

TEACHERS GUIDE

to “Bring in the Clean-Up Crew!”

Multidisciplinary classroom activities based on the Young Naturalists nonfiction story in *Minnesota Conservation Volunteer*, July-August 2025, 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 words, 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!

“Bring in the Clean-Up Crew”

Multidisciplinary classroom activities based on the Young Naturalists nonfiction story in *Minnesota Conservation Volunteer*, July-August 2025, mndnr.gov/mcvmagazine.



SUMMARY. While people have not always had favorable reactions to the turkey vulture, "Bring in the Clean-Up Crew" provides Young Naturalists with many reasons to marvel over the turkey vulture and appreciate what it does for the world around us!

SUGGESTED READING LEVELS. Third through middle school grades

MATERIALS. Young Naturalist story and student study guide; Internet access, and other print and online resources your media specialist may provide; and additional optional resources for extension activities as listed below.

PREPARATION TIME. 10–15 minutes, not including time for extension activities.

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

MINNESOTA ACADEMIC STANDARDS APPLICATIONS. “Bring in the Clean-Up Crew” 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. For more information on the Minnesota Academic Standards see the [Minnesota Department of Education Page](#).

WRITING BENCHMARKS (GRADES 3-8)

Research to Build and Present Knowledge (Benchmarks 3.6.7.7, 3.6.8.8, 4.6.7.7, 4.6.8.8, 5.6.7.7, 5.6.8.8, 6.7.7.7, 7.7.7.7, 8.7.7.7)

LANGUAGE BENCHMARKS GRADES 3-8)

Vocabulary Acquisition and Use (Benchmarks 3.10.4.4, 3.10.5.5, 3.10.6.6, 4.10.4.4, 4.10.5.5, 4.10.6.6, 5.10.4.4, 5.10.5.5, 5.10.6.6, 6.11.4.4, 6.11.5.5, 6.11.6.6, 7.11.4.4, 7.11.5.5, 7.11.6.6, 8.11.4.4, 8.11.5.5, 8.11.6.6)

READING BENCHMARKS Literacy in Science and Technical Subjects

Key Ideas and Details (Benchmarks 6.13.1.1, 6.13.2.2)

Craft and Structure (Benchmarks 6.13.4.4, 6.13.6.6)

WRITING BENCHMARKS:

Text Types and Purposes (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, 3.6.8.8, 4.6.7.7, 4.6.8.8, 5.6.7.7, 5.6.8.8, 6.7.7.7, 7.7.7.7, 8.7.7.7)

SPEAKING, VIEWING, LISTENING AND MEDIA LITERACY (GRADES 3-8)

Comprehension and Collaboration (Benchmarks 3.8.1.1, 3.8.2.2, 4.8.1.1, 4.8.2.2, 5.8.1.1, 5.8.2.2, 6.9.1.1, 6.9.2.2, 7.9.1.1, 7.9.2.2, 8.9.1.1)

Presentation of Knowledge and Ideas (Benchmarks 3.8.4.4, 4.8.4.4, 4.8.5.5, 5.8.4.4, 5.8.5.5, 6.9.4.4, 6.9.5.5, 7.9.4.4, 7.9.5.5, 8.9.4.4, 8.9.5.5)

SCIENCE

SCIENCE AND ENGINEERING PRACTICES

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning investigations
4. Analyzing and interpreting data
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

CROSS CUTTING CONCEPTS

2. Cause and effect
3. System and system models
5. Energy and matter: flows, cycles, and conservation
6. Structure and function
7. Stability and change

DISCIPLINARY CORE IDEAS

Life Sciences 1 From molecules to organisms: Structures and processes

Life Sciences 2 Ecosystems: Interactions, energy and dynamics

Life Sciences 3 Heredity: Inheritance and variation of traits

Life Sciences 4 Biological Evolution: United and Diversity

Earth and Space Sciences 3: Earth and Human Activity

Engineering, Technology, and the Application of Science 2: Links among Engineering, Technology, Science, and Society

SOCIAL STUDIES

Geography (Benchmark (4.3.4.9.1))

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 contact *Minnesota Conservation Volunteer*.

Preview. Introduce students to the Young Naturalists’ story by reading aloud the story’s title (“Bring in the Clean-Up Crew!”). Invite students to brainstorm ideas regarding the meaning of the story’s title and how that relates to the turkey vulture. Then ask students to think about the article’s subtitle (“Turkey vultures are adapted for their special way of life – feasting on dead animals”) and how that new information from the subtitle informs their thinking about the meaning of the main title. Invite ideas as to what they anticipate the story will be about or what they already know about turkey vultures. Students could also write prediction sentences and return to them after the story is read to see which predictions were confirmed.

