

JUNE 2006

National Wildlife Federation®  
**Ranger  
Rick**®

EDUCATOR'S  
**GUIDE**



This guide is designed to complement the June 2006 issue of National Wildlife Federation's *Ranger Rick*® magazine.





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***It is available online, free of charge, in PDF format. To access the guide, go to  
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## Introduction

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### Welcome to the *Ranger Rick Educator's Guide!*

This guide provides you with educational activities to bring **National Wildlife Federation's** *Ranger Rick*® magazine alive in the classroom and beyond. Using *Ranger Rick* feature articles as an entry point, this guide engages students ages 7-12 in exploring the natural world to build literacy, critical and creative thinking skills, and understanding across the disciplines. Activities are correlated with the National Education Standards for science and language arts, and are designed to assist you in meeting required curriculum objectives.

### Can we have class outside today?

Find out how you can say "Yes!" at [www.nwf.org/backyardwildlifehabitat](http://www.nwf.org/backyardwildlifehabitat). The outdoor environment offers excellent opportunities for active, hands-on, interdisciplinary learning. You can enhance the learning experience by creating your own habitat site. Revitalize an entire schoolyard, a garden, or even a rooftop, windowsill, or balcony by creating an outdoor classroom and sanctuary for birds, butterflies, and other wildlife.

### How To Use This Guide

Each section of the guide is matched with a specific *Ranger Rick* feature. After you read through the magazine, choose the stories and activities that complement your curriculum and that will interest your students. Sections include:

- **Learning Links.** A summary of concepts presented in the article.
- **Discussion Questions and Writing Prompts.** Entry points to engage students in discussion or writing to develop literacy and thinking skills.
- **Resources.** Web sites and books where you can find further information.
- **Activity Ideas.** Quick investigations and extended projects to complement article topics.
- **Student Pages.** Ready-to-copy activity sheets for students.

We have also provided a **Family Fun** activities page for you to copy and send home with students.

**Subscribe to *Ranger Rick!***  
**Special rate classroom subscriptions available.**  
Details at [www.nwf.org/rangerrick](http://www.nwf.org/rangerrick)

# Hum, Hum, Hummers!

pages 4-11



## Learning Links:

**Hummingbirds are amazing! Whether they are acrobatically zipping to and fro, or hovering in mid-air drinking nectar from a flower, or attaching a tiny nest to a hanging leaf with spider silk, they are sure to wow readers with their incredible adaptations.**

## DISCUSSION QUESTIONS & WRITING PROMPTS

### Pre-Reading Questions:

- Have you ever seen a hummingbird?
- How are they different from other birds?

### Comprehension Check:

- How big is the smallest hummingbird? The biggest?
- Describe three special things about the way hummingbirds fly.
- What do hummingbirds eat?
- How does a hummingbird get nectar from inside a flower?
- What animals eat hummingbirds? How do they catch these speedy birds?

### Critical and Creative Thinking Connections:

- Why do you think they're called hummingbirds?
- How does a hummingbird use its amazing flying abilities?
- Many hummingbirds are very small. What might be some advantages of being small? What might be some disadvantages?
- Of more than 330 species of hummingbirds, only 16 breed in the United States and only one of those in the eastern U.S. (the ruby-throated hummingbird). Many more species live in tropical areas. Why do you think that is?
- A hummingbird's bill is just the right shape to get the food it needs. Describe the shapes of some other birds' bills. How might these other shapes help them get food?

## RESOURCES

***It's a Hummingbird's Life*** by Irene Kelly (Holiday House, 2003). A lively look at a year in the life of a ruby-throated hummingbird.

***Hummingbirds: A Beginner's Guide*** by Laurel Aziz (Firefly Books, 2002). Consult this thorough reference to find answers to all your questions about hummers.

***Hummingbird Nest*** by Kristine O'Connell George (Harcourt Children's Books, 2004). This journal of poems, illuminated by Barry Moser's watercolor paintings, records the story of an Anna's hummingbird that nested on the author's patio.

