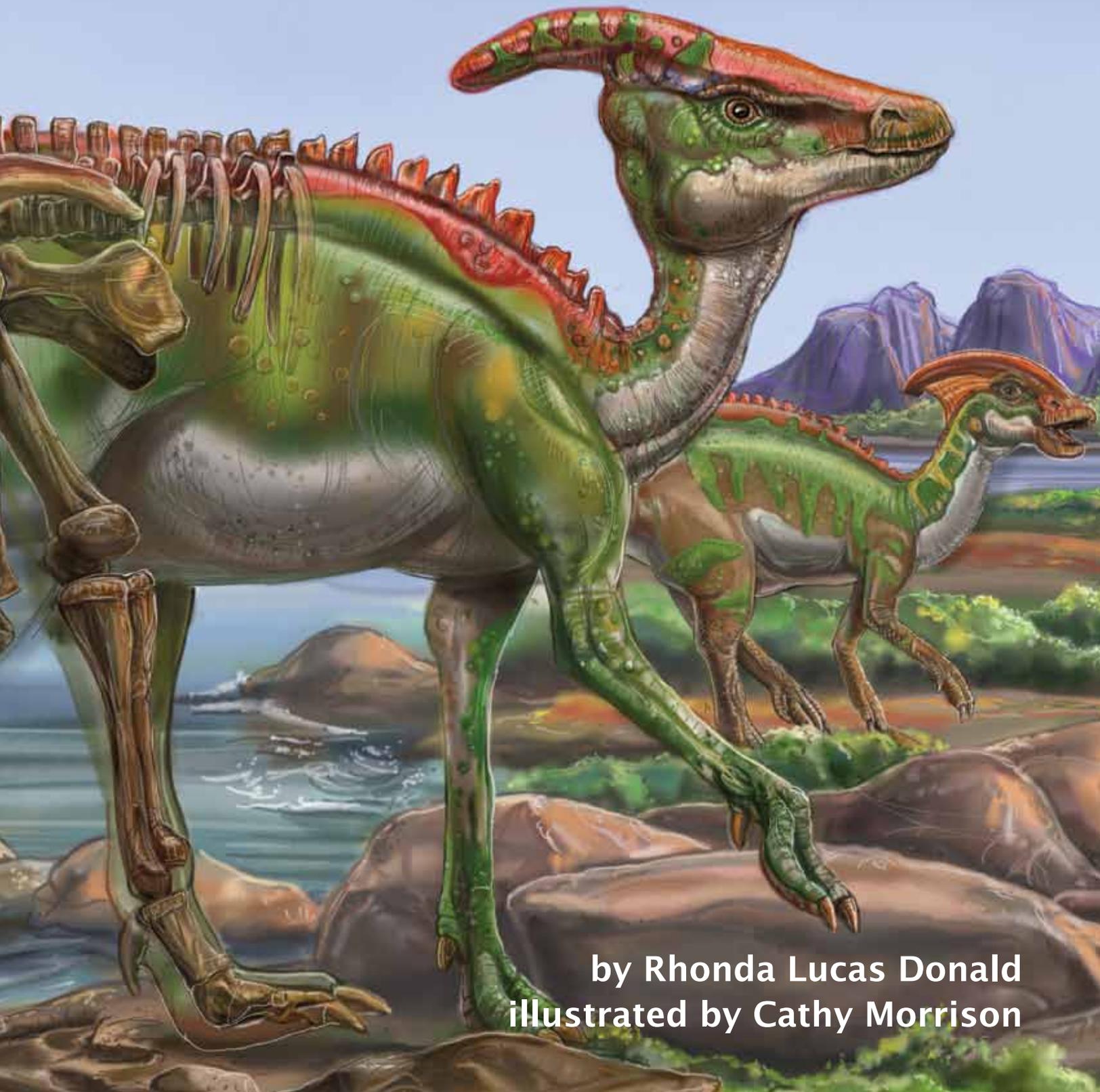


DINO TREASURES



by Rhonda Lucas Donald
illustrated by Cathy Morrison

DINO TREASURES

Just as some people dig and look for pirate treasure, some scientists dig and look for treasures, too. These treasures may not be gold or jewels but fossils. Following in the footsteps of *Dino Tracks*, this sequel takes young readers into the field with paleontologists as they uncover treasured clues left by dinosaurs. Readers will follow what and how scientists have learned about dinosaurs: what they ate; how they raised their young; how they slept, fought, or even if they ever got sick. The tale is told through a rhythmic, fun read-aloud that can be sung to the tune of *Itsy Bitsy Spider*.

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 ArbordalePublishing.com include:

- For Creative Minds as seen in the book (in English & Spanish):
 - Biologist or Paleontologist?
 - Body and Trace Fossils: Reading the Clues
- Teaching Activities (to do at home or school):
 - Reading Questions
 - Language Arts
 - Science
 - Math
 - Geography
 - Coloring Pages
- 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 available for purchase online.

Thanks to the many scientists, listed on the copyright page, who verified the information in this book.

