10 EASY STEPS TO TEACHING DINOSAURS
# Table of Contents

**STEP 1**  Using This Book........................................................................................................ 3-4

**STEP 2**  Gather Great Resources......................................................................................... 5-8

**STEP 3**  Speak the Lingo........................................................................................................ 9-12

**STEP 4**  Set the Scene............................................................................................................ 13-16

**STEP 5**  Plan a Project............................................................................................................. 17-20

**STEP 6**  Teach Ten Terrific Lessons...................................................................................... 21-72

**STEP 7**  Cross the Curriculum............................................................................................... 73-76

**STEP 8**  Tie in Technology..................................................................................................... 77-82

**STEP 9**  Assess Learning......................................................................................................... 83-88

**STEP 10** Celebrate! ............................................................................................................... 89-91

Answer Sheets ......................................................................................................................... 92-93

Vocabulary Cards .................................................................................................................... 94-101
A Note About the Internet

The Internet is a constantly changing environment. The sites listed as additional references were current at the time this book went to press.
INTRODUCTION TO DINOSAURS

There’s a lot more to understanding dinosaurs than simply identifying a T. rex or knowing that dinosaurs roamed the Earth millions of years ago. A complete study of dinosaurs includes the science of paleontology, geography, geology, biology, timelines, measurement, and much more.

In this unit of study, students will learn about common kinds of dinosaurs and how we know they existed. But we couldn’t stop there, so we’ve included lessons on possible dinosaur lifestyles, dinosaur fossils, dinosaur diets, dinosaur extinction, and dinosaur ancestors that exist today.

Each of the following lessons in Step 6 features a quick, informative mini-lesson, easy to accomplish experiments and activities, a journal prompt, and a homework idea.

1. Fossils
   Objective: To learn about fossils and what they tell us about dinosaurs.

2. Paleontology
   Objective: To understand the job of a paleontologist.

3. The Early Life of Dinosaurs
   Objective: To recognize that most dinosaurs hatched from eggs and to learn what paleontologists know about dinosaurs’ early years.

4. Herbivore or Carnivore?
   Objective: To learn that plant-eating dinosaurs and meat-eating dinosaurs had different types of teeth.

5. More About Herbivores
   Objective: To investigate the common characteristics of plant-eating dinosaurs.

6. More About Carnivores
   Objective: To investigate the common characteristics of meat-eating dinosaurs.

7. Small Dinosaurs
   Objective: To study small dinosaur species and their distinct characteristics.

8. Large Dinosaurs
   Objective: To study large dinosaur species and their distinct characteristics.

9. Extinction
   Objective: To explore the scientific theories behind dinosaur extinction.

10. Prehistoric Animals that Still Exist Today
    Objective: To learn about animals that have changed little since prehistoric times and to compare their characteristics to those of dinosaurs.

In addition to the lessons and experiments, this book contains many other tools to help you make this unit more complete, including:

- A list of books and web sites for you and your students. (Step 2)
- A vocabulary list of dinosaur words and definitions along with vocabulary worksheets, puzzles, and pocket chart activities. The back of the book contains a pocket chart card for each vocabulary word. You can use the pocket on the inside back cover to store the cards once they’re torn out from the book. (Step 3)
- Learning center ideas filled with information to help you set up classroom dinosaur centers and an area for students to work on a dinosaur bulletin. (Step 4)
- Information for an ongoing project that allows students to create fossils. (Step 5)
- Cross-curricular learning ideas to carry the study of dinosaurs into other areas of your curriculum. This includes calculating the amount of food a T. rex might eat, listing adjectives that describe different dinosaurs, and learning more about the locations of the various dinosaur digs that are in progress today. (Step 7)
- Connections to technology with a web page project on paleontology and a multimedia presentation on dinosaurs. (Step 8)
- Assessment tools including rubrics, journals, and tests. You’ll find plenty of tools and ideas for alternative or traditional assessment of student learning. (Step 9)
- A culminating game and celebration that allow the students to “show what they know” while reinforcing the content covered. (Step 10)
Great Resources for You

It’s impossible to be an expert on every subject you teach, yet that’s exactly how your students see you. Before you begin teaching this dinosaur unit, spend a few nights reviewing the following web sites and books, and you’ll be up to speed in no time!

Web Sites

Dinobase
http://palaeo.gly.bris.ac.uk/dinobase/dinopage.html
This is an incredibly organized database of dinosaur information. The site also includes inquiry-driven links that help find answers to common dinosaur questions.

Dinorama
http://www.nationalgeographic.com/dinorama/frame.html
This National Geographic site contains information about every dinosaur type and prehistoric time period. You’ll also find a lot of great information on dinosaur discoveries, as well as interesting “fun facts.” The site is full of links to other National Geographic information and additional dinosaur sites outside its web confines.

Dinosaurs
On this site, you will find information on more than 50 dinosaurs. Each profile is presented in easy-to-read language and is accompanied by clear illustrations. This site also does a wonderful job of organizing the information by time period.

Books That Help Prepare

Benton, Michael. Focus on Dinosaurs. New York: Shooting Star Press, 1994. This book uses clever icons to point out dinosaur information and activities that fall into the following categories: geography, language and literature, science, history, math, arts and crafts, and music.


Tanaka, Shelley. Graveyards of the Dinosaurs. New York: Hyperion, 1998. This book combines incredible photography with illustrations to tell the story of seven different “dinosaur graveyards,” or sites where large numbers of fossils have been discovered. The author describes how the fossils were found and what life might have been like in that particular area millions of years ago.
GATHER GREAT RESOURCES

Great Resources for Your Students

Surrounding your students with great resources is a sure way to stimulate learning. The first step is to encourage your students to take a look at a few of the great web sites and books listed on this page and on page 7. The field trip ideas in this section will also get your students in gear for dinosaurs. You’ll have a captive audience before you even begin teaching!

Web Sites

Dinobase
http://palaeo.gly.bris.ac.uk/dinobase/dinopage.html
This is a well organized database of dinosaur information. The site also includes inquiry-driven links that help students find answers to common dinosaur questions.

Dinorama
http://www.nationalgeographic.com/dinorama/frame.html
This National Geographic site contains information about every dinosaur type and prehistoric time period. There’s also a lot of great information on dinosaur discoveries and interesting “fun facts.” The site is full of links to other National Geographic information and additional dinosaur sites outside its web confines.

Fossil Zone
http://www.discovery.com/exp/fossilzone/fossilzone.html
This site is fun and educational. Students can build a dinosaur out of bones, learn about recent fossil discoveries, or check out the dinosaur gallery.

Kinetosaurs
http://206.230.113.73/kinetosaur/
This site is so interesting! It combines art, science, and history into one incredible package. See how artist John Payne uses science and art to create dinosaur sculptures and make them move! You can also find out about individual dinosaurs in the dinosaur database and then print and color the pictures.

Nova Online: Curse of T. rex
http://www.pbs.org/wgbh/nova/trex
This Nova site looks into all the factors surrounding the life of T. rex. It also has a great article on other types of life that may have been around during the days of the dinosaurs. This is the companion site to a great Nova special, which is worth getting on tape.

Project Exploration
http://www.projectexploration.org
This site takes students on an expedition to Egg Mountain, the famous dinosaur-nesting site in Montana. Students will learn about digging up, preparing, and studying dinosaur bones.

Walking With Dinosaurs
http://www.discovery.com/exp/fossilzone/fossilzone.html
Read through the fact files, play a dinosaur game, learn about dinosaur footprints, send a dinosaur postcard, or find out about extinction — it’s all possible with this BBC site.
Great Resources for Your Students

Books

Brandenberg, Aliki. Digging Up Dinosaurs.
Like almost all Aliki books, the story format of this informative text teaches as it entertains. Any child that dreams of becoming a paleontologist will want to read this book over and over again.

Brandenberg, Aliki. Dinosaur Bones.
Aliki does a great job of telling factual information in a story format. Students will learn about the discovery of the first fossil and how the science of paleontology has grown over the years. The table at the end of the book lists all the dinosaurs shown or mentioned in the book and includes where and when they lived.

Ms. Frizzle is at it again! This time, that crazy bus of hers takes the class to visit paleontologists at a dinosaur dig, but before they realize what’s happening, the bus turns into a time machine that takes them back to prehistoric times and the land of dinosaurs.

Gurney, James. The World of Dinosaurs.
This book mixes photos with great illustrations and just the right amount of text to cover the dinosaur “basics.” The foldout pages within the book will be popular destinations for adults and children.

Hornblow, Lenora. Prehistoric Monsters Did the

Strangest Things.
This book features 25 short stories designed to explain many dinosaur questions and oddities. The stories are short yet informative — and never boring.

Like all the other Eyewitness Books, this book uses great photography and illustrations to educate the reader. The topics take up a two-page spread and the information is concise yet very informative.

This book has beautiful hand-drawn illustrations and insightful stories about T. rex and all its other “big” relatives. The world map at the front of the book is a big plus. It labels areas where the giant Mesozoic creatures lived.

This book combines dramatic photography with illustrations to tell the story of seven different “dinosaur graveyards,” or sites where large numbers of fossils have been discovered. The author describes how the fossils are found and what life might have been like in that particular area millions of years ago.

Guest Speaker Ideas

1. A paleontologist from a local university.
2. Someone who has taken part in an actual dig.
3. A travel agent who can describe adventure vacations in the most popular “dinosaur graveyard” areas.
4. A librarian who can bring along a wide variety of nonfiction dinosaur reading and research material.

Field Trip Ideas

1. Visit a museum to view fossils and life-size dinosaur models on display.
2. Inquire about school field trips if you live near an actual dig site.

© Learning Resources, Inc.
Dear Parents:

Over the next few weeks our class will be studying dinosaurs. Our topics of interest will include:

1. Fossils
2. Paleontology
3. The Early Life of the Dinosaurs
4. Herbivores and Carnivores
5. More About Herbivores
6. More About Carnivores
7. Small Dinosaurs
8. Large Dinosaurs
9. Extinction
10. Prehistoric Animals that Still Exist Today

If you have personal stories or insights to share on any of the above listed topics, we would love to have you come in and talk to the class. We would also appreciate any materials (books, videos, and posters) that you’d be willing to share for the next few weeks.

Reinforcing learning at home will help your child retain the information learned in school. Try to find time to discuss the topics, ask questions, and stay involved with homework and projects. If possible, explore the following web sites with your child.

Dinobase
http://palaeo.gly.bris.ac.uk/dinobase/dinopage.html

Dinorama
http://www.nationalgeographic.com/dinorama/frame.html

Dinosaurs

Fossil Zone
http://www.discovery.com/exp/fossilzone/fossilzone.html

Thank you for all your help and support.
**Dinosaur Vocabulary**

Understanding the meanings of key words before delving into the topic will help students grasp the concepts later on. The pages in Step 3 provide the practice to help students retain the words and their definitions. The worksheets are based on the following list of vocabulary words from the lessons in Step 6. Each word is also printed on the pocket chart cards located at the end of this book.