**[learner.org/jnorth/tm/humm/About.html](http://learner.org/jnorth/tm/humm/About.html)** Learn about and track the migration of hummingbirds at Journey North. Follow the links to explore more facts about the characteristics, life cycle, ecology, and conservation of hummingbirds.

**[hummingbirds.net](http://hummingbirds.net)** Here's a wealth of information about hummers of all kinds.

## ACTIVITY IDEAS

### Hummers by the Numbers

The numbers associated with hummingbirds are impressive, and they lend themselves to some interesting math calculations. Have students complete the **Hummers by the Numbers** student page to find out more about the large sums generated by these little birds. In the last step, students create their own problems; have them exchange with classmates and solve.

**TIME:**

**30 Minutes**

**MATERIALS:**

**[Hummers by the Numbers student page](#)**

### Look and Listen

Do hummingbirds live in or pass through your neighborhood? If so, plant a hummingbird garden or put up a feeder to attract them. When a bird arrives, have students seek out answers to questions such as: What species is it? Is it a male or female? Does it perch while it drinks or does it hover in midair? Can you hear it “humming”? Does more than one hummer ever visit at a time? If so, how do they interact? For more hummingbird observation activities, visit [rubythroat.org/ObservationMain.html](http://rubythroat.org/ObservationMain.html) and [globe.gov/fsl/html/templ.cgi?hum\\_materials&lang=en&nav=1](http://globe.gov/fsl/html/templ.cgi?hum_materials&lang=en&nav=1).

**TIME:**

**30 Minutes**

**MATERIALS:**

**Hummingbird feeder  
or flowers  
Field guide to birds**

### Flower Power

Where does a flower store its nectar? Do all flowers have nectar? Do brightly-colored flowers have more nectar than less colorful ones? Invite students to investigate these questions by comparing and dissecting a variety of flowers. Encourage them to use magnifying glasses to look closely at the flowers and ask them to note similarities and differences between the structures of different kinds of flowers. Discuss the fact that hummingbirds pollinate certain flowers, while others are pollinated by bees, flies, butterflies, moths, bats, or wind—and that the size, shape, color, and smell of the flower all work together to attract the appropriate pollinator. For information about pollination, see [smithsonianeducation.org/educators/lesson\\_plans/partners\\_in\\_pollination](http://smithsonianeducation.org/educators/lesson_plans/partners_in_pollination). Extend the fun by having students design their own hummingbird flowers, as described in the lesson plan at [kidsgardening.com/growingideas/PROJECTS/mar04/design.html](http://kidsgardening.com/growingideas/PROJECTS/mar04/design.html).

**TIME:**

**30 Minutes**

**MATERIALS:**

**A variety of flowers  
Magnifying glasses**

### Hummingbird Art

Hummingbirds, with their graceful curves and glittering colors, are perfect subjects for an art project. Have students take a close look at the photos in the *Ranger Rick* story and then make their own hummers to hang. Cut out cardboard silhouettes or shape three-dimensional birds from polymer clay (the kind that can be baked in a home oven). To add the characteristic hummingbird shimmer, decorate the birds with iridescent paints, glitter, or sequins. (That shimmer is called *iridescence*. Unlike colors that come from pigments, the iridescent colors of a hummingbird's feathers change as light strikes them from different angles. Soap bubbles, oil slicks, and certain butterfly wings produce a whole rainbow of dazzling colors in the same way.) Add a loop of string or wire and hang students' creations on high.

**TIME:**

**45 Minutes**

**MATERIALS:**

**Cardboard or  
polymer clay  
Scissors  
Craft paints  
Glitter or sequins**

## HUMMERS BY THE NUMBERS

In the box are some average numbers for hummingbirds.  
Use them to answer the questions below.

