Young Naturalists

Teachers Guide

Prepared by Pam Roiger, Bemidji Middle School, Bemidji

"What's Eating You?" Multidisciplinary Classroom Activities

Teachers guide for the Young Naturalists article "What's Eating You?" by Larry Weber. Published in the July–August 2001 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/biting_bugs/index.html

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.mdnr.gov/education/teachers/activities/ynstudyguides/survey.html.*

Summary

"What's Eating You?" describes six common Minnesota biting insects in a repeated pattern layout. Special features on the "anatomy of a bite" and tips to keep these pests at bay are included. Students will enjoy learning about their insect neighbors. Be aware that many science terms are included. Please note that if you are downloading articles from the Web site only the Young Naturalists article is available in PDF.

Suggested reading levels: Upper elementary through junior high

Total words: 2,396

Materials: Transparency for vocabulary, flash cards (optional), newsprint for graphic organizers

Preparation time: About two hours, not including extension activities

Estimated instructional time: Three 50-minute class periods

Minnesota Academic Standards applications: "What's Eating You?" 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 5
IV. Life Science
E. BiologicaL Populations Change Over Time
F. Flow of Matter and Energy
Grades 7, 9-12
IV. Life Science
B. Diversity of Organisms
C. Interdependence of Life
E. Biological Populations Change Over Time
F. Flow of Energy and Matter
Arts
Artistic expression: 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

(1) Elementary students may enjoy an introduction of insects generally with readings from *Joyful Noise: Poems for Two Voices* by Paul Fleischman and Eric Beddows (1988). Survey the article. Ask your students to examine the photos. (2) Use the KWL strategy (Ogle, 1986) to find out what your students already know (K) about metamorphosis, 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. 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 science or art you may ask students to review their KWL's for concepts that are specific to those disciplines. (3) A third

Preview continued

way to preview would be to use the insect classification activity at www.iit.edu/~smile/bi9601.html. If you choose to use this site, additional materials will be needed to create the insects used in becoming acquainted with classification keys. (4) Finally, the first and second paragraphs of the article provide a short preview.

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.

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 guide with your class before you read the article. Explain how the questions parallel the story. This becomes a strategy to teach your students orientation to the assignment. You may wish to read the story aloud and complete the study questions in class or in small groups. 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 also be used as a quiz.

Adaptations

Read aloud to special needs students. This study questions section is shorter and more generic than others in the Young Naturalists series so abbreviation is not needed. Apply adaptations to the vocabulary (flashcards or see list below) instead. Peer helpers, paraprofessionals or adult volunteers may lend a hand with the study questions. Cooperative groups with close supervision can also offer effective support to special needs students.

Adaptations continued

Since this article is particularly rich with scientific terminology, you may wish to try one or more of the following activities to support your special needs students .

1. Divide students into groups and assign each group an insect from the article. Have students use a T-shaped graphic organizer to sort information. For example, students write the family name on the top of the T, characteristics of males to the left of the vertical line, and characteristics of females to the right of the vertical line.
2. Use a T-shaped graphic organizer to compare one insect with another.
3. Use the article to teach study skills by showing students how the article is organized. Each insect is conveniently given a page to a page and a half in the same pattern (title, life cycle, etc.).
4. Another way to teach reading to learn is to explore the article's rich descriptive language. For example, two great idioms are present, the title and "donate to the cause" (page 34). The author has liberally used the hyphen, italics, and comparisons (tubelike, troughlike, wormlike). One way to point out these characteristics to students would be to guide them through a scavenger hunt. Write headings on poster board or newsprint (words ending with "like," idioms, words in italics, etc.). Students would skim (or scavenge) for words or phrases that fit your headings .
5. Cut and paste the vocabulary list into a matching worksheet of word groups consisting of no more than five terms and their definitions.

Assessment

The study questions can be an assessment. The insect classification Web site described in the preview can be use as an assessment. The BugQuest Web site listed in Web Resources (below) may also be used. Other assessment ideas: (1) Students may write an essay describing how a specific insect locates and bites its prey. (2) Poster presentations may illustrate how an insect's biting behavior is an adaptation to its environment. (3) Ask each student to write two or three multiple choice or short answer questions as they read the story. Select 15-20 student questions for a quiz.

