice	Rulers, meter sticks, hand lenses, thermometers
4. Byrd Baylor – favorites OR celebrations	Listen to a story, then go outside to find and record your favorites or celebrations	Byrd Baylor book
5. Wetland Invertebrates	Collect, examine, describe, measure, sketch, and release wetland “bugs”	Nets, hand lenses, bug boxes, colored pencils, keys/cards
6. Mapping – sounds, colors	Make one or two maps of a wetland/prairie to depict colors/sounds	Colored pencils, compasses
7. Nature journaling sampler	Use several tools to aid in journaling such as hand lens, cloud chart, view finder, compass, and thermometer	Let’s Go Outside backpacks
8. Sketching Nature	Practice various observation and art techniques such as sketching basics, contour sketching, gesture sketching, scribble sketching, view finding	colored pencils, view finders, clipboards, prairie plant brochures or wetland plant, ID cards
9. Weather Trek	Practice using thermometer, wind meter, compass, ruler or meter stick; record data and sky observations	Thermometers, wind meters, compasses, rulers, meter sticks, cloud charts





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Nature Journaling

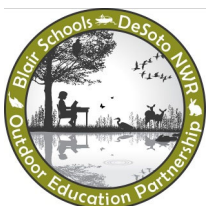
Weather Alternatives

Field investigations take place rain or shine. Everyone should dress appropriately for the weather. In the event of unsafe weather (lightning, high winds, extreme cold) or pouring rain, everyone must come indoors. PWLC staff make every effort to make your travel worthwhile despite the weather and prepare indoor, age-appropriate plans. PWLC staff welcomes teacher input into these plans. Some possible alternatives might include:

- Go outside for a very short amount of time, even if only under the deck to conduct the chosen field activity if possible.
- Bring plant/seed or aquatic invertebrate samples indoors for examination.
- Use mounted specimens, furs, and/or skulls of birds and mammals.
- Use latex animal tracks with ink pads to create stories.
- Conduct a map scavenger hunt indoors. See 6th grade, fall lesson, “Mapping a Prairie Wetland.”
- Tour the exhibit area and watch prairie wetlands videos in the sod house theater with the objective of searching for birds, invertebrates, plants, or observing seasonal changes in the land and weather.

Staff-Led Adaptation

For younger students (K-2), modify the mini-lesson on nature journals by first asking what nature is and then what a journal is. Explain a few reasons why people keep a nature journal. Then continue on with getting ready to go outside, but leave their journals or papers in the classroom. Conduct the field activity and then return to the classroom. Ask students to draw a picture of their favorite thing they did or saw outside (or the most beautiful thing or the strangest thing, etc.). Chaperones can help children who cannot write by adding a few labels or a caption. Collect the papers and provide them to the teacher to bring back to school and make a class journal, each student’s paper serving as a page in the journal. A cover can be created with a title such as, “Our Class Nature Journal of the Prairie Wetlands Learning Center.” Display the class journal for visitors to see, such as parents during conferences, or send it home with a different student each week to share with families.





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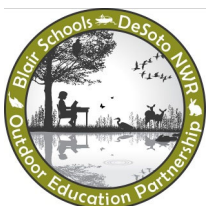
Nature Journaling

Teacher-Led Extensions/Adaptations/Assessment Ideas

- Conduct steps 2 through 4 of the *Nature Journaling Procedure* outlined above at school prior your visit. This will allow your students more time outdoors at the PWLC. Please inform PWLC staff when booking if you will be conducting the mini-lesson at school so staff can plan accordingly.

Students may wish to make and bring their own nature journal to use at the PWLC. See section, “Make a Nature Journal,” for one possibility. To make a twig-bound journal, visit <http://bringinguplearners.com/2008/01/28/homeschool-hacking-tips-make-your-own-nature-journal/>.

- Read an excerpt from The Sense of Wonder by Rachel Carson, and then take a walk to find examples of wonders in nature. Record them in field journals.
- Visit the same place outside with your students on a regular basis, such as daily, weekly, monthly, seasonally, or annually. Record changes over time in journals.
- Explore your school grounds or local park together, and then sit in silence as students use their nature journals to complete a free write.
- Send journals home with students to make observations and discoveries in their yards. They can replicate a field activity done at school and/or at the PWLC, then compare and contrast results from each site.
- Periodically pair students up and have a journal exchange. Students read each others’ journals to make new discoveries about how to journal and individualization. Provide prompts to guide discussion. Comments may be shared verbally or in writing.
- If cameras are available, use them in combination with writing and sketching. For example, using field notes recorded when journaling, write a poem to accompany a photo. Compare and contrast something that was both sketched and photographed.
- Draw connections to curriculum with nature journals. Link them to academic activities when possible such as for science concepts and vocabulary, spelling, writing (similes and metaphors, onomatopoeia, punctuation, adjectives, verbs, nouns), poetry, art, math (fractions, percents, mean, mode, median, measurements, benchmarking), local history, and data organization and interpretation.
- Explore the lives and writings of famous naturalists, role models for nature journaling. Some possibilities include Lewis and Clark, John Muir, Aldo Leopold, and Rachel Carson. Read biographies about them, dress like them, watch or listen to recordings of them, and most importantly, apply their ideas to student journaling.





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Nature Journaling

- Use journal entries to produce polished work in creative writing, science, art, or music, key to preventing nature journaling from becoming a form of “busy work.” Teaching how to use journals outside is a first step. Complete the process by allowing students to productively use it to share their discoveries with others, just as adult naturalists and scientists do. They might write reports, write and present speeches, create a class publication (field guide, newsletter, literary collection, phenology calendar, audio/video recordings), lead guided tours, organize a gallery display and reception, or hold a conference to share discoveries made through journaling. Some of these options would also be adaptable for web site publishing and class fundraisers complete with a book signing, public reading, or celebration.
- As a class, write a free-verse poem using observations from field journals. Each student writes one thought about their experience. Go systematically around the room and ask each student to read their thought aloud. Write each thought on a poster sized piece of paper on the wall. Each student reads the previous student’s sentence and adds their own to it, building the poem. Each sentence gets written on the poster, but cover the preceding lines so only the previous sentence shows. Once each student’s sentence has been read and recorded, then uncover the completed poem and read it aloud. Add photos or art if desired and display for others to enjoy.
- Read student journals regularly and provide written encouragement, questions, or further information.
- Allow students to evaluate their own journal. Provide prompts such as -- which entries are their favorites and why? Do they see patterns among the entries? What would someone reading their journal 100 years from now discover about them and their place?
- Grade certain journal entries using an assessment rubric and clear criteria.
- Give an open-journal quiz which bolsters incentive to make complete entries.
- Pair students with buddies to introduce journaling to younger students.

References and Resources

Books and Web Sites for Adults

- [A Sand County Almanac](#) by Aldo Leopold
- [Backyard Almanac, a 365-Day Guide to the Plants and Critters that Live in Your Backyard](#) by Larry Weber
- [By a Thousand Fires, Nature Notes and Extracts from the Life and Unpublished Journals of Ernest Thompson Seton](#) by Julia M. Seton
- [Field Notes on Science and Nature](#) by Michael R. Canfield, editor
- [Into the Field, a Guide to Locally Focused Teaching](#) by Clare Walker Leslie, John Tallmadge, and Tom Wessels
- [Jim Gilbert’s Minnesota Nature Notes](#) by Jim Gilbert
- [Journal of a Prairie Year](#) by Paul Gruchow





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Nature Journaling

- Keeping a Nature Journal, Discover a Whole New Way of Seeing the World Around You by Clare Walker Leslie and Charles E. Roth
- Moon Journals: Writing, Art, and Inquiry Through Focused Nature Study by Joni Chancer and Gina Rester-Zodrow
- Nature Journaling, a Creative Path to Environmental Literacy, a Guide for Sinking Roots in Place and Branching Out Toward Environmental Literacy in Grades 4-8 by Kate Hofman
- One Square Mile, an Artist's Journal of America's Heartland by Cathy Johnson
- Project Bluestem, Neal Smith National Wildlife Refuge, U.S. Fish and Wildlife Service
- Rhythms of the Refuge, Horicon National Wildlife Refuge
- The Naturalist's Field Journal, a Manual of Instruction Based on a System Established by Joseph Grinnell by Steven G. Herman
- The Sense of Wonder by Rachel Carson
- Using Science Notebooks in Elementary Classrooms by Michael P. Klentschy
- "A Nature Journaling Guide: Fostering a Naturalistic Outlook" session presented by Kate Hofmann and Joe Passineau, University of Wisconsin-Stevens Point, at the North American Association for Environmental Education Conference, Biloxi, Mississippi
- "Folding Memories" by Janine Newhouse, Strides newsletter by Leopold Education Project, Winter 2006
- "Writing and Drawing in the Naturalist's Journal," by Joseph M. Dirnberger, Steven McCullagh, and Tom Howick. The Science Teacher, January 2005
- Teaching in the Outdoor Classroom educator workshop, Prairie Wetlands Learning Center, Dave Ellis, instructor
- How to Draw Birds for a Naturalist Journal, <http://www.wildernesscollege.com/how-to-draw-birds.html>
- Introduction to Nature Journals, http://www.smithsonianeducation.org/educators/lesson_plans/journals/index.html
- Keeping a Nature Journal, http://www.sierraclub.org/education/nature_journal.asp
- Make a Twig Nature Journal, <http://bringinguplearners.com/2008/01/28/homeschool-hacking-tips-make-your-own-nature-journal/>
- Nature Journaling, <http://gnmparents.com/the-littlest-naturalists-part-iii-nature-journaling/>
- The Field Book Project, <http://www.mnh.si.edu/rc/fieldbooks/>
- The Nature Journal as a Tool for Learning, <http://www.newhorizons.org/strategies/environmental/matsumoto.htm>
- Writing and Drawing in the Naturalist's Journal, http://www.nsta.org/store/product_detail.aspx?id=10.2505/4/tst05_072_01_38
- The Illustrated Nature Journal, a Handbook, <http://www.pinicola.ca/jourbook.htm>
- Wheels of Time and Place, <http://partnersinplace.com/wheels-of-time-and-place>





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Nature Journaling

Books and Web Sites for Children

- By the Shores of Silver Lake by Laura Ingalls Wilder, excerpts from “The West Begins,” “Shanty on the Claim,” and “Where Violets Grow.”
- Cloud Dance by Thomas Locker
- Draw and Color Insects by Walter Foster and Diana Fisher
- Everybody Needs a Rock by Byrd Baylor
- Guess Who My Favorite Person Is by Byrd Baylor
- I’m in Charge of Celebrations by Byrd Baylor
- Just a Seed by Wendy Blaxland
- Lewis and Clark, the Adventure in the West by Frank Burd
- Mouse and Mole and the All-Weather Train Ride by Doug Cushman
- My Nature Journal by Adrienne Olmstead
- Salamander Rain: a Lake and Pond Journal by Kristin Pratt-Serafini
- The Lewis and Clark Expedition, Join the Corps of Discovery to Explore Uncharted Territory by Carol A. Johmann
- The Nature Connection, an Outdoor Workbook for Kids, Families, and Classrooms by Clare Walker Leslie
- The Other Way to Listen by Byrd Baylor
- Weather Words and What They Mean by Gail Gibbons
- Where Does the Wind Blow? by Cindy Rink

Nature journal template, http://www.sierraclub.org/education/nature_journal_template.pdf

Credits

This field investigation was developed and written by Prairie Wetlands Learning Center Staff, U.S. Fish and Wildlife Service. Thanks to Prairie Science Class naturalist Tia Thysell for reviewing this lesson plan. Thanks to Dave Ellis, Prairie Science Class coordinator, for contributing to this lesson. Thanks to the following teachers for reviewing this lesson plan: Sarah Collins, home school parent/teacher, kindergarten and 2nd grade; Renee Larsen, 2nd grade, Fergus Falls; Kari Kreft, 2nd grade, West Central Area Schools; Vicki Hanneman, 3rd grade, Fergus Falls; Dorothy Droll, 5th grade, St. Henry’s School, Perham; Stacy Lundquist, Battle Lake, 5th and 6th grade math and reading; Deb Strege, licensed teacher. Thank you to Mark Baldwin, Director of Education, Roger Tory Peterson Institute of Natural History, Jamestown, New York, for reviewing this lesson.





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3rd Grade State Standards

Science-

SC1:

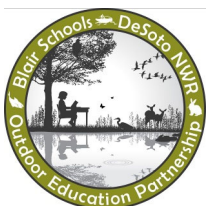
- 3.1.1.a Ask testable scientific questions
- 3.1.1.b Plan and conduct investigations and identify factors that have the potential to impact an investigation
- 3.1.1.c Select and use equipment correctly and accurately
- 3.1.1.d Make relevant observations and measurements
- 3.1.1.e Collect and organize data
- 3.1.1.f Develop a reasonable explanation based on collected data
- 3.1.1.g Share information, procedures, and results with peers and/or adults
- 3.1.1.h Provide feedback on scientific investigations
- 3.1.1.i Use appropriate mathematics in all aspects of scientific inquiry
- 3.1.2.a Recognize that scientific explanations are based on evidence and scientific knowledge.
- 3.1.2.c Recognize many different people study science
- 3.1.3.a Identify a simple problem
- 3.1.3.b Propose a solution to a simple problem
- 3.1.3.c Implement the proposed solution
- 3.1.3.d Evaluate the implementation
- 3.1.3.e Communicate the problem, design, and solution
- 3.2.3.a Recognize that sound is produced from vibrating objects; the sound can be changed by changing the vibration
- 3.1.1.a Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- 3.1.1.b Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.
- 3.1.1.c Ask questions to determine cause and effect relationships of electrical or magnetic interactions between two objects not in contact with each other.
- 3.1.1.d Define a simple design problem the can be solved by applying scientific ideas about magnets.

SC 7:

- 3.7.2.a Construct an argument that some animals form groups that help members survive.
- 3.7.2.b Analyze and interpret data from fossils to provide evidence of the organisms and environments in which they lived long ago.
- 3.7.2.c Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, some cannot survive at all.
- 3.7.2.d Make a claim about the merit of a solution to a problem caused when the environment changes and they types of plants and animals that live there may change.
- 3.7.2.e Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

SC 9:

- 3.9.3.a Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproductions, and death.
- 3.9.3.b Analyze and interpret data to provide evidence that plants and animals have traits inherited from their parents and that variation of these traits exists in a group of similar organisms.
- 3.9.3.c Use evidence to support the explanation that traits can be influenced by the environment .
- 3.9.3.d Use evidence to construct an explanation for how the variation in characteristics among individuals of the same





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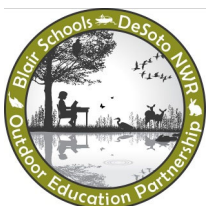
species may provide advantages in surviving, finding mates, and reproducing.

SC 12:

- 3.12.4.a Represent data in a table, pictograph, and bar graph displays to describe typical weather conditions expected during a particular season.
- 3.12.4.b Obtain and combine information to describe climates in different regions of the world
- 3.12.4.c Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

Language Arts-

- LA 3.1.3.a Know and apply advanced sound/spelling patterns (e.g., Anglo-Saxon common roots and affixes, special vowel spellings [ough, ion], multi-syllable words) when reading, writing, and spelling grade-level text.
- LA 3.1.3.b Use word structure to read text (e.g., prefixes/suffixes contractions, syllabication, derivation).
- LA 3.1.3.c Recognize and read grade-level (phonetic and non-phonetic) words in text.
- LA 3.1.4.a Listen to and read text of increasing length and/or complexity to increase reader stamina.
- LA 3.1.4.b Use context to adjust pace and prosody based on purpose, text complexity, form, and style.
- LA 3.1.5.a Determine meaning of words through the knowledge of word structure elements, known words, and word patterns (e.g., contractions, plurals, possessives, parts of speech, syllables, affixes, base and root words, abbreviations).
- LA 3.1.5.b Apply context clues (e.g., word, phrase, and sentence clues) and text features to help infer meaning of unknown words.
- LA 3.1.5.c Acquire new academic and content-specific grade-level vocabulary, relate to prior knowledge, and apply in new situations.
- LA 3.1.5.d Identify semantic relationships (e.g., synonyms, antonyms, homographs, homophones, multiple-meaning words) to determine the meaning of words, aid in comprehension, and improve writing.
- LA 3.1.5.e Locate words and determine meaning using reference materials .
- LA 3.1.6.a Identify author's purpose(s) (e.g., explain, entertain, inform, persuade) to support text comprehension.
- LA 3.1.6.b Identify and describe elements of literary text (e.g., characters, setting, plot, point of view).
- LA 3.1.6.d Summarize a literary text and/or media, using key details to identify the theme.
- LA 3.1.6.e Determine main ideas and supporting details from informational text and/or media.
- LA 3.1.6.f Use text features to locate information and explain how the information contributes to an understanding of print and digital text. LA 3.1.6.g Compare and contrast the characteristics that distinguish a variety of literary and informational texts. LA 3.1.6.h Compare and contrast similar themes, topics, and/or patterns of events in literary and informational texts to develop a multicultural perspective.
- LA 3.1.6.i Construct and/or answer literal and inferential questions and support answers with specific evidence from the text or additional sources.
- LA 3.1.6.j Identify and apply knowledge of organizational patterns to comprehend informational text (e.g., sequence, description, cause and effect, compare/contrast).
- LA 3.1.6.k Select text and explain the purpose (e.g., answer a question, solve problems, enjoy, form an opinion, understand a specific viewpoint, predict outcomes, discover models for own writing, accomplish a task).
- LA 3.1.6.l Build background knowledge and activate prior knowledge to identify text-to-self, text-to-text, and text-to-world connections before, during, and after reading.
- LA 3.1.6.m Self-monitor comprehension by recognizing when meaning is disrupted and apply strategies to clarify, confirm, or correct.
- LA 3.1.6.n Make and confirm/modify predictions and inferences before, during, and after reading literary, informational, digital text, and/or media.



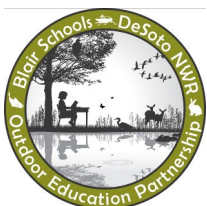


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- LA 3.1.6.o Demonstrate an understanding of text via multiple mediums (e.g., writing, artistic representation, video, other media).
- LA 3.1.6.p Make connections between the text of a story, drama, or poem and a visual or oral presentation of the text.
- LA 3.2.1.a Use prewriting activities and inquiry tools to generate ideas and organize information.
- LA 3.2.1.b Generate a draft that develops a clear topic suited to the purpose and intended audience and organizational pattern, including a clear introduction, body, and conclusion with appropriate transitions.
- LA 3.2.1.c Gather and use relevant information and evidence from one or more authoritative print and/or digital sources to support claims or theses.
- LA 3.2.1.d Compose paragraphs with grammatically correct sentences of varying length, complexity, and type.
- LA 3.2.1.e Revise to improve and clarify writing through self-monitoring strategies and feedback from others.
- LA 3.2.1.f Provide oral and/or written descriptive feedback to other writers.
- LA 3.2.1.g Adjust writing processes to persevere in short and long-term writing tasks of increasing length and complexity.
- LA 3.2.1.h Proofread and edit writing recursively for format and conventions of standard English (e.g., spelling, capitalization, grammar, punctuation, syntax, semantics).
- LA 3.2.1.i Display academic honesty and integrity by avoiding plagiarism and/or overreliance on any one source and by following a standard format for citation.
- LA 3.2.1.j Publish a legible document in manuscript, cursive, or digital format, and apply formatting techniques (e.g., indenting paragraphs, title).
- LA 3.2.2.a Communicate information and ideas effectively in analytic, descriptive, informative, narrative, poetic, persuasive, and reflective modes to multiple audiences using a variety of media and formats.
- LA 3.2.2.b Provide evidence from literary or informational text to support ideas or opinions.
- LA 3.2.2.c Conduct and publish research to answer questions or solve problems using multiple resources to support theses.
- LA 3.2.2.d Use precise word choice and domain-specific vocabulary to write in a variety of modes.
- LA 3.2.2.e Compare various mentor texts and/or exemplars to create a similar piece.
- LA 3.3.1.a Communicate ideas and information in a clear and concise manner suited to the purpose, setting, and audience (formal voice or informal voice), using appropriate word choice, grammar, and sentence structure.
- LA 3.3.1.b Demonstrate appropriate speaking techniques (e.g., appropriate eye contact, adequate volume, clear pronunciation) for a variety of purposes and situations, including interpreting text.
- LA 3.3.1.c Utilize appropriate visual and/or digital tools to enhance verbal communication and add interest.
- LA 3.3.1.d Convey a perspective with clear reasoning and support.
- LA 3.3.1.e Ask pertinent questions to acquire or confirm information.
- LA 3.3.2.a Demonstrate active and attentive listening skills (e.g., eye contact, nonverbal cues, recalling, questioning) for multiple situations and modalities.
- LA 3.3.2.b Identify the purpose and credibility of information being presented in diverse media and formats.
- LA 3.3.2.c Complete a task following multi-step directions.
- LA 3.3.3.a Demonstrate appropriate social etiquette and apply social cues when communicating.
- LA 3.3.3.b Demonstrate awareness of and sensitivity to the appropriate use of words (e.g., stereotypes, multiple meanings of words) in conversation.
- LA 3.3.3.c Apply conversation strategies to recognize and consider new information presented by others in relationship to one's own ideas.
- LA 3.3.3.d Listen, ask clarifying questions, summarize, and respond to information being communicated and consider its contribution to a topic, text, or issue under study.





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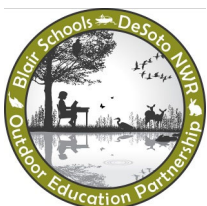
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- LA 3.3.3.e Collaboratively converse with peers and adults on grade-appropriate topics and texts, building on others' ideas to clearly express one's own views while respecting diverse perspectives.
- LA 3.4.1.a Locate, organize, and evaluate information from print and digital resources to generate and answer questions and create new understandings.
- LA 3.4.1.b With guidance, demonstrate ethical use of information and copyright guidelines by appropriately quoting or paraphrasing from a text and citing the source using available resources (e.g., online citation tools).
- LA 3.4.1.c Use or decipher multiple formats of print and digital text (e.g., cursive, manuscript, font, graphics, symbols).
- LA 3.4.2.a Practice safe and ethical behaviors when communicating and interacting with others digitally (e.g., safe information to share, appropriate language use, utilize appropriate sites and materials, respect diverse perspectives).
- LA 3.4.2.b Use appropriate digital tools (e.g., social media, online collaborative tools, apps) to communicate with others for conveying information, gathering opinions, and solving problems

Math-

- MA 3.1.1.a Read, write and demonstrate multiple equivalent representations for numbers up to 100,000 using objects, visual representations, including standard form, word form, expanded form, and expanded notation.
- MA 3.1.1.b Compare whole numbers through the hundred thousands and represent the comparisons using the symbols $>$, $<$ or $=$.
- MA 3.1.1.c Round a whole number to the tens or hundreds place, using place value understanding or a visual representation.
- MA 3.1.1.d Represent and understand a fraction as a number on a number line.
- MA 3.1.1.e Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.
- MA 3.1.1.f Show and identify equivalent fractions using visual representations including pictures, manipulatives, and number lines.
- MA 3.1.1.g Find parts of a whole and parts of a set using visual representations.
- MA 3.1.1.h Explain and demonstrate how fractions $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and a whole relate to time, measurement, and money, and demonstrate using visual representation.
- MA 3.1.1.i Compare and order fractions having the same numerators or denominators using visual representations, comparison symbols, and verbal reasoning
- MA 3.1.2.a Add and subtract within 1,000 with or without regrouping.
- MA 3.1.2.b Select and apply the appropriate methods of computation when solving one- and two- step addition and subtraction problems with four-digit whole numbers through the thousands (e.g., visual representations, mental computation, paper-pencil).
- MA 3.1.2.c Use drawings, words, arrays, symbols, repeated addition, equal groups, and number lines to explain the meaning of multiplication.
- MA 3.1.2.d Use words and symbols to explain the meaning of the Zero Property and Identity Property of multiplication.
- MA 3.1.2.e Multiply one digit whole numbers by multiples of 10 in the range of 10 to 90.
- MA 3.1.2.f Use objects, drawings, arrays, words and symbols to explain the relationship between multiplication and division (e.g., if $3 \times 4 = 12$ then $12 \div 3 = 4$).
- MA 3.1.2.g Fluently (i.e. automatic recall based on understanding) multiply and divide within 100.
- MA 3.1.2.h Determine the reasonableness of whole number sums and differences in real-world problems using estimation, compatible numbers, mental computations, or other strategies.
- MA 3.2.1.a Identify arithmetic patterns (including patterns in the addition or multiplication tables) using properties of operations.



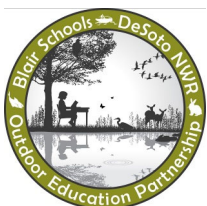


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- MA 3.2.1.b Interpret a multiplication equation as equal groups (e.g., interpret 4×6 as the total number of objects in four groups of six objects each). Represent verbal statements of equal groups as multiplication equations.
- MA 3.2.2.a Apply the commutative, associative, and distributive properties as strategies to multiply and divide.
- MA 3.2.2.b Solve one-step whole number equations involving addition, subtraction, multiplication, or division, including the use of a letter to represent the unknown quantity.
- MA 3.2.3.a Solve real-world problems involving two-step equations (involving two operations) involving whole numbers using addition and subtraction.
- MA 3.2.3.b Write an equation (e.g., one operation, one variable) to represent real-world problems involving whole numbers
- MA 3.3.1.a Identify the number of sides, angles, and vertices of two-dimensional shapes.
- MA 3.3.1.b Sort quadrilaterals into categories (e.g., rhombuses, squares, and rectangles).
- MA 3.3.1.c Draw lines to separate two-dimensional figures into equal areas, and express the area of each part as a unit fraction of the whole.
- MA 3.3.3.a Find the perimeter of polygons given the side lengths, and find an unknown side length.
- MA 3.3.3.b Tell and write time to the minute using both analog and digital clocks.
- MA 3.3.3.c Solve real-world problems involving addition and subtraction of time intervals and find elapsed time.
- MA 3.3.3.d Identify and use the appropriate tools and units of measurement, both customary and metric, to solve real-world problems involving length, weight, mass, liquid volume, and capacity (within the same system and unit).
- MA 3.3.3.e Estimate and measure length to the nearest half inch, quarter inch, and centimeter.
- MA 3.3.3.f Use concrete and pictorial models to measure areas in square units by counting square units.
- MA 3.3.3.g Find the area of a rectangle with whole-number side lengths by modeling with unit squares, and show that the area is the same as would be found by multiplying the side lengths.
- MA 3.3.3.h Identify and draw rectangles with the same perimeter and different areas or with the same area and different perimeters.
- MA 3.4.1.a Create scaled pictographs and scaled bar graphs to represent a data set—including data collected through observations, surveys, and experiments—with several categories.
- MA 3.4.1.b Represent data using line plots where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.
- MA 3.4.2.a Solve problems and make simple statements about quantity differences (e.g., how many more and how many less) using information represented in pictographs and bar graphs.





Discovery Hike



Grade: 3

Duration:
30-45 minutes

Supplies

- Students' nature journals
- Pens/pencils
- Optional: hand lenses

Summary

Nature is full of discoveries for students to make. During a semi-structured hike at DeSoto National Wildlife Refuge, students will use nature as a platform for making discoveries about the natural world.

Objectives

- Record observations about nature in a journal
- Write personal thoughts about an experience in nature
- Brainstorm and apply categories to guide the discovery hike

Standards:

Science:

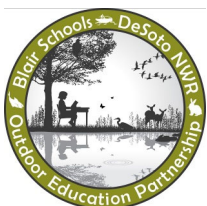
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Language Arts:

LA 3.2.1a, LA 3.2.2.a, LA 3.2.2.d, LA 3.3.1.a, LA 3.3.2.a, LA 3.3.2.b, LA 3.3.2.c, LA 3.3.2.d

Procedure

1. Students open to the next blank page in their nature journals and title the page "Discovery Hike."
2. Students write their data line at top of the page including day, time, location and weather. This will help students at the end of the year when they look at trends throughout the year.
3. Ask students how they think we learn about nature. What do you know about nature observation? How could we learn more about nature today?
4. Explain observation and how observation can help us learn all different kinds of things about nature. Illustrate how careful observation over the course of time can help us see patterns we would not have otherwise known existed. Show them how when looking carefully there are different traits. Prompt them how this can help them survive in their habitats and what they could do to improve this.
5. Introduce the discovery hike. Today the students will be explorers as we journey together on a discovery hike. During this hike, they will be recording observations in their journals. Explain to the students that we will do discovery hikes in different seasons to see similarities and differences in the seasons.
6. Help students set up the journal page. Divide the page into four





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Discovery Hike

quadrants. Each quadrant should have a label and these can change depending on what is being studied. Examples include sketch, animals, plants, sound observations, sight observations, smell observations, questions and general observations.

7. The ranger leads the students on a hike to see what they can discover. This is not a silent activity but being quiet can help with observing wildlife. Students are encouraged to record observations as they make them.
8. If desired, a hand lens can be provided to the students to give them an opportunity to look at nature more closely. This is often a good idea because it adds excitement while allowing for closer observation.
9. At the end of the discovery hike, students sit in a circle and share what they discovered. This will allow for the development of public speaking skills as well as reflection on the activity.

Extensions:

1. Have students write an essay detailing their experiences during their discovery hike. Using nature as an authentic learning environment can help students write descriptively from their own experiences.
2. Repeat the discovery hike near your school. How does it differ from the discovery hike at DeSoto National Wildlife Refuge? How is it the same?



How to set up the page in the students nature journal:

Discovery Hike

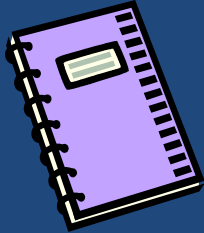
Date, Time, Location, Weather

Quad 1	Quad 2
Quad 3	Quad 4

Special Traits found today:



Color Map



Grade: 3

Duration:
30-45 minutes

Supplies:

- Students' nature journals
- Pens/Pencils

Summary

Colors in nature are vibrant and can be an exciting way for children to start making observations and connections with the natural world. By using nature as an authentic learning environment, students will learn to observe and record colors.

Objectives

- Recognize colors and color variations in the outdoor environment
- Record color observations in a journal
- Use careful observations to identify and record subtle color observations not noticed during a quick run through nature

Standards:

Science:

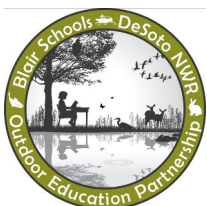
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Language Arts:

LA 3.3.2.a, LA 3.3.2.b, LA 3.3.2.c, LA 3.3.2.d, LA 3.3.3.c

Procedure

1. Students bring nature journals to all outdoor lessons. Students open to the next open page and title the page "Color Map"
2. Students write their data line at the top of the page including day, time, location and weather. This will help students at the end of the year when they look at trends throughout the year.
3. Ask students what colors they often see in nature? What do the colors mean? Are colors different in different natural environments? Do colors in nature vary depending on the season? Are the sizes of the plants different? Will the color and size give them an advantage? Can the location of the color help this?
4. Have students make color observations about the area around where they are sitting. Encourage students to be more detailed in their descriptions using specific terms or more detailed color descriptions (i.e. Kermit the Frog green, dark brown at the bottom of the tree becoming lighter brown as the tree grows higher). Introduce the idea of different shades of colors and categorizing different shades.
5. Explain the journaling procedure. Students will sit in a location assigned by a teacher quietly to observe and record colors they see. The students will put a dot in the middle of their journal page to signal where they are sitting. This will allow them to pinpoint on the journal page where they see each color. There are three options of journaling.





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Color Map

Students can use colored pencils to illustrate colors, using descriptive language to describe color differences and shades or they can create a key with a letter code for each color (i.e. DB is dark brown and SY is sand yellow).

6. Take students to the predetermined location. Set them along the trail so they are far enough to not be able to talk to each other comfortably. The length of the observation varies by age group. 15-20 minutes is a good guideline for third grade.
7. When the observation time is complete, gather students in a group to share discoveries. Sharing time is important for solidifying learning and helping students build confidence and public speaking skills.