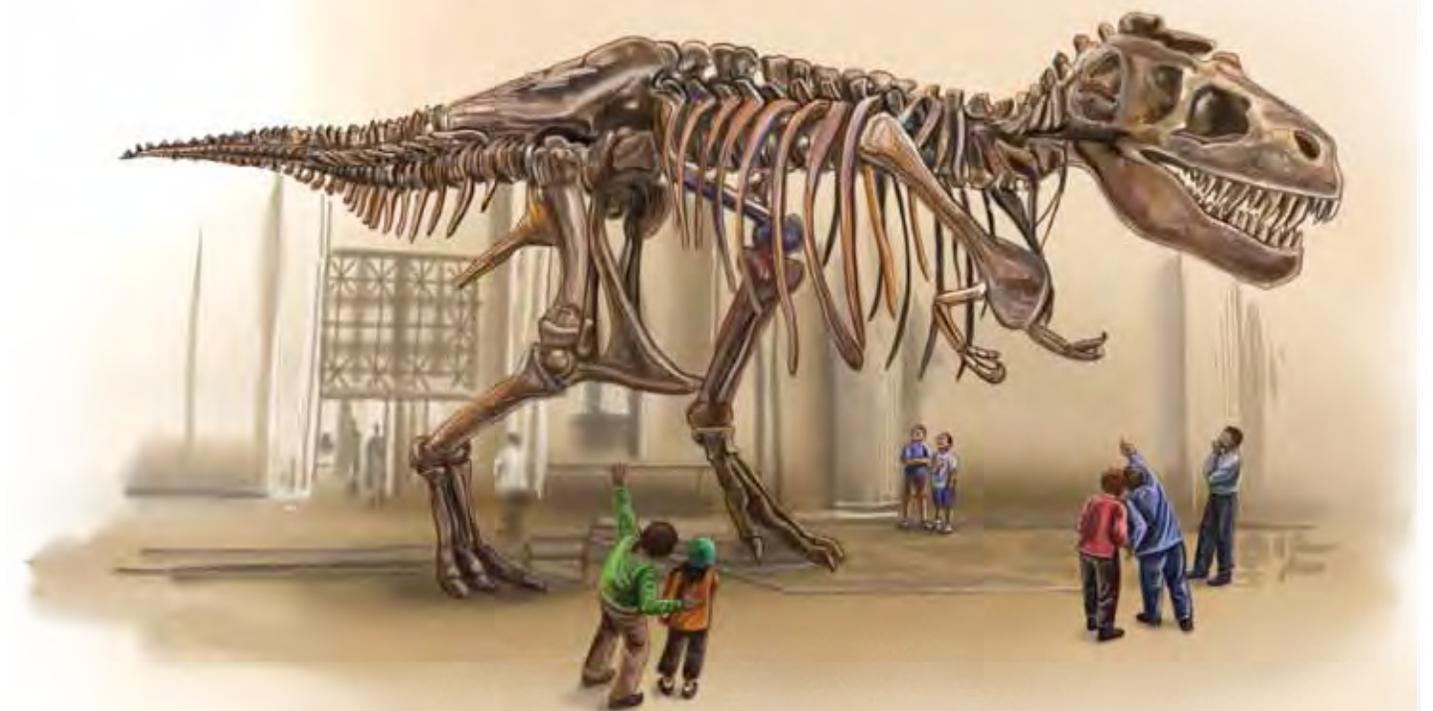
Award-winning author **Rhonda Lucas Donald** has written more than a dozen books for children and teachers, including the prequel to this book, *Dino Tracks*. Her recent book *Deep in the Desert*, won the silver medal in the 2011 Moonbeam Children's Book Awards. She is a member of the Society of Children's Book Writers and Illustrators, National Science Teachers Association, and the Cat Writers Association. Rhonda and her husband share their Virginia home with their dogs, Maggie and Lily, and their very dignified cats, Darwin and Huxley. Visit her website at browntabby.com.

Cathy Morrison may have started her art career in animation but she soon fell in love with illustrating children's books and has been doing so for 20 years. Some titles she's illustrated include *Dino Tracks*, *Daisylocks*, *Nature Recycles: How About You?*, *Three Little Beavers*, and *Animalogy: Animal Analogies* for Arbordale, as well as *Ignacio's Chair*, and the *Young Patriots Series* including *Alexander Hamilton*, *Young Statesman*; *Frederick Douglass*, *Young Defender of Human Rights*; and *Juliette Low*, *Girl Scout Founder*. She is a member of the Society of Children's Book Writers and Illustrators. Cathy works from home in a studio loft overlooking a beautiful view of the Mummy Range, on the northern side of Rocky Mountain National Park. Check out her blog at cathymorrison.blogspot.com.



