

# WALKING WITH DINOSAURS



**Youth Media  
International**

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## Teacher's Guide

Dear Educator:

Nothing captures students' attention like dinosaurs. And, nothing captures the world of dinosaurs like the amazing new video set *Walking with Dinosaurs*, available wherever videos are sold beginning April 18th. Youth Media International, in cooperation with BBC Video, is proud to provide you with this teacher's guide on a subject sure to fascinate your students.

With the help of this teacher's guide, you can make the fascinating world of *Walking with Dinosaurs* come alive for middle school students as they explore biology, paleontology and natural history. This kit will enable your students to fully appreciate the evolving history of nature while expanding their skills in scientific inquiry, research, math and language arts.

The material in this guide can be used whether or not students have seen the *Walking with Dinosaurs* video set. The program will also be broadcast on the Discovery Channel on April 16th. By combining the most advanced computer graphics with the latest scientific findings, this unique series paints an astonishingly realistic picture of the sights and sounds of the more than 155 million years when these amazing reptiles roamed the earth. The videos are presented in the format of a natural history program, allowing viewers to observe living, breathing dinosaurs in their natural, prehistoric habitats. Students, their teachers and families will be fascinated by how the dinosaurs hunted, fed, defended territory, mated, reared young and interacted—all set against the authentic backgrounds of locations where prehistoric plants survive today.

Feel free to modify and duplicate the copyrighted activity sheets to suit the needs of your students. You may choose to have students work in groups for some activities. Please share the materials with other teachers at your school.

We hope you will remain on our mailing list. To ensure that you receive future mailings, please fill out and return the enclosed reply card. We welcome your comments and suggestions.

Sincerely,

A handwritten signature in black ink that reads "Roberta Nusim".

Roberta Nusim  
Publisher

## PROGRAM OBJECTIVES

- To give students a better understanding of the evolution of our world and the world of dinosaurs.
- To stimulate learning about biology, paleontology and natural history.
- To give students practice in scientific inquiry, critical thinking, research, math and language arts.

## TARGET AUDIENCE

This program has been designed for students in grades 6 to 8. The activities can be tailored to the interests and abilities of your students.

# IT'S ABOUT TIME

**Materials Needed:** One activity sheet per student, resource materials, colored markers, art supplies, index cards, objects from home for building a display

**Concepts/Skills Covered:** Library and Internet research, evolution, survival adaptations, habitats, critical thinking, hypothesizing, math, language arts

**PART A.** 1. Explain that the class is going to begin with a review of the different eras and periods in earth's history. Explain that no one is sure exactly when life on earth began, but fossils of bacteria have been found in rocks that are more than three billion years old. Tell students that scientists divide earth's history into eras and the eras into periods.

**The Paleozoic Era** (600–245 million years ago)—the Age of Ancient Life. Worms, jellyfish and trilobites lived at the beginning of this era. By its end, the first fish, land animals (amphibians), early insects and reptiles appeared.

**The Mesozoic Era** (245–65 million years ago)—the Age of Dinosaurs. It is divided into the Triassic, Jurassic and Cretaceous periods. Help students understand that dinosaurs either adapted and developed, or died out.

**The Cenozoic Era** (65 million years ago to the present)—the Age of Mammals. When it began, not a single dinosaur was left.

2. Timeline wall chart: Have students work in pairs to prepare a chart of the earth's history. They can calculate in-scale measurements using the scale 1 inch = 10 million years from a point representing the present to an event in the earth's history. Have each pair of students research one event from the chart, including what was taking place at the time in earth's history. Have students put all their information together to create a colorful wall chart using lengths of chart paper taped together. They should show the plants and animals that lived during each time period. (Note: The timeline wall chart will be 38 feet long when finished. Use a hallway, field, gym or cafeteria for your display, or if those are unavailable, use the walls of your classroom, possibly encircling the room with the chart.)

## PROGRAM COMPONENTS

1. This teacher's resource guide.
2. Three reproducible student activity masters.
3. A response card for teacher comments. To remain on our mailing list, please return this card with your comments.