Flowers visited in one day - 1,000

Laps with tongue - 13 per second

Heart beats, at rest - 250 per minute

Weight of one ruby-throated hummingbird - 3 grams

Heart beats, flying - 1,220 per minute

Average speed - 35 miles per hour

Wing flaps - 80 per second

### 1. Wanna Race?

Find a clock or watch with a second hand. Count how many times you can flap your "wings" in 10 seconds. \_\_\_\_\_

How many times would a hummingbird flap in 10 seconds? \_\_\_\_\_

How many more times did the hummingbird flap than you? \_\_\_\_\_

### 2. Gotta Have Heart.

Find your pulse on your wrist or neck. How many times does your heart beat in one minute? \_\_\_\_\_

Now run in place for one minute and then count your pulse again. \_\_\_\_\_

How much faster is your heart rate when you have been exercising? \_\_\_\_\_

How much faster does a flying hummingbird's heart beat than a resting hummingbird's heart? \_\_\_\_\_

### 3. Penny for Your Thoughts.

A penny weighs about 3 grams. If you had \$1 in pennies on one side of a scale, how many ruby-throated hummingbirds would need to stand on the other side to balance it? \_\_\_\_\_

### 4. Fast Food.

A hummingbird hovers at a flower for 20 seconds eating nectar. How many times does it lap with its tongue in this time? \_\_\_\_\_

If all its flower visits for a whole day average out to 20 seconds each, how many times does it lap with its tongue in one day? \_\_\_\_\_

### 5. Your Turn!

On the back of this page, write your own question using numbers from the box.

# We're Herp Hounds

pages 16-19

2



## Learning Links:

**Tracking down study subjects is an important part of herpetology, the study of reptiles and amphibians. The young “herp hounds” in this story are happy to help their herpetologist dad and to share some of what they’ve learned with readers.**

## DISCUSSION QUESTIONS & WRITING PROMPTS

### Pre-Reading Questions:

- Does someone in your family have a job that you think is interesting? What is it? Why are you interested?
- Have you ever helped this person with his or her work? If so, did you like it? If not, would you like to help? Why or why not?

### Comprehension Check:

- What are “herps”? What is someone who studies them called?
- Why are the three brothers in this story called “Herp Hounds”?
- What are three things the Herp Hounds do to help their dad?
- Describe some of the equipment that the Herp Hounds use.

- Why do they want to catch herps? What do they do with them?

### Critical and Creative Thinking Connections:

- Have you seen any of the animals in this story? Are there any you’ve never heard of? Which ones would you like to learn more about?
- Which animals in this story are reptiles? Which are amphibians? What are the similarities and differences between these two groups of animals?
- Why do you think some people don’t like herps? How do you feel about them?
- What do you think happened to make Gareth so muddy in the first photo in the story? How do you think he felt? How would you feel?
- Would you like to go on one of the Herp Hounds’ adventures? Why or why not?

## RESOURCES

***Peterson First Guide to Reptiles and Amphibians*** by Roger Conant (Houghton Mifflin, 1999). A good pocket guide for outdoor exploration, this book describes the habits and habitats of a variety of reptiles and amphibians.

***Snakes, Salamanders, and Lizards*** by Diane Burns (Northword Press, 1995). A take-along guide to herps that invites exploration and observation of nearby nature.

[nationalzoo.si.edu/Animals/ReptilesAmphibians/ForKids/default.cfm](http://nationalzoo.si.edu/Animals/ReptilesAmphibians/ForKids/default.cfm) Reptile and amphibian facts and fun at the Smithsonian’s National Zoo Web site.

[www.dnr.state.wi.us/org/caer/ce/eeek/job/index.htm](http://www.dnr.state.wi.us/org/caer/ce/eeek/job/index.htm) Kids can explore a variety of wildlife and environmental careers, including herpetology, at this Web site.

## ACTIVITY IDEAS

### Herp Search

Did you like reading about the Herp Hounds? Why not go herp hounding yourselves! Visit a nearby pond, stream, or wetland and try to spot some herps—or even just hear them. (Frogs make a lot of noise in spring and early summer!) Try to visit your place regularly and see what changes each time. Do different frogs call at different times of the day or year? Are turtles basking on sunny days? Can you find any egg masses from frogs, toads, or salamanders? If so, how long does it take for the eggs to hatch and the tadpoles to grow legs and become adults? What do they become? Have students keep a journal of their observations and, when they have questions, encourage them to look up answers and share them with the group.