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>dinosaur</td>
<td>large reptile that lived on Earth millions of years ago; <em>dinosaur</em> means “fearfully great lizard”</td>
</tr>
<tr>
<td></td>
<td>fossil</td>
<td>remains or evidence of dinosaurs usually preserved in rock or some other material; fossils can be imprints or the actual bones</td>
</tr>
<tr>
<td></td>
<td>reptile</td>
<td>cold-blooded animal covered with scales that lays eggs on land</td>
</tr>
<tr>
<td>2</td>
<td>paleontologist</td>
<td>scientist who studies plants and animals from the past</td>
</tr>
<tr>
<td>3</td>
<td>egg</td>
<td>where most dinosaurs began their lives</td>
</tr>
<tr>
<td>4</td>
<td>sand</td>
<td>building material for some dinosaur nests</td>
</tr>
<tr>
<td>5</td>
<td>beaks</td>
<td>jaws that protrude from an animal’s face; common feature of many plant-eating dinosaurs</td>
</tr>
<tr>
<td>6</td>
<td>carnivore</td>
<td>animal that eats other animals (“meat eater”)</td>
</tr>
<tr>
<td></td>
<td>herbivore</td>
<td>animal that eats plants (“plant eater”)</td>
</tr>
<tr>
<td></td>
<td>theropod</td>
<td>another name for meat eaters</td>
</tr>
<tr>
<td>7</td>
<td>Compsognathus</td>
<td>“pretty jaw,” small, chicken-sized dinosaur that walked on 2 legs, ran quickly, ate meat</td>
</tr>
<tr>
<td></td>
<td>Microvenator</td>
<td>“small hunter,” small, turkey-sized dinosaur that walked on 2 legs, had a long neck, had a big brain, ate meat</td>
</tr>
<tr>
<td></td>
<td>Mussaurus</td>
<td>“mouse lizard,” small dinosaur measuring 9-16 inches (22.8-40.6 cm) long, ate plants</td>
</tr>
<tr>
<td></td>
<td>Psittacosaurus</td>
<td>“parrot lizard,” small dinosaur that stood 4 feet (1.2 m) tall, walked on 2 or 4 legs, had horns on cheeks, ran quickly, ate plants</td>
</tr>
<tr>
<td></td>
<td>Saltopus</td>
<td>“leaping foot,” small cat-sized dinosaur that walked on 2 legs, had a long head, ran quickly, ate meat</td>
</tr>
</tbody>
</table>
### Lesson 8

<table>
<thead>
<tr>
<th>Apatosaurus (Ah-PAT-oh-SORE-us)</th>
<th>extinct species of animal that has died out or no longer exists</th>
</tr>
</thead>
<tbody>
<tr>
<td>“thunder lizard,” large dinosaur measuring 70-90 feet (21.4-27.5 m) long, walked on 4 legs, ate plants</td>
<td></td>
</tr>
<tr>
<td>Carcharodontosaurus (kar-kar-o-don-toh-SORE-us) “shark tooth lizard,” large dinosaur measuring up to 45 feet (13.7 m) long with 8 inch (20.3 cm) long teeth, walked on 2 legs, ate meat</td>
<td></td>
</tr>
<tr>
<td>Edmontosaurus (ed-mon-toh-SORE-us) “Edmonton lizard,” large dinosaur measuring 42 feet (12.8 m) long, had a duck-bill</td>
<td></td>
</tr>
<tr>
<td>Triceratops (try-SERRA-tops) “three horned face,” large dinosaur measuring 30 feet (9.1 m) long, walked on 4 legs, ate plants</td>
<td></td>
</tr>
<tr>
<td>Tyrannosaurus rex (tie-RAN-oh-SORE-us REX) “tyrant lizard king” or “T. rex,” large dinosaur measuring 40 feet (12.2 m) long, very smart, walked on 2 legs, had sharp 9 inch (22.9 cm) long teeth, ate meat</td>
<td></td>
</tr>
</tbody>
</table>

### Lesson 9

| shape mouth, walked on two legs, ran slowly, ate plants |

### Lesson 10

| prehistoric animal that lived before people began recording history in writing |

---

### Pocket Chart Vocabulary Activities

Using your pocket chart cards and a pocket chart, try a few of the activities listed below to introduce and develop dinosaur vocabulary words.

#### Begin Each Lesson

Begin each lesson by showing the new vocabulary words that apply for that lesson. At the end of each lesson, review the words with your students together.

#### Quick, What’s the Question?

Play “What’s the Question?” Divide the class into teams. Pull one vocabulary card, and give its definition without showing the face of the card. The first team to “buzz in” with the correct word receives a point. Continue until all the cards have been revealed.

#### Dinosaur Math

Use the dinosaur picture cards to play a matching game. Match the picture of the dinosaur with the name of that dinosaur.

#### Definition, Please

Play “What’s the Definition, Please?” Place all the cards in the pocket chart. Divide the students into four teams. Teams take turns sending a player up to the chart to retrieve a card to take back to their group. The group then has 30 seconds to come up with a definition for the word they choose to receive a point. If they don’t come up with the correct definition, the other teams have the opportunity to answer. Play resumes with the next team going up to draw a card. Continue until all the words have been defined.

#### Vocabulary Sorting

Sort the words into categories: herbivores, carnivores, paleontology, and so on. Discuss instances where words could be placed in multiple categories.

#### Dino Cards Learning Center

Consider creating a learning center with the vocabulary cards. Encourage students to use the cards in the following ways:

- As flash cards, and students race to see who can come up with the correct dinosaur name
- By placing the words in alphabetical order
- By sorting the cards according to dinosaur diets (herbivore or carnivore)
- By placing the pocket chart cards in a pile, drawing five cards, and then writing a sentence using the word or image from each of the cards that was drawn
Dinosaur Vocabulary Practice

Fill in the blank with the correct word from your dinosaur vocabulary word sheet or pocket chart words. If you need help, use the Word Bank.

1. A(n) _________________ animal lived before people began recording history in writing.

2. A(n) _________________ eats meat.

3. A(n) _________________ is a plant-eater.

4. The _________________ is the hard framework of an animal’s body.

5. Most dinosaurs began their life inside an _________________.

6. A(n) _________________ was a large reptile that lived on the Earth millions of years ago.

7. The remains or evidence of dinosaurs usually preserved in rock are called _________________.

8. A(n) _________________ studies plants and animals from the past.

9. An animal species becomes _________________ when it dies out.

Word Bank:
prehistoric  carnivore  herbivore
egg           skeleton  fossils  dino-
saur          extinct   paleontologist
SPEAK THE LINGO

Name ______________________________________________

Dinosaur Vocabulary Crossword

Fill in the crossword puzzle with the clues. Use the word bank if you need help.

Across
1. name that means “three-horned face”
2. a name for meat eaters
3. nests were made from this
4. remains or evidence of dinosaurs
5. a carnivore also has this name

Down
6. also known as T. rex
7. word for a species of animals that has died out or no longer exists
8. where many dinosaurs began their lives
9. large reptiles that lived on earth millions of years ago

Word Bank:
carnivores fossils Tyrannosaurus rex
dinosaurs sand Triceratops
extinct eggs theropod
Step 4
SET THE SCENE

Classroom Learning Centers

Just as the backdrops and costumes are important to a play, a welcoming classroom environment is important to foster learning. The room should be fun, inviting, and interactive. With that in mind, this section features learning center activities and bulletin board ideas to help you set up the room for a study of dinosaurs.

1. Create a Dino Learning Center

This center allows students to exercise their minds while using their hands. Allow students to use the materials below to create their own replica of a dinosaur skeleton. Remind them to use the photos or drawings for reference. Then, add labels identifying the dinosaur to the base of each creation, and place each student’s dinosaur on display to create your own natural history museum. You’ll want to keep the following materials at this learning center for students to use in creating their dinosaurs:

- pipe cleaners
- thin, flexible wire
- toothpicks or tongue depressors
- photos or drawings of actual dinosaur skeletons
- clay for a base
- labels

2. Interview a Dino Learning Center

Kids love to tape record their own voices, so why not give them the opportunity? Encourage students to work in pairs to research a specific dinosaur. Then, have the students create interview questions for the dinosaur they researched. Suggest questions about the dinosaur’s appearance, habits, diet, and so on. Allow students to take turns role playing as the interviewer and the dinosaur. Set aside time at the end of each day to play the tapes for the entire class. Be sure to keep these materials at this learning center:

- dinosaur information books
- tape recorder
- microphone
- blank tapes
- notes about specific dinosaurs
- pencils

3. Dino Dig Learning Center

This learning center gives students the opportunity to take on the role of amateur paleontologists. Start this experiment by burying plastic replicas of dinosaur bones in a sand table each morning. Then, allow students to use tools like small shovels to uncover the bones. Teach them to treat the bones as a paleontologist might (i.e., by carefully extracting them from the sand and removing debris with a brush). Then, challenge students to identify the bones with an identification chart that has the bone name and dinosaur to which it belongs and to record information from each day’s dig. Be sure to keep extra small brushes, shovels, identification charts, and student recording sheets handy.

4. Experiment Learning Center

This center will help you organize all of the experiments in this book for your students. Be sure to have the following materials at this station:

- supplies for the experiments in Step 6
- experiment Science Logs

You may also want to include directions at this center for other experiments you’ve come across during your research.
Learning Centers Checklist: Teacher

Use this checklist to record which students have completed each center activity. Record a grade or symbol to reflect the level of completion to the left of each learning center. You could use the wider column beneath each learning center to jot a note about the student’s performance and the date completed.

<table>
<thead>
<tr>
<th>Student</th>
<th>1. Create a Dino</th>
<th>2. Dino Interview</th>
<th>3. Dino Dig</th>
<th>4. Dinosaur Experiments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Learning Centers Checklist: Students

Photocopy this page for each student, and cut it in half. Have your students use this sheet for sign-off by you or a peer each time they successfully complete a center. Remind students that completing more than one center a day or repeating a center during the week is permitted.

<table>
<thead>
<tr>
<th>Name</th>
<th>_______________________________</th>
<th>Date</th>
<th>____________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centers</td>
<td>Week</td>
<td>Monday</td>
<td>Tuesday</td>
</tr>
<tr>
<td>______ – ______</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Create a Dino</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Dino Interview</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Dino Dig</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Dinosaur Experiments</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
No Bones About It

On construction paper, draw a dinosaur habitat. Color or paint the scene. Place a large dinosaur in the middle of the scene. Over the course of the unit, allow students to glue large pasta pieces, toothpicks, tongue depressors, sticks from frozen treats, or other art materials onto the large dinosaur to make its skeleton. You’ll also want to show samples of dinosaurs and their skeletons at this bulletin board. Locate several pictures of dinosaurs and their skeletons. Make two copies of the dinosaur’s skeleton. Laminate the copies for durability. Staple one set of skeleton copies in a row on the bulletin board. Tape or staple a copy of the matching dinosaur picture over each skeleton. Tape or staple the top of the picture only, so students can raise it to see the skeleton beneath.

Store the second set of dinosaur skeleton copies in a large pocket attached to the board. Students can match skeletons and dinosaurs from the pocket. They can self-check their work by raising the dinosaur on the board to reveal the correct skeleton. Use a corner of the board as an area to post students’ questions about dinosaurs. Be sure to leave space after each question for the answer as you come across it in your studies.

Dino Data

This is an interactive learning bulletin board designed to highlight the “wow” factor so often associated with the study of dinosaurs. This board should be divided into four interactive areas:

1. Current Events: Create a space where students can post current happenings in the world of paleontology. Ask students to bring in newspaper clippings, printouts from web sites, and stories from current magazines that cover dinosaurs and paleontology.

2. Focus on Footprints: Make several life-sized dinosaur footprints. Write the name of the dinosaur below its footprint. Challenge students to find out how many human footprints fit inside each dinosaur footprint. Tell them to trace an outline of their feet on each dinosaur footprint, repeating this until no more footprints fit inside. Record how many human footprints fit inside each particular dinosaur’s footprint.

