“Damsels and Dragons”
Multidisciplinary Classroom Activities

Teachers guide for the Young Naturalists article “Damsels and Dragons,” by Janice Welsh. Published in the July–August 1996 Volunteer, or visit www.dnr.state.mn.us/young_naturalists/dragons/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 to suit user needs. Users are encouraged to provide feedback through an online survey at www.mdnr.gov/education/teachers/activities/ynstudyguides/survey.html.

“Damsels and Dragons” describes the physical and behavioral characteristics of dragonflies and damsels. Eighty-six species of dragonflies occur throughout Minnesota. Students also learn about a dragonfly’s life cycle as it metamorphoses from egg to adult, and about a Minnesota Department of Natural Resources naturalist, Mark Carroll, who has done research on dragonflies.

Summary

Upper intermediate through high school

Total words: 773

Materials: Copies of article, study guide, drawing paper, colored pencils, pencils, glue, string, scissors

Preparation time: About one hour

Estimated instructional time: Two to three 50-minute class periods for preview, study guide, and assessment

www.mndnr.gov/young_naturalists/dragons/index.html
“Damsels and Dragons” may be applied to the following Minnesota Department of Education Academic standards:

**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 4

**IV. Life Science**
- B. Diversity of Organisms
- Grade 5

**IV. Life Science**
- E. Biological populations change over time
- Grades 7, 9-12

**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**

Ask students to compare and contrast dragonflies with helicopters (see attached illustration). Why are dragonflies called the helicopters of the insect world? Do your students think dragonflies inspired engineers to create the helicopter? Why or why not? Copy the illustrations and make a transparency for use during preview. Use the KWL strategy (Ogle, 1986) to find out what your students already know (K) about odonata, 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. You might begin by asking small groups to brainstorm as many facts/ideas as possible. Then combine the groups for a class list. 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 for concepts that are specific to those disciplines. An appropriate activity for older students involves building categories of knowledge that may be added to as students read the article and complete the study guide. Assign categories to small groups. Allow a few minutes for group discussion and then discuss as a class. Record the categories on posters and display. Add information as it emerges.
See the copy-ready vocabulary list included in this guide. You may wish to modify 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 section below).

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 students 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. Also, preview the study questions for unfamiliar terms.

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.

Questions in the study guide parallel the story. That is, the answer to the first question occurs first in the story, followed by the second, and so on. Read the study guide with your class before reading the story. Depending on the reading ability of the class, teachers might wish to read the story aloud and complete the study guide as a class or in small groups. Inclusion teachers might wish to provide direct support as their students read the story and complete the study guide. The study guide may also be used as a quiz. Note that items 2, 5, 11, and 13 and the Challenge require varying degrees of critical/analytical thinking.

Read aloud to special needs students. Abbreviate the study guide or highlight priority items to be completed first. For example, highlight questions 1, 3, 6, 8, 11, and 13. Special needs students may try these first and then, if time allows, try the others. Peer helpers, teaching assistants, or adult volunteers may lend a hand with the study guide. Study guide and/or extension activities may also be done in small groups.

You may use all or part of the study guide, combined with vocabulary, as a quiz. Other assessment ideas include: (1) Students may write an essay describing the dragonfly/damselfly life cycle, body structure, flight characteristics, or habitat. (2) Ask students to explain how wetland preservation/restoration affects dragonfly and damselfly survival. (3) Students may draw and label dragonfly/damselfly body parts. (4) Poster presentations may illustrate/describe the life cycle of dragonflies and damselflies and relationships with other organisms.

1. Students draw, color, and cut out dragonflies and damselflies that may then be suspended from the ceiling. There are a number of excellent sites on the Internet regarding dragonflies and damselflies. See the North American Dragonfly Migration Project for high-quality pictures of several species.
Extension activities continued

2. Spring is a great time to study dragonflies, especially if your school is near a wetland. Have your class conduct a dragonfly watch during May and June. Identify the species and date of first observation. Note other flying insects present when dragonflies are observed.

3. Contact the Minnesota Odonata Survey Project (www.mndragonfly.org). Your students can get involved in this DNR-supported project, which can be extended over future grades.


