

Animal Eyes

By Mary Holland



Animal Eyes

Animal eyes can be large and round, far apart, or even bright blue. Each of these traits gives us clues into an animal's world. Readers will not only investigate the sense of sight but also how an animal's eyes can tell us where they are in the food chain, whether they hunt during the day or night, or their age. Award-winning nature photographer and environmental educator **Mary Holland** shares a wide variety of peepers throughout this photographic journal.

Animals in this book include: gray treefrog, coyote, eastern chipmunk, juvenile red-tailed hawk, common green darner, barred owl, flying squirrel, jumping spider, beaver, common garter snake, black bear cub, eastern box turtle and a human girl.

It's so much more than a picture book . . . this book is specifically designed to be both a fun-to-read story and a launch pad for discussions and learning. We encourage adults to do the activities with the young children in their lives both at home and in the classroom. Free online resources and support at www.ArbordalePublishing.com include:

- For Creative Minds as seen in the book (in English & Spanish):
 - Animal Vision Fun Facts
 - Glossary
 - Match the Eye to the Animal
- Teaching Activities (to do at home or school):
 - Reading Questions
 - Math
 - Language Arts
 - Geography
 - Science
- Interactive Quizzes: Reading Comprehension, For Creative Minds, and Math Word Problems
- English and Spanish Audiobooks
- Related Websites
- Aligned to State, Common Core & NGSS Standards
- Accelerated Reader and Reading Counts! Quizzes
- Lexile and Fountas & Pinnell Reading Levels

eBooks with Auto-Flip, Auto-Read, and selectable English and Spanish text and audio are available for purchase online.

Thanks to David Clipner, Chief Naturalist and Animal Curator at Leslie Science & Nature Center, for verifying the accuracy of the information in this book.

Mary Holland is a naturalist, nature photographer, columnist, and award-winning author with a life-long passion for natural history. After graduating from the University of Michigan's School of Natural Resources, Mary worked as a naturalist at the Museum of the Hudson Highlands in New York state, directed the state-wide Environmental Learning for the Future program for the Vermont Institute of Natural Science, worked as a resource naturalist for the Massachusetts Audubon Society, and designed and presented her own "Knee-High Nature Programs" for libraries and elementary schools throughout Vermont and New Hampshire. Her other children's books include *The Beavers Busy Year*, *Ferdinand Fox's First Summer* (NSTA / CBC Most Outstanding Science Trade Book and Moonbeam Children's Book Award) with Arbordale and *Milkweed Visitors*, (Science Books and Films' list for the best books of 2006 in the category Children's Books under Zoological Sciences). Mary's book *Naturally Curious: a Photographic Field Guide and Month-by-Month Journey Through the Fields, Woods and Marshes of New England* won the 2011 National Outdoor Book Award for the Nature Guidebook category. Mary lives in Vermont with her lab, Emma.