3. Fun Facts: As you study dinosaurs, you’ll certainly come across many fun and interesting facts. Whenever a fact comes up, have a student write the fact on a sentence strip or note card and place it on the bulletin board. At the end of the unit, you’ll have a board full of amazing but true facts.

4. Data at a Glance: Create a chart that allows students to add information about each dinosaur as they learn about it. A chart like the one below will serve as an easy-to-access reference guide.

<table>
<thead>
<tr>
<th>Name &amp; Picture</th>
<th>Length</th>
<th>Weight</th>
<th>Height</th>
<th>Food</th>
<th>Unique Features</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Step 5

PLAN A PROJECT

Fossil Formation

Requiring students to put their knowledge and skills to work is a great way to ensure long-term retention of content. In Step 5: Plan a Project, students have an opportunity to gather information over a long period of time and share their data.

This project allows students to observe the process of decomposition first-hand and to gain a better understanding of the process of fossilization.

1. Create a Compost Pile
   Start a compost pile outside your classroom. Work with school personnel to identify a location for your pile. Build a bin no smaller than three square feet, but no larger than five square feet. A bin is not a must; a loose pile will work just fine. However, containing the pile within a bin makes it easier to turn and maintain.

   Start your pile with as many natural, decomposable materials as possible — mainly “brown ones” (such as leaves, shredded paper, a large bag of dirt) and “green ones” (such as grass clippings and vegetable scraps). Be sure to shred materials into small pieces before adding them to the pile. Add a little nitrogen (such as coffee grounds or fertilizer) to help speed up decomposition.

2. Buy a Bone
   Ask your butcher for a large cow bone. Bury it in the compost pile.

3. Add To and Turn the Pile
   Once a week have students save vegetable scraps from the lunchroom to add to the pile. As you add the scraps, turn the pile and check the moisture. Turn the pile once a week, keeping the pile moist, but not wet. A pitchfork works much better than a shovel for turning the pile.

4. Observe and Record Changes
   Students should observe and record the changes that happen in the pile and to the bone each week on their log sheets. They will notice that the bone is remaining intact while the other materials are decaying.

5. Write a Report
   Have students use the report form provided on page 20 to compile their findings and record their opinions.

6. Put Your Compost to Work
   At the end of the school year, spread the compost around shrubs and flowers on the school grounds. It’ll act as a fertilizer.

   Note: True fossils contain no bone material. (Minerals replace the bone.) These minerals take a long time to form; and they form under very special conditions. Although the bone in the compost pile will eventually decay, students will see how this activity models the formation of real fossils by observing how soft materials, like skin and muscle, decay quickly, while hard materials, like bones and teeth, do not.
Fossil Checklist

Use this chart to plan each step of the compost project, set goals, and keep up with the progress. Note: This project will take more than 5 weeks to complete.

<table>
<thead>
<tr>
<th>Project Tasks &amp; Goals</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collect Compost Material</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collect Data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpret Data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Write a Report</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share the Report with the Class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Weekly Compost and Fossil Observation Log

Use this observation log to record your findings. Be sure to write about what the compost looks like, what the bone looks like, and what you think will happen to each at the end of the project.

<table>
<thead>
<tr>
<th>Date</th>
<th>Compost Observations</th>
<th>“Fossil” Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Fossil and Compost Report

Use this page to write up your report from the Compost and Fossil project.

What We Did: ____________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Materials We Used: _______________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Weekly Activities and Observations: _______________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Length of Experiment: ____________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Outcome: ______________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

My Thoughts: ____________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Name ________________________________________________________________
Step 6
TEACH TEN TERRIFIC LESSONS

Introduction

The 10 lessons presented on the pages that follow provide a comprehensive study of dinosaurs. Work through the steps in order, or pick and choose the activities that will enhance what you’re already teaching — the choice is yours!

Each lesson contains 3 parts:

1. Teacher Note Page(s)
   Provides a general overview of the lesson’s topic. These pages include:
   • They’ll Need to Know ... for a general overview of the lesson’s topic
   • Prove It! for points to bring up as students are working through the experiments
   • Journal Prompt to assess student learning and to give students the opportunity to put the science concept into their own words and/or expand their thinking beyond the topic
   • Homework Idea to follow up on the concept at home

2. Experiments and Activities
   Provides hands-on experiences designed to reinforce the day’s lesson. The teaching notes page provides background information for each experiment.

3. Science Log
   Provides a space for students to record the concepts learned and their observations from the experiments.
Overview

The following table explains the objective of each lesson as well as the experiments, activities, and supplies needed in each lesson. Be sure to collect these supplies in advance.

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fossils: Students learn about fossils and what they tell us about dinosaurs.</td>
<td>Experiment 1: Making an Imprint: sand, water, large containers, objects with which to make impressions</td>
</tr>
<tr>
<td></td>
<td>Experiment 2: Making a Fossil: half-pint milk containers, petroleum jelly, shells, rocks, or other hard objects, plaster of Paris, large bowls or small buckets, water, newspaper, small paintbrushes or toothbrushes, hammers, goggles, screwdrivers</td>
</tr>
<tr>
<td></td>
<td>Activity 1: Show What You Know: Fossils: page 28</td>
</tr>
<tr>
<td>2. Paleontology: Students find out about the job of a paleontologist.</td>
<td>Experiment 1: Digging for Fossils: large pan of Crispy treats with up to five non-melting ingredients added (such as dried beans, raisins, pasta, nuts, jellybeans), construction paper, toothpicks, small brushes, paper plates, bar graph sheet (page 32), crayons</td>
</tr>
<tr>
<td></td>
<td>Activity 1: Paleontology Puzzle: page 33, tape</td>
</tr>
<tr>
<td>3. The Early Life of Dinosaurs: Students recognize that most dinosaurs hatched from eggs and learn what paleontologists have discovered about the early years of dinosaurs.</td>
<td>Experiment 1: Dinosaur Eggs: raw chicken eggs, tall drinking glasses, vinegar, water, spoon, newspaper</td>
</tr>
<tr>
<td></td>
<td>Activity 1: Hatching Dinosaur Art: plastic eggs that open in halves, small, medium, and large pom-poms, felt, scissors, pinking shears (optional), glue, “wiggly” craft eyes</td>
</tr>
<tr>
<td></td>
<td>Activity 2: Show What You Know: Scrambled Dinosaur Eggs: page 38</td>
</tr>
<tr>
<td>4. Herbivore or Carnivore?: Students learn that plant-eating dinosaurs and meat-eating dinosaurs had different types of teeth.</td>
<td>Experiment 1: Eating With Your Own Teeth: mirrors, celery, lettuce, other green vegetables, sandwich meat, hamburger or other cooked meat, water or juice (optional)</td>
</tr>
<tr>
<td></td>
<td>Experiment 2: Tooth Models: apples, peanut butter, plastic knives, marshmallows, candy corn, paper plates</td>
</tr>
<tr>
<td></td>
<td>Activity 2: Show What You Know: Dinosaur Food Match: page 44, scissors</td>
</tr>
<tr>
<td>5. More About Herbivores: Students investigate the common characteristics of plant-eating dinosaurs.</td>
<td>Experiment 1: Herbivore Teeth: wooden blocks, celery, lettuce, leaves, or other plant material, newspaper, latex gloves, raw meat, such as chicken, beef, or a pork chop, disinfectant spray, paper towels</td>
</tr>
<tr>
<td></td>
<td>Experiment 2: Herbivore Defenses: pictures of plant-eating dinosaurs, construction paper, hard materials, such as toothpicks, craft sticks, tongue depressors, straws, pipe cleaners, and sequins, soft materials, such as cotton balls, felt, pom-poms, fur, and feathers, glue, scissors, crayons</td>
</tr>
<tr>
<td></td>
<td>Activity 1: Show What You Know: Following Dino Directions: page 49, crayons</td>
</tr>
</tbody>
</table>
### Overview (continued)

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Supplies</th>
</tr>
</thead>
</table>
| 6. More About Carnivores: Students investigate the common characteristics of meat-eating dinosaurs. | Experiment 1: Snippers: scissors, various cooked meats, such as fish, chicken, or beef  
Experiment 2: Hide and Seek: red, yellow, blue, and green dinosaurs, red, yellow, blue, and green play dough  
Activity 1: Show What You Know: Dinosaur Match: page 53 |
| 7. Small Dinosaurs: Students identify common species of small dinosaurs and their distinct characteristics. | Experiment 1: Sizing Up: overhead transparencies, photocopied pictures of a Tyrannosaurus rex and Mussaurus, 12” x 18” sheets of construction paper, tape, overhead projector, long extension cord, rolling cart, yard stick  
Activity 1: Show What You Know: Small Dinosaurs Word Scramble: page 58 |
| 8. Large Dinosaurs: Students identify common species of large dinosaurs and their distinct characteristics. | Experiment 1: Balancing Act: large marshmallows, plastic straws, paper and pencils, pictures of a dinosaur walking on 2 legs (biped) and on 4 legs (quadruped), scissors  
Activity 1: Show What You Know: Large Dinosaurs Crossword Puzzle: page 63 |
| 9. Extinction: Students explore scientific theories behind dinosaur extinction. | Experiment 1: Extreme Changes: three green potted plants, labels, marker, access to freezer and dark closet, camera, board to display photos  
Activity 1: Show What You Know: My Dinosaur Theory: page 67 |
| 10. Prehistoric Animals that Still Exist Today: Students identify animals that have changed little since prehistoric times and compare their characteristics to those of dinosaurs. | Experiment 1: Alike and Different: pictures of various dinosaurs, pictures of different present-day animal species (see page 72 for ideas), drawing paper, crayons, dinosaur/animal stencils  
Activity 1: We Lived with the Dinosaurs!: page 71, large envelopes, index cards  
Activity 2: Show What You Know: Past to Present: page 72 |
Lesson 1: Fossils

Use this page when you introduce Fossils to your students. The fun facts can be used to draw your students into the topic.

They’ll Need to Know …

Millions of years ago, ancient reptiles called dinosaurs roamed the Earth. They became extinct long before humans began recording history so there is no written record of them. Thanks to fossils, however, scientists have learned about various dinosaurs and their habits. They have even been able to reconstruct dinosaur bones so it is now possible to get an idea of how dinosaurs looked and moved.

Fossils at a glance:
- Scientists know about dinosaurs because of the fossils they have found.
- Fossils are the remains or evidence of the dinosaurs.
- Fossils can form from imprints, or from actual bones that, over time, have turned to stone.

Prove It!

Discuss the fossil experiments on the next few pages. You may want to simplify and display the directions in a manner appropriate for your age group. Emphasize that fossils are not only objects, but imprints of objects as well. Emphasize the importance of safety when using the hammer and blunt instruments.

Experiment 1: Making an Imprint Teaching Notes:
In this experiment, students will see that when objects are pressed in the sand and removed, they leave an imprint much like the imprints dinosaurs left long ago.

Experiment 2: Making a Fossil Teaching Notes:
Be sure to explain to students what the plaster of Paris represented when it dried and hardened around the object. The plaster of Paris was similar to the way sand and sediment hardens around dinosaur remains to create fossils. You can also introduce to students how cautious paleontologists need to be when they’re working with fossils.

Journal Prompt

Pretend it has rained and you go outside and find a footprint in the mud. Who or what left it? How do you know? What do you think that footprint will look like millions of years from now? Write about it.

Homework Idea

Encourage students to find something at home that will make an imprint, and place a piece of unlined paper over the object. Tell students to rub the side of a crayon over the paper. Then, invite students to bring the paper to school and challenge the class to guess which object each student used to make their rubbing.

Fossilized skin prints from dinosaurs show what texture the skin had.

