Water & Weather

From the Flood to Forecasts

Tom DeRosa
Carolyn Reeves

Investigate the Possibilities

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Elementary General Science

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Carolyn Reeves

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Unless otherwise noted, Scripture quotations are from the New International Version of the Bible.

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We would like to gratefully acknowledge Michael Oard for his time in previewing *Water and Weather*. His books have been a blessing to so many over the years, including *Flood by Design*, *Frozen in Time*, and *Life in the Great Ice Age*.

TABLE OF CONTENTS

About the Authors

Tom DeRosa, as an experienced science educator and a committed creationist, has incorporated both his passions in the founding and the directing of the Creation Studies Institute, a growing national creation organization whose chief focus is education. His wealth of experience in the public school, Christian school, and homeschool markets for over 35 years has given special insights into what really works in engaging young minds. He holds a master's degree in education, with the emphasis of science curriculum. He is an author and sought-out, enthusiastic creation speaker who has a genuine love for the education of our next generation.

Carolyn Reeves is especially skilled at creating ways to help students develop a greater understanding of not just scientific concepts, but also how these are applied within the world around us. Carolyn retired after a 30-year career as a science teacher, finished a doctoral degree in science education, and began a new venture as a writer and an educational consultant. She and her husband make their home in Oxford, Mississippi, where they are active members of North Oxford Baptist Church. The Reeves have three children, three in-law children, and ten grandchildren.

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NOAA: 37LM, 37 all bottom, 38 all, 39T, 41B, 77LB, 78 all, 79L, 82RT, 83LB,
NASA: 74L, 83RT
U.S. National Archives and Records Administration: 16RT
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INTRODUCTION

Catastrophe is a word that means a widespread, often violent disaster; something that drastically changes the world in a short time. It includes all the violent weather events seen so often in the news: tornadoes, hurricanes, heavy sleet and snow, and torrential rains that bring flooding to areas all over the earth.

"This book will help introduce you to how weather and water have shaped the earth, in big and small ways, since the time of God's wonderful creation, as well as how the Biblical Flood helped form the world we know today.

Billions and billions of remains of once-living plants and animals are found as fossils in rocks and layers of rocks all over the world. Where did all of these fossils come from and how is it that they're spread all over the earth?

Starting with the Flood, we will look at how this massive amount of water that covered even the highest mountains stirred up soil and other debris, creating the perfect environment for fossils to form. This is one of the most dramatic physical evidences for a global deluge.