## HOW TO USE THIS GUIDE

- Review the accompanying materials and schedule them into your classroom lessons.
- It is not necessary to see the *Walking with Dinosaurs* videos to do the activities. Preview the videos if you plan to use them.
- Use the related activities as a springboard to further ideas and discussion.

## OVERVIEW

You and your students can take the ultimate journey back in time to the reign of the dinosaurs and a lost world. Using the latest scientific findings, the *Walking with Dinosaurs* video set depicts the 155-million-year history of these great creatures with real-life images that make you feel as if dinosaurs are alive today—from the aggressive *Coelophysis*, who first learned to hunt in packs, to *Tyrannosaurus Rex*, the most terrifying carnivore on the planet. You and your students will feel as if you were there when the ground trembled and the air moved as dueling *Triceratops* locked horns and the mighty *Ornithocheirus* soared over 300 miles on a single wing-flap.

## ACTIVITY ONE

Event in Earth's History	When It Took Place	Measurement from the Present on Timeline
Earth's beginnings	4.57 billion years ago	38 feet
Life on earth begins (bacteria & algae)	3 billion years ago	29 feet
Soft-bodied animals appear	550 million years ago	4.5 feet
Early fish appear	450 million years ago	3.75 feet
Amphibians appear	350 million years ago	35 inches
First reptiles appear	310 million years ago	31 inches
Age of dinosaurs begins	245 million years ago	24.5 inches
Flowering plants develop	180 million years ago	18 inches
Birds evolve	160 million years ago	16 inches
Dinosaurs become extinct.		
Age of mammals begins	65 million years ago	6 inches
Early humans appear	5 million years ago	1/2 inch
End of most recent Ice Age	10,000 years ago	1/100 inch

3. Write the names of the following dinosaurs or reptiles on slips of paper—one per slip—and put them in a paper bag. You will need to make multiple copies of each slip so that each student can pick five different names.

### Episode 1: *New Blood*

*Coelophysis*, *Postosuchus*, *Placerias*, *Plateosaurus*, *Cynodont*, *Peteinosaurus*.

### Episode 2: *Time of the Titans*

*Diplodocus*, *Brachiosaurus*, *Stegosaurus*, *Allosaurus*, *Ornitholestes*, *Anurognathus*.

### Episode 3: *A Cruel Sea*

*Cryptoclidus*, *Liopleurodon*, *Eustreptospondylus*, *Rhamphorhynchus*.

### Episode 4: *Beneath a Giant's Wings*

*Ornithocheirus*, *Tapejara*, *Iguanodon*, *Utahraptor*, *Polacanthus*, *Oberomesornis*.

### Episode 5: *Spirits of the Silent Forest*

*Laellynasaura*, *Muttaborrasaurus*, dwarf *Allosaur*, *Koolasuchus*.

### Episode 6: *Death of a Dynasty*

*Tyrannosaurus*, *Ankylosaurus*, *Torosaurus*.

Have students research their dinosaurs and fill in the blanks for Part A of Activity 1. Have them work in groups to correct and refine

their information. Then ask the group to use the information from the activity sheets to make up 3 x 5 index cards as game cards. Each game card will feature the five questions and answers on the activity sheets. Have students work in groups to create one card for each dinosaur. Collect their cards to check facts and eliminate duplicates. Then, hold a *Walking with Dinosaurs* Fascinating Facts Contest and divide the class into two teams.

**PART B.** Discuss how animals relate to their habitats. Have students complete Part B by researching their favorite dinosaur and filling in the statements about its habitat. You may want younger students to pick one dinosaur as a class and have everyone bring in an item from home to create its habitat display. Have older students work individually to create their own displays.

**PART C.** Have students take their sheets home to complete Part C with their families. Back in the classroom, have them share their families' responses, and then collect the data, graph the families' opinions, and draw conclusions.

# BUILT FOR SURVIVAL

**Materials Needed:** One activity sheet per student, resource materials, objects from home for adaptation display

**Concepts/Skills Covered:** Library and Internet research, evolution, survival adaptations, habitats, critical thinking, hypothesizing, math, creative writing, oral expression

**PART A.** 1. Explain that animals develop physical adaptations over millions of years to help them survive. Have students brainstorm examples of physical adaptations that might help a dinosaur survive.