The fossil of a bone doesn’t have any bone in it. It actually turned to rock as minerals replaced the bone.
Experiment 1: Making an Imprint

Try This!
Work as a class first to show the experiment. Then have students work in small groups to experiment with imprints similar to those left behind by fossils. Have students record their findings on the Making an Imprint Science Log.

Procedure:
1. Pour sand into one container.
2. Add enough water to the container so the sand holds together.
3. Place an object in the sand to make an imprint.
4. Remove the object, and allow children to observe the imprint. Discuss how it compares to the object that made it.
5. Smooth the sand in the container. Use other objects to make imprints in the sand, but don’t let students watch as you do this. When you finish, challenge students to guess which object made each imprint.
6. Divide children into small groups.
7. Give each group a container of wet sand and imprint materials. Let them repeat the experiment.

What Happened?
What happened when you pressed an object into the sand? What kind of imprint did it leave behind? Were you always able to tell what the object was based on the imprint? Why or why not? How is the imprint like a fossil?
Experiment 2: Making a Fossil

Try This!
Have students work individually or in pairs to create their own fossil. Note: This is a two-day experiment. Express the importance of safety when working with the screwdrivers and hammers. Have students fill in their observations on the Making a Fossil Science Log.

Procedure:
1. Be sure the objects are clean. Give each child one object and one milk container.

2. Help children cover the objects with a thin coat of petroleum jelly. Next, help them cover the inside surfaces of their milk containers with petroleum jelly.

3. Mix plaster of Paris according to package directions. You will need enough to fill each child’s milk container.

4. Pour 2 inches (5.1 cm) of plaster of Paris mixture into each milk container.

5. Have children place their objects in their containers.

6. Cover the objects with another layer of plaster of Paris.

7. Let the plaster dry thoroughly (at least 24 hours).

8. When the plaster is dry, help children peel their milk containers off the plaster blocks.

9. Cover students’ work areas with newspaper.

10. Have children put on goggles. Show them how to carefully chip away the plaster with a hammer and a screwdriver. When they reach the “fossil,” they should clean the last bit of plaster away with a brush.

What Happened?
What happened when the plaster of Paris dried? Was it easy to find your object? Paleontologists find dinosaur fossils in hardened rock, called sediment. How is the plaster of Paris like sediment?
Making an Imprint

Question: How are imprints made? ____________________________

________________________________________________________________________

What I did:________________________________________________________________

________________________________________________________________________

What happened: ___________________________________________________________________

________________________________________________________________________

Why it happened: ___________________________________________________________________

________________________________________________________________________

Making a Fossil

Question: How did dinosaur fossils form? ____________________________

________________________________________________________________________

What I did: ___________________________________________________________________
FOSSILS

Activity 1: Show What You Know: Fossils

Draw a line from the object to its matching fossil.

1. human
   - A.

2. leaf
   - B.

3. shell
   - C.

4. large dinosaur
   - D.

5. bird
   - E.

Name _________________________________________________
Lesson 2: Paleontology

Use this page when you introduce the science of Paleontology to your students. The fun facts can be used to draw your students into the topic.

They’ll Need to Know ...

Paleontologists are scientists who systematically study life from the past, mainly by studying fossils. Only rarely are complete dinosaur skeletons found. Sometimes extra bones from different dinosaurs are found at the same site, known as a “dig.”

Paleontology at a glance:
• Paleontologists are scientists who study life from the past.
• Paleontologists carefully remove fossils and piece them together like puzzles.
• By studying fossils, paleontologists can tell how dinosaurs lived, what they ate, and if they lived alone or in groups.
• Paleontologists CANNOT determine dinosaur color, dinosaur sounds, or how dinosaurs interacted.

Prove It!

Discuss the experiments on the next page. You may want to simplify and display the directions in a manner appropriate for your age group. You will need to prepare the Crispy treats ahead of time for Experiment 1. Choose ingredients that will not melt, so you can provide a sample with distinct “fossil” parts.

Experiment 1: Digging for “Fossils”

Teaching Notes:
In this experiment, students acted as paleontologists by excavating fossils (i.e., non-melting ingredients) from a dig site (the Crispy treats). Be sure to have students total each kind of non-melting ingredient they found and represent their data on the bar graph on page 32.

Journal Prompt

Paleontologists study about life from the past. Write a story about something exciting that happened to you long ago.

Homework Idea

Have children work at home with an adult to dig around the home for interesting or unusual items. They should bring one of their “finds” to school.

Fun Facts!

• A three-year-old child once found a fossil of a dinosaur egg.
• The word fossil comes from the Latin word meaning “dug up.”
Experiment 1: Digging for “Fossils”

Try This!

Use this experiment to provide an alternative to an actual dinosaur dig. Encourage students to record their findings on the Digging for Fossils Science Log. Then, model how you would like students to fill in the bar graph on page 32, and allow students time to work on the graph independently.

Procedure:

1. Cut the construction paper into small rectangles that are each about 2” x 2”. Give each student a set of rectangles (in all five colors). Explain which rectangle color represents which ingredient in the Crispy treats. Discuss how the treats model a rock with fossils inside.

2. Divide the Crispy treats equally among students.

3. Each student should place his or her treat on a paper plate and carefully pick it apart using a toothpick and a brush. Keep extra toothpicks handy for your students.

4. As students find the non-melting ingredients, they should place them on the appropriate colored rectangle.

5. Have students total the number of each ingredient piled on their rectangles. Help them turn their tallies into data they can graph on the Bar Graph sheet.

What Happened?

How many of each kind of “fossil” did you find? Were you able to get the whole fossil out, or did some of it break off? How is this work like what a paleontologist does?
Use this log sheet to record your findings from the Digging for “Fossils” experiment.

Question: How do paleontologists find fossils?

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

What I did:

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

What happened:

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

The kinds of fossils I found:

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

Record the number of each “fossil” you found:

1. ___________________________ 2. ___________________________

3. ___________________________ 4. ___________________________
Bar Graph Sheet: Digging for “Fossils”

Record the kind of fossil you found at the bottom of the page. Then, color in the number of squares in that column to show how many you were able to find. Use a different color crayon for each kind of fossil.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
<td>5.</td>
</tr>
</tbody>
</table>
Activity 1: Paleontology Puzzle

Cut out the dinosaur skeleton pieces below. Work as a paleontologist to tape the pieces back together. When you finish, your skeleton should look like a dinosaur skeleton.
Lesson 3: The Early Life of Dinosaurs

Use this page when you introduce Dinosaur Eggs to your students. The fun facts can be used to draw your students into the topic.

They’ll Need to Know ...

Paleontologists believe most dinosaurs hatched from eggs and looked like small adults. Some eggs measured more than 10 inches (25.4 cm) long. Of course, that is not so big when you consider how large some dinosaurs were. One reason paleontologists think the eggs were not even larger is because the eggshells would have had to have been extremely thick to support the egg’s weight. If eggshells are too thick, the animals inside them cannot break out to hatch.

Some fossilized eggs have been found in nests of sand or mud. Other eggs have been found in rows, indicating a dinosaur may have been walking when it laid its eggs.

Dinosaur Eggs at a Glance:
- Dinosaurs hatched from eggs.
- Dinosaurs laid their eggs on the ground.
- Dinosaurs may have hatched from soft-shelled eggs (like turtle eggs), rather than hard-shelled eggs (like bird eggs).

Prove It!

Discuss the egg experiment outlined in Experiment 1. You may want to simplify and display the directions in a manner appropriate for your age group. Note: Eggs need to be prepared one day before you present this experiment. Handle raw eggs with care.

Experiment 1: Dinosaur Eggs Teaching Notes:
In this experiment, the vinegar dissolved the calcium content of the eggshell (which makes a bird’s shell rigid). A tough, leathery membrane remained. Paleontologists believe dinosaurs laid flexible, leathery eggs like this one. Today’s reptiles still lay this type of egg (and birds lay rigid eggs, like the ones left in glasses of water). Encourage students to explain the difference.

Journal Prompt

Wow! You found a dinosaur egg. Write all about it — where you found it, what it looks like, how many eggs were in the nest, what will hatch out of it, and so on.

Homework Idea

Have students find five pictures of different kinds of eggs or make a list of five animals that hatch from eggs.

FUN FACTS!

- Many dinosaur babies were small enough to fit in your hand.
- The largest dinosaur egg ever found was about the size of a basketball.
Experiment 1: Dinosaur Eggs

Try This!

Work as a class to recreate what a dinosaur egg may have looked like. Then, have students record their findings on the Dinosaur Eggs Science Log.

Procedure:

1. The day before you present this experiment, place three chicken eggs in three separate glasses filled with vinegar. Be sure the eggs are completely covered. Place the other two eggs in two glasses of water.

2. To begin the experiment, remove one egg from a glass of vinegar with a spoon. The vinegar should have dissolved part of the shell.

3. Let students gently feel the egg. Note: The other two eggs are “extras,” in case this one breaks.

4. Discuss how the egg feels.

5. Discuss how the egg looks.

6. Repeat Steps 2 through 5 with an egg from a glass of water. Note: The other egg is an “extra,” in case this one breaks.

7. Store all the eggs in glasses of water so students can observe them.

What Happened?

What happened to the egg in the vinegar? What did it feel like? What happened to the egg in the water? What did that feel like? How might this be like an egg of a dinosaur or an egg of a bird?
Use this log sheet to record the findings from the Dinosaur Eggs experiment.

Question: Do all eggshells feel the same?
___________________________________________________________________
___________________________________________________________________

What I did:___________________________________________________________________
___________________________________________________________________

What happened:___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

Why it happened:___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

Draw the egg that had been in vinegar:
Activity 1: Hatching Dinosaur Art

In this activity, children will use their imagination to create baby dinosaurs inside eggs. (In fact, paleontologists have found fossilized eggs containing baby dinosaurs. Many of the “felt features” children add in this activity have been preserved in these fossils.) To start, read the instructions to students.

Procedure:

1. Give each child a plastic egg, a set of pom-poms, and a pair of craft eyes.

2. Tell children to glue the medium-size pom-pom on top of the large pom-pom. This shape represents the baby dinosaur’s body and head.

3. Tell children to glue on the small pom-poms to make a nose and four feet.

4. Tell children to glue the eyes on the dinosaur’s face.

5. Help children cut the felt into shapes like tails, claws, horns, and plates for the spine. Note: You may wish to cut some pieces of felt with pinking shears to simulate spines or spikes down a dinosaur’s back.

6. Once children finish gluing on their dinosaur features, tell them to place it in the plastic egg. It is hatching!

MATERIALS NEEDED

- plastic egg for each child
- pom-poms — 1 large, 1 medium, and 5 small per child
- felt
- scissors
- pinking shears (optional)
- glue
- two “wiggly” craft eyes for each child
Activity 2: Show What You Know: Scrambled Dinosaur Eggs

Unscramble the letters in each problem below to make a dinosaur word. Use the Word Bank if you need help.

Word Bank:
- paleontologist
- hatch
- fossil
dinosaur
- nest
eggshell

1. thach  2. tsen  3. losif  4. glelesgh  5. tenplgsoilaoto  6. ursnioad
   ___________  ___________  ___________

Write one fact you know about dinosaur eggs:

_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________

Name ____________________________________________
Lesson 4: Herbivore or Carnivore?

Use this page when you introduce the concepts of Herbivores and Carnivores to your students. The fun facts can be used to draw your students into the topic.

They’ll Need to Know ...

