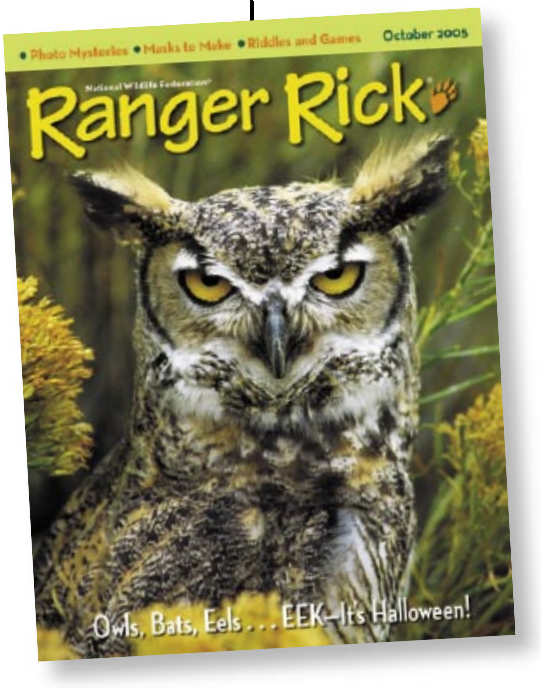
OCTOBER 2005

National Wildlife Federation®
Ranger Rick®

EDUCATOR'S GUIDE



This guide is designed to complement the October 2005 issue of National Wildlife Federation's *Ranger Rick*® magazine.

NATIONAL WILDLIFE FEDERATION®
www.nwf.org®

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Introduction

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 Science Education Standards 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/schoolyardhabitats**. The outdoor environment offers excellent opportunities for active, hands-on, interdisciplinary learning. You can enhance the learning experience by creating your own ***Schoolyard Habitats*** or ***Backyard Wildlife 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. Each section includes:

- ***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.

1 Hannah Hamster's A-maze-ing World

pages 14-19

Learning Links:

Students learn about hamster habits and discover why scientists are studying captive hamsters to learn how to better protect hamsters in the wild.

DISCUSSION QUESTIONS & WRITING PROMPTS

Pre-Reading Questions:

- Do you or any of your friends have pet hamsters? What makes them good pets?
- What do you know about hamsters? What else would you like to learn?
- Did you know that some hamsters live in the wild?

Comprehension Check:

- In the wild, what kind of habitat do hamsters live in? How is a pet hamster's home similar to and different from hamsters' habitat in the wild?
- What do hamsters eat?
- What are some of the responsibilities of a hamster mom?
- Why is Professor Rolf Gatterman, the scientist in this article, studying hamsters?
- Explain how he uses each of the following tools to study hamsters: 1) the maze; 2) treats; 3) I.D. markers.

Critical and Creative Thinking Connections:

- Use the information in this article to calculate how many babies a hamster mom could have in a year.
- Why might grown-up hamsters fight when they have to share space?
- How do you think scientists could use what they learn from studying captive hamsters to help wild hamster populations recover?
- Beside hamsters, what other pets also live in the wild? (*For example, turtles, snakes, rats, mice, gerbils, rabbits, birds*). How are pets different from wild animals?
- To study hamsters, Professor Gatterman built tunnels that are similar to wild hamsters' burrows. Why do you think it is important for the homes to be similar?
- Imagine you wanted to study another kind of animal in this way. Choose an animal and describe how you would build it a home similar to its habitat in the wild.

RESOURCES

www.bbc.co.uk/cbbc/wild/pets/hamster.shtml A fun Web page about hamsters from the BBC's Web site for children.

My Pet Hamster by Anne Rockwell (Harper Trophy, 2002). A simple narrative from a child's perspective with lots of facts about hamsters woven into the story.

Hamsters by Susan Meredith (Usborne, 1999). Focuses on care of pet hamsters but also includes an overview of types of hamsters and their habits.

10 Minutes Till Bedtime by Peggy Rathman (G.P. Putnam's Sons, 1998). A very silly book about a visiting hamster family – just for fun!

