YOUNG NATURALISTS

TEACHERS GUIDE

TO "BORN TO DIG"

Multidisciplinary classroom activities based on the Young Naturalists nonfiction story in *Minnesota Conservation Volunteer,* March-April 2023, 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 Naturalists 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. The magazine is entirely financially supported by its readers.

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

Thank you for bringing Young Naturalists into your classroom!

"Born to Dig"

Multidisciplinary classroom activities based on the Young Naturalists nonfiction story in *Minnesota Conservation Volunteer,* March-April 2023, mndnr.gov/mcvmagazine.

Summary. Chances are your students know what Groundhog Day is. But do they know what a groundhog is? They will after they devour this fascinating Young Naturalists feature. From how it makes its home to what it does in winter, students will learn about the ways of the groundhog, also known as woodchuck. Enjoy!

Suggested reading levels. Third through middle school grades

Materials. KWL organizer; optional resources include dictionaries, video viewing equipment, Internet access and other print and online resources your media specialist may provide.

Preparation time. 15–30 minutes, not including time for extension activities.

Estimated instruction time. 30–60 minutes, not including extension activities.

Minnesota academic standards applications. "Born to Dig" activities described below may be used to support some or all of the following Minnesota Department of Education standards for students in grades 3–8:

Math

Geometry and Measurement (Benchmark 7.3.2.3)
Data analysis and Probability (Standard 7.4.3)

English Language Arts (Grades 3-8)

Reading Benchmarks: Informational Text
Key Ideas and Details (Benchmarks 3.2.1.1, 3.2.2.2, 4.2.1.1, 4.2.2.2, 5.2.1.1, 5.2.2.2, 6.5.1.1, 7.5.4.4, 8.5.4.4)
Craft and Structure (Benchmarks 3.2.4.4, 3.2.5.5, 4.2.4.4., 4.2.5.5, 5.2.4.4, 6.5.4.4, 7.5.4.4, 8.5.4.4)
Integration of Knowledge and Ideas (Benchmarks 3.2.7.7, 4.2.7.7, 4.2.9.9, 5.2.7.7, 5.2.9.9)

Writing Benchmarks (Grades 3-8)

Text Types and Purpose (Benchmarks 3.6.1.1, 3.6.2.2, 4.6.1.1, 4.6.2.2, 5.6.1.1, 5.6.2.2, 6.7.1.1, 6.7.2.2, 7.7.1.1., 7.7.2.2, 8.7.1.1,8.7.2.2)
Research to Build and Present Knowledge (Benchmarks 3.6.7.7, 4.6.7.7, 5.6.7.7, 6.7.1.1, 7.7.1.1, 7.7.2.2, 8.7.1.1, 8.7.2.2)

Speaking, Viewing, Listening and Media Literacy (Grades 3-8)

Comprehension and Collaboration (Benchmarks 3.8.1.1, 4.8.1.1, 5.8.1.1, 6.9.1.1, 7.9.1.1, 8.9.1.1)

Language benchmarks Grades 3-8)

Vocabulary Acquisition and Use (Benchmarks 3.10.4.4, 4.10.4.4, 5.10.4.4, 6.11.4.4, 6.11.6.6, 7.11.4.4, 7.11.6.6, 8.11.4.4, 8.11.6.6)

Reading benchmarks Literacy in Science and Tecchnical Subjects (Grades 6-8)

Key Ideas and Details (Benchmarks 6.13.1.1, 6.13.2.2)
Craft and Structure (Benchmark 6.13.8.8)

Writing benchmarks: Literacy in Science and Technical Subjects (Grades 6-8)

Research to Build and Present Knowledge (Benchmark 6.14.7.7)

Science (*coding is based on the 2019 commissioner approved draft of MN Academic Standards in Science)

Science and Engineering Practices

1. Asking questions and defining problems
2. Developing and using models.
3. Planning and carrying out investigations
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Cross Cutting Concepts

2. Cause and effect
3. Scale, proportion, and quantity

6. Structure and function

Disciplinary Core Ideas

Life Sciences 2: Ecosystems: Interactions, energy, and dynamics
Engineering, Technology, and the Application of Science 2: Links among Engineering, Technology, Science, and Society

Social Studies

History (Standards 5.4.1.1, 6.4.1.1)

For current, complete Minnesota Academic Standards, see www.education.state.mn.us. Teachers who find other connections to standards are encouraged to contact *Minnesota Conservation Volunteer.*

For current, complete Minnesota Academic Standards, see Teachers who find other connections to standards ontact *Minnesota Conservation Volunteer*.