Not all dinosaurs ate the same types of food. Some ate meat and were carnivores, while others ate vegetation and were herbivores. Paleontologists look at dinosaur teeth to determine a dinosaur’s diet. By studying fossilized teeth, paleontologists can tell how dinosaurs obtained food and how large or small the dinosaurs were.

Dinosaur Teeth at a Glance:

• Meat eaters, or carnivores, had sharp teeth for tearing food.
• Plant eaters, or herbivores, had flat teeth for grinding food.
• Paleontologists are still finding teeth today that belonged to dinosaurs from millions of years ago.

Teaching Notes:

In this experiment, students mimicked the chewing action of carnivores and herbivores as they tore food with their canines and ground food with their molars. Humans, of course, are omnivores, so they have two kinds of teeth to handle both meat and plant material.

Experiment 2: Tooth Models Teaching Notes:

In this experiment, students demonstrated their understanding of herbivore and carnivore teeth by constructing accurate models of dinosaur mouths. Carnivores had “candy corn teeth” and herbivores had “marshmallow teeth.” As with Experiment 1, make sure that no one has any food allergies to the items students will be working with and eating in this experiment.

Journal Prompt

If you were a dinosaur, would you prefer meat or fruits and vegetables? Why?

Homework Suggestion

Have students interview a member of their family to find out what he or she has eaten during the day. Encourage your students to make a list of foods considered to be meats and foods considered to be plants.

Experiment 1: Eating with Your Own Teeth

Discuss the teeth experiment outlined on page 40. You may want to simplify and display the directions in a manner appropriate for your age group. Make sure no one has any food allergies to the foods you have students try out. Also, keep in mind that students will be trying meat products. If some students are vegetarian, consider bringing in hard vegetables or fruits for students to use as a replacement for the meat.

Teaching Notes:

In this experiment, students mimicked the chewing action of carnivores and herbivores as they tore food with their canines and ground food with their molars. Humans, of course, are omnivores, so they have two kinds of teeth to handle both meat and plant material.

Experiment 2: Tooth Models Teaching Notes:

In this experiment, students demonstrated their understanding of herbivore and carnivore teeth by constructing accurate models of dinosaur mouths. Carnivores had “candy corn teeth” and herbivores had “marshmallow teeth.” As with Experiment 1, make sure that no one has any food allergies to the items students will be working with and eating in this experiment.

Journal Prompt

If you were a dinosaur, would you prefer meat or fruits and vegetables? Why?

Homework Suggestion

Have students interview a member of their family to find out what he or she has eaten during the day. Encourage your students to make a list of foods considered to be meats and foods considered to be plants.

Experiment 1: Eating with Your Own Teeth

Discuss the teeth experiment outlined on page 40. You may want to simplify and display the directions in a manner appropriate for your age group. Make sure no one has any food allergies to the foods you have students try out. Also, keep in mind that students will be trying meat products. If some students are vegetarian, consider bringing in hard vegetables or fruits for students to use as a replacement for the meat.

Teaching Notes:

In this experiment, students mimicked the chewing action of carnivores and herbivores as they tore food with their canines and ground food with their molars. Humans, of course, are omnivores, so they have two kinds of teeth to handle both meat and plant material.

Experiment 2: Tooth Models Teaching Notes:

In this experiment, students demonstrated their understanding of herbivore and carnivore teeth by constructing accurate models of dinosaur mouths. Carnivores had “candy corn teeth” and herbivores had “marshmallow teeth.” As with Experiment 1, make sure that no one has any food allergies to the items students will be working with and eating in this experiment.

Journal Prompt

If you were a dinosaur, would you prefer meat or fruits and vegetables? Why?

Homework Suggestion

Have students interview a member of their family to find out what he or she has eaten during the day. Encourage your students to make a list of foods considered to be meats and foods considered to be plants.

Experiment 1: Eating with Your Own Teeth

Discuss the teeth experiment outlined on page 40. You may want to simplify and display the directions in a manner appropriate for your age group. Make sure no one has any food allergies to the foods you have students try out. Also, keep in mind that students will be trying meat products. If some students are vegetarian, consider bringing in hard vegetables or fruits for students to use as a replacement for the meat.

Teaching Notes:

In this experiment, students mimicked the chewing action of carnivores and herbivores as they tore food with their canines and ground food with their molars. Humans, of course, are omnivores, so they have two kinds of teeth to handle both meat and plant material.

Experiment 2: Tooth Models Teaching Notes:

In this experiment, students demonstrated their understanding of herbivore and carnivore teeth by constructing accurate models of dinosaur mouths. Carnivores had “candy corn teeth” and herbivores had “marshmallow teeth.” As with Experiment 1, make sure that no one has any food allergies to the items students will be working with and eating in this experiment.

Journal Prompt

If you were a dinosaur, would you prefer meat or fruits and vegetables? Why?

Homework Suggestion

Have students interview a member of their family to find out what he or she has eaten during the day. Encourage your students to make a list of foods considered to be meats and foods considered to be plants.

Not all dinosaurs had teeth. The Psittacosaurus (“parrot-lizard”) had a beak like a parrot’s.

• The duck-billed dinosaurs had as many as 960 cheek teeth!

• Unlike mammals, dinosaurs were able to replace the teeth they lost throughout their lives.
HERBIVORE OR CARNIVORE?

Experiment 1: Eating with Your Own Teeth

**MATERIALS NEEDED**
- mirror for each student or student pair
- celery, lettuce, other green vegetables
- sandwich meat, hamburger meat, or other cooked meat
- water or juice (optional)

**Try This!**
Have students pretend they are dinosaurs by trying to eat with only their canines or their molars. Make sure students are not allergic to the foods you will be serving. Upon completion, have students record their observations on the Eating with Your Own Teeth Science Log.

**Procedure:**
1. Define dinosaur carnivores and herbivores. Explain how teeth differed between the two types of dinosaurs.
2. Have students use a mirror to locate their sharp teeth (canines) and their flat teeth (molars). Explain that students will need to know the location of each type of tooth to carry out this experiment.
3. Give everyone a small piece of meat. Direct them to use just their canines to chew the meat. Repeat this step with other meat samples.
4. Give everyone a small piece of green vegetable food. Direct them to use just their molars to chew the vegetable. Repeat this step with the other plant samples.
5. Discuss Steps 2 and 3 as a class. Compare the ease or difficulty children had chewing the food, as well as the chewing action they tended to use. Relate these observations to dinosaur teeth and diets.

**What Happened?**
What kind of teeth did you use to tear into the meat? What kind of teeth did you use to chew the vegetables? What do these teeth look like? How are they similar to those of dinosaurs that were herbivores or carnivores?
Try This!

Have students create a tasty replica of a dinosaur’s mouth. They’ll need to decide whether their dinosaur will be a plant eater or a meat eater. Encourage students to use their Tooth Models Science Log to record their observations.

Procedure:

1. Give each child the materials listed above. Cut each child’s apple into two equal pieces. Place the pieces on the paper plate.

2. Tell students to spread a thick layer of peanut butter on one side of each apple slice. Students should then choose which dinosaur to make: a plant eater or a meat eater.

3. Have students press marshmallows or candy corn into the peanut butter layer to represent canines or molars, according to their choice.

4. Help students gently fit the apple pieces together to form a dinosaur mouth.

5. Discuss the models, then eat them!

What Happened?

What kind of “teeth” did you use for a herbivore? What kind of “teeth” did you use for a carnivore? How are these choices like a real dinosaur’s teeth?
HERBIVORE OR CARNIVORE?

Science Log

Use this log sheet to record the findings from the Eating with Your Own Teeth experiment.

Question: How do dinosaurs use their teeth to eat? ________________

___________________________________________________________________

___________________________________________________________________

What I did: _______________________________________________________

___________________________________________________________________

___________________________________________________________________

What happened: ___________________________________________________

___________________________________________________________________

___________________________________________________________________

Why it happened: _________________________________________________

___________________________________________________________________

___________________________________________________________________

Draw a picture of the teeth in your mouth, and circle the canines and molars:

Name ___________________________________________________________
Use this log sheet to record the findings from the Tooth Models experiment.

Question: What can paleontologists learn by studying tooth fossils? ____________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

What kind of dinosaur mouth I chose: ________________________________________
_________________________________________________________________________
_________________________________________________________________________

What kind of teeth that dinosaur had: ________________________________________
_________________________________________________________________________
_________________________________________________________________________

What I did: ______________________________________________________________
_________________________________________________________________________

Draw a picture of your dinosaur’s mouth. Label it “herbivore” or “carnivore.”
HERBIVORE OR CARNIVORE?

Activity 1: Show What You Know: Dinosaur Food Match

Cut out the dinosaurs. Glue them on the page, placing them beneath the food they would eat.

Meat

Vegetation

Tyrannosaurus rex
(tie-RAN-oh-SORE-us REX)

Triceratops
(try-SERRA-tops)

Stegosaurus
(STEG-uh-sore-us)
Lesson 5: More About Herbivores

Use this page when you introduce Herbivores to your students. The fun facts can be used to draw your students into the topic.

They’ll Need to Know ...

Most dinosaurs (approximately 65%) were plant eaters, or herbivores. Herbivores had flat, blunt teeth for chewing and grinding vegetation or they had beaks like birds. Many plant-eating dinosaurs had small brains and were not very smart. Many also walked on 4 legs and were quadrupeds. Some had long necks to reach vegetation growing high off the ground. Plant-eating dinosaurs had a variety of physical and behavioral defenses against meat-eating dinosaurs. Examples include horns, claws, spikes, armored plates, thick skin, large size, and speed. Paleontologists can distinguish herbivores from carnivores by their fossilized teeth, their footprints, and the size of their jaws.

Herbivores at a Glance:
• Herbivorous dinosaurs had flat, blunt teeth.
• Herbivorous dinosaurs had to defend themselves from meat-eating dinosaurs.
• Most 4-legged dinosaurs were herbivores.

Prove It!

Discuss the experiments on the next few pages. You may want to display the directions in a manner appropriate for your age group. Note: Only the teacher should touch the raw meat in Experiment 1 due to health hazards.

Experiment 1: Herbivore Teeth Teaching Notes:
In this experiment, students discovered it was easier to break down plants than meat with their wooden blocks. That is why plant-eaters had flat teeth. Be sure that you are the only one using the raw meat and that you discard the items and clean the area properly after use.

Experiment 2: Herbivore Defenses Teaching Notes:
In this experiment, students will demonstrate their understanding of defense characteristics by choosing hard materials to create a model dinosaur that could defend itself from a meat eater. Students may point out during this experiment that the dinosaur’s behavior was its defense.

Journal Prompt
Write about what it might be like to have a plant-eating dinosaur as a pet.

Homework Idea
Have students take a nature walk with an adult helper and find some pieces of plants that they think a plant-eating dinosaur might eat. Have students identify the plants on a piece of paper with a field journal. Encourage them to also make a label to tape to the plant, and then share their plant types with the class.

• Some species of dinosaurs have been identified by their fossilized teeth alone.
• Scientists have determined that the ratio of plant eaters to meat eaters, in the age of the dinosaur, is close to the ratio that exists for today’s animal species.
MORE ABOUT HERBIVORES

Experiment 1: Herbivore Teeth

Try This!
Have students use wooden blocks as dinosaur teeth to “chew” meat and vegetables. Have students record their observations on their Herbivore Teeth Science Log.

Procedure:
1. Give each child two blocks and green plant food.

2. Let the children experiment by using the blocks to “chew” the plant into pieces, modeling how plant-eating dinosaurs used their teeth for chewing and grinding vegetation.