**TIME:****60 Minutes****MATERIALS:****Herp field guides**

### Herpetolo-Who?

Contact a local nature center or college/university and inquire about herpetology experts in your community. If you can track one down, invite this person to take your group on a herp excursion, or at least come talk about his or her work and share some stories—and perhaps even some live herps—from the field. Encourage students to prepare questions ahead of time for your visitor.

**TIME:****60 Minutes****PREPARATION:****Arrange a visit with a herpetologist**

### Science in the Family

The Herp Hounds developed an early interest in herps by helping their dad. Also in this issue of *Ranger Rick*, you read about a firefly researcher whose sons help her collect study subjects (page 25) and a boy who helped his dad construct a real dream boat (page 39). Invite students to use these examples to spark discussion about their own experiences. Has anyone been involved with a parent's or another adult's career, hobby, or interest in a similar way? If they could have a family member be a scientist of any sort, what kind would they choose? Why? What would they like to do to help? Have students write about their experiences, real or imagined.

**TIME:****30 Minutes****MATERIALS:****Paper and pencils**

### Learn a Herp

Invite students to look through reptile and amphibian field guides and “adopt” a local herp to investigate. Start by brainstorming a list of questions to guide their research, such as: What habitat does this species live in? What does it do in the winter? What does it eat? What eats it? How does it reproduce? What are the stages in its life cycle? What threats does it face? Then have each student share what she or he learns by creating a PowerPoint® presentation or a poster to share with the group. Schedule the presentations or poster sessions as a “Herpetology Conference” and invite question-and-answer periods and discussion among the students “experts.”

**TIME:****Several 60-Minute sessions****MATERIALS:****Library/Internet access to research herps  
Computers with PowerPoint®**

# Go with the Glow

pages 22-26

3



## Learning Links:

**Fireflies delight people of all ages with their light shows on warm summer nights. Equally fascinating are the behind-the-scenes details of the beetles' life cycle: They begin life as predatory glowworms and, as adults, use their lights as signals for finding mates.**

## DISCUSSION QUESTIONS & WRITING PROMPTS

### Pre-Reading Questions:

- Have you ever seen fireflies lighting up at night? If so, when? Where?
- What do you think the lights are for?

### Comprehension Check:

- What is a firefly's light called? What makes it glow?
- Why do fireflies flash their lights?
- In a firefly "conversation," what does the male do? What does the female do?
- Describe the deadly trick that some female fireflies play.
- How does a firefly begin its life?
- What hatches out of a firefly egg? What does it look like? What does it eat?

### Critical and Creative Thinking Connections:

- Do you see the two pairs of wings on the firefly in the photo on pages 22-23? This is a feature all beetles share. Can you name any other kinds of beetles?
- What do you think are some advantages of lights as a way to communicate? (*very visible to potential mates*) What might be some disadvantages? (*very visible to predators!*)
- Signaling with lights is only one of many ways animals communicate. What are some other ways that animals talk to each other? (Hint: Think about all five senses.)
- What question are Dr. Lewis and her team currently investigating about fireflies? How do you think they might set up an experiment to study this?

## RESOURCES

**Fireflies** by Sylvia Johnson (Lerner, 1986). This excellent reference on fireflies has stood the test of time.

**Fireflies** by Ann Heinrichs (Compass Point Books, 2004). More information about fireflies around the world, their life cycle, and how and why they light up.

**Fireflies!** by Julie Brinckloe (Macmillan, 1985). In this story, a young boy catches fireflies on a summer evening and then makes the difficult choice to let them go.

[iris.biosci.ohio-state.edu/projects/FFiles](http://iris.biosci.ohio-state.edu/projects/FFiles) The Ohio State University insect collection's "Firefly Files" include facts, photos, resources, and fun activities—all about fireflies.

