

TEACHERS GUIDE

TO “7 NATURAL CHAMPIONS”

Multidisciplinary classroom activities based on the Young Naturalists nonfiction story in *Minnesota Conservation Volunteer*, Sept.–Oct. 2016, www.mndnr.gov/mcvmagazine

Minnesota Conservation Volunteer magazine tells stories that connect readers to wild things and wild places. Subjects include earth science, wildlife biology, botany, forestry, ecology, natural and cultural history, state parks, and outdoor life.

Education has been a priority for this magazine since its beginning in 1940. “One word—Education—sums up our objective,” wrote the editors in the first issue. Thanks to the MCV Charbonneau Education Fund, every public library and school in Minnesota receives a subscription. Please tell other educators about this resource.

Every issue now features a Young Naturalists story and an online Teachers Guide. As an educator, you may download Young Naturalist stories and reproduce or modify the Teachers Guide. The student portion of the guide includes vocabulary cards, study questions, and other materials.

Readers’ contributions keep *Minnesota Conservation Volunteer* alive. It is the only state conservation magazine to claim the distinction of being financially supported by contributions from its readers.

Find every issue online. Each story and issue is available in a searchable PDF format. Visit www.mndnr.gov/mcvmagazine and click on *past issues*.

Thank you for bringing Young Naturalists into your classroom!

“ 7 NATURAL CHAMPIONS”

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SUMMARY. Just as human Olympic athletes use their muscles to jump, run, swim, dive, and more, animals use their muscles to carry out a variety of everyday activities. “7 Natural Champions” profiles Minnesota animals that are champions of various activities. Readers learn how each animal’s unique adaptations help it survive.

SUGGESTED READING LEVELS. Third through middle school grades

MATERIALS. A copy of the “7 Natural Champions” *Minnesota Conservation Volunteer* article and study guide for each student; additional materials as needed for extension activities (see below)

PREPARATION TIME. One hour plus additional time for desired extension activities

ESTIMATED INSTRUCTION TIME. One to two hours, not including extension activities

MINNESOTA ACADEMIC STANDARDS APPLICATIONS. A copy of the “7 Natural Champions” *Minnesota Conservation Volunteer* story and study guide for each student; additional materials as needed for extension activities (see below)

LANGUAGE ARTS READING BENCHMARKS INFORMATIONAL TEXT GRADES 3–8

Key Ideas and Details, Craft and Structure, Integration of Knowledge and Ideas, Range of Reading and Level of Text Complexity

WRITING BENCHMARKS 3–8 Text Types and Purposes, Writing Process, Research to

Build and Present Knowledge, Range of Writing

READING BENCHMARKS: LITERACY IN SCIENCE AND TECHNICAL SUBJECTS 6–8

Key Ideas and Details, Craft and Structure, Integration of Knowledge and Ideas, Range of Reading and Level of Text Complexity

WRITING BENCHMARKS: LITERACY IN HISTORY/SOCIAL STUDIES, SCIENCE, AND TECHNICAL SUBJECTS 6–8

Text Types and Purposes, Writing Process: Production and Distribution of Writing, Research to Build and Present Knowledge, Range of Writing

MATHEMATICS GRADES 3, 4, 5 AND 6

3.1.2.2; 3.1.2.4; 4.1.1.5; 5.1.1.4; 6.1.3.4

SCIENCE GRADES 3, 4, 5, AND 6

Life Science

3.4.1.1.1; 4.1.2.1.1; 5.4.1.1.1; 5.4.4.1.1; 7.1.3.4.1; 7.4.2.1.2; 8.1.3.4.1

SOCIAL STUDIES GRADES 3, 4, 6, AND 8

3.3.1.1.1; 3.4.1.2.1; 4.3.1.1.2; 6.3.1.1.1; 8.3.1.1.2; 8.4.1.2.1

ARTS GRADES K–12

1. Artistic Foundations: Visual Arts
2. Artistic Process: Create or Make: Visual Arts
3. Artistic Process: Perform or Present: Visual Arts
4. Artistic Process: Respond or Critique: Visual Arts

For current, complete Minnesota Academic Standards, see www.education.state.mn.us.

PREVIEW. (1) Ask students what they know about the Olympics. Round out their knowledge using web resources (see below) as needed. (2) Discuss how all people have unique physical strengths, from long jumping to being able to wiggle their ears or crack their knuckles. Invite students to share how they like to use their muscles, and explain how muscles get stronger as we use them. (3) Explain that you will be exploring how some Minnesota animals use their muscles to help them survive. Ask students to share their observations of ways animals use their muscles.