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 story. Select the best items for a class quiz. (2) Use a “Round Robin Retell” format to assess what students learned through the story. Students sit in a circle, and each student paraphrases a key idea from the story. Each student must listen carefully to the ideas shared to avoid repeating something that was already shared. (3) After reading the story, ask students to draw sketches that illustrate key concepts, ideas, and details. Students can then share with a peer or present their drawings to the class, explaining how they made connections with the information in 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. Show students a picture of a turkey vulture. Ask students to write down words that describe the turkey vulture based on its appearance. Show students [this video](#) on New World vultures by San Diego Zoo Kids. After watching the video, again ask students to write words that describe the turkey vulture; next, have students compare their two lists of descriptors. Then ask students what the phrase “never judge a book by its cover” means; discuss its meaning and how it applies to their notions of vultures before and after learning more about them. Invite students to think about and share other situations for which this phrase may apply or be helpful advice. Students could also be prompted to think about the point of view of the author of the Young Naturalist story, and compare that with their own point of view on the turkey vulture. Students can then be prompted to write an opinion piece on turkey vultures, relating to if it is a species to be admired and valued, or a species to be disregarded, feared, or repulsed by. Students should support their point of view with reasons and information.

2. International Vulture Awareness Day is the first Saturday of September. While the population of turkey vultures is stable in Minnesota, some species of vultures across the world have experienced dramatic population declines over the last decades. Invite students to design a project to support awareness of vultures’ important role in ecosystem health and disease prevention. For example, students could make posters of threats to vulture populations or actions people can take to support vulture conservation efforts. The [IVAD Activity Guide](#) may inspire some ideas for hands-on demonstrations, or students could choose a specific vulture to investigate.

3. Most raptors have a poor sense of smell, relying on their eyesight and, in some cases, their hearing to find their prey. The turkey vulture is an exception, using a highly developed sense of smell to help them find their food. The rotting carrion gives off a gas (ethyl mercaptan), which is the same sulfurous compound added to natural gas that allows a person to smell a gas leak. Vultures follow the smell of this gas to the rotting carrion. Ask students to think about how biologists determined that the turkey vulture relies on its sense of smell, rather than sight, to locate food. Invite them to skim through the story again, looking for clues from the vulture’s anatomy. Then ask students to imagine they were a biologist and wanted to find out whether a particular vulture species or another raptor had a well-developed sense of smell. Have students design an investigation that would provide evidence toward a conclusion about that species’ sense of smell.

4. Turkey vultures have the lowest gastric pH of all vertebrates. Their stomach acid has a pH slightly above zero, which is lower (more acidic) than that of a car battery. It is so acidic that it could dissolve metal, as well as digest nearly all disease-causing organisms. These strong stomach acids come in handy for another reason! When they feel threatened or are attacked, they can vomit up this stomach acid and project it up to 10 feet. Students can learn more about pH levels through [simple experiments with red cabbage juice](#) to test the acidity of common household items and ingredients, or even their favorite [sour candy](#).

5. Turkey vultures are nature's recyclers. They are called detritivores, or animals that eat detritus (bodies of dead animals, waste products, and other things that once were part of living plants or animals). Vultures' stomach acid is so acidic that they can eat carcasses infected with all sorts of dangerous things, such as Botulinum toxin, rabies, and anthrax bacteria that would be deadly to other scavengers. In countries where vulture populations have declined, there have been increases in disease. Detritivores are different from decomposers; decomposers break down dead, organic materials, rather than eating the dead organisms like detritivores. Have students select one detritivore, other than a vulture, to research and create a multi-media presentation of their chosen species for sharing with their class. (A good starting point for their research is the Young Naturalist story, [Nature's Recyclers](#).)

6. Disease prevention is not the turkey vulture's only contribution to ecosystem and human health! Based on a [recent study](#) by researchers from Argentina, vultures contribute to a considerable reduction in carbon emissions by eating carcasses before they decompose and release greenhouse gases. Their research suggests this ecosystem service cannot easily be replaced by other species, including humans. With older students, read the study and then ask students to use evidence from the article, as well as supplemental research, to compare and evaluate competing designs, ideas, or methods for this ecosystem service.

WEB RESOURCES

MINNESOTA DNR WEB PAGES

[Birds of Minnesota](#)

[Minnesota Breeding Bird Map List](#)

GENERAL TEACHER AND STUDENT RESOURCES

[Minnesota DNR Teachers' Resources](#)

YOUNG NATURALISTS STORIES:

[How do Birds Fly?](#)

[Nature's Recyclers](#)

MINNESOTA CONSERVATION VOLUNTEER STORIES

[Turkey Vulture: A Bird with an Image Problem](#)

[Bird Hawks, Eagles and Vultures](#)

[Life and Death in Bird Art](#)

OTHER MATERIALS

[Cornell Lab Bird Lessons and Activities](#)

[Audubon Adventures](#)

STUDY QUESTIONS ANSWER KEY

1. What feature of a turkey vulture allows it to eat carrion without getting sick?

- a. **Its acidic stomach**
- b. Special proteins in its stomach
- c. Its regurgitation of carrion
- d. Its olfactory system

2. What covers the head of a turkey vulture?

- a. Plumage
- b. Porous skin
- c. **Bristles**
- d. None of the above

3. What are three identifying characteristics of the turkey vulture?

A body about as large as a bald eagle; an unfeathered, bright red head; and a wide stripe of light-colored feathers under each wing.