[sdnhm.org/kids/lightsalive](http://sdnhm.org/kids/lightsalive) Fireflies aren't the only living things that light up using bioluminescence. The San Diego Natural History Museum has a great Web site about all kinds of living lights.

## ACTIVITY IDEAS

### Illuminated Poetry

Read the poem "A Light Dance" on page 27. Have students read in pairs, alternating "she says" and "he says" lines. Add extra drama by dimming the lights and giving each reader a flashlight. For another firefly poem in two voices, check out "Fireflies" in Paul Fleischman's *Joyful Noise: Poems for Two Voices* (Harper Trophy, 1988). Then have students compose their own firefly poems. Write the final drafts on black construction paper with glow-in-the-dark crayons or paint. Then display them in a dark room!

#### TIME:

**30-60 Minutes**

#### MATERIALS:

**Flashlights (optional)**  
**Black construction paper**  
**Glow-in-the-dark crayons or paint**

### Flashy Friends

Gather your group in the evening to observe fireflies firsthand. Better yet, organize a campout and make firefly-watching one of the night's highlights. (June 24 is the second annual Great American Backyard Campout. Check out [backyardcampout.org](http://backyardcampout.org) for details.) Take along some flashlights and containers and see page 26 for activity ideas. Can you identify the flash patterns and determine how many different species are flashing? If you join the conversation by imitating the pattern with a flashlight, can you get a response? Catch some fireflies: What do they look like up close? Hand out copies of the [Firefly Friends student page](#) on clipboards to guide the investigation and encourage students to record their observations.

#### TIME:

**45 Minutes**

#### MATERIALS:

**Penlights or small flashlights**  
**Clear containers**  
**Clipboards**  
**Pencils**  
[Firefly Friends student page](#)

### Say What?

Try this "enlightening" game to learn more about firefly communication. Make several sets of cue cards with flash patterns written out in a Morse code-like series of dots and dashes (— · —). You'll need at least two cards for each pattern. Give each player a cue card and a flashlight. Players then spread out and begin flashing the pattern on their card. Their goal is to pair up with a "mate" who is flashing the same signal. Continue the round until everyone is paired up. Then swap cards and play again. Add more rules to introduce other aspects of firefly biology. For instance, girls could stand in one place while boys "fly" around looking for a match. Or pass out an odd number of cards, so that not everyone finds a mate each round. This game would work best in an open field at dusk. If that's not possible, play indoors with the shades drawn and lights off, or use a creative alternative to the light signal, such as a whistle or clapping pattern, a word phrase, or a hand signal.

#### TIME:

**30 Minutes**

#### MATERIALS:

**For each student:**  
**Cue card with a flash pattern**  
**Flashlight**

### Living Lights

Light produced by living things is called *bioluminescence*, and fireflies aren't the only ones that use it. Have students investigate some of the other light-producing organisms, from plankton, fish, and jellies to the glowing fungus called foxfire. The Web site [sdnhm.org/kids/lightsalive](http://sdnhm.org/kids/lightsalive) will "shed some light" on the whos, the whys, and the hows of bioluminescence.

#### TIME:

**30 Minutes**

#### MATERIALS:

**Internet access**

# Student Page

## FIREFLY FRIENDS

Head outside on a summer evening and be a firefly scientist!

Date _____	Time _____	Place _____
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From where you are standing, how many fireflies can you see flashing right now?  
\_\_\_\_\_ Just a few    \_\_\_\_\_ Around 10    \_\_\_\_\_ Around 20    \_\_\_\_\_ 30 or more

How many different flash patterns do you see? Draw each one in the boxes below. Then draw a line connecting the box to the place where you saw that flash pattern.


*High in the air*

*In the trees*

*Near the ground*

*In the bushes*

*On the ground*



What happens if you flash one of these patterns with a flashlight?

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Catch a firefly and draw it below. Describe what you see.

