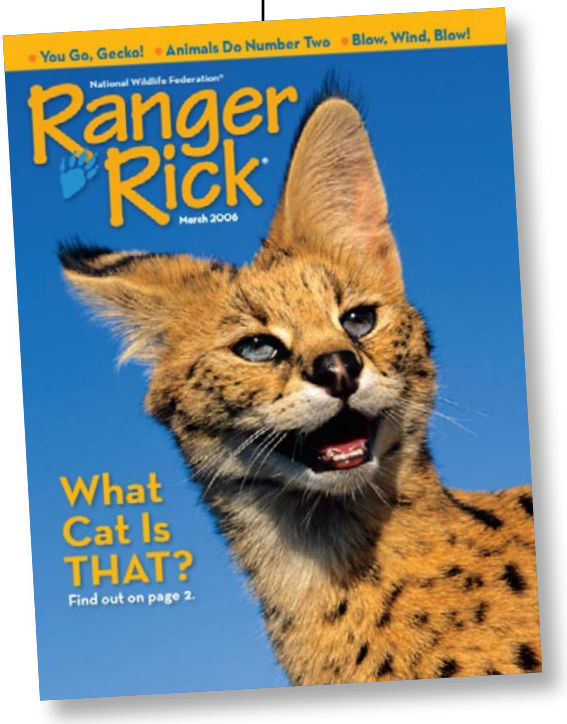
MARCH 2006

National Wildlife Federation®

Ranger Rick® EDUCATOR'S GUIDE



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

NATIONAL WILDLIFE FEDERATION

Contents & Contacts

2 Contents & Contacts
3 Introduction

ACTIVITIES

4 You Go, Gecko!
7 What Cat is That?
9 The Scoop on Poop
11 Ranger Rick's Adventures
13 The Ways of Wind
16 Family Fun Page

17 National Science Education Standards Chart

Writer: **Kate Hofmann**
Editors: **Ellen Lambeth and Gerry Bishop**
Designer: **Jeffrey Hutman**

For more information on NWF's education programs, visit www.nwf.org/education

For more information about this guide, or to offer comments, email Kate Hofmann at chofmann@nwf.org

National Wildlife Federation
11100 Wildlife Center Drive
Reston, VA 20190

1-800-822-9919
info@nwf.org

www.nwf.org

To subscribe to* Ranger Rick® *magazine and find other fun stuff for kids, visit www.nwf.org/kids

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/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.

You Go, Gecko!

pages 4-9

Learning Links:

These likeable lizards have some amazing adaptations for their high-flying, ceiling-climbing lifestyle.

DISCUSSION QUESTIONS & WRITING PROMPTS

Pre-Reading Questions:

- Have you ever wished you could climb walls like Spiderman?
- Can you think of any animals with this ability or with other "superpowers"?

Comprehension Check:

- How do some geckos "fly"?
- Where do geckos live?
- What do geckos eat?
- How does camouflage help a gecko?
- What are three things that make geckos different from most other lizards? (*they have feet with special bristles for climbing upside down, they're nocturnal, and they can make sounds*)

Critical and Creative Thinking Connections:

- What's the size difference between the largest and smallest geckos?
- If you had hands and feet as sticky as a gecko's, what would you do with this talent?
- Why might people believe it's good luck to have a gecko as a houseguest?
- Would you like to have a gecko living in your house? Why or why not?

RESOURCES

Lizards Weird and Wonderful by Margery Facklam (Little, Brown, 2003). Learn more about geckos and many other interesting lizards.

Snakes, Salamanders, and Lizards by Diane Burns (Northwords Press, 1995). This "take-along guide" includes lots of useful information about lizards and other gecko relatives.

enchantedlearning.com/subjects/reptiles/lizard/Gecko.shtml Gecko facts and a printout to color from Enchanted Learning.

nationalzoo.si.edu/Animals/ReptilesAmphibians/Facts/FactSheets/Tokaygecko.cfm More facts about tokay geckos from the National Zoo.

ACTIVITY IDEAS

Name-Sayers

Geckos are named for the sound they make. Ask students if they can think of any other animals named this way (such as the chickadee). Just for fun, suggest they give some familiar animals new names based on the sounds the animals make. As students share their made-up names, the rest of the group can guess what animals they describe.