Extensions

1. Have students write an essay detailing their experiences during their silent observation. For some students, this silence in nature is a new experience that could lead to really interesting journal entries.
2. Repeat the color map activity near your school. How does it differ from the color map at DeSoto National Wildlife Refuge? How is it the same?

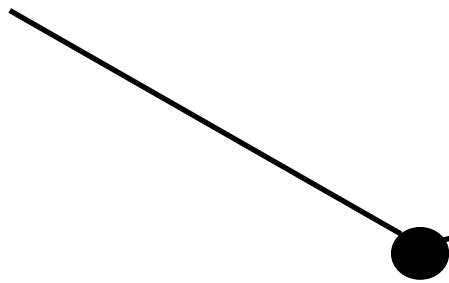


How to set up the page in the students nature journal:

Color Mapping

Date, Time, Location, Weather

Sunshine
yellow flowers



Cloud grey gavel

Special Traits:



Sound Map



Grade: 3

Duration
30-45 minutes

Supplies

- Students' Nature Journals
- Pens/Pencils

Summary

Recognizing, categorizing and describing sounds are essential skills for child development. By using nature as an authentic learning environment, students will learn to observe, record and identify sounds.

Objectives

By the end of this lesson, students will be able to:

- Recognize natural and unnatural sounds in the outdoor environment
- Record sound observations in a journal
- Identify the location and direction of sounds through careful observation
- Categorize and describe sounds

Standards:

Science:

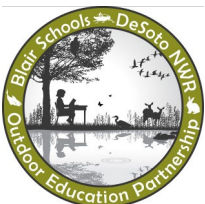
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Language Arts:

LA 3.2.1a, LA 3.3.1.a, LA 3.3.2.a, LA 3.3.2.c, LA 3.3.2.d, LA 3.3.3.c

Procedure

1. Students open to the next page in their nature journals and title the page "Sound Map."
2. Students write their data line at the top of the page including day, time, and weather. This will help students at the end of the year when they look at trends throughout the year.
3. Ask students if they hear a lot of sounds in their neighborhoods. What sounds are most common? What natural sounds do you hear the most? What would you like to hear? How do you think you could hear more sounds? What different sounds do birds make, or even animals? Can this be advantageous to them? How can it help with navigation, breeding, and protection?
4. Have students sit quietly during the introduction for one minute with their eyes close and count on their fingers all the natural sounds they hear. At the end of the quiet time, have students share their observations.
5. Explain the journaling procedure. Students will sit in a location assigned by a teacher quietly to observe and record sounds they hear. The students will put a dot in the middle of their journal page to signify where they are sitting. This will allow them to pinpoint on the journal page where they hear the sounds coming from. They are encouraged to draw lines if the sound is moving to illustrate the location and direction of the movement. Students will record sounds until time is called.





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Sound Map

6. Take students to the predetermined location. Set them along the trail so they are far enough to not be able to talk to each other comfortably. This activity is best done in complete human silence. The length of the observation varies by age group. 15-20 minutes is a good guideline for third grade.
7. When the observation time is complete, gather students in a group to share discoveries. Sharing time is important for solidifying learning and helping students build confidence and speaking skills.

Extensions:

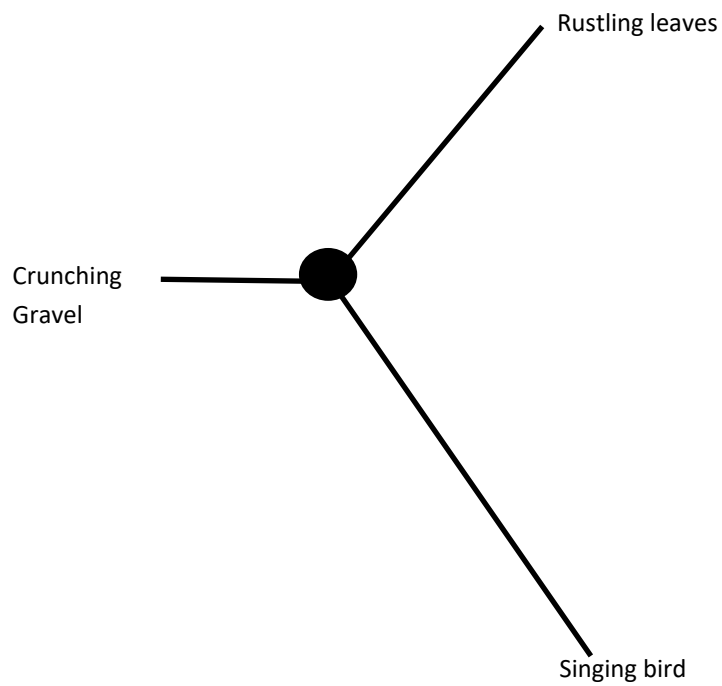
1. Have students write an essay detailing their experiences during their silent observation. For some students, this silence in nature is a new experience that could lead to really interesting journal entries.
2. Repeat the sound map activity near your school. How does it differ from the sound map at DeSoto National Wildlife Refuge. How is it the same?



How to set up the page in the students nature journal:

Sound Mapping

Date, Time, Location, Weather



Special Traits:



Fall Migratory Bird Exploration



Grade: 3

Duration
60-75 minutes

Supplies

- Students' Nature Journals
- Pens/Pencils
- Binoculars
- Spotting scopes
- Bus

Summary

No occurrence in the Missouri River valley better symbolizes the change in seasons than the bird migration in the fall and spring. Birds are easily seen during migration and will provide a context for young students to begin to develop wildlife observation skills and recognize that nature changes throughout the seasons.

Objectives

By the end of this lesson, students will be able to:

- Use binoculars and other tools to view migratory birds
- Record and sketch observations of migratory birds in nature journals
- Demonstrate listening and observation skills

Standards

Science:

3.1.1.c, 3.1.1.d, 3.1.1.e, 3.7.2.c, 3.7.2.d, 3.7.2.e

Language Arts:

LA 3.1.5.b, LA 3.3.1.a, LA 3.3.2.b, LA 3.3.2.c, LA 3.3.3.c

Procedure

1. Students bring nature journals to all outdoor lessons. Students open to the next blank page and title it "Fall Migratory Bird Exploration."
2. Students listen to a short presentation about migration. Introduce the concept of migration and why it might be important for birds to migrate in the spring and fall. Students make connections between bird migration and a road trip. Birds need a resting and feeding spot for migration such as national wildlife refuges like we need a hotel and restaurant during a trip.
3. Instruct students how to set up the journal page. Complete the weather data line.
4. Demonstrate proper techniques for how to use binoculars. Have students practice bring binoculars to their faces while keeping view of an object in the distance.
5. Demonstrate proper spotting scope techniques and explain that the leaders will set up the scopes and they will look through them.
6. Explain to students that detailed journal descriptions are important as we will try to match the descriptions to a bird guide at the end of the lesson today. Explain that students will be expected to sketch and describe four different bird species. Ask students to take note of traits that can help the birds on their migration and survival. What life cycle





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Fall Migratory Bird Exploration

stage are some/ all of the birds at?

7. Observe birds from viewing gallery at visitor center.
8. Load bus and head out to observe migratory birds.
9. Over the course of two or three stops, students should be able to view a variety of migratory birds to possibly include mallards, northern pintail, green wing teal, pelicans, bald eagles and other species. For this lesson, focus should be on observing bird behavior and colors and not identifying the species.
10. Provide students with a simple bird guide with 6-8 species seen in the area recently. Have them try to match up their sketches and descriptions with the birds on the guide.
11. Allow focused time on the bus for students to record observations in their journals.



How to set up the page in the students nature journal:

Fall Migration Bird Exploration

Date, Time, Location, Weather

Bird 1	Bird2
Bird 3	Bird 4

Special Traits found today:



“Reading the Land” Winter Exploration



Grade: 3

Duration
60-75 minutes

Supplies

- Students’ Nature Journals
- Pens/Pencils

Summary

Using an excerpt of Aldo Leopold’s The Sand County Almanac students explore the winter environment and search for signs of animals. Students will learn to “read the land” for clues as to animal movements and winter survival strategies.

January Thaw

By Aldo Leopold

“Each year after the midwinter blizzards, there comes a night of thaw when the tinkle of dripping water is heard in the land. It brings strange stirrings, not only to creatures abed for the night, but to some who have been asleep for the winter. The hibernating skunk, curled up in his deep den, uncurls himself and ventures forth to prowls the wet world, dragging his belly in the snow. His track marks one of the earliest datable events in the cycle of beginnings and ceasing which we call a year.”

The track is likely to display an indifference to mundane affairs uncommon at other seasons; it leads straight across-country, as if its maker had hitched his wagon to a star and dropped the reins. I follow, curious to deduce his state of mind and appetite, and destination if any.

January observation can be almost as simple and peaceful as snow, and almost as continuous as cold. There is time not only to see who has done what, but to speculate why.”

Objectives

By the end of this lesson, students will be able to:

- Use their senses to explore the winter environment
- Document discoveries in a nature journal
- Observe evidence of animals in winter and make guesses as to what the animals were doing

Standards:

Science:

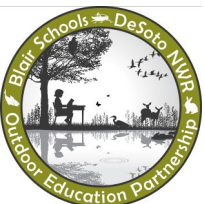
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Language Arts;

LA 3.2.1.a, LA 3.3.1.a, LA 3.3.2.b, LA 3.3.2.c, LA 3.3.2.d, LA 3.3.3.c

Procedure

1. Welcome students back to DeSoto National Wildlife Refuge. Have





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“Reading the Land” Winter Exploration

them open their journals to the next blank page.

2. Explain what we are going to do outside today to observe animals and animal signs in winter.
3. Winter allows us to come up with the stories of the animal tracks. It will allow us to make guesses about what the animal was doing, where it was going and why. The snow pack allows for a record on animal movements that gives us a better way to observe animal movements than other times of year. What changes occur in animals on the refuge to help them survive the winter? Observe changes in the animals and plants around them. What life cycle stage are they at?
4. Complete the weather data line for the journal entry.
5. Discuss with the students the three ways that animals survive the winter (migration, hibernation and adaptation). Have them think about what signs of animals we might see outside in the winter snow today.
6. Head outside to explore the winter environment. If you find good animal tracks, follow them across country to try and figure out where they are going.
7. Make observations of any signs of animals you see. Remind students to record these observation in their journals. Let nature be your guide and follow clues that you and your group see.
8. Lead a wrap up discussion that brings together observations made by the students and how animals survive the winter at DeSoto National Wildlife Refuge.



How to set up the page in the students nature journal:

Winter Exploration

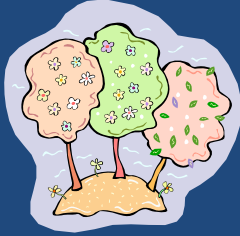
Date, Time, Location, Weather

Quad 1	Quad 2
Quad 3	Quad 4

Special Traits found today:



Spring Exploration



Grade: 3

Duration
60-75 minutes

Supplies

- Nature journals
- Buckets
- Nets
- Viewing jars
- Key to Life in the Pond Guides
- Spoons

Summary

Spring is a time of new discoveries. During this wetland investigation, students will explore aquatic macroinvertebrates. Aquatic macroinvertebrates help show a window on the diversity of wetland habitats and help students understand life cycles.

Objectives

By the end of this lesson, students will be able to:

- Make careful observation about the natural world
- Use environmental as a context for descriptive and reflective writing
- Students map a certain area based on its color and sounds, applying observation skills.

Standards

Science:

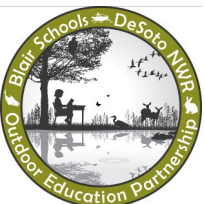
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Language Arts:

LA 3.1.5.b, LA 3.3.1.a, LA 3.3.2.b, LA 3.3.2.c, LA 3.3.2.d, LA 3.3.3.c

Procedure

1. Meet the bus at the Wood Duck Pond Trail. Lead a discussion about what wetlands are, how to identify aquatic invertebrates, life cycles of aquatic critters and why wetlands are important to those life cycles.
2. Set up a journal page for students to document 4 critters seen during the wetland investigation. What point of the life cycle are the critters in? What advantages are they displaying to ensure their survival? Camouflage?
3. Divide the students into groups of 2 or 3. Make sure each group gets a net, tray, spoon, viewer, and key. Demonstrate how to use both the nets and the viewer.
4. Set parameter for investigation area.
5. Encourage students to take a close look at every bucket to see if they can spot smaller critters. Encourage patience in the observations as this can lead to the best observations.
6. The refuge staff person and teachers will circulate during the investigation time. The students will use field guides to identify invertebrates.





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Spring Exploration

7. Encourage the students to carefully identify the invertebrates and count the number of species identified as part of the wrap up discussion.
8. Have students clean out equipment, hike back to parking lot and return the equipment.
9. Wrap up session questions:
 - What macroinvertebrates did your group identify today?
 - Based on what you have learned, why are wetlands important to animal life cycles?
 - What are some ways national wildlife refuges protect wildlife?



How to set up the page in the students nature journal:

Spring Exploration

Date, Time, Location, Weather

Quad 1	Quad 2
Quad 3	Quad 4

Special Traits found today:



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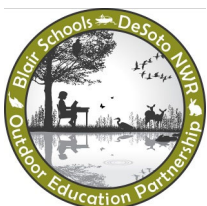
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5th Grade State Standards

Science-

- 5.1.1.a Ask testable scientific questions
- 5.1.1.b Plan and conduct investigations and identify factors that have the potential to impact an investigation
- 5.1.1.c Select and use equipment correctly and accurately
- 5.1.1.d Make relevant observations and measurements
- 5.1.1.e Collect and organize data
- 5.1.1.f Develop a reasonable explanation based on collected data
- 5.1.1.g Share information, procedures, and results with peers and/or adults
- 5.1.1.h Provide feedback on scientific investigations
- 5.1.1.i Use appropriate mathematics in all aspects of scientific inquiry
- 5.1.2.a Recognize that scientific explanations are based on evidence and scientific knowledge
- 5.1.2.c Recognize many different people study science
- 5.1.3.a Identify a simple problem
- 5.1.3.b Propose a solution to a simple problem
- 5.1.3.c Implement the proposed solution
- 5.1.3.d Evaluate the implementation
- 5.1.3.e Communicate the problem, design, and solution
- 5.2.1.c Use appropriate metric measurements to describe physical properties
- 5.3.1.a Develop a model to describe that matter is made of particles too small to be seen
- 5.3.1.b Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, mixing substances, the total weight of matter is conserved.
- 5.3.1.c. Make observations and measurements to identify materials based on their properties
- 5.3.1.d Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
- 5.8.2.a Use models to describe that energy in animals' food was once from the sun
- 5.8.2.b Support an argument that plants get the materials they need for growth chiefly from air and water
- 5.8.2.c Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment
- 5.11.3.a Support an argument that the gravitational force exerted by the Earth on objects is directed down
- 5.11.3.b Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distance from Earth
- 5.11.3.c Represent in graphical displays to reveal patterns of daily changes in the length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.
- 5.13.4.a Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
- 5.13.4.b Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.
- 5.13.4.c Obtain and combine information about ways individual communities use science ideas to protect Earth's resources and environment.
- 5.13.4.d Define a simple design problem that can be solved by applying scientific ideas about the conservation of fresh water on Earth.
- 5.13.4.e Define simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.





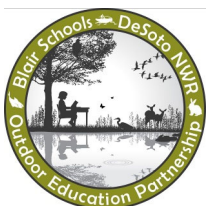
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Language Arts-

- LA 5.1.3.a Know and apply phonetic and structural analysis (e.g., Greek and Latin roots and affixes, multi-syllable words) when reading, writing, and spelling grade level text.
- LA 5.1.4.a Use reading strategies to persevere through text of increasing length and/or complexity.
- LA 5.1.4.b Use context to adjust pace and prosody based on purpose, text complexity, form, and style.
- LA 5.1.5.a Apply knowledge of word structure elements, known words, and word patterns to determine meaning (e.g., parts of speech, Greek, Latin, and Anglo-Saxon affixes and roots).
- LA 5.1.5.b Select and apply knowledge of context clues (e.g., word, phrase, sentence, and paragraph clues) and text features to determine meaning of unknown words.
- LA 5.1.5.c Acquire new academic and content-specific grade-level vocabulary, relate to prior knowledge, and apply in new situations.
- LA 5.1.5.d Identify semantic relationships (e.g., synonyms, antonyms, homographs, homophones, multiple-meaning words) to determine the meaning of words, aid in comprehension, and improve writing.
- LA 5.1.5.e Determine meaning using reference materials.
- LA 5.1.6.a Examine text to determine author's purpose(s) and describe how author's perspective (e.g., beliefs, assumptions, biases) influences text.
- LA 5.1.6.b Analyze and describe elements of literary text (e.g., characters, setting, plot, point of view, theme).
- LA 5.1.6.c Identify and explain why authors use literary devices (e.g., simile, metaphor, alliteration, onomatopoeia, imagery, rhythm, personification, hyperbole, idioms).
- LA 5.1.6.d Summarize and analyze a literary text and/or media, using key details to explain the theme. 30 Approved by the Nebraska State Board of Education 9/5/14 Updated 9/30/14
- LA 5.1.6.e Summarize and analyze an informational text and/or media, using supporting details to explain the main idea.
- LA 5.1.6.f Use text features to locate information and explain how the information contributes to an understanding of print and digital text.
- LA 5.1.6.g Use textual evidence to compare and contrast the characteristics that distinguish a variety of literary and informational texts.
- LA 5.1.6.h Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in literary and informational texts, citing textual evidence to develop a national and international multicultural perspective.
- LA 5.1.6.i Construct and/or answer literal, inferential, and critical questions and support answers with explicit evidence from the text or additional sources.
- LA 5.1.6.j Identify and apply knowledge of organizational patterns to comprehend informational text(s) (e.g., sequence, description, cause and effect, compare/contrast, fact/opinion).
- LA 5.1.6.k Select text for a particular purpose (e.g., answer a question, solve problems, enjoy, form an opinion, understand a specific viewpoint, predict outcomes, discover models for own writing, accomplish a task), citing evidence to support analysis, reflection, or research.
- LA 5.1.6.l Build background knowledge and activate prior knowledge to identify text-to-self, text-to-text, and text-to-world connections before, during, and after reading.
- LA 5.1.6.m Self-monitor comprehension by recognizing when meaning is disrupted and apply strategies to clarify, confirm, or correct.
- LA 5.1.6.n Make and confirm/modify predictions and inferences with text evidence while previewing and reading literary, informational, digital text, and/or media.
- LA 5.1.6.o Demonstrate an understanding of text via multiple mediums (e.g., writing, artistic representation, video, other media).
- LA 5.1.6.p Compare and contrast the text of a story, drama, or poem and a visual or oral presentation of the text.
- LA 5.2.1.a Use prewriting activities and inquiry tools to generate ideas, organize information, guide writing, and answer questions.



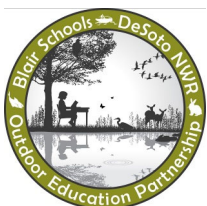


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- LA 5.2.1.b Generate a draft that develops a clear topic suited to the purpose and intended audience and organizational pattern, including a strong thesis, body, conclusion, and appropriate transitions linked to the purpose of the composition.
- LA 5.2.1.c Gather and use relevant information and evidence from multiple authoritative print and/or digital sources to support claims or theses.
- LA 5.2.1.d Compose paragraphs with grammatically correct simple, compound, and complex sentences of varying length, complexity, and type.
- LA 5.2.1.e Revise to improve and clarify writing through self-monitoring strategies and feedback from others.
- LA 5.2.1.f Provide oral, written, and/or digital descriptive feedback to other writers.
- LA 5.2.1.g Adjust writing processes to persevere in short and long-term writing tasks of increasing length and complexity.
- LA 5.2.1.h Proofread and edit writing recursively for format and conventions of standard English (e.g., spelling, capitalization, grammar, punctuation, syntax, semantics).
- LA 5.2.1.i Display academic honesty and integrity by avoiding plagiarism and/or overreliance on any one source and by following a standard format for citation.
- LA 5.2.1.j Publish a legible document in manuscript, cursive, or digital format, and apply formatting techniques (e.g., indenting paragraphs, title).
- LA 5.2.2.a Communicate information and ideas effectively in analytic, descriptive, informative, narrative, poetic, persuasive, and reflective modes to multiple audiences using a variety of media and formats.
- LA 5.2.2.b Provide evidence from literary or informational text to support analysis, reflection, and research.
- LA 5.2.2.c Conduct and publish research projects to answer questions or solve problems using multiple resources to support theses.
- LA 5.2.2.d Use precise word choice and domain-specific vocabulary to write in a variety of modes.
- LA 5.2.2.e Compare various mentor texts and/or exemplars to create a similar piece.
- LA 5.3.1.a Communicate ideas and information in a clear and concise manner suited to the purpose, setting, and audience (formal voice or informal voice), using appropriate word choice, grammar, and sentence structure.
- LA 5.3.1.b Demonstrate appropriate speaking techniques (e.g., appropriate eye contact, adequate volume, clear pronunciation, word choice) for a variety of purposes and situations, including interpreting text.
- LA 5.3.1.c Utilize appropriate visual and/or digital tools to enhance verbal communication and add interest.
- LA 5.3.1.d Convey a perspective with clear reasoning and support.
- LA 5.3.1.e Ask pertinent questions to acquire or confirm information
- LA 5.3.2.a Demonstrate active and attentive listening skills (e.g., eye contact, nonverbal cues, taking notes, recalling, questioning) for multiple situations and modalities.
- LA 5.3.2.b Identify the purpose and credibility of information being presented in diverse media and formats.
- LA 5.3.2.c Complete a task following multi-step directions.
- LA 5.3.3.a Demonstrate appropriate social etiquette and apply social cues when communicating.
- LA 5.3.3.b Demonstrate awareness of and sensitivity to the appropriate use of words (e.g., stereotypes, multiple meanings of words) in conversation.
- LA 5.3.3.c Apply conversation strategies to recognize and consider new information presented by others in relationship to one's own ideas.
- LA 5.3.3.d Listen, ask clarifying questions, summarize, and explain information being communicated and consider its contribution to a topic, text, or issue under study.
- LA 5.3.3.e Collaboratively converse with peers and adults on grade-appropriate topics and texts, building on others' ideas to clearly express one's own views while respecting diverse perspectives.
- LA 5.4.1.a Locate, organize, analyze, and evaluate information from print and digital resources to generate and answer questions and create new understandings.
- LA 5.4.1.b Demonstrate ethical use of information and copyright guidelines by appropriately quoting or paraphrasing from a text and citing the source using available resources (e.g., online citation tools).
- LA 5.4.1.c Use or decipher multiple formats of print and digital text (e.g., cursive, manuscript, font, graphics, symbols).



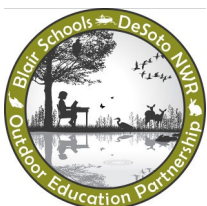


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- LA 5.4.2.a Practice safe and ethical behaviors when communicating and interacting with others digitally (e.g., safe information to share, appropriate language use, utilize appropriate sites and materials, respect diverse perspectives).
- LA 5.4.2.b Use appropriate digital tools (e.g., social media, online collaborative tools, apps) to communicate with others for conveying information, gathering opinions, and solving problems.
- Math-
- MA 5.1.1.a Determine multiple equivalent representations for whole numbers and decimals through the thousandths place using standard form, word form, and expanded notation.
- MA 5.1.1.b Compare whole numbers, fractions, mixed numbers, and decimals through the thousandths place and represent comparisons using symbols $>$, $<$, or $=$.
- MA 5.1.1.c Round whole numbers and decimals to any given place.
- MA 5.1.1.d Recognize and generate equivalent forms of commonly used fractions, decimals, and percents (e.g., halves, thirds, fourths, fifths, and tenths).
- MA 5.1.1.e Write powers of 10 with exponents.
- MA 5.1.2.a Multiply multi-digit whole numbers using the standard algorithm.
- MA 5.1.2.b Divide four-digit whole numbers by a two-digit divisor, with and without remainders using the standard algorithm.
- MA 5.1.2.c Multiply a whole number by a fraction or a fraction by a fraction using models and visual representations.
- MA 5.1.2.d Divide a unit fraction by a whole number and a whole number by a unit fraction.
- MA 5.1.2.e Explain division of a whole number by a fraction using models and visual representations.
- MA 5.1.2.f Interpret a fraction as division of the numerator by the denominator.
- MA 5.1.2.g Add, subtract, multiply, and divide decimals to the hundredths using concrete models or drawings and strategies based on place value, properties of operations (i.e. Commutative, Associative, Distributive, Identity, Zero), and/or relationships between operations.
- MA 5.1.2.h Add and subtract fractions and mixed numbers with unlike denominators.
- MA 5.1.2.i Determine the reasonableness of computations involving whole numbers, fractions, and decimals.
- MA 5.1.2.j Multiply and divide by powers of 10.
- MA 5.2.1.a Form ordered pairs from a rule such as $y=2x$, and graph the ordered pairs on a coordinate plane.
- MA 5.2.2.a Interpret and evaluate numerical or algebraic expressions using order of operations (excluding exponents).
- MA 5.2.3.a Solve real-world problems involving addition and subtraction of fractions and mixed numbers with like and unlike denominators.
- MA 5.3.1.a Identify three-dimensional figures including cubes, cones, pyramids, prisms, spheres, and cylinders.
- MA 5.3.1.b Identify faces, edges, and vertices of rectangular prisms.
- MA 5.3.1.c Justify the classification of two-dimensional figures based on their properties
- MA 5.3.2.a Identify the origin, x axis, and y axis of the coordinate plane.
- MA 5.3.2.b Graph and name points in the first quadrant of the coordinate plane using ordered pairs of whole numbers.
- MA 5.3.3.a Recognize that solid figures have volume that is measured in cubic units.
- MA 5.3.3.b Use concrete models to measure the volume of rectangular prisms in cubic units by counting cubic units.
- MA 5.3.3.c Generate conversions within the customary and metric systems of measurement.
- MA 5.4.2.a Use observations, surveys, and experiments to collect, represent, and interpret the data using tables (e.g., frequency charts) and bar graphs.
- MA 5.4.2.b Formulate questions that can be addressed with data and make predictions about the data.





Introduction to the Refuge



Grade: 5

Duration: 90-120
minutes

Supplies

- Student journals

Summary

An in-classroom visit to introduce the students to the expectations they should follow during their visits and about DeSoto and Boyer Chute National Wildlife Refuges.

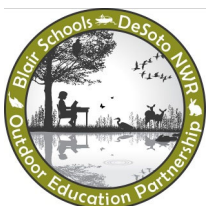
Objectives

By the end of this lesson, students will be able to:

- Identify the behavior expected of them
- Why the refuges were established
- What supplies they will need every time they visit.

Procedure:

1. Greet students and ask them if they know what a National Wildlife Refuge is.
2. What are the main purposes and uses of National Wildlife Refuges?
 - We are there to protect wildlife and their habitat for future generations.
 - Big 6—Hunting, Fishing, Wildlife Observation, Wildlife Photography, Environmental Education, Interpretation.
3. Why were Desoto and Boyer Chute established:
 - Boyer Mission: **was established to recover fish and wildlife habitat in and along the Missouri River and to restore essential wildlife habitat that became scarce after the river was "improved" for navigation half a century ago.**
 - DeSoto Mission: **was established to provide important stopover site habitat for migratory waterfowl that follow the Mississippi flyway.**
4. What are the expectations we have for the students
 - Students will be respectful and listen while at the refuge
 - Students will be attentive and focused in on their lesson
 - Students will be understanding that they will be outside in a variety of weather conditions.
5. Supplies students will need while on the refuge:
 - Weather appropriate clothing
 - Their nature journal
 - Writing utensils
 - Their listening ears



Refuge Introduction

Journal Entry

Date: _____ Time: _____

Location: _____

Weather Conditions: _____

Cloud Coverage (Select One):

Cirrus (Wispy), Cumulus (Puffy), Stratus

(Dense and Layered), Cumulus

(Thunderclouds)

Estimated Temp: _____ Actual Temp: _____

Estimated Wind Dir. & Speed: _____

Actual Wind Dir. & Speed: _____

Colors of the Day:

What are National Wildlife Refuges?

Why were DeSoto and Boyer Chute
NWRs established?

How am I expected to act at the refuge?

What supplies am I expected to have when
visiting DeSoto?

What are the Big Six uses of Refuges?



Sense of Wonder



Grade: 5

Duration: 90-120
minutes

Supplies

- Student journals
- Sense of Wonder book

This lesson is adapted from a field investigation lesson at Prairie Wetlands Learning Center in Fergus Falls, Minnesota.

Summary

Students are introduced to naturalists as scientists and to author Rachel Carson as one example of a naturalist. Students listen to an excerpt from a book by Rachel Carson called The Sense of Wonder. Then, using a data collection sheet, students go into the field to search for wonder. Afterwards, they share their discoveries and draw conclusions.

Objectives

By the end of this lesson, students will be able to:

- Identify naturalists as one type of scientist
- Describe three things a naturalist does (observe nature, record data, share discoveries with others)
- List three qualities of naturalists (quiet, prepared, full of questions and wonder, in the moment, sharing, curious, respectful, observant, and patient)
- Search for and find wonder (such as beauty, surprise, awe, delight, joy) in the prairie
- Practice being naturalists and consider the possibility that they are naturalists
- Identify and enjoy the prairie as one place for exploration and exploring as a positive choice or activity

Standards

Science:

5.1.1.b, 5.1.1.d, 5.1.1.e, 5.1.1.g, 5.1.2.c, 5.3.1.c, **5.13.4.c**

Language Arts:

LA 5.2.1.a, 5.2.2.b, 5.3.1.a, 5.3.2.b, 5.3.2.c

Procedure

1. Ask students to tell you what a naturalist is. What kind of job is that? (scientist)
2. What does a naturalist do? (observes nature, writes things down, shares discoveries with others, keys into what is happening in nature around them [ie. Loss of butterflies, etc.]) Record their answers on the white board as students record them in their notebooks. Are *they* naturalists?





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Sense of Wonder

3. Introduce the thought that humans alter the environment like the Missouri River and hold influence over natural systems to protect (Refuges, Parks, etc.), or negatively affect them (Pollution, Overhunting, etc.).
4. Ask students to tell you the qualities of a naturalist. How does a naturalist behave outside? Record a list on the white board and fill in any qualities they may have missed. A completed list included prepared, quiet, observant, patient, curious, respectful, full of wonder, inquisitive, in the moment, and sharing. Students should also record this list in their notebooks.
5. Briefly introduce Rachel Carson as a naturalist author (*Silent Springs*).
6. Set up a T-chart with the students to discuss the two kinds or definitions of wonder. Use student response to fill in both sides of the chart. Ask for examples of wonder questions for the left side of the chart (I wonder what's for dinner? I wonder what we're doing in science tomorrow?) Ask for examples of amazing things for the wonder-amazing side of the chart (Joe Mauer when he hits a homerun, my mother, a loon, a sunrise...)
7. Start a wonder word list for continuation during the reading. Wonder words are synonyms for "wonder" such as beauty, surprise and mystery.
8. Read the night sky section of *The Sense of Wonder*. See section, "Excerpt from *The Sense of Wonder*." Ask students to jot down any wonder words they hear; individual words which are synonyms for "wonder."
9. Invite students to join you on a search for wonder outside. Help them prepare their journal. At the top of their investigation page, they should write the title "Sense of Wonder." Be sure to include the date and the location. On the white board, model what their data sheet will look like by dividing the page into quadrants. Allow them to choose four wonder word from a list (such as joy, mystery, thrill, excitement, love, awe, surprise, beauty, delight) and title each quadrant with one of the four words. Instruct the students that they can write and/or sketch and label examples of those kinds of wonder in each quadrant.
10. Remind everyone that they are naturalists and should practice being naturalists in the field. How should they behave? (quiet, observant, patient, etc.) Allow for as much time as possible in the field. Move from group to group to answer questions, model good naturalist behavior, and remind students to record their wonder on their investigation sheets.
11. During outdoor time (which should be an hour or more), have students sit quietly and still for up to 15 minutes to observe nature. Space them about five meters apart from each other along a section of trail. This allows for personal reflection and a more intimate experience in nature without interference from classmates.
12. Wrap up by asking a few students to share the wonder they found with the class. Reread the first





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Sense of Wonder

paragraph of the excerpt and ask students to free write on their experience. (What if I never saw this before? What if I knew I would never see it again?). Ask a few students to share with the class. How can they be more open to sensing wonder? Ask them how or who they could share this discovery with when they return home? (Does your sense of wonder end when you leave? Encourage them to keep going outside anywhere they are to search for wonder; it is free and is a good, healthy choice of activity.