Extension activities

1. Assign older students or science classes to list and define scientific words in the article, including: diptera, kingdom, phylum, class, order, family, genus, species, antennae, culicidae, proboscis, life cycle, larvae, pupa, overwinter, adult, thorax, pollinate, aquatic, tularemia, abdomen, midges, entomologist.
2. Have students diagram each insect's life cycle.
3. Use extension activities from the BugQuest Web site listed in Web Resources (below).
4. Have students write a dialogue between any two of the insects in the article modeled on Paul Fleischman's book Joyful Noise.
5. Have students diagram the a biting insect's anatomy, parts, and/or life cycle on poster board. As an alternative, have them draw the diagrams on copy paper, then copy them and let other students color and/or label the parts.
6. Have students research DEET. How does it work? What are the safety concerns?

Extension activities continued

7. If weather allows, collect insects. Examine them and classify them using the scientific classification system.
8. Have students research edible insects around the world.
9. Have students research the development of the scientific classification system.
10. Have students research a bat house, design one, and make copies of the design to share with the class.

Web resources

Scientific Classification
www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookDivers_class.html
www.arkive.org/
www.dmoz.org/Kids_and_Teens/School_Time/Science/Living_Things/Animals/
www.kidzone.ws/animals/scientific.htm

About Insects
insectzoo.msstate.edu/Students/basic.orders.html
users.erols.com/allnutt/bugquest.html
www.uky.edu/Agriculture/Entomology

Related articles

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

July–August 1996
"Damsels and Dragons"
www.dnr.state.mn.us/young_naturalists/dragons/index.html

March–April 2002
"Plants That Eat Animals"
www.dnr.state.mn.us/young_naturalists/insectivores/index.html

March–April 2004
"Special Delivery"
www.dnr.state.mn.us/young_naturalists/eggs/index.html

July–August 2004
"Buggy Sounds of Summer"
www.mndnr.gov/young_naturalists/buggysounds/index.html

July–August 2006
"Regal Fritillary (Speyeria idalia)"
www.dnr.state.mn.us/volunteer/julaug06/mp.html

References

Fleischman, Paul and Beddows, Eric. *Joyful Noise: Poems for Two Voices*. Scholastic: New York, N.Y., 1988.
Hock, M.F., Deshler, D.D. & Schumaker, J.B. *Strategic Tutoring*. Lawrence, KS: 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

"What's Eating You?" by Larry Weber *Minnesota Conservation Volunteer*, July–August 2001
www.dnr.state.mn.us/young_naturalists/biting_bugs/index.html

Name_____Period_____Date_____

1. Female mosquitoes, unlike males need _____ for their eggs. When you slap a biting mosquito, it is a _____(gender)?

2. A mosquito detects a food source through _____ and _____.

3. Male black flies bite animals. T or F

4. A female mosquito uses a proboscis to get blood. What does a female black fly use? _____

_____

5. Thinking of colors in clothing, how can you avoid being bitten by a black fly? _____

_____

6. Describe an easy way to identify horse flies. _____

_____

7. Like the house fly, the _____ originally came from Europe.

8. A no-see-um is also known as a _____.

9. Why should we thank biting midges for chocolate? _____

_____

10. Of the seven "Shoo Fly Tips," which appeals to you and why? _____

_____

_____

11. *Challenge:* What do the following terms have to do with the biting insects in this story?
(a) Tabanidae (b) Diptera (c) Muscidae (d) Culicidae (e) Ceratopogonidae (f) Simuliidae

_____

_____

_____

Study Questions Answer Key

"What's Eating You?" by Larry Weber *Minnesota Conservation Volunteer*, July–August 2001
www.dnr.state.mn.us/young_naturalists/biting_bugs/index.html

1. Female mosquitoes, unlike males need **blood** for their eggs. When you slap a biting mosquito, it is a **female** (gender).

2. A mosquito detects a food source through **heat** and **carbon dioxide**.

3. Male black flies bite animals. **F**

4. A female mosquito uses a proboscis to get blood. What does a female black fly use?

She uses four slashing teeth to cut a wound, then laps up the blood.