ACTIVITY IDEAS

A-Maze-ing Hamsters

In this story, Hannah Hamster navigated her way through a maze for food treats. Have students use the article and other resources to learn more about wild hamsters. What do they eat? What dangers do they face? Then have students draw their own mazes to show what they discovered. They can draw a hamster in its burrow at the beginning of the maze, and add pictures or words to indicate hazards wild hamsters might encounter along the way and food they like to eat at the end. Then have students trade mazes with a partner and find a safe path for the hamster from the beginning to the end of the maze.

TIME:
30 Minutes
MATERIALS:
Books/Internet to research hamsters
Paper & pencils

Hamster Chat

As a class, brainstorm ideas about what life is like for a pet hamster, a hamster in the wild, and a hamster like Hannah that is part of a scientific study. Record students' ideas. Then have them select from the ideas generated to write a two- or three-way conversation in which the animals compare and contrast their lives.

TIME:
30 Minutes
MATERIALS:
Chalkboard or flip chart
Paper/pencils

Where in the World?

Hannah Hamster explains that golden hamsters are found in the deserts of the Middle East and Eastern Europe. The golden hamsters people keep as pets are descended from a population in Syria. Have students locate Syria on a map or globe. Other kinds of hamsters inhabit other areas; students could investigate these species to find out where they live in the wild. (A good resource is www.petwebsite.com/hamsters/hamster_species.htm.) Have students locate these places as well. They could also find out what each species looks like, what kind of habitat it lives in, and other details about its life history.

TIME:
30 Minutes
MATERIALS:
Books/Internet to research hamsters
Map or globe

Pet Science

After students read the article, discuss the research questions and techniques Professor Gatterman uses to study hamsters. Ask students to brainstorm additional questions they have about hamsters. Then discuss how they might answer some of these questions using observation or experiments. Have small groups of students choose a simple question and design an experiment they could carry out with a pet hamster. (Emphasize, of course, that their experiments shouldn't harm the hamster!) For instance, students might offer different types of food and record the hamster's preferences, or keep track of when and how much a hamster sleeps, exercises, or engages in other activities. If a pet hamster is available, students could set up their experiments, record the results, and present what they discover to the rest of the group.

TIME:
1 Hour or more
MATERIALS:
Pet hamster (optional)
Other supplies as needed (optional)

2 Elf Owl 911

pages 22-25

Learning Links:

A fallen saguaro branch sets in motion a rescue maneuver and a rare glimpse into the lives of cactus-nesting elf owls.

DISCUSSION QUESTIONS & WRITING PROMPTS

Pre-Reading Questions:

- If you were a bird, how would you decide where to build your nest? What criteria would you use to choose the best place?
- If you lived in a desert with no tall trees to nest in, what might you choose instead?

Comprehension Check:

- Where does this story take place?
- For elf owls, what are the advantages and disadvantages of nesting in a saguaro?
- Why did the authors want to prop up the saguaro arm after it fell?
- Why couldn't they just pick it up? How did they solve this problem?
- The authors stated that they were "thrilled to learn that our extreme home makeover worked!" How did they know they'd been successful?

Critical and Creative Thinking Connections:

- How is a saguaro cactus in the desert like a tree in a forest? How is it different?
- The authors explained that when they returned to check on the nest, the adult owl gave them a look "maybe to say 'thanks,' but more likely to say, 'Please leave us alone!'" Why might they have interpreted the owl's look this way?
- When something happens in nature like a cactus arm breaking, it can be hard to know whether people should step in and help. Do you think the authors did the right thing? Why or why not?
- Can you think of any other solutions to the elf owls' problem?

RESOURCES

www.nps.gov/sagu/ Browse the Web site of Arizona's Saguaro National Park for more information about the saguaro cactus and its habitat.

http://helios.bto.ed.ac.uk/bto/desbiome/saguaro.htm Find more information and some nice photos of saguaros.

www.owling.com/Elf_nh.htm Detailed information about elf owls from Owling.com.

The Book of North American Owls by Helen Sattler (Clarion, 1998). A comprehensive overview of owl biology plus a glossary of the 21 North American owl species.

Cactus Hotel by Brenda Guiberson (Henry Holt, 1993). A picture book about the life cycle of the saguaro and the desert animals that live in, on, and near it.

Desert Giant: The World of the Saguaro Cactus by Barbara Bash (Sierra Club Books, 1989). A vivid look at the saguaro and the animals and people that depend on it.

ACTIVITY IDEAS

Pictures + Words = Story

The photos play an essential part in this story of the elf owl rescue. Ask students first to look just at the pictures and predict what happens in the story. Then have them read the article. How much of their prediction was correct? What additional details did the text provide? What if the story were all words with no photos? What details would be missing then? Divide students into small groups to discuss the contributions of both pictures and words in creating a story. Groups could also consider the photographers' technique, discussing how the Berquists could have captured these images and what makes each shot effective. Students may also enjoy discussing which photos are their favorites and why.

TIME:
15 Minutes
MATERIALS:
None

Elf Owl Essentials

Challenge students to sleuth out more information about elf owls. How big are these smallest of North American owls? What do they eat? What eats them? Are they more active during the day or at night? Do they always build their nests in saguaros? Students can use the suggested resources to answer these questions. Then have them organize the information they discover using the format of the "Quick Bits" story on bats on pages 26-27. Starting with a drawing or photo of an elf owl in the center of the page, they can add paragraphs about the owl's adaptations, behavior, and habitat.

TIME:
30 Minutes
MATERIALS:
Books/Internet to research owls
Sheet of 11x17 paper for each student

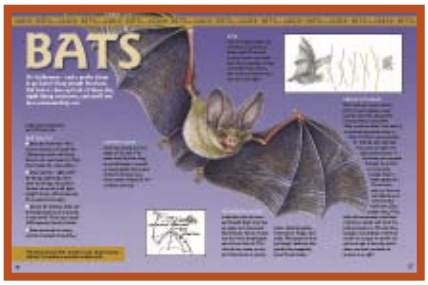
Real Life Drama

The story of the elf owls' misfortune and rescue lends itself to retelling. Students could create a skit, a puppet show, or a picture book to tell the tale. They should start by carefully planning their approach. How can they best depict the story's events in the medium they've chosen? From whose perspective will they tell the story? What information and materials will they need to successfully complete the project? After they translate the story into their own words and create a polished final product, arrange for students to share their creations with classmates, family members, or a group of younger students.

TIME:
1 Hour
MATERIALS:
Dramatic props
Art supplies

Quick Bits: Bats

pages 26-28



Learning Links:

Bats are in the limelight at Halloween, but they offer an excellent opportunity to study predator-prey relationships, adaptations for flight, and navigation by echolocation any time of the year.

DISCUSSION QUESTIONS & WRITING PROMPTS

Pre-Reading Questions:

- What are some words you would use to describe a bat?
- What do you know about bats? What questions do you have about them?
- Why do you think bats are associated with Halloween?

Comprehension Check:

- What do bats have in common with all other mammals?
- What makes bats different from other mammals?
- How are bats' bodies built for flying?
- Why is the expression "blind as a bat" a myth?
- How do insect-eating bats navigate and hunt in the dark?

Critical and Creative Thinking Connections:

- Use what you learned in this article to compare bats with birds. What are the similarities and differences between these two flying animals?
- A number of myths cause people to fear or dislike bats. But myths are untrue! For example, you already learned that "blind as a bat" is a myth. Bats aren't blind, they won't get caught in your hair, and they only rarely carry the disease rabies – no more often than other mammals. Brainstorm some ideas about how you could help more people find out the truth about bats.
- Like bats, some kinds of whales and dolphins also use echolocation to navigate and hunt. Why do you think echolocation helps them? How is their habitat similar to and different from bats' habitat?
- Imagine you could navigate by echolocation for one night. Where would you go? What would you do with this incredible ability?

RESOURCES

www.batcon.org Bat Conservation International's Web site is a definitive bat resource.

www.cccoe.k12.ca.us/bats/ Here's a wealth of information about bats, designed especially for educators.

http://members.aol.com/bats4kids Kids can explore lots of bat information here.

Amazing Bats by Seymour Simon (Seastar, 2005). A clear and engaging book of bat facts illustrated with photographs of many bat species.

Outside and Inside Bats by Sandra Markle (Walker Books, 2004). Describes the physical characteristics and behavior of bats in an engaging, photo-filled format.

Bat Loves the Night by Nicola Davies (Candlewick, 2001). A beautifully illustrated tale about a pipistrelle bat, with additional facts in smaller type on each page.

ACTIVITY IDEAS

Map-A-Bat

TIME:
30 Minutes
MATERIALS:
Map-a-Bat Student Page

Copy the **Map-a-Bat Student Page** for each student. Have them make a concept map to organize the information they learned about bats in this article. If students are not familiar with concept maps, explain that they will start from the bat in the center of the page and connect words or brief phrases summarizing key points in the reading. See the example above.

Bat and Moth Game

TIME:
15 Minutes
MATERIALS:
Blindfold

This classic game is a fun way to learn about echolocation. Outdoors, gather your group in a circle. One blindfolded student – the bat – stands in the center of the circle. (Students will point out that bats aren't blind; explain that this is just to simulate darkness!) Send three or four more students into the circle to be moths. The bat is hungry and hunting for a moth meal. Each time she calls out "Bat!" the moths must respond "Moth!" This simulates the bat's squeak bouncing off the moth. The bat tries to tag the moths, calling out as often as she wants to locate them. The moths can move around, crouch down, or duck out of the way, but cannot go outside the circle. Students around the outside of the circle can be the trees; they put their hands up and act as bumpers to keep the bat and moths contained. As moths are tagged, they join the outer circle. Play additional rounds and rotate roles. After playing this game, take your group out at dusk (or encourage them to go out with their families) and see if you can spot bats beginning their night of hunting.

Build A Bat House

TIME:
Several days or weeks
MATERIALS:
Variable depending on your approach

Many bat species are declining due to habitat loss. People can help bats by putting up bat houses. Inviting bats to live nearby is good for bats, and it helps us too: a single bat can eat hundreds of insects in one night! You and your students can learn more about bat houses at Bat Conservation International's Bat House Project www.batcon.org/bhra and then embark on a project to put up houses in your area. This can be a terrific interdisciplinary educational endeavor! It might involve:

- Writing letters to the principal or community leaders asking for permission to install bat houses at school or around town.
- Creating an informational pamphlet, exhibit, or event that explains why bats are beneficial and addresses concerns about them.
- Researching bat house designs, calculating dimensions, and compiling lists of materials; or comparison shopping for finished houses.
- Asking local businesses to donate materials, or fundraising to buy materials.
- Inviting skilled woodworkers (parents, grandparents) to help with construction.
- Building and painting the bat houses, then installing and monitoring them.

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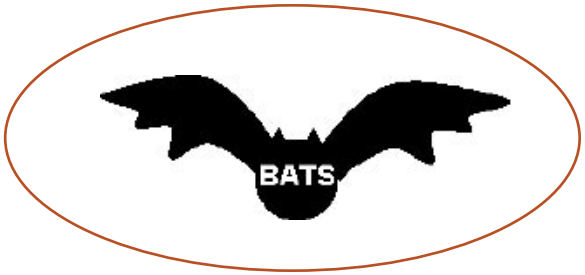
MAP-A-BAT

Make a concept map using the information you learned about bats in *Ranger Rick*.



bat art by Kate Hofmann

4 Eeeek—Eels!

pages 32-37

Learning Links:

No need to squeal – eels are fascinating creatures! Students find out about eels and eel-like fish and their surprising strategies for eating and avoiding being eaten.

DISCUSSION QUESTIONS & WRITING PROMPTS

Pre-Reading Questions:

- What do you know about eels? What questions do you have about them?
- Have you heard the expression "slippery as an eel"? What do you think it means?

Comprehension Check:

- Why do many of the eels in these pictures have their mouths open?
- How many different kinds of eels are there?
- When a snake eel and a shrimp cooperate, each one benefits. How?
- Where do garden eels get their name? How do they protect themselves?
- Which part of the name *electric eel* is misleading?
- How do electric eels use electricity?
- Why are lampreys unpopular?
- Name three interesting facts about American eels.

Critical and Creative Thinking Connections:

- In Europe, China, and Japan, eel meat is a delicacy—but Americans rarely eat it. Would you eat eel? Why or why not?
- Electric eels hunt using very powerful electric jolts. They also use low-level electric currents to navigate in murky water and communicate with one another. Compare this strategy with bats' use of echolocation. How are these two unusual sensory abilities similar and different?
- In this article, you met eels with all kinds of wild ways to get food and protect themselves from being food for something else. Compare and contrast the different strategies these eel species use. Can you think of other animals that use similar strategies?

RESOURCES

www.enchantedlearning.com/subjects/fish/printouts/eels.shtml Information about and diagrams of several eel species.

Think of an Eel by Karen Wallace (Candlewick, 1993). An attractive book about the life cycle of an eel that travels from the Sargasso Sea to a freshwater river and back.

Those Amazing Eels by Cheryl Mays Halton (Dillon Press, 1990). A detailed reference book about eels.

ACTIVITY IDEAS

Eels Real and Unreal

Copy the **Eels Student Page** for each student. After they use what they learned in "Eeeeek – Eels!" to fill in the chart, have them invent an imaginary eel species of their own, being sure to give the eel strategies to hunt for food and to protect itself from becoming food for something else.

TIME:
15 Minutes
MATERIALS:
Eels Student Page

Eel Family Album

In this article, students meet some of the many eels and eel-like fish in the world. Explore eel diversity and species relationships further by creating an "Eel Family Album." Each student could create his or her own individual album or one page for a class book. Have them draw or attach a picture of each eel and then add a caption about the species. Captions could be funny or strictly scientific; in either case they should communicate real information such as where the eel lives or how it behaves. For example, the caption for a garden eel might read, "Great Aunt Gloria in her element – always happiest in the middle of a crowd." And beside a picture of an electric eel, "Postcard from the Amazon from a distant second cousin. Never did know his real name – everyone just called him Zap."

TIME:
30 Minutes
MATERIALS:
Paper
Art supplies

Tales from the Road

Eels that are born in the ocean, live most of their lives in freshwater rivers, and then return to the sea to mate are called *catadromous*. Salmon and other *anadromous* fish have the opposite life cycle; they migrate from freshwater rivers to the ocean and back. Investigate the two life cycles, comparing changes each animal's body undergoes, advantages it gains by migrating, and hazards it faces. Then ask students to write a conversation between a young salmon and a young eel that pass each other in a river and exchange advice about the journey, and a follow-up conversation years later when the two meet again.

TIME:
45 minutes
MATERIALS:
Books/Internet to research eels and anadromous fish

Lamprey Control: Pro and Con

When lampreys entered the Great Lakes through shipping channels in the 1920s, they caused a significant decline in fish populations. People have been trying to remove this unwelcome invader ever since. A combination of chemical lampricides to kill larval lampreys, physical barriers, and other methods are used to control the population. However, the lampricide (believed to have minimal effects on other living things) doesn't work everywhere, and scientists fear that lampreys may eventually become resistant to it. Have students investigate lamprey control at the Web sites of Wisconsin Sea Grant www.seagrant.wisc.edu/greatlakesfish/sealamprey.html and the Great Lakes Fishery Commission www.glfc.org/lampcon.php. Form small groups to discuss the problem of this invasive species and formulate opinions about what should be done. Alternatively, stage a debate in which students represent different positions (such as a commercial fisher, a recreational lake user, an ecologist, an animal rights activist, as well as a lamprey and its host fish).

TIME:
1 hour
MATERIALS:
Books/Internet to research lamprey control

National Wildlife Federation® Ranger Rick® Student Page

THE REAL EEL

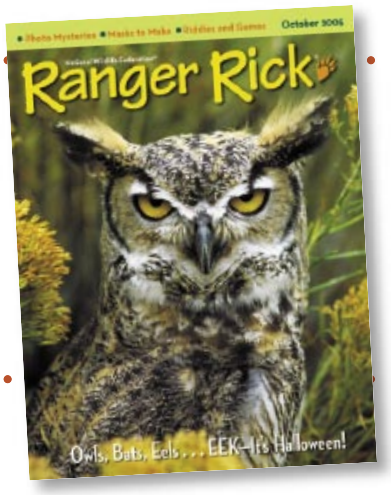
Choose three eels (or eel-like fish) from the *Ranger Rick* article "Eeeek – Eels!" Add their names to the chart. Then fill in the chart for each eel.

Name of Eel	What It Eats	How it Gets Food

EEL UN-REAL

Now use what you've learned about eels to invent an imaginary eel. Describe what it eats and how it gets its food. Then explain how it protects itself so it won't be eaten by another animal. On the back of this page, draw your eel.

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!

FACE VALUE

Go on a walk to look for faces and shapes in nature around your neighborhood. Take pictures of what you discover, or take friends out to find out if they see the same thing you noticed. Look for *The Butterfly Alphabet* by Kjell Sandved or ABCs *Naturally* by Lynne Diebel and Jann Kalscheur for inspiration to find letters in nature too! ("Look Again!" pages 4-9).

CREATURES OF THE NIGHT

Halloween is the perfect time to celebrate creatures of the night: spiders, bats, moths, owls, and other nocturnal animals. Check out a library book to learn more about who's who in the night world. Head outside for a walk in the moonlight; leave your flashlights behind while you look and listen for nighttime animals. Read the two "Night Poems" on page 21 and then turn your whole family into night creatures by making masks like the ones in "Be a Creature" on pages 10-11!

BUILD A BAT ABODE

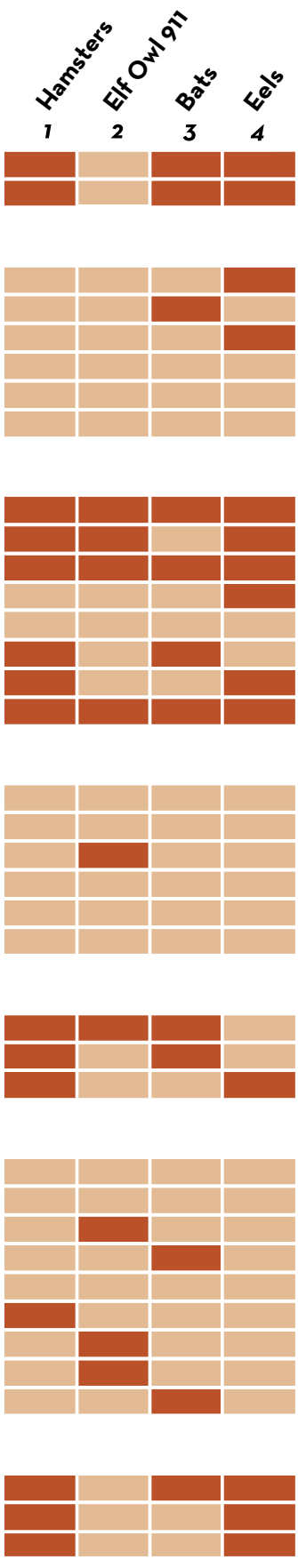
After you read "Quick Bits: Bats" on pages 26-27, step outside at dusk and look for bats flying in your neighborhood. Can you spot any? If so (or if you've seen them in warmer weather), consider putting up a bat house to encourage these helpful bug-hungry animals to move in nearby next spring! Building a bat house is a fun family project. Find out how from Bat Conservation International at **www.batcon.org/bhra** or **www.nwf.org/backyardwildlifehabitat/bathouse.cfm**.

EEL TALES

You may have noticed that eels don't have a starring role in many fairy tales, fables, books, or films. But just look at those expressive faces in "Eeeek – Eels!" (pages 32-37). Imagine the drama of a colony of a thousand swaying garden eels, or the shock value of a single electric eel! Now do your part to give eels their well-deserved fame: make up a bedtime story starring eels as the main characters.

***For more interactive family fun, be sure to visit* www.nwf.org/kids**

NATIONAL SCIENCE EDUCATION STANDARDS



Science as Inquiry

K-8	Abilities necessary to do scientific inquiry
K-8	Understandings about scientific inquiry

Physical Science

K-4	Properties of objects and materials
K-4	Position and motion of objects
K-4	Light, heat, electricity, and magnetism
5-8	Properties and changes of properties in matter
5-8	Motions and forces
5-8	Transfer of energy

Life Science

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

Earth & Space Science

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

Science & Technology

K-4	Abilities to distinguish between natural and human objects
K-8	Abilities of technological design
K-8	Understanding about science and technology

Science in Personal and Social Perspectives

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

History and Nature of Science

K-8	Science as a human endeavor
5-8	Nature of science
5-8	History of science