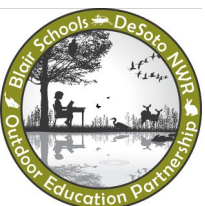
Excerpt from *The Sense of Wonder* by Rachel Carson

“Exploring nature...is largely a matter of becoming receptive to what lies all around you. It is learning again to use your eyes, ears, nostrils and finger tips, using your senses. For most of us, knowledge of our world comes largely through sight, yet we look about with such unseeing eyes that we are partially blind. One way to open your eyes to unnoticed beauty is to ask yourself. ‘What if I had never seen this before? What if I knew I would never see it again?’

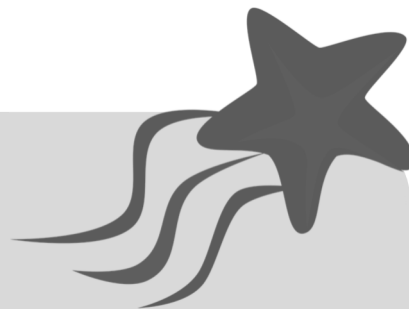
“I remember a summer night when such a thought came to me strongly. It was a clear night without a moon. With a friend, I went out on a flat headland that is almost a tiny island, being all but surrounded by the waters of the bay. There the horizons are remote and distant rims on the edge of space. We lay and looked up at the sky and the millions of stars that blazed in the darkness. The night was so still that we could hear the buoy on the ledges out beyond the mouth of the bay. Once or twice a word spoken by someone on the far shore was carried across on the clean air. A few lights burned in cottages. Otherwise there was no reminder of other human life; my companion and I were alone with the stars. I have never seen them more beautiful: the misty river of the Milky Way flowing across the sky, the patterns of the constellations standing out bright and clear, a blazing planet low on the horizon. Once or twice a meteor burned its way into the earth’s atmosphere.

“It occurred to me that if this were a sight that could be seen only once in a century or even once in a human generation, this little headland would be thronged with spectators. But it can be seen many scores of nights in any years, and so the lights burned in cottages and the inhabitants probably gave not a thought to the beauty overhead; and because they could see it almost any night perhaps they will never see it.

“An experience like that, when one’s thoughts are released to roam through the lonely spaces of the universe, can be sharedeven if you don’t know the name of a single star. You can still drink in the beauty, and think and wonder at the meaning of what you see.”



Read the excerpt below:



“It occurred to me that if this were a sight that could be seen only once in a century or even once in a human generation, this little headland would be thronged with spectators. But it can be seen many scores of nights in any years, and so the lights burned in cottages and the inhabitants probably gave not a thought to the beauty overhead; and because they could see it almost any night perhaps they will never see it.

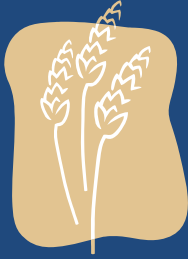
“An experience like that, when one’s thoughts are released to roam through the lonely spaces of the universe, can be sharedeven if you don’t know the name of a single star. You can still drink in the beauty, and think and wonder at the meaning of what you see.” -Rachel Carson, *A Sense of Wonder*.

Looking at this excerpt, what do you think that Rachel Carson is trying to tell you about observations and nature?

How do you think that you can apply her advice in your everyday routine (such as on your way to school or during recess)?



Native Prairie Exploration



Grade: 5

Duration: 90-120
minutes

Supplies

- Student journals
- Prairie Flower Guides
- Measuring stick
- Hoola Hoops/ Wooden Frames
- Food webs
- Shovel/Soil pit

Summary

Native prairie is a vibrant and disappearing ecosystem. In Nebraska, less than one percent of the native prairie remains. This ecosystem is home to many native plants and animals and plays an important role in the life cycles of many migratory birds. In this lesson, student will make discoveries about the prairie at DeSoto National Wildlife Refuge.

Objectives

By the end of this lesson, students will be able to:

- Identify two grasses and four flowers
- Sketch the web of nutrients going from decomposers to plants back into the ground.
- Sketch characteristics of flowers and grasses looking for details
- Use sense to help identify characteristics of grasses and flower including sight, feel and smell
- Be able to identify where plants get their materials for growth
- Analyze the interactions of the plants, air and ground

Standards

Science:

5.1.1.b, 5.1.1.c, 5.1.1.d, 5.1.1.e, 5.3.1.a, 5.8.2.a, **5.8.2.b**, 5.8.2.c, 5.11.3.c, 5.13.4.a, 5.13.c

Language Arts:

LA 5.2.1.a, 5.2.2.a, 5.2.2.b, 5.3.1.a, 5.3.2.a, 5.3.2.b, 5.3.3.b, 5.3.3.c

Math:

MA 5.1.1.c, 5.1.1.d, 5.1.2.c, 5.1.2.d, 5.1.2.e, 5.1.2.f,

Procedure

1. Greet students ask them what they know about native prairie.
2. Present short talk about native prairies and the prairie ecosystem. Emphasize plant and decomposer interactions and pollinator interactions within the system.
3. Introduce the field investigation to the students. Students will observing everything within a hoola hoop or wooden frame (i.e. soil moisture, plants, dead plants, bugs, etc.). They will be using guides given to them to identify the grasses and forbs. Have students sketch their findings in their journals (give Examples of field sketches).
4. Bring students together in field and ask what they have observed, ask if observed any interactions between the bugs, plants, dead plants, and





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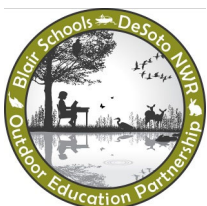
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Native Prairie Exploration

soil.

5. Ask students how they think this helps create the materials plants need to grow, take a few answers and then explain. Ask what plants would be able to photosynthesize the most in the prairie and what they use from the air and soil. Sugar stores in plants to create energy.
6. With the students thinking about the materials plants need to grow and what they have observed in the system introduce them to decomposers. Prompt this with the question: “ Who here saw a bunch of dead grasses or plants with a bunch of bugs on them?”. Explain the role of these insects as decomposers and how they break down dead materials and benefit the system.
7. Bring students to a soil pit and show the soil layers, narrowing in the focus to the organic layer where the most decomposition happens. Explain nutrient cycling and give the students bits of the soil to feel its moisture level and texture/graininess. Propose to them what type of soil would be best to grow in sandy soils like the beach or these soils.
8. Talk about how annual fires also recycle the nutrients and how this can manage for invasive species. Introduce them to the idea of fire ecology and how fire is an important to a prairie ecosystem.
9. Introduce the concept of transpiration by showing a bag tied to some prairie plants with condensations versus that of the wetland plants and trees.
10. Have student write down their observations about what decomposers they have seen today or know of and how nutrients are cycled through the prairie.
11. Open discussion with the students as a group and have them share their discoveries.



Read the excerpts below:

“The first part of [the trail] is beautiful and surpassing anything of the kind I have ever seen. Large rolling prairies stretching as far as your eyes can carry you. The grass so green and the flowers of every description from violets to geraniums of richest hue.” – Elizabeth Keegan (12) *Stories of Young Pioneers in Their Own Words, Violet T. Kimball*

“I think I shall never forget that long lonely day, waiting on that vast undulating prairie that stretched as far as the eye could reach, covered with grasses and flowers... It must have been a lovely scene that bright spring morning, but I hardly think it was appreciated by the little band that were bravely leaving home, friends, country, and kindred to take their toilsome march across the Rocky Mountains.” – Mary Jane Mount (9) *Stories of Young Pioneers in Their Own Words, Violet T. Kimball*



Imagine you were one of these early pioneers exploring the prairies of DeSoto National Wildlife Refuge, write a journal entry with 6-8 complete sentences about the experience in your own words and experiences.

Fill in this grid to represent the plants that you find in your frame.

What fraction of your frame is grasses? What is that fraction as a percentage?

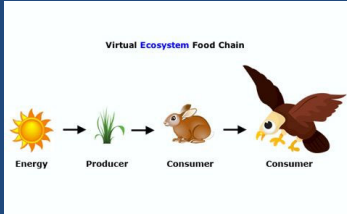
What fraction of your frame is wildflowers? What is that fraction as a percentage?

What fraction of your frame is shrub? What is that fraction as a percentage?

What took up the most space in your frame?



Energy Cycles



Grade: 5

Duration: 90-120 minutes

Supplies

- Poker chips
- Carp parts?
- Morel carving

Summary

The natural world is a complex ecosystem made up of different levels of nutrient cycling and life cycles. This includes food chains, the interactions of organisms, the flow of energy, and the reaction to introductions and removals from these ecosystems.

Objectives

By the end of the lesson students will be able to:

- Recognize one food chain that can occur between the wildlife living on DeSoto National Wildlife Refuge.
- Identify one producer, primary consumer, secondary producer, tertiary producer, and decomposer.
- Illustrate the relationship lead poisoning and bioaccumulation through food webs.
- Identify the role the refuge has in protecting these food chains
- Propose two reasons why it is important to protect ecosystems.
- Explain two ways animals behaviors change seasonally and between day and night.
- Understand the interaction of the biosphere, atmosphere, and geosphere in context to food chains (nutrients, photosynthesis, etc).

Standards

Science:

5.1.1.a, 5.1.1.b, 5.1.1.d, 5.1.1.e, 5.1.1.f, 5.1.1.g, 5.1.1.i, 5.1.2.a, 5.1.2.c, 5.8.2.a, 5.8.2.b, 5.8.2.c, 5.11.3.c, **5.13.4.a**, 5.13.4.b, 5.13.4.c

Language Arts:

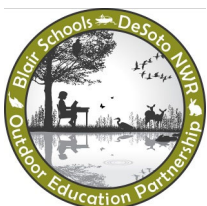
LA 5.3.1.a, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.b

Math:

MA 5.1.1.c, 5.1.1.d, 5.1.2.c, 5.1.2.d, 5.1.2.e, 5.1.2.f, 5.4.2.a, 5.4.2.b

Procedure

1. Welcome students and ask if they know how energy flows through ecosystems. Introduce the students to producers, consumers, and decomposers. Explain to the students what each of these levels in the energy pyramid and then show the students the pyramid they will be filling in themselves. Explain to the students how they will also be creating their own food web. Show them a brief example of what a food web looks like.
2. Bring students to the bullhead inlet and ask them what they think the





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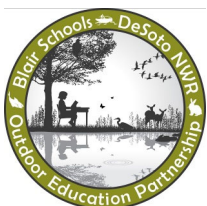
Blair Community Schools and DeSoto National Wildlife Refuge



Energy Cycles

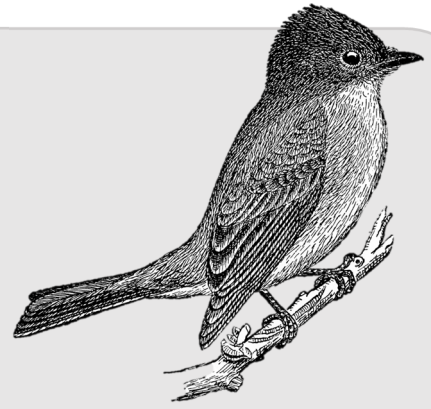
food web for the lake is. Introduce the students to what an invasive species is. What invasive species do they think we have in the lake at DeSoto. Explain to the students what happens when there is a invasive species in an ecosystem.

3. Talk about human interactions with the food web and how humans will fish. Ask who fishes and if they use sinkers on their lines. Talk to students about bioaccumulation and bring chips to demonstrate how lead poisoning accumulates through wetland ecosystems.
4. Bring students to the cottonwood and grassland trails, hike a minute while students fill in their worksheets. After a short walk, ask the students what they think will happen if one of the parts of their food web was removed. Does they system change or stay the same. Do animal behaviors change when the sun sets or rises? What about seasonally? (Circadian Rhythms)
5. Wrap the lesson up by:
 - Asking students what food chains they created.
 - Getting examples of what producers, herbivores, consumers and decomposers they found.
 - Ask what other examples could they find of invasive species near their houses.
 - How can they help stop things like lead poisoning.
 - What kind of food chain would they find in their backyard?



Read the excerpt below:

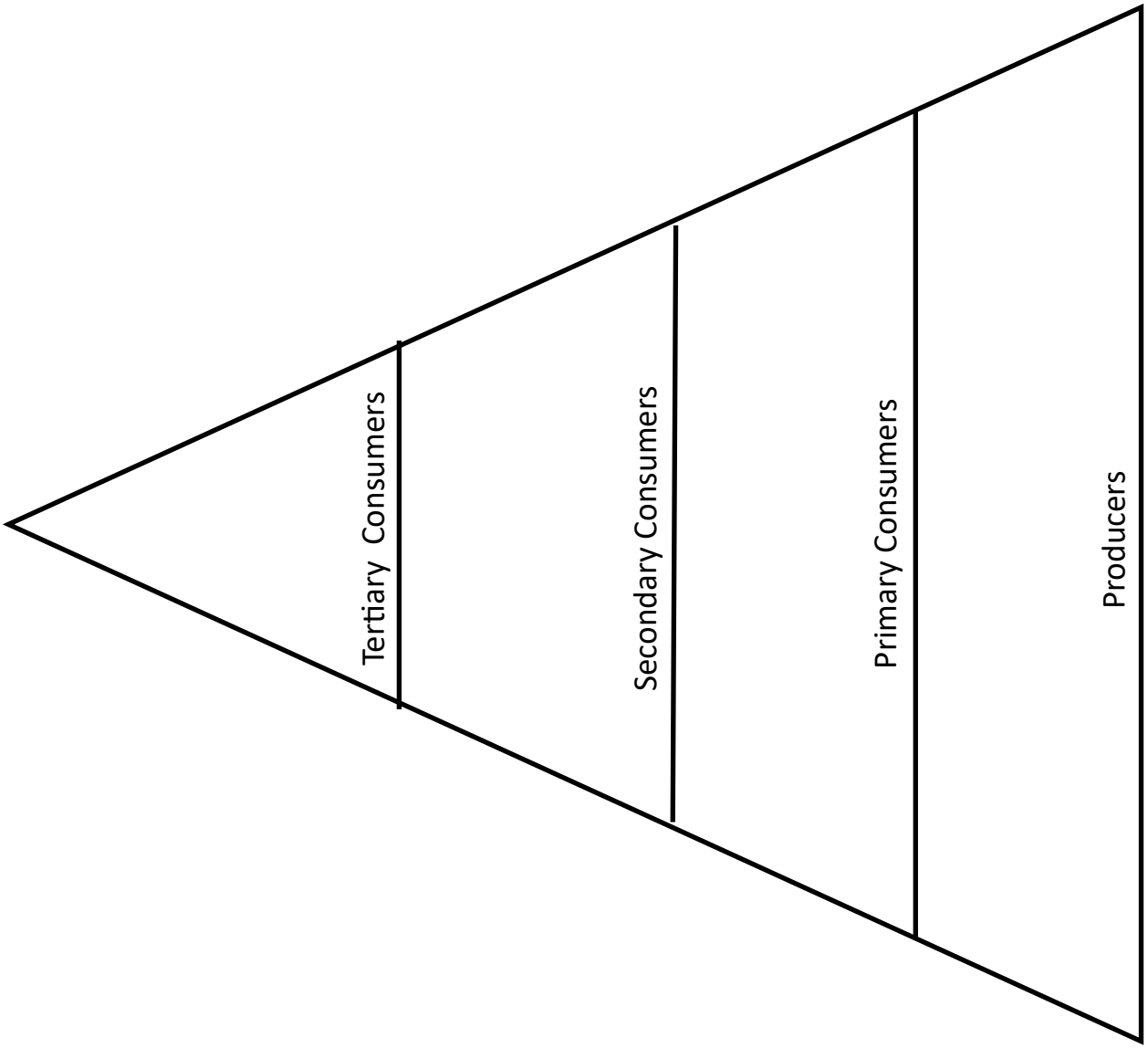
“Plants of course, are not the only focus of the refuge. As more prairie plants flourish, prairie animals are returning in greater and greater numbers. Bobcats, coyotes, badgers, skunks, deer, and the rare Indiana bat make their way through the woods and grasslands of the refuge. Everywhere you look, colorful birds forage or sing to attract mates. These include many grasslands species that were especially hard hit when prairies were destroyed, such as bobolinks, upland sandpiper, and Henslow’s sparrow.”—Sneed B. Collard III, *The Prairie Builders, Reconstructing America’s Lost Grasslands*.



If you were in this prairie what animals do you think would be the apex predator (or tertiary consumer)? Explain why you think this.

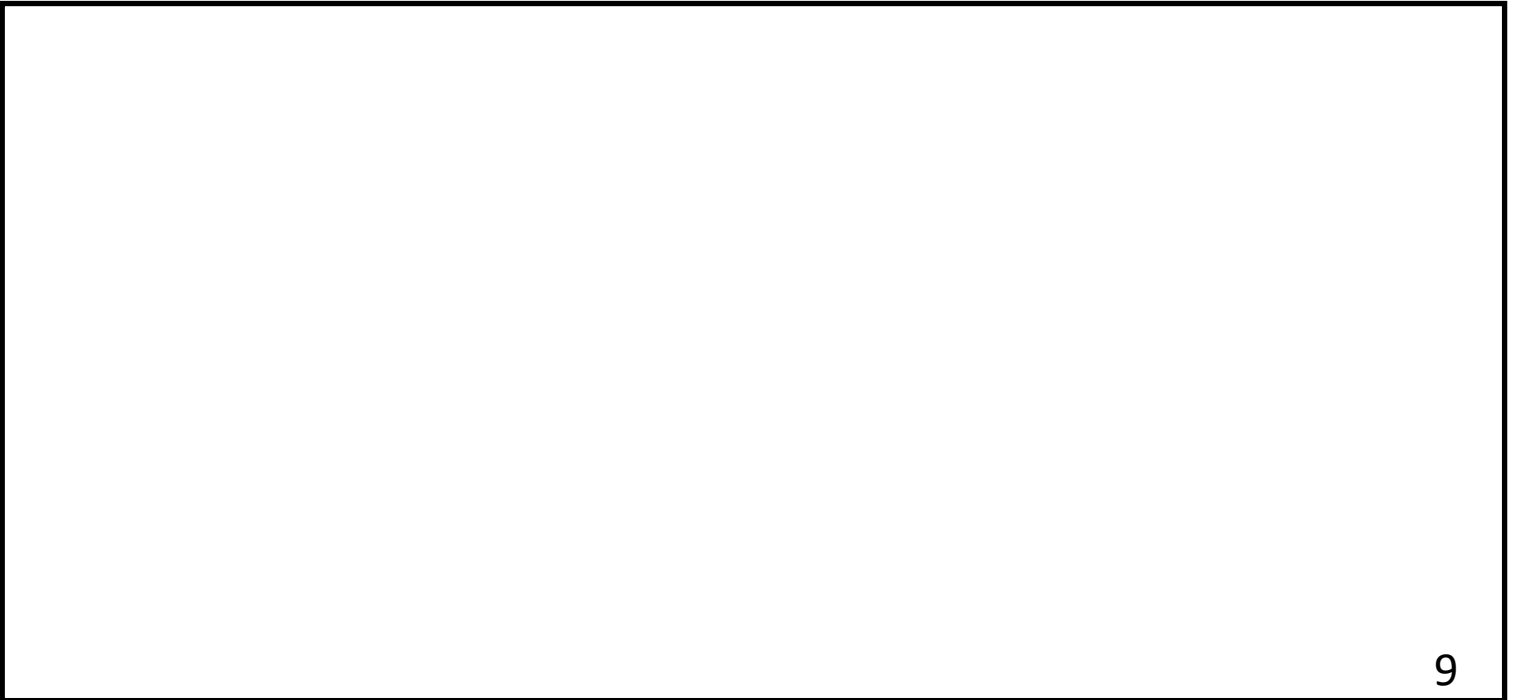
Why is it important for the plants to flourish in prairie before all the other animals in the prairie will?

What do you think will happen one of these animals are removed from the ecosystem?



Decomposers

Food Chain





Migratory Birds



Grade: 5

Duration: 90-120
minutes

Supplies

- Student journals
- Binoculars
- Birds of Nebraska field guides
- Migration Game

Summary

DeSoto National Wildlife Refuge was established in 1958 as a sanctuary for migratory birds. In the spring and fall, DeSoto's wetlands host migratory bird population that use the refuge for resting and feeding. Refuge management aims to create conditions that allow the migratory birds to get the food and rest they need to complete their migration.

Objectives

By the end of this lesson, students will be able to:

- Use binoculars and other tools to view migratory birds
- Record and sketch observations of migratory birds in nature journals
- Demonstrate listening and observation skills
- Recognize the importance of wetlands for migratory birds
- Recognize that birds use the night sky and stars while migrating to and from DeSoto NWR
- Recognize that the stars change depending on when the migration occurs whether in the spring or the fall.

Standards

Science:

5.1.1.a, 5.1.1.b, 5.1.1.d, 5.1.1.e, 5.1.2.a, **5.8.2.a**, 5.11.3.a, 5.11.3.b, 5.11.3.c, 5.13.4.a, 5.13.4.d, 5.13.4.e

Language Arts:

LA 5.2.2.b, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.d

Math:

MA 5.1.1.c, 5.1.1.d, 5.1.2.c, 5.1.2.d, 5.1.2.e, 5.1.2.f,

Procedure

1. Gather students in the auditorium and ask what they know about the fall migration at DeSoto. Ask what role wetlands play in the migration.
2. Use Migration to discuss the importance stopover sites like DeSoto to migratory birds. Ask if any of the students know how birds figure out when they need to migrate (Changes in temperature, food sources, and day length). Talk about ways that the waters and wetlands are managed on the refuge to help promote use by migratory waterfowl.
3. Explain to the students that the migration patterns and routes that the birds follow are dependent on the night sky and the brightness of the stars. Explain further that these change depending on when the migrations occurs (Fall or Spring). The stars positions also change





Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



Migratory Birds

throughout the duration of the night.

4. Explain to students that they will be observing the fall migration in a moment and journaling what birds they see, along with the wetland characteristics the birds are using/occupying (Eating aquatic plants, swimming, etc.) Have students fill in on their sheets what birds they think they will observe during our fall migration.
5. Divide into groups of two, hang out binoculars and give a quick tutorial on how to focus and use them.
6. Allow the students time to look at the migratory birds and explore the viewing gallery area at their own pace. If students aren't journaling, remind them that they are responsible for documenting their observations. Keep checking the spotting scopes to ensure they are pointing towards birds. This indoor area is used because the building acts as a viewing blind and allows the students a good chance to identify and study birds up close without flushing them from their positions.
7. Depending on the time available, take students out on the refuge on the bus or on nature hike to further observe and listen to the birds.
8. The students will gather around again for a summary and review of what they learned, lead the discussion which will address the following:
 - What types of species were you able to identify? How many?
 - Would you be able to use the night sky to find your way home, let alone to another country or state?
 - Why is DeSoto NWR important for migratory birds?
 - What role does the refuge play in protecting wetlands for migratory birds?
 - What fuels the birds for their trip to and from DeSoto NWR?
 - How can the refuge staff manage for migratory birds on the refuge?



Read the excerpt below:

“All over the world millions of birds set off on long, perilous migrations each year. Bird migration is a regular mass movement. Birds fly from winter homes to summer nesting areas in spring and make the return trip in fall.



If you follow these vast movements of wildlife, you can witness some of the greatest spectacles of the natural world.

Even before the end of winter, flocks of blackbirds begin streaming into northern wetlands to feed and claim nesting territories. More species return in the early days of spring—ducks, killdeers, woodcocks, phoebes, and kinglets. As spring advances, the woodlands start to fill more as more and more birds join the procession. Flocks of thousands swarm into wetland refuges to feed and rest before continuing the journey.

Fall ushers in the second half of the spectacle. Now many of the migrants are less colorful. The brighter feathers that they wore on the mating season have been replaced by duller ones. And their numbers are greater; offspring that were born during the summer months are ready to join their parents on the return trip. About five billion land birds from five hundred different species leave their North American nesting areas to spend the winter further south.—Carol Lerner *On the WING: American Birds in Migration*.

If you were a migrating bird in the fall why might DeSoto National Wildlife Refuge be a place that you would need? _____

If you were a migrating bird what might be some perils that you could run into?

Bird Fractions

What fraction of the birds you saw today would you say were geese?

What fractions of the birds you saw today would you say were songbirds?

What fraction of the birds you saw today would you say were ducks?

What fraction of the birds diets would you say is vegetation?

What fraction of the birds diet would you say is invertebrates?

What fraction of the birds diet would you say is seeds?



Birding



Grade: 5

Duration: 90-120
minutes

Supplies

- Binoculars
- Field guides for birds
- Nesting guides
- Bird house supplies

Summary

Students will explore how different adaptations in different families of bird have changed their means of travel, as well as nesting and feeding habits. Students will take what they have learned and apply it to birdhouse building, while learning how they can help conserve habitat space in their own backyards.

Objectives

By the end of this lesson, students will be able to:

- Identify three bird species using a field guide.
- Identify two bird species without the assistance of a field guide.
- Understand that gravity has a role to play in the different flight patterns of birds.
- Distinguish two nesting types of different birds
- Recognize they can help provide feeding and nesting areas for birds at home.

Standards

Science:

5.1.1.a, 5.1.1.c, 5.1.1.d, 5.1.1.e, 5.1.1.g, **5.8.2.a**, 5.8.2.c, 5.13.4.c

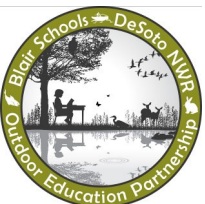
Language Arts:

LA 5.2.1.a, 5.3.1.a, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.b, 5.3.3.c

Math:

Procedure

1. Greet students. Bring students into multipurpose room and hand out binoculars, bird books and birding worksheets. Explain to students what they will be observing while they are in the visitor center and how gravity can affect many of the birds they will be watching.
2. Students will be tasked with trying to identify and record down multiple different bird species they can see in the gallery in and around DeSoto Lake. While observing and identifying the birds' students should be thinking about why the birds are eating differently, travelling differently and then also nesting differently, i.e. differences between songbirds and waterfowl. (allow for 45 minutes)
3. Students will be brought back into the multipurpose room and ask them what their observations were and record them on the white board.
4. Using the results, you received from the students ask them what they





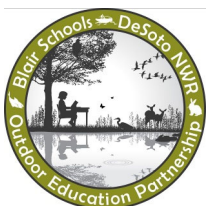
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Bird Identification/Bird Houses

think the more commonly identified species eat, where they nest, and why they travel the way they do (ie. On the water or flying in the sky).

5. Build off of the answers you were given by students and explain to them the different adaptations and behaviors that cause these birds to have different nesting and feeding habits as well as means of travel.
6. Leave off with the topic of nesting or bring the topic back to the forefront of the students minds by asking them how they think they can provide nesting habitat for songbirds at home. Students will then build bird houses to bring home with them. Explain to students as they are outing the houses together, how to construct them, but also how it important that we as naturalist provide nesting areas in our own backyards due to habitat loss. Give more background as to why putting out birdhouses are beneficial to songbirds.
7. Summarize the lesson with students be asking the following questions:
 - What types of birds did we see today in the viewing gallery?
 - Where will you put your birdhouse at home?
 - What other way do you think you can help birds throughout the year at home as a naturalist?



Bird Observations (Feeders)

Name:

Species of Bird:

Size (As big as):

Sparrow

Robin

Crow

Hawk

Eagle

Habitat Specific Location:

Ground

Water

Tree Trunk

Branch

In the Air

Feeder

Behaviors Seen:

Flying

Drinking

Bathing

Feeding

Hopping

Perching

Walking

Swimming

Other

How does the bird interact with gravity:

Choose two behaviors and explain what the bird was doing and why.

Behaviors:

1.

2.

Behavior Explanation 1:

Behavior Explanation 2:

Drawing:

Bird Observations (Lake)

Name:

Species of Bird:

Size (As big as):

Sparrow

Robin

Crow

Hawk

Eagle

Habitat Specific Location:

Ground

Water

Tree Trunk

Branch

In the Air

Feeder

Behaviors Seen:

Flying

Drinking

Bathing

Feeding

Hopping

Perching

Walking

Swimming

Other

How does the bird interact with gravity:

Choose two behaviors and explain what the bird was doing and why.

Behaviors:

1.

2.

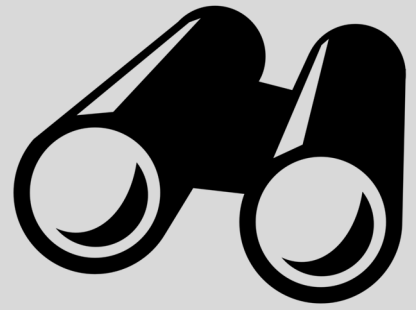
Behavior Explanation 1:

Behavior Explanation 2:

Drawing:

Read the excerpt below:

Curiously, however, in contrast to the migration of waterfowl, the passage of land birds, which creates such a stir in spring, is an event marked primarily by obscurity. The journey south in fall for small birds seems almost a filtering process rather than a great wave. Gradually, there seem to be fewer catbirds whining in the shrubbery. Some morning you may happen to notice that there are fewer Robbins in the lawn. Even the sprightly warblers that were so much a part of the spring migration pass through in dull un-distinguished plumage. If anything, there are more warblers now than there were in the spring, since the new crop of young is moving south too, but the presence of the tree leaves and the dull plumage keep them well hidden.
-John Mitchell and the Massachusetts Audubon Society, *The Curious Naturalist*.



Why do you think you should participate in bird watching, even if you can not identify the birds?

Why do you think that the warblers have dull plumage?



Natural Systems Interaction



Grade: 5

Duration: 90-120
minutes

Supplies

- Ruler
- Soil
- Grass and soil
- Filtering materials?
- Jello Mix
- Boiling water
- Tubes
- Clear Cup
- Potting soil

Summary

During this lesson students will explore the interactions of the atmosphere, hydrosphere, biosphere, anthrosphere, and geosphere in forms of weathering, erosion and changes in animal behavior. They will determine the effects of the waters in river and lake on their shores, what humans do to increase these effects and how these changes can affect the wildlife and ecosystems around them.

Objectives

By the end of this lesson, students will be able to:

- Identify two agents of erosion and agents of chemical change.
- Analyze the effects of weathering.
- Explain ways deposition can help wildlife regain habitats they have previously lost.
- Explain that humans can alter naturally occurring processes.
- List two ways that refuge staff manage water on the refuge.

Standards

Science:

5.1.1.a, 5.1.1.c, 5.1.1.d, 5.1.1.e, 5.1.1.g, 5.3.1.b, 5.8.2.c, **5.13.4.a**, 5.13.4.b, 5.13.4.c, 5.13.4.d, 5.13.4.e

Language Arts:

LA 5.2.1.a, 5.3.1.a, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.b, 5.3.3.c

Math:

MA 5.1.1.c, 5.1.1.d, 5.1.2.c, 5.1.2.d, 5.1.2.e, 5.1.2.f

Procedure

1. Greet Students in Multipurpose room. Introduce to the students weathering and erosion. How do rocks break down? How can wind and water speed up this process. List different ways the soil and rock can break down on the refuge and in other parts of the country. Show the students how fast soil can break down under heavy rain vs that of vegetative soils (Have two pans, one with bare soil and the other with a patch of grass and soil. Run water down them). Introduce them to their interactions worksheet and how they are expected to fill it out.
 - ⇒ Weathering: the breakdown of rocks at the Earth's surface, by the action of rainwater, extremes of temperature, and biological activity. It does not involve the removal of rock material. Three types: Physical, Chemical, and Biological.