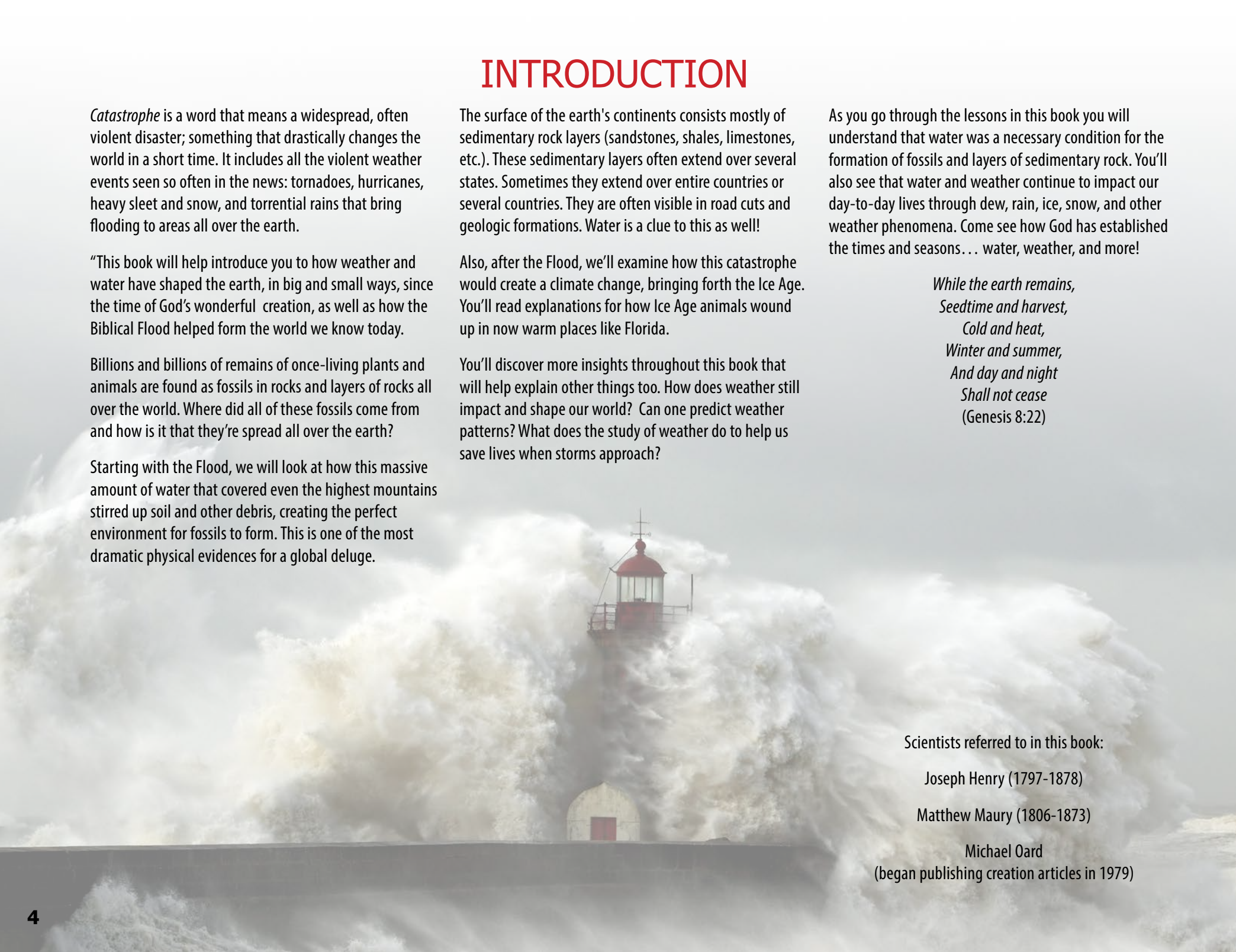
The surface of the earth's continents consists mostly of sedimentary rock layers (sandstones, shales, limestones, etc.). These sedimentary layers often extend over several states. Sometimes they extend over entire countries or several countries. They are often visible in road cuts and geologic formations. Water is a clue to this as well!

Also, after the Flood, we'll examine how this catastrophe would create a climate change, bringing forth the Ice Age. You'll read explanations for how Ice Age animals wound up in now warm places like Florida.

You'll discover more insights throughout this book that will help explain other things too. How does weather still impact and shape our world? Can one predict weather patterns? What does the study of weather do to help us save lives when storms approach?

As you go through the lessons in this book you will understand that water was a necessary condition for the formation of fossils and layers of sedimentary rock. You'll also see that water and weather continue to impact our day-to-day lives through dew, rain, ice, snow, and other weather phenomena. Come see how God has established the times and seasons… water, weather, and more!

While the earth remains,
Seedtime and harvest,
Cold and heat,
Winter and summer,
And day and night
Shall not cease
(Genesis 8:22)



Scientists referred to in this book:

Joseph Henry (1797-1878)

Matthew Maury (1806-1873)

Michael Oard
(began publishing creation articles in 1979)

HOW TO USE THIS BOOK

Each investigation gives students a chance to learn more about some part of God's creation. To get the most out of this book, students should do each section in order. Many science educators believe science is best learned when students begin with an investigation that raises questions about why or how things happen, rather than beginning with the explanation. The learning progression recommended for this book is: engage, investigate, explain, apply, expand, and assess. In each lesson, students will be introduced to something that is interesting, they will do an investigation, they will find a scientific explanation for what happened, they will be able to apply this knowledge to other situations and ideas, they will have opportunities to expand what they learned, and there will be multiple assessments.