2. Have students do research to fill in the chart for Part A of Activity 2. After sharing responses, have them complete the activity by writing a scenario that focuses on an event in a day in the life of their dinosaur. Examples of events

include searching for food, avoiding a predator or caring for young.

**PART B.** Explain that students are going to create their own 3-D display of a dinosaur adaptation. Help them grasp how the shape of a bone or tooth, for instance, evolved over time, with some animals surviving to reproduce and pass along their genes for successful adaptations. Assist students in brainstorming ways to illustrate their adaptation—by using a pair of pliers, for instance, to demonstrate how the jaws of *Allosaurus* might have worked to clamp on prey. Have them share their 3-D displays with the class. Then have them list the adaptation they illustrated and its relation to some modern animals.

# CLUES FROM THE PAST

**Materials Needed:** One activity sheet per student, sample fossils if available, resource materials, ball of string at least 150 feet long, yardstick

**Concepts/Skills Covered:** Library and Internet research, critical thinking, communication skills, hypothesizing, history of paleontology, scientific organization

**PART A.** 1. Share one or more real fossils with students. If necessary, show pictures of fossils from books. See if they can identify the creatures each represents. Explain that the earliest dinosaur fossil find comes from a book written in 300 A.D. by Chang Qu, a Chinese scholar, who described “dragon bones” found in Sichuan Province. It took many centuries, however, before people understood that actual reptiles had existed long ago. Explain that paleontology, the study of dinosaurs, is relatively recent. The first dinosaur was named only 150 years ago.

2. Have students research some of these famous dinosaur “heroes”: Gideon and Mary Mantell (Mary found small rocks containing teeth and showed her husband, who became the first to recognize that huge reptiles existed in the distant past), William Buckland (first to describe and name a dinosaur, although he did not use the word *dinosaur*), Richard Owen (coined the term *Dinosauria*), Joseph Leidy (studied early U.S. fossil find from New Jersey), Louis Dollo (studied the Bernissart Find, a mass grave of *Iguanodons* in Belgium that laid the foundation for modern paleontology), Edward Drinker Cope and Othniel Charles Marsh, Eberhard Fraas, George F. Sternberg, Roy Chapman Andrews, Barnum Brown and Mary Anning.

3. Have students find out more about real dinosaur digs and the discoveries that resulted. Have them use what they find out to fill in the blanks for Items 1-6 in Part A of this activity.

4. Explain that dinosaur classification is controversial and is constantly being revised based on new finds. Tell students that they are going to use their critical thinking skills to come up with their own way of illustrating how their dinosaur is related to other dinosaurs. For instance, *Brachyosaurus* was a kind of *Sauropod*; *Sauropods* are a kind of *Sauropodomorpha*; *Sauropodomorpha* is a branch of the group *Saurischia*; *Saurischia* is one of two groups (*Saurischia* and *Ornithischia*) that make up the group *Dinosauria*. Then have students complete Item 7 of the activity by creating their own diagram on the back of the sheet.

**PART B.** Have students go outside into the schoolyard and measure a length of string the size of *Diplodocus*, the largest of the *Sauropods* (150 feet), using a yardstick. Compare it to the size of the largest modern mammal, the blue whale (100 feet) and the elephant (11 feet high). Have students demonstrate other sizes of their favorite dinosaurs. Explain that string is one way to illustrate the size of some dinosaurs. Use other ways to demonstrate dinosaur length, height or weight.

**PART C.** Explain that paleontologists are like dinosaur detectives—solving the mysteries about dinosaurs based on clues in the fossil record. Have students take the activity sheet home to complete Part C with their families. Back in the classroom, have them share aloud how they used their critical thinking skills to form a theory about something that happened in their community. Help them relate the skills they used to the work of paleontologists.

## ACTIVITY TWO

**PART C.** Have students use the prior activities on adaptation to create a list of the survival features that interest them most. Then, have them take the activity master home to their families to brainstorm real opportunities to see evidence of dinosaurs and physical adaptations. They can share their family’s suggestions in class.