Natural Systems Interaction

- ⇒ Erosion: the process by which soil and rock particles are worn away and moved elsewhere by wind, water or ice.
2. Once done explaining the worksheet introduce students to the idea of changes in animal behaviors during the changes in seasons. Explain hibernation, brumation, and habitat utilization. Explain the Jello experiment to the students. Have the students hide their “animals”. File the students onto the bus to explore different locations on the refuge.
 - ⇒ Jello Experiment: Give students jello mix in tubes and explain to them that they need to hide their tube or “animal” in a place where they could be properly protected from the cold. If they chose right the “animal” wouldn't turn into jello at the end of the experiment.
 3. At DeSoto Lake, ask students what they thing caused the shores of the lake to break down (repetitive wave actions from boating, birds, and currents within the lake from releasing and letting in water). What will the shore look like if the waves were more aggressive or bigger in size? What affect do you think humans play a part in the wave action on the lake? What will the shore look like in a long time (sloped or cliff like)? How can humans manage the water to reduce erosion?
 4. At the Missouri River Outlook show the students the shoreline, why do they think that the shore is so steep? Why is this different from the shore of DeSoto lake (differences in speed of water = harsher more aggressive erosion)? How do they think that the changes that humans have done to the river has changed how the water moves and weathers the shore. Is there more or less sediment deposited by the river daily now or when it wasn't straightened? What are the effects of flooding on the refuge. Are there more dead trees? What does this do for the wildlife? Look at the sediment deposition. How can this help the animals? Would this be good soil to grown new trees and plants in? If there was a heavy rainfall would they still expect the sediment to be there? Collect some sediment in a container or paper cup.
 5. Explain to students the effects humans can have on waters and pollution. How do we manage for this? Ask them if we took that cup of soil from the river sediment vs that of another area of the refuge, which soil do they think would grow a bean plant faster? Have them write a hypothesis on the bottom of their journal entry.
 6. When back at the refuge have students gather their “animals” on the way in. Why do they think their animal solidified or stayed liquid? Was their shelter sufficient enough to block out the cold weather and keep the animal warm?
 7. Summarize the lesson and ask the students:
 - What did they discover would be the best hide away for a hibernating or brumating animal?
 - What did they think of the erosion they saw on the refuge?
 - If the river wasn't managed or straighten how do they think the river shores and course would look like today?
 - Would animals have different behaviors in the weather during the summer?
 - Do they think that wind and rain could have the same effect on the shores and rocks on the refuge as the water has?



Natural Systems

Observations:

Nature Journal Entry

Date: _____ Time: _____

Location: _____

Weather Conditions: _____

Cloud Coverage (Select One):

Cirrus (Wispy), Cumulus (Puffy), Stratus (Dense and Layered), Cumulous (Thunderclouds)

Estimated Temp: _____ Actual Temp: _____

Estimated Wind Dir. & Speed: _____

Actual Wind Dir.. & Speed: _____

Colors of the Day:

Beauty 4+

I now know:

Awesome 4+

Surprise 4+

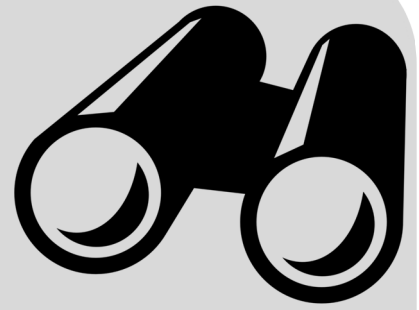
Big Question 4+

Read the excerpt below:

“In recent decades bird-watchers in eastern North American realized that they were seeing fewer forest birds. Since many of these birds are long-distance migrants that spend the winter in Mexico and Central American, scientist look to Latin American to explain the decline.

They knew that the rainforest homes of many birds are being destroyed. To feed growing populations in Latin America, great sections of tropical forests are being cleared for farming. These forestlands are not very fertile, and after a year or two of cultivation the soils lose their nutrients. In days past farmers then moved on to new areas, and in time new trees grew on the abandoned farmland. Some kinds of birds returned, though not the species that make their homes in old forests.

But farming practices are changing. With the increasing use of fertilization, more cleared lands now become permanent cornfields or pastures for cattle. Very few kinds of birds live in agricultural fields.” - Carol Lerner, *On the Wing, American Birds in Migration*.

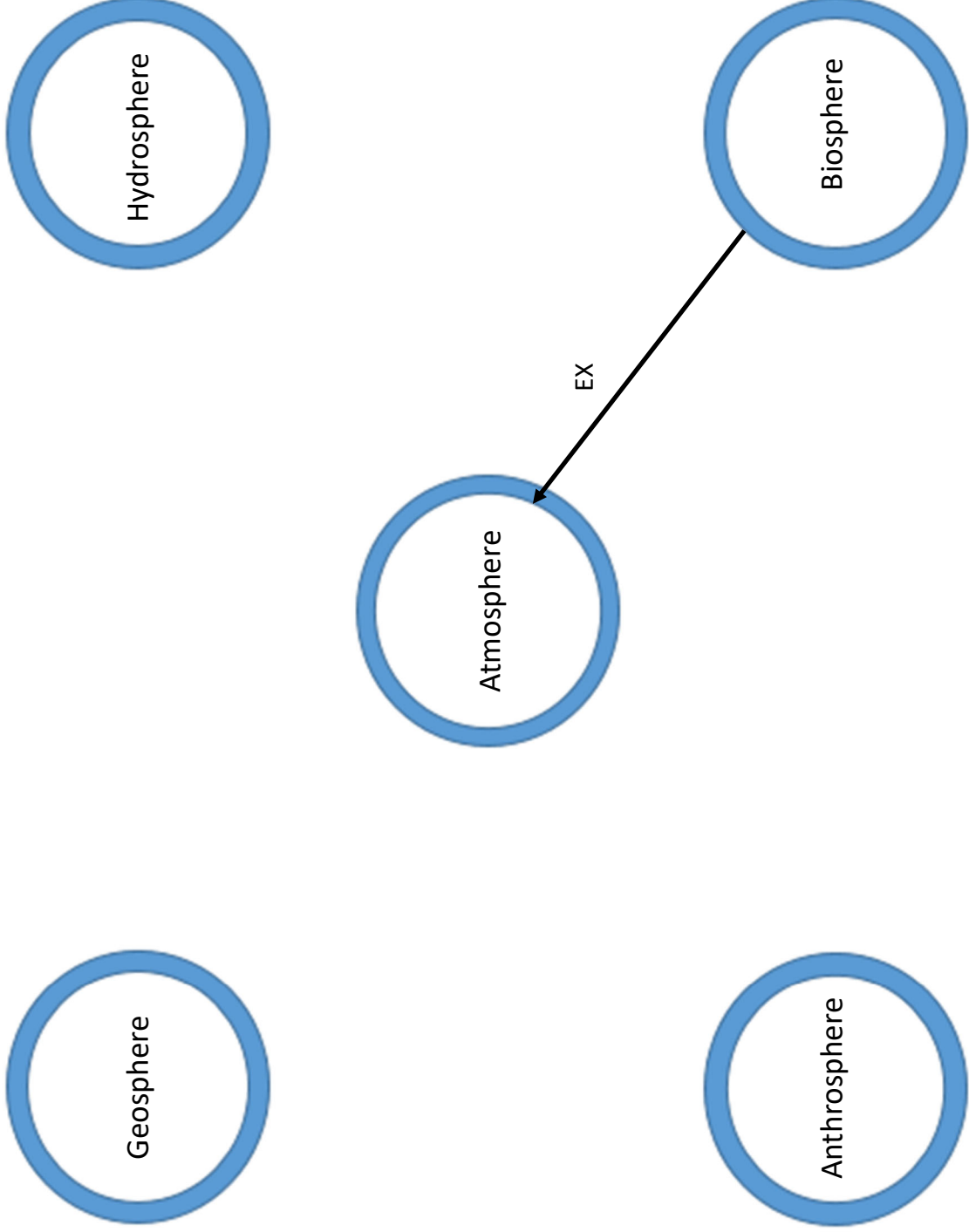


What interaction do you see within this passage (Between the spheres, Ex: Geosphere)? Explain why you see this interaction.

What interaction could you bring into the situation to create a more positive influence in the forest and farmlands to create better habitat for the migrating birds? Explain your reasoning.

Interactions between the different spheres I saw at

DeSoto NWR:



Label your interaction line with the letter below and write the interaction here:

EX: Animals breathe air to continue life processes.

A.

B.

C.

D.

E.

F.

G.

H.

I.



Bald Eagles



Grade: 5

Duration: 90-120 minutes

Supplies

- Eagle wing span poster
- Bald eagle mount
- Eagle skull
- Turkey feathers
- Talon
- Eagle photo book
- Tape of eagle call
- Binoculars
- Spotting scope
- Branch from eagles' nest
- Students' nature journals
- Pens/pencils
- Bus

Summary

The bald eagle will be the primary focus of this field trip. While learning about the eagle, students will explore larger concepts like predator/prey relationships, habitat issues, and endangered species and recovery. Bald eagles are a great illustration of how species can become endangered, what happens once they are listed on the endangered species list, and how recovery is possible

Objectives

By the end of this lesson, students will be able to:

- Explain four characteristics of a bald eagle that makes it a successful predator.
- Illustrate the reason why the bald eagle became an endangered species and two reasons why bald eagles recovered.
- Distinguish between what is and what isn't good habitat for nesting bald eagles.
- Plan and conduct an investigation into a question of their own choosing about bald eagles.
- Explain three ways national wildlife refuges help protect wildlife.
- Explain where bald eagles get their energy from.

Standards

Science:

5.1.1.a, 5.1.1.c, 5.1.1.d, 5.8.2.a, 5.8.2.c, 5.11.3.c, 5.13.4.c

Language Arts:

LA 5.2.1.a, 5.2.2.b, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.b, 5.3.3.c

Math:

MA 5.1.1.c, 5.1.1.d, 5.1.2.c, 5.1.2.d, 5.1.2.e, 5.1.2.f,

Procedure:

1. Gather students near the bald eagle for a discussion of bald eagles' adaptations that contribute to the bald eagle being a good predator.
2. Divide students into five groups, in these groups students will work an investigation for the outdoor portion of the lesson. Students should use the KWOL (Know, Wonder, Observed, Learned) method to organize their investigation and each group should agree upon one question to be the focus of their investigation and each group should agree upon one question to be the focus of their investigation while outside.
3. Hand out binoculars to students and give proper short introduction on how to use them to students.





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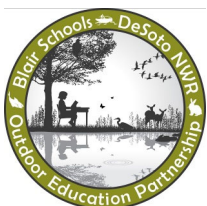
Blair Community Schools and DeSoto National Wildlife Refuge



Bald Eagles

4. Load up the bus for a tour on refuge, have students look for eagles and stop at the Missouri outlook. Make sure to have been scouting the refuge before the program to see where the eagles have been hanging out on the refuge to assure that there will be eagles for the students to investigate. Set up a spotting scope and have students come off the bus in groups of ten to observe, reminding them to be good naturalists (to be quiet and respectful).
5. Stop at the Bob Starr Outlook. Lead a short hike up to the eagles' nest and discuss nesting locations and habits. Ask students to sketch out the area of the eagles' nest to determine why it was chosen by the eagles for their nest. Students should use this time to work on the KWOL charts.
6. Wrap up the lesson by discussing what birds were seen throughout the day, the eagles' nest site and go over the KWOL group investigations. Ask the students these questions:
 - What adaptations make bald eagles successful predators?
 - Why did bald eagles become endangered and why did they recover?
 - What makes the nest site of the bald eagle so attractive to them?
 - What is something new you learned about bald eagles after going on the refuge tour today?
 - How does DeSoto National Wildlife Refuge help protect bald eagles?

Bald Eagles: Adapted for Being Good Predators





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Theme: As a predator, bald eagles have a variety of adaptations to be successful hunters.

Beak: (*prop: eagle skull*)

Curved, sharp, serrated for tearing (like a steak knife). They eat smaller prey whole and regurgitate (vomit) the inedible parts.

Eyes: (*prop: eagle skull*)

2-4X better than human eyes. Can see a rabbit in a meadow from a mile away. Clear eyelids protect eyes which can be closed to prevent water in while still allowing the eagle to see. Orientated toward the front on both sides of head for better visibility. Have two centers to focus, one to the front and one to the side, allowing for a bigger range of vision. Fixed in the socket, have to turn whole head. (Have kids watch something moving) can rotate head in 3/4 circle (have kids rotate head)

Wings: (*prop: drawing of wings*)

7-8 feet long, wide for gliding/soaring Flight: bald eagles are powerful fliers who can reach speeds of up to 100 mph during a dive. Average flight speeds are about 20 to 40 mph. They can soar for hours on end.

Feathers: (*prop: turkey feathers*)

More than 7,000 feathers. Down feathers are soft for warmth, flight feathers are stiff for swooping and soaring.

Bones (*prop: turkey feathers*)

Hollow, light-weight. Skeleton weights about half a pound (250-300 grams), and is only 5 or 6% of the eagle's total weight. The feathers weight twice that much. The beak, talons, and feathers are made of keratin.

Legs (*prop: book photo*)

Strong muscles for grabbing. They have a well defined sense of touch used for hunting.

Toes (feet):

Large—size of an adult human hand. Used for gripping and crushing. 3 forward toes, 1 backward facing.

Talons: (*prop: talon*)

Sharp for grasping and piercing.

Other:

Birds of Prey (Raptor): curved beak and sharp talons (hawks, eagles, falcons, owls, etc. all raptors)

Weight: 10-13 lbs (Females are larger than males)

Live 30 or more years in the wild

Nests: can reach 10 feet across and weight up to 2,000 pounds. They lay 1-3 eggs, incubate for 35 days

Food: Eagles need to eat 6-11% of their body weight every day. This would mean an average 5th grader would have to eat 21,000 calories to keep this ratio. That's 16 frozen Jack's pepperoni pizzas in one day. No wonder they can eat an entire goose.

Eagle calls (*prop: tape player*)



Bald Eagles Nature

Journal Entry

Date: _____ Time: _____

Location: _____

Weather Conditions: _____

Cloud Coverage (Select One):

Cirrus (Wispy), Cumulus (Puffy), Stratus (Dense
and Layered), Cumulous (Thunderclouds)

Estimated Temp: _____ Actual Temp: _____

Estimated Wind Dir. & Speed : _____

Actual Wind Dir.. & Speed: _____

Colors of the Day:

Beauty 4+

Awesome 4+

Surprise 4+

Big Question 4+

Bald Eagle Adaption Sketches and
Notes:

I now know:

Read the excerpt below:

“Bald Eagles are birds of prey, or raptors. This means that they hunt other animals for food. Other birds of prey include hawks, falcons, vultures, and owls.

Like nearly all birds of prey, bald eagles are most active during the day. They live in forested areas along rivers, lakes, marshes and seacoasts. They perch in trees and look down into the water for fish to eat. They travel only as far as they need to find open water and fish to hunt. Bald eagles rarely migrate long distances as many other birds do. Some bald eagles even live in the same place all year.”- Emily J. Dolbear, *Bald Eagles*.



“Adult bald eagles have few enemies in nature. To survive, they need a place to perch, a large body of open water, and little contact with humans. Bald eagles in the wild can live up to 30 years old.

Bald eagles have many tools to help survive. Those tools include their wings, eyes, talons, and bill. Each part of the bald eagles body plays an important role in its survival.”
- Emily J. Dolbear, *Bald Eagles*.

If you were a migrating bald eagle, why might you want to stop at DeSoto National Wildlife Refuge? (Think about the habitat requirements the reading goes over.)

What other birds of prey do you think utilize the refuge? Do you think they stay on refuge year round like some of our bald eagles do?

Bald Eagle Mathematics

If on average a bald eagle lives 20 years and are juveniles for 5 years, what fraction of their lives are they juveniles in days? Also list the percentage. (Hint: There are 365 days a year) Show calculations.

A bald eagle can hold up to 2 pounds of food in their crop. Compared to their relative body weight, on average, of 10 pounds; what percentage of their body weight is just food? Show the fraction and calculations.



Scientific Observation

Grade: 5

Duration: 90-120
minutes

Supplies

- Worksheets
- Pens/pencils

If indoors:

- Tape player with bird calls
- Materials from outside to touch
- Board
- Markers

Summary

Observation skills are key to successful science. Students need to be able to use their senses to observe and record events to help aid in scientific inquiry. By using nature as the object of study, students will practice using their senses of sight, hearing, smell, and feel to make observations. By developing these observation skills, students will have the tools necessary to complete more complex scientific inquiries in the future.

Objectives

By the end of this lesson, students will be able to-

- Describe their feelings during the quiet time using at least five different descriptive words and phrases.
- Predict the location of an animal/bird based on indirect observations (bird calls, scat)
- Make five observations each of sight, sound, feel, and smell during the outdoor quiet time.
- Explain three ways national wildlife refuges help protect wildlife.

Standards

Science:

5.1.1.d, 5.1.1.e, 5.1.2.a, 5.1.3.a, 5.1.3.d, 5.1.3.e

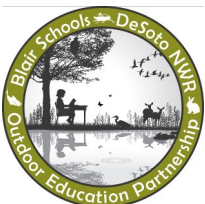
Language Arts:

LA 5.2.1.a, 5.2.2.a, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.b, 5.3.3.c

Math:

Procedure

1. Students will listen to pre-lesson by a ranger, help students get in tune with their senses by drawing their attention to something that works each of their senses and work as a group to properly describe the sense.
2. Teachers help arrange students along the trail. Students will be spaced so that they cannot talk to more see other students. This is designed to give them the feeling that they are totally alone with nature.
3. Quiet observation on the trails begins. This observation will last approximately one hour. Students will record their experiences using their journals or the worksheet provided by their teachers.
4. Gather the students form the trail to discuss what they just experienced. This will be a time to test to see if the objectives of the trip are met. The discussion leader will use the following questions:





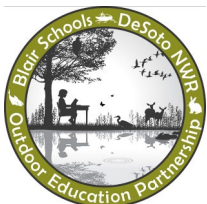
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Sensory Awareness

- Can you describe what it was like to be alone in nature?
- What are some observations you had about sight, sound, smell and hearing?
- How were you able to tell if animals were present even if you did not see them?
- What makes DeSoto National Wildlife Refuge a special place?



Scientific Observation

Sketches:

Nature Journal Entry

Date: _____ Time: _____

Location: _____

Weather Conditions: _____

Cloud Coverage (Select One):

Cirrus (Wispy), Cumulus (Puffy), Stratus (Dense
and Layered), Cumulus (Thunderclouds)

Estimated Temp: _____ Actual Temp: _____

Estimated Wind Dir. & Speed: _____

Actual Wind Dir. & Speed: _____

Colors of the Day:

Beauty 4+

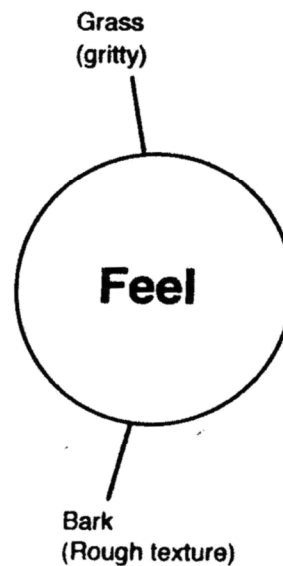
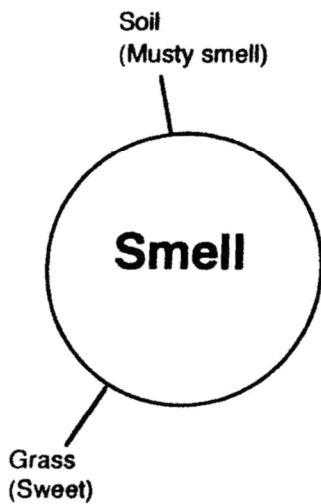
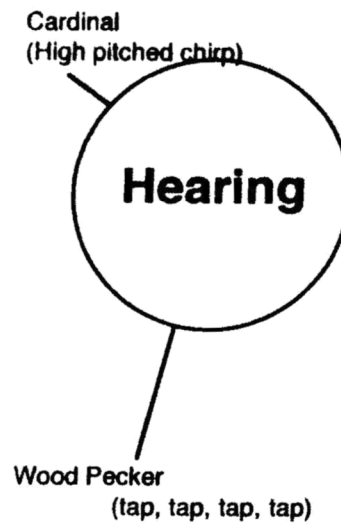
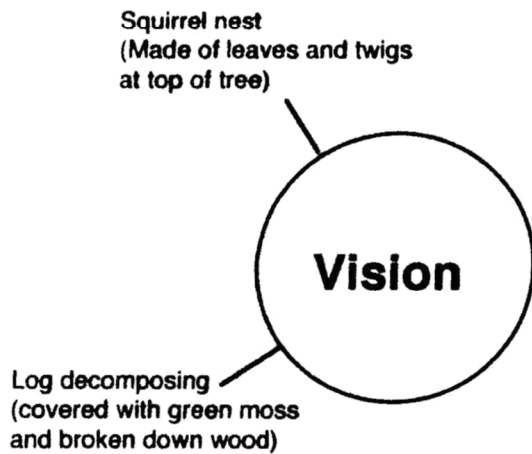
I now know:

Awesome 4+

Surprise 4+

Big Question 4+

1. Using Your Senses Webs



Read the excerpt below:

“The months of the year, from January up to June, are a geometric progression in the abundance of distractions. In January one may follow a skunk track, or search for bands of chickadees, or see what young pines the deer have browsed, or what muskrat houses the mink have dug, with only an occasional and mild digression into other doings. January observation can be almost as simple and peaceful as snow, and almost as continuous as cold. There is time not only to see who has done what, but to speculate why.” - Aldo Leopold, *A Sand County Almanac*.



Why do you think it was important for Aldo Leopold to observe the activities of the wildlife around him?

If you could observe any given ecosystem or follow an animal for a day, how would you go about doing so? What animal or ecosystem would you choose?



Refuge/Water Management* Removed



Grade: 5

Duration: 90-120 minutes

Supplies

- River Dioramas
- Food dyes
- Ball sprinkles
- Hoola hoops/wooden frames
- Water test kits

Summary

The central focus will be the refuge wetlands and waterfowl, including the interactions of management, water levels, biomass and migration all play a role here at DeSoto National Wildlife Refuge. Students will be able to explore the refuge and see plants that are beneficial to waterfowl for food and how the level of freshwater in the wetlands influences the amount and types of plant growth. Then using this the student will be able to recognize the interactions of the plants, water, and birds on the refuge and why it is important to manage and protect these systems.

Objectives

By the end of the lesson students will be able to:

- Recognize the water system of DeSoto National Wildlife Refuge as a freshwater lake and freshwater river.
- Identify one management technique utilized by the refuge to control water movement and level.
- Illustrate the relationship between the water level of the wetlands on the refuge to the amount of biomass and ability to sustain waterfowl.
- Identify the role the refuge has in protecting waterfowl.
- Propose two reasons why it is important to protect wetlands.
- Explain two ways nation wildlife refuges help protect waterfowl.
- Understand the interaction of the hydrosphere and biosphere at DeSoto NWR and different influence over each.

Standards

Science:

5.1.1.b, 5.1.1.c, 5.1.1.d, 5.1.1.e, 5.1.1.f, 5.1.1.h, 5.1.1.i, 5.1.2.a, 5.1.3.a, 5.1.3.b, 5.1.3.e, 5.3.1.a, **5.8.2.b**, 5.13.4.a, 5.13.4.b, 5.13.4.c, 5.13.4.d, 5.13.4.e

Language Arts:

LA 5.3.1.a, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.b

Math:

MA 5.1.1.c, 5.1.1.d, 5.1.2.c, 5.1.2.d, 5.1.2.e, 5.1.2.f, 5.4.2.a, 5.4.2.b

Procedure

1. Welcome students and ask if they know why DeSoto National Wildlife Refuge was established. Introduce the wetlands and the effects that wetlands have on river systems such as the Missouri River and pollution of the river.





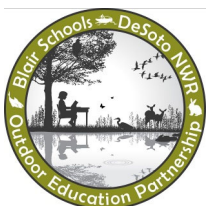
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Refuge/Water Management

Introduce the water testing experiment and collect student hypothesis (make sure to collect samples at different locations).

1. Talk about the altering of the landscape in Iowa and Nebraska from wetlands to farm fields, and the changes to the Missouri River and the impact these held on the water flow and the habitat around the area (habitat change and loss).
2. Take the students out into the wetlands/DeSoto lake, explain what a wetland is, why they are important and show them examples of plants that grow in the wetlands/lake that provide food or cover for many of the waterfowl species (explain how water level and flooding can influence this distribution). Mention how they filter waters.
3. Split the kids onto groups and make sure each group is placed around a hoola hoop at either mostly cover or food sources for the wildlife, ask each group to observe what is within their hoola hoop and decide if they think that their hoola hoop would give the waterfowl food or shelter, give student a guide? To figure out what types of plants are within their hoola hoop.
4. Combine the students together again and move to a location holding water structures and explain how they alter the water levels.
5. The students will be brought back to the multipurpose room to test the samples. The differences in the sample testing results will show the students that there is different compositions of nutrients and particles within the waters between the lake, wetlands, and river.
9. Wrap up the lesson with these questions:
 - Based on what you have seen today what are some ways DeSoto NWR manages the water levels?
 - Why is it important to have wetlands?
 - What influence does water hold over plants and animals on DeSoto NWR?
 - Why did the water testing result the way it did?



Water Management

Journal Entry

Date: _____ Time: _____

Location: _____

Weather Conditions: _____

Cloud Coverage (Select One):

Cirrus (Wispy), Cumulus (Puffy), Stratus (Dense and Layered), Cumulous (Thunderclouds)

Estimated Temp: _____ Actual Temp: _____

Estimated Wind Dir. & Speed: _____

Actual Wind Dir.. & Speed: _____

Colors of the Day:

Beauty 4+

Awesome 4+

Surprise 4+

Big Question 4+

Water Testing Experiment:

Hypothesis:

Results:

I now know:

Read the excerpt below:

“The problem was water. The Lagoons were saline; the river, where we could find it, was too muddy to drink. At each new camp we dug a new well. Most wells, however yielded only brine form the Gulf. We learned, the hard way, where to dig for sweet water. When in doubt of a new well, we lowered the dog in by his hind legs. If he drank freely, it was signal for us to beach the canoe, kindle the fire, and pitch the tent.”
-Aldo Leopold, *A Sand County Almanac*.



If you were Aldo Leopold, how would you have found fresh drinking water on DeSoto National Wildlife Refuge? Write down your procedure and reasoning.

Why is it important to Aldo Leopold that his dog drank the water of the and how did it signal to Leopold and his company to set up camp?

Why do you think the river was too muddy for Leopold and his company to drink the water from it?

Wetland Fractions

Fill in this grid to represent the plants that you find within your frame.

What fraction of your frame is grasses? Turn your fraction into a percentage.

What fraction of your frame is shrub? Turn your fraction into a percentage.

What fraction of your frame is water? Turn your fraction into a percentage.

What category took up the largest fraction/percent of your frame?

Duck Math

You have 10 acres of excellent wetlands with about 25,000 ducks on it in a day. How many days of use can you get out of this land?

You get about 3.5 days of use with 25,000 ducks a day out of a patch of poor wetlands. How many acres of wetlands are used?

You have 5 acres of fair wetlands with about 25,000 ducks on this square patch of land a day. How many days of use can you expect from this land?

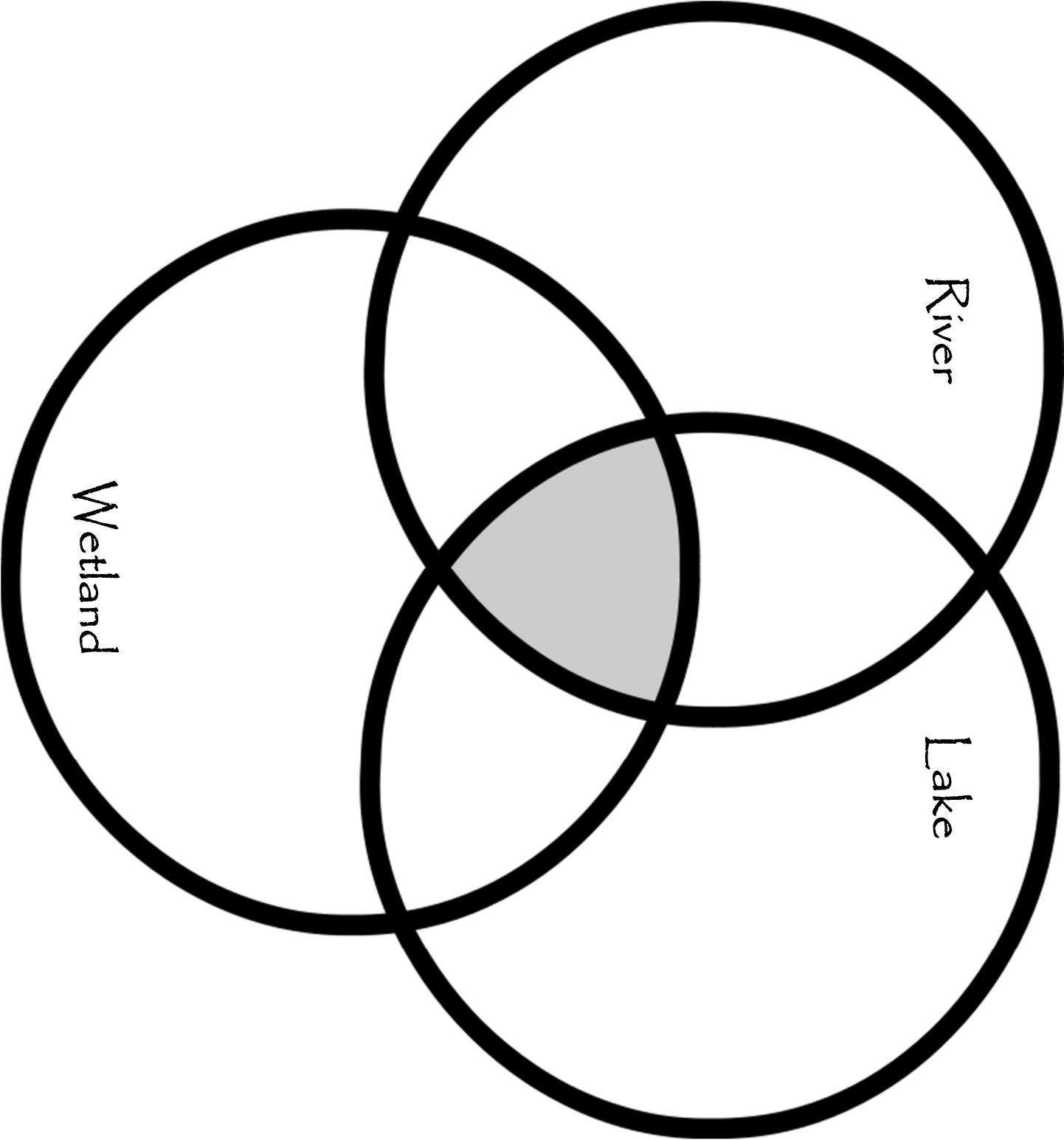
You get 32 days of use out of a square of excellent wetlands with about 25,0000 ducks on that land a day. How many acres of excellent wetlands are being used?

Bird Business

How many species of birds do you see out on the wetland?

What species would you say takes up the largest surface area on the wetland?

What fraction of the birds' diets would you say are plant material versus that of invertebrates?





Wetland Study *Removed from curriculum

Grade: 5

Duration: 90-120
minutes

Supplies

- Nets
- Trays/Bins
- Spoons
- Viewers
- Key to Life in the Pond
- Model of aquatic invertebrates

Summary

Wetlands are a disappearing but important part of the local ecosystems. Wetlands are responsible for many natural processes and hold a special place in area history. The wetland study will help the students learn that nature can be much more than meets the eye and that careful study you can learn some of its secrets.

Objectives

By the end of this lesson, students will be able to-

- Use a key to identify and classify three different aquatic invertebrates.
- Choose appropriate methods of collecting pond samples.
- Propose two reasons why it is important to protect wetlands.
- Explain three ways national wildlife refuges help protect wildlife.