Rhonda Lucas Donald Cathy Morrison

DINO TREASURES

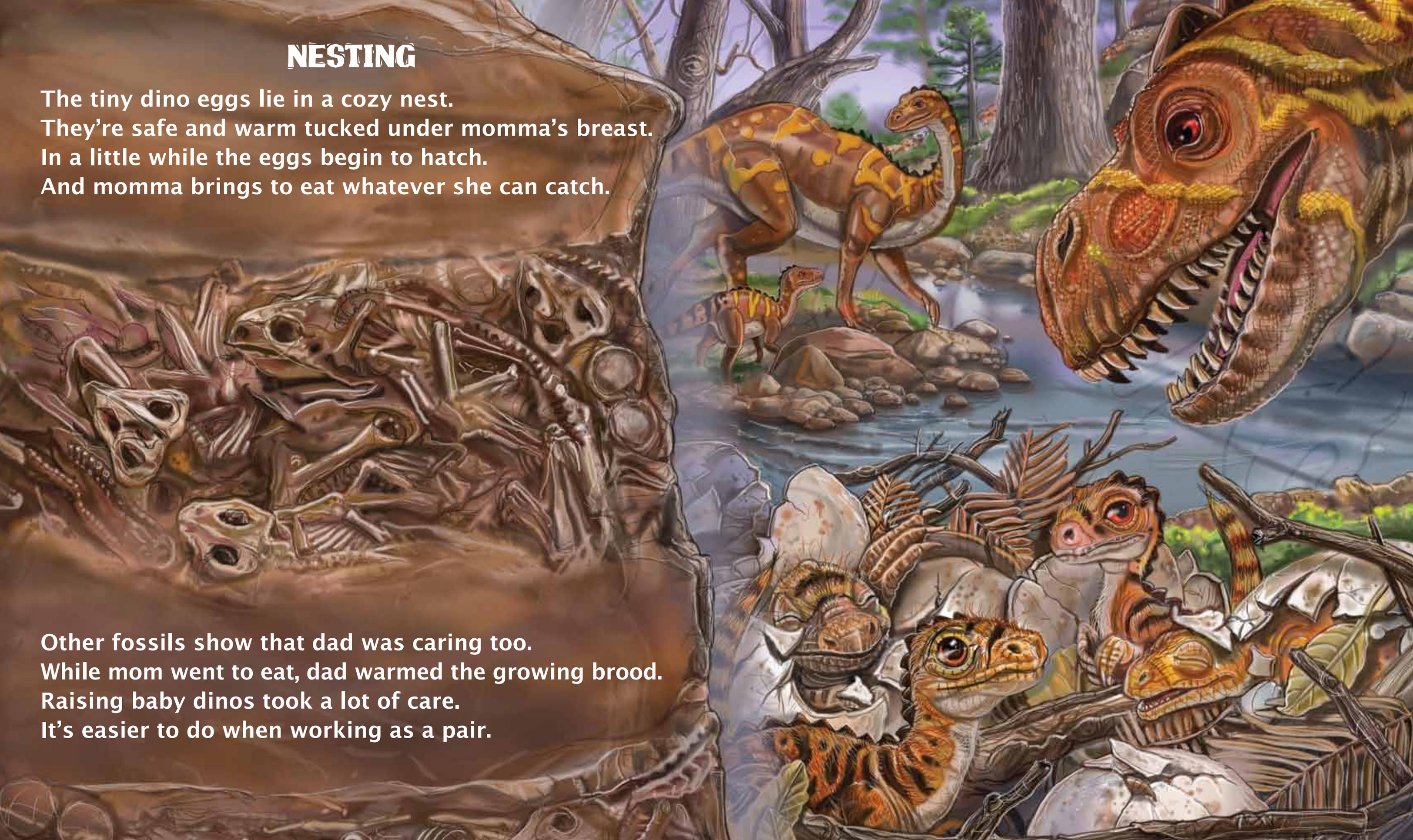


by Rhonda Lucas Donald
illustrated by Cathy Morrison

NESTING

The tiny dino eggs lie in a cozy nest.
They're safe and warm tucked under momma's breast.
In a little while the eggs begin to hatch.
And momma brings to eat whatever she can catch.