Preview. What do your students already know about woodchucks? Give them a chance to share their thoughts and observations. Then divide them into small groups to do a KWL activity. Give each student a copy of the organizer (see teach-nology.com/web_tools/graphic_org/kwl/) and encourage each to make notes during the group discussion. Within the groups, have students describe what they already know about woodchucks and what they wonder about them and encourage each to write down their thoughts on the organizer. As you read and discuss the article and carry out extension activities, they can then record what they learn. If you'd like to try something different, you might wish to check out the THC and KLEW frameworks.

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. Share the words with you students and invite them to guess what they think they mean. Tell them you will be reading a story that will help them understand these words so they can use them in the future! As your students encounter these vocabulary words in the story, you may want to encourage them to infer meaning using context clues, such as other words in the sentence or the story's illustrations. Students also could be encouraged to compare their inferences as to what the words mean with their earlier guesses and with the definitions from the vocabulary list.

Study questions overview. Preview the study questions with your class before you read the article. Then read the story aloud. Complete the study questions in class, in small groups, or as an independent activity, or use them as a quiz.

Assessment. You may use all or part of the study guide, combined with vocabulary, as a

quiz. Other assessment ideas include: (1) Have students write multiple-choice, true-false, or short-answer questions based on the article. Select the best items for a class quiz. (2) Have students write and present a skit that includes at least 10 facts from the story. (3) Have students draw a woodchuck in the center of a large piece of paper, then surround it with facts they learned from the story.

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. The woodchuck's connection to Groundhog Day can be a launchpad for a variety of activities. You might invite students to look into the origins of the holiday in the U.S. Use what they find as a starting point for a discussion about how traditions from different cultures become incorporated into U.S. society, and invite students to share traditions from their own family's culture of origin. Alternatively, Groundhog Day can be a starting point for an exploration into both folklore and science related to weather prediction. Older students might query the data around how often Punxsutawney Phil has predicted the arrival of spring correctly, applying statistical analysis to determine whether his success rate differs from random chance.

2. Use this story as the starting point for a compare-and-contrast exercise. Divide students into small groups. Put slips of paper with the names of other Minnesota mammals in a bag. Have each group use books from your school library or online resources to list as many ways in which their animal and the woodchuck are similar and as many ways as different, then share their results with the rest of the class. Students could also be prompted to write an informative text to explain the similarities and differences.

3. Woodchucks are among mammals that undergo true hibernation. Learn what happens in the animal's body as it enters this dormant state. Some people have proposed that experts develop ways to induce hibernation in astronauts as a way to transport them long distances over long periods of time without having to maintain their bodies at full function. Have students look into pros and cons of this approach and construct an argument for or against conducting research to explore this option. To present the results of their analysis, they could a) participate in a Lincoln-Douglas debate, b) write an opinion piece, supporting their point of view with reasons and relevant evidence, or c) be a guest on a radio call-in show or podcast hosted by a fellow student.

4. What's in a name? "Woodchuck" and "groundhog" are two names for the creature described in this story. It has a scientific name as well, and a few other common ones, including "whistle pig." Introduce the concept of etymology—the study of word origins

and evolution—and look into where, how, and why the various names originated.

5. Teach your students the tongue-twister "Woodchuck Song" and variations. Invite them to make up verses of their own!.

6. Woodchucks are helping to save human lives. Woodchucks can be infected with a virus similar to hepatitis B, which can lead to liver cancer and cirrhosis. This makes the woodchuck a helpful animal for studying viral hepatitis in humans. Encourage older students to research online why woodchucks are so valuable in medical research on hepatitis B and how studying woodchucks have advanced medical treatments. Students could be prompted to write informative texts to convey what they learned using relevant facts in an organized way.

7. Using the illustration of the woodchuck burrow on pages 48 and 49 of the story and sidewalk chalk, go outside with students to the playground or sidewalk and have students measure and draw a life-size burrow of a woodchuck. Once the burrow is drawn, students might enjoy moving through the burrow as if they were woodchucks, changing direction in the turn-around chamber and escaping danger by exiting out of the secondary entrance. If space is limited, or for older students, provide students with a desired scale factor and have them figure out the dimensions, measure, and draw the burrow.