Standards

Science:

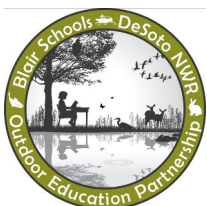
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Language Arts:

LA 5.2.1.a, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.b

Procedure

1. Meet the bus at the Wood Duck Pond Trail. Lead a discussion about what wetlands are, how aquatic invertebrate survive this environment and why wetlands are important.
2. Divide the students into groups of 2 or 3. Make sure each group gets a net, tray, spoon, viewer, and key. Demonstrate how to use both the nets and the viewer.
3. Set parameter for investigation area.
4. The refuge staff person and teachers will circulate during the investigation time. The students will use field guides to identify invertebrates.
5. Have students clean out equipment, hike back to parking lot and return the equipment. Wrap up session questions:
 - Based on what you have learned, why are wetlands important?
 - What are some ways national wildlife refuges protect wildlife?





Beavers *Removed from curriculum



Grade: 5

Duration: 90-120 minutes

Supplies

- Build a Beaver Activity Box
- Microphone
- Beaver Fur
- Beaver Tail
- Beaver-chewed log



Summary

Beavers will be the central focus of this outdoor classroom experience. The focus will be on the adaptations of beavers, how beavers affect their environment and how they use their adaptations to survive and thrive. This will enable students to make connections with the bigger picture of the ecosystem by thinking about how one animal behaves and survives. The beavers are also used as an example of human/wildlife interactions and what constitutes a good habitat for different species.

Objectives

By the end of this lesson, students will be able to:

- Recognize and explain, citing two reasons whether downed trees were felled by beavers or by another natural/human force
- Illustrate how five or more adaptations help beavers survive in their environment
- Plan an investigation of a beaver site using three or more different investigation techniques (sight, sound, touch, scat, trails, etc.)
- Make two predictions about how beavers moving into an area would affect the landscape
- Appraise, citing two examples, whether a site has been habitat for beavers or not

Standards

Science:

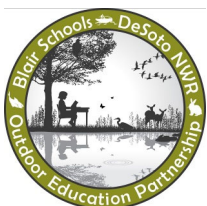
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Language Arts:

LA 5.2.1.a, 5.2.2.a, 5.3.1.a, 5.3.2.b, 5.3.2.c, 5.3.3.b

Procedure

1. Discussion of DeSoto National Wildlife Refuge and where beavers may be present there.
2. Build a Beaver activity—from Jacksonville State University Field Schools (supplies are kept by 5th grade teachers at Arbor Park School). This lesson incorporates class participation, questions, and critical thinking. The refuge staff person asks for a volunteer for the human beaver and has them stand on the picnic table. Then students are asked to name adaptations that beavers have on their bodies to help them survive and what these adaptations are used for. Each adaptation is represented with an item for the human beaver to wear. Instructions for





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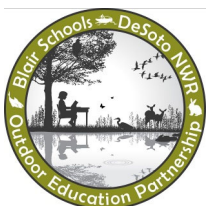
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Beavers

each adaptation are found on the information sheet from Jacksonville State. This role-play activity helps the students visualize beaver adaptations and they will use the knowledge of those adaptations during their investigation later in the morning.

3. Travel to an area with beaver activity (pre-scouted location) and give students an introduction about the group investigation. It helps to talk about it like CSI (Crime Scene Investigation TV show) to add excitement to the process. Start by going through a simple investigation with the group by leading them through some questions about a particular site. Help them to form a hypothesis on what activity may have been in the area. This who, what, when, where, why, and how format will help the students organize their investigation and help them focus on the important factors they will present. Students are then divided into groups, given parameters of a search area, and are sent out to find a place where beavers have been active.
4. The groups come together and travel from site to site where the student groups present the findings of their investigations. Refuge staff and teachers ask questions of the group to allow for them to further show their knowledge and to clarify their thinking. A microphone will be used and all students will be required to give a portion of the presentation. This will allow for the students to apply the information they have learned about beaver adaptations to a real life setting, propose a hypothesis about what they think happened at their site and why, and practice speaking in front of an audience.
5. The students will gather around again for a summary and review of what they learned. The refuge staff person will lead the discussion which will address the following:
 - What adaptations do beavers have to help them survive in their environment?
 - How can you tell if a beaver felled a tree and that it didn't fall from another cause?
 - How would you tell your friends and family if beavers have been active in an area?
 - How have beavers changed this environment and who benefits from that change?The answers to these questions will provide feedback to the refuge staff person and the teachers as to what the students learned and maybe what areas could use more attention in the future.



Beaver Scene

Beaver Scene Investigation Sketches and
Notes:

Investigation (BSI)

Nature Journal Entry

Date: _____ Time: _____

Location: _____

Weather Conditions: _____

Cloud Coverage (Circle One):

Cirrus (wispy) Cumulus (puffy clouds) Stratus

(dense and layered) Cumulous (Thunderclouds)

Est. Temp. _____ Actual Temp. _____

Est. Wind Dir. & Speed: _____

Actual Wind Dir. & Speed: _____

Colors of the Day:

Beaver Adaptation Sketches: and Notes:

I now know:



Tracking/Winter Observation ***Removed**



Grade: 5

Duration: 90-120 minutes

Supplies

- Bucket
- Scale
- Hot Chocolate
- Animal tracks field guide
- Nature journals

Summary

Tracking animals in the winter provides an exciting way for students to learn about direct and indirect observations and data collection methods. Winter is a time that students do not naturally think about going outside so this is a good time for students to see that nature does not have a season. Development of observation skills is the key to successful scientific inquiry and investigations. This lesson uses winter and animal tracking as a way to increase students' awareness and helps them formulate better observations by using nature as the subject.

Objectives

By the end of this lesson, students will be able to:

- Identify two animal tracks and explain their motion of travel.
- Analyze track spacing and frequency to determine if there are patterns.
- Explain three ways national wildlife refuges help protect wildlife.
- Link that gravity is a driving force between animals and the creation of their tracks in the soil.
- Explain that during different seasons tracking for animals is done different ways.

Standards

Science:

5.1.1.a, 5.1.1.c, 5.1.1.d, 5.1.1.e, 5.1.1.g, 5.3.1.b, 5.8.2.a, 5.11.3.a, 5.11.3.c

Language Arts:

LA 5.2.1.a, 5.3.1.a, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.b, 5.3.3.c

Math:

MA 5.1.1.c, 5.1.1.d, 5.1.2.c, 5.1.2.d, 5.1.2.e, 5.1.2.f,

Procedure

1. Greet Students in Multipurpose room. Explain to students what tracking is and how the snow helps hunters/predators track their quarry in the winter.
2. Bring students outside and propose to them that the snow melts and creates an icy footprint, or track (Show them this with your handprint in the snow). What force pulls the animals feet down into the snow so that they leave a footprint? Will the smashed snow weigh the same as the fluffy snow? Will melted snow weigh the same as it was when it wasn't melted? Get a class hypothesis on what they think will weigh more, water or snow.





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Tracking/Winter Observation

3. To prove or disprove the class hypothesis collect snow and weigh it on the scale inside the multipurpose room (Weigh it again later in the lesson to show that the weight is retained even though the snow has melted).
4. After this experiment is started ask the students to see if they can find any tracks or signs of animals in the snow around the visitor center. Have the students take notes and draw their observations in their journals. Stay outside for about 30-45 minutes in this section depending on weather.
5. Once inside gather the in the multipurpose room and have students finish drawing their observations using stamps, rubbings, field guides and other resources they have available. Leave them for about 10-15 minutes.
6. Once they are about done, show them the snow experiment and how it has melted within the bucket, weigh the bucket. Did the class come up with the right hypothesis or where they wrong? Why do they think that they water and snow weighed the same?
7. Summarize the lesson and ask the students these questions:
 - Why do they think the snow had tracks from the animals?
 - How would they track animals in other seasons?
 - Do animals keep the same behavior in other seasons? Would this cause them to be easier or harder to track?



Animal Tracking Nature

Animal Track Sketches:

Journal Entry

Date: _____ Time: _____

Location: _____

Weather Conditions: _____

Cloud Coverage (Select One):

Cirrus (Wispy), Cumulus (Puffy), Stratus

(Dense and Layered), Cumulous

(Thunderclouds)

Estimated Temp: _____ Actual Temp: _____

Estimated Wind Dir. & Speed: _____

Actual Wind Dir. & Speed: _____

Colors of the Day:

Beauty 4+

Awesome 4+

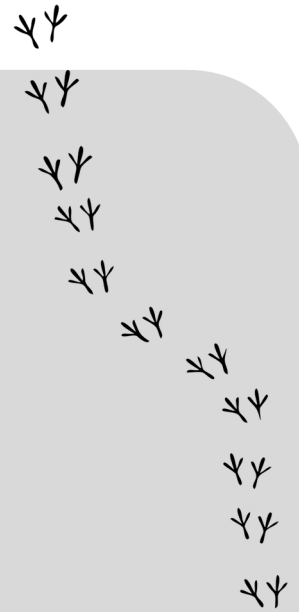
Surprise 4+

Big Question 4+

Observations:

I now know:

Read the excerpt below:



“But in spite of the activity beneath the blanket, it is mammal life above the snow that creates the real show of winter, at least for the human community. Snow cover, especially a light snow on a hard crust, lays down a ledger upon which last night’s activities are written. Even though several of the more common mammals, such as the woodchuck or the chipmunk, are either dormant or in hibernation, the lives of small animals are never so clearly recorded as after a fresh snow. Everywhere in the woods, the thin dribbles of white-footed mouse tracks stitch the trees together; gray squirrel tracks appear abruptly at the base of one tree, trace an erratic pattern through the woods, and then end at the base of another tree. The single-line track of the red fox makes easy curves along the field edges, and rabbit tracks meander from one brushy cover to the next. -John Mitchell and the Massachusetts Audubon Society, *The Curious Naturalist*.

How do you think the observer followed the different signs of animals during the winter outside? Provide examples on how you might do the same near your house or school.

Why do you think it is important for us to still observe nature even in the winter? Provide examples as to why this would be important.

Calculating Those Tracks!

List the types of animal tracks you found today and write fractions for each species relative to the entire amount of tracks found.

What animal had the highest percentage of tracks found today?

If we found a track that was about an inch long and then another track about 5 inches long, which track would belong to the larger animal? Sketch the tracks below.



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6th Grade State Standards

Science-

- 6.1.1.a Formulate testable questions that lead to predictions and scientific investigations
- 6.1.1.b Design and conduct logical and sequential investigations including repeated trials
- 6.1.1.d Select and use equipment appropriate to the investigation, demonstrate correct techniques
- 6.1.1.e Make qualitative and quantitative observations
- 6.1.1.f Record and represent data appropriately and review for quality, accuracy, and relevancy
- 6.1.1.g Evaluate predictions, draw logical inferences based on observed patterns/relationships, and account for on-relevant information
- 6.1.1.h Share information, procedures, results, and conclusions with appropriate audiences
- 6.1.1.j Use appropriate mathematics in all aspects of scientific inquiry
- 6.1.2.a Recognize science is an ongoing process and the scientific community accepts and uses explanations until they encounter new experimental evidence not matching existing explanations
- 8.1.3.f Distinguish between scientific inquiry (asking questions about the natural world) and technological design (using science to solve practical problems)
- 6.1.3.h Recognize that solutions have intended and unintended consequences
- 6.1.3.i Compare and contrast the reporting of scientific knowledge and the reporting of technological knowledge
- 6.2.1.b Describe physical and chemical properties of matter
- 6.2.1.c Recognize most substances can exist as a solid, liquid, or gas depending on temperature
- 6.2.1.d Compare and contrast solids, liquids, and gases based on properties of these states of matter
- 5.2.1.g Classify substances into similar groups based on physical properties
- 6.3.1.a Recognize the levels of organization in living organisms (cells, tissues, organs, organ systems, organisms)
- 6.3.1.e Describe how plants and animals respond to environmental stimuli
- 6.3.3.a Diagram and explain the flow of energy through a simple food web
- 6.3.3.b Compare the roles of producers, consumers, and decomposers in an ecosystem
- 6.3.3.c Recognize that producers transform sunlight into chemical energy through photosynthesis
- 6.3.3.d Determine the biotic and abiotic factors that impact the number of organisms an ecosystem can support
- 6.3.3.e Recognize a population is all the individuals of a species at a given place and time
- 6.3.3.f Identify symbiotic relationships among organisms
- 6.3.3.g Identify positive and negative effects of natural and human activity on an ecosystem SC8.3.4.a Describe how an inherited characteristic enables an organism to improve its survival rate
- 6.3.4.b Recognize the extinction of a species is caused by the inability to adapt to an environmental change
- 6.4.1.a Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer
- 6.4.1.b Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution , taking into account relevant scientific principle and potential impacts on people and the natural environment that may limit possible solutions.
- 6.4.1.c Plan a investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.
- 6.4.1.d Construct, use , and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
- 6.6.2.a Conduct an investigation to provide that living things are made of cells; either on or many different numbers and types.
- 6.6.2.b Develop and use a model to describe the function of a cells as a whole and ways parts of cells contribute to the





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function.

- 6.6.2.c Use arguments supported by evidence fro how the body is a system of interacting subsystems composed of groups of cells.
- 6.6.2.d Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain fro immediate behavior or storage as memories.
- 6.9.3.a Construct an argument based on the evidence fro how plant and animal adaptions affect the probability of successful reproduction.
- 6.9.3.b Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
- 6.9.3.c Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation
- 6.12.4.a Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.
- 6.12.4.b Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates
- 6.12.4.c Ask questions to clarify evidence of the factors that have caused the change in global temperatures over thousands of years.
- 6.12.4.d Analyze and interpret data on weather and climate to forecast future catastrophic events and inform the development of technologies to mitigate their effect.
- 6.13.5.a Develop a model to describe the cycling of water through Earth’s systems driven by energy from the sun and the force of gravity.

Language Arts-

- LA 6.1.3.a Know and apply phonetic and structural analysis (e.g., Greek and Latin roots and affixes, multi-syllable words) when reading, writing, and spelling grade level text.
- LA 6.1.4.a Use reading strategies to persevere through text of increasing length and/or complexity.
- LA 6.1.5.a Apply knowledge of Greek, Latin, and Anglo-Saxon roots, prefixes, and suffixes to understand complex words, including words across content areas.
- LA 6.1.5.b Select and apply knowledge of context clues (e.g., word, phrase, sentence, and paragraph clues) and text features to determine meaning of unknown words.
- LA 6.1.5.c Acquire new academic and content-specific grade-level vocabulary, relate to prior knowledge, and apply in new situations.
- LA 6.1.5.d Identify and use semantic relationships (e.g., multiple meanings, metaphors, similes, idioms, analogies, synonyms, antonyms) to determine the meaning of words, aid in comprehension, and improve writing.
- LA 6.1.5.e Verify meaning and pronunciation of words or phrases using reference materials.
- LA 6.1.6.a Analyze text to determine author’s purpose(s) and describe how author’s perspective influences text. LA 6.1.6.b Analyze and explain the relationships between elements of literary text (e.g., character development, setting, plot, conflict, point of view, theme).
- LA 6.1.6.c Identify and explain why authors use literary devices (e.g., simile, metaphor, alliteration, onomatopoeia, imagery, rhythm, personification, hyperbole, idioms, analogy, tone, mood).
- LA 6.1.6.d Summarize and analyze a literary text and/or media, using key details to explain the theme.
- LA 6.1.6.e Summarize and analyze an informational text and/or media, using supporting details to explain the main idea.
- LA 6.1.6.f Apply knowledge of text features to locate information and explain how the information contributes to an understanding of print and digital text.
- LA 6.1.6.g Use textual evidence to compare and contrast the characteristics that distinguish a variety of literary and informational texts.



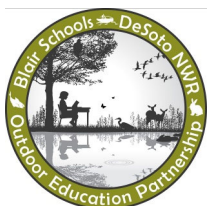


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- LA 6.1.6.h Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in literary and informational texts, citing textual evidence to develop a regional, national, and international multicultural perspective.
- LA 6.1.6.i Construct and/or answer literal, inferential, critical, and interpretive questions and support answers with explicit evidence from the text or additional sources.
- LA 6.1.6.j Apply knowledge of organizational patterns to comprehend informational text (e.g., sequence/chronological, description, cause and effect, compare/contrast, fact/opinion).
- LA 6.1.6.k Select text for a particular purpose (e.g., answer a question, solve problems, enjoy, form an opinion, understand a specific viewpoint, predict outcomes, discover models for own writing, accomplish a task), citing evidence to support analysis, reflection, or research.
- LA 6.1.6.l Build background knowledge and activate prior knowledge to clarify text, deepen understanding, and make text-to-self, text-to-text, and text-to-world connections while reading complex text.
- LA 6.1.6.m Self-monitor comprehension and independently apply appropriate strategies to understand text.
- LA 6.1.6.n Make and confirm/modify predictions and inferences with text evidence while previewing and reading literary, informational, digital text, and/or media.
- LA 6.1.6.o Demonstrate an understanding of complex text using textual evidence via multiple mediums (e.g., writing, artistic representation, video, other media). LA 6.1.6.p Analyze the extent to which a filmed or live production of a story, drama, or poem resembles or differs from the text or script.
- LA 6.2.1.a Use prewriting activities and inquiry tools to recursively generate ideas, organize information, guide writing, and answer questions.
- LA 6.2.1.b Generate a draft that develops a clear topic suited to the purpose and intended audience and organizational pattern, including a strong thesis, body, conclusion, and appropriate transitions linked to the purpose of the composition.
- LA 6.2.1.c Gather and use relevant information and evidence from multiple authoritative print and/or digital sources including primary and secondary sources to support claims or theses.
- LA 6.2.1.d Compose paragraphs with grammatically correct simple, compound, and complex sentences of varying length and complexity.
- LA 6.2.1.e Revise to improve and clarify writing through self-monitoring strategies and feedback from others. LA 6.2.1.f Provide oral, written, and/or digital descriptive feedback to other writers.
- LA 6.2.1.g Adjust writing processes to persevere in short and long-term writing tasks of increasing length and complexity.
- LA 6.2.1.h Proofread and edit writing recursively for format and conventions of standard English (e.g., spelling, capitalization, grammar, punctuation, syntax, semantics).
- LA 6.2.1.i Display academic honesty and integrity by avoiding plagiarism and/or overreliance on any one source and by following a standard format for citation.
- LA 6.2.1.j Publish a legible document using a variety of media, and apply formatting techniques to enhance the readability and impact of the document (e.g., fonts, spacing, design, images, citations).
- LA 6.2.2.a Communicate information and ideas effectively in analytic, argumentative, descriptive, informative, narrative, poetic, persuasive, and reflective modes to multiple audiences using a variety of media and formats.
- LA 6.2.2.b Provide evidence from literary or informational text to support analysis, reflection, and research. LA 6.2.2.c Conduct and publish research projects to answer questions or solve problems using multiple resources to support theses.
- LA 6.2.2.d Use precise word choice and domain-specific vocabulary to write in a variety of modes.
- LA 6.2.2.e Compare various mentor texts and/or exemplars to create a similar piece.





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- LA 6.3.1.a Communicate ideas and information in a clear and concise manner suited to the purpose, setting, and audience (formal voice or informal voice), using appropriate word choice, grammar, and sentence structure.
- LA 6.3.1.b Demonstrate and adjust speaking techniques (e.g., appropriate eye contact, pacing, nonverbal cues, word choice) for a variety of purposes and situations, including interpreting text.
- LA 6.3.1.c Utilize appropriate visual and/or digital tools to enhance verbal communication and add interest.
- LA 6.3.1.d Convey a perspective with clear reasoning and support.
- LA 6.3.1.e Ask pertinent questions to acquire or confirm information.
- LA 6.3.1.f Address alternative or opposing perspectives when appropriate to the mode of speaking.
- LA 6.3.2.a Utilize active and attentive listening skills (e.g., eye contact, nonverbal cues, taking notes, summarizing, questioning) for multiple situations and modalities.
- LA 6.3.2.b Analyze and evaluate the purpose and credibility of information being presented in diverse media and formats.
- LA 6.3.2.c Complete a task following multi-step directions.
- LA 6.3.3.a Apply appropriate social etiquette and practice social protocols when communicating.
- LA 6.3.3.b Demonstrate awareness of and sensitivity to the appropriate use of words (e.g., stereotypes, connotations, subtleties of language) in conversation.
- LA 6.3.3.c Apply conversation strategies to recognize, consider, and explain new information presented by others in relationship to one's own ideas
- LA 6.3.3.d Listen, ask probing questions, summarize, and explain information being communicated and consider its contribution to a topic, text, or issue under study.
- LA 6.3.3.e Collaboratively converse with peers and adults on grade-appropriate topics and texts, building on others' ideas to clearly and persuasively express one's own views while respecting diverse perspectives.
- LA 6.4.1.a Locate, organize, analyze, evaluate, and synthesize information from print and digital resources to generate and answer questions and create new understandings.
- LA 6.4.1.b Demonstrate ethical use of information and copyright guidelines by appropriately quoting or paraphrasing from a text and citing the source using available resources (e.g., online citation tools, publication guidelines).
- LA 6.4.1.c Use or decipher multiple formats of print and digital text (e.g., cursive, manuscript, font, graphics, symbols).
- LA 6.4.2.a Practice safe and ethical behaviors when communicating and interacting with others digitally (e.g., safe information to share, appropriate language use, utilize appropriate sites and materials, respect diverse perspectives).
- LA 6.4.2.b Use appropriate digital tools (e.g., social media, online collaborative tools, apps) to communicate with others for conveying information, gathering opinions, and solving problems.

Math-

- MA 6.1.1.a Determine common factors and common multiples using prime factorization of numbers with and without exponents.
- MA 6.1.1.b Represent non-negative whole numbers using exponential notation.
- MA 6.1.1.c Compare and order rational numbers both on the number line and not on the number line.
- MA 6.1.1.d Convert among fractions, decimals, and percents using multiple representations.
- MA 6.1.1.e Determine ratios from drawings, words, and manipulatives.
- MA 6.1.1.f Explain and determine unit rates.
- MA 6.1.1.g Model integers using drawings, words, manipulatives, number lines, and symbols.
- MA 6.1.1.h Compare and order integers and absolute value both on the number line and not on the number line.
- MA 6.1.1.i Determine absolute value of rational numbers.
- MA 6.1.2.a Multiply and divide non-negative fractions and mixed numbers.





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- MA 6.1.2.b Evaluate expressions with positive exponents.
- MA 6.1.2.c Divide multi-digit whole numbers using the standard algorithm.
- MA 6.1.2.d Add, subtract, multiply, and divide decimals using the standard algorithms.
- MA 6.1.2.e Estimate and check reasonableness of answers using appropriate strategies and tools.
- MA 6.2.1.a Create algebraic expressions (e.g., one operation, one variable as well as multiple operations, one variable) from word phrases.
- MA 6.2.1.b Recognize and generate equivalent algebraic expressions involving distributive property and combining like terms.
- MA 6.2.1.c Represent and analyze the relationship between two variables using graphs, tables, and one-step equations.
- MA 6.2.2.a Simplify expressions using the distributive property and combining like terms.
- MA 6.2.2.b Use substitution to determine if a given value for a variable makes an equation or inequality true.
- MA 6.2.2.c Evaluate numerical expressions, including absolute value and exponents, with respect to order of operations.
- MA 6.2.2.d Given the value of the variable, evaluate algebraic expressions (which may include absolute value) with respect to order of operations (non-negative rational numbers).
- MA 6.2.2.e Solve one-step equations with non-negative rational numbers using addition, subtraction, multiplication and division.
- MA 6.2.2.f Use equivalent ratios relating quantities with whole numbers to create a table. Find missing values in the table.
- MA 6.2.2.g Represent inequalities on a number line (e.g., graph $x > 3$).
- MA 6.2.3.a Write equations (e.g., one operation, one variable) to represent real-world problems involving nonnegative rational numbers.
- MA 6.2.3.b Solve real-world problems involving non-negative rational numbers.
- MA 6.2.3.c Solve real-world problems involving percent of numbers.
- MA 6.2.3.d Solve real-world problems using ratios and unit rates.
- MA 6.3.1.a Identify and create nets to represent two-dimensional drawings of prisms, pyramids, cylinders, and cones.
- MA 6.3.2.a Identify the ordered pair of a given point in the coordinate plane.
- MA 6.3.2.b Plot the location of an ordered pair in the coordinate plane.
- MA 6.3.2.c Identify the quadrant of a given point in the coordinate plane.
- MA 6.3.2.d Draw polygons in the coordinate plane given coordinates for the vertices.
- MA 6.3.2.e Calculate vertical and horizontal distances in the coordinate plane to find perimeter and area.
- MA 6.3.3.a Determine the area of quadrilaterals, including parallelograms, trapezoids, and triangles by composition and decomposition of polygons as well as application of formulas.
- MA 6.3.3.b Determine the surface area of rectangular prisms and triangular prisms using nets.
- MA 6.3.3.c Apply volume formulas for rectangular prisms.
- MA 6.4.1.a Represent data using line plots, dot plots, box plots, and histograms.
- MA 6.4.2.a Solve problems using information presented in line plots, dot plots, box plots, and histograms.
- MA 6.4.2.b Compare and interpret data sets based upon their graphical representations (e.g., center, spread, and shape).
- MA 6.4.2.c Find and interpret the mean, median, mode, and range for a set of data.
- MA 6.4.2.d Compare the mean, median, mode, and range from two sets of data.





Leaf Lab & Inference Short Story



Grade: 6

Duration

60-90 minutes

Supplies

- Notebook
- Activity sheet
- Wooden boards
- Cloth
- Hammers

Summary

Students will use the fall environment to enhance classroom learning. Through the leaf lab, students will make observations and measurements about three leaves of different colors. Students will use those leaves for leaf printing as a way to discuss chlorophyll. In the inference short story, students will use the natural environment as a context for observations and inference writing.

Objectives

By the end of this lesson, students will be able to-

- Measure and observe characteristics of different leaves in the fall environment.
- Make observations and inferences about unique items in the outdoor classroom.

Standards

Science:

8.1.1.e, 8.1.1.f, 8.2.1.g,

Language Arts:

6.2.1.a, 6.2.2.a, 6.3.1.a, 6.3.3.c

Procedure

On the following pages.





Leaf Lab

Procedure

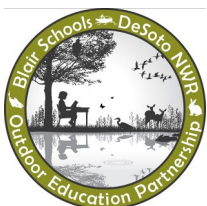
1. Take a few minutes to find 1 green leaf. Make sure it is “fresh” and in good shape.
2. Using your ruler, measure the length of your green leaf in centimeters from the **bottom of the leaf** (do not include the stem) to the **highest part of the leaf**, and record the measurement in data table 1.
3. Using your ruler, measure the width of the green leaf in centimeters **at its widest point**, and record the measurement in data table 1.
4. Make 3 qualitative observations about your leaf and record them in data table 2.
5. Now, on the other side of this paper, trace around the leaf. Take your time to make sure it’s a good quality tracing. Label it by writing the leaf’s color inside the tracing (e.g. “Green”).
6. **KEEP THAT LEAF!** You will need it later. Now, repeat steps 2-5 with a “fresh” yellow/orange leaf, and then again with a “fresh” purple/red leaf.

Data Table 1

Leaf Color	Length	Width
Green	cm	cm
Yellow/Orange	cm	cm
Purple/Red	cm	cm

Data Table 2

Make 3 Qualitative observations for GREEN	1.
	2.
	3.
Make 3 Qualitative observations for YELLOW/ORANGE	1.
	2.
	3.
Make 3 Qualitative observations for PURPLE/RED	1.
	2.
	3.





Inference Short Story

Procedure

1. Take around 3-4 minutes to search for something unique that interests you (example: a bird’s nest, a cacoon, animal tracks in the mud, a spider making a web, etc.).
2. Record 6 or more observations about the object you found. They can be either qualitative or quantitative, and you may have any amount of either (example: 3 Qual. + 5 Quan).
3. When you are finished making 6 or more observations, use those observations to write an inference short story about your object (maybe how it got there, what it’s doing, why it looks the way it does).

6+ Observations:

Short Story:





Structure vs Function

Grade: 6

Duration

60-90 minutes

Supplies

- Activity Sheets
- Clipboards
- Hand Lens

Structure vs. Function ~ Name _____ Period _____

Draw **detailed** sketches of 4 various organisms. Observe 2 organisms with a Hand Lens and 2 without a Hand Lens

Organism: _____

Without Hand Lens

Organism: _____

Without Hand Lens

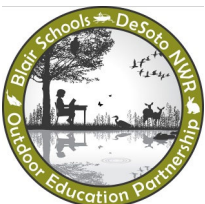
Organism: _____

With Hand Lens

Organism: _____

With Hand Lens

Take some time to think about why the organism would be structured like it is. Then on the back of this paper write at least **3 sentences for each organism** brainstorming on what the function of its structure might be.





Snow Study



Grade: 6

Duration

60-90 minutes

Supplies

- Plastic cups for measuring snow
- Spring scales
- Jello mix
- Film Canisters
- Activity Sheets
- Clipboards

Summary

Winter snow provides a great venue for learning and applying skills in measuring temperature, successful animal adaptations, physical properties and geometric shapes.

Objectives

By the end of this lesson, students will be able to-

- Assess the quality of a den location for staying warm in the winter
- Determine weight, mass and volume of snow
- Make connections between geometric shapes and objects in nature

Standards

Science:

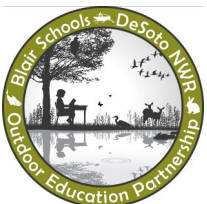
8.1.1.e, 8.1.1.f, 8.2.1.g,

Language Arts:

6.2.1.a, 6.2.2.a, 6.3.1.a, 6.3.3.c

Procedure

On the following pages.





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January DeSoto Trip — Name: _____ Per: _____

J-E-L-L-O ~ “It’s Alive” ...for now!

1. Temperature before hibernation: _____ ° C
2. Temperature after hibernation: _____ ° C
3. Did your contents “survive” as a liquid or freeze to death as jello? _____
4. Where did you choose to hibernate? _____
5. Explain why you think your hibernation spot did or did not work and if there are any ways to improve next time.