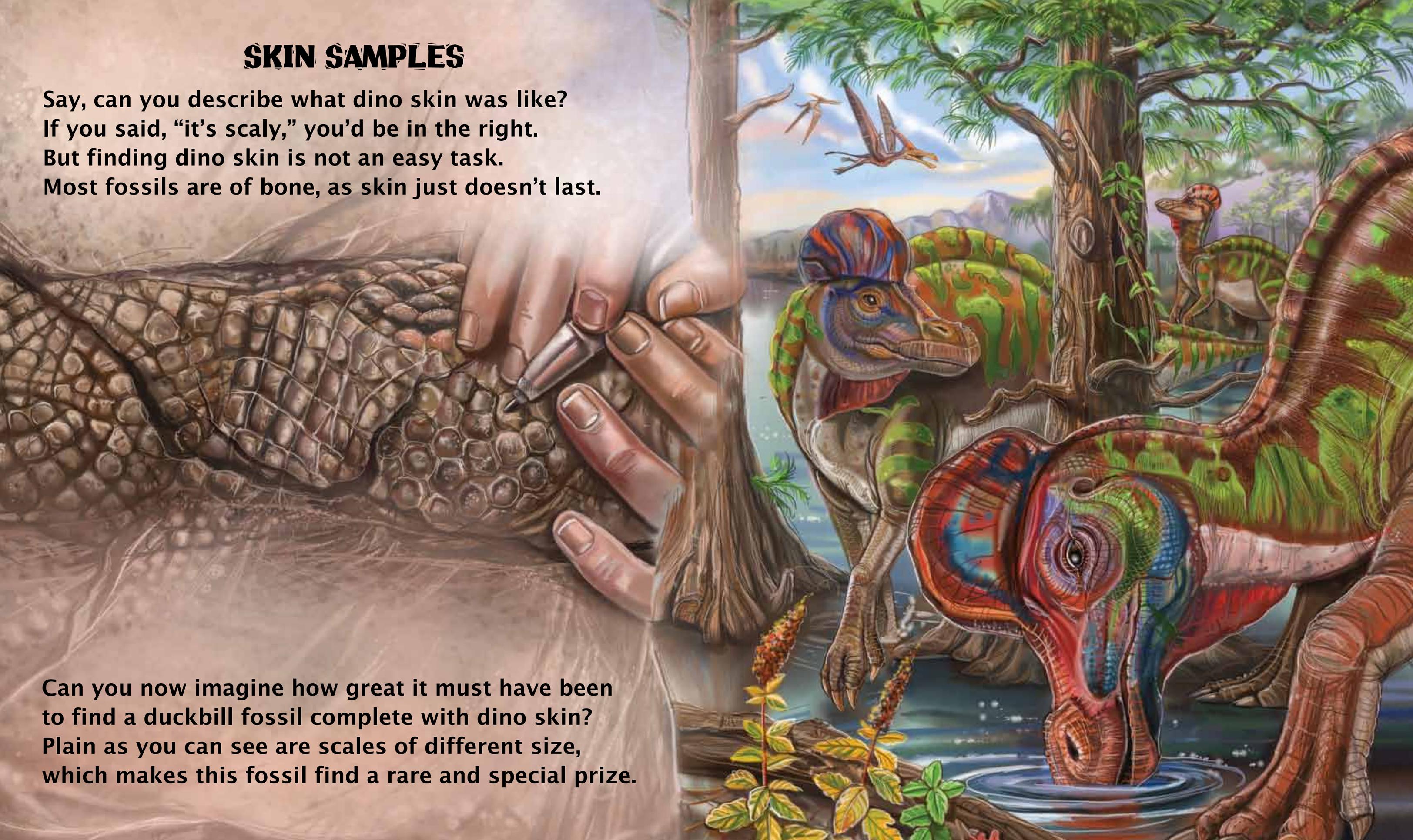
Other fossils show that dad was caring too.
While mom went to eat, dad warmed the growing brood.
Raising baby dinos took a lot of care.
It's easier to do when working as a pair.



SKIN SAMPLES

**Say, can you describe what dino skin was like?
If you said, “it’s scaly,” you’d be in the right.
But finding dino skin is not an easy task.
Most fossils are of bone, as skin just doesn’t last.**

**Can you now imagine how great it must have been
to find a duckbill fossil complete with dino skin?
Plain as you can see are scales of different size,
which makes this fossil find a rare and special prize.**



FEATHERS

Everybody knows that feathers are for birds. But dinos had them too, in case you hadn't heard. Some were kind of fuzzy and others fully plumed. Many more had feathers than anyone assumed.