TIME:
15 Minutes
MATERIALS:
Paper
Pencils

Great Green Geckos!

How many words can you think of that start with the letter G? As a group, make a list of G words. Then divide your list into different parts of speech: verbs, nouns, adjectives, adverbs. Now have some fun making up silly poems or tongue twisters about geckos using as many G words as you can.

TIME:
15 Minutes
MATERIALS:
Paper
Pencils

Fancy Feet

Ask students to carefully read the section on page 6 about why geckos' feet make them super climbers. Then have students write a description in their own words about how these fancy feet work. The author of this story compares geckos' feet to sticky notepaper. Encourage students to come up with their own analogies to enhance their descriptions.

TIME:
30 Minutes
MATERIALS:
Paper
Pencils

Gecko Tape

Scientists are using what they've learned about geckos' feet to invent a new kind of tape. You and your students can learn more about it at the BBC News Web site **news.bbc.co.uk/2/hi/science/nature/2953852.stm**. Engage students in a discussion about the following questions: How does gecko tape work? What are its advantages? What challenges do scientists still need to overcome to make the tape widely available? Then have students brainstorm ways this special super-sticky tape could be used.

TIME:
30 Minutes
MATERIALS:
Internet Access

Gecko Gaze

On page 7 of "You Go, Gecko," students will find pictures showing a gecko's pupil in bright and dim light. Have them use the **Gecko Gaze student page** to study the reaction of their own eyes to different light conditions. They can use a mirror (or look at a partner's eyes) to see what happens to their pupils when they move from a dimly lit place to a brightly lit one. Invite them to investigate whether their eyes look and behave like a gecko's. Then discuss the reason for the phenomenon. *(In both geckos and humans, the pupil is an opening that lets light into the eye, where the light then strikes the retina. The pupil opens wide in dim light to allow more light to enter. In bright light, it contracts to reduce the amount of light entering.)*

TIME:
30 minutes
MATERIALS:
Gecko Gaze student page
Hand mirrors (optional)

National Wildlife Federation® Ranger Rick®

Student Page

GECKO GAZE

On page 7 of "You Go, Gecko," look at the pictures of the gecko's eye in bright and dim light. Draw what it looks like in the space below.

DIM LIGHT	BRIGHT LIGHT

Now check your eyes in a mirror (or look at a friend's eyes). What does your pupil look like? Draw your eye in:

- **A place where the light is very dim. (Be sure to wait for your eyes to adjust.)**
- **A sunny or brightly lit place. (Again, wait for your eyes to adjust.)**

DIM LIGHT	BRIGHT LIGHT

1. What happens to your pupil in dim light? _____

_____

_____

2. What happens to your pupil in bright light? _____

_____

_____

3. Is this the same as what happens to a gecko's pupil? _____

_____

_____

4. Why does this happen? _____

_____

_____

What Cat is That?

pages 16-20

Learning Links:

"That cat" is a serval, a slim wildcat whose big ears and long, powerful limbs make it a highly effective hunter.

DISCUSSION QUESTIONS & WRITING PROMPTS

Pre-Reading Questions:

- Have you ever watched a house cat hunt or play at hunting?
- What kinds of behaviors did you observe?

Comprehension Check:

- Where do servals live?
- How do servals use their big ears?
- Describe or demonstrate the methods a serval uses to hunt: a) in the grass, b) in the air, and c) in the water.

Critical and Creative Thinking Connections:

- How is a serval similar to and different from other wild cats? Compare its body shape and behaviors with those of other cats such as lions, tigers, or cheetahs.
- What advantages does the serval's coat pattern provide?
- Servals hunt in the grass, in the air, and in the water. What might be some advantages of hunting in all these different habitats?
- How do you think people discovered that a serval hears sounds too high-pitched for humans to hear?

RESOURCES

Small Wild Cats by Samantha Bonar (Franklin Watts, 2003). Servals and other small wild cats star in this book, illustrated with photos from around the world.