Physical Properties of Snow ~ (Complete in your snow fort)

1. Scoop snow from the top of your fort. Level it with the rim of the cup at the top. DO NOT PACK IN THE SNOW!

- Weight of snow: _____ N
- Mass of snow: _____ g
- Volume of snow: 266 mL

*** Next week:

If mass = _____ and volume = _____ then density of snow = _____ mass ÷ volume

2. Scoop snow from the bottom of your fort. Level it with the rim of the cup at the top. DO NOT PACK IN THE SNOW!

- Weight of snow: _____ N
- Mass of snow: _____ g
- Volume of snow: 266 mL

*** Next week:

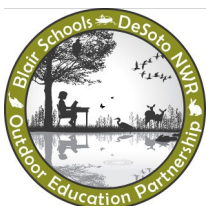
If mass = _____ and volume = _____ then density of snow = _____ mass ÷ volume

3. Now pack the snow tightly into the cup. Make sure it is level with the rim.

- Weight of snow: _____ N
- Mass of snow: _____ g
- Volume of snow: 266 mL

*** Next week:

If mass = _____ and volume = _____ then density of snow = _____ mass ÷ volume





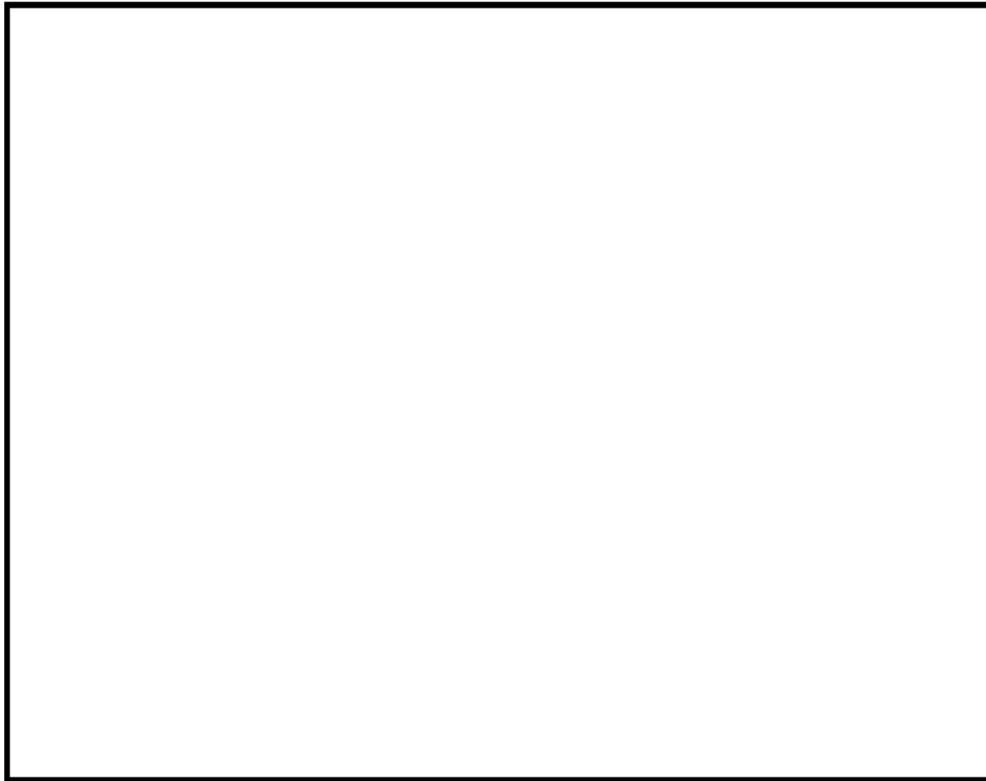
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Snowflake Geometry ~ (Complete in your snow fort)

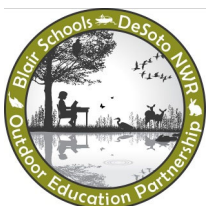
In this activity, you will **observe a snowflake** with a hand lens/microscope and **sketch it**. Make sure your sketch is large enough to fill the box below. Once your sketch is complete, **choose 8 or more terms** from the word bank and **label them** using the corresponding number on your snowflake sketch.



LABLES

• Use the number of the word to mark its location on your snowflake.

1. Adjacent angles
2. Complimentary angles
3. Supplementary angles
4. Point
5. Line
6. Ray
7. Congruent angles
8. Plane
9. Right angle
10. Obtuse angles
11. Straight angle





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Observing Physical Properties

As you look through the museum displays choose **unique** items and record their physical properties.

Property	Item: _____	Item: _____	Item: _____	Item: _____
Color(s)				
Geometric shape(s)				
Guess the odor				
Estimate size (cm or m)				
State of matter				
Estimate volume				
Estimate mass				





Soil Sampling

Grade: 6

Duration

60-90 minutes

Supplies

- Activity Sheets
- Clipboards
- Coffee Can
- Spoon
- Toothpick
- Microscope

De Soto Soil Sampling

Names: _____

Your teacher will demonstrate how to collect your soil sample. Once you have your soil, drop it onto the newspaper and spread to observe. Use your spoons and toothpicks to separate the components of the soil.

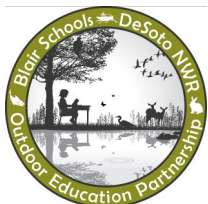
- Initial Observation/Eyes: soil color, texture, and large pieces. **If you find any larger particles, record the length or width in millimeters.**
- First observe using your hand lens, and then describe as much detail as possible what you see in the soil. Record all of the above.
- Then observe with a hand lens to record/draw the particles you can see in greater clarity now.
- Spread a very small amount onto one half of a Petri dish and observe using one of the microscopes. Record all of the above.

ITEMS that may be in the soil you see: sand, silt, clay, rock, roots, leaves, stems, seeds, berries, nuts & shells, worms, insects, animal remains (hair, fur, bones, etc.), water, salt, minerals, larvae or eggs cases, etc.

What type of material makes up the majority of the soil?

Soil Sample #1

	DRAW what you see	LIST what you see (include length in mm)
Eyes		
Hand Lens		
Microscope		
Colors		
Texture		





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Soil Sample #2

	DRAW what you see	LIST what you see (include length in mm)
Eyes		
Hand Lens		
Microscope		
Colors		
Texture		

Soil Particle Settling

1. Get a clear container and fill it with 1 inch of soil.
2. Fill the rest of the container full with water and seal it with a lid. Record lid letter _____
3. Shake for 1 minute and then set it down to observe later.
4. When we return to observe, carefully look at your container (**DON'T SHAKE!**) and draw a picture of the layers you see below.

Write or Draw about erosion

When we look at the erosion site, either write a description or draw a NEAT picture of the erosion that you see.





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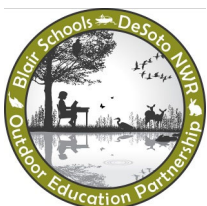
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7th Grade State Standards

Science-

- 7.1.1.a Formulate testable questions that lead to predictions and scientific investigations
- 7.1.1.b Design and conduct logical and sequential investigations including repeated trials
- 7.1.1.c Determine controls and use dependent (responding) and independent (manipulated) variables
- 7.1.1.d Select and use equipment appropriate to the investigation, demonstrate correct techniques
- 7.1.1.e Make qualitative and quantitative observations
- 7.1.1.f Record and represent data appropriately and review for quality, accuracy, and relevancy
- 7.1.1.g Evaluate predictions, draw logical inferences based on observed patterns/relationships, and account for non-relevant information
- 7.1.1.h Share information, procedures, results, and conclusions
- 7.1.1.j Use appropriate mathematics in all aspects of scientific inquiry
- 7.1.2.a Recognize science is an ongoing process and the scientific community accepts and uses explanations until they encounter new experimental evidence not matching existing explanations
- 7.1.2.b Describe how scientific discoveries influence and change society
- 7.1.3.g Describe how science and technology are reciprocal
- 7.1.3.h Recognize that solutions have intended and unintended consequences
- 7.1.3.i Compare and contrast the reporting of scientific knowledge and the reporting of technological knowledge
- 7.3.1.a Develop models to describe the atomic composition of simple molecules
- 7.3.1.b Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.
- 7.3.1.c Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
- 7.5.2.a Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
- 7.5.2.b Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved
- 7.5.2.c Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.
- 7.5.2.d Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success
- 7.7.3.a Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- 7.7.3.b Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
- 7.7.3.c Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem
- 7.7.3.d Apply scientific principles to design a method for monitoring and increasing positive human impact on the ecosystem
- 7.8.4.a Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
- 7.8.4.B Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as matter moves through an organism
- 7.8.4.C Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem





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- 7.8.4.D Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- 7.8.4.E Construct an argument supported by evidence that changes to physical or biological components of an ecosystem affect populations.
- 7.13.5.A Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process
- 7.13.5.B Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
- 7.13.5.C Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems
- 7.14.6.A Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
- 7.14.6.B Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of past plate motions
- 7.14.6.C Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

Language Arts-

- LA 7.1.3.a Know and apply phonetic and structural analysis (e.g., Greek and Latin roots and affixes, multi-syllable words) when reading, writing, and spelling grade level text.
- LA 7.1.4.a Use reading strategies to persevere through text of increasing length and/or complexity.
- LA 7.1.5.a Apply knowledge of Greek, Latin, and Anglo-Saxon roots, prefixes, and suffixes to understand complex words, including words across content areas.
- LA 7.1.5.b Select and apply knowledge of context clues (e.g., word, phrase, sentence, and paragraph clues) and text features to determine meaning of unknown words.
- LA 7.1.5.c Acquire new academic and content-specific grade-level vocabulary, relate to prior knowledge, and apply in new situations.
- LA 7.1.5.d Analyze and use semantic relationships (e.g., multiple meanings, synonyms, antonyms, figurative language, connotations, subtle distinctions) to determine the meaning of words, aid in comprehension, and improve writing.
- LA 7.1.5.e Verify meaning and pronunciation of words or phrases using reference materials.
- LA 7.1.6.a Analyze the meaning, reliability, and validity of the text considering author's purpose and perspective.
- LA 7.1.6.b Analyze and explain the relationships between elements of literary text (e.g., character development, setting, plot, conflict, point of view, theme).
- LA 7.1.6.c Analyze the author's use of literary devices (e.g., simile, metaphor, personification, idiom, oxymoron, hyperbole, alliteration, onomatopoeia, analogy, tone, mood).
- LA 7.1.6.d Summarize, analyze, and synthesize a literary text and/or media, using key details to support interpretation of the theme.
- LA 7.1.6.e Summarize, analyze, and synthesize an informational text and/or media, using supporting details to formulate the main idea.
- LA 7.1.6.f Apply knowledge of text features to locate information and explain how the information contributes to an understanding of print and digital text.
- LA 7.1.6.g Cite specific textual evidence to analyze and make inferences based on the characteristics of a variety of literary and informational texts.
- LA 7.1.6.h Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in literary and informational texts, citing textual evidence to develop a regional, national, and international multicultural perspective.





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- LA 7.1.6.i Construct and/or answer literal, inferential, critical, and interpretive questions and support answers with explicit evidence from the text or additional sources.
- LA 7.1.6.j Apply knowledge of organizational patterns to comprehend informational text (e.g., sequence/chronological, description, spatial, cause and effect, compare/contrast, fact/opinion, proposition/support).
- LA 7.1.6.k Select text for a particular purpose (e.g., answer a question, solve problems, enjoy, form an opinion, understand a specific viewpoint, predict outcomes, discover models for own writing, accomplish a task), citing evidence to support analysis, reflection, or research.
- LA 7.1.6.l Build background knowledge and activate prior knowledge to clarify text, deepen understanding, and make text-to-self, text-to-text, and text-to-world connections while reading complex text.
- LA 7.1.6.m Self-monitor comprehension and independently apply appropriate strategies to understand text.
- LA 7.1.6.n Make and confirm/modify inferences with text evidence while previewing and reading literary, informational, digital text, and/or media.
- LA 7.1.6.o Demonstrate an understanding of complex text using textual evidence via multiple mediums (e.g., writing, artistic representation, video, other media).
- LA 7.1.6.p Analyze the extent to which a filmed or live production of a story, drama, or poem resembles or differs from the text or script.
- LA 7.2.1.a Use prewriting activities and inquiry tools to recursively generate ideas, organize information, guide writing, and answer questions.
- LA 7.2.1.b Generate a draft that conveys complex ideas through analysis and use of organizational patterns that are suited to the purpose and intended audience, and includes a strong thesis, body, conclusion, and appropriate transitions linked to the purpose of the composition.
- LA 7.2.1.c Gather and use relevant information and evidence from multiple authoritative print and/or digital sources including primary and secondary sources to support claims or theses.
- LA 7.2.1.d Compose paragraphs with grammatically correct simple, compound, and complex sentences of varying length and complexity.
- LA 7.2.1.e Revise to improve and clarify writing through self-monitoring strategies and feedback from others.
- LA 7.2.1.f Provide oral, written, and/or digital descriptive feedback to other writers.
- LA 7.2.1.g Adjust writing processes to persevere in short and long-term writing tasks of increasing length and complexity.
- LA 7.2.1.h Proofread and edit writing recursively for format and conventions of standard English (e.g., spelling, capitalization, grammar, punctuation, syntax, semantics).
- LA 7.2.1.i Display academic honesty and integrity by avoiding plagiarism and/or overreliance on any one source and by following a standard format for citation.
- LA 7.2.1.j Publish a legible document using a variety of media, and apply formatting techniques to enhance the readability and impact of the document (e.g., fonts, spacing, design, images, citations).
- LA 7.2.2.a Communicate information and ideas effectively in analytic, argumentative, descriptive, informative, narrative, poetic, persuasive, and reflective modes to multiple audiences using a variety of media and formats.
- LA 7.2.2.b Provide evidence from literary or informational text to support analysis, reflection, and research.
- LA 7.2.2.c Conduct and publish both short and sustained research projects to answer questions or solve problems using multiple primary and/or secondary sources to support theses.
- LA 7.2.2.d Use precise word choice and domain-specific vocabulary to write in a variety of modes.
- LA 7.2.2.e Analyze various mentor texts and/or exemplars in order to create a similar piece.





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- LA 7.3.1.a Communicate ideas and information in a clear and concise manner suited to the purpose, setting, and audience (formal voice or informal voice), using appropriate word choice, grammar, and sentence structure.
- LA 7.3.1.b Demonstrate and adjust speaking techniques (e.g., appropriate eye contact, pacing, nonverbal cues, word choice) for a variety of purposes and situations, including interpreting text.
- LA 7.3.1.c Utilize appropriate visual and/or digital tools to enhance verbal communication and add interest.
- LA 7.3.1.d Convey a perspective with clear reasoning and valid evidence.
- LA 7.3.1.e Ask pertinent questions to acquire or confirm information.
- LA 7.3.1.f Address alternative or opposing perspectives when appropriate to the mode of speaking.
- LA 7.3.2.a Utilize active and attentive listening skills (e.g., eye contact, nonverbal cues, taking notes, summarizing, questioning) for multiple situations and modalities.
- LA 7.3.2.b Analyze and evaluate the purpose and credibility of information being presented in diverse media and formats.
- LA 7.3.2.c Complete a task following multi-step directions.
- LA 7.3.3.a Apply appropriate social etiquette and practice social protocols when communicating.
- LA 7.3.3.b Demonstrate awareness of and sensitivity to the appropriate use of words (e.g., stereotypes, connotations, subtleties of language) in conversation.
- LA 7.3.3.c Apply conversation strategies to recognize, consider, and explain new information presented by others in relationship to one's own ideas.
- LA 7.3.3.d Listen, ask probing questions, and interpret information being communicated and consider its contribution to a topic, text, or issue under study.
- LA 7.3.3.e Collaboratively converse with peers and adults on grade-appropriate topics and texts, building on others' ideas to clearly and persuasively express one's own views while respecting diverse perspectives.
- LA 7.4.1.a Locate, organize, analyze, evaluate, and synthesize information from print and digital resources to generate and answer questions and create new understandings.
- LA 7.4.1.b Demonstrate ethical use of information and copyright guidelines by appropriately quoting or paraphrasing from a text and citing the source using available resources (e.g., online citation tools, publication guidelines).
- LA 7.4.1.c Use or decipher multiple formats of print and digital text (e.g., cursive, manuscript, font, graphics, symbols).
- LA 7.4.2.a Practice safe and ethical behaviors when communicating and interacting with others digitally (e.g., safe information to share, appropriate language use, utilize appropriate sites and materials, respect diverse perspectives).
- LA 7.4.2.b Use appropriate digital tools (e.g., social media, online collaborative tools, apps) to communicate with others for conveying information, gathering opinions, and solving problems

Math-

- MA 7.1.2.a Solve problems using proportions and ratios (e.g., cross products, percents, tables, equations, and graphs).
- MA 7.1.2.b Add, subtract, multiply, and divide rational numbers (e.g., positive and negative fractions, decimals, and integers).
- MA 7.1.2.c Apply properties of operations as strategies for problem solving with rational numbers.
- MA 7.1.2.d Use multiple strategies to add, subtract, multiply, and divide integers.
- MA 7.1.2.e Estimate and check reasonableness of answers using appropriate strategies and tools.
- MA 7.2.1.a Describe and create an inequality from words and pictures (e.g., one-step, one-variable).
- MA 7.2.1.b Represent real-world situations with proportions.
- MA 7.2.2.a Solve equations using the distributive property and combining like terms.
- MA 7.2.2.b Use factoring and properties of operations to create equivalent algebraic expressions (e.g., $2x + 6 = 2(x + 3)$).





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- MA 7.2.2.c Given the value of the variable(s), evaluate algebraic expressions (including absolute value).
- MA 7.2.2.d Solve two-step equations involving rational numbers which include the integers.
- MA 7.2.2.e Solve one-step inequalities involving integers and rational numbers and represent solutions on a number line.
- MA 7.2.3.a Describe and write linear equations from words and tables.
- MA 7.2.3.b Write a two-step equation to represent real-world problems involving rational numbers in any form.
- MA 7.2.3.c Solve real-world problems with equations that involve rational numbers in any form.
- MA 7.2.3.d Solve real-world problems with inequalities.
- MA 7.2.3.e Use proportional relationships to solve real-world problems, including percent problems, (e.g., % increase, % decrease, mark-up, tip, simple interest).
- MA 7.2.3.f Solve real-world problems involving scale drawings using a proportional relationship.
- MA 7.3.1.a Apply and use properties of adjacent, complementary, supplementary, and vertical angles to find missing angle measures.
- MA 7.3.1.b Draw triangles (freehand, using a ruler and a protractor, and using technology) with given conditions of three measures of angles or sides, and notice when the conditions determine a unique triangle, more than one triangle, or no triangle.
- MA 7.3.3.a Solve real-world problems involving perimeter and area of composite shapes made from triangles, quadrilaterals and polygons.
- MA 7.3.3.b Solve real-world problems involving surface area and volume of composite shapes made from rectangular and triangular prisms.
- MA 7.3.3.c Determine the area and circumference of circles both on and off the coordinate plane.
- MA 7.4.1.a Represent data using circle graphs.
- MA 7.4.2.a Solve problems using information presented in circle graphs.
- MA 7.4.2.b Explain the difference between a population and a sample.
- MA 7.4.2.c Generate conclusions about a population based upon a random sample.
- MA 7.4.2.d Determine and critique biases in different data representations.
- MA 7.4.3.a Generate a list of possible outcomes for a simple event.
- MA 7.4.3.b Describe the theoretical probability of an event using a fraction, percentage, and decimal.
- MA 7.4.3.c Find theoretical probabilities for independent events.
- MA 7.4.3.d Perform simple experiments and express the degree of likelihood (possible, impossible, certain, more likely, equally likely, or less likely); write as fractions and percentages.
- MA 7.4.3.e Find experimental probability for independent events.
- MA 7.4.3.f Compare and contrast theoretical and experimental probabilities.
- MA 7.4.3.g Find the probability of dependent compound events.
- MA 7.4.3.h Identify complementary events and calculate their probabilities.





Nature Scavenger Hunt Lab

Grade: 7

Duration
30 minutes

Supplies

- Scavenger hunt list
- Camera
- Identification guide for trees and plants

Expanding the Classroom Walls II

Detailed Lesson Plan

Nature Scavenger Hunt

Objective: To introduce the students to the wildlife refuge and get them to use their observation & inference skills. Students learn how to make good observations and inferences in class and now will practice these skills in nature.

Inspiration: This lesson was inspired by our visit to Mahoney State Park where we did a similar activity.

Grade Subject/ Level: Science 7 – easily adaptable for different levels.

Materials:

Scavenger hunt list

Camera

Identification Guide for Trees and Plants

Lesson Procedure:

We will be using the trail outside of the Visitor's center at Desoto Wildlife refuge.

Hand out the scavenger hunt cards.

Explain to students that they need to take a digital picture of the items on the list unless they are asked to do otherwise. Please remind students that because this is a wildlife refuge we may not collect or remove anything from the refuge so they may not pick berries or leaves to show as proof.

Break students into groups of 4 to complete the scavenger hunt. Students will have 20 minutes to find as many items as they are able to find.

The group that locates the most items will be given a prize.





Nature Scavenger Hunt Lab

Scavenger Hunt List

You need to bring back a picture of each item. Please do not bring back any items. You have 15 minutes to see how many of the following items you can find.

Draw the following items:

Poison ivy

Animal tracks

Virginia Creeper

An Insect (try to name it)

Take a picture of:

Cottonwood Tree

Butterfly

Bird /bonus if can identify

Coniferous Tree

Spider Web

Choose 2 items and make 2 Qualitative & 2 Quantitative observations for each. Label the Qualitative & Quantitative observations.





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Nature Scavenger Hunt Lab

Flooding:

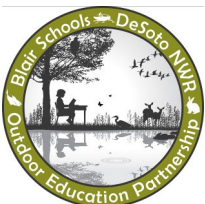
There are 4 markers along the roadway you will need to take a picture at each point. We will be downloading these photos to make a journal as the water recedes.

You will also need to record the water level at each marker. You will then mark these areas on the map.

Example: Water is over the road at point A.

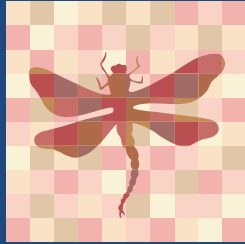
There are trees that you can see. Estimate how much the water has receded by looking at the markings the water left on the trees. Do this at each of the markers.

Finally draw a map showing the roadway, the administration building, each of our markers and show the flooding on your map. Show the trees and record your observations from above on the map.





Ecosystem Lab



Grade: 7

Duration
60 minutes

Supplies

- Ecosystem Lab sheet
- Pencils

DeSoto Lake

1. Find two different plant organisms and two different animal or insect organisms. With each one, write down at least four different *quantitative* observations and five different *qualitative* observations.

Plant Organism 1:

Plant Organism 2:

Animal or Insect Organism:

Animal or Insect Organism:

2. Find two abiotic factors and describe three qualitative observations about each of them.

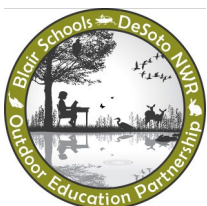
Abiotic Factor 1:

Abiotic Factor 2:

3. When you combine all of the organisms you identified from this area and all of the abiotic factors, what are you describing? *(Circle the best answer)*

- a. Population b. Community c. Ecosystem d. Species

4. Find as many different animal or insect organisms as you can and list them below. If you do not know the name of the organism, describe it.





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Ecosystem Lab

Bottom Land Hardwood Forest

1. Find at least two plant organisms and one animal organism. With each one, write down at least four different quantitative observations and five different qualitative observations.

Plant Organism 1:

Plant Organism 2:

Animal Organism 1:

2. When you describe all of the above organisms in the same area, what are you describing? *(Circle the best answer)*

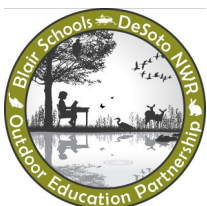
- a. Population b. Community c. Ecosystem d. Species

3. Find at least two indirect observations of animal or insect organisms. With each one, write down at least two qualitative observations.

Organism 1:

Organism 2:

4. Find as many different animal or insect organisms as you can and list them below. If you do not know the name of the organism, describe it.





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Ecosystem Lab

Prairie

1. Find at least two plant organisms and two animal or insect organisms. With each one, write down at least four different quantitative observations and five different qualitative observations.

Plant Organism 1:

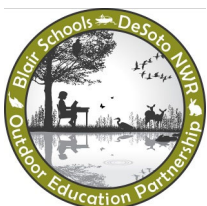
Plant Organism 2:

Animal or Insect Organism 1:

Animal or Insect Organism 2:

2. Pretend that you are a world traveler and are seeing this type of ecosystem for the first time and you want to describe it to a friend back in your hometown, many miles away. You will write a journal or diary entry that uses many descriptive words (Adjectives. Observations.) that best describes everything about the ecosystem. Be sure to include descriptions of the organisms you see (direct or indirect observations), the abiotic factors you see, and any other observation you can make. This needs to be two paragraphs long with each paragraph having at least four sentences.

3. Find as many different animal or insect organisms as you can and list them below. If you do not know the name of the organism, describe it.





Estimating Tree Lab



Grade: 7

Duration
60 minutes

Supplies

- Estimating trees lab sheet
- Flagged area for estimation
- Meter stick for measuring step size

Estimating the number of trees within a wooded area

Suppose you are working for a forest conservation organization. You are in charge of determining the approximate number of trees within a 100,000 square foot area. Follow the steps below.

1. Estimate the length and width of the roped area.

a. Measure your stride to the nearest half-foot. Place a tape measure on the ground. Beginning with your toe at the beginning take one "normal" step and write your stride here:

b. Find the **length** of the roped off area. Beginning with your toe at a corner take normal strides along one side of the area counting them as you go. Write the number of strides here:

Multiply your stride length from part 'a' with your number of strides to find the estimated length:

c. Find the **width** of the roped off area. Beginning with your toe at a corner take normal strides along the adjacent side of the area counting them as you go. Write the number of strides here:

Multiply your stride length from part 'a' with your number of strides to find the estimated width:

2. Estimate the Area of the roped off section.

a. Multiply the length and width from #1b and #1c above.





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3. Count the number of trees in the roped off section and write that number here:

4. Estimate the number of trees in a 100,000 square foot wooded area using a proportion.
Here is an example:

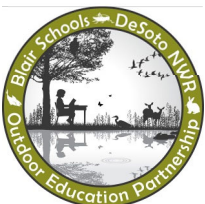
$$\begin{array}{l} \text{My number of trees} \\ \text{from \#3 above} \end{array} \rightarrow \frac{20 \text{ trees}}{2,400 \text{ ft}^2} = \frac{n}{100,000 \text{ ft}^2}$$

$$\begin{array}{l} \text{My estimated area} \\ \text{from \#2 above} \end{array} \rightarrow$$

Cross multiply to get an equation: $2,400n = 2,000,000$

Solve by dividing: $2,000,000 \div 2,400 = 833.3333$

So, for this example, there are approximately 833 trees within the 100,000 square foot wooded area.





GPS Scavenger Hunt

Grade: 7

Duration
60 minutes

Supplies

- GPS lab sheet
- GPS unit
- Food, water and shelter cards

Desoto GPS Lab

Name _____

GPS 1 _____

GPS 2 _____

For Animal 1 you will find the following items and place the cards in the place you think they could find these items.

Animal 1 Name:

Describe the area that you put each item in and explain how the organism would meet this need. Also next to each item write down what you named it on the GPS.

Food Source:

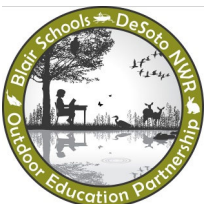
Water:

Shelter:

What type of habitat does your animal live in?

What other animals live in this area? Will they affect your animal?

Draw a food chain showing at least 3 organisms and includes your animal.





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GPS Scavenger Hunt

For Animal 2 you will find the cards placed by the other group and describe how its habitat will help it to get the things that it needs to survive.

Animal 2 Name:

Describe the area that you put each item in and explain how the organism would meet this need. Also next to each item write down what you named it on the GPS.

Food Source:

Water:

Shelter:

What type of habitat does your animal live in?

What other animals live in this area? Will they affect your animal?

Did you find signs of animals while you were completing this activity. Describe what signs you found.

Draw a food chain showing at least 3 organisms and includes your animal.





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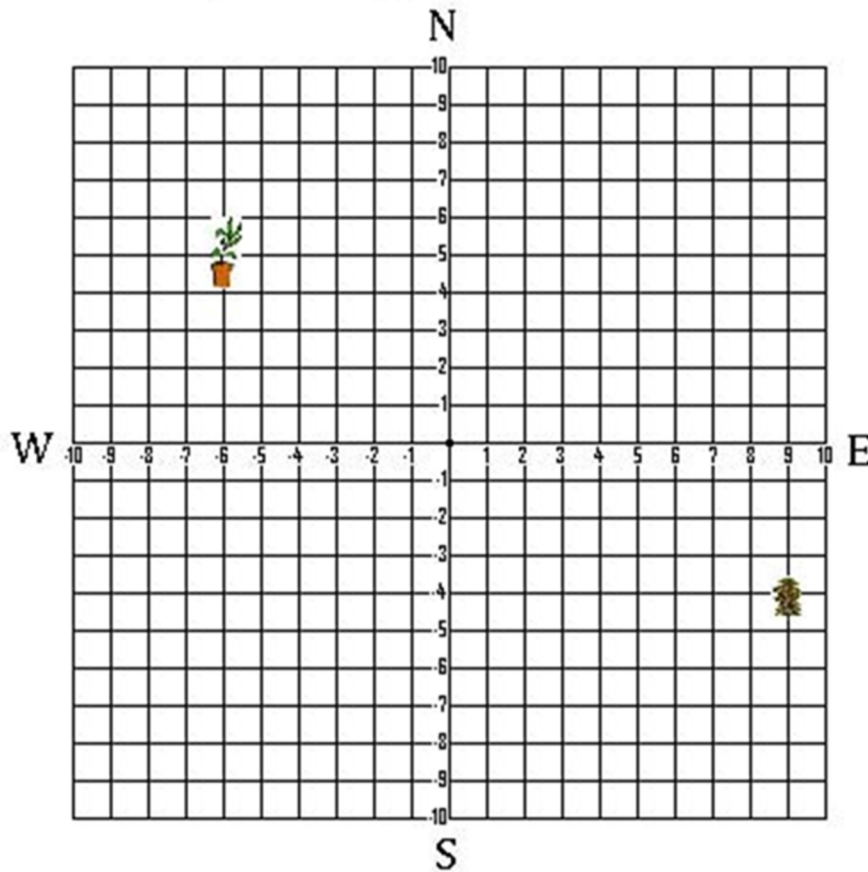
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DESOTO COORDINATE PLANE ACTIVITY

Find the coordinates (to the nearest positive/negative foot) of each listed item. First write the location with directions then write the ordered pair with integers.

1. Find the point of origin.
2. Locate each direction (North, South, West, East)
3. Familiarize yourself with the coordinate plane - For example, Quadrant 1 will be North and East of the origin, etc.
4. Use the examples below to help.



Example 1: Find the coordinates of the plant.

Answer: 6 Feet West and 5 Feet North (-6, 5)

Example 2: Find the coordinates of the tree.

Answer: 9 feet East and 4 feet south (9, -4)

Created by ONS, Blair NE - 2011





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Find the coordinates (to the nearest positive/negative foot) of each listed item. First write the location with directions then write the ordered pair with integers.

1. Birdhouse #1 (quadrant 1)
2. Large stump (quadrant 3)
3. Birdhouse # 2
4. Center post on right side of shelter

Using your coordinates and knowledge of coordinate planes find the horizontal or vertical distance.

5. Using only the coordinates you found above, find the distance between birdhouse #2 and the stump.

Name the item found at each of the following locations. DO NOT TOUCH OR MOVE THE PLACED ITEMS. DO NOT TELL OTHER GROUPS WHAT THE ITEMS ARE OR WHERE THEY ARE LOCATED.

6. 40 feet west and 65 feet North (-40, 65)
7. 50 feet West and 30 feet south (-50, -30)
8. 90 feet East and 168 feet North (90, 168)





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Find the coordinates (to the nearest positive/negative foot) of each listed item. First write the location with directions then write the ordered pair with integers.

1. Birdhouse #1 (quadrant 1)
2. Large stump (quadrant 3)
3. Birdhouse # 2
4. Center post on right side of shelter

Using your coordinates and knowledge of coordinate planes find the horizontal or vertical distance.

5. Using only the coordinates you found above, find the distance between birdhouse #2 and the stump.

Name the item found at each of the following locations. **DO NOT TOUCH OR MOVE THE PLACED ITEMS. DO NOT TELL OTHER GROUPS WHAT THE ITEMS ARE OR WHERE THEY ARE LOCATED.**

1. 67 feet west and 92 feet North (-67, 92)
2. 80 feet East and 70 feet South (80, -70)
3. 40 feet East and 152 feet North (40, 152)





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Find the coordinates (to the nearest positive/negative foot) of each listed item. First write the location with directions then write the ordered pair with integers.

1. Birdhouse #1 (quadrant 1): **103 feet East, 33 feet North (103, 33)**
2. Large stump (quadrant 3): **33 feet West, 53 feet South (-33, -53)**
3. Birdhouse # 2: **33 feet West, 49 feet North (-33, 49 feet)**
4. Center post on right side of shelter: **111 feet West, 58 feet North (-111, 58)**

Using your coordinates and knowledge of coordinate planes find the horizontal or vertical distance.

5. Using only the coordinates you found above, find the distance between birdhouse #2 and the stump.

(-33, 49) and (-33, -53)

$$49 - (-53) = 49 + 53 = 102 \text{ feet}$$

Name the item found at each of the following locations. **DO NOT TOUCH OR MOVE THE PLACED ITEMS. DO NOT TELL OTHER GROUPS WHAT THE ITEMS ARE OR WHERE THEY ARE LOCATED.**

1. 40 feet west and 65 feet North (-40, 65)

Golf Ball

2. 50 feet West and 30 feet south (-50, -30)

Small floss container

3. 90 feet East and 168 feet North (90, 168)

Teacher appreciation trinket (pink hair)





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Find the coordinates (to the nearest positive/negative foot) of each listed item. First write the location with directions then write the ordered pair with integers.