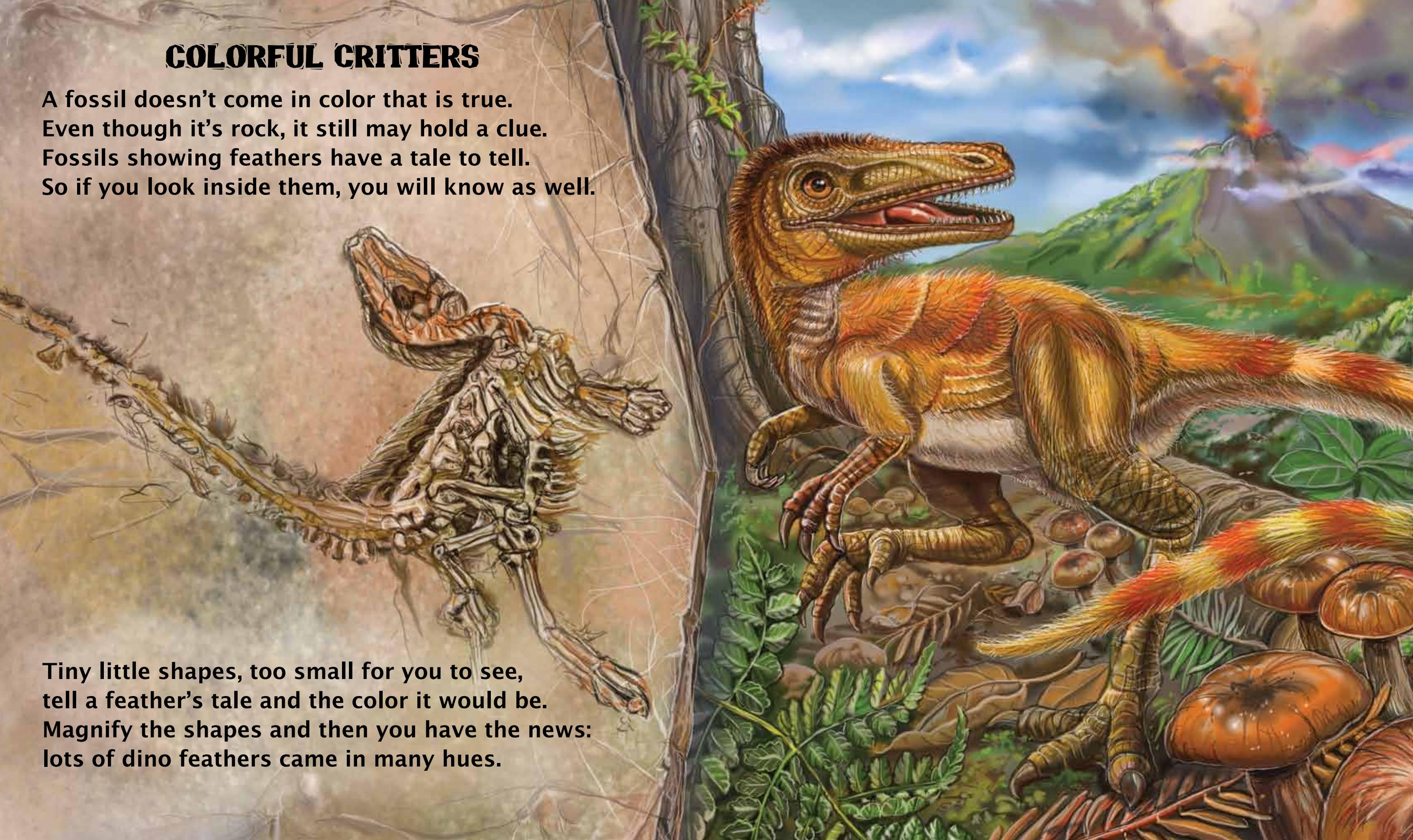
So what's with all the feathers? Could the dinos fly? Maybe they helped keep a dino warm and dry. Or they might have helped to show off to a mate. That's the way a peacock tries to get a date!



COLORFUL CRITTERS

**A fossil doesn't come in color that is true.
Even though it's rock, it still may hold a clue.
Fossils showing feathers have a tale to tell.
So if you look inside them, you will know as well.**

**Tiny little shapes, too small for you to see,
tell a feather's tale and the color it would be.
Magnify the shapes and then you have the news:
lots of dino feathers came in many hues.**



For Creative Minds

The For Creative Minds educational section may be photocopied or printed from our website by the owner of this book for educational, non-commercial uses. Cross-curricular teaching activities, interactive quizzes, and more are available online. Go to ArbordalePublishing.com and click on the book's cover to explore all the links.

Biologist or Paleontologist?

Scientists who study living things (biologists) often observe animals to learn about them. If they are working in the field, they might even see different animal signs (nests with eggs, footprints, or poop) that help them to better understand the animal they are studying.

Scientists who study dinosaurs (paleontologists) learn about the animals by studying body or trace fossil clues. They sometimes use knowledge of today's animals to help them understand the dinosaurs.

Identify whether you think the following statements describe the work of a biologist or a paleontologist. Can you explain "why" to someone?

1. The scientist dissected the owl pellet to see what it had eaten.
2. The scientist discovered that the round-looking rock was fossilized poop (coprolite) containing bits of bone from a plant-eating dinosaur.
3. In 2011, scientists found several dinosaur feathers trapped in amber.
4. In 2007, scientists found a duckbilled dinosaur that was so well preserved that even the skin had fossilized.
5. Scientists watched the birds care for their young.
6. Scientists found fossils of an animal sitting on eggs in a nest in Mongolia.
7. Scientists used medical scanners to see inside fossils of a dino skull. Inside the crest were hollow passages similar to the inside of a horn. Using computer simulations, they were able to recreate the sound made when air passed through the dinosaur's crest.
8. Scientists followed the footprints to the animal's burrow and then watched the animal care for its young.
9. Scientists can identify a general type of dinosaur from its footprints (tracks) but not the exact species.
10. In 2012, a scientist discovered fossilized footprints in a stream near Washington, DC.

Answers: 1) Biologist. 2) Paleontologist. 3) Paleontologist. 4) Paleontologist. 5) Biologist. 6) Paleontologist. 7) Paleontologist. 8) Biologist. 9) Paleontologist. 10) Paleontologist.



Body and Trace Fossils: Reading the Clues

Fossils are signs of things that have lived in the past. Fossils can be of plants or animals but all of the fossils mentioned in this book relate to dinosaurs.

Body fossils are physical proof of dinosaurs' existence. They are the body or body pieces (bones, claws, or teeth) of the actual dinosaur. In some cases, the body pieces turned into rock. In other cases, the bodies or body pieces were preserved in amber (fossilized tree resin).