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# Little Red

pages 34-37

4



## Learning Links:

**Ah, the mystique of being a little-known, rarely-seen (and very appealing) animal! Little Red the red panda won't have any trouble engaging students in learning about his habits and habitat, and in the process he will open their eyes to an animal and a part of the world that's likely unfamiliar to them.**

## DISCUSSION QUESTIONS & WRITING PROMPTS

### Pre-Reading Questions:

- When you hear the word *panda*, what do you think of?
- Have you ever heard of a red panda?

### Comprehension Check:

- Where do red pandas live?
- Where do they spend their days?
- What do they do at night?
- Why do they have to be careful down on the ground?
- Are red pandas and giant pandas relatives?

### Critical and Creative Thinking Connections:

- Red pandas are called by many names. What would you call them?
- What do red pandas and giant pandas have in common? How are they different?
- Why do you think Little Red sleeps during the day and eats at night?
- Why are red pandas in trouble? What are people doing to help them? Can you think of any other ways people could help?

## RESOURCES

[globio.org/glossopedia/redpanda](http://globio.org/glossopedia/redpanda) In Globio's Glossopedia entry for the red panda, you'll find lots more facts about this fascinating animal.

[bristolzoo.org.uk/learning/animals/mammals/red-panda](http://bristolzoo.org.uk/learning/animals/mammals/red-panda) Fun facts about red pandas from the Bristol Zoo in England.

## ACTIVITY IDEAS

### Red Panda Research

Invite students to check out [globio.org/glossopedia/redpanda](http://globio.org/glossopedia/redpanda) to find out lots more about red pandas. Be sure to click on the photo and video links in the lower left corner to see more images and watch red pandas in action. Send students hunting for answers to questions such as: How did red pandas come to be called *panda*? Why do you think giant pandas share part of their name? What word describes an animal that's most active at dawn and dusk? What special adaptations do red pandas have for eating bamboo? Do they eat anything else? Where are red panda cubs born? At what age do they start eating bamboo? How long do they stay with their mother? Why don't people know exactly how many red pandas are left? What's the greatest threat to their survival?

**TIME:**

**30 Minutes**

**MATERIALS:**

**Internet access**

### Adventures of Little Red

After students read "Little Red," engage them in one of these writing projects:

- The photos in "Little Red" fit together to tell a story about a red panda's life. Look at the photos and then write the story in your own words. Choose a perspective: third person, first person as if you were watching from nearby, or Little Red's own.
- Continue this story by writing about more of Little Red's adventures.
- Imagine that Little Red meets Ranger Rick Raccoon and friends. Write a comic about what happens.

**TIME:**

**30 Minutes**

**MATERIALS:**

**Paper and pencils**

### Panda Mask

Provide an assortment of art supplies and invite students to make a red panda mask using one of the photos in *Ranger Rick* as a model. A simple strategy is to use a paper plate as a base, cut holes for eyes, glue on construction paper cutouts for ears and other features, and then paint or color the mask. For a more involved project, make the masks from paper mache or plaster casts and paint them when they're dry. Then have students act out scenes from Little Red's life or write their own red panda drama.

**TIME:**

**60 Minutes or more**

**MATERIALS:**

**Craft supplies (see options in activity)**

### Beautiful Bamboo

Bamboo is important as panda food—and much more! People eat it too, and also use this woody grass to build houses, furniture, fences, flooring, and even bridges and bicycles! Does bamboo grow near you? If so, take students on a walk to experience a bamboo grove, or bring some in to see and touch. Learn more about bamboo at [globio.org/zh/glossopedia/bamboo/index.htm](http://globio.org/zh/glossopedia/bamboo/index.htm). Your investigation will turn up fascinating facts about other animals that eat it, how many kinds there are, where it grows, how tall it grows, how strong it is, and how fast it grows (very, very fast!). This could lead to an interesting discussion about renewable versus nonrenewable resources (bamboo is celebrated as a sustainable, environmentally-friendly material) but also the problems with introducing species to places where they aren't native (bamboo grows so vigorously that people trying to remove it where it isn't wanted have a major battle on their hands!).