1. Birdhouse #1 (quadrant 1): **103 feet East, 33 feet North (103, 33)**
2. Large stump (quadrant 3): **33 feet West, 53 feet South (-33, -53)**
3. Birdhouse # 2: **33 feet West, 49 feet North (-33, 49 feet)**
4. Center post on right side of shelter: **111 feet West, 58 feet North (-111, 58)**

Using your coordinates and knowledge of coordinate planes find the horizontal or vertical distance.

5. Using only the coordinates you found above, find the distance between birdhouse #2 and the stump.

(-33, 49) and (-33, -53)

$$49 - (-53) = 49 + 53 = 102 \text{ feet}$$

Name the item found at each of the following locations. DO NOT TOUCH OR MOVE THE PLACED ITEMS. DO NOT TELL OTHER GROUPS WHAT THE ITEMS ARE OR WHERE THEY ARE LOCATED.

4. 67 feet west and 92 feet North (-67, 92)

Whiteout bottle

5. 80 feet East and 70 feet South (80, -70)

Small travel bottle of scope

6. 40 feet East and 152 feet North (40, 152)

Small Santa decoration





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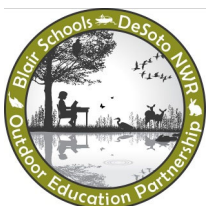
8th Grade State Standards

Science-

- 8.1.1.A Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
 - 8.1.1.B Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
 - 8.1.1.C Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.
 - 8.1.1.D Ask questions about data to determine the factors that affect the strength of electrical and magnetic forces.
 - 8.1.1.E Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects
 - 8.1.1.F Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact
 - 8.2.2.A Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
 - 8.2.2.B Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
 - 8.2.2.C Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.
 - 8.4.3.A Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
 - 8.4.3.B Develop a model to describe that when the arrangement of objects interacting at a distance changes, then different amounts of potential energy are stored in the system.
 - 8.9.4.A Develop and use a model to describe why structural changes to genes (mutations) may result in harmful, beneficial, or neutral effects to structure and function of organisms
 - 8.9.4.B Gather and synthesize information about technologies that have changed the way humans influence inheritance of desired traits in organisms.
 - 8.10.5.A Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
 - 8.10.5.B Apply scientific ideas to construct an explanation for the anatomical similarities and differences among and between modern and fossil organisms to infer evolutionary relationships.
 - 8.10.5.C Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.
 - 8.10.5.D Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time
 - 8.11.6.A Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
 - 8.11.6.B Develop and use a model to describe the role of gravity in the motions within the galaxy and the solar system
 - 8.11.6.C Analyze and interpret data to determine scale properties of objects in the solar system.
- SC 14:
- 8.14.7.A Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6- billion-year-old history.

Language Arts-

- LA 8.1.3.a Know and apply phonetic and structural analysis (e.g., Greek and Latin roots and affixes, multi-syllable words) when reading, writing, and spelling grade level text.



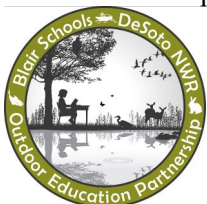


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- LA 8.1.4.a Use reading strategies to persevere through text of increasing length and/or complexity.
- LA 8.1.5.a Apply knowledge of Greek, Latin, and Anglo-Saxon roots, prefixes, and suffixes to understand complex words, including words across content areas.
- LA 8.1.5.b Select and apply knowledge of context clues (e.g., word, phrase, sentence, and paragraph clues) and text features to determine meaning of unknown words.
- LA 8.1.5.c Acquire new academic and content-specific grade-level vocabulary, relate to prior knowledge, and apply in new situations.
- LA 8.1.5.d Analyze and use semantic relationships (e.g., multiple meanings, synonyms, antonyms, figurative language, connotations, subtle distinctions) to determine the meaning of words, aid in comprehension, and improve writing.
- LA 8.1.5.e Verify meaning and pronunciation of words or phrases using reference materials.
- LA 8.1.6.a Analyze the meaning, reliability, and validity of text considering author's purpose and perspective.
- LA 8.1.6.b Analyze and explain the relationships between elements of literary text (e.g., character development, setting, plot, conflict, point of view, inferred and recurring themes).
- LA 8.1.6.c Analyze the author's use of literary devices (e.g., simile, metaphor, personification, idiom, oxymoron, hyperbole, alliteration, onomatopoeia, analogy, tone, mood).
- LA 8.1.6.d Summarize, analyze and synthesize the development of a common theme between two literary text and/or media.
- LA 8.1.6.e Summarize, analyze, and synthesize the connection between the main ideas of two informational texts and/or media.
- LA 8.1.6.f Analyze and evaluate information from print and digital text features to support comprehension.
- LA 8.1.6.g Cite specific textual evidence to analyze and make inferences based on the characteristics of a variety of literary and informational texts.
- LA 8.1.6.h Analyze the social, historical, cultural, and biographical influences in a variety of texts, citing textual evidence from literary and informational text to develop a national and international multicultural perspective.
- LA 8.1.6.i Construct and/or answer literal, inferential, critical, and interpretive questions and support answers with explicit evidence from the text or additional sources.
- LA 8.1.6.j Apply knowledge of organizational patterns to comprehend informational text (e.g., sequence/chronological, description, spatial, cause and effect, compare/contrast, fact/opinion, proposition/support).
- LA 8.1.6.k Select text for a particular purpose (e.g., answer a question, solve problems, enjoy, form an opinion, understand a specific viewpoint, predict outcomes, discover models for own writing, accomplish a task), citing evidence to support analysis, reflection, or research.
- LA 8.1.6.l Build background knowledge and activate prior knowledge to clarify text, deepen understanding, and make connections while reading complex text.
- LA 8.1.6.m Self-monitor comprehension and independently apply appropriate strategies to understand text.
- LA 8.1.6.n Make and confirm/modify inferences with text evidence while previewing and reading literary, informational, digital text, and/or media.
- LA 8.1.6.o Demonstrate an understanding of complex text using textual evidence via multiple mediums (e.g., writing, artistic representation, video, other media).
- LA 8.1.6.p Analyze the extent to which a filmed or live production of a story, drama, or poem resembles or differs from the text or script.
- LA 8.2.1.a Use prewriting activities and inquiry tools to recursively generate ideas, organize information, guide writing, answer questions, and synthesize information.





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- LA 8.2.1.b Generate a draft that conveys complex ideas through analysis and use of organizational patterns that are suited to the purpose and intended audience and includes a strong thesis, body, conclusion, and appropriate transitions linked to the purpose of the composition.
- LA 8.2.1.c Gather and use relevant information and evidence from multiple authoritative print and/or digital sources including primary and secondary sources to support claims or theses.
- LA 8.2.1.d Compose paragraphs with grammatically correct simple, compound, and complex sentences of varying length and complexity.
- LA 8.2.1.e Revise to improve and clarify writing through self-monitoring strategies and feedback from others. LA 8.2.1.f Provide oral, written, and/or digital descriptive feedback to other writers.
- LA 8.2.1.g Adjust writing processes to persevere in short and long-term writing tasks of increasing length and complexity.
- LA 8.2.1.h Proofread and edit writing recursively for format and conventions of standard English (e.g., spelling, capitalization, grammar, punctuation, syntax, semantics).
- LA 8.2.1.i Display academic honesty and integrity by avoiding plagiarism and/or overreliance on any one source and by following a standard format for citation.
- LA 8.2.1.j Publish a legible document using a variety of media, and apply formatting techniques to enhance the readability and impact of the document (e.g., fonts, spacing, design, images, citations).
- LA 8.2.2.a Communicate information and ideas effectively in analytic, argumentative, descriptive, informative, narrative, poetic, persuasive, and reflective modes to multiple audiences using a variety of media and formats.
- LA 8.2.2.b Provide evidence from literary or informational text to support analysis, reflection, and research.
- LA 8.2.2.c Conduct and publish both short and sustained research projects to answer questions or solve problems using multiple primary and/or secondary sources to support theses
- LA 8.2.2.d Use precise word choice and domain-specific vocabulary to write in a variety of modes.
- LA 8.2.2.e Analyze various mentor texts and/or exemplars in order to create a similar piece.
- LA 8.3.1.a Communicate ideas and information in a clear and concise manner suited to the purpose, setting, and audience (formal voice or informal voice), using appropriate word choice, grammar, and sentence structure.
- LA 8.3.1.b Demonstrate and adjust speaking techniques (e.g., appropriate eye contact, pacing, nonverbal cues, word choice) for a variety of purposes and situations, including interpreting text.
- LA 8.3.1.c Select and utilize appropriate visual and/or digital tools to enhance understanding for specific audiences.
- LA 8.3.1.d Convey a perspective with clear reasoning and valid evidence.
- LA 8.3.1.e Ask pertinent questions to acquire or confirm information.
- LA 8.3.1.f Address alternative or opposing perspectives when appropriate to the mode of speaking.
- LA 8.3.2.a Utilize active and attentive listening skills (e.g., eye contact, nonverbal cues, taking notes, summarizing, questioning) for multiple situations and modalities.
- LA 8.3.2.b Analyze the purpose of information presented in diverse media and formats, evaluate its motives (e.g., social, commercial, political), and determine its credibility.
- LA 8.3.2.c Complete a task following complex multi-step directions.
- LA 8.3.3.a Apply appropriate social etiquette and practice social protocols when communicating.
- LA 8.3.3.b Demonstrate awareness of and sensitivity to the appropriate use of words (e.g., stereotypes, connotations, subtleties of language) in conversation.
- LA 8.3.3.c Apply conversation strategies to recognize, consider, and explain new information presented by others in relationship to one's own ideas.
- LA 8.3.3.d Listen, ask probing questions, and interpret information being communicated and consider its contribution to





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a topic, text, or issue under study.

- LA 8.3.3.e Collaboratively converse with peers and adults on grade-appropriate topics and texts, building on others' ideas to clearly and persuasively express one's own views while respecting diverse perspectives.
 - LA 8.4.1.a Locate, organize, analyze, evaluate, and synthesize information from print and digital resources to generate and answer questions and create new understandings.
 - LA 8.4.1.b Demonstrate ethical use of information and copyright guidelines by appropriately quoting or paraphrasing from a text and citing the source using available resources (e.g., online citation tools, publication guidelines).
 - LA 8.4.1.c Use or decipher multiple formats of print and digital text (e.g., cursive, manuscript, font, graphics, symbols).
 - LA 8.4.2.a Practice safe and ethical behaviors when communicating and interacting with others digitally (e.g., safe information to share, appropriate language use, utilize appropriate sites and materials, respect diverse perspectives).
 - LA 8.4.2.b Use appropriate digital tools (e.g., social media, online collaborative tools, apps) to communicate with others for conveying information, gathering opinions, and solving problems.
- Math-
- MA 8.1.1.a Determine subsets of numbers as natural, whole, integer, rational, irrational, or real, based on the definitions of these sets of numbers.
 - MA 8.1.1.b Represent numbers with positive and negative exponents and in scientific notation.
 - MA 8.1.1.c Describe the difference between a rational and irrational number.
 - MA 8.1.1.d Approximate, compare, and order real numbers (both rational and irrational) and order real numbers both off and on the number line.
 - MA 8.1.2.a Evaluate the square roots of perfect squares less than or equal to 400 and cube roots of perfect cubes less than or equal to 125.
 - MA 8.1.2.b Simplify numerical expressions involving exponents and roots (e.g., $4(-2)$ is the same as $1/16$). MA 8.1.2.c Simplify numerical expressions involving absolute value.
 - MA 8.1.2.d Multiply and divide numbers using scientific notation.
 - MA 8.1.2.e Estimate and check reasonableness of answers using appropriate strategies and tools.
 - MA 8.2.1.a Create algebraic expressions, equations, and inequalities (e.g., two-step, one variable) from word phrases, tables, and pictures.
 - MA 8.2.1.b Determine and describe the rate of change for given situations through the use of tables and graphs.
 - MA 8.2.1.c Describe equations and linear graphs as having one solution, no solution, or infinitely many solutions.
 - MA 8.2.1.d Graph proportional relationships and interpret the slope.
 - MA 8.2.2.a Solve multi-step equations involving rational numbers with the same variable appearing on both sides of the equal sign.
 - MA 8.2.2.b Solve two-step inequalities involving rational numbers and represent solutions on a number line.
 - MA 8.2.3.a Describe and write equations from words, patterns, and tables.
 - MA 8.2.3.b Write a multi-step equation to represent real-world problems using rational numbers in any form.
 - MA 8.2.3.c Solve real-world multi-step problems involving rational numbers in any form.
 - MA 8.3.1.a Determine and use the relationships of the interior angles of a triangle to solve for missing measures.
 - MA 8.3.1.b Identify and apply geometric properties of parallel lines cut by a transversal and the resulting corresponding, alternate interior, and alternate exterior angles to find missing measures.
 - MA 8.3.2.a Perform and describe positions and orientation of shapes under single transformations including rotations (in multiples of 90 degrees about the origin), translations, reflections, and dilations on and off the coordinate plane.
 - MA 8.3.2.b Find congruent two-dimensional figures and define congruence in terms of a series of transformations.





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MA 8.3.2.c Find similar two-dimensional figures and define similarity in terms of a series of transformations.

MA 8.3.3.a Explain a model of the Pythagorean Theorem.

MA 8.3.3.b Apply the Pythagorean Theorem to find side lengths of triangles and to solve real-world problems.

MA 8.3.3.c Find the distance between any two points on the coordinate plane using the Pythagorean Theorem.

MA 8.3.3.d Determine the volume of cones, cylinders, and spheres, and solve real-world problems using volumes.

MA 8.4.1.a Represent bivariate data (i.e. ordered pairs) using scatter plots.

MA 8.4.2.a Solve problems and make predictions using an approximate line of best fit.





Leaf Rubbing

Grade 8

Duration
60-90 minutes

Supplies

- White paper
- Crayons
- Leaves

LEAF RUBBINGS

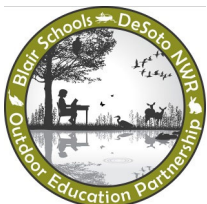
1. Collect 2 different leaves as you explore.
2. Fold a piece of plain white paper in half.
3. Position the leaf 'vein side up' inside the paper.
4. Select a crayon piece (peel of any paper on it).
5. Turn the crayon on its side and rub over the top of the folded paper (with leaf 'vein side up' inside).
6. Select another color if you would like.
7. Repeat with the second leaf on the other half of the paper.

Label the following on each rubbing:

1. Petiole (structure that connected the blade to the stem or branch you removed it from).
2. Blade (entire colored part of leaf except petiole)
3. Margin (rim or edge of blade)
4. Midrib (central vein of the blade)
5. Side vein (branches off the midrib)

Answer the following questions about each leaf:

1. Did your leaf come from tree, grass or shrub?
 - a.
 - b.
2. What is the actual color of the leaf?
 - a.
 - b.
3. Is your rubbing of the upper or lower epidermis (outer layer)?
 - a.
 - b.
4. Did the leaf come from a monocot (parallel veins) or dicot (branching veins)?
 - a.
 - b.
5. Use the tree guide to determine what type of tree the leaf came from:
 - a.
 - b.





Math Tree Graph

How Many Trees Does Thee See Activity

Count **ALL** of the trees **and tree stumps** in the roped off area. **DO NOT** walk in the roped off area. You may need to walk around to make sure you get every tree and stump counted. Once you have finished counting, write down your data here: _____. Use this number to help solve the following questions. When finished, give this to your math teacher and have them sign your DeSoto Scavenger Hunt Worksheet if it is finished correctly.

Grade 8

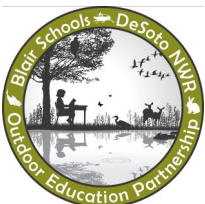
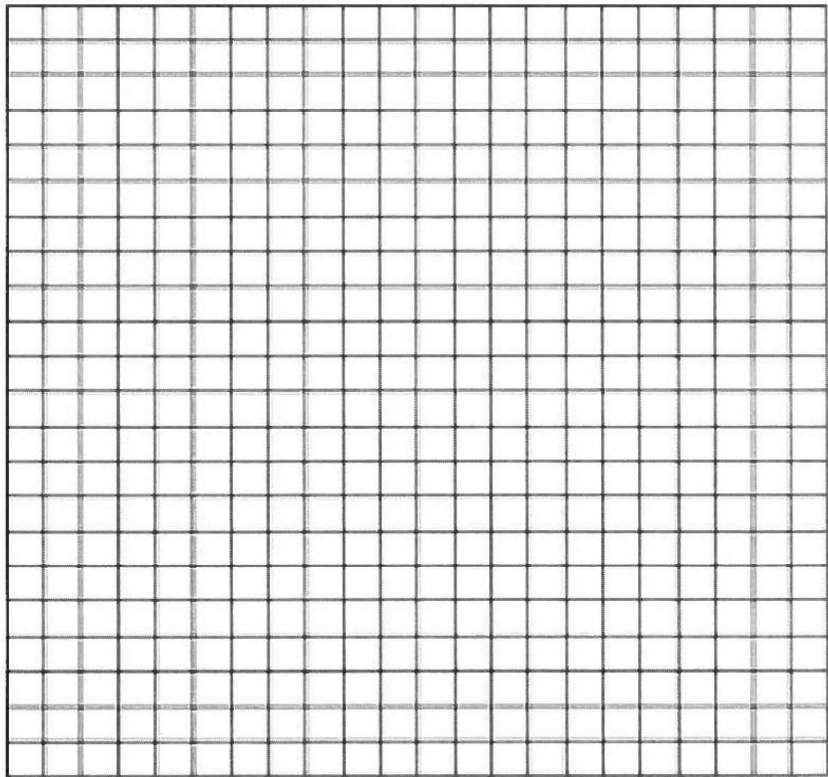
Duration
60-90 minutes

Supplies

- Graph paper
- Rope
- Calculator (optional)

1. Assuming all of the tree stumps were cottonwood trees, what percentage of all of the trees are cottonwood trees? Show your work:

2. Make a bar graph charting living trees and trees that are not living. Make sure you label each axis and the data that you are graphing. Add an appropriate title that reflects both axis and include correct units in the labels.





Visual Poet

Visual Poet: DeSoto

Grade 8

Duration
60-90 minutes

Supplies
• iPad

NAME: _____ iPad NUMBER: _____

You will be creating another filmstrip poem while out at DeSoto – similar to the one that you completed in class yesterday. The steps are the same, but the pictures and sentences must be different.

First, you must take **3 pictures** out at DeSoto:

1. Something unique to DeSoto
2. Something man-made
3. Something in motion

These pictures will be connected to your descriptive writing, **so choose wisely!** Be thoughtful about your pictures – take them so that they look nice!

Open the “Visual Poet” app, just like we did yesterday.

Tap a panel, and tap the black bar at the bottom of the screen that says “New Image,” and tap the words “From Library.” From there, you will be able to find one of your pictures and format it so that it shows up in your panel. Choose the part of the photo that you want in your panel, and double tap the area that you’ve chosen.

For each picture, you must write a detailed, descriptive sentence. **Be creative!** You can tell a story with your sentence, or you can just describe what is in the box, but you must use **vivid verbs** and **detailed adjectives** in a **complete sentence** to describe what is in the box.

To add text, tap the picture. A small, white box will pop up, and all you have to do is start typing. When you are finished with your sentence, move the box to where you want it to be in the picture. Swipe your finger from left to right to get back to the main screen.

Write your three sentences here:

1. _____
2. _____
3. _____

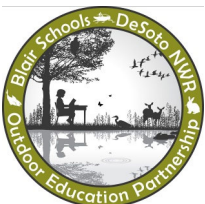
Complete the process for all three panels.

When you have filled all three panels with a picture and sentence, title your poem by tapping the box, write your name under credits, and tap “Save.”

When we get back to Otte, you will send me your poems.

You will be graded on the following:

- Quality/accuracy of pictures
- Complete sentences
- Descriptive, meaningful writing





Nature Walk

Grade 8

Duration
60-90 minutes

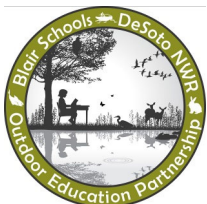
- Supplies**
- Activity Sheet
 - Clip board



On your nature walk, fill in the following information in the chart below with your observations.

Number of nests	Number of feathers	Number of birds observed	Number of feces deposits	Number of bird songs/sounds

In the space below create a bar graph including all the information in the chart above. Remember to also include labels on axes and an appropriate title.





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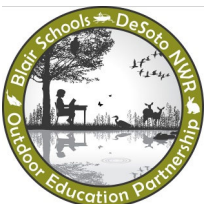
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Nature Walk

Based on your observations, interpret your data table and bar graph to determine how many individual birds you witnessed. Your inference should be explained in a paragraph. Take into consideration how many birds you saw that were also creating the songs, had made the nests, etc.

Can you identify any of the birds by species (eagle, robin, duck, etc.)? If so, name them below:





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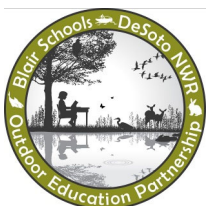


12th Grade State Standards

Science

SC 1: Inquiry, the Nature of Science, and Technology

- 12.1.1 Students will develop and conduct investigations that lead to the use of logic and evidence in the formulation of scientific explanations and models.
 - 12.1.1.a Formulate a testable hypothesis supported by prior knowledge to guide an investigation
 - 12.1.1.b Design and conduct logical and sequential scientific investigations with repeated trials and apply findings to new investigations
 - 12.1.1.d Select and use lab equipment and technology appropriately and accurately
 - 12.1.1.e Use tools and technology to make detailed qualitative and quantitative observations
 - 12.1.1.f Represent and review collected data in a systematic, accurate, and objective manner
 - 12.1.1.g Analyze and interpret data, synthesize ideas, formulate and evaluate models, and clarify concepts and explanations
 - 12.1.1.h Use results to verify or refute a hypothesis
 - 12.1.1.i Propose and/or evaluate possible revisions and alternate explanations
 - 12.1.1.k Evaluation scientific investigations and offer revisions and new ideas as appropriate
 - 12.1.1.I Use appropriate mathematics in all aspects of scientific inquiry
 - 12.1.2 Students will apply the nature of scientific knowledge to their own investigations and in the evaluation of scientific explanations
 - 12.1.2.a Recognize that scientific explanations must be open to questions, possible modifications, and must be based upon historical and current scientific knowledge
 - 12.1.2.b Describe how society influences the work of scientists and how science, technology, and current scientific discoveries influence and change society
- #### SC 3: Life Sciences
- 12.3.1.d Describe how an organism senses changes in its internal or external environment and responds to ensure survival
 - 12.3.3.b Recognize that atoms and molecules cycle among living and nonliving components of the biosphere
 - 12.3.3.c Explain how distribution and abundance of different organisms in ecosystems are limited by the availability of matter and energy and the ability of the ecosystem to recycle materials
 - 12.3.3.d Analyze factors which may influence environmental quality
 - 12.3.4 Students will describe the theory of biological evolution
 - 12.4.2.c Evaluate the impact of human activity and natural causes on Earth's resources (groundwater, rivers, land, fossil fuels)





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Name(s) _____

What's in an Ecosystem?

How well do you know the environment around your home or school? You may walk through it every day without noticing most of the living things it contains or thinking about how they survive. Ecologists, on the other hand, observe organisms and seek to understand how ecosystems work. In this lab, you will play the role of an ecologist by closely observing part of your environment.

Objectives

Survey an area of land and determine the land's physical features and the types of organisms that live there.
Identify possible relationships between organisms that live in the area of land you surveyed.

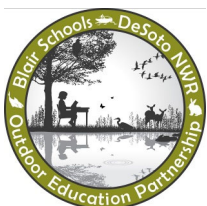
Standards

Materials

- Hand lens
- Colored pencils
- Pencil
- Piece of cardstock
- Field guide to insects or plants
- 4 stakes, 50 m of string (already in place)

Procedure

1. Use a tape measure or meter stick to measure a 10 m x 10 m site to study. Place one stake at each corner of the site. Loop the string around each stake and run the string from one stake to the next to form boundaries for the site. (Already done for you)
2. Survey the site and then prepare a site map of physical features of the area on cardstock. For example, show the location of streams, sidewalks, trails, large rocks, and the direction of any noticeable slopes.
3. Create a set of symbols to represent the organisms at your site. For example, you might use green triangles to represent trees, blue circles to represent insects, or brown squares to represent animal burrows or nests. At the bottom or side of the cardstock, make a key for your symbols.
4. Draw your symbols on the map to show the location and relative abundance of each type of organism. If there is not enough space on your map to indicate the specific kinds of plants and animals you observed, record them on the back of the cardstock.
5. Record any observations of organisms in their environment. For example, note insects feeding on plants or seeking shelter under rocks.





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a. **Sunlight exposure**– How much of the area is exposed to sunlight? Will this change and why? Has this affected the vegetation? Explain

b. **Soil**- Color (do not just put brown)

c. **Rain**- When was the last rain recorded for this area? -

d. **Maintenance**– Is the area maintained? Mowed and picked up? Describe

e. **Water Drainage**– Is the area well drained, or does it have pools of water? Why?

f. **Vegetation Cover**– How much of the soil is covered with vegetation? How much of the soil is exposed?

g. **Evidence of Man**– Is there any evidence of human activity? Explain

6. After completing these observations, identify a 2 meter x 2 meter area that you would like to study in more detail. One large step is equivalent to 1 meter.
7. Use your hand lens to inspect the area,. Be careful not to disturb the soil or the organisms. Then record the types of insects and plants you see. Use your field guides to identify one species of plant or insect. **You must check to see if you are correct. Be ready to show the organism and the picture in the field guide. List the organisms you have identified and draw a picture of at least one of them.**





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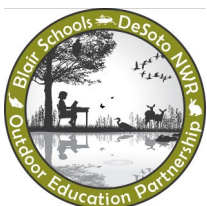
Organisms	Drawing

8. Collect a small sample of soil with your spoon, and observe it with your hand lens. **Record a description of the soil and the organisms that live in it.**

9. Go to another group's plot. List at least 5 differences and 5 similarities between them.

Differences

Similarities





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Name(s) _____

Introduction to Biomes

Biomes definition:

The world's major communities, classified according to the predominant vegetation and characterized by the adaptations of organisms to that particular environment.

-or-

A major type of ecosystem with a distinctive climate and organisms.

Objectives

Standards

Materials

- Refuge Guide

Prairie Biome

1. List four common species of animals that are common to this biome. If you don't see them, list the evidence.

1. _____
2. _____
3. _____
4. _____

2. List two adaptations that these animals have to survive here.

1. _____
2. _____

3. List four common species of plants that are common to this biome.

1. _____
2. _____
3. _____
4. _____

4. List two adaptations that these plants have to survive here.

1. _____
2. _____

5. Name an invasive species to this biome. What is being done to manage its spread?





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6. What is being done to manage this prairie?

Wetland Biome

1. List four common species of animals that are common to this biome. If you don't see them, list the evidence.

1. _____
2. _____
3. _____
4. _____

2. List two adaptations that these animals have to survive here.

1. _____
2. _____

3. List two common species of plants that are common to this biome.

1. _____
2. _____

4. List two adaptations that these plants have to survive here.

1. _____
2. _____

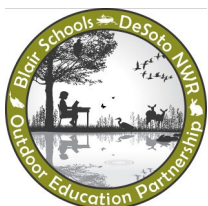
5. Name an invasive species to this biome. What is being done to manage its spread?

6. In what ways is the wetland biome important to people?

Deciduous Forest

1. List four common species of animals that are common to this biome. If you don't see them, list the evidence.

1. _____
2. _____





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3. _____
4. _____
2. List two adaptations that these animals have to survive here.
 1. _____
 2. _____
3. List four common species of plants that are common to this biome.
 1. _____
 2. _____
 3. _____
 4. _____
4. List two adaptations that these plants have to survive here.
 1. _____
 2. _____
5. Name an invasive species to this biome. What is being done to manage its spread?

Fisheries

1. Describe three things that you learned from the presentation.





Observing Birds in the Wild

Grade: 12

Duration
60-90 minutes

Supplies

- Activity sheets
- Binoculars
- Birds of Nebraska Guidebook

Summary

Observing birds in the wild is fun but does take some patience and skill. The observer must be able to locate the bird, watch what it is doing and try to identify it all within a few moments. This activity concentrates on looking for different behaviors exhibited by songbirds.

Songbirds may be perching on a branch, singing to attract mates, feeding their young, searching for food on the ground, preening their feathers—really any number of behaviors. A bird's behavior may be a particular adaptation to help the bird survive. For example, flocking is a behavioral adaptation that helps protect a bird from a predator. Behavior may be specific to one species or found in many species. A White-breasted Nuthatch can walk down a tree head-first. Most woodpeckers prop on the sides of trees. Many sparrows feed on or near the ground. Knowing the behavior patterns of birds and of different species of birds is fundamental to our understanding of songbirds and can help in their conservation.

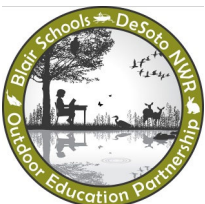
Before going out to observe birds in an area, think about where birds may be found and what time birds will be most active based on what time of year it is and what weather exists. Most songbirds tend to be very active in the morning and early evening.

Objectives

Students will identify different behavior patterns of birds and explain their function.

Procedure

1. In this exercise, students will be looking for birds exhibiting different types of behavior, like flying, swimming, or singing. When a behavior is spotted, place a check in the space provided on the worksheet. Identify the species if possible.
2. Go over these tips for bird observations:
 - Before beginning fieldwork, dress in comfortable clothing that is dull-colored. This helps the observer blend into the natural habitats being explored. Also, sneakers are good footwear as they enable the observer to move about quietly. Move slowly and freeze in place after flushing birds and they may return to allow for observation
 - Gather needed equipment—field guide, binoculars (if possible), a notebook, pencil and worksheet.
 - Get permission from landowners to walk on private property. To





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Observing Birds in the Wild

see the most variety of birds, try to visit a local wildlife sanctuary, state park, or federal refuge. Always check water bodies to see if any birds are sitting or wading in the pond or along its edge.

- Try to search for birds within an hour or two of dawn or a couple of hours before dusk. These are the times when birds are most active, especially in spring or summer.
 - If the bird's name is known, record it; otherwise, note its colors, distinguishing features and observed behavior and try to use a field guide to identify it.
 - Don't forget to record the type of natural habitat where the bird is observed. Look at the surroundings carefully. Then, describe the physical environment, including the types of plants present, the time of year, and the weather. This information will help the student/observer understand the natural conditions each species needs to survive.
 - Always remember-the natural environment comes first. Never harm or disturb an animal, plant or nest. Also, never take an animal away from its habitat. No bird, or other creature, can exist for very long away from its own environment.
3. Choose an area and take students out to conduct the search. Students can work individually, in pairs or in groups.
 4. Return to the classroom and summarize the information. Have students discuss why a particular behavior may be a benefit or detriment to a bird. Consider the following questions: Were any behaviors not observed? Why? Did any single species seem to be exhibiting a particular type of behavior? Why?





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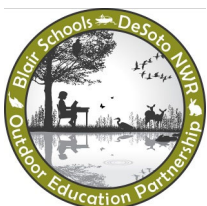
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Bird Identification

Noticing how birds look, act and sound are the first steps toward bird identification. Some key points to bird identification are size, shape, wings, tail, legs and feet, field marks, and body patterns. Compare sizes of other birds. Use familiar birds such as a crow, sparrow or robin when making size comparisons. Look at whether the bird is chunky or slender and examine the bill shape and length. Wings can be looked at to determine flying style. Long and narrow wings usually indicate long-distance flying and maybe flying over water. Long and broad wings are for soaring over land. Length, shape, and uses of the tail are an important clue in identifying the bird. Shape and size of legs and feet can tell about the habits and habitat of a bird. Make sure to note head shape, color pattern on face, eye rings, eyebrow, eye line, light and dark contrasts, as well as any other field marks. Also, notice if there are any patterns, or contrasts in color, on the body or the tail. Along with a field guide, this information can be used to identify the bird.

