Young Naturalists

Teachers Guide

Prepared by Jack Judkins, Department of Education, Bemidji State University

"Buggy Sounds of Summer" Multidisciplinary Classroom Activities

Teachers guide for the Young Naturalists article "Buggy Sounds of Summer," by Larry Weber. Illustrations by Taina Litwak. Published in the July–August 2004 *Conservation Volunteer*, or visit www.dnr.state.mn.us/young_naturalists/buggysounds

Young Naturalists teachers guides are provided free of charge to classroom teachers, parents, and students. This guide contains a brief summary of the articles, suggested independent reading levels, word counts, 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. 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.dnr.state.mn.us/education/teachers/activities/ynstudyguides/survey.html. Note: this guide is intended for use with the PDF version of this article.*

Summary

"Buggy Sounds of Summer" introduces readers to crickets, katydids, and cicadas, three insects that make sounds with specialized body parts. Through photos, illustrations, and text, students learn about four kinds of crickets and katydids, and five kinds of cicadas. Topics include physical appearance; habitat and diet; and how, when, and why these interesting insects produce their songs.

Suggested reading levels: Fifth through eighth grades

Total words: 1,569

Materials: Print resources from your media center on insects, poster board, colored pencils and markers, aquarium with screen top, magnifying lenses, materials for musical instruments, e.g., combs, wooden chopsticks, wood, plastic, razor knives and small saws (provide safety instruction and supervision), glue, tape, rubber bands

Preparation time: One hour (not including extensions)

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

Minnesota Academic Standards applications: "Buggy Sounds of Summer" may be applied to the following Minnesota Department of Education Academic Standards:

Language Arts

I. Reading and Literature
- A. Word Recognition, Analysis and Fluency
- B. Vocabulary Expansion
- C. Comprehension
- D. Literature

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

Minnesota History and Social Studies

II. Minnesota History Grades 4–8
- E. Industrial Era 1865–1914: Students will describe the impact of industrialization on work, home, leisure life, politics, immigration, urbanization, and changes in the physical landscape.
- G. Post–World War II to the Present: Students will identify and describe significant land use changes in Minnesota, issues related to land use, and analyze the impact of those changes and issues.

V. Geography Grades 4–8
- D. Interconnections: The student will identify examples of the changing relationships between patterns of settlement, land use and topographic features in the United States.

Science

Grade 5

IV. Life Science
- E. Biological Populations Change Over Time

Grade 7

IV. Life Science
- B. Diversity of Organisms
- C. Interdependence of Life
- E. Biological Populations Change Over Time

Arts: Artistic Expression: Music and Visual Arts

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

Preview

Late spring or early fall, when students may observe crickets, katydids, and cicadas in the wild, is a good time to read this article. Pet shops sell crickets, which are easy to care for and make interesting classroom pets. You may have access to audio recordings of calls (see www.ent.iastate.edu/list/insect_sounds.html or type "cricket sounds" into a Google search and you will be amazed at the options) that will help students become familiar with similarities and differences between species.

Ask students to preview the photos and illustrations. Then Use the **KWL** strategy (Ogle, 1986) to find out what your students already know (**K**) about ants, 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 ready-to-use **KWL** worksheet. Note: Items 8–10 require inferential thinking.

Vocabulary preview

Use the transparency-ready vocabulary review sheet to preview key terms, invite students to list terms they feel are important to understanding the article, or ask students to discover word meanings through context. Following your preview of the article, and based on your knowledge of your students' needs, you may wish to add words to the vocabulary list.

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). This is an important organizational tool for students and should be emphasized before you begin working on the study questions. 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 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, below). The study questions may also serve as a quiz.

Adaptations

Read aloud to special needs students. You may choose to abbreviate the study questions and then, if time allows, complete the remaining questions. 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 some of the study questions, combined with vocabulary, as a quiz. Other assessment ideas: (1) Students may create a two- or three-column chart comparing and contrasting species in the orders Orthoptera and Hemiptera (formerly Homoptera) described in the article. While all have some features in common, each species has evolved unique characteristics, occupies a different habitat, and makes different sounds. (2) Students may draw, color, and label a species from each group. (3) Ask students to explain in a short essay how crickets, katydids, and cicadas produce their songs. (4) Combine items (2) and (3) in a poster.

Extension activities

1. Ask students to listen for the songs of crickets, katydids, and cicadas at school and at home. Students may even make audio recordings of songs to replay in class. Observations may be noted in nature journals.
2. Keep in an aquarium crickets, katydids, and cicadas that students have captured or purchased. Students may make observations (magnifying lenses will be helpful) for a week and record their notes in a nature journal. Breakfast cereals such as Cheerios or Rice Krispies and a damp paper towel will provide adequate food and water. Wild insects may be released where they were captured after you complete your observations. Do not release purchased crickets into the environment.
3. Use this article to introduce your students to the fields of entomology and taxonomy (see Web resources, below).
4. Provide a variety of materials (wood, plastic, cardboard, combs, wooden chopsticks, etc.) and tools (with appropriate supervision) and invite students to create cricket-sound instruments. Have students experiment with making sounds. Compare student sounds with online sounds.
5. Students may wish to do more in-depth research on a particular species or group of insects. Use poster sessions to let students present visual and oral information.
6. You may wish to expand item 8 in the Study Questions into a research/debate project, during which students may examine social and economic aspects of habitat and species preservation.

