

Blaine Wetland Sanctuary

5 eSTEM Lessons

I. Key Concepts

Blaine Wetland Sanctuary lessons are based these 6 concepts:

- A fen is a specialized wetland. It's a unique intertwining of geology and biology that we are still working to conserve, restore, and understand.
- Scientists, young and old, use our 5 senses (sight, touch, taste, hear, smell) to notice nature (make observations). We then ask questions to find out more.
- Science is a process of collaboration and science literacy is using reliable science to make decisions that benefit the community in that collaboration.
- Unique habitats, such as the Blaine Wetland Sanctuary offer places for rare and endangered species. This action supports biodiversity of earth's biosphere system.
- Learning and acting in local conservation efforts such as Blaine Wetland Sanctuary and water care in my neighborhood contributes positively to citizenship here and understanding water resources globally.
- The BWS site has changed and continues to change: seasonally now, over long periods of time in the past, as climate changes, and as wetland ecology restoration efforts move forward.

II. Audience

Community groups such as schools, scouts, clubs, and families all use the area in different ways. Scientific research as well as ecology restoration are happening right now at the Blaine Wetland Sanctuary, making it a spectacular place to learn. Specifically for teachers, the Minnesota science standards and national Next Generation Science Standards are listed for 5 lessons, and summarized on a chart for your convenience. Learning targets are matched with MN Science Standards and NGSS skills, based on season and grade level. For example, the "Fall FUNology" lesson emphasizes ecology, seasons, and energy which best fits with elementary school science standards and skills for grade 2.

III. Pedagogy & Timing

Consider the BWS boardwalk more than a field trip, but a learning lab itself. The lessons are based on a trip to the site. Each stop on the tour becomes a mini-lesson. Portions of the lessons may be adapted for a classroom setting. Plan on 60-90 minutes per class at the site.

The first lesson, "Welcome Hike & Belly Biology" is designed to introduce people of all ages to the Blaine Wetland Sanctuary any time of year. Four additional lessons teach systems-thinking by learning through the seasonal changes the area has to offer. Students experiencing all four seasonal lessons also gain an intense local phenology experience of biosphere, geosphere, hydrosphere, and atmosphere.

Science education strategies utilized are the 5E model with hands-on practice of science processes of engineering design and the scientific method. The 5E's are: engage, explore, explain, elaborate, and evaluate.

The curriculum pieces developed for BWS embrace the Next Generation Science Standard's 3-D learning by weaving into the student experience both content and skills with relevant interdisciplinary community connection opportunities.

IV. Materials

In general please consider...

- A wagon or mobile cart for supplies
- Bins large and small to sort and store materials
- Labels & Permanent marker
- Specialized laminated maps in sets of 20-30
- Golf pencils
- "How to" instructions for the photo poles
- Waste container / system
- Identification books, cards, or resource links
- First-Aid kit on site or in group leader backpack
- Insulated water jug (cold & hot) fits to cart
- BWS mugs with participation fee or reusable mugs for use in programming activities (engineering design challenges)

V. Planning Your Trip

Each visit to the Blaine Wetland Sanctuary is new and different based on weather, season, water levels, wildlife, flowering plants, and more. Please consider the following options when it comes to your visit with students:

Teacher Led Hiking of BWS boardwalk

- FREE – just call or email to reserve your date and time
 - i. recreation@blainemn.gov
 - ii. 763-785-6164
- Open all seasons
- Less busy weekdays
- Most educational groups allow 60-90 minutes to hike the boardwalk, across the islands, to the overlook and back. All paved trail or boardwalk
- Bus parking lot off of Lexington Avenue
- Standards based curriculum (NGSS and MN) and maps available FREE now from City of Blaine
- Interpretive signs and scientist stories coming soon!
- Combine your field trip with playtime at the Lexington Athletic Complex.

Naturalist Led hike with eSTEM activities at BWS

- Standards-based curriculum (NGSS and MN) with eSTEM engineering design challenges led by Growing Green Hearts naturalist and licensed science teacher, Heidi Ferris.
- Available for group sizes 10 to 150
- Larger groups use rotating stations of up to 30 student per group

- weekdays, all seasons
- Contact Heidi Ferris at GrowingGreenHearts.com to save your date!
- Rate \$250/2hrs/30-60students up to \$750/all day/stations
- All engineering design and water quality testing materials included

Teacher Training at BWS, Teacher-led field trip

- Teachers experience BWS then embed BWS into your curriculum for kids
- 1 hr environmental STEM curriculum training at your school with 1 hour nature hike at BWS for teacher teams led by Growing Green Hearts eSTEM expert, naturalist, and licensed science teacher, Heidi Ferris.
- FREE standards-based curriculum and eSTEM activities specific to BWS, adaptable to your age group
- coaching on interdisciplinary connections to meet your needs
- contact Heidi Ferris at GrowingGreenHearts.com
- rate \$150/hr/per 30 staff
- teacher training materials included

VI. 5 Lesson Descriptions

“Blaine Wetland Sanctuary Welcome Hike & Belly Biology”

What’s underground (and under the boardwalk) will surprise you! Come and meet our new neighbor, the Blaine Wetland Sanctuary. Together we will explore how water, land, air, and living things interact with each other in this special place. Throughout the nature hike participants will dazzle the senses with belly biology, systems bingo, and BWS nature trivia. Activities are designed for all ages.

“Blaine Wetland Sanctuary Springs Alive!”

Water is on the move and so are the creatures as spring arrives at the Blaine Wetland Sanctuary. Hike, learn and play at the fen- a specialized wetland. Guided activities will open your eyes to the unique geology and biology- that we are still working to conserve, restore, and understand. From frogs to filters, we’ll use environmental STEM to experience nature springing alive in the unique habitats along the boardwalk and trails. Activities are designed for all ages.

“Superheroes & Systems at Blaine Wetland Sanctuary”

The fen at Blaine Wetland Sanctuary is a water superhero! Hike the boardwalk with us to learn the story: How does the fen battle the water pollutant villains? Which plants are signs of health in the system? Where is there evidence of change at the fen? Together we will explore examples of how water, air, land, and living things are interconnected at the site. Activities for all ages include: connecting maps with core sampling, use-your-senses bingo, and an engineering design challenge.

“Fall FUNology with Phenology ”

Investigate nature’s wonders big and small- mammals, sedges, birds and seeds. Phenology is the study of how plants and animals change with the seasons. We’ll use games, belly biology, and an engineering design challenge to explore how energy moves through the system and what fall has in store for the fen. Participants of all ages can learn ways to connect with others near and far in citizen science phenology activities.

“Frozen Secrets of the Fen”

The fen has some frozen secrets hidden deep beneath the snow and sedges! Join this nature hike to learn more about the hidden geologic story of BWS and what’s happening underground today. In celebration of winter we will experiment with shadows, crystals, insulation, and climate. Activities are designed for all ages.

VII. Scientists Stories & Community Partnerships

Scientists are sharing their stories! From rare plants to wetland restoration, animals in an urban environment to birding- the Blaine Wetland Sanctuary is a place for research, learning, and enjoy nature. Your students can use these stories to explore careers and fen research at the same time. Expert scientists that have been working to understand the fen have shared their stories in easy-to-read way. The City of Blaine has partnered with the Board of Water and Soil Resources, Minnesota Department of Natural Resources, Coon Creek Watershed District, Rice Creek Watershed District, Ecological Consultants Inc, Anoka Ramsey Community College, St. Cloud State University, and more.