Bird behavior can help to identify the particular species. Behavior is easily observed at backyard feeders. Differences in behaviors related to eating, sleeping, mating, singing, flying, and in perching can be noted between different species of birds. Birds exhibit specific patterns in flight. Some birds fly fast, slow, erratic, in straight lines, or not at all. Birds vary in feeding behaviors. Some feed on the ground like robins, others in water like many ducks, or in the air like chimney swifts. Eastern phoebes can grab a mosquito in flight. Birds use songs for vocalization. Songs are species-specific and can help with bird identification. Nests are also often species specific. Birds are very particular about the materials used and placement of their nests. For example, robins build a nest with some dried mud and use sticks and grasses to form the bowl, and usually nests are in the forks of branches. Color, size, shape, and number of eggs will vary between species of birds.





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Name _____ Block _____

Wildlife Refuge Management

What is the comprehensive conservation plan CCP?

Who helps write it?

What is the name of the Refuge Manager at DeSoto?

Wetland-

What types methods can used to restore wetlands? List 2

What type is used at this location?

Farmland-

What was farmland used for in the past?

What does the refuge plan to do with the farmland?

Prairie

As talked about in our last trip, what is the refuge planning to do with these prairies?

River

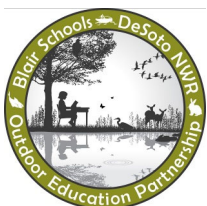
Name 3 endangered species that can be found near or on this refuge.

Pick one and describe what this means in regards to management?

Refuge visitor uses:

Hunting, fishing, wildlife observations, photography, education, and interpretation

Paragraph-Pick one of the above visitors uses and describe how it's managed on the refuge.





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Name(s) _____

Soil Lab

Materials

Bag containing:

- Spoon
- Extraction tube (the large plastic tube)
- 3 square plastic tubes labeled K-Potassium, N-Nitrogen, P-Phosphorous
- 4 boxes of tablets (potassium, phosphorous, nitrates, and Flocc Ex)
- 2 pipets
- Soil thermometer and skinny metal thermometer
- Large bottle of distilled water
- Hand lens

Procedure

Each group will be assigned an area to do their testing. We have a lot to do on this trip, so please stay on task. Do not dispose of anything or dump anything at the Refuge. I will have a bucket for all waste liquid/soil solutions.

Once you have reached your assigned area, please follow these instructions, record your data, and answer the questions.

1. Describe the overall area as if you were telling somebody who couldn't see it:

2. Record the following. You will need to leave the thermometer at each site until the temperature remains constant for about 3 minutes.

Use the skinny metal thermometer for air temperature.

- a. Air temp in sunlight _____
- b. Air temp in shade _____
- c. Why is there a difference? _____

Use the same thermometer to take the temperature at the soil surface under the leaf litter.

- a. Air temp under organic matter _____

Use soil thermometer—green top

- a. Soil temperature approx. two inches down _____
- b. Why is there a difference?

Why does the temperature of the soil matter? _____

Look at the instruction on the brown folded lab sheet. Follow these instructions for getting your soil





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extraction, and then continue on to the phosphorous, nitrate, and potassium test. Record your data below. Use the laminated colored chart to determine your results. You must wait the designated amount of time for each test. The results take awhile to develop. The questions in italics need to be answered prior to doing the lab using the information sheets provided.

- Phosphorous test results _____
What is phosphorus necessary for? _____
What changes the phosphorus in the soil into available forms? _____
How does pH affect the phosphorous? _____
Give 2 characteristics of plants that lack phosphorous _____

Would you be able to notice if a plant has been given to much phosphorous? Why?

Look at your field data, are plants receiving enough phosphorous? _____
 Does this area need fertilizers added? _____

- Nitrogen test results _____
Why is Nitrogen necessary to plants? _____
List two ways to increase the amount of Nitrogen in your soil _____

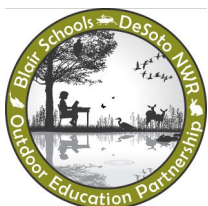
How do you know if your plant is lacking in Nitrogen?

What could happen if you give a plant too much Nitrogen?

Look at your field data, are plants receiving enough nitrogen? _____
 Does this area need fertilizers added? _____

- Potassium test results _____
List three reasons potassium is necessary for plants
 1. _____ 2. _____ 3. _____
List three characteristics of plants that need more potassium
 1. _____ 2. _____ 3. _____
If a plant is receiving too much potassium, what could happen?

- I will be around with a pH, moisture, and light meter probe.
 Record the pH of the soil _____
How does the pH of the soil affect plants? _____
What do most plants prefer? _____
 List four plants that would prefer your soil's pH
 1. _____ 2. _____ 3. _____
 4. _____





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What would you do to raise the pH of your soil? _____

What would you do to lower the pH of your soil? _____

How much moisture is in the soil? _____

Does your soil need more or less moisture? _____

If this was your lawn or house plant, what would you do? _____

What is the light reading? _____

Why would you want or need to know this? _____

Describe the vegetation in the area in at least 4 sentences. _____

Draw a picture of 1 plant species that you see.

Healthy soil has many soil organisms. Use a hand lens to locate at least one soil organism. Draw a picture of an organism that you see in your soil.





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Name(s) _____

Urban Water Quality Testing—DeSoto Field Trip

Materials

- Urban Water Test Kit

Procedure

1. Make 8-10 observations about your collection site using site, sound, and smell.

2. Coliform test—We will record results next class period.

Results _____ p. 11-12

3. Chlorine Results _____ p. 13-14

4. Copper Results _____ p. 15-16

5. Dissolved Oxygen Results _____ ppm p. 17-19

6. Hardness _____ p. 20-21

Multiply the number of tablets used by 40. _____ # of tablets x 40 = _____

Greater than 50 ppm is considered hard water.

7. Iron _____ p. 22-23

8. Nitrate _____ p. 24-25

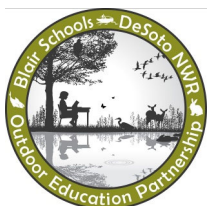
Unpolluted water is below 4 ppm. Greater than 40 ppm is unsafe to drink.

9. pH _____ p. 26-27

10. Phosphate _____ p. 28-29

Greater than .03 ppm contribute to increased plant growth.

11. Temperature _____ p. 30-31





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Name(s) _____

Water Quality Testing / Environmental Science / DeSoto Field Trip

Materials

- Calorimeter w/multicolored handout instructions
- Test strips w/instructions
- Kit w/instructions

Procedure

Circle location assigned: **Bullhead Pond** **Ditch** **Missouri River** **Road Pond**

Make 8-10 Observations about your collection site. Describe the watershed.

Cargill Probes—Get results at picnic table

pH results _____ DO results _____

Calorimeter—Follow instructions in multicolored handouts at picnic table

Be sure to include the label that appears on the machine

Turbidity _____ Nitrate _____

Phosphorus _____ -if time pH _____ -if time

Test Strips—Follow instructions on the bottle- Not every group will do both, do the tests that are in your clear container

Ammonia results _____ Phosphorus results _____

Kit results—Follow instructions in the kit

1. Dissolved Oxygen results _____ ppm p. 16-19

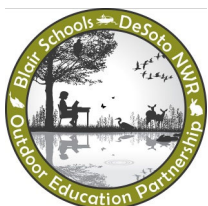
Temperature _____ Celsius _____ Fahrenheit Use thermometer

Record percent saturation in water _____ p. 19

Rank _____ p. 32-33

2. Nitrate results _____ p. 22-25 Rank _____ p. 32-33

3. pH results _____ p. 24-25 Rank _____ p. 32-33





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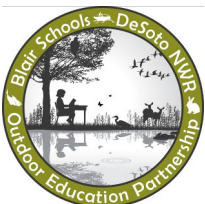


4. Phosphate results _____ p. 26

Rank _____ p. 32-33

5. Turbidity results _____ p. 30-31

Rank _____ p. 32-33





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Name(s) _____

Fire Ecology Lab

Pre-Lab Questions

1. Define Ecological Succession-

Primary Succession -

Secondary Succession-

2. What is a pioneer species?

3. What is a climax community?

4. Give an example of a natural cause of secondary succession.

5. **Draw a picture of succession happening from page 140.**





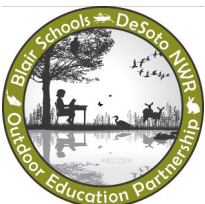
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Use Fire Sheet

1. Name five reasons someone would do a management-ignited prescribed burn
2. What five elements are considered before fire managers do a burn?
3. Name five things that someone on the fire crew must wear.
4. What are three examples of natural firebreaks?
5. What is a drip torch?
6. What is a hand line?
7. List two similarities and two differences between a headfire and a backfire.
8. How long does it take for new growth to appear?
9. Name three tall grass species that appear first.
10. List three invaders that they might be trying to get rid of.





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Name(s) _____

Fire Ecology Lab

Materials

- Calorimeter w/multicolored handout instructions
- Test strips w/instructions

Procedure

Observe the field that hasn't been burned. Write at least 5 sentences about your observations. Describe it as though you were telling someone who couldn't see it. Use all the following: sight, sound, and smell.

Take a soil temperature, surface temperature, and moisture content for the unburned area.

Location A Soil _____ Surface _____ Moisture _____ (provided)

Measure the height of the tallest plant you see. _____

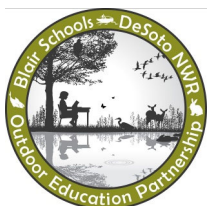
Write at least 5 sentences on your observations of the burned field. Describe it as though you were telling someone who couldn't see it. Use all the following: sight, sound, and smell.

Take a soil temperature, surface temperature, and moisture content for the burned area.

Location A Soil _____ Surface _____ Moisture _____ (provided)

Measure the height of the tallest plant you see. _____

Explain why there is a difference between the two sites in regards to soil and surface temperature.





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Discussion Questions

1. How do they know what fields to burn and when?
2. How often do they burn?
3. If you were in charge of a prescribed burn at the Refuge, what 3 factors determine whether you burn that day?
4. What would happen to this prairie without fire?
5. Name 2 or more purposes of prescribed burns.
6. List 3 plants that they are trying to get rid of?
7. Name 3 examples of native grasses?
8. What is a serotinous cone? Do they exist in the prairie?
9. Name 2 adaptations that plants have to survive fire?
10. What adaptations do animals in the prairie have to survive a fire?
11. How long does it take for things to grow again?
12. What is the difference between a backfire and headfire? Can you tell where the fire was lit?
13. How many people does it take to do a prescribed burn?





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14. If we did the nitrogen, phosphorous, and potassium test again in the burned field, would the results be higher, lower, or the same? Why?





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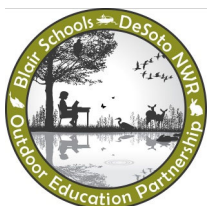
Scope and Sequence

3rd Grade—October

Content	Skills	Assessment	Instructional Strategies	Notes
A. Observation as science B. Descriptive writing C. Sound mapping D. Color mapping	A. Make careful observation about the natural world B. Use environmental as a context for descriptive and reflective writing C. Students map a certain area based on color and sounds, applying observation skills	A. Students' journals B. Discussion C. Classroom reflection	A. Discuss how to make observations in nature B. What makes a good naturalist? C. Discovery hike D. Sound map E. Color map F. Hand lens looking	

3rd Grade—November

Content	Skills	Assessment	Instructional Strategies	Notes
A. Observation as science B. Descriptive writing and detailed observation note taking	A. Make careful observation about the natural world B. Use environmental as a context for descriptive and reflective writing C. Use bird migration as a catalyst for studying natural, seasonal change.	A. Students' journals B. Discussion C. Classroom reflection	A. Discuss how to make observations in nature B. Binocular and bird identification lesson C. Develop skills in note taking and using observational details for science.	





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3rd Grade—February

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Observe animals in winter</p> <p>B. Descriptive writing</p>	<p>A. Observe animal signs without destroying them</p> <p>B. Describe an animal clue using multiple characteristics (size, shape, direction, patten, etc.)</p> <p>C. Use evidence of winter animal to infer about animal (direction of travel, pace, gait, etc.)</p> <p>D. Enjoy exploring outside in winter</p>	<p>A. Students’ journals</p> <p>B. Discussion</p> <p>C. Classroom reflection</p>	<p>A. Wildlife mysteries lesson—modified from a lesson from the Prairie Wetlands Learning Center, MN</p> <p>B. Journaling before, during, and after lesson</p>	

3rd Grade—April

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Observation as science</p> <p>B. Descriptive writing</p> <p>C. Sound/color mapping</p> <p>D. Wetland wondering</p>	<p>A. Make careful observation about the natural world</p> <p>B. Use environmental as a context for descriptive and reflective writing</p> <p>C. Students map a certain area based on its color and sounds, applying observation skills</p>	<p>A. Students’ journals</p> <p>B. Discussion</p> <p>C. Classroom reflection</p>	<p>A. Discuss how to make observations in nature</p> <p>B. What makes a good naturalist?</p> <p>C. Discovery hike</p> <p>D. Sound map</p> <p>E. Color map</p> <p>F. Wetland wondering</p>	





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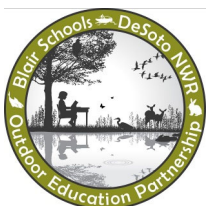


5th Grade—September

Content	Skills	Assessment	Instructional Strategies	Notes
A. Sense of Wonder—Rachel Carson and how to be a good naturalist	A. Observing nature B. Descriptive writing C. Exploring D. Drawing conclusions about nature E. Reflecting on outdoor experience	A. Students’ journals B. Discussion C. Classroom reflection	A. Discuss Rachel Carson as a naturalist B. Discuss naturalists as scientists C. Describe what a naturalist does D. Practice being naturalists in the field	This lesson teaches the naturalists skills that will be used on all future lessons. Naturalist skills are reviewed at the beginning of all subsequent lessons.

5th Grade—September

Content	Skills	Assessment	Instructional Strategies	Notes
A. Investigate prairie plants using appropriate tools B. Explain one way that prairie restoration happens C. List two adaptations of prairie seeds D. Recognize the parts of prairie seeds	A. Observing nature B. Descriptive writing C. Exploring D. Drawing conclusions about nature E. Reflecting on outdoor experience	A. Students’ journals B. Discussion C. Classroom reflection	A. Powerpoint on DeSoto prairie plants and parts of prairie seeds B. Outdoor exploration of prairie with journaling component C. Follow-up discussion on discoveries	





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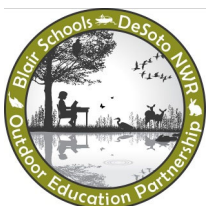


5th Grade—October

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students will recognize beavers as a major factor on the landscape.</p> <p>B. Students will be able to name five beaver adaptations.</p> <p>C. Students will investigate a beaver site using three or more different investigation techniques (sight, sound, tracks, etc.)</p> <p>D. Students will draw conclusions about beaver activity</p>	<p>E. Observation skills</p> <p>F. Listening skills</p> <p>G. Scientific Investigation/ Method</p> <p>H. Drawing conclusions about nature</p> <p>I. Reflecting on outdoor experience</p>	<p>A. Answers given by students during Build a Beaver activity</p> <p>B. Student journal writing for pre and post activity</p> <p>C. Presentations of beaver site evidence</p> <p>D. Wrap up discussion questions and answers</p>	<p>A. Build a Beaver activity— a student dresses up as a beaver with items symbolizing the adaptations of a beaver</p> <p>B. Scientific investigation of a beaver site</p> <p>C. Student presentation on findings of beaver site</p> <p>D. Wrap-up discussion of discoveries</p>	<p>Build a beaver box kept at Arbor, beaver hide and skull kept at DeSoto.</p>

5th Grade—November

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students will recognize a wetland</p> <p>B. Students will be able to describe three characteristics of wetlands</p> <p>C. Students use field guides, binoculars and spotting scopes to identify migrating waterfowl using refuge wetlands</p>	<p>A. Observation skills</p> <p>B. Listening skills</p> <p>C. Scientific investigation/ Method</p> <p>D. Drawing conclusions about nature</p> <p>E. Reflection on outdoor experience</p>	<p>A. Journal entries</p> <p>B. Participation in the Wetlands Wonders pre-lesson activity</p> <p>C. Wrap-up discussion</p>	<p>A. Students participate in “Wetland Wonders” ranger talk to learn about functions, structure and importance of wetlands</p> <p>B. Students learn how to use field guides and binoculars</p> <p>C. Visit one or more wetlands to look for migrating waterfowl</p>	





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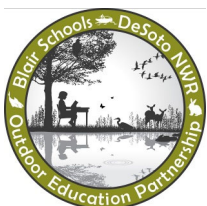


5th Grade—January

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students study animal tracks in the winter</p> <p>B. Students observe birds at the winter feeders</p>	<p>A. Observation skills</p> <p>B. Listening skills</p> <p>C. Scientific Investigation/ Method</p> <p>D. Drawing conclusions about nature</p> <p>E. Reflecting on outdoor experience</p>	<p>A. Journal pages on “Winter Birds at DeSoto” and “Animal Tracks at DeSoto”</p> <p>B. Answers to questions during group lesson</p> <p>C. Observations shared during wrap up</p>	<p>A. Students are read a passage from <u>A Sand County Almanac</u> called “January Thaw” that describes winter as a great time for outdoor observation</p> <p>B. Students are asked to consider what animal made the track, why and where it was going</p> <p>C. Students are given binoculars and field guides to use for birding indoors</p> <p>D. Students will make observations about the birds at the feeders including name, size behaviors and a drawing</p>	

5th Grade—March

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Explain four characteristics of the bald eagle that make it a successful predator</p> <p>B. Articulate the reason why bald eagles became an endangered species and two reasons why the bald eagle recovered</p> <p>C. Distinguish between what is and what isn’t good habitat for nesting bald eagles</p>	<p>A. Observation skills</p> <p>B. Listening skills</p> <p>C. Scientific Investigation/ Method</p> <p>D. Drawing conclusions about nature</p> <p>E. Reflecting on outdoor experience</p>	<p>A. Students’ journals</p> <p>B. Wrap-up discussion to gauge student retention of concepts</p>	<p>A. Lesson on why the bald eagle is a good predator. Incorporates bald eagle mount, wing span comparison, and eye comparison interactive elements</p> <p>B. Refuge tour to observe bald eagles using spotting scopes and binoculars</p> <p>C. Stop at eagle nest to look for nesting activity</p>	





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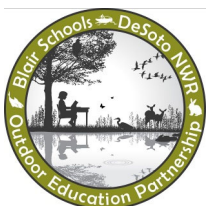


5th Grade—April

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students sit quietly for one hour to observe nature</p> <p>B. Describe the activity using at least five descriptive words and phrases</p> <p>C. Make five observations each for sight, sound, feel and smell</p>	<p>A. Observation skills</p> <p>B. Listening skills</p> <p>C. Scientific Investigation/ Method</p> <p>D. Drawing conclusions about nature</p> <p>E. Reflecting on outdoor experience</p>	<p>A. Students’ journals</p> <p>B. Wrap-up session to discuss observations and feelings of the quiet hour in nature</p>	<p>A. Indoor session prepares students for careful nature observation. Students use descriptive words to describe smell, feel and sound.</p> <p>B. Outside teachers place students apart on a trail where they sit quietly for an hour, observing and journaling</p> <p>C. Wrap up session to share observations and feelings</p>	

5th Grade—May

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students use a key to identify and classify at least three different aquatic invertebrates</p> <p>B. Students choose appropriate method for collecting wetland samples</p> <p>C. Students describe at least two reasons why it is important to protect wetlands</p>	<p>A. Observation skills</p> <p>B. Listening skills</p> <p>C. Scientific Investigation/ Method</p> <p>D. Drawing conclusions about nature</p> <p>E. Reflecting on outdoor experience</p>	<p>A. Students’ journals</p> <p>B. Wrap-up session</p>	<p>A. Introduction session teaches students how to use the “Key to Life in the Pond” and wetland study equipment</p> <p>B. Students work in groups to catch and identify macroinvertebrates</p> <p>C. Wrap up session to describe discoveries</p>	





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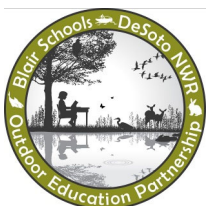


6th Grade—October

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students will complete a writing assignment related to fall experiences.</p> <p>B. Leaf printing to show chlorophyll colors in fall leaves</p> <p>C. Structure vs. function lesson</p>	<p>A. Students will apply writing concepts using the outdoor classroom for inspiration</p> <p>B. Students will use leaf printing to see chlorophyll first hand</p> <p>C. Students apply lessons on structure vs. function to an outdoor lab</p>	<p>A. Student worksheets</p> <p>B. Post lesson discussions</p>	<p>A. Activity sheet for structure and function where students examine two structures using bare eyes and hand lens, then write about the function.</p> <p>B. Teacher-led writing exercise</p> <p>C. Leaf printing on paper using hammers to break leaves to reveal color</p>	

6th Grade—November

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students learn about migrating birds at DeSoto</p> <p>B. Make connections between the migrating birds and how some of the species use Canada as part of their life cycle</p>	<p>A. Students make connections between social studies lessons on Canada and the migrating birds at the Refuge</p> <p>B. Students recognize the interconnectedness of nature and they see the connection of migration through different countries</p>	<p>A. Students use range maps to see if the birds at DeSoto use their Canadian national park for part of their life cycle</p> <p>B. Additional writing component can be added next year</p>	<p>A. Students listen to a PowerPoint about the migrating birds at DeSoto. Each species includes a range map so students can see the full path of migration.</p> <p>B. Students get to observe birds on a wetland to make the real life connections with migration.</p>	





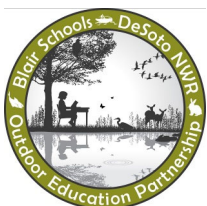
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6th Grade—January

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students study the physical properties of snow</p> <p>B. Students draw geometry angles of snowflakes they observe</p> <p>C. Students study physical properties of items in the visitor center</p> <p>D. Students consider what animals need to survive in winter</p>	<p>A. Use tools to measure weight and mass of snow at different levels of snowpack</p> <p>B. Use hand lens to observe and draw snowflakes in great detail</p> <p>C. Observe physical properties of visitor center exhibits</p> <p>D. Use knowledge and reasoning to help a “creature” survive in winter</p>	<p>E. Student worksheets</p> <p>F. Post lesson discussions</p>	<p>A. Students build a snow fort outside and then use tools to measure weight and mass at different levels of the fort</p> <p>B. Use a hand lens to sketch a snowflake, then label the angles using the proper geometry angle</p> <p>C. Observe four items from the visitor center exhibits and describe their physical properties from the chart</p> <p>D. Hide a jell-o animal in a shelter and check on it in 10 minutes to see if it lived or died</p>	





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7th Grade—September

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Learn native habitats of the Missouri River Valley</p> <p>B. Use quantitative and qualitative observations to learn about ecosystems</p> <p>C. Use direct and indirect observations and abiotic factors to learn about ecosystems</p>	<p>A. Observation skills</p> <p>B. Scientific note keeping</p> <p>C. Draw conclusions about nature</p>	<p>A. Student worksheets</p> <p>B. Post lesson discussions</p>	<p>A. Students follow a worksheet to observe DeSoto Lake, Hardwood Forests, and the Prairie</p> <p>B. Make careful observations and record them on the sheet</p>	

7th Grade—October

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Study insects in the prairie</p> <p>B. Study insects in the wetlands</p>	<p>A. Observation skills</p> <p>B. Scientific note keeping</p> <p>C. Draw conclusions about nature</p>	<p>A. Student worksheets</p> <p>B. Post lesson discussions</p>	<p>A. Students follow worksheet that guides insect observation for the wetland and the prairie</p> <p>B. Instructors give detailed directions on how to use equipment before they start the lab</p>	





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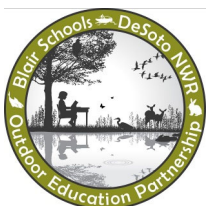


7th Grade—November

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Use GPS technology to complete activity</p> <p>B. Learn about animal habitats and needs of animals (food, water, shelter)</p>	<p>A. Learn to use GPS technology</p> <p>B. Apply knowledge about animal habitat needs to place food, water and shelter cards and marking them with GPS locations</p> <p>C. Teamwork skills are used during activity</p>	<p>A. Success of students finding the hidden cards will help assess how well the first group used the technology to hide and mark the cards</p>	<p>A. In class, students learn about habitat needs of animals</p> <p>B. Students learn how to use a GPS unit and practice using it</p> <p>C. Hands-on exploration using GPS gives students a chance to use their new skills</p>	

7th Grade—Bertrand

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Learn about Steamboat Bertrand</p> <p>B. Learn about steamboating era on the Missouri River and make connections with its importance</p> <p>C. Put Bertrand into the context of Civil War History</p> <p>D. Learn about museum operations and what it takes to conserve a large museum collection</p>	<p>A. Students learn about history and how people work to preserve history</p> <p>B. Students are able to go behind the scenes of the Bertrand exhibit and in doing so have to practice being calm, quiet, and following directions.</p>	<p>A. Student worksheets</p> <p>B. Post lesson discussions</p> <p>C. Questioning by teachers and refuge staff during lesson.</p>	<p>A. Museum curator visits class ahead of trip to talk about Bertrand and the Civil War</p> <p>B. Three stations at the visitor center. Cargo gallery where an activity sheet is completed, Bertrand movie, and the behind the scenes tour.</p>	





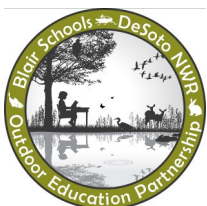
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7th Grade—April

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Creative writing assignment related to Greek Mythology</p> <p>B. Math lesson using a tree plot to set up a proportion to estimate the number of trees in a larger plot</p> <p>C. Math lesson to calculate the speed of the Missouri River</p>	<p>A. Creative writing</p> <p>B. Applying math topics such as proportions and calculating speed of river.</p>	<p>A. Students will turn in creative writing assignment for a grade</p> <p>B. Students will turn in tree estimation worksheet for a grade</p>	<p>A. Students will apply skills learned in the traditional classroom to the outdoor classroom. This includes calculating speed, proportions, and creative writing</p>	





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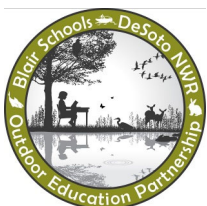


8th Grade—October

Content	Skills	Assessment	Instructional Strategies	Notes
A. In preparation for state writing exams, students use DeSoto NWR as inspiration for descriptive writing	A. Practice descriptive writing using an authentic, place-based context B. Students are expected to use all descriptive writing conventions learned in the classroom	A. Student writing is used as an assessment	A. This outdoor lesson follows up on teaching in the classroom on descriptive writing techniques and practice in a classroom setting	

8th Grade—November

Content	Skills	Assessment	Instructional Strategies	Notes
A. Students use DeSoto NWR as a context to apply the five themes of geography (place, location, human/environment interaction, region and movement) B. While observing migratory birds, students record species and numbers of birds to use in math lessons back at school C. Learn about refuge management techniques	A. Application of skills learned in geography class B. Observation and identification skills of migratory birds C. Put information learned during DeSoto trip into context with refuge management	A. Student worksheets for geography and bird observation B. Post lesson discussions	A. Refuge staff present on refuge management techniques using a power point presentation B. Students hike around visitor center and make observations for geography lesson C. Refuge staff and teachers set up spotting scopes on a wetland and students use binoculars and guide books to identify migratory birds	





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8th Grade—March

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Using the Bertrand cargo gallery, students count the number of a certain artifact on display and use that to find its proportion of total cargo.</p> <p>B. Students see a life size representation of the Bertrand (using flags) and use that in math lessons.</p> <p>C. Students view a film about the National Wildlife Refuge System to help put DeSoto in context of the larger refuge system.</p>	<p>A. Apply math skills learned in the classroom to the visitor center setting.</p> <p>B. Students work as a team on outdoor activity.</p>	<p>A. Student worksheets for proportion lesson</p> <p>B. Post-lesson discussions</p>	<p>A. In-school lessons on proportions and estimations are applied using the worksheet in the cargo gallery.</p>	





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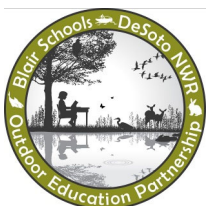


High School Environmental Science—September

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Survey an area of land and determine the land’s physical features and the types of organisms that live there.</p> <p>B. Identify possible relationships between the organisms that live in the area of land you surveyed.</p>	<p>A. Careful observation of a plot of land</p> <p>B. Preparing a site map to document area using symbols to represent features of the plot</p> <p>C. Consider a variety of characteristics to help assess the plot</p>	<p>A. Students will turn in site map that will be used to assess how well students were able to apply the concepts</p>	<p>A. Students learn about ecosystems in the classroom prior to their trip to DeSoto.</p> <p>B. Students draw a site map using symbols to represent their ecosystem</p> <p>C. Using the site map, assess the quality of the ecosystem in terms of environmental factors and biodiversity.</p>	

High School Environmental Science—October

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Study three major biomes of DeSoto (Deciduous forest, Prairie, and Wetland)</p> <p>B. Apply biology concepts such as common plants/animals, adaptations and invasive species to different biomes</p>	<p>A. Students will apply skills in observation and identification to document characteristics of biomes</p> <p>B. Students develop skills in documenting for science</p>	<p>A. Student worksheets will be used to assess the comprehension of the information</p>	<p>A. Students learn about the concept of biomes, adaptations and invasive species in the classroom</p> <p>B. Students apply concepts to observations about three different biomes at the refuge</p>	





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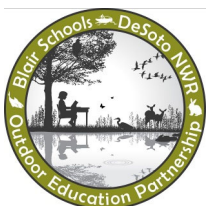


High School Environmental Science—November

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Use characteristics and behaviors of birds to aid in identification</p> <p>B. Use book guides to identify birds observed on the refuge</p>	<p>A. Observation skills</p> <p>B. Organizing information to use in identifying birds</p>	<p>A. Students worksheets will be used for assessment</p>	<p>A. Lesson on bird characteristics and behaviors will give students context to identify birds</p> <p>B. Use field guides to identify birds from a worksheet and birds seen at DeSoto</p>	

High School Environmental Science—March

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. During a soil study, record information on soil characteristics to assess soil quality</p> <p>B. Use scientific data collection methods to collect soil information</p> <p>C. Analyze soil information for trends and patterns</p>	<p>A. Use scientific method</p> <p>B. Observation skills</p> <p>C. Ability to make accurate scientific measurements</p>	<p>A. Student worksheets</p> <p>B. Post-trip class discussion</p>	<p>A. At school, students learn about soil characteristics, content, and how to assess soil quality</p> <p>B. Using knowledge from the in-class lesson, students complete a soil lab at DeSoto NWR</p>	





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High School Environmental Science—April

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Conduct a lab on water quality at the refuge in three different locations</p> <p>B. Analyze water quality information for trends and patterns</p>	<p>A. Use of scientific method</p> <p>B. Observation skills</p> <p>C. Ability to make accurate scientific measurements</p>	<p>A. Students worksheets</p> <p>B. Post-trip class discussion</p>	<p>A. At school, students learn about water quality and how to assess it</p> <p>B. Using knowledge from the in-class lesson, students complete a water quality lab at DeSoto NWR</p>	

High School Environmental Science—April

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Learn about fire ecology</p> <p>B. Learn about how fire is used as a management tool</p> <p>C. Learn about how prescribed burns are conducted by refuge staff</p>	<p>A. Connecting information on ecological succession, pioneer species and climax communities to prescribed burning</p> <p>B. Practice listening skills to acquire information from refuge staff</p>	<p>A. Student worksheets</p> <p>B. Student questions and answers to presenter</p> <p>C. Post-trip class discussion</p>	<p>A. Study fire ecology in class</p> <p>B. Refuge staff presents on prescribed fire; why we burn, how we burn, and equipment used</p> <p>C. Students record information on worksheet during presentation</p>	