8. The article indicates the woodchuck is a species in the mammal order Rodentia, in the family Sciuridae, and the genus Marmota (marmots). Have students create a table where the rows are Kingdom, Phylum, Class, Order, Family, Genus, and Species. For the table's columns, students can use woodchuck, squirrel, chipmunk, gopher, prairie dog, badger, and muskrat. Have students complete the table, filling in the information for each mammal to answer which of the mammals listed is the closest relative to the woodchuck.

9. Several predators of woodchucks are mentioned in the article, including foxes, coyotes, hawks, and bobcats. When alarmed, the woodchuck may make a whistling sound to drive away potential predators and let other woodchucks in the area know of the danger. Researchers in Maine determined that both chipmunks and woodchucks, which share similar predators, responded to the warning signals of each other. What might be the advantage of "eavesdropping" on warning signals (intercepting alarm calls) produced by another species? Ask students to think about the research design needed for the Maine researchers to discover that chipmunks and woodchucks intercept (respond to) the warning calls of each other. Students can check their ideas by learning more about this study: "Eavesdropping of woodchucks (Marmota monax) and eastern chipmunks (Tamias striatus) on heterospecific alarm calls," *Journal of Mammalogy* 92(3):493–499. 2011. or check a reader-friendly summary.

Web Resources

Minnesota DNR Web pages
General Teacher and Student Resources
Minnesota DNR Teachers' Resources

Web Resources:
National Geographic Kids: Groundhog
Animal Diversity Web: Woodchuck
Minnesota Seasons: Woodchuck

Related Young Naturalists articles
The Soil Is Alive!
Wild Things in Winter

Videos
Fun Facts About Groundhogs!

Study questions answer key
1. What is the difference between a woodchuck and a groundhog? **There is no difference—these are two names for the same animal.**

2. True or false: Woodchucks are a type of squirrel. **True, they are a member of the squirrel family.**

3. What three kinds of woodchucks are found in Minnesota? **The Canada woodchuck, the rufescent woodchuck, and the southern woodchuck.**

4. True or false: Minnesota's three subspecies of woodchucks are all found in the same parts of the state. **False. The Canada woodchuck lives in the north, the rufescent woodchuck lives in north-central Minnesota, and the southern woodchuck lives in the south.**

5. How can you tell a woodchuck burrow's front door from its back door? **The front door has excavated soil and rocks around it, while the back door might not.**

6. How does a woodchuck use its burrow?
a. To escape from predators
b. To hibernate
c. As a nest for its young
d. As a bathroom
e. All of the above

7. Name three adaptations that help a woodchuck dig its burrow. **Answers may vary but should include at least some of these mentioned in the article: strong muscles, short legs, leathery paws, long claws.**

8. Why is the side of a hill a good place for a woodchuck burrow? **The slope helps water drain away.**

9. What is a hibernaculum? **A burrow used just for hibernating.**

10. How does chewing on wood benefit a woodchuck?
a. It helps keep its teeth from growing too long.
b. It provides a source of wood for building its home.
c. The sound serves as a warning to predators to stay away.
d. The sound attracts mates.

11. True or false: Like beavers, woodchucks chew down trees and haul wood to build their homes. **False.**

12. Name two animals that eat woodchucks. **Answers may vary; animals mentioned in the article include foxes, coyotes, hawks, and bobcats.**

Challenge question: What fraction of the size of an adult woodchuck is a newborn woodchuck? **A woodchuck weighs about 1 ounce when it's born. A full-grown woodchuck might weigh 15 pounds. 15 pounds x 16 ounces per pound = 240 ounces. A newborn woodchuck is 1/240th the size of an adult. In other words, it would take 240 of them to balance out a grownup!**

Minnesota comprehensive assessments answer key.

1. Why won't you see groundhogs on Groundhog Day in Minnesota? **They are still hibernating underground.**

2. What does the writer mean when she says, "A woodchuck is built to dig"? **A woodchuck's body has parts that are useful for excavating holes, such as long claws, strong legs, and a head that can serve as a shovel.**

3. What is the advantage of making underground chambers closer to the surface than the main tunnel? **If the burrow floods, the chambers stay dry.**

4. What is the advantage of using an underground bathroom instead of pooping on the surface? **Poop on the surface would provide predators clues as to where they might find and attack a woodchuck.**

5. True or false: Woodchucks don't need to drink water. **True, they can get the water they need from the plants they eat and the dew covering them.**

Vocabulary list

architect – one who designs a building
frisky – actively playful
litter – a group of baby animals born at the same time
subterranean – underground
forecast – predict
nursery – a place where young are taken care of

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