Web resources

There is a wealth of information about insects online. Google searches will provide dozens of excellent sites. Here are a few examples:

Singing Insects of North America
buzz.ifas.ufl.edu
Cricket graphics
www.enchantedlearning.com
Insect classroom activities
www.insectzoo.msstate.edu
Tree of Life Web Project
tolweb.org/tree?group=Orthoptera&contgroup=Neoptera
Japanese Singing Insects
www.insects.org/ced3/japanese_sing.html

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

July–August 2001
"What's Eating You?"
www.dnr.state.mn.us/young_naturalists/biting_bugs

July–August 2000
"Minnesota Profile: Katydids"
www.dnr.state.mn.us/volunteer/julaug00/katydids.html

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

July–August 1994
"Flying Flowers"
www.dnr.state.mn.us/young_naturalists/butterflies

References

1. 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

"Buggy Sounds of Summer," by Larry Weber. Illustrations by Taina Litwak
Minnesota Conversation Volunteer, July–August 2004
www.dnr.state.mn.us/young_naturalists/buggysounds

Name _____ Period _____ Date _____

1. Why do you think only male crickets, katydids, and cicadas sing? _____

_____

_____

2. Why are insect sounds loudest in late afternoon or early evening? _____

_____

_____

3. Why do you think people have kept crickets as pets for thousands of years? _____

_____

_____

4. How many kinds of crickets and katydids are described in this article? _____

5. List one interesting fact about each:

Crickets

Type	**Fact**

Katydids

Type	**Fact**

6. Crickets and katydids belong to the insect order Orthoptera. To which order do cicadas belong? _____

7. What must young cicadas do after they hatch? Why? _____

_____

_____

8. Why is the prairie cicada disappearing? _____

_____

9. Should we be concerned if the prairie cicada disappears? Why or why not? _____

_____

_____

10. What makes periodic cicadas so unusual? _____

11. Why do you think cicadas make louder sounds than crickets or katydids? _____

_____

_____

Study Questions Answer Key

"Buggy Sounds of Summer," by Larry Weber. Illustrations by Taina Litwak
Minnesota Conversation Volunteer, July–August 2004
www.dnr.state.mn.us/young_naturalists/buggysounds

1. Why do you think only male crickets, katydids and cicadas sing? **Answers will vary, but may include that males are territorial or more aggressive than females.**

2. Why are insect sounds loudest in late afternoon or early evening? **Air temperature is warmest at that time of day. Since insects are cold-blooded, their body temperature and activity level rise with the air temperature.**

3. Why do you think people have kept crickets as pets for thousands of years? **Answers will vary, but should mention the cricket's song, association with good luck, and use as a fighting animal. Encourage students to think beyond the information provided in the article, especially if they have observed crickets in the classroom.**

4. How many kinds of crickets and katydids are described in this article? **Four of each.**

5. List one interesting fact about each: **Answers will vary, but the four kinds of crickets are spring field, fall field, ground, and tree. The katydids are shieldback, meadow, conehead, and bush.**

6. Cricket and katydids belong to the insect order Orthoptera. To which order do cicadas belong? **Hemiptera**

7. What happens to young cicadas after they hatch? **They burrow into the ground.** Why? **They need a safe to feed and grow for a long period of time.**

8. Why is the prairie cicada disappearing? **Its habitat (and food supply) is disappearing.**

9. Should we be concerned if the prairie cicada disappears? Why or why not? **Answers will vary depending upon point of view. During classroom debate, encourage respectful discussion of differing opinions.**

10. What makes periodic cicadas so unusual? **Answers will vary, but should include how long they stay underground, their huge numbers, and the fact that they are confused with locusts.**

11. Why do you think cicadas make louder sounds than crickets or katydids? **Answers may vary, but should include the importance of the tympana, which act as amplifiers.**

Minnesota Comprehensive Assessments Practice Items

"Buggy Sounds of Summer," by Larry Weber. Illustrations by Taina Litwak
Minnesota Conversation Volunteer, July–August 2004
www.dnr.state.mn.us/young_naturalists/buggysounds

Name _____Period _____Date_____

1. When you hear crickets, katydids, or cicadas singing, who is making the sounds?
   A. The females
   B. The males
   C. The babies
   D. All three

2. What is the purpose of the calls?
   A. They are a danger signal
   B. They help parents find their babies
   C. The male calls for a mate
   D. They predict the weather

3. How do crickets and katydids make their songs?
   A. They whistle through their mouths.
   B. They fly swiftly through calm air.
   C. They rub their legs together.
   D. They rub the sharp ridge of one wing against the rough part of the other wing.

4. The harp and mirror parts of a cricket's wings serve what purpose?
   A. They help the cricket locate food.
   B. They protect the cricket's babies.
   C. They broadcast the cricket's song.
   D. They reflect sunlight.

5. The purpose of this article is to:
   A. Entertain
   B. Persuade
   C. Inform

Minnesota Comprehensive Assessments Practice Items Answer Key

"Buggy Sounds of Summer," by Larry Weber. Illustrations by Taina Litwak
Minnesota Conversation Volunteer, July–August 2004
www.dnr.state.mn.us/young_naturalists/buggysounds

1. When you hear crickets, katydids, or cicadas singing, who is making the sounds? **B. The males.**

2. What is the purpose of the calls? **C. The male calls for a mate.**

3. How do crickets and katydids make their songs? **D. They rub the sharp ridge of one wing against the rough part of the other wing.**

4. The harp and mirror parts of a cricket's wings serve what purpose? **C. They broadcast the cricket's song.**

5. The purpose of this article is to: **C. Inform.**

Vocabulary

"Buggy Sounds of Summer," by Larry Weber. Illustrations by Taina Litwak
Minnesota Conservation Volunteer, July–August 2004
www.dnr.state.mn.us/young_naturalists/buggysounds

amplify	to make louder
Hemiptera	insect order to which cicadas belong (formerly Homoptera)
Orthoptera	insect order to which crickets and katydids belong
predators	animals that eat other animals
pulsate	beat in a rhythm, as in a heartbeat
species	animals that can mate with one another
stridulation	singing style of crickets and katydids
synchronize	to make two things happen at the same time