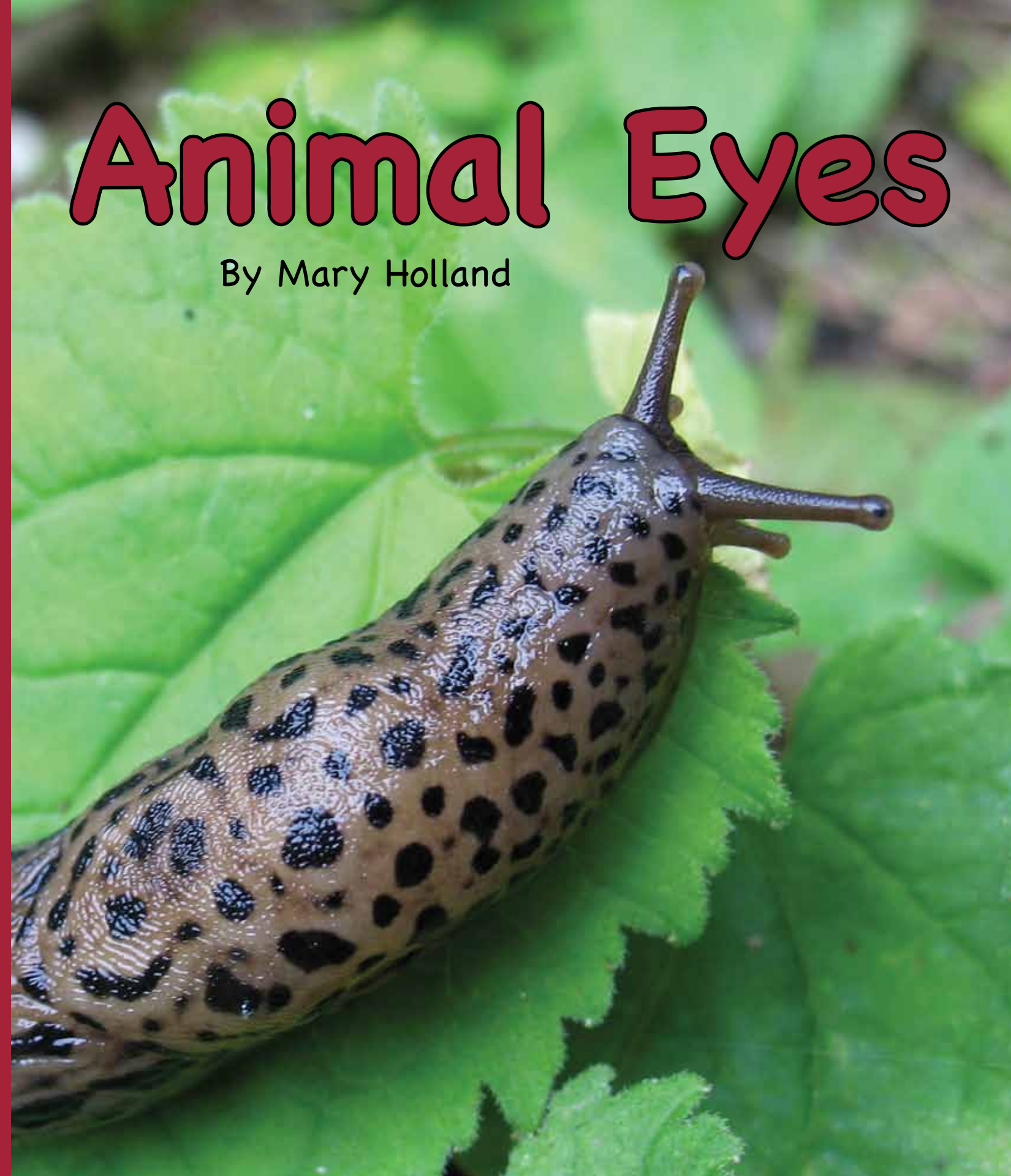
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