Wild Cats of the World by Mel and Fiona Sunquist (University of Chicago Press, 2002). While this book is dense (it's written for adults), it will provide answers to almost any question posed by curious cat lovers.

Your Cat's Wild Cousins by Hope Ryden (Dutton, 1992). Learn about some characteristics and behaviors that house cats share with their wild relatives.

www.wildcatconservation.org/cats/factsheets/index.shtml Look here for lots of facts about servals and other wild cats.

ACTIVITY IDEAS

What Size Is That Cat?

Servals are small for wild cats, but how do they compare with the domestic cat? Ask several students with pet cats to find out how much their cats weigh. Have students average these numbers to find an approximate weight for a domestic cat. Then compare this with the average weight of a serval. Does a serval weigh twice as much? Three times as much? For math practice, students could calculate the difference as a fraction or percentage.

TIME:
15 Minutes
MATERIALS:
Paper
Pencils

Cats Will Be Cats

As students read "What Cat is That?" have them make notes about the serval's hunting behaviors. Then provide an opportunity to watch a house cat playing with a toy. Students with a pet cat could do this at home. Alternatively, you could arrange for a playful cat to visit the classroom or bring in a video for students to view. Ask them to watch for any behaviors that are similar to things a serval does when it is hunting. Encourage them to record their observations as they watch. Afterward, ask them to share what they noticed. Discuss the fact that although most domestic cats don't need to hunt for food, they still have a strong hunting instinct and other things in common with their wild relatives.

TIME:
30 Minutes
MATERIALS:
Playful pet cat
Cat toys
Paper
Pencils

Lend Me Your Ear

Challenge students to construct an "ear-extender" that makes their ears more like a serval's. Demonstrate by simply cupping your hands around your ears to tilt them forward and enhance the surface area available to catch sound. With some creativity and an assortment of materials to choose from (such as paper, cardboard, foam, foil, and plastic containers), students can improve on this basic technique. When all students have functional ear extensions, have them test their hearing with and without the ear-extender. How does it affect the distance, volume, or pitch of sounds they're able to hear? Which types of ear-extenders work best, and why?

TIME:
45 Minutes
MATERIALS:
Assortment of craft materials
Scissors

Wide World of Wild Cats

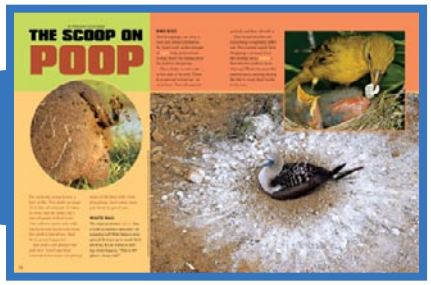
Expand your cat study from servals to wild cats in general. Have students make a chart comparing the characteristics of a variety of cats. Each student could make his or her own chart or investigate one cat in detail and contribute information to a class chart. Some cats to consider: lion, tiger, cheetah, lynx, bobcat, panther, leopard, jaguar, ocelot. Some information to seek: size, weight, coat pattern, habitat, diet, hunting strategies, average number of young, which parent(s) care for young and for how long, whether cat is solitary or social, threats facing the species, etc. Find good information about all 37 cat species at: www.wildcatconservation.org/cats/factsheets/index.shtml.

TIME:
45 Minutes
MATERIALS:
Library/Internet access to research wild cats

The Scoop on Poop

pages 22-30

3



Learning Links:

Yes, it'll make you say "Ew!" But it may also make you say "Who?" and "Is this a clue?" and "Can that be true?" It's all there for your review—in none other than "number two."

DISCUSSION QUESTIONS & WRITING PROMPTS

Pre-Reading Questions:

- Where would you rank a story about animal poop on a scale from 1: "So disgusting I'll have to tear those pages out of my magazine" to 10: "So interesting I'll read it *first*!" Be honest!
- Do you ever see animal droppings outdoors? What have you noticed about them?

Comprehension Check:

- Poop is a fact of life for all animals . . . but why?
- Name an animal with an interesting way of getting rid of its poop. What does it do?
- Name two animals that use their own poop for something. What do they do with it?
- Name two animals that use another animal's poop for something. What do they do with it?
- What are c*oprolites*? Why do some scientists find them interesting?

Critical and Creative Thinking Connections:

- Imagine that you are walking in the woods and want to know more about the animals that live there. What kinds of things could you learn from looking at their droppings?
- This story ends with the line, "When it comes to poop, the end is often just the beginning." What does this mean? How does it relate to what you learned in the story?
- For many animals, poop is a useful resource. For humans, it's something we usually prefer not to think about. Why do you think this is?

RESOURCES

Poop: A Natural History of the Unmentionable by Nicola Davies (Candlewick, 2004). Poop gets more than just a mention in this fact-filled tour of animal waste and what's done with it, while cartoon illustrations and goofy dialogue bubbles keep it light.

The Truth about Poop by Susan Goodman (Viking, 2004). A scientist's curiosity combined with plenty of humor characterize this take on the subject.

Tracks, Scats, and Signs by Leslie Dendy (Northword, 1996). This "take-along guide" shows you how to use clues such as tracks and scat to find out about the wildlife in your neighborhood.

http://bear-tracker.com/animalscat.html Pictures and information about all kinds of animal scat—a great clue for tracking.

ACTIVITY IDEAS

Scat Rap

Why not begin your investigation of the wonders of waste with a musical celebration of the subject? You can find one version of the classic "Scat Rap" at aeoe.org/resources/songs/SCAT.pdf. If you're musically inclined, try the tune provided—or just let students make up their own rhythm. After you learn these verses, try composing some new ones of your own using information from "The Scoop on Poop."

TIME:
15 minutes
MATERIALS:
Student copies of the "Scat Rap"

Animal Signs Hike

At your library, check out a field guide to scat and other animal signs, such as *Tracks, Scats, and Signs* by Leslie Dendy (see Resources). Take students on a hike in an area that's home to a variety of animals. Look for scat and other clues to help you determine what kinds of animals have been out and about. You may want to bring a ruler and magnifying glass to assist with identification. By looking closely at scat, can you tell not only what kind of animal left it, but also how recently and what the animal had eaten? You may be able to identify hair, feathers, seeds, or other items. Have students record their observations in a notebook or nature journal.

TIME:
30-45 minutes
MATERIALS:
Field guides
Notebooks or nature journals

Wonderful Worm Poop

Take a closer look at the photo of a worm and its castings in "The Scoop on Poop" (page 30). The castings are a good source of nutrients for plants. Want to see for yourselves? Set up a worm composting bin in the classroom and watch red wiggler worms happily transform your vegetable scraps into rich fertilizer. Not only is this an excellent way to put your garbage to good use, it's also a fascinating scientific process to watch and monitor. *Worms Eat My Garbage* by Mary Appelhof (Flower Press, 1997) explains how it works and leads you step by step through the process. Visit wormwoman.com for information about the book and other resources.

TIME:
Ongoing
MATERIALS:
Worms Eat My Garbage or other resources

Waste Not, Want Not

Investigate some of the many ways humans have dealt with their poop throughout history. Send students on a search for answers to questions such as: When were flush toilets invented? What did people do before that, or in places where they're not available? When you flush the toilet, where does it go? What are some of the problems with the current systems? (For instance, excessive water use, offensive smells, and contamination of water supplies when sewage treatment plants or septic tanks get old or overburdened.) Check out some of the alternatives, too: low-flow toilets, composting toilets, and "living machines" (constructed wetland systems where bacteria, plants, and fish break down and use the waste in a way that mimics natural processes).

TIME:
45 minutes
MATERIALS:
Library/Internet access for research

Ranger Rick's Adventures

pages 31-33

Learning Links:

Frogs are highly sensitive to pollution and other problems in their habitat. They can serve as early warning signs of trouble. In this story, Rick and his friends go looking for frogs and discover not only what's harming them, but also how to help.

DISCUSSION QUESTIONS & WRITING PROMPTS

Pre-Reading Questions:

- Have you ever heard frogs calling on a spring or summer night?
- Why do you think frogs make these sounds?

Comprehension Check:

- Why had the frogs and toads disappeared from the ponds where Rick and his friends were looking for them?
- What was different about the last place they went, Crystal Pond?
- Why was Crystal Pond a good place for frogs and toads to live?

Critical and Creative Thinking Connections:

- Why do you think the gang found more and more frogs as they went upstream?
- Where would you go in your neighborhood if you wanted to listen for frogs and toads?
- Frogwatch volunteers collect data about what kinds of frogs they hear in a certain location. They monitor the location throughout the breeding season, and often from year to year. How do you think scientists might use this information?
- What could you and other people in your community do to help frogs and their habitat?

RESOURCES

All About Frogs by Jim Arnosky (Scholastic, 2002). This helpful resource is indeed "all about frogs": the many different kinds, their life cycle, and their songs and behaviors.

Growing Frogs by Vivian French (Candlewick, 2000). A young girl and her mother collect frog eggs and watch the amazing transformation into adult frogs.

nwf.org/FrogwatchUSA Includes lots of helpful information for identifying frogs by sight and sound, as well as everything you need to know to join Frogwatch.

ACTIVITY IDEAS

Frogs in Your Neighborhood

Frankie, a star character in this story, is a wood frog. Wood frogs are some of the first frogs to come out in the spring to sing and mate. Spring peepers (small frogs with big Xs on their backs and even bigger voices) are also early breeders. Do these frogs live in your area? You and your students can find out at nwf.org/FrogwatchUSA. Discover what kinds of frogs and toads live in your state, see what they look like, and listen to the calls they make.

TIME:
15 Minutes
MATERIALS:
Internet access

Listen to the Frog Chorus

After you find out what kinds of frogs and toads live in your neighborhood and what they sound like, go to a nearby pond or wetland and listen for them. Try to visit your pond for the first time before any frogs have begun calling, and then return regularly and note when new species begin singing their songs. If you enjoy this, you'd make great Frogwatch volunteers!

TIME:
Ongoing
MATERIALS:
Access to a pond or wetland

Sing the Frog Chorus

Create your own frog chorus! Here's how: Divide students into three groups. Teach each group one of the following parts, and then put it all together for a grand spring serenade. As each group repeats their line over and over, you can "conduct" the orchestra, calling for each part to grow louder and then softer and finally fade away.

- The Bullfrogs. *Mashed potatoes. Mashed potatoes.* (low and slow, with the "mashed" drawn out)
- The Chorus Frogs. *Fried rice, fried rice, fried rice . . .* (medium speed and pitch, ascending up the scale on "fried" and then dropping back down for "rice")
- The Spring Peepers. *Tomatoes! Tomatoes! Tomatoes!* (very high, repeated fast and steadily)

TIME:
15 Minutes
MATERIALS:
None

Frog Friends

Ask students to brainstorm a list of ways people can help frogs and toads. Refer to the information in "Ranger Rick's Adventures" and at nwf.org/FrogwatchUSA for more ideas. Then have students write and illustrate a poster or pamphlet to share with people in your community. Be sure that students explain what harms amphibians and why, and also provide suggestions for helpful things people can do.

TIME:
60 Minutes
MATERIALS:
Library/Internet access to research frogs
Drawing paper
Art supplies

The Ways of Wind

pages 34-39

5

Learning Links:

Wind affects many animals. For humans, it can cause problems but also power many fun and useful pursuits.

DISCUSSION QUESTIONS & WRITING PROMPTS

Pre-Reading Questions:

- Make a list of words to describe different kinds of wind.
- What's your favorite thing to do on a windy day?

Comprehension Check:

- What are some ways people use wind?
- What are some ways other animals and plants use wind?
- How does wind cause problems?

Critical and Creative Thinking Connections:

- Wind is invisible, but there are lots of clues that tell you when it is blowing. Give an example for each one of your senses (sight, hearing, touch, smell).
- How could you use the power of the wind in a new way to accomplish a useful task? Describe your idea or invention.
- Read about what causes wind in "Ask Rick" on page 14. Using this explanation, can you figure out why wind usually blows from an ocean or lake toward the land during the daytime (an onshore breeze) but reverses direction and blows toward the water (an offshore breeze) at night?

RESOURCES

Feel the Wind by Arthur Dorros (Harper Trophy, 1990). What causes wind? What happens when it blows? Find answers to your windy wonderings in this book.

I Face the Wind by Vicki Cobb (Harper Collins, 2003). Questions and simple activities encourage children to discover the science behind air and wind.

Weather by Lorrie Mack (Dorling Kindersley, 2004). Here's an engaging look at all kinds of weather facts and phenomena. Illustrated with sharp photos and helpful diagrams.

kidwind.org A useful collection of information and activities for exploring wind power with children.

ACTIVITY IDEAS

Wind Watch

On a day with a noticeable breeze, take students outdoors to investigate wind conditions and record their findings on the **Wind Watch student page**. First have them use their senses to make observations about the wind. Then use the Beaufort Wind Force Scale to estimate the wind speed. You'll find a copy of the scale at **spc.noaa.gov/faq/tornado/beaufort.html**. Read each entry to students and have them decide which level best matches current conditions. Then see if you can determine the wind direction. Use an existing wind vane or have students construct their own; see **sln.fi.edu/tfi/units/energy/windtomake.html** for instructions. Alternatively, students could use a compass to draw the cardinal directions on the ground, and then hold up a windsock to see where the wind is coming from. Make these observations regularly over a period of time and have students analyze the results to find out the number of calm days compared with windy days and the most common (prevailing) wind direction.

TIME:
30 Minutes
MATERIALS:
Wind Watch student page
Copy of Beaufort wind scale
Wind vane or windsock
Compass

Wind Play

Take some time on a windy day to play! Make kites, pinwheels, or windsocks and enjoy testing them in the wind. Find instructions for a variety of wind toys and tools at this Web site: **sln.fi.edu/tfi/units/energy/windtomake.html**. Students could also compare a variety of kite designs and determine which shapes work best, and why.

TIME:
30 Minutes
MATERIALS:
Supplies for wind toys, such as kite paper, lightweight fabric, or tagboard

Wandering on the Wind

All kinds of living things use the wind to travel from place to place. In addition to tumbleweeds and dandelions, lots of other plants send their seeds to new places on the breeze. Many more (including most of the grains we eat) use the wind for pollination. Though the plants are rooted, the wind carries their tiny pollen grains far and wide. Certain birds, insects, and spiders also depend on the wind to move around. Discuss these wind-travelers with students, and then ask them to write a story about a plant or animal that rides the wind. Encourage them to imagine how it feels to be carried by the wind and what they would see on this journey. Remind them to use descriptive words that will help a reader fully experience the sensory impressions they've imagined.

TIME:
30 Minutes
MATERIALS:
Paper and pencils

Wind Work

Investigate wind energy with your students. Do you have a wind farm nearby, or perhaps just a neighbor with a wind turbine? If so, arrange a visit to see how it works. Fact sheets from the American Wind Energy Association (**www.awea.org/pubs/factsheets.html**) will add more context, as well as provide you with information about how your state measures up in terms of wind potential. For more background and activities to help you teach about wind energy, visit **kidwind.org**.

TIME:
Variable
MATERIALS:
Internet access
Access to a local wind farm, if possible

National Wildlife Federation® Ranger Rick®

Student Page

WIND WATCH

Wind Observations. You can't see wind, so how do you know when it's blowing? Explain your observations below.

I see _____

I hear _____

I smell _____

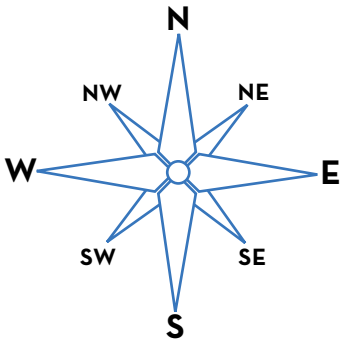
I feel _____

Wind Words. Write three words that describe the wind today:

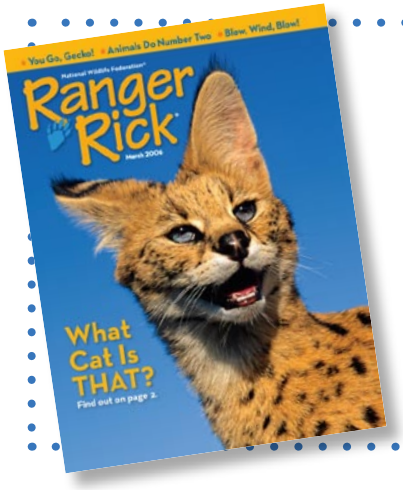
_____ _____ _____

Wind Speed. Use the Beaufort Wind Force Scale to find the force of the wind.

Wind Force --- (a number between 0 and 12)	**Draw a picture of what the wind is doing.**
Wind Name --- (such as *light breeze, strong breeze, gale*)	



Wind Direction. Circle the direction the wind is coming from on the compass rose.



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!

LUCKY LIZARDS

Read "You Go, Gecko" on pages 4-9 and become a gecko expert. Then invite some geckos home. Follow the instructions on page 10 to make good-luck geckos for family members or friends.

FACES IN NATURE

Did you see those funny nature faces in "Dear Ranger Rick" (page 11)? Bet you could make a great one of your own! Spend some time outside collecting leaves, pinecones, rocks, or whatever other materials you can find. Then let your creativity shine. For extra fun, make your face in a public park and then stick around to watch others discover it.

PHOTO FUN

Spring's on the way—high time to head outside! First, take a look at the winning photo contest entries in "And the Winners Are..." on page 12. Then grab a camera and see if you can get some nature shots of your own. Give each family member a chance to frame a photo. If kids under age 13 get some good shots, send 'em in for the next contest!

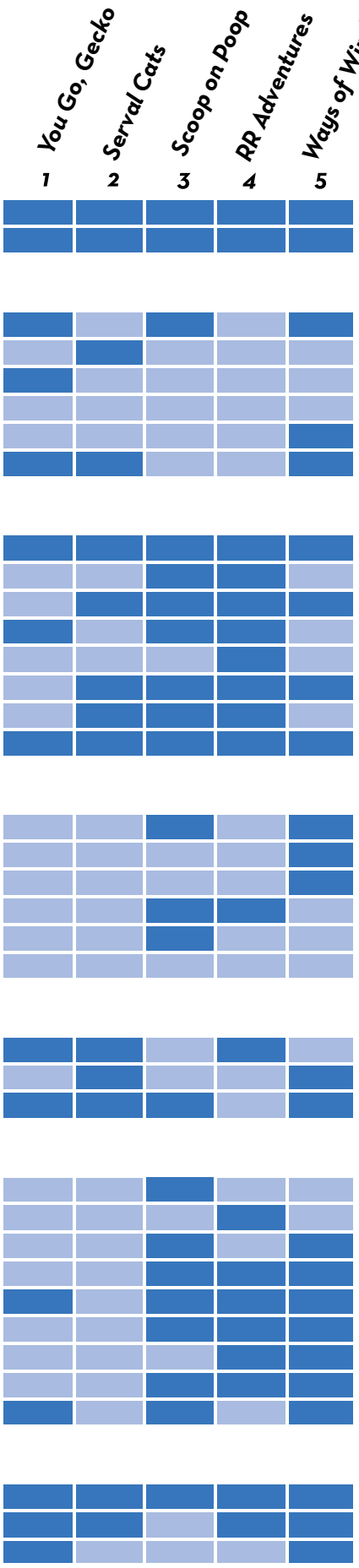
ROBIN REVELATIONS

Have you seen a robin lately? Read about what robins are up to in winter and early spring in "Ask Rick" on page 14. Then go scouting to see whether they're around in your neighborhood. If so, have they been there all winter or have they recently returned? Not sure? Visit a nearby nature center or ask bird enthusiasts in your area (find a local Audubon Society chapter at **audubon.org/local**) and see if you can discover the answer.

PLAY WITH THE WIND

On the next breezy day, set aside some time for fun. Make a wind wand by tying a ribbon or streamer to the end of a stick. Or grab a kite, pinwheel, or windsock if you have one. Then find a place where the breeze is strong and invite the wind to come and play. ("The Ways of Wind," pages 34-39)

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