### RELATED ACTIVITIES

Discuss the differences between herbivores, carnivores and omnivores. Have students research different dinosaurs and what they ate, focusing on how diversification in feeding habitats worked in favor of all kinds of dinosaurs found in a particular region.

## ACTIVITY THREE

### RELATED ACTIVITIES

1. Present several theories of how dinosaurs became extinct. Have students research information that supports each theory, with emphasis on the recent discovery of a large crater pointing to the meteor theory so widely accepted today.

2. Provide the class with verbal clues about fossil finds that paleontologists have discovered. Have students hypothesize what each clue might tell about a particular dinosaur and how the clue could relate to dinosaur behavior—feeding, movement or protection from enemies.

### RESOURCES

*Walking with Dinosaurs* video set  
*Walking with Dinosaurs* DVD  
*The Making of Walking with Dinosaurs* video

### BOOKS

*Walking with Dinosaurs. A Natural History*, by Tim Haines. Dorling, Kindersley Publishing, Inc., 1999.  
*Mammals and Their Extinct Relatives*, by Lowell Dingus, Richard Redford, et al. Museum of Natural History, 1994.  
*The Book of Dinosaurs: The Natural History Museum Guide*, by Tim Gardom with Angela Milner. Carlton Ltd., 1998.

### WEB SITES

- BBC America: <http://www.bbcamerica.com>
- American Museum of Natural History: <http://www.amnh.org>
- Discovery Channel: <http://www.discovery.com>



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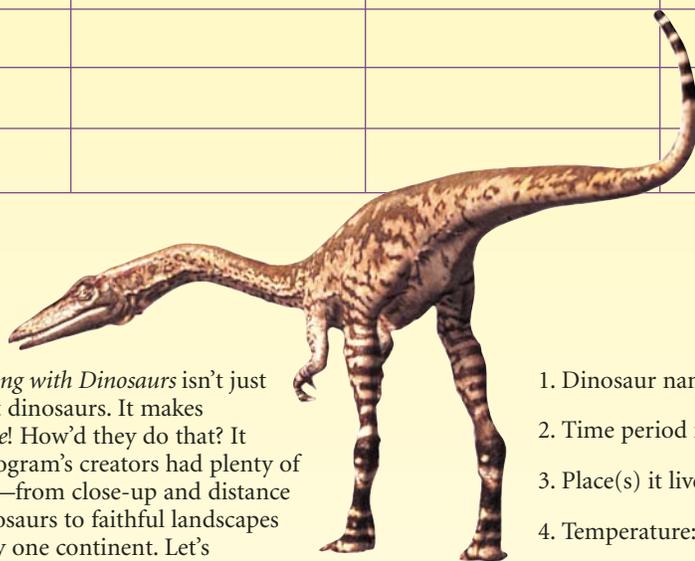
# IT'S ABOUT TIME

## ACTIVITY ONE

**PART A.** *Walking with Dinosaurs* is an exciting new video set, available wherever videos are sold beginning April 18th. It combines the most advanced computer graphics and latest scientific findings to make dinosaurs come alive! For the first time ever, the most amazing reptiles the world has ever seen are portrayed as living, breathing animals. What did it feel like when Diplodocus swung her mighty tail? When Liopleurodon exploded out of the waves to seize prey and drag it beneath the water? When a pack of hungry Utahraptors came trotting over the hill? In *Walking with Dinosaurs*, you can see for yourself.

Imagine you're one of the paleontologists who's been asked to help the scriptwriters. They need information about lots of dinosaurs. In the chart below, write the names of the dinosaurs you've been asked to research. Fill in information for each one. Your teacher will tell you how to use the chart to create your own *Walking with Dinosaurs* Fascinating Facts Contest that you and your classmates can play together.