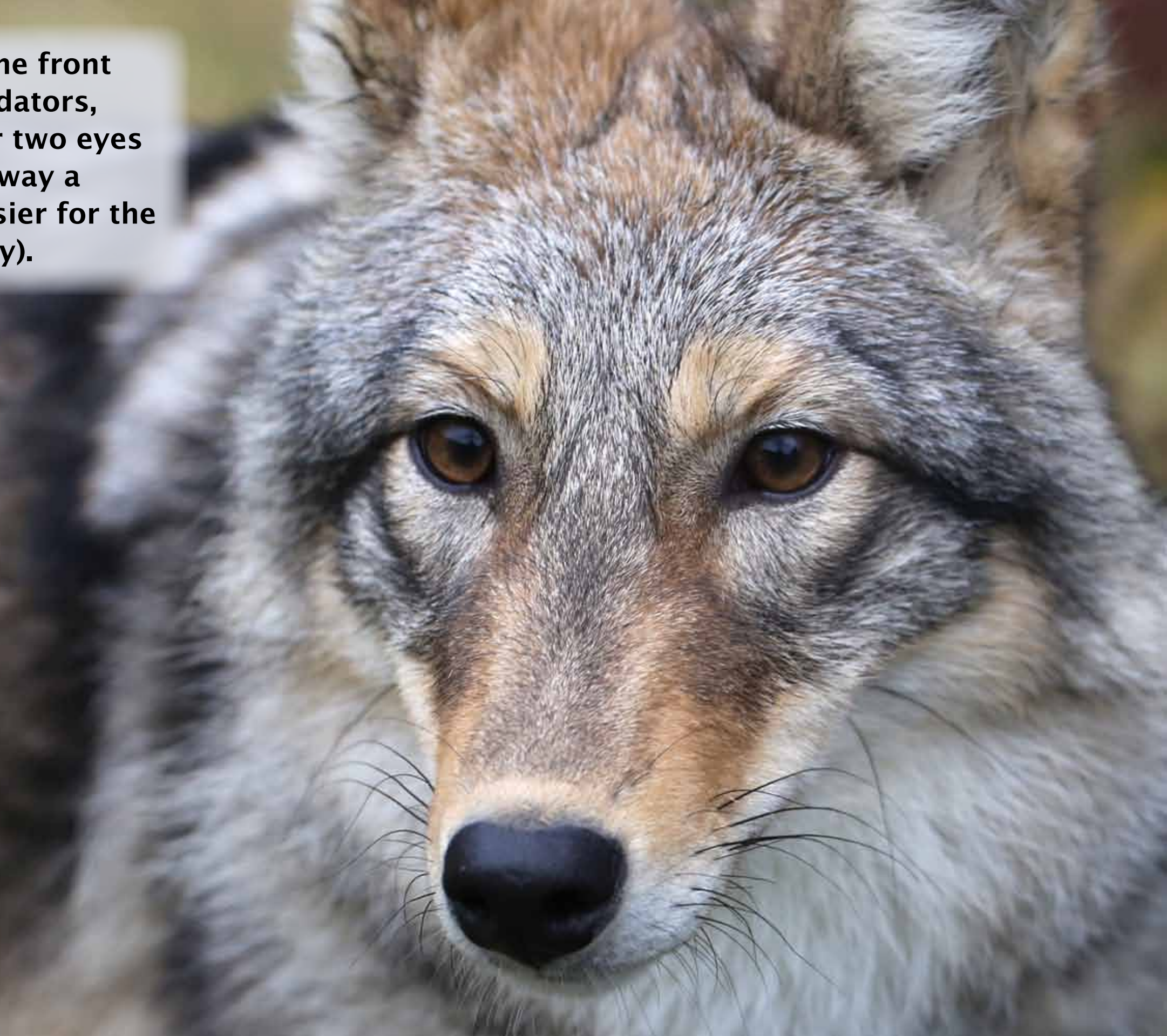