Think about This (Engage) — Students should make a note of what they know or have experienced about the topic. If this is a new topic, they could write some questions about what they would like to learn.

The Investigative Problem(s) — Students should be sure to read this so they will know what to be looking for during the investigation.

Gather These Things — Having everything ready before starting the investigation will help students be more organized and ready to begin.

Procedures and Observations (Investigate) — Students should first follow the instructions given and make observations of what happens. There will usually be opportunities for students to be more creative later.

The Science Stuff (Explain) — This section will help students understand the science behind what they observed in the investigation. The explanations will make more sense if they do the investigation first.

Making Connections (Apply) — Knowledge becomes more permanent and meaningful when it is related to other situations and ideas.

Dig Deeper (Expand) — This is an opportunity for students to expand what they have learned. Since different students will have different interests, having choices in topics and learning styles is very motivating. All students should aim to complete one "Dig Deeper" project each week, but the teacher may want older students to do more. Generally, students will do at least one project from each lesson, but this is not essential. It is all right for students to do more than one project from one lesson and none from another.

What Did You Learn? (Assessment) — The questions, the investigations, and the projects are all different types of assessments. For "What Did You Learn?" questions, students should first look for answers on their own, but they should be sure to correct answers that might not be accurate.

Additional opportunities for creative projects and contests are found throughout the book. For grading purposes, they can be counted as extra credit or like a "Dig Deeper" project.

Nurture Wisdom and Expression

Each book contains information about early scientists and engineers. Students need to see that they were regular people who had personal dreams and who struggled with problems that came into their lives. Students may be surprised to realize how many of the early scientists believed that understanding the natural world gave glory to God and showed His wisdom and power.

In addition to the science part, students will find creation apologetics and Bible mini-lessons. The apologetics will clear up many of the misconceptions students have about what science is and how it works. Both the apologetics and Bible lessons should lead to worthwhile discussions that will help students as they form their personal worldviews.

Students with artistic and other creative interests will have opportunities to express themselves. For example, some of the apologetics are written in narrative form and are suitable for drama presentations. As scientists are introduced and researched, students can also present what they have learned as time-dated interviews or news accounts. Remember, if the scientists are included in a drama presentation, they should be represented as professionals, not as stereotyped, weird-looking people.