VOCABULARY PREVIEW. You can find a copy-ready vocabulary list at the end of this guide. Feel free to modify it to fit your needs. Write the words on the board and invite students to share what they think they mean. Then provide your definition. Tell students you will be reading a story that will help them make these words their own so they can use them in the future. You might wish to use the vocabulary study cards (adapted from *Strategic Tutoring*) found at the end of the Study Questions for this Young Naturalists feature. On one half of the card is a key vocabulary word or phrase (in large letters) framed as a question or statement.

On the other half is the answer to the question or the rest of the statement. Cut along the horizontal line, fold in the middle, and tape or staple, then use as flash cards. We've included a few blanks so you or your students can add new words or phrases if you'd like.

STUDY QUESTIONS OVERVIEW. Preview the study questions with your class before you read the article.

ACTIVITY. Read "7 Natural Champions" aloud. Talk about what you learned from the article: What was most interesting? What was surprising? Complete the study questions in class, in small groups, or as an independent activity, or use them as a quiz. Complete extension activities (below) as time and interest allow.

ASSESSMENT. You may use all or part of the study guide, combined with vocabulary, as a quiz. Other assessment ideas include: (1) Ask students to list the five most interesting things they learned about the "natural champions" described in the article. (2) Have students write multiple-choice, true-false, or short-answer questions based on the article. Select the best items for a class quiz. (3) Have students create posters or presentations demonstrating what they learned.

ADAPTATIONS. Read aloud to special needs students. Abbreviate the study questions or focus on items appropriate for the students. Adapt or provide assistance with extension activities as circumstances allow.

EXTENSION ACTIVITIES. Extensions are intended for individual students, small groups, or your entire class. Young Naturalists articles provide teachers many opportunities to make connections to related topics, to allow students to follow particular interests, or to focus on specific academic standards.

- 1) Explore how muscles work. TeachEngineering's engineering-focused lesson plan called "[Move Your Muscles](#)" connects the biology and engineering of muscles.
- 2) Two animal champions we meet in this article are vertebrates (animals with backbones) and two are invertebrates (animals without backbones). Compare and contrast vertebrate muscle systems and invertebrate muscle systems.
- 3) Explore the differences between rabbits and hares. The Young Naturalists story "[Minnesota Is Hopping With Hares and Rabbits](#)" is a good place to start.
- 4) Learn more about the Sargasso Sea. Depending on their interests, invite your students to complete one of the following (or a similar project they propose themselves) and share with the class: a) Learn about and present to the class: Why and how did the Sargasso Sea form? b) Learn about and share with the class: What part has the Sargasso Sea played in the history of exploration? c) Pretend you are a creature that lives in the Sargasso Sea writing in your diary at the end of the day. Describe what your day was like and what adventures you had. d) The Sargasso Sea is shaped like a giant whorl. Draw pictures of as many other things in nature that you can think of that are shaped like whorls. e) The Sargasso

Sea is the location of the North Atlantic Garbage Patch. Learn about what this is, why it formed, why it's a problem, what people are doing about it—and how you and your classmates can help keep it from getting worse.

4) Invite students to learn about their favorite Olympic event. Can they think of an animal that would be good at it? Why? Invite them to design and draw or build a three-dimensional model of an imaginary animal that would be a superstar at that event.

5) Results of Olympic events are reported using the metric system—meters instead of yards, kilograms instead of pounds, and so on. Invite students to explore the origin of English and metric system of measurement. If time allows, introduce the concept of Lincoln-Douglas debates by staging a debate around the proposition, “The United States should adopt the metric system as its standard system of measurement.” Education World offers useful guidance for introducing debate to students as young as third grade.

WEB RESOURCES

GENERAL TEACHER AND STUDENT RESOURCES

[“Minnesota DNR Teachers’ Resources”](#)

[“DNR Kids Page”](#)

OLYMPICS

[“Olympic Summer Games”](#) (overview of the event with links to news on 2016 games)

[“Olympic History”](#) (videos on past events)

MUSCLES

[“The Magic School Bus Flexes Its Muscles”](#) (video exploring how muscles work)

ANIMAL CHAMPIONS

[“Guinness Book of World Records”](#) (records for strongest animals and lots more)

AMERICAN EEL

[“American Eel \(*Anguilla rostrata*\)”](#) (brief overview of American eel biology and ecology)

[“The Vanishing Eel”](#) (report from 1944 on the status of eels in Minnesota)

ANTS

[“Ants”](#) (Young Naturalists introduction to Minnesota ants, with Teachers Guide)

WATER BOATMAN

[“Spring to Life Ponds”](#) (Young Naturalists story in life in vernal ponds, with Teachers Guide)