4. Is the neck of a human or a turkey vulture more flexible, and why is that? **Turkey vultures have more flexible necks. They have 14 cervical vertebrae, and in contrast, humans have only 7.**

5. How are turkey vultures distinct from other raptors?

Turkey vultures are distinct in that they rarely hunt live prey; their talons are also more blunt than the talons of other raptors.

6. What trait of the turkey vulture is shared with wild turkeys?

- a. Similar wingspan
- b. **Featherless head**
- c. Talons
- d. Speckled feathers

7. Why is the story title “Bring in the Clean-Up Crew” a good title for a story on turkey vultures? **Because turkey vultures are scavengers, and as scavengers, they eat carrion and help prevent remains of animals from accumulating.**

8. While from a distance a young turkey vulture looks like an adult, but up close, which of the following would help distinguish the young bird from the adult:

- a. **The young bird’s head is gray, and its beak is black.**
- b. The young bird’s head is white, similar to a bald eagle.
- c. The young bird’s feathers are gray rather than black like the adults’ feathers.
- d. The feathers of the adult’s body has more of a metallic shimmer to them.

9. Why are turkey vultures described in the story as picky eaters, even though they eat all sorts of dead animals?

Their beak isn’t strong enough to slice through thick skin or crunch large bones, so they have to be picky as they eat the carrion, looking for and eating the bits of flesh and small bones.

10. True or False. A turkey vulture prefers flying over flat landscapes, so they can have a better view as they search for carrion. **False: They prefer hilly landscapes, such as river valleys and lakeshores, because these slopes cause air to rush upward creating a “lift” that helps them get into flight and stay aloft.**

Challenge: The story mentions that when a captive turkey vulture, “Tommy,” it flew more than 2,500 miles—all the way to Guatemala – in 23 days! How many miles per hour was Tommy flying (assuming Tommy flew straight through without stopping)?

Approximately 4.5 miles/hr

Erratics – Glacial Lakes

Stalactites – Forestville/Mystery Cave

Rhyolite – Tettegouche

Pinkish quartzite – Blue Mounds

Graywacke – Jay Cooke

2-mile-long beach – Zippel Bay

MINNESOTA COMPREHENSIVE ASSESSMENTS ANSWER KEY.

1. Using clues from the story, which of the following statements best describes the author’s main purpose for writing “The Clean-Up Crew?”

- a. To help readers learn about the ways vultures are similar to and different from other raptors.
- b. To encourage readers to donate money to keep turkey vultures from going extinct in the coming years.
- c. **To encourage readers to have a positive attitude toward vultures and appreciate**

their interesting features, including their contribution to the world around us.

2. Coloration is among the many surprising features of the turkey vulture. Up close, what color are the feathers on the upper part of a turkey vulture's body?

- a. plain brown
- b. a deep 'sooty' gray
- c. speckled white, gray, black, and brown
- d. dark brown, bronze, and metallic blue**

3. What physical trait of a turkey vulture aids it in keeping itself clean despite its scavenger feeding habits?

- a. It has a long, sturdy beak for preening its feathers.
- b. The metallic blue feather coloration attracts sunlight, and the warmth disinfects its feathers.
- c. It has a featherless head.**
- d. Its curved talons help comb through its feathers after eating.

4. Where would you be likely to see a turkey vulture?

- a. In the forest during the evening, when they start to hunt their prey
- b. In the prairies and other grassy areas
- c. In cities near garbage cans or dumpsters
- d. Along roadsides**

5. Using story details, what can we infer regarding which turkey vulture in the story – Tommy or Aura – had the healthier diet? **Tommy (he can fly and Aura cannot.)**

VOCABULARY LIST

Talon – claws on a bird's toes

Scavenger – animals that eat the remains of animals that have already died

Carrion – the remains of an animal that has died and becomes food for another animal

Resident – person or animal who lives somewhere permanently or on a long-term basis

Plumage – feathers

Olfactory – relating to the sense of smell

Hide – animal skin

Carcass – the body of a dead animal

Thermals - columns of warm air that rise off areas heated by sunlight.

Aloft – airborne, or something up in the air

Broods – an adult bird sitting on or near the chicks

Regurgitate – to bring up food that has been swallowed

Fledgling – a young bird that has grown feathers and is learning to fly

Anatomy – the body structure of a living thing