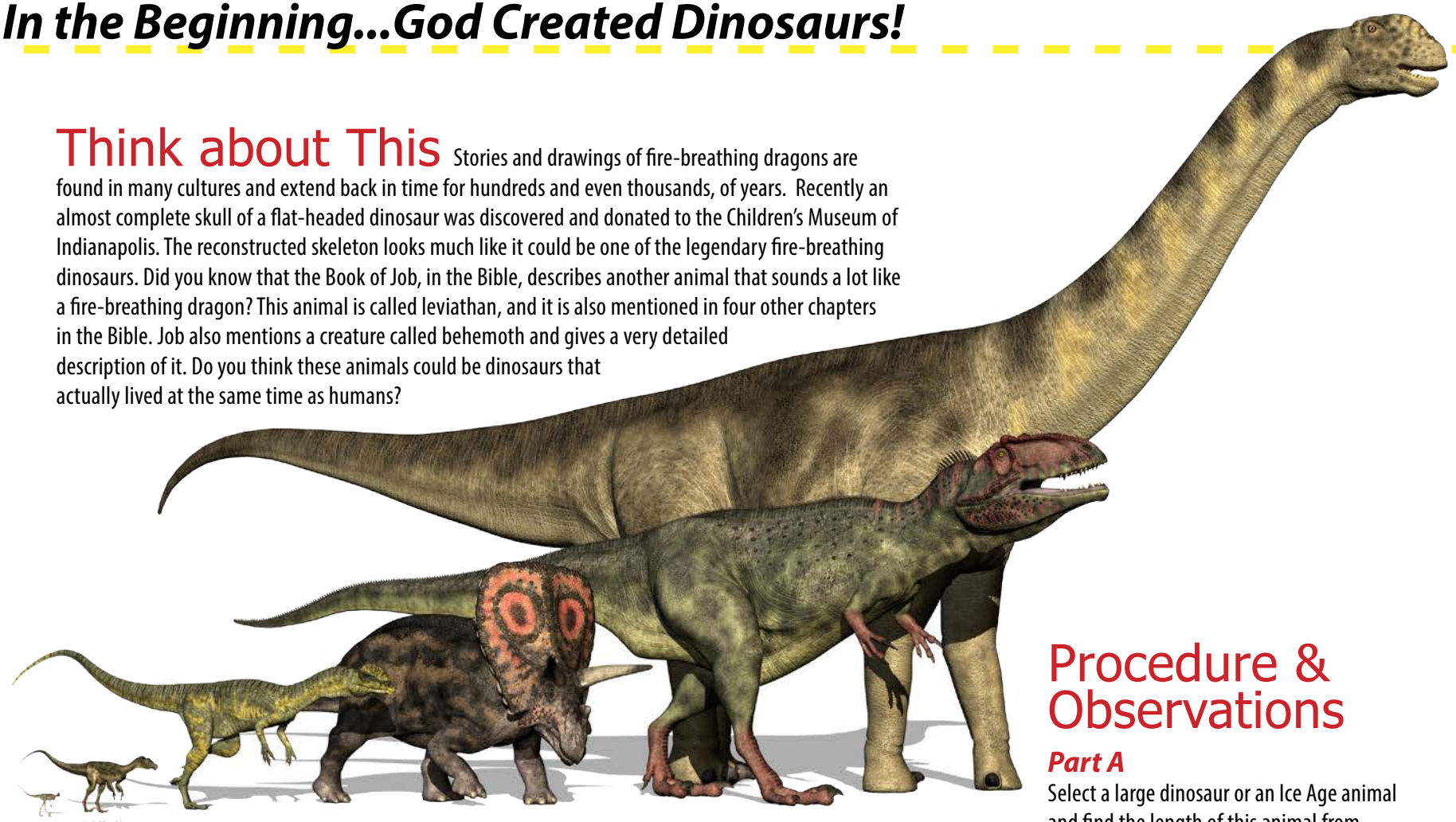
These experiments require adult supervision. They have been specifically designed for educational purposes, with materials that are readily available. At their conclusion, please appropriately dispose of any by-products or food items included in the experiments.

INVESTIGATION #1

In the Beginning...God Created Dinosaurs!

Think about This

Stories and drawings of fire-breathing dragons are found in many cultures and extend back in time for hundreds and even thousands, of years. Recently an almost complete skull of a flat-headed dinosaur was discovered and donated to the Children's Museum of Indianapolis. The reconstructed skeleton looks much like it could be one of the legendary fire-breathing dinosaurs. Did you know that the Book of Job, in the Bible, describes another animal that sounds a lot like a fire-breathing dragon? This animal is called leviathan, and it is also mentioned in four other chapters in the Bible. Job also mentions a creature called behemoth and gives a very detailed description of it. Do you think these animals could be dinosaurs that actually lived at the same time as humans?



Procedure & Observations

Part A

Select a large dinosaur or an Ice Age animal and find the length of this animal from a reference book or the Internet. Make a beginning mark on the floor or other surface with a piece of masking tape. Measure the length of the animal with a measuring tape and mark its total length by putting another piece of masking tape on the floor.

The Investigative Problems

What were the sizes of animals that are now extinct? Did they all live at the same time? Why were there rocks in some dinosaur stomachs?

1. Name the animal and tell how long it was.

Cut several 3 foot strips of paper (nearly one meter). Place the paper strips between the two pieces of masking tape. If your room is too small to finish, tell how many strips you put down and how many more you need in order to show the length of this animal.

