

Teacher Guides were made by teachers for teachers as a collaborative project of EVSC, USI, and WNS. Special thanks to the authors of this Guide: EVSC Teachers Leah Hoffman & Gail Stewart and to the authors of the bibliography: USI Dept. of Teacher Education faculty Dr. Joyce Gulley and Dr. Jeff Thomas.

Program: WATER DANCE

Target Audience: Grades 3, 4, 5

Description: Discover a world under water by water bug fishing. Dip nets in the marsh to catch an incredible diversity of aquatic life and observe them through magnified viewers. See things dance before your eyes as they ‘tell’ a story about the quality of the water they live in and how they interact with their environment.

Teacher Guide Contents:

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Program Agenda:**Time Needed:** 2.5 hrs.

I. Welcome and Introduction to wetlands	30 min
II. Activities (with rotation if necessary)	
A. Wetland Tour	55 min
B. Water Investigations	55 min
III. Conclusion	10 min

Program Synopsis:

After a brief introduction to vocabulary and concepts, children will be split into smaller groups for the duration of the program. Small groups will take a hike through different habitats: wetland, forest, and prairie, and enjoy wildlife sightings and learn more about the natural area. Groups will also conduct water investigations on the wetland marsh by “water bug fishing” with nets and identification of their insect collection using magnifying tools and ID guides. As a group we will discuss their results (insects found), pass around insects for everyone to see, and make conclusions about the water quality in the wetland. We will begin and end the water investigations with discussion of the scientific method. Students will utilize their notebooks to record their observations and make conclusions about what they’ve learned, demonstrating their grasp of the scientific process.

Objectives: Students will be able to....

1. Conduct scientific investigations using knowledge, tools, and evidence.
2. Observe, identify, and describe wetland life, particularly macroinvertebrates
3. Make predictions about the quality of water in a wetland and impacts of pollution.
4. Recognize that organisms interact with each other and their environment in various ways for survival.
5. Gain an understanding of the nature of science and interrelatedness of all living and nonliving things.
6. Draw and write about observations in a notebook.
7. Have Fun.

Indiana Academic Science Standards Summary: Students investigate the nature of science using observations, tools, and evidence. Students use tools to identify aquatic life and compare and describe differences. They will work cooperatively to develop explanations and make predictions about water quality. Students will revise their understanding of human impact and interrelatedness of organisms and their environment, and communicate their findings in notebooks.

Indiana Academic Science Standards Code:

2010 IASS: Grades 3-5 Nature of Science Process Standards, Life Science Standards.

Grade 3 [Changes] Change and Growth:

- Observe, describe, and ask questions about plant growth and development.
- Take measurements of plant growth.
- Observe, ID, and record plant structures and their functions.
- Observe, ID, and compare different plants and their structures.
- Model the life cycle of a plant.
- Form hypothesis and test influences on plant growth.

Grade 4 [Form and Function] Structures of Life:

- Observe, describe, and ask questions about structures of organisms that affect their growth and survival.
- Show that offspring are like parents and others, but vary.
- Observe, compare, and record – draw and write – physical characteristics (adaptations) of live plants and animals from widely different environments.
- Design investigation to explore how an organism meets its needs by responding to information from environment. I.e. grow towards light.
- Engineer and describe how a given organism might adapt to global warming.

Grade 5 [Systems] Interdependence:

- Observe, describe, and ask questions about how changes in one part of an ecosystem create changes in other parts.
- Observe and classify organisms as producers, consumers, decomposers, predator and prey.
- Describe and build a nature recycler to allow observation of decomposition i.e. earthworms in compost.

STEM Correlations:

- **Science:** Refer to the Life Science Standards listed above
- **Technology:** Completion of Program Notebooks under the document camera for easy whole group instruction, charts, field guides, magnifying lenses, nets
- **Engineering:** Sorting insects by groups, making predictions, solving problems
- **Mathematics:** data collection, quantification, analyses

English/Language Arts Correlations:

program notebook, descriptive and identifying writing prompts, sketching observations

Program Preparation:

Students will get more out of the program if they have been introduced to the following vocabulary and concepts prior to the program visit.

Vocabulary:

Habitat, wetland, watershed, macro-invertebrates, pollution, water quality, hypothesis

Concepts:

- Wetlands are areas with lots of water during most of the year, waterlogged (hydric) soils, and water-loving (hydrophytic) vegetation.

- Wetlands / Water is an excellent habitat for many plants and animals, but it can be adversely impacted by human activities.
- Water quality can be determined by biological, chemical, and physical factors.
 - Biological indicators (macro-invertebrates) are the most reliable indicators over time.
 - Macro-invertebrates – animals that have no back bone, are visible with the naked eye and spend all or part of their life in water. Since they don't travel like fish, they are excellent indicators of the water quality in the recent past and present.
- Watershed – the area of land where all of the water that is under it or drains off of it goes into the same place
- Pollution – anything that adversely affects the survival of living organisms
 - Point source– permitted type of pollution such as wastewater treatment plants, industrial waste, combine sewage overflows, etc
 - Nonpoint source – broadly acquired pollution over a large land area, caused by surface runoff picking up pollutants from the land as it flows to the lakes and rivers.
 - Tolerance – relative capacity of an organism to grow or thrive when subjected to an unfavorable environmental factor

Program Follow Up:

- Review vocabulary & concepts.
- Lead students to discuss / share their field trip experiences
- Review student notebooks as a class and assist students with completion/correction of answers.
- Rent the WNS Traveling Nature Trunks for your classroom, if available for your program topic.
- Utilize one of the many supplemental lesson plans available on our website: www.wesselmannaturesociety.org > Educators (top tab). Most programs have completed supplements but some are still in development.

Activity suggestions:

Arts/ Crafts:

- Macroinvertebrate graphing activity:
http://extension.usu.edu/files/publications/publication/NR_WQ_2005-06.pdf
- Testing Water tension, understanding water striders drawing craft
<http://www.crayola.com/lesson-plans/testing-water-tension-lesson-plan/>
- Speedboat Matchsticks, a surface tension experiment
<http://www.kids-science-experiments.com/speedboatmatchsticks.html>

Games:

- Build-a-bug (appendices located below in web resources)
http://extension.usu.edu/files/publications/publication/NR_WQ_2005-02.pdf

- Simon says move-like-this-aquatic-animal game.
http://extension.usu.edu/files/publications/publication/NR_WQ_2005-03.pdf

Snacks:

- Tapioca pudding – frog eggs snack (add green food coloring?)

Bibliography:

ABOUT HABITATS: WETLANDS. Cathryn Sill. Peachtree, 2013. ISBN 1561456896. Gorgeous artwork brings the story of the wetlands to life. This book would be an excellent read aloud before a trip to Howell Wetlands. (Note: This book is not available in the EVPL, but it is readily available at bookstores.)

B IS FOR BLUE PLANET: AN EARTH SCIENCE ALPHABET. Ruth Strother. Illus. Bob Marshall. Sleeping Bear Press, 2011. ISBN 9781585364541. The interplay between natural resources and human interaction is described in simple text while sidebars provide more detailed explanations. (Note: This book is not available in the EVPL, but it is readily available at bookstores.)

BIODIVERSITY OF WETLANDS. Greg Pyers. Marshall Cavenish Books, 2012. ISBN 9781608705337. EVPL Call Number 577.68 PYERS. This book presents the variety of living things found in a wetland and the delicate balance within.

EXPLORE RIVERS AND PONDS WITH 25 PROJECTS. Carla Mooney. Nomad Press, 2012. ISBN 1936749807.
Great hands-on projects for teachers and students to explore life in rivers and ponds. (Note: This book is not available in the EVPL, but it is readily available at bookstores.)

HARMONY: A VISION FOR OUR FUTURE. The Prince of Wales. HarperCollins Publisher, 2010. EVPL Call Number 577 CHARL. In an adaptation of his book for adult, Prince Charles encourages young readers to appreciate nature and work to save natural habitats.

MEADOWLANDS: A WETLANDS SURVIVAL STORY. Thomas Yezerski. ISBN 9780374349134. EVPL Call Number 577.69 YEZER. The book shows how diligent work by conservations restored a wetlands to its natural state after urban sprawl had almost killed it.

NEAR ONE CATTAIL : TURTLES, LOGS, AND LEAPING FROGS. Anthony D. Fredericks. Illustrated by Jennifer DiRubbio. Dawn Publications, 2005. ISBN 1584690704.
EVPL Call Number 591.768 FREDE. This book describes the variety of plants and animals found in a wetlands and how they are interconnected.
591.768 FREDE CHECK SHELF

WETLANDS. Peter Benoit. True Books, 2011. ISBN 9780531205518. EVPL Call Number 577.68 BENOI. This book presents facts and figures about wetlands in an accessible format.

WETLANDS JOURNEY. Jeanne Weaver. National Geographic Society, 2007. ISBN 9781426301858. EVPL Call Number 577.68 WEAVE. Classic National Geographic photographs invite readers into the world of the wetlands.

Stories:

Other Book Resources:

- American Forest Foundation. *Project Learning Tree: PreK-8 Environmental Education Activity Guide*. 2012. (Refer to Cross-Reference Indices for Activities)
- Council for Environmental Education. *Project Wild Aquatic: K - 12 Curriculum & Activity Guide*. 2005.
- Council for Environmental Education. *Project Wild: K - 12 Curriculum & Activity Guide*. 2005.
- Ganeri, Anita. *Ponds and Pond Life*. Franklin Watts, 1993.
- Lasky, Kathryn. *Pond Year*. Candlewick Press, 1995.
- Nelson, Dennis. *Project Wet Curriculum and Activity Guide 2.0*. Project Wet, 2007.
- Yezerki, Thomas. *Meadowlands: A Wetlands Survival Story*. Farrar Straus & Giroux, 2011.
- Serafini, Frank. *Looking Closely Around the Pond*. Kids Can Press, 2010.
- Sidman, Joyce. *Song of the Water Boatman: And Other Pond Poems*. Houghton Mifflin Co., 2005.

Websites Resources:

- Pre and Post visit lesson plans on our website: www.wesselmannaaturesociety.org
- Indiana DNR Educator Resources: <http://www.in.gov/dnr/fishwild/2340.htm>
- Project WET: <http://projectwet.org/>
- Project WOW!: http://www.wetland.org/education_edmaterials.htm
- Hoosier Riverwatch: <http://www.hoosieriverwatch.com/>
- Project Wild: <http://www.projectwild.org/>
- Aquatic Macroinvertebrate Interactive Identification Guide:
<http://people.virginia.edu/~sos-iwla/Stream-Study/Key/MacroKeyIntro.HTML>
- Bugs Don't Bug Me Lesson Plan:
http://extension.usu.edu/files/publications/publication/NR_WQ_2011-12.pdf

Pre- and Post- Program Assessment:

Be sure to ask a pre- and post- program survey question to assess student learning.

(A ready-to-use form was provided with your confirmation and is also available on our website.)

Please report the results on your program evaluation form and return to us.

WATER DANCE:

Q: What can we determine the water quality (how clean or polluted) in a wetland?

A: By investigating / looking at the types of aquatic insects found there.

The following programs are less popular: Monitoring Creek Health Target audience: 6 th -8 th grade 100 students per year Focus is on the recovery and lack of recovery of Coho Salmon and Steelhead Trout. Students monitor creek water pH, dissolved oxygen, and temperature. Point Reyes National Seashore 53. Subscribe to view the full document. California Phenology Project Education & Outreach Report Version 2.0, November 2011 Uncovering the San Andreas Fault Target audience: 5 th -8 th grade. 30 students per year. High School Programs: The park offers an estuarine/marine science program for hi 1 Project Title: President Presentations Target Audience: Intermediate to advanced English and Civics students (NRS levels 4-5) Description and Objectives: In this project, each student will be assigned a U.S. president to research. Through their research, students will develop a better understanding of the structure of the U.S. government, responsibilities of the executive branch of government, important presidents and key events in U.S. history. These guidelines are primarily targeted at national hepatitis programme managers and other policy-makers in ministries of health, particularly in LMICs, who are responsible for the development of national hepatitis testing and treatment plans, policy and guidelines. These guidelines will also be useful for laboratory managers in ministries of health, reference laboratories and key hospital laboratories, who are responsible for validation of assays, development of national testing algorithms, and national procurement of assays and quality control (QC).