5. Thinking of colors in clothing, how can you avoid being bitten by a black fly? **Don't wear blue!**

6. Describe an easy way to identify horse flies. **Horse flies have iridescent green and purple eyes. (Answers may vary.)**

7. Like the house fly, the **stable** fly originally came from Europe.

8. A no-see-um is also known as a **midge**.

9. Why should we thank biting midges for chocolate? **One species pollinates cocoa trees in tropical forests**.

10. Of the seven "Shoo Fly Tips," which appeals to you and why? **Accept reasonable answers**.

Challenge: What do the following terms have to do with the biting insects in this story?

(a) Tabanidae (b) Diptera (c) Muscidae (d) Culicidae (e) Ceratopogonidae (f) Simuliidae

These are the Latin words for the order, (b) Diptera, that the biting insects in this story belong to, as well as the families for (a) horse and deer flies; (c) stable flies; (d) mosquitoes; (e) midges and (f) black flies.

Minnesota Comprehensive Assessments Practice Items

"What's Eating You?" by Larry Weber *Minnesota Conservation Volunteer*, July–August 2001
www.dnr.state.mn.us/young_naturalists/biting_bugs/index.html

Name _____Period _____Date_____

1. Why do you think the female black fly's saliva contains a chemical to partially numb the nerves of its victim?_____

_____

2. How do black flies help the environment?
   A. They keep people from going in the woods.
   B. They pollinate blueberries.
   C. They are signs of clean water.
   D. B and C

3. What deer flies have in common with horse flies and black flies?
   A. They bite humans.
   B. They only bite at night.
   C. They only bite in daylight.
   D. A and C

4. Why should you avoid insect repellents with a large amount of DEET?_____

_____

_____

5. Instead of buying a bug zapper to keep away mosquitoes you can _____ .
   A. move to Arizona
   B. build a bat house
   C. screen in your backyard
   D. play loud music

Minnesota Comprehensive Assessments Answer Key

"What's Eating You?" by Larry Weber *Minnesota Conservation Volunteer*, July–August 2001
www.dnr.state.mn.us/young_naturalists/biting_bugs/index.html

1. Why do you think the female black fly's saliva contains a chemical to partially numb the nerves of its victim? **Answers should include the idea that numbing the nerves allows the fly time to bite and take blood before being swatted.**
2. How do black flies help the environment? **D. B and C**
3. What deer flies have in common with horse flies and black flies? **D. A and C**
4. Why should you avoid insect repellents with a large amount of DEET? **DEET is a poison and should be treated with caution.**
5. Instead of buying a bug zapper to keep away mosquitoes you can **B. build a bat house.**

Vocabulary

"What's Eating You?" by Larry Weber *Minnesota Conservation Volunteer*, July–August 2001
www.dnr.state.mn.us/young_naturalists/biting_bugs/index.html

abundant more than enough; plentiful

aerial in the air

anesthetic a drug that hinders feeling

emerge come out or come forth

insect arthropod with three body segments, two antennae, three pairs of legs and two sets of wings

iridescent lustrous or brilliant quality

minute (mi-nute) very small

nourish feed for life and growth

Vocabulary Study Cards

"What's Eating You?" by Larry Weber *Minnesota Conservation Volunteer*, July–August 2001
www.dnr.state.mn.us/young_naturalists/biting_bugs/index.html

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.

When a thing is **abundant** it is	FOLD HERE	When a thing is **plentiful** it is
The word **aerial** means	FOLD HERE	Insects that fly **in the air** are
An **anesthetic** is a	FOLD HERE	A **drug that hinders feeling** is called an

Vocabulary Study Cards

"What's Eating You?" by Larry Weber *Minnesota Conservation Volunteer*, July–August 2001
www.dnr.state.mn.us/young_naturalists/biting_bugs/index.html

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 **emerge** is to	FOLD HERE	To **come out or come forth** 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
An **iridescent** surface is	FOLD HERE	A **lustrous or brilliant** surface is

Vocabulary Study Cards

"What's Eating You?" by Larry Weber *Minnesota Conservation Volunteer*, July–August 2001
www.dnr.state.mn.us/young_naturalists/biting_bugs/index.html

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 **minute** object is	A **very small** object is
To **nourish** is to	To **feed for life and growth** is to

FOLD HERE

FOLD HERE

FOLD HERE