[“Corixidae”](#) (video of water boatmen swimming)

OSPREY

[“Minnesota’s Wild Anglers”](#) (Young Naturalists story about animals that fish, with Teachers Guide)

[“Osprey Cam”](#) (Live video of nesting osprey at the Minnesota Landscape Arboretum)

“Return of the Osprey” (MCV article, March–April 2003)

BULLSNAKE

“Pituophis catenifer” (Minnesota DNR guide to bullsnakes)

“Pituophis catenifer: Gopher Snake” (Animal Diversity Web information page)

GOLDEN SHINER

“Notemigenus crysoleucas, Golden Shiner”

WHITE-TAILED JACKRABBIT

“White-tailed Jackrabbit” (Minnesota DNR guide to jackrabbits)

“Minnesota Is Hopping With Hares and Rabbits” (Young Naturalists story with Teachers Guide)

EMERGENT BEHAVIOR

“Everyday Examples of Emergence” (PBS Nova resources on emergent behavior in animals and more)

STUDY QUESTIONS ANSWER KEY

1. How far does an American eel swim from Minnesota to its breeding grounds in the Sargasso Sea? What would that distance be in kilometers? **1,800 miles - 2,900 kilometers**
2. Where do American eels get the energy for their marathon swim?
They get their energy from oil they made from fish, frogs, snails, and other food.
3. What makes an eel slippery? How does that help it swim? **Slimy skin with tiny scales allows water to slip smoothly past the eel as it swims.**
4. Show on the map below the approximate location of the Sargasso Sea.



5. What does a pavement ant do when it finds a piece of food? **It carries the food back to its colony.**
6. Why can pavement ants lift 10 times their weight, but humans can only lift three to

four times their weight? **Pavement ants are tinier than humans, so they don't have to use as much of their muscle power to lift their own body.**

7. In which of these places would you be most likely to find a water boatman? **d. a pond**

8. An expert osprey usually catches a fish one out of every four dives. If an osprey dives 72 times in one week, how many fish is it likely to catch? **The osprey would be likely to catch 18 fish at that rate.**

9. What parts of an osprey's head help the osprey be a good diver, and how? **It has a slit-shaped nose that closes to keep from filling with water and transparent "third eyelids" that protect its eyes.**

10. A bullsnake kills its prey by: **a. squeezing it.**

11. How does synchronized swimming help golden shiners survive? **Swimming together reduces each shiner's chances of getting eaten by a predator, since there are so many fish to choose from.**

12. What do golden shiners eat? **Golden shiners eat microscopic plants and animals they find in the water.**

13. Which is faster — a human or a white-tailed jackrabbit? Which can jump farther? **A white-tailed jackrabbit is faster than a human, but a human can jump farther than a jackrabbit.**

14. True or false: A jackrabbit is a type of rabbit. **False: A jackrabbit is a kind of rabbit relative known as a hare.**

15. Match the natural Olympian to the trait that helps it "perform" in its event:

American eel - slimy skin

pavement ant - strong neck and leg muscles

water boatman - fine hairs called setae on its legs

osprey - waterproof oil

bullsnake - many sets of vertebrae and ribs

golden shiner - following unwritten rules

white-tailed jackrabbit - huge hip muscles

Challenge: Imagine that you and a jackrabbit are in a race. You both start at the same place and at the same time. The jackrabbit runs 36 miles per hour and you run 6 miles per hour. How far ahead of you will the jackrabbit be after 5 minutes? **36 mph = 3 miles in 5 minutes. 6 mph = 0.5 mile in 5 minutes. The jackrabbit will be 1.5 miles ahead.**

MINNESOTA COMPREHENSIVE ASSESSMENTS ANSWER KEY.

1. What kind of animal is the American eel? **A. a fish**
2. Pavement ants known for **B. their strength.**
3. What does a water boatman use as oars? **A water boatman uses its hind legs and setae as oars.**
4. In a school of shiners, which fish chooses the direction? **D. none of the above**
5. What is the Sargasso Sea? **The Sargasso Sea is an expanse of seaweed floating in the north Atlantic Ocean.**

VOCABULARY LIST

emergent showing up when individual parts come together

marathon a race that covers 26.2 miles

microscopic something that can be seen only through a microscope

pavement a hard, flat surface for traveling on, such as concrete or blacktop

perpendicular at right angles

propel to push or force

schools groups of fish swimming together

setae bristlelike sets of fine hairs

streamlined shaped in a way that allows water or air to flow easily past

stride a stretched out step

synchronized happening at the same time

transparent see-through

uropygial gland a structure near a bird's tail that produces oil for grooming

waterlogged filled with water