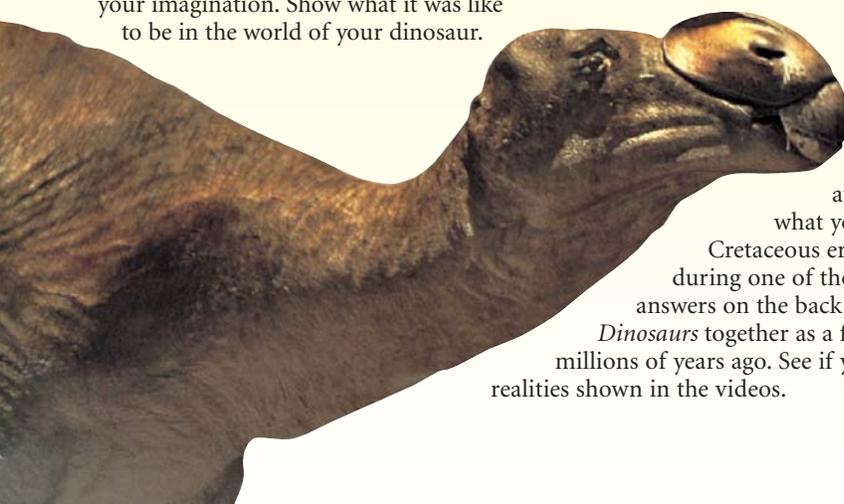
Dinosaur	Era	Dates It Lived	What Its Name Means	Type of Food It Ate



**PART B.** *Walking with Dinosaurs* isn't just about dinosaurs. It makes dinosaurs *come alive!* How'd they do that? It wasn't easy. This program's creators had plenty of unusual challenges—from close-up and distance shots of lifelike dinosaurs to faithful landscapes in a world with only one continent. Let's investigate how you would deal with one of the challenges.

From rain forests in Chile to giant redwood stands in California, the forests, prairies and oceans in *Walking with Dinosaurs* look real—because they are! For instance, for the forest scenes, the makers used visuals from places where prehistoric plants actually survive today. How would you meet the challenge of portraying a dinosaur in its natural habitat? Choose your favorite dinosaur. Find out when it lived. What was the earth like? What was your dinosaur's habitat? Fill in the blanks to get started. Now, create your own display to show where your dinosaur lived. Use art supplies. Use materials from your home or backyard. But most of all, use your imagination. Show what it was like to be in the world of your dinosaur.

1. Dinosaur name: \_\_\_\_\_
2. Time period it lived: \_\_\_\_\_
3. Place(s) it lived: \_\_\_\_\_
4. Temperature: (cool? hot?) \_\_\_\_\_
5. Climate: (rainy, dry?) \_\_\_\_\_
6. Land features: (volcanoes? desert?) \_\_\_\_\_
7. Some prehistoric plants that lived then and now: \_\_\_\_\_  
and \_\_\_\_\_ found in(place) \_\_\_\_\_
8. Some dinosaurs that lived at the same time: \_\_\_\_\_  
and \_\_\_\_\_



**PART C.** Viewing *Walking with Dinosaurs* is like taking a thrilling trip back into time to visit ancient earth at different stages in history. Using the chart from Part A, share what you know with your family about the Triassic, Jurassic and Cretaceous eras. Ask each member of your family: If they could visit our world during one of those time periods, when would they visit and why? List their answers on the back of this sheet to share in class. Better yet, watch *Walking with Dinosaurs* together as a family and get the big picture of what life on our planet was like millions of years ago. See if your family's imagination about life during those eras matches the realities shown in the videos.

# BUILT FOR SURVIVAL

## ACTIVITY TWO

**PART A.** The makers of *Walking with Dinosaurs* give us a unique glimpse into the lives of many kinds of dinosaurs—not just the few most people have heard of. To build a narrative, they had to find out about the physical adaptations that helped dinosaurs survive. Where does that information come from? Fossil remains tell the story. For example, a long, flexible neck combined with grinding teeth indicate that Plateosaurus was a plant-eater. Hips and legs designed for running upright and claws that look like grappling hooks tell us Allosaurus was a powerful predator. Just the shape of a dinosaur’s teeth shows whether it ate leaves in treetops, ferns low on the ground or other dinosaurs.

List three physical adaptations of one dinosaur below. Research information for each physical adaptation. Use what you learn to describe a typical day in the life of your dinosaur, based on the physical characteristics that helped it survive. Continue your scenario on the other side of this sheet.