3. Allow children time to experiment with each plant sample. Discuss observations as a class.

4. Show the class a sample of raw meat. Use physician gloves when handling the meat. Then, demonstrate what happens when you use the wooden blocks to try and “chew” the meat sample. Discuss what happens. Discard the meat properly when you finish this experiment, and be sure to clean the tools that touched the raw meat and clean up the area with disinfectant spray and paper towels.

What Happened?
What was easier to break down with the blocks, the plants or the meat? Why do you think that was? How are the blocks like the teeth of herbivores?

MATERIALS NEEDED
- 2 wooden blocks for each child
- celery, lettuce, leaves, or other green plant food
- newspaper
- latex gloves
- raw meat, such as chicken, beef, or a pork chop (only you will be working with these materials)
- disinfectant spray
- paper towels
Experiment 2: Herbivore Defenses

Try This!

Have students create their own dinosaur and give it protective characteristics common to plant-eating dinosaurs. Afterward, encourage students to record their observations and findings on their Herbivore Defenses Science Log.

Procedure:

1. Show pictures of plant-eating dinosaurs, and discuss their defense mechanisms.

2. Have students cut out a dinosaur shape from the construction paper.

3. Suggest how children might use the materials listed above to represent some of the defense mechanisms discussed, such as spikes, horns, thick scales, spines, and so on.

4. Invite children to help themselves to the art materials. Challenge them to make dinosaurs that have a particular characteristic that helps them defend themselves.

5. Share and discuss dinosaur models as a class.

What Happened?

What kind of dinosaur did you create? What kinds of items help it to defend itself?
MORE ABOUT HERBIVORES

Use this log sheet to record the findings from your herbivore experiments.

**Herbivore Teeth**

**Question:** How did plant-eating dinosaurs use their teeth to eat? _____________________________________________________________________

**What I did:** _____________________________________________________________________

___________________________________________________________________

**What happened:** _____________________________________________________________________

___________________________________________________________________

**Why it happened:** _____________________________________________________________________

___________________________________________________________________

**Herbivore Defenses**

**Question:** How did plant-eating dinosaurs’ bodies help them defend themselves?

___________________________________________________________________

___________________________________________________________________

**Material I chose to use:** _____________________________________________________________________

___________________________________________________________________

**Defenses my model dinosaur had:** _____________________________________________________________________

___________________________________________________________________

___________________________________________________________________
MORE ABOUT HERBIVORES

Activity 1: Show What You Know: Following Dino Directions

Follow the directions to complete your picture.

- Color the dinosaurs the way you think each one may have looked.
- Draw a tall tree next to the Diplodocus’ (di-PLOH-de-kus) mouth.
- Draw a small plant in the Triceratops’ (try-SERRA-tops) mouth.
- Draw a nest with 3 eggs behind the Stegosaurus (STEG-uh-SORE-us).
- Draw four rocks in the bottom right corner.
- Draw a sun and clouds in the sky.

Diplodocus

Triceratops

Stegosaurus
Lesson 6: More About Carnivores

Use this page when you introduce Carnivores to your students. The fun facts can be used to draw your students into the topic.

They’ll Need to Know ...

Approximately 35% of dinosaurs ate meat, or were carnivores. Carnivorous dinosaurs, also known as theropods, had many characteristics to help them hunt and kill their prey. They had large jaws, sharp claws, and sharp teeth. Their long, strong legs helped them run quickly. They also had keen senses and a large brain to plan hunting strategies. Paleontologists also believe plant-eating dinosaurs probably had camouflage characteristics that would have forced meat eaters to employ intelligent hunting methods. Some dinosaurs, like the Coelophysis, even hunted in packs.

Because many meat eaters’ heads were larger in proportion to their bodies than those of plant eaters, some scientists think meat eaters were the smarter of the two groups. Carnivorous dinosaurs not only ate herbivorous dinosaurs, they likely ate other carnivores, including those of their own species. Therefore, meat-eating dinosaurs had to protect themselves from other meat eaters.

Carnivores at a Glance:
• Meat-eating dinosaurs had large jaws, sharp claws, and sharp teeth.
• Meat-eating dinosaurs ate plant-eating dinosaurs and other meat-eating dinosaurs.
• Carnivorous dinosaurs used different defenses to protect themselves from being eaten by other dinosaurs.

Discuss the experiments on page 51. You may want to display the directions in a manner appropriate for your age group. Remind students of the proper way to handle scissors. Note: Be sure the meat used in Experiment 1 is properly cooked so it can be handled safely.

Experiment 1: Snippers Teaching Notes:
In this experiment, students have the chance to experience how a meat-eating dinosaur might have chewed its food. Through experimentation and discussion, they should have concluded that a T. rex used its teeth to catch and hold its meal.

Experiment 2: Hide and Seek
This experiment will help students understand the concept of camouflage as skin coloring that helps animals hide in their own environment. Students should discover that the toy dinosaurs were not as noticeable if they were hidden in play dough that matched the color of the dinosaur.

Journal Prompt
Why would a hunting dinosaur need camouflage?
Write about your ideas.

Homework Idea
Photocopy a picture of a dinosaur for each student, and encourage students to disguise their dinosaur so no one knows it was ferocious. Have them bring their camouflaged dinosaur to school and share it with the class.

Prove It!

• Tyrannosaurus rex’s arms were so short it could not reach its mouth with its front claws.
• A small group of Triceratops dinosaurs would have provided enough food to feed a T. rex for a lifetime.
Experiment 1: Snippers

Try This!
Have students follow the instructions to experience how a meat-eating dinosaur handled food. Have them record their findings on the Snippers Science Log.

Procedure:
1. Give each child a pair of scissors and a piece of meat.
2. Let the children experiment with the scissors and meat to see how meat-eating dinosaurs used their teeth to snag and tear their food. Let them repeat this step with other meat samples. Discuss observations as a class.
3. Finish by sharing theories regarding how Tyrannosaurus rex ate its food if its arms couldn’t reach its mouth.

What Happened?
How does a T. rex chew its food? How does a T. rex catch its food? Do you think it could have eaten with its hands?

Experiment 2: Hide and Seek

Try This!
Use this experiment to explore the importance of camouflage as a form of protection from enemies. Encourage students to record their observations on the Hide and Seek Science Log.

Procedure:
1. Define and discuss camouflage. Divide students into pairs. Give each pair one dinosaur and a chunk of play dough in each of the four colors.
2. Challenge one partner to hide the dinosaur in a chunk of play dough of any color, while the other partner is not looking. Then, this partner should try to find which chunk of play dough hides the dinosaur. Repeat this step several times, having students change the color of play dough used each time.
3. Now have students hide the dinosaur around the room near items of the same color. Ask students to explain whether it was easier to find the dinosaur in the dough or around the room.

What Happened?
Where was it easiest to find the dinosaur? Where was it the hardest? Why do you think that was?
Science Log

Use this log sheet to record your findings from your carnivore experiments.

Snippers .....................................................
Question: How did meat-eating dinosaurs use their teeth to eat? __
___________________________________________________________________

What I did:________________________________________________________
___________________________________________________________________

What happened:___________________________________________________
___________________________________________________________________

Why it happened:__________________________________________________
___________________________________________________________________

Hide and Seek .....................................................
Question: How might a dinosaur’s skin have helped it hide? ______
___________________________________________________________________

What I did:________________________________________________________
___________________________________________________________________

What happened:___________________________________________________
___________________________________________________________________

Why it happened:__________________________________________________
___________________________________________________________________

Name ______________________________________________
Activity 1: Show What You Know: Dinosaur Match

Read the information about each dinosaur. Then, write the name of the dinosaur next to its picture.

Albertosaurus (al-BERT-oh-SORE-us) carnivore, looked like a T. rex, but smaller

Compsognathus (comp-sog-NAY-thus) carnivore, one of the smallest dinosaurs, had bird-like legs and feet, walked on 2 feet

Diplodocus (di-PLOH-de-kus) herbivore, walked on 4 legs, had a long tail and neck, was one of the longest dinosaurs

Oviraptor (OHV-ih-RAP-tor) carnivore, walked upright, had a horn-like crest on its head

Stegosaurus (STEG-uh-SORE-us) herbivore, had plates on its back and spikes on its tail

Triceratops (try-SERRA-tops) herbivore, had 3 horns on its head
Lesson 7: Small Dinosaurs

Use this page when you introduce Small Dinosaurs to your students. The fun facts can be used to draw your students into the topic.

They’ll Need to Know ...

Not all dinosaurs were enormous. Below is information on some of the smaller dinosaurs. You may wish to copy and post this page in the classroom for student reference.

Compsognathus (comp-sog-NAY-thus) ("pretty jaw")
- chicken-sized
- weighed 5-6 pounds
- walked on 2 legs
- had a pointed head, sharp teeth, and long neck
- ate small insects and lizards
- was a fast runner

Microvenator (mik-roh-ven-AH-tor) ("small hunter")
- was turkey-sized
- weighed 6-14 pounds
- walked on 2 legs
- was a fast runner
- had short arms, big eyes, a long neck, and may have had a toothless beak
- probably ate small reptiles, mammals, and insects
- was one of the most intelligent dinosaurs

Mussaurus (mus-OR-us) ("mouse lizard")
- is the smallest skeleton found to date, but only the young measuring between 9-16 inches (22.9-40.6 cm) have been found
- could fit in an adult’s hand
- had a long neck, tail, and snout
- walked on 2 legs, but probably ran on all 4 legs
- was a plant eater and not very intelligent

Psittacosaurus (si-TAK-oh-SORE-us) ("parrot lizard")
- was as tall as a first grader but as long as an adult, about five to six feet from snout to tail
- walked on 2 or 4 legs
- had a narrow horny beak like a parrot’s with horn-like growths on its cheeks
- was a fast-moving plant eater
- may have traveled in herds
Lesson 7: Small Dinosaurs (continued)

Discuss the small dinosaur experiment outlined on page 56. You may want to simplify and display the directions in a manner appropriate for your age group.

Experiment 1: Sizing Up Teaching Notes:
In this experiment, you may need to practice projecting dinosaur images to determine if your room is large enough. If suggested images are too big, other dinosaurs can be used. By viewing the actual size of the dinosaurs, students will be able to compare the dinosaurs’ sizes. Encourage further investigation by having students compare the dinosaurs to their own sizes, too.

Journal Prompt
The Saltopus is so small you could bring it to school in your book bag. Imagine doing just that. Then, your dinosaur escapes! Write about what happens.

Homework Idea
Assign students a letter from the alphabet, and have them find a dinosaur whose name starts with this letter. Challenge students to do research and write five facts about it. The report should include the dinosaur’s name, how it is pronounced, and a picture of the dinosaur. As a class, make a book from the reports.

Prove It!

Saltopus (SALT-oh-pus) (“leaping foot”)
• was cat-sized
• weighed about two pounds
• walked on 2 legs
• had a long head
• had dozens of razor-like small teeth in its mouth
• ate mostly insects or dead animals that other dinosaurs had killed
• was a fast runner

Small dinosaurs were thought to have longer life spans than large dinosaurs.
Experiment 1: Sizing Up

Try This!
This neat experiment will allow students to understand actual dinosaur size. Encourage students to record their thoughts on the Sizing Up Science Log.