2. How many strips of paper did it take to equal the length of this animal?
3. Describe the length in another way by estimating the number of cars that it would take to equal the length of this animal.

Repeat this activity with a small dinosaur or Ice Age animal.

4. Name the animal and tell how long it was.
5. Tell how many strips of paper (or fractions of the paper) it took to equal the length of this animal.
6. Describe the length by estimating the number of cars (or fractions of a car) that it would take to equal the length of this animal.

Part B

Place several smooth rocks inside a bag. Add a small amount of vinegar to the bag to simulate stomach acid, along with a piece of lettuce. Now rub the bag to simulate a plant-eating dinosaur walking around with the rocks rubbing against the vegetation to help digest it.

1. Describe what happens to the lettuce leaf in the bag.
2. What do you think rocks do in a dinosaur's stomach?
3. Why do you think vinegar was added to the bag?

Part C. Optional

Use reference sources and find the length of the strides of your dinosaur or Ice Age animal (from Part A). Compare the strides of the large and the small dinosaur/ Ice Age animal.

The Science Stuff

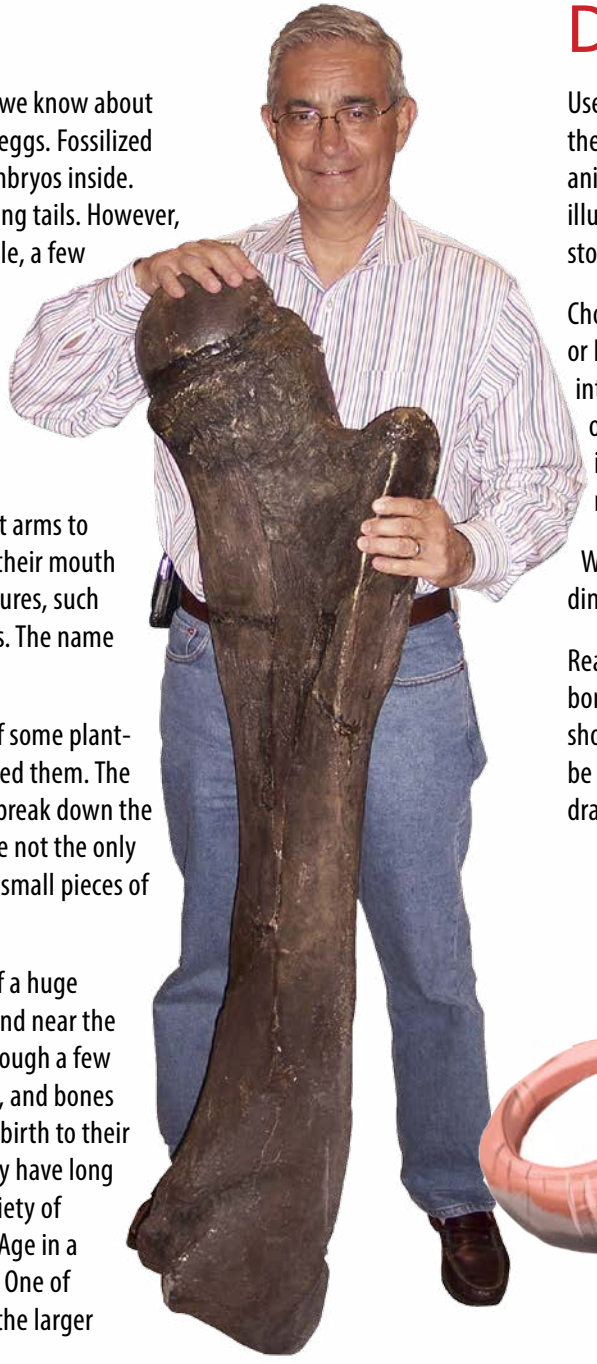
Dinosaurs are a fascinating group of animals, but most of what we know about them is from fossil remains. We know that many dinosaurs laid eggs. Fossilized dinosaur eggs have been discovered, some of which had tiny embryos inside. They generally had small brains, many teeth, long necks, and long tails. However, these characteristics were not found in all dinosaurs. For example, a few dinosaurs apparently did not have teeth.

Dinosaurs lived in great numbers before the Flood, and ranged from the size of a chicken to about 150 feet (almost 50 meters) in length. The sizes of most dinosaurs were somewhere in the middle.

Some dinosaurs walked on two legs and used their smaller front arms to hold things. Other dinosaurs walked on four legs and just used their mouth or teeth to hold objects. Dinosaurs had a variety of unusual features, such as armor plates that covered their backs or spikes on their heads. The name "dinosaur" means terrible lizard.

Gastroliths, or stones, have been found in the stomach region of some plant-eating dinosaur fossils. It is thought that the dinosaurs swallowed them. The grinding action of the stones on the plant material would help break down the food the dinosaurs had eaten and aid in digestion. Dinosaurs are not the only animals to make use of rocks to help digest food. Chickens hold small pieces of gravel in their gizzards that helps them digest their food.

Ice Age animals are as puzzling as the dinosaurs are. Remains of a huge number of woolly mammoths have been discovered in Siberia and near the Arctic Circle. Only bones and tusks remain of most of them, although a few have been found that are completely frozen with their fur, flesh, and bones intact. Woolly mammoths are warm-blooded animals that give birth to their young. They resemble modern elephants in many ways, but they have long curved tusks, a thick layer of hair, and smaller ears. Another variety of mammoth, the Columbian mammoth, also lived during the Ice Age in a region generally south of the territory of the woolly mammoth. One of the fascinating facts about mammoths is that fossil remains of the larger Columbian mammoths have been found in South Florida.



Tom DeRosa holding a large femur of a Columbian mammoth found in the Peace River, Florida.

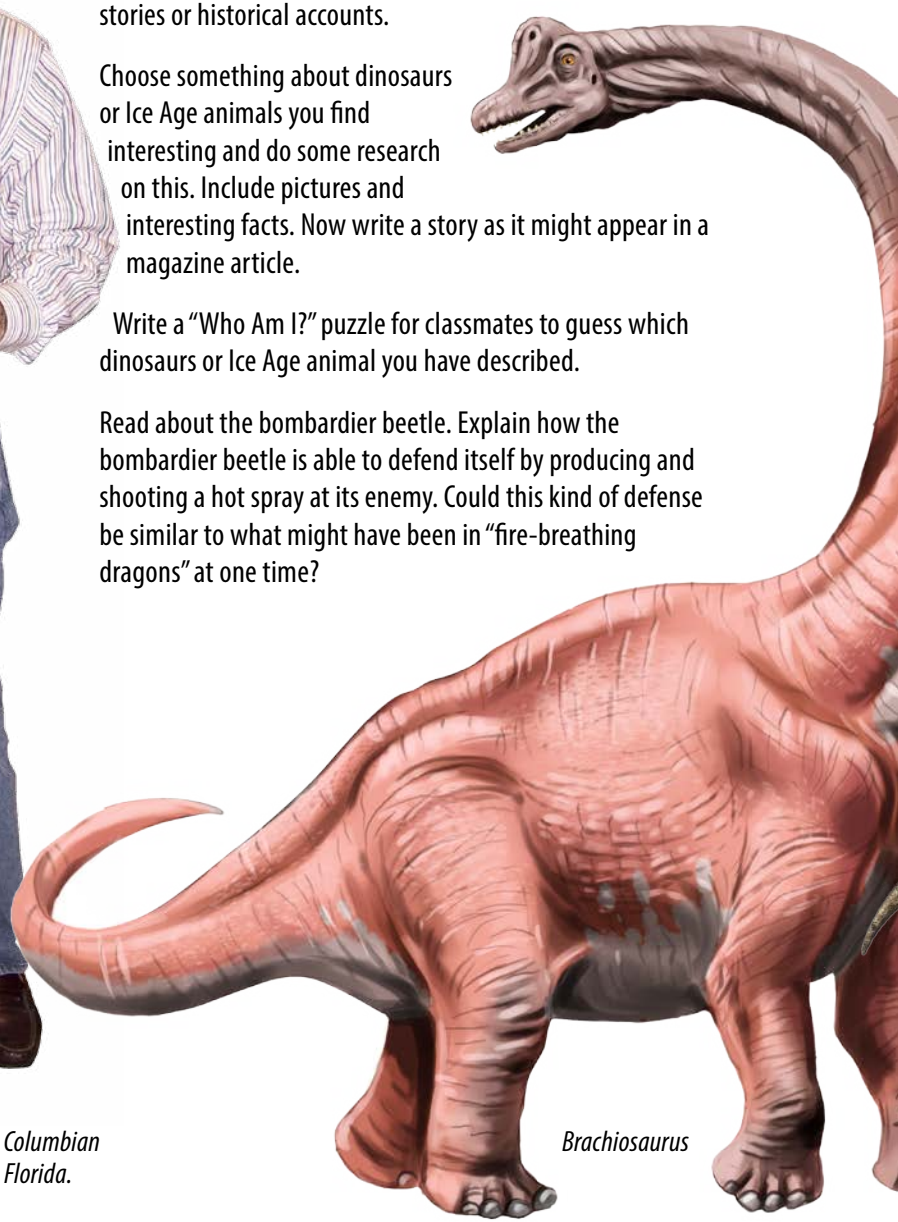
Dig Deeper

Use the descriptions of leviathan or behemoth found in the Bible and try to make a drawing of what one of these animals might look like. Compare your picture to descriptions, illustrations, and drawings of dragons found in literature stories or historical accounts.

Choose something about dinosaurs or Ice Age animals you find interesting and do some research on this. Include pictures and interesting facts. Now write a story as it might appear in a magazine article.

Write a "Who Am I?" puzzle for classmates to guess which dinosaurs or Ice Age animal you have described.

Read about the bombardier beetle. Explain how the bombardier beetle is able to defend itself by producing and shooting a hot spray at its enemy. Could this kind of defense be similar to what might have been in "fire-breathing dragons" at one time?



Brachiosaurus

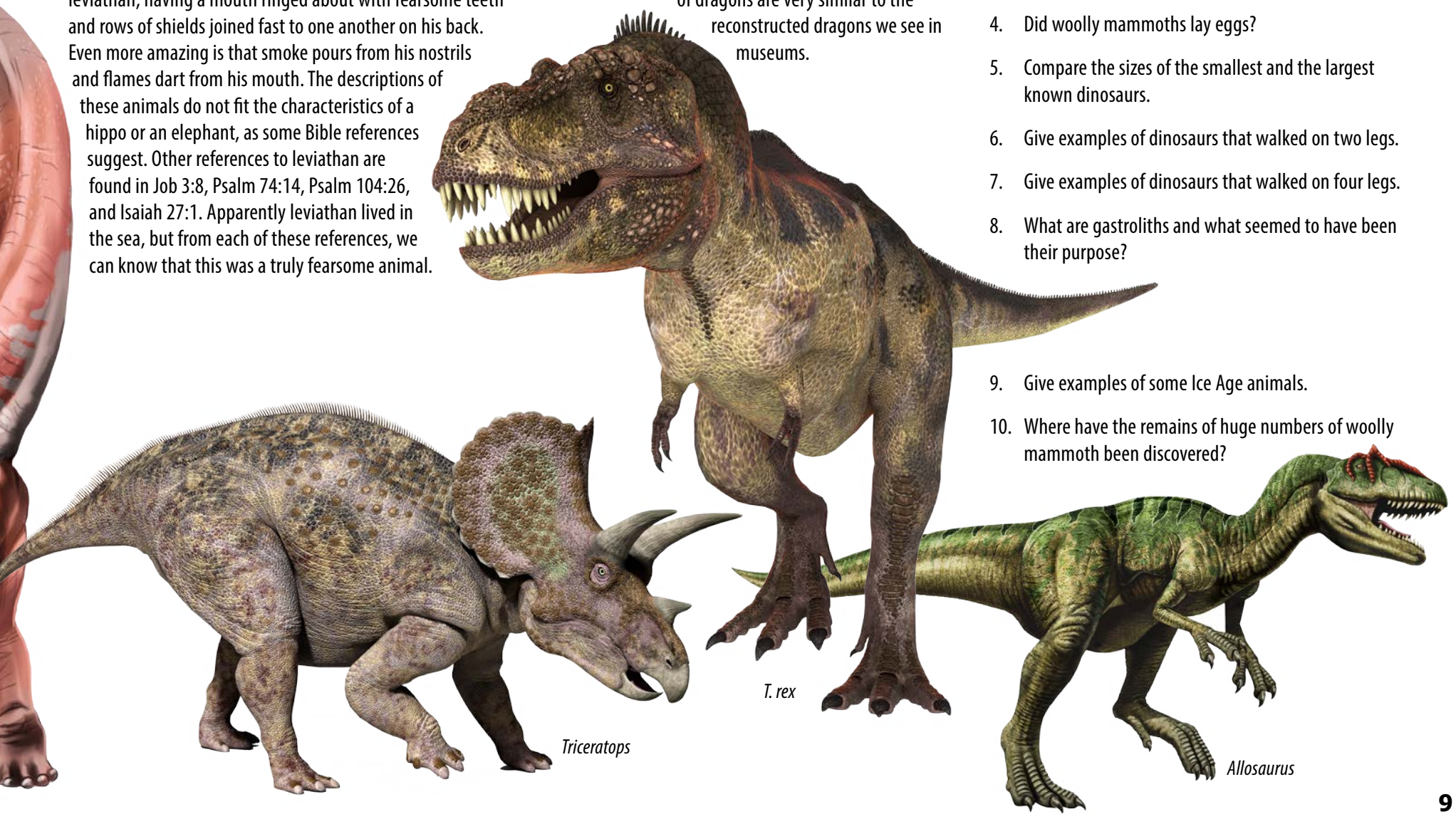
Making Connections

There are fascinating references of animals in the Book of Job that sound like accurate descriptions of dinosaurs. Certainly Job would have been familiar with the animals that were being discussed. The 40th chapter of Job describes the powerful behemoth with a tail that sways like a cedar tree. The 41st chapter of Job refers to a fierce animal known as leviathan, having a mouth ringed about with fearsome teeth and rows of shields joined fast to one another on his back. Even more amazing is that smoke pours from his nostrils and flames dart from his mouth. The descriptions of these animals do not fit the characteristics of a hippo or an elephant, as some Bible references suggest. Other references to leviathan are found in Job 3:8, Psalm 74:14, Psalm 104:26, and Isaiah 27:1. Apparently leviathan lived in the sea, but from each of these references, we can know that this was a truly fearsome animal.

Stories and references to dragons are found in nearly every civilization. Ancient books tell of using dragon parts for medicine. Many pictures of dragons are found in Oriental arts and books. Ancient Chinese stories tell of dragons being used to pull the emperor's chariot. Dragon slayers, such as Beowulf, are among the early heroes. The descriptions of dragons are very similar to the reconstructed dragons we see in museums.

What Did You Learn?

1. Are dinosaurs classified as reptiles, amphibians, or mammals?
2. Did dinosaurs lay eggs?
3. Are woolly mammoths classified as reptiles, amphibians, or mammals?
4. Did woolly mammoths lay eggs?
5. Compare the sizes of the smallest and the largest known dinosaurs.
6. Give examples of dinosaurs that walked on two legs.
7. Give examples of dinosaurs that walked on four legs.
8. What are gastroliths and what seemed to have been their purpose?
9. Give examples of some Ice Age animals.
10. Where have the remains of huge numbers of woolly mammoth been discovered?



Triceratops

T. rex

Allosaurus