4. Discuss why groups all over the world are working to preserve dragonfly and damselfly habitat and to protect dragonflies.

Web resources

Insects
members.aol.com/YESbugs/bugclub.html
www.bugbios.com/entophiles/index.html

Dragonflies
tolweb.org/tree?group=Odonata&contgroup=Pterygota

Related articles

Many related Minnesota Conservation Volunteer articles are available online at www.mndnr.gov/volunteer/articles/index.html, including:

May–June 2008
“Spring to Life Ponds”
www.dnr.state.mn.us/young_naturalists/ponds/index.html

March–April 2008
“The Magic of Morphing”
www.dnr.state.mn.us/young_naturalists/magic_morphing/index.html

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

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

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

References


Study Questions

Teachers guide for the Young Naturalists article “Damsels and Dragons,” by Janice Welsh. Published in the July–August 1996 Volunteer, or visit www.dnr.state.mn.us/youn gnaturalists/dragons/index.html.

Name___________________________________________Period________Date_________________

1. Compare the flight patterns of dragonflies and helicopters. How are they similar? ________________
___________________________________________________________________________________
___________________________________________________________________________________

2. Imagine you are describing a damselfly or dragonfly to someone who has never seen one. Include its physical appearance as well as its behavior. _________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

3. Explain why a dragonfly is classified as an insect. __________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

4. Draw a resting dragonfly and damselfly. Show how they are different. Label the legs, wings, head, thorax and abdomen. (Draw on attached sheet or on back of study guide.)

5. Where is the skeleton of a dragonfly? _______________________________ How does its skeleton differ from yours? _________________________________
___________________________________________________________________________________

6. How many species of dragonflies and damselflies are there around the world? ________________

7. What is a dragonfly called immediately after it hatches from its egg? ___________________________
___________________________________________________________________________________

8. The transformation from egg to adult is called what? ___________________________
___________________________________________________________________________________
9. How long can this transformation take for some dragonflies? _______________________________

10. What do growing dragonflies eat? ____________________________________________________
___________________________________________________________________________________

11. Why should we work to preserve dragonfly habitat? ________________________________
___________________________________________________________________________________
___________________________________________________________________________________

12. What do entomologists study? ______________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

13. Who is Mark Carroll and how did his interests as a child lead to his present occupation? __________
___________________________________________________________________________________

14. Think about your own interests. Might they prepare you for a future career? ________________
    How and in what field? _______________________________________________________________
___________________________________________________________________________________

Challenge: Why do you suppose dragonflies have survived for 250 million years? ________________
___________________________________________________________________________________
___________________________________________________________________________________
Study Questions Answer Key

1. Compare the flight patterns of dragonflies and helicopters. How are they similar? **Both can hover and fly in all directions.**

2. Imagine you are describing a damselfly or dragonfly to someone who has never seen one. Include its physical appearance as well as its behavior. **Answers will vary, and may include that dragonflies and damselflies are insects with six legs, three body parts, and two pairs of wings; that they look and fly like helicopters; that they eat other flying insects.**

3. Explain why a dragonfly is classified as an insect. **It has three body parts, six legs, two pairs of wings, and two antennae.**

4. Draw a resting dragonfly and damselfly. Show how they are different. Label the legs, wings, head, thorax, and abdomen. (Draw on attached sheet or on back of study guide.) **Dragonflies rest with wings out (perpendicular to body). Damselflies rest with wings folded (in line with body).**

5. Where is the skeleton of a dragonfly? **On the outside of its body** How does its skeleton differ from yours? **Answers will vary. Students may observe that dragonflies lack bones, and that they shed their exoskeletons during metamorphosis.**

6. How many species of dragonflies and damselflies are there around the world? **5,500** How many in Minnesota? **86**

7. What is a dragonfly called immediately after it hatches from its egg? **Nymph**

8. The transformation from egg to adult is called what? **Metamorphosis**

9. How long can this transformation take for some dragonflies? **Two years**

10. What do growing dragonflies eat? **Tadpoles and minnows**

11. Why should we work to preserve dragonfly habitat? **Dragonflies and damselflies help control mosquito populations. Other animals eat dragonflies and damselflies.**