Dinosaurs left traces: footprints, chew marks, nests, burrows, and even eggs. Sometimes those traces turned into fossils so that scientists can find them today. These trace fossils help scientists to learn about dinosaur behavior: what they ate, how they moved, and how they raised their young.

Paleontologists "read" the fossilized rock clues to learn about the dinosaurs. They use their knowledge of rocks (geology), living plants and animals (biology), and other science subjects to help them put together some of the puzzle pieces.



Several different fossilized nests and eggs have been found. One nest had 34 baby hatchlings with an adult nearby; all were sitting up with legs tucked underneath them. A nest found in Mongolia even had an adult male sitting on the eggs. Dinosaur's closest relatives, birds and crocodiles, also lay eggs and care for their young. Paleontologists can infer that at least some dinosaurs raised young the way birds and crocodiles do.

In 1999, a young teenager found a mummified dinosaur buried on his family farm in North Dakota. Scientists spent years digging the body out. The body was buried so quickly that the skin turned to stone, keeping its form and texture. The skin has geometric patterns, similar to a soccer ball. Using electron microscopes, scientists see that the skin had cell structures similar to modern-day birds and reptiles.



Some dinosaur fossils show a few feathers as impressions around the skeleton. Other dinosaur fossils show the dinosaurs were fully covered with feathers, much like today's birds. In 2011, scientists found several dinosaur feathers trapped in amber. The 78- to 79-million-year-old amber preserved the feathers in detail, including traces of their colors.

Bird feathers and human hair have tiny structures in their cells that carry color. The shape of the structure shows what color it is. For example, a round shape indicates a reddish color. Scientists can see the shapes under a powerful microscope and can infer that the dinosaur cell structures and colors would be similar to or the same as those today.



Just as wild animals may fight for survival today, dinosaurs fought too. Two fighting dinosaurs, a *Velociraptor* and a *Protoceratops*, must have been caught in a collapsing sand dune in what is now Mongolia. The collapsing sand buried them so quickly that their bodies were fossilized.



Fossilized poop is called coprolite. By studying it, scientists can tell what kinds of things the ancient animal had eaten. A coprolite thought to have come from a *Tyrannosaurus rex* (*T. rex*) has pieces of bone from a plant-eating dinosaur, confirming that *T. rex* were meat eaters.

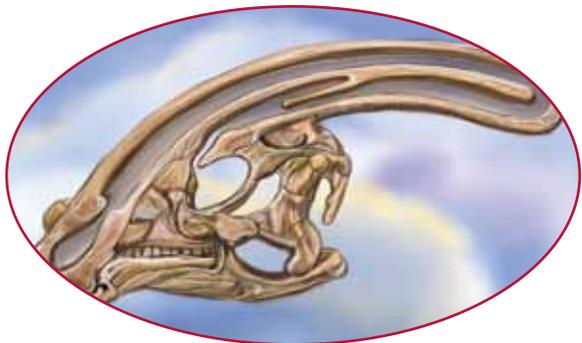
Discovered in China in 2004, the *Mei long* fossil is of a sleeping feathered dinosaur. Scientists think it was buried by volcanic ash or died by poisonous gas from a volcanic eruption. The dinosaur was sleeping with its feet tucked under its body and its head under a wing—just as many birds sleep today. The dinosaur would have been about the size of a duck.



Studying coprolites is not the only way that scientists can learn what dinosaurs ate. Some fossils have items in their stomachs. The bone of a pterosaur was found in the stomach of a Velociraptor. A duckbilled dinosaur's stomach had the remains of more than 40 kinds of plants! Fish scales and teeth were found in the stomach of a *Baryonyx walkeri*.



Just as you might leave footprints in mud, so did the dinosaurs. Sometimes these footprints, or tracks, fossilized so that we can see them today. Many tracks together make a trackway. These tracks and trackways help tell us how large the dinosaurs were, whether the dinosaurs were walking, running, slipping in the mud, or even swimming! The shape of the prints also tells us whether the track maker ate plants or meat.



Parasaurolophus had a large bony crest on its head, but scientists didn't know what it was for. They used medical scanners to see inside the skull. The scientists found hollow passages similar to the inside of a horn. Using computer simulations, they recreated the sound made when air passed through the crest. Scientists think the dinos called to others over long distances similar to the way wolves and coyotes do.

Studying the skulls of *Pachycephalosaurus wyomingensis* ("thick-headed lizard"), scientists found signs of injury. They can't say for sure, but think head butting may have caused the injuries. Since male bighorn sheep head butt to see who will get the females, scientists infer that the dinosaurs probably did the same.



"Sue" is the nickname of the largest and most complete *T. rex* skeleton ever found. Even though she was a fierce predator, her bones show evidence of a very hard life. Just like a doctor might see your broken bone with an x-ray, scientists can see that Sue had several broken bones in her ribs that had healed. Some scientists think this mighty predator may have died from an infection in her jaw.



Most scientists agree that birds are living dinosaurs. Birds are the only present-day animals that have feathers and hollow bones. Many scientists are most excited about the way that birds still stand and run on the balls of their three-toed feet. Just like many dinosaurs, all birds have long and mobile S-shaped necks. Scientists were able to remove the remains of proteins from a *T. rex* fossil. The proteins were most similar to the proteins of an ostrich and a chicken.

Thanks to the following scientists for verifying the information in this book:

- Dr. Phil Bell, Vertebrate Paleontologist, University of New England, Australia
- Dr. Karen Chin, Curator of Paleontology, Museum of Natural History and Associate Professor of Geological Sciences at University of Colorado
- Dr. Jacques Gauthier, Professor of Geology, Yale University and Curator of Vertebrate Paleontology at the Peabody Museum
- Dr. Tyler Lyson, Marmarth Research Foundation and Researcher for the Smithsonian Institution National Museum of Natural History
- Dr. Ryan McKellar, Invertebrate Paleontologist, Postdoctoral Fellow, University of Alberta
- Dr. Joseph Peterson, Vertebrate Paleontologist, Assistant Professor of Geology, University of Wisconsin—Oshkosh
- William F. Simpson, McCarter Collections Manager, Fossil Vertebrates, Field Museum of Natural History
- Dr. David Varricchio, Associate Professor of Paleontology, Montana State University
- Dr. Thomas E. Williamson, Curator of Paleontology, New Mexico Museum of Natural History and Science

Library of Congress Cataloging-in-Publication Data

Donald, Rhonda Lucas, 1962- author.

Dino treasures / by Rhonda Lucas Donald ; illustrated by Cathy Morrison.
pages cm

Audience: Ages 4-8.

Audience: K to grade 3.

ISBN 978-1-62855-450-2 (English hardcover) -- ISBN 978-1-62855-458-8 (English pbk.) -- ISBN (invalid) 978-1-62855-474-8 (English downloadable ebook) -- ISBN 978-1-62855-490-8 (English interactive dual-language ebook) -- ISBN 978-1-62855-466-3 (Spanish pbk.) -- ISBN 978-1-62855-482-3 (Spanish downloadable ebook) -- ISBN 978-1-62855-498-4 (Spanish interactive dual-language ebook)

1. Dinosaurs--Juvenile literature. 2. Fossils--Juvenile literature. 3. Paleontologists--Juvenile literature. I. Morrison, Cathy, illustrator. II. Title.

QE861.5.D68 2014

567.9--dc23

2014009961

Translated into Spanish: Dino tesoros

Lexile® Level: 660

key phrases for educators: dinosaurs, fossils, scientists/jobs

Bibliography:

- "Birds are Dinosaurs." *American Museum of Natural History*. Accessed March 20, 2014. <http://www.amnh.org/explore/science-topics/birds-are-dinosaurs>.
- "Cretaceous Footprints Found at Goddard." August 23, 2012. *NASA*. <http://www.nasa.gov/centers/goddard/news/features/2012/nodosaur.html>
- "The Fighting Dinosaurs." *American Museum of Natural History*. Accessed March 20, 2014. <http://www.amnh.org/exhibitions/past-exhibitions/fighting-dinos/the-fighting-dinosaurs>.
- Hopkin, Michael. "Fossil Dinosaur Slept Like a Bird." October 13, 2004. *Nature*. Accessed March 20, 2014. <http://www.nature.com/news/2004/041011/full/news041011-7.html>
- "How Did Dinosaurs Behave?" *Smithsonian National Museum of Natural History*. Accessed March 20, 2014. <http://www.mnh.si.edu/exhibits/backyard-dinosaurs/how-did-dinosaurs-behave.cfm>.
- "How Do Scientists Know What Dinosaurs Ate Without Looking at Their Teeth?" *University of California, Santa Barbara*. Accessed March 20, 2014. <http://scienceline.ucsb.edu/getkey.php?key=198>.
- Joyce, Christopher. "Dinosaur Dads Cared for Young, Researchers Say." December 19, 2008. *NPR*. Accessed March 20, 2014. <http://www.npr.org/templates/story/story.php?storyId=98442140>
- Joyce, Christopher. "Fossil Hunters Uncover Rare Dinosaur Skin." July 3, 2009. *NPR*. Accessed March 20, 2014. <http://www.npr.org/templates/story/story.php?storyId=106229723>.
- Markey, Sean. "Dino Dung: Paleontology's Next Frontier?" March 12, 2003. *National Geographic News*. Accessed March 20, 2014. http://news.nationalgeographic.com/news/2003/03/0312_030312_dinodung.html
- Sloan, Chris. "Dinosaur True Colors Revealed for First Time." January 27, 2010. *National Geographic Daily News*. Accessed March 20, 2014. <http://news.nationalgeographic.com/news/2010/01/100127-dinosaur-feathers-colors-nature/>
- Switek, Brian. "Fossil Testifies to Pachycephalosaur Pain." May 3, 2012. *Smithsonian.com*. Accessed March 20, 2014. <http://www.smithsonianmag.com/science-nature/fossil-testifies-to-pachycephalosaur-pain-79971905/>
- Switek, Brian. "How Parasaurolophus Set the Mood." February 14, 2011. *Smithsonian.com*. Accessed March 20, 2014. <http://www.smithsonianmag.com/science-nature/how-parasaurolophus-set-the-mood-94657740/?no-ist=>
- "SUE's Injuries and Illnesses." SUE at *The Field Museum*. Accessed March 20, 2014. <http://archive.fieldmuseum.org/sue/#photo-gallery-special-features-3>.
- Trinity-Stevens, Annette. "Sept. 9 paper with MSU coauthor underscores dinosaur parenting." *Montana State University*. Accessed March 20, 2014. <http://www.montana.edu/cpa/news/nwview.php?article=1886>.
- Wilford, John Noble. "Feathers Trapped in Amber Reveal a More Colorful Dinosaur Age." September 15, 2011. *The New York Times*. Accessed March 20, 2014. http://www.nytimes.com/2011/09/20/science/20feather.html?_r=1&

Text Copyright 2014 © by Rhonda Lucas Donald

Illustration Copyright 2014 © by Cathy Morrison

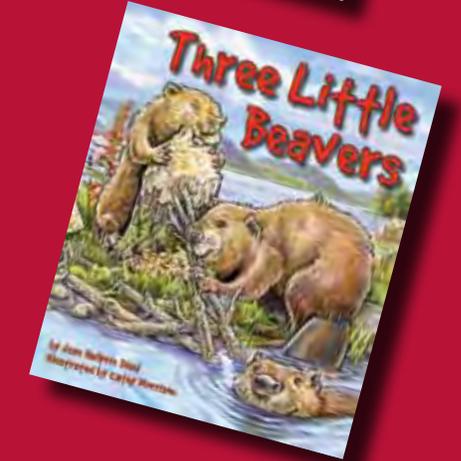
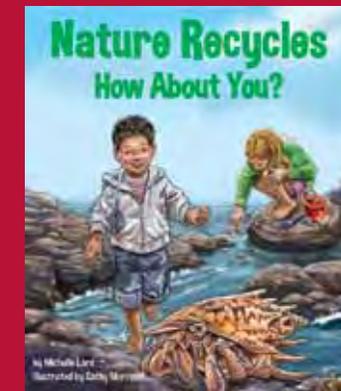
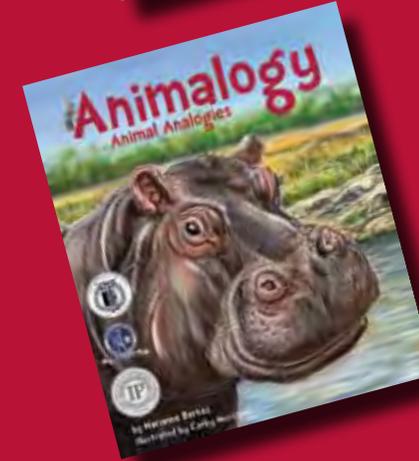
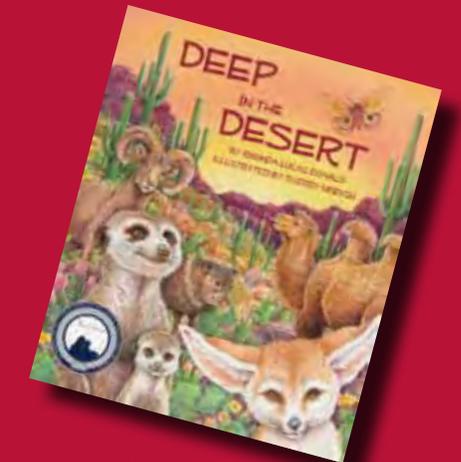
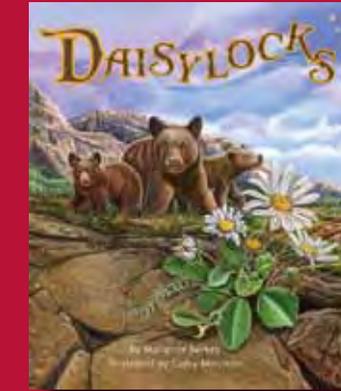
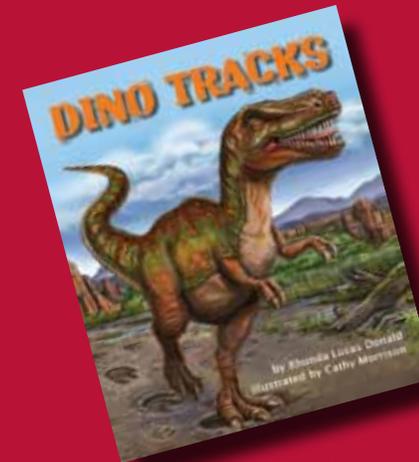
The "For Creative Minds" educational section may be copied by the owner for personal use or by educators using copies in classroom settings.

Manufactured in China, June, 2014
This product conforms to CPSIA 2008
First Printing

Arbordale Publishing
Mt. Pleasant, SC 29464
www.ArbordalePublishing.com



If you enjoy this book, look for other Arbordale books that may be of interest:



Includes 4 pages of
learning activities.
Look for more free activities
online at
ArbordalePublishing.com