Dinosaur Species: \_\_\_\_\_ Time Period: \_\_\_\_\_

Dinosaur Physiology Specially Adapted for Survival	How It was Used	What the Physical Adaptation Tells About How the Dinosaur Lived

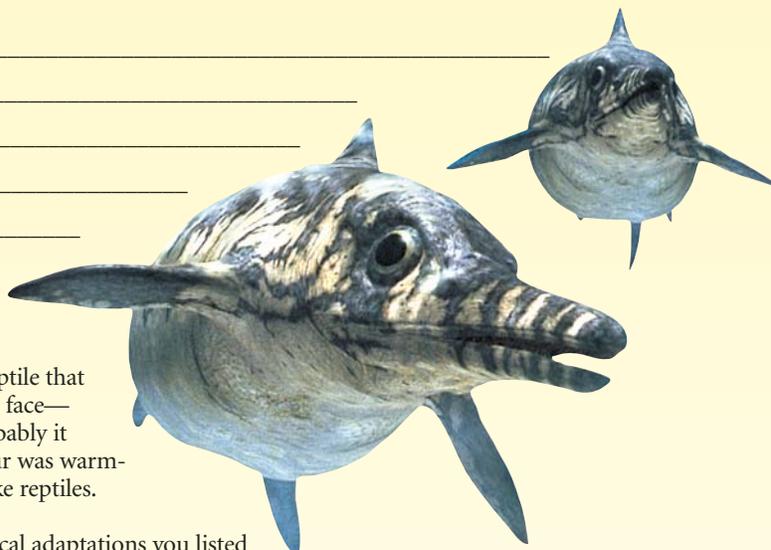
A day in the life of my dinosaur: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



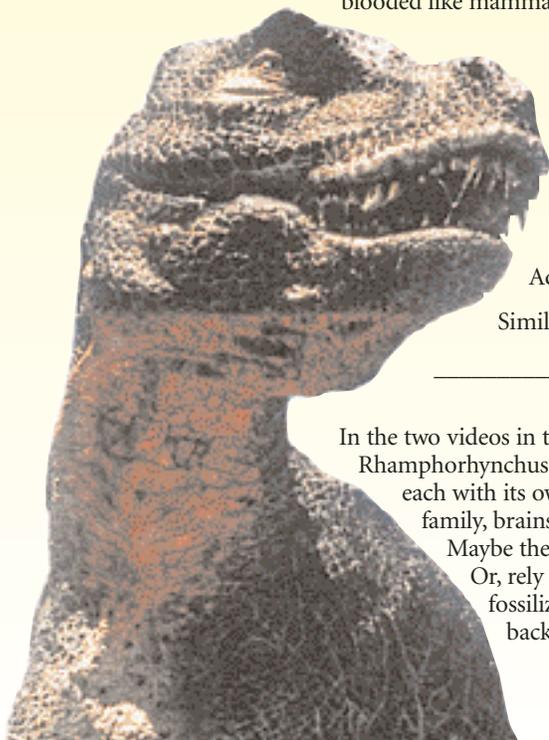
**PART B.** In *Walking with Dinosaurs* we meet the Pterosaur, a flying reptile that had fur over its body, but not on its wing membranes, tail or face—similar to the pattern in modern bats. How did fur help the Pterosaur? Probably it helped by regulating body temperature, which further suggests this dinosaur was warm-blooded like mammals, not cold-blooded like reptiles.

Select one of the physical adaptations you listed above. Create a 3-D display of how the adaptation works. For instance, how would the hips and legs of Allosaurus, designed for upright running, help it run faster? Why is speed important to a predator like Allosaurus, the “lion of the Jurassic”? Explain your work to your classmates. When you’re done, research to find similarities between the physical adaptation you selected and modern animals and list them below.

Adaptation: \_\_\_\_\_

Similarities to modern animals: \_\_\_\_\_

In the two videos in the *Walking with Dinosaurs* set, we observe Placerias, Postosuchus, Cryptoclydus, Rhamphorhynchus, Ophtahalmosaurus, Muttaborrasaurus, Leallynasaura, Koolasuchus, just to name a few, each with its own physical adaptations. Which survival features most intrigue you? With help from your family, brainstorm where you could go to see evidence of dinosaurs and their physical adaptations. Maybe there is a dinosaur park or natural history museum near where you take a summer vacation. Or, rely on a local museum, nature center, zoo, petting farm, rock or shell shop (where fossils and fossilized shells may be seen) or gem and mineral fair. Share the ideas your family came up with back in class.