**TIME:**

**30 Minutes**

**MATERIALS:**

**Internet access  
Bamboo plants or items made from bamboo (optional)**



# Family Fun!

*Dear Parent or Guardian,  
Your child is reading Ranger Rick magazine in class. Each month, amazing photos, feature articles, and activities bring nature, wildlife, and conservation to life. Extend the learning and fun at home with these engaging family activities. Enjoy!*

## **HAVE A HUMMER SUMMER**

Invite hummingbirds to visit this summer. All you need is their favorite food—nectar or sugar water. They get “fuel” for flight, and you get a close-up view of some amazing aviators! Find out how in “Calling All Hummers” on [page 11](#).

## **LIGHTS ALIVE**

If you live in firefly country, now's the time to watch them lighting up the night. Read all about their lives in “Go with the Glow” on [pages 22-25](#) in *Ranger Rick*. Then try the activities on [page 26](#) for a close-up experience with the story's shining stars.

## **PHOTO OPPORTUNITY**

You saw the winning entries in the last *Ranger Rick* photo contest on [page 31](#). The deadline for the next contest is coming up. It's the perfect time to get outside and line up your best shot! Details at [nwf.org/rangerrick](http://nwf.org/rangerrick).

## **FLOAT YOUR OWN BOAT**

Read about the amazing ice cream stick boat in “What Floats This Boat?” on [pages 38-39](#). Then try making your own model boat from ice cream sticks or craft sticks. Take it to the nearest pond or stream and see if it floats!

## **WE WANT YOU—FOR THE CAMPOUT CREW!**

Summer's here, and that means it's time for the second annual Great American Backyard Campout! S'mores, stargazing, sleeping in a tent . . . don't miss the fun on June 24, 2006. In your yard or at a nearby campground, you can join a nationwide celebration of family fun under the stars. Find out more and register your campout at [backyardcampout.org](http://backyardcampout.org).

*For more interactive family fun, be sure to visit [www.nwf.org/kids](http://www.nwf.org/kids)*

# NATIONAL EDUCATION STANDARDS

*Hummers* 1  
*Herp Hounds* 2  
*Fireflies* 3  
*Red Pandas* 4

		NATIONAL SCIENCE EDUCATION STANDARDS			
		1	2	3	4
<b>Science as Inquiry</b>					
K-8	Abilities necessary to do scientific inquiry				
K-8	Understandings about scientific inquiry				
<b>Life Science</b>					
K-4	Characteristics of organisms				
K-4	Life cycles of organisms				
K-4	Organisms and environments				
5-8	Structure and function in living systems				
5-8	Reproduction and heredity				
5-8	Regulation and behavior				
5-8	Populations and ecosystems				
5-8	Diversity and adaptations of organisms				
<b>Earth &amp; Space Science</b>					
K-4	Properties of Earth materials				
K-4	Objects in the sky				
K-4	Changes in earth and sky				
5-8	Structure of the Earth system				
5-8	Earth's history				
5-8	Earth in the solar system				
<b>Science &amp; Technology</b>					
K-4	Abilities to distinguish between natural and human objects				
K-8	Abilities of technological design				
K-8	Understanding about science and technology				
<b>Science in Personal and Social Perspectives</b>					
K-8	Personal health				
K-4	Characteristics and changes in populations				
K-4	Types of resources				
K-4	Changes in environments				
K-4	Science and technology in local challenges				
5-8	Populations, resources, and environments				
5-8	Natural Hazards				
5-8	Risks and benefits				
5-8	Science and technology in society				
<b>History and Nature of Science</b>					
K-8	Science as a human endeavor				
5-8	Nature of science				
5-8	History of science				
<b>ENGLISH LANGUAGE ARTS</b>					
1	Reading for perspective				
2	Understanding the human experience				
3	Evaluation strategies				
4	Communications skills				
5	Communications strategies				
6	Applying knowledge				
7	Evaluating data				
8	Developing research skills				
9	Understanding and respecting diversity				
10	Developing English competency				
11	Participating in literary communities				
12	Using language for oneself				