Procedure:
1. Transfer the photocopies of the dinosaur pictures onto transparency sheets.
2. Place the transparencies on an overhead projector, which has been set up on a rolling cart with an attached extension cord.
3. Start with the smallest dinosaur, Mussaurus. Project the image onto a light-colored wall or board. Tape the construction paper to the wall with the projected image.
4. Have a student hold a yard stick next to the wall, and measure and mark a vertical line that is 2 feet (.6 m) long on the construction paper.
5. Move the projector back and forth until the dinosaur is shown at its actual size.
6. Have students trace and cut out the Mussaurus.
7. Repeat the above steps with the T. rex. You probably will not be able to fit the entire dinosaur on the wall. If not, back up the overhead projector until the head reaches actual size (about 4 feet, or 1.2 m). Then, help students measure the size of the head, trace it, and cut it out. Place the head shape on the floor. Challenge students to find how many Mussaurus bodies will fit inside the T. rex’s head.
8. As a class, discuss observations and make comparisons of each dinosaur’s size to the students’ sizes.

What Happened?
Were you surprised by the sizes of these dinosaurs? Do you think a T. rex would be able to find a Mussaurus? Why or why not?
SMALL DINOSAURS

Use this log sheet to record your findings from the Sizing Up experiment.

Question: Were dinosaurs all the same size? __________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

What I did: _______________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

What happened: __________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

Why it happened: _________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

Name ____________________________________________________________
**Activity 1: Show What You Know: Small Dinosaurs Word Scramble**

Unscramble the underlined words to answer questions about some small dinosaurs. Use the Word Bank if you need help.

<table>
<thead>
<tr>
<th>Unscramble</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The Microvenator (mik-roh-ven-AH-tor) ate <strong>TEMA</strong>; it was a carnivore.</td>
<td>A.</td>
</tr>
<tr>
<td>2. Only fossils of Mussaurus (mus-OR-us) as a <strong>BBYA</strong> have been found.</td>
<td>B.</td>
</tr>
<tr>
<td>3. Many small dinosaurs were <strong>FATS</strong> runners.</td>
<td>C.</td>
</tr>
<tr>
<td>4. The Saltopus (SALT-oh-pus) was about the size of a small <strong>ATC</strong>.</td>
<td>D.</td>
</tr>
<tr>
<td>5. The Psittacosaurus (si-TAK-oh-SORE-us) had a horny <strong>KBEA</strong> and no teeth.</td>
<td>E.</td>
</tr>
<tr>
<td>6. The young Mussaurus (mus-OR-us) skeleton was so small it could fit in a person’s <strong>AHDN</strong>.</td>
<td>F.</td>
</tr>
<tr>
<td>7. The Microvenator (mik-roh-ven-AH-tor) was smart because it had a large <strong>NBIRA</strong>.</td>
<td>G.</td>
</tr>
<tr>
<td>8. Compsognathus (comp-sog-NAY-thus) was a <strong>DBIR</strong>-like dinosaur.</td>
<td>H.</td>
</tr>
<tr>
<td>9. Psittacosaurus (si-TAK-oh-SORE-us) was a <strong>LPNTA</strong> eater, also known as an herbivore.</td>
<td>I.</td>
</tr>
<tr>
<td>10. Saltopus (SALT-oh-pus) had <strong>VFIE</strong> fingers on each hand.</td>
<td>J.</td>
</tr>
</tbody>
</table>

**Word Bank:**
- meat
- cat
- brain
- five
- baby
- beak
- bird
- fast
- hand
- plant
Lesson 8: Large Dinosaurs

Use this page when you introduce Large Dinosaurs to your students. The fun facts can be used to draw your students into the topic.

They’ll Need to Know ...

Dinosaurs were some of the largest land animals ever to live. Due to their size, their weight needed to be equally distributed throughout their bodies so they could keep their balance. Below is information on some of the largest dinosaurs. You may wish to copy and post these pictures in the classroom for student reference.

Apatosaurus (ah-PAT-oh-SORE-us) ("thunder lizard")
- used to be known as Brontosaurus
- was the largest land animal to ever live at about 70-90 feet (21.4-27.5 m) long and weighing between 33 and 38 tons
- had a long neck and a 15-foot (4.6 m) tail that aided in balance
- walked on all 4 legs
- was an herbivore

Edmontosaurus (ed-mon-toh-SORE-us) ("Edmonton (rock formation) lizard")
- lived in herds
- measured 42 feet (12.8 m) long and weighed about 3.5 tons
- was a duck-billed dinosaur
- had short arms and hands shaped like mittens
- walked on 2 or 4 legs
- was a slow runner and poor at defending itself
- was an herbivore

Carcharodontosaurus (kar-kar-o-don-toh-SORE-us) ("shark tooth lizard")
- measured about 26 feet long (7.9 m)
- had strong jaws and sharp teeth up to 8 inches (20.3 cm) long
- walked on 2 strong legs
- was a fairly fast runner
- was a carnivore

Triceratops (try-SERRA-tops) ("three-horned face")
- looked like a rhinoceros
- measured 30 feet (9.2 m) long, 10 feet (3 m) high, and weighed from 6 to 12 tons
- walked on 4 thick legs with hoofed claws
- had a skull up to 10 feet (3 m) long, making it one of the largest
- was an herbivore
Lesson 8: Large Dinosaurs (continued)

Tyrannosaurus rex (tie-RAN-oh-SORE-us REX) ("tyrant lizard king")
- had a large brain and was a very smart dinosaur
- measured 40 feet (12.2 m) long, 18 feet (5.5 m) tall, and weighed 5 to 7 tons
- walked on 2 powerful legs with bird-like feet that had 3 large toes
- had 60 sharp teeth that were up to 9 inches (22.9 cm) long
- was a carnivore that could eat up to 500 pounds of meat

Large Dinosaurs at a Glance:
- Dinosaurs were some of the largest land animals ever to live.
- Large dinosaurs needed to distribute their weight equally to help them balance.
- Both herbivores and carnivores could grow into large dinosaurs.

Prove It!
Discuss the Balancing Act experiment. You may want to simplify and display the directions in a manner appropriate for your age group by building models ahead of time if students need help visualizing the final product.

Experiment 1: Balancing Act Teaching Notes:
Through experimentation with marshmallows and straws, students saw that the large dinosaurs’ tails were key to maintaining balance.

Journal Prompt
Imagine you have found a live dinosaur. When he tries to walk, he keeps falling down. What can you do to help him keep his balance? Write about it.

Homework Idea
Have students use materials at home to build a dinosaur that balances. Encourage students to bring their model to school to share with the class.

- Tyrannosaurus rex did not live during the Jurassic period but millions of years later in the Cretaceous period.
- The largest animal to ever live is the blue whale, which swims the ocean today.
EXPERIMENT 1: BALANCING ACT

TABLE OF CONTENTS

MATERIALS NEEDED
- 8 large marshmallows for each child
- 2 plastic straws for each child
- paper and pencils
- pictures of a dinosaur walking on 2 legs
- (biped) and on 4 legs (quadruped)
- scissors

TRY THIS!
This experiment will demonstrate how difficult it was for larger dinosaurs to balance. Model this experiment for students before they start. Then, allow them to explore independently and record their findings on the Balancing Act Science Log.

PROCEDURE:
1. Have students stand up and lean over. Discuss what they do to prevent themselves from falling.
2. Look at the dinosaur pictures. Discuss what dinosaurs might do to keep their balance.
3. Give each student two straws and eight marshmallows. Tell students to cut one straw in half and to cut the other straw into four equal pieces (help them if needed).
4. Help children build a model of a bipedal dinosaur. Use the long straw pieces for the leg bones. Use marshmallows to connect the legs at the top like a pelvis, and to make feet on each end. Make sure it is balanced.
5. Tell children to stick one short piece of straw into the marshmallow on top. Then, have them stick another marshmallow on this short straw. This represents a neck and head.
6. Have children add a tail to the dinosaur model. They can do so by sticking another short piece of straw into the “pelvis” marshmallow at a 90-degree angle to the neck, then adding a marshmallow to the other end of the straw.
7. When the dinosaur is balanced and complete, tell students to draw a picture of it.
8. After the children finish their pictures, have them remove the head and tail from their dinosaur model.
9. Help children turn their dinosaur into a four-legged model. You will need a short piece of straw for the body, a marshmallow for the shoulders, two short pieces of straw for front legs, and two marshmallows for feet.
10. Discuss why this body structure is more stable.
11. Add a neck and a head using a half piece of straw and a marshmallow. Discuss what happens and what can be done to solve the problem.
12. Give students the marshmallows and straws needed to solve the problem.
13. When the dinosaur is balanced and complete, students should draw a picture of it.

WHAT HAPPENED?
Which had better balance, the four-legged dinosaur or the two-legged dinosaur? What helped a larger dinosaur balance its body?
Use this log to record the findings from the Balancing Act experiment.

Question: How do large dinosaurs keep their balance?

___________________________________________________________________

___________________________________________________________________

Biped Dinosaur Model

What I did:________________________________________________________

___________________________________________________________________

What happened:__________________________________________________

___________________________________________________________________

Why it happened:_________________________________________________

___________________________________________________________________

Quadruped Dinosaur Model

What I did:________________________________________________________

___________________________________________________________________

What happened:__________________________________________________

___________________________________________________________________

Why it happened:_________________________________________________
Activity 1: Show What You Know: Large Dinosaur Crossword Puzzle

Complete the crossword puzzle using words that complete the statements below. Use the Word Bank if you need help.

Across
1. Tyrannosaurus rex (tie-RAN-oh-SORE-us REX) liked to eat ____________.
2. Meat-eating dinosaurs had ______________ teeth.
3. The word “dinosaur” means terrible ________________.
4. The Apatosaurus (ah-PAT-oh-SORE-us) had a long ____________ to reach into the trees.

Down
5. Large dinosaurs had long ____________ to help them keep their balance.
6. The Triceratops (try-SERRA-tops) had three ____________ on its head.
7. The Triceratops (try-SERRA-tops) was a ____________ eater.
8. The Apatosaurus (ah-PAT-oh-SORE-us) walked on ____________ legs.

Word Bank:
- neck
- sharp
- plant
- tails
- four
- lizard
- horns
- meat
Lesson 9: Extinction

Use this page when you introduce the concept of Extinction to your students. The fun facts can be used to draw your students into the topic.

They’ll Need to Know ...

Extinction is the process by which species die out. Extinction is a natural result of evolution. Species of animals and plants die out for many reasons. Some include disease, climate changes, depleted resources, competition, and habitat loss. Species become extinct when they cannot adapt to changes in their environment. Most extinction is not caused by major catastrophes or severe climate change, but by small changes requiring adaptation and flexibility. One theory as to why dinosaurs became extinct is that the climate on Earth changed. This would have produced a long period of species decline from starvation.

Another theory states that dinosaurs became extinct due to a catastrophic event. The extinction would have been sudden, with no evidence of decline. In this case “sudden” means in less than one million years. Scientists can tell when these periods occur because they form a dead zone between layers of rocks with evidence of life. It is possible a large meteor may have hit Earth, causing catastrophic results. Scientists believe the climate would have changed drastically. The meteor may have caused huge fires, severe storms with high winds, and volcanic eruptions. Dust and ash would have covered the sky, blocking the light and warmth from the sun. This would destroy the bottom of the food chain – plants.

Extinction at a Glance:
- Dinosaurs are extinct.
- There are many theories as to how they died.
- When dinosaurs became extinct, other life forms survived.

Prove It!

Discuss the extinction experiment outlined on page 65. You may want to simplify and display the directions in a manner appropriate for your age group.

Experiment 1: Extreme Changes
Teaching Notes:
Just like the dinosaurs, all plants died when exposed to extreme conditions after a catastrophic event. This experiment is a good model of what happens to plants during extreme conditions.

Journal Prompt
What do you think really happened to the dinosaurs? Write about your thoughts.

Homework Idea
Have students interview each member of their family for their theories on extinction and then draw a picture showing these theories.