Eyes come in lots of sizes, colors and shapes. They help us in many different ways. Eyes help us find food, make things, recognize friends, and move from one place to another.

An animal's eyes can often tell us something about the animal.



A coyote's eyes are both located in the front of its head. This is true for most predators, animals that eat other animals. Their two eyes work together to tell them how far away a mouse or rabbit is. That makes it easier for the predator to catch animals to eat (prey).





Lots of predators eat chipmunks. The animals that predators eat are called prey.

A chipmunk's eyes are on the sides of its head, not the front. This helps it watch for enemies in many different directions at the same time.

Many other prey animals also have eyes on the sides of their heads. This makes it very hard for predators to sneak up on them.

Most hawks can see even better than people. Each of a red-tailed hawk's eyes is as big as or bigger than its brain. Hawks can spot prey from very far away, even if it as small as a mouse.



For Creative Minds

This For Creative Minds educational section contains activities to engage children in learning while making it fun at the same time. The activities build on the underlying subjects introduced in the story. While older children may be able to do these activities on their own, we encourage adults to work with the young children in their lives. Even if the adults have long forgotten or never learned this information, they can still work through the activities and be experts in their children's eyes! Exposure to these concepts at a young age helps to build a strong foundation for easier comprehension later in life. This section may be photocopied or printed from our website by the owner of this book for educational, non-commercial uses. Cross-curricular teaching activities for use at home or in the classroom, interactive quizzes, and more are available online. Go to www.ArbordalePublishing.com and click on the book's cover to explore all the links.

Animal Vision Fun Facts

Most animals, including people, have five senses. Can you name them? Seeing is one of the most important senses for many animals.

- The largest eyeball on the planet is 11 inches wide—about the size of a dinner plate. It belongs to the giant squid.
- An owl cannot move its eyes. It must move its head to see in different directions.
- Frogs' eyes bulge so they can stay underwater and still be able to see, with their eyes poking above the surface.
- Frogs use their eyes to help them swallow food! When they pull their eyes down into the roof of their mouth, their eyes help push the food down their throats.
- The eyes of bats and moles are hard to see because they are so very tiny.
- It's almost impossible to sneeze without closing your eyes.
- Your eyes blink over 27,000 times in one day.
- Dolphins sleep with one eye open.
- Worms don't have eyes.
- Some fish that live in deep, dark waters of underground caves do not have eyes either.



Glossary



Binocular vision: The prefix “bi” means two, as in the two wheels of a bicycle. Ocular refers to eyes or vision. Binocular means two eyes that work together. These two eyes are usually located in the front of an animal's head. Binocular vision helps animals to judge distances, helping them to track prey. Most predators have binocular vision.



Compound eyes: Insects have eyes that “bug” out, letting them see in all directions at once. These eyes usually have between 3,000 and 9,000 optical units, called ommatidia. Because each eye is made up of many different units, they are called compound eyes. Some insects, like the dragonfly, can have as many as 25,000 units in each eye! The more units the insect has, the better the insect can see. These units are so small that we can only see them under a microscope.

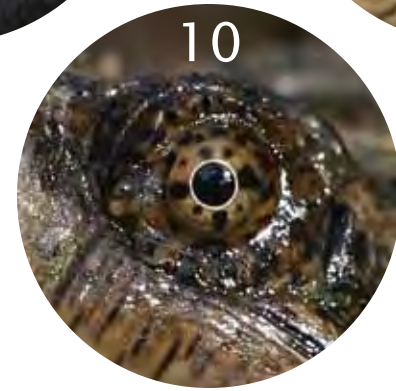
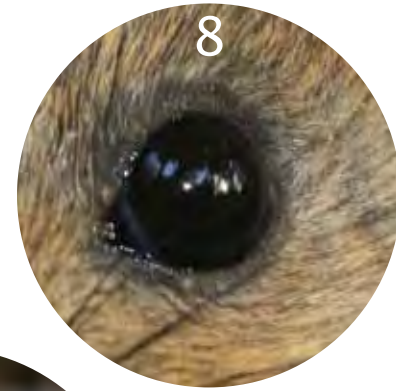
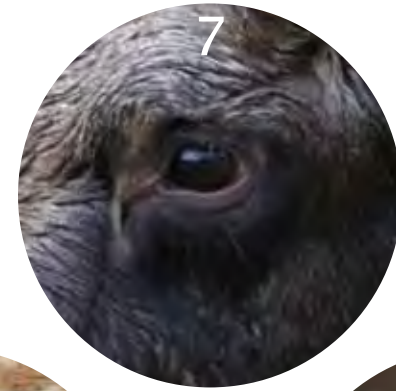
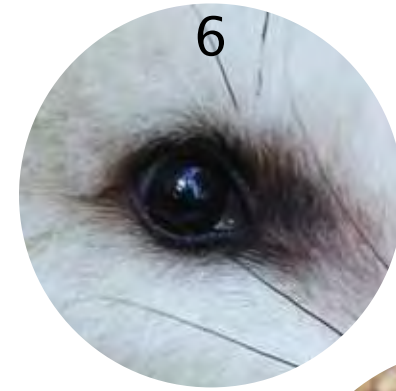


Nictitating membrane: Most animals have upper and lower eyelids that move up and down. Some animals have a third, see-through eyelid to protect their eyes. This third eyelid, called a nictitating membrane, moves across each eye. Many animals that swim or fly use these eyelids to protect their eyes. This eagle has its third eyelid drawn across its eye. The small insert shows what its eye would look like if the third eyelid was curled up in the corner of its eye, not being used.

Spectacles: Snakes and some lizards don't have eyelids at all. They have see-through scales called spectacles that cover their eyes. Because the scales are part of their skin, as they shed their skin to grow (molt), the new skin has new see-through scales to protect their eyes.



Match the Eye to the Animal



human



red fox



white-footed mouse



opossum



American toad



deer fly



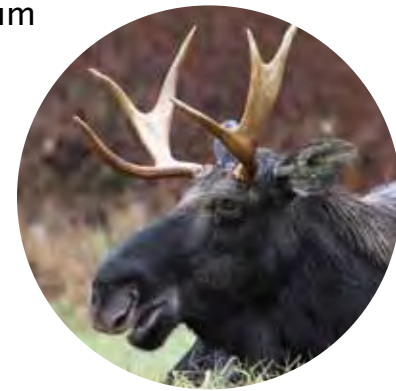
common loon



ruffed grouse



snapping turtle



moose

Answers: 1-deer fly, 2-American toad, 3-red fox, 4-common loon, 5-human

Answers: 6-opossum, 7-moose, 8-white-footed mouse, 9-ruffed grouse, 10-snapping turtle

The animals shown in the book (in order) are: loon (cover), slug (title page), gray treefrog, coyote, eastern chipmunk, juvenile red-tailed hawk, common green damselfly, barred owl, flying squirrel, jumping spider eating a fly, beaver, common garter snake, black bear cub, eastern box turtle and a human girl.

To Titus—who, in my eyes, is the dearest sister anyone could ever be lucky enough to have.—MH

Photo credit for the photograph of the little girl goes to Gigi Halloran.

Thanks to David Clipner, Chief Naturalist and Animal Curator at Leslie Science & Nature Center, for verifying the accuracy of the information in this book.

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Bibliography:

- "Beavers." *Prince William Forest, U.S. National Forest*. February 4, 2014. <http://www.nps.gov/prwi/naturescience/beaver.htm>.
- Brookshire, Bethany. "Making a Snake Spectacle." *Science News*. October 31, 2013. <https://www.sciencenews.org/blog/scicurious/making-snake-spectacle>.
- Choi, Charles Q. "Blind Fish Still Able to 'See'." *Live Science*. January 28, 2008. <http://www.livescience.com/9555-blind-fish.html>.
- Eaton, Joe. "Nature's Safety Goggles." *Bay Nature*. April 1, 2009. <http://baynature.org/articles/natures-safety-goggles>.
- "Eyes." *Horseshoe-Crab.com*. February 4, 2014. <http://horseshoe-crabs.com/horseshoe-crab-anatomy/horseshoe-crab-eyes>.
- "Frogs and Toads" *Maryland Zoo*. February 6, 2014. <http://www.marylandzoo.org/wp-content/uploads/2009/08/Frogs.pdf>.
- Liley, Ray. "Colossal Squid Has World's Biggest Eyes." *National Geographic News*. <http://news.nationalgeographic.com/news/2008/04/080430-AP-new-zealand.html>. October 28, 2010.
- "Insect Compound Eye versus Human Eye." *PawNation*. February 2, 2014. <http://animals.pawnation.com/insect-compound-eye-vs-human-eye-5728.html>.
- Rivera, Erin. "Did You Know Animal Eye Facts." *Visian ICL*. February 4, 2014. <http://visianinfo.com/did-you-know-animal-eye-facts>.
- "Worm Facts." *University of Illinois Extension*. February 6, 2014. <http://urbanext.illinois.edu/worms/facts>.

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