12. What do entomologists study? **Insects**

13. Who is Mark Carroll and how did his interests as a child lead to his present occupation? **He is a DNR naturalist. He is still interested in insects.**

14. Think about your own interests. Might they prepare you for a future career? How and in what field? **Answers will vary.**

Challenge: Why do you suppose dragonflies have survived for 250 million years? **Answers may include that dragonflies have been well adapted to changing climate and habitat; that they have been able to find a variety of insect prey.**
Name ___________________________________________ Period _______ Date_________________

1. Mark Carroll’s mother made him
   A. stop collecting bugs.
   B. a butterfly net.
   C. an old shoe box.
   D. promise not to get his feet wet.

2. Some other names for dragonflies include
   A. damsel flies and biddies.
   B. deer flies and darners.
   C. horse stingers and bee hawks.
   D. darning needles and bombers.

3. Dragonflies form a _______________ with their legs in order to _________________________.
   A. basket; catch food
   B. basket; land on water
   C. web; perch on reeds
   D. point; dive into water

4. Explain how a dragonfly nymph’s lower jaw works. _______________________________________
   ______________________________________________________________________________________
   ______________________________________________________________________________________

5. A dragonfly’s top speed is _______ miles per hour.
   A. 75
   B. 55
   C. 35
   D. 15

MINNESOTA CONSERVATION VOLUNTEER
1. Mark Carroll’s mother made him **B. a butterfly net**.

2. Some other names for dragonflies include **C. horse stingers and bee hawks**.

3. Dragonflies form a **A. basket** with their legs in order to **catch food**.

4. Explain how a dragonfly nymph’s lower jaw works. **The nymph’s lower unhinges and slides out like a drawer so it can eat big prey like tadpoles or minnows**.

5. A dragonfly’s top speed is **C. 35 miles per hour**.
**Vocabulary**

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<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindmost or third insect body part</td>
</tr>
<tr>
<td>aquatic</td>
<td>living in or near water</td>
</tr>
<tr>
<td>antennae</td>
<td>pair of long, slender feelers on an insect’s head</td>
</tr>
<tr>
<td>biology</td>
<td>study of living things and life processes</td>
</tr>
<tr>
<td>exoskeleton</td>
<td>tough, protective outer body covering</td>
</tr>
<tr>
<td>hover</td>
<td>fly in place as if suspended</td>
</tr>
<tr>
<td>metamorphosis</td>
<td>a complete change in form</td>
</tr>
<tr>
<td>molt</td>
<td>sheds skin or feathers</td>
</tr>
<tr>
<td>naturalist</td>
<td>person who studies plants and animals in their natural surroundings</td>
</tr>
<tr>
<td>nymph</td>
<td>young, incompletely developed insect</td>
</tr>
<tr>
<td>species</td>
<td>similar animals that are able to breed with one another</td>
</tr>
<tr>
<td>thorax</td>
<td>chest; middle of three insect body parts</td>
</tr>
</tbody>
</table>
Vocabulary Study Cards
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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.

An insect’s **abdomen** is its

An insect’s **hindmost or third body part** is its

What does **aquatic** mean?

A plant or animal that **depends on water** is

An insect’s **antennae** are

A pair of long, slender **feelers on its head** are an insect’s
Vocabulary Study Cards

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The science of biology is the study of living things and life processes.

An exoskeleton is a tough, protective outer body covering.

To hover means to fly in place as if suspended.
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- A dragonfly’s **metamorphosis** is
- When a dragonfly undergoes a complete change in form it is called a

- When a damselfly **molts**
- When a damselfly sheds its skin it

- A **naturalist** is a person who
- A person who studies plants and animals in their natural surroundings is called a
Vocabulary Study Cards

Teachers guide for the Young Naturalists article “A Most Amazing River” by Mary Hoff. Published in the July–August 2008 Volunteer, or visit www.mndnr.gov/young_naturalists/mississippi

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.

An insect **nymph** is

A young or incompletely developed insect is a

A **species** is a group of

Similar animals that are able to breed with one another are a

An insect’s **thorax** is its

An insect’s chest, or middle of three body parts is its
**Vocabulary Study Cards**

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