# CLUES FROM THE PAST

## ACTIVITY THREE

**PART A.** It's truly amazing what paleontologists can learn from the fossil remains of dinosaurs! For instance, *Walking with Dinosaurs* introduces us to the furry ancestors of today's mammals—the Cynodonts. These reptiles had some characteristics of mammals. For instance, tiny holes in the snout part of their skull suggest they had whiskers. If they had whiskers, they may have had fur (needed for temperature control) that suggests that, unlike reptiles, they may have been warm-blooded like mammals. Did Cynodonts actually nurture their young the way they do in the video? Based on the latest evidence, many scientists believe so. Find out where more of the fascinating facts in the video come from by researching real dinosaur digs in history and the kinds of finds that resulted. Then, imagine that you are a paleontologist from one of those digs. Create an exhibit poster for your most exciting fossil discovery. Fill in this information to help you.

1. Who made the discovery: \_\_\_\_\_
2. When: \_\_\_\_\_
3. Where: \_\_\_\_\_
4. Name of dinosaur: \_\_\_\_\_
5. Parts of skeleton found: \_\_\_\_\_
6. What it tells about how the dinosaur lived: \_\_\_\_\_  
\_\_\_\_\_
7. On the back of this sheet, create a diagram that shows how the dinosaur is related to other kinds of dinosaurs.

**PART B.** What was it like to look up and see Ornithocheirus winging by on his migration to the breeding ground? You can find out if you have the opportunity to watch *Walking with Dinosaurs*. In the meantime, research and fill in the measurement associated with each dinosaur listed below. Use your imagination to think of a way to demonstrate length, weight or height, whether large or small—for instance, so many school buses or football fields long, or even bed-lengths.

Dinosaur	Measurement	When It Lived	How I Would Demonstrate It
Plateosaurus	Length:		
Brachiosaurus	Weight:		
Liopleurodon	Length:		
Ornithocheirus	Wingspan:		
Koolasuchus	Width of head:		
Tyrannosaurus	Distance it could open its mouth:		

Finally, think of a creative comparison—the length of the largest marine dinosaur with that of the largest land-dwelling dinosaur is an example. Write your idea and findings below.

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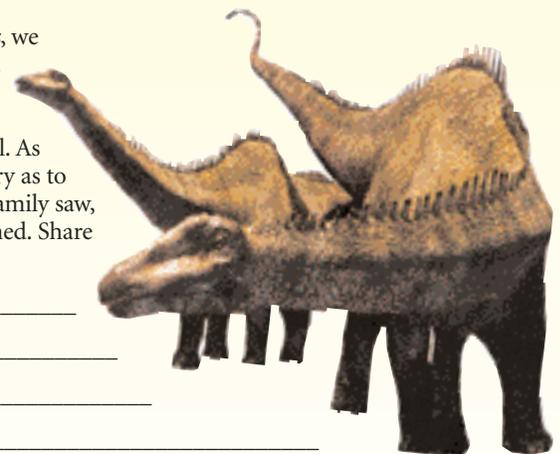
**PART C.** In the episode *Time of the Titans* from the video set *Walking with Dinosaurs*, we observe Diplodocus, longest of the sauropods. Based on clues from fossils it left behind, scientists used critical thinking skills to determine that this dinosaur ate mostly ferns. Take your family on a Mystery Walk. Tell everyone to look for clues to a natural or human event—in your backyard, in your neighborhood, in a park or at the mall. As a group, use your own critical thinking skills: observe, review what you know, form a theory as to what happened and take action to test your theory. Below, document what you and your family saw, how you used your critical thinking skills and what those skills tell you about what happened. Share your results back in the classroom.

What we observed: \_\_\_\_\_

Related facts that we know: \_\_\_\_\_

What happened—our theory: \_\_\_\_\_

How we tested our theory: \_\_\_\_\_



When you watch the *Walking with Dinosaurs* video set, discuss with your family how the creators used the same critical thinking skills.