- Scientists claim that 99% of all species that ever lived are extinct.
Try This!
This experiment allows students a peek at what it might have been like for the plants that were alive during the time of the dinosaurs’ extinction. You’ll want to work through the experiment as a class. Note that it takes up to 10 days to complete. Have students record their findings on their Extreme Changes Science Log.

Procedure:
1. Discuss possible reasons for dinosaur extinction.
2. Label each potted plant 1, 2, or 3. Take a picture of each green plant. Display pictures in an area where they can be observed and more can be added.
3. Place one plant in the freezer.
4. Place one plant in the closet.
5. Place one plant by the classroom window. Do not water it.
6. Check the plants and take pictures of them after two days, five days, and 10 days.
7. Display the pictures on the board. Discuss observations and relate the experiment to the time of dinosaur extinction.

What Happened?
What did the plants look like after two days? How about five and 10 days? How is this experiment like what might have happened to plants during the time of the dinosaurs?

MATERIALS NEEDED
• three green potted plants
• access to freezer and dark closet
• labels
• marker
• a quick-shot kind of camera (digital, for example)
• board to display photos
EXTINCTION

Use this log to record the findings from the Extreme Changes experiment.

Question: How do extreme conditions affect all living things?

___________________________________________________________________

___________________________________________________________________

What we did:_____________________________________________________

___________________________________________________________________

___________________________________________________________________

What happened after two days:_____________________________________

___________________________________________________________________

___________________________________________________________________

What happened after five days:_____________________________________

___________________________________________________________________

___________________________________________________________________

What happened after 10 days:_____________________________________

___________________________________________________________________

___________________________________________________________________

Why it happened:_________________________________________________

___________________________________________________________________

___________________________________________________________________

___________________________________________________________________

Name ____________________________________________________________
Activity 1: Show What You Know: My Dinosaur Extinction Theory

Use this space to write what you think happened to the dinosaurs.

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

________________________________________________________
_______________________________________________________
________________________________________________________
_________________________________________________________
Lesson 10: Prehistoric Animals That Still Exist Today

Use this page when you introduce descendants of Prehistoric Animals to your students. The fun facts can be used to draw your students into the topic.

They’ll Need to Know ...

Dinosaurs all died out, but some animals that live today are relatives of the dinosaurs. For example, turtles and crocodiles are related to dinosaurs. These two living reptile species have changed very little in the last 200 million years. A crocodile’s skin is tough and scaly, like a dinosaur’s skin likely was. Turtles have protective shells, not unlike armor found on dinosaurs. Lizards and snakes are two other reptiles that lived during the end of the dinosaur era. Other kinds of animals have change little since prehistoric times or even earlier. Jellyfish and cockroaches date back to earlier periods in time than do dinosaurs. Sharks, seagulls, storks, frogs, toads, and the platypus are species that are as old as dinosaurs. Dinosaurs and present-day species have survival needs in common: food, water, shelter, and a suitable habitat. These needs won’t ever change for living things.

You may also want to simplify and display the directions in a manner appropriate for your age group. Also, keep in mind that you will need to prepare clues in advance for Activity 2: We Lived with the Dinosaurs!

Experiment 1: Alike and Different Teaching Notes: Through class discussion and then by drawing dinosaurs and animals of today by themselves, students will realize that dinosaurs have things in common with animals of today, such as, appearance, needs, protection, etc. Consider extending the lesson by asking students how we are like and unlike dinosaurs.

Journal Prompt

Pick a dinosaur and an animal that is alive today. Tell how they are alike and different.

Homework Idea

Challenge students to find a picture of one of their ancestors, write one fact about this person, and write or draw one way they are like the ancestor and one way they are different. Encourage students to bring the picture to share with the class.

Prove It!

Discuss the ancestors experiment outlined on the Alike and Different page. At this time, you’ll want to discuss habitat types and the different animals that live in those climates (e.g., deserts, rainforests, tundras, wooded areas, etc.).

- The cockroach is the most adaptive animal to ever live.
- Birds are thought to be descendants of dinosaurs.
Experiment 1: Alike and Different

Try This!
Have students complete this activity as a class and then independently. Then, encourage them to record their findings in the Alike and Different Science Log.

Procedure:
1. Display the pictures of dinosaurs and present-day animal species. Discuss the characteristics and needs of these animals.

2. Tell students to identify a present-day animal that resembles a dinosaur. Discuss their choices.

3. Give each student a piece of paper. Have students draw a habitat on the paper. Remind them that the habitat should meet the needs of the animals that live there.

4. Tell students to draw a dinosaur that may have lived in that habitat.

5. Tell students to draw an animal of today that may live in that habitat.

6. Display finished pictures.

7. Ask students to come up and discuss the pictures. Students should not discuss their own picture. Instead, challenge them to explain another student’s picture.

What Happened?
What kind of animal of today has things in common with your dinosaur? Are they different in any way? How?
Use this Science Log to record your conclusion from the Alike and Different experiment.

Question: Do today’s animals have links to the past?

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

What I drew:
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

Why I drew it:
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

My conclusion:
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
Activity 1: We Lived with the Dinosaurs!

Students will use clues to guess the identity of mystery prehistoric animals. You can write out the clues for this activity, draw scenes, cut out pictures, or supply actual objects.

Procedure:

1. Divide the students into small groups. Give each group a large numbered envelope containing clues you have prepared about an animal on index cards (one card per clue). None of the clues should give the animal completely away, but all clues combined should.

2. Have each group write down their guess, then pass the envelope to another group. When all groups have seen each envelope, discuss the correct answers and how each set of clues revealed the animals’ identities.

Here are some suggestions for clues to provide:

- **Turtle**
  - eggs
  - seashell
  - the letters: “s,” “l,” “o,” “w”
  - pond

- **Crocodile**
  - swamp
  - shoes or belt with scales
  - log floating in water
  - sharp teeth

- **Cockroach**
  - can of bug spray
  - picture of someone screaming
  - picture of a ladybug labeled “my relative”
  - crumbs on the floor

- **Frog**
  - lily pad
  - fly
  - warts
  - jumping action

- **Shark**
  - sharp teeth
  - ocean
  - fish
  - the letters: “J,” “A,” “W,” “S”

- **Stork**
  - wings
  - baby
  - long bird legs
  - housetop with chimney

- **Jellyfish**
  - jelly
  - fish
  - ocean/beach
  - cooked spaghetti
Activity 2: Show What You Know: Past to Present

Draw a line from each dinosaur to the animal alive today that shares some of its features. Think of ways they are alike and different.

1. Oviraptor (OHV-ih-RAP-tor) A. rhinoceros
2. Mussaurus (mus-OR-us) B. bird
3. Psittacosaurus (si-TAK-oh-SORE-us) C. mouse
4. Triceratops (try-SERRA-tops) D. parrot
Math and Dinosaurs

There’s no better way to enhance learning and make it relevant to students than to tie it with all areas of the curriculum. In this step, you’ll find a few fun curriculum-extending activities you might want to try!

This page is filled with ways you can extend the learning to Math.

1. Big Bite

A T. rex can eat up to 500 pounds of meat and bone in one bite. Discover how big a bite that is. Make a class list of items that are pretty average in weight (cows, horses, etc.). Find the weight of these animals. Use a calculator to figure out what combination of animals would make a 500-pound meal. If your totals are within five pounds of 500, they are acceptable.

2. Go to Great Lengths

Have students do research to find out how long some kinds of dinosaurs were from nose to tail. Encourage them to unroll a ball of yarn, tie a knot every 5-10 feet (1.5-3.1 m), take the yarn outdoors, and lay out lengths that match the lengths of different dinosaurs.

3. Show Them Standing Tall

Have students do research to discover how tall some dinosaurs stood. Invite them to make a graph with a partner, such as the one shown below, to record their data.
This page is filled with ways you can extend the learning to Social Studies.

1. Fossil Maps
   Dinosaur fossils have been found on all seven continents. Have students use maps, globes, and the Internet to find places on each continent where dinosaur fossils have been found.

2. U.S. Fossils
   Encourage students to do research to identify the states where fossils have been found. Then, have them use the map of the United States below to color in the states they identified in their research.
Language Arts, Reading, and Dinosaurs

This page is filled with ways you can extend the learning to Language Arts and Reading.

1. Describe That Dino
   Here’s one game students can play with a group of friends. During one minute, players all write down as many adjectives and adverbs they can think of to describe dinosaurs. When the minute is up, the writing stops. Then, players take turns reading their lists. If other players have the same word on their lists, they must cross it off. In the end, the winner is the player who has the most words remaining on his or her list.

2. Tape a Dinosaur Story
   Have students work in small groups to create a read-along tape using great dinosaur-related books like If the Dinosaurs Came Back by Bernard Most or Danny the Dinosaur by Sid Fleischmann. Remind students to use an expressive voice as they read. They may even want to follow up with a list of questions for their audience.

3. Write Your Own Version
   Have students read a book with a pattern, such as Brown Bear, Brown Bear, What Do You See? or Dear Zoo. Then, encourage students work as a class to rewrite the story replacing the animals in the book with dinosaurs. Each student can write and illustrate a page. Bind the pages into a book, and place it in the class library.

Other ideas you may have:

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
CROSS THE CURRICULUM

Writing, Physical Education, Art, & Dinosaurs

This page is filled with ways you can extend the learning to Writing, Physical Education, and Art.

1. Dino-mite Poetry
   Have students write a poem about their favorite dinosaur. Encourage them to write a haiku or an acrostic poem about it. A haiku poem uses five syllables for the first sentence, seven syllables for the second sentence, and five syllables again for the third sentence. Acrostic poems spell out a word when the first letter of each line is read from top to bottom. Then, encourage students to share their poems with the class.

2. Traveling Back in Time
   Have students write a travel brochure describing a trip back in time to the days of dinosaurs.

3. Writing About Fossils
   Encourage students to write a nonfiction article describing step-by-step how a fossil is formed.

4. Help a New Paleontologist
   Invite students to write an instruction sheet that tells a new paleontologist what to do with a newly discovered bone. Have them include directions for things like cleaning the fossil, caring for it, identifying it, and sharing it with others.

5. Play Dinosaur Tag
   Allow students to play a game of tag. Form two groups: herbivores and carnivores. Herbivores wear labels of one color. Carnivores wear labels of another color. Carnivores must chase and tag herbivores. To make the game harder, form three groups: herbivores, carnivores, and plants. Create labels with 3 colors. Carnivores can only tag herbivores, and herbivores can only tag plants.

6. Delicious Dino Eggs
   As an ongoing art project, make a large papier-mâché dinosaur egg. Paint and decorate it, cut a small hole in the top of the egg, and fill it with treats. On the day of the celebration, hang the egg outside. Let students help the egg “hatch” (break open) by taking turns hitting it with a stick!
Two Great Projects

Technology offers wonderful opportunities for reinforcing learning of all types. In this section you’ll find two great projects that will allow you to take full advantage of all technology has to offer while at the same time strengthen the knowledge gained during the unit of study. Depending on the age group, these activities may be rather advanced. They can be simplified by not using technology or by working through the activities as a whole group. The options are limitless!

1. Create a Multimedia Presentation: Name the Dinosaur

This unit of study concentrates not only on understanding the science of paleontology, but also on understanding how a wide variety of dinosaurs inhabited Earth at the same time. Whether large or small, carnivores or herbivores, they all managed to survive because of their varying needs and exceptional protective characteristics. A multimedia presentation provides a great way for students to tell others about specific dinosaurs and their characteristics.

Divide students into groups of two or three. Assign each group a specific dