Young Naturalists

Teachers Guide

Prepared by Jack Judkins, Bemidji Area Schools, Bemidji, Minnesota

"Spring-to-Life Ponds" Multidisciplinary Classroom Activities

Teachers guide for the Young Naturalists article "Spring-to-Life Ponds" by Larry Weber. Illustrated by Vera Ming Wong. Published in the May–June 2008 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/ponds.

Young Naturalists teachers guides are provided free of charge to classroom teachers, parents, and students. This guide contains a brief summary of the article, suggested independent reading levels, word count, materials list, estimates of preparation and instructional time, academic standards applications, preview strategies and study questions overview, adaptations for special needs students, assessment options, extension activities, Web resources (including related Conservation Volunteer *articles), copy-ready study questions with answer key, and a copy-ready vocabulary sheet and vocabulary study cards. There is also a practice quiz (with answer key) in Minnesota Comprehensive Assessments format. Materials may be reproduced and/or modified a to suit user needs. Users are encouraged to provide feedback through an online survey at www.mndnr.gov/education/teachers/activities/ynstudyguides/survey.html.*

Summary

"Spring-to-Life Ponds," through text and illustrations, describes the life cycle of a vernal pond and the many organisms that depend on it for their survival. Students learn how vernal ponds form and disappear. Creatures from across the animal kingdom, with the exception of fish, use vernal ponds for food, shelter, and reproduction. The article is an excellent resource if you are studying taxonomy, climate change, or ecology. See Extension Activities.

Suggested reading levels: upper elementary through ninth grade

Total words: 1,536

Materials: Drawing paper, grid paper, clipboards, microscopes, poster board, pencils, pens, markers, and print resources from your media center and the Web sites listed under Web Resources

Preparation time: One to two hours, not including time for extension activities

Estimated instructional time: Two to three 50-minute class periods (not including extensions)

Minnesota Academic Standards applications: "Spring-to-Life Ponds" may be applied to the following Minnesota Department of Education standards:

Language arts
I. Reading and Literature
A. Word Recognition, Analysis, and Fluency
B. Vocabulary Expansion
C. Comprehension
II. Writing
A. Types of Writing
B. Elements of Composition
C. Spelling
D. Research
E. Handwriting and Word Processing
III. Speaking, Listening and Viewing
A. Speaking and Listening
B. Media Literacy

Science
Grade 4
IV. Life Science
B. Diversity of Organisms
Grade 5
IV. Life Science
Flow of Matter and Energy
Grades 7
IV. Life Science
B. Diversity of Organisms
C. Interdependence of Life
F. Flow of Matter and Energy
Grades 9–12
IV. Life Science
B. Diversity of Organisms
C. Interdependence of Life
F. Flow of Matter and Energy

Social Studies
II. Minnesota History
Grades 4–8
E. Industrial Era: Students will describe the impact of industrialization on work, home, leisure life, politics, immigration, and changes in the physical landscape.

V. Geography
Grades 4–8
B. Maps and Globes: The student will make and use maps to acquire, process, and report on the spatial organization of people and places on Earth.
D. Interconnections: The student will describe how humans influence the environment and in turn are influenced by it.
E. Essential Skills: The student will use maps, globes, geographic information systems, and other sources of information to analyze the natures of places at a variety of scales.
Grades 9–12
B. Essential Skills: The student will use maps, globes, geographic

Minnesota Academic Standards applications continued:

information systems, and other sources of information to analyze the natures of places at a variety of scales

D. Interconnections: The student will describe how humans influence the environment and in turn are influenced by it.

Arts
Artistic Expression
D. Visual Arts

Complete Academic Standards are available at www education.state.mn.us. Teachers who find other connections to academic standards are encouraged to contact *Minnesota Conservation Volunteer.*

Preview

Before you read, ask students to survey the article. Examine the headings and illustrations. Use the **KWL** strategy (Ogle, 1986) to find out what your students already know **(K)** about pond/aquatic life, what **(W)** they would like to learn, and eventually what they learned **(L)** while reading the article and related materials, and through participating in extension activities. You might begin by asking small groups to brainstorm **K** and **W** lists. Then combine the groups' lists to make a class list. Display your **K** and **W** ideas on poster board or paper (see Vocabulary preview). Add to your **L** list as you read and discuss the article. See www.teach-nology.com/web_tools/graphic_org/kwl for a KWL generator that will produce individual organizers for your students. KWL also gives you the opportunity to introduce interdisciplinary connections you will make during extension activities. For example, if you plan to use the article during social studies, or science, you may ask students to review their KWL for concepts that are specific to those disciplines.

If you have access to a projector or document camera, show the animated maps from mrbdc.mnsu.edu/mnbasin/fact_sheets/wetlands.html. Students can compare 1860s to 1980s Minnesota wetlands (www.macalester.edu/environmentalstudies/threerivers/ENVI133_F07/Wetlands%20webpage/Wetland%20loss%20in%20Minnesota.html) as a prelude to connecting this article to geography and Minnesota history standards.

Vocabulary preview

See the copy-ready vocabulary list included in this guide. You may wish to break the list into smaller lists, since the vocabulary in this article may present significant challenges to your students. You may also wish to add words to or delete words from the list based on your knowledge of your students' needs. Pretesting vocabulary individually, in small groups, or with your entire class can be an effective vocabulary preview strategy. You may then post-test at the conclusion of this activity (see Assessment below). Italicized terms have not been included on the list.

Connections to vocabulary in the article may also be made during KWL. If students are not familiar with some of the terms, include them in the **W** list. Other terms may be added to the **W** list as they read the article. Eventually they can be moved to the **L** list. You may write vocabulary from the article in green ink, while other ideas are written in black. Notes: Some of the words in the vocabulary list definitions may require further explanation.

Vocabulary preview continued

You may wish to use the study cards found at the end of this guide. Cut along the horizontal line; fold in the middle and tape or staple. Study cards, see Strategic Tutoring (Hock, Deshler and Schumaker, 2000) can be applied to any subject area. On one side of the card, in large letters, write a key word or phrase that students are expected to know. In smaller letters frame the word or phrase in a question or statement. On the other side of the card, in large letters, write the answer to the question. Finally, in smaller letters, frame the answer in a question or statement. Blanks are provided to allow you or your students to add new words or phrases.

Study questions overview

Study questions parallel the story (the answer to the first question appears first in the article, followed by the second, and so on). Preview the entire guide with your class before you read the article. You may wish to read the story aloud and complete the study questions in class, in small groups, or as an independent activity. The questions may be assigned as homework, depending on the reading ability of your students. Inclusion teachers may provide more direct support to special needs students (see Adaptations section). The study questions may be also used as a quiz. Note: Items 1, 3, 7, 8, 10 11, 12, and 15 and the Challenge require varying degrees of inferential thinking.

Adaptations

Read aloud to special needs students. Abbreviate the study questions or highlight priority items to be completed first, for example, items 2, 4, 5, 6, and 13. If time allows, remaining items may be attempted. Peer helpers, paraprofessionals, or adult volunteers may lend a hand with the study questions. With close teacher supervision, cooperative groups can also offer effective support to special needs students, especially for extension activities.

Assessment

You may use all or part of the study guide, combined with vocabulary, as a quiz. Other assessment ideas include: (1) Students may write an essay describing the importance of wetland preservation/restoration. (2) On your visit to a vernal pond, evaluate students' notes and drawings. (3) Prepare slides of pond water. Ask students to draw and label organisms in the water. (4) Poster presentations may illustrate/describe life cycles of a particular species and/or its relationships with other organisms in the pond. (5) Play the frog calls for spring peepers, chorus frogs, and wood frogs as part of an evaluation.

Extension activities

1. Students may, on a map of Minnesota, illustrate the loss of wetland acres since the middle 1800s. See mrbdc.mnsu.edu/mnbasin/fact_sheets/wetlands and www.macalester.edu/environmentalstudies/threerivers/ENVI133_F07/Wetlands%20webpage/Wetland%20loss%20in%20Minnesota.html for maps of wetland loss, and www.50states.com/maps/minnesota.htm for a Minnesota blank map.
2. Invite a DNR wildlife manager (files.dnr.state.mn.us/contact/wildlife_managers.pdf) to your classroom to expand your discussion of wetland

Extension activities continued

management or to let you know how you and your students can get involved in wetland preservation/restoration.

3. Explore possibilities for getting involved in monitoring frogs, toads, salamanders, or turtles. See links below.
4. Students may construct a chart or poster, placing the organisms they have learned about in this article into their respective taxonomic categories from phyla to species.
5. See www.42explore.com/pond.htm for many excellent teaching ideas and resources on pond life hands on activities.
6. Read Life in a Jar Young Naturalists article (see Related Articles below) as a companion to Spring-to-Life Ponds. The extension activities for Life in a Jar will work well for Spring-to-Life Ponds.

Web resources

Wetland loss in Minnesota

www.dnr.state.mn.us/wetlands/index.html
files.dnr.state.mn.us/outdoor_activities/hunting/waterfowl waterfowlheritage.pdf
mrbdc.mnsu.edu/mnbasin/fact_sheets/wetlands.html
www.macalester.edu/environmentalstudies/threerivers/ENVI133_F07/Wetlands%20webpage/Wetland%20loss%20in%20Minnesota.html

Pond life

www.42explore.com/pond.htm
www.dcnr.state.pa.us/wrcf/keynotes/summer00/vernal_ponds.html
www.riveredgenaturecenter.org/UserFiles/File Teacher%20Guides/Vernal%20Pond%20Life%20Teacher's%20Guide.pdf

Frog calls

www.pca.state.mn.us/kids/frogsforkids.html
animaldiversity.ummz.umich.edu/site/topics/frogCalls.html

Frog and turtle preservation

www.pca.state.mn.us/hot/frogs.html
cgee.hamline.edu/frogs
www.mepartnership.org/mep_whatsnew.asp?new_id=2139

Taxonomy

animaldiversity.ummz.umich.edu/site/index.html
www.angelfire.com/mo2/animals1/taxonomy.html
mclibrary.nhmccd.edu/taxonomy/taxonomy.html

Wetland wildlife

www.extension.iastate.edu/Publications/PM1425.pdf
web.mit.edu/polisci/mpepp/wetlands_wildlife.htm
www.americaswetlandresources.com/wildlife_ecology/plants_animals_ecology/animals/index.html

Web resources continued

Birds
www.holoweb.com/cannon/regular.htm

Teacher resources
www.dnr.state.mn.us/education/teachers/index.html

Related articles

Many related *Minnesota Conservation Volunteer* articles are available online at www.dnr.state.mn.us/volunteer/articles/index.html, including:

May–June 2001
"Six Slippery Salamanders"
www.mndnr.gov/young_naturalists/salamanders

July–August 2001
"What's Eating You?"
www.mndnr.gov/young_naturalists/biting_bugs

July–August 2002
"Life in a Jar"
www.mndnr.gov/young_naturalists/pond_life

March–April 2003
"Let's Go Birding"
www.mndnr.gov/young_naturalists/birding

March–April 2004
"Special Delivery"
www.mndnr.gov/young_naturalists/eggs

July–August 2005
"The Wonder of Water"
www.mndnr.gov/young_naturalists/water

July–August 2005
"Water Flea (Genus: Daphnia)"
www.holoweb.com/cannon/regular.htm

September–October 2005
"Wetland Complexity"
www.mndnr.gov/volunteer/septoct05/wetland_complexity.html

September–October 2006
"Duck Plan Fledges"
www.mndnr.gov/volunteer/sepoct06/duck.html

March–April 2008
"The Magic of Morphing"
www.mndnr.gov/young_naturalists/magic_morphing

References

Hock, M.F., Deshler, D.D., and Schumaker, J.B. Strategic Tutoring. Lawrence, Kan.: Edge Enterprises, 2000.

Ogle, D.S. K-W-L Group Instructional Strategy. In A.S. Palincsar, D.S. Ogle, B.F. Jones, and E.G. Carr (Eds.), Teaching Reading as Thinking: Teleconference Resource Guide, pp.11–17. Alexandria, Va.: Association for Supervision and Curriculum Development, 1986.

Study Questions

"Spring-to-Life Ponds" by Larry Weber. Illustrated by Vera Ming Wong. Published in the May–June 2008 *Minnesota Conservation Volunteer*, or visit www.dnr.state.mn.us/young_naturalists/ponds.

Name_____Period_____Date_____

1. What words give you a clue about how long it takes frogs to develop from eggs into adults?

_____

_____

2. What happens to vernal ponds during the summer? _____

_____

3. Why do you think vernal ponds attract such a wide variety of animals? _____

_____

_____

4. Where does the water in vernal ponds come from? _____

_____

_____

5. Where would you find most vernal ponds? Why? _____

_____

_____

6. Why don't fish live in vernal ponds? _____

_____

_____

7. Why can a spring peeper's call be heard from a great distance? _____

_____

_____

8. How can you identify the species of April frog by examining its eggs? _____

_____

9. Since blue-spotted salamanders do not call, how do the males attract the females?_____

_____

_____

10. What makes fairy shrimp unique? _____

_____

11. How do you suppose water boatmen, whirligig beetles, and water striders got their names?

_____

_____

12. Do fishing spiders catch fish? _____

_____

13. What attracts turtles and snakes to vernal ponds? _____

_____

_____

14. Do all vernal ponds dry up in summer? _____

_____

_____

15. Should vernal ponds by protected? Why or why not?_____

_____

_____

_____

Challenge: Why is it important for animals that hatch in vernal ponds to grow up quickly?____

_____

_____

_____

Study Questions Answer Key

"Spring-to-Life Ponds" by Larry Weber. Illustrated by Vera Ming Wong. Published in the May–June 2008 *Minnesota Conservation Volunteer*, or visit www.dnr.state.mn.us/young_naturalists/ponds.

1. What words give you a clue about how long it takes frogs to develop from eggs into adults? **"I had to make many trips to the pond before I was able to see the tiny, striped frogs." (Page 31)**

2. What happens to vernal ponds during the summer? **They shrink and then most vanish.**

3.Why do you think vernal ponds attract such a wide variety of animals? **Answers will vary, but should include details about food, shelter, and reproduction.**

4. Where does the water in vernal ponds come from? **Rain and melting snow**

5. Where would you find most vernal ponds? Why? **In the woods. Trees provide shade, which helps ponds keep their water longer.**

6. Why don't fish live in vernal ponds? **The water dries up. Unlike other vernal pond animals, fish can't live without a body of water.**

7. Why can a spring peeper's call be heard from a great distance? **It is high pitched.**

8. How can you identify the species of April frog by examining its eggs? **Spring peepers lay single eggs. Chorus frogs lay several small clusters, and wood frogs lay single, large clusters.**

9. Since blue-spotted salamanders do not call, how do the males attract the females? **Males attract females through body movements.**

10. What makes fairy shrimp unique? **Fairy shrimp are not found in large bodies of water. They only appear in spring. They are the largest crustaceans in vernal ponds.**

11. How do you suppose water boatmen, whirligig beetles, and water striders got their names? **Water boatmen look like they have oars. Whirligig beetles move in circles. Water striders walk on water.**

12. Do fishing spiders catch fish? **Not in vernal ponds, because there are no fish in vernal ponds.**

13. What attracts turtles and snakes to vernal ponds? **Turtles eat tadpoles and snakes eat frogs.**

14. Do all vernal ponds dry up in summer? **No, some hold water year round and do not dry up until there is a long dry period.**

15. Should vernal ponds by protected? Why or why not? **Answers will vary. Help your students understand the importance of protecting vernal ponds for their value to wildlife and the balance of nature.**

Challenge: Why is it important for animals that hatch in vernal ponds to grow up quickly? **Most vernal ponds dry up. Then animals that depend on them have to move on or become dormant.**

Minnesota Comprehensive Assessments Practice Items

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Name _____Period _____Date_____

1. Fairy shrimp spend the winter as _____ .
   A. cocoons
   B. eggs in the bottom of vernal ponds
   C. shrimp in the Gulf of Mexico
   D. None of the above

2. Young insects are _____ in vernal ponds.
   A. plentiful
   B. preyed upon
   C. never found
   D. A and B

3. When vernal ponds dry up, snails and clams _____ .
   A. die
   B. continue growing
   C. become dormant
   D. turn into crustaceans

4. Most people don't notice vernal ponds because _____ .
   A. vernal ponds are small
   B. they don't look for vernal ponds
   C. vernal ponds often dry up for part of the year
   D. all of the above

5. Male frogs call to _____ .
   A. keep other male frogs away
   B. attract insect prey
   C. attract female frogs
   D. A and C

Minnesota Comprehensive Assessments Answer Key

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1. Fairy shrimp spend the winter as **B.** eggs in the bottom of vernal ponds.

2. Young insects are **D. A** and **B** in vernal ponds.

3. When vernal ponds dry up, snails and clams **C.** become dormant.

4. Most people don't notice vernal ponds because **D.** all of the above.

5. Male frogs call to **D. A** and **C.**

Vocabulary

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amphibian	cold-blooded vertebrate that breeds and develops in water, but spends time on land as an adult
aquatic	dependent upon water
arachnid	a large class of animals that includes spiders and mites
crustacean	an arthropod with a hard shell, several pairs of legs, two pairs of antennae, and eyes on stalks
dynamic	full of activity; systems that change over time
gelatinous	jellylike
hibernaculum	winter den of a hibernating animal
hibernate	dormant, sleeplike state in winter
insect	arthropod with three body segments, two antennae, three pairs of legs, and two sets of wings
mammal	warm-blooded animal that feeds milk to its young
mollusk	soft-bodied animals with or without shells, such as clams, snails, squid, or octopuses
parasite	a plant or animal that lives in or on another
predator	an animal that kills and eats other animals

Vocabulary

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reptile	a cold-blooded animal with scales, such as alligators, snakes and turtles
species	animals that resemble one another and may interbreed
undulating	wavelike movement
vernal	occurring in spring

Vocabulary Study Cards

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Cut along the horizontal lines, fold on the dashed vertical line and tape or staple. Blanks are provided to allow you or your students to add new words or phrases.

An **amphibian** is	FOLD HERE	**A cold-blooded animal, such as a frog or toad, that spends time on land, but must breed in water** is an
What does **aquatic** mean?	FOLD HERE	A plant or animal that **depends on water** is
An **arachnid** is	FOLD HERE	**A member of a large class of animals that includes spiders and mites** is called an

Vocabulary Study Cards

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Cut along the horizontal lines, fold on the dashed vertical line and tape or staple. Blanks are provided to allow you or your students to add new words or phrases.

A **dynamic** vernal pond is	FOLD HERE	**A system that is full activity, and changes over time** is
A **gelatinous** substance is	FOLD HERE	**A jellylike substance** is
A **hibernaculum** is a	FOLD HERE	**The winter den of a hibernating animal** is its

Vocabulary Study Cards

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Cut along the horizontal lines, fold on the dashed vertical line and tape or staple. Blanks are provided to allow you or your students to add new words or phrases.

To **hibernate** is to	FOLD HERE	**To assume a dormant, sleeplike state in winter** is to
An **insect** is an	FOLD HERE	**An arthropod with three pairs of legs, three body parts, two antennae, and two sets of wings** is an
Mammals are	FOLD HERE	**Warm-blooded animals that feed milk to their young** are

Vocabulary Study Cards

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Cut along the horizontal lines, fold on the dashed vertical line and tape or staple. Blanks are provided to allow you or your students to add new words or phrases.

Mollusks are	FOLD HERE	**Soft-bodied animals with or without shells, such as clams, snails, squid, or octopuses** are
A **parasite** is	FOLD HERE	**A plant or animal that lives in or on another plant or animal** is called a
A **predator** is an	FOLD HERE	An animal that kills and eats other animals is called a

Vocabulary Study Cards

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Cut along the horizontal lines, fold on the dashed vertical line and tape or staple. Blanks are provided to allow you or your students to add new words or phrases.

Reptiles are	FOLD HERE	**Cold-blooded animals with scales, such as alligators, snakes, and turtles** are
A **species** is a group of	FOLD HERE	**Animals that resemble one another and may interbreed** are a
An **undulating** motion is a	FOLD HERE	**A wavelike movement is described** as

Vocabulary Study Cards

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Cut along the horizontal lines, fold on the dashed vertical line and tape or staple. Blanks are provided to allow you or your students to add new words or phrases.

Vernal refers to	**Events that occur or are associated with Spring** are

FOLD HERE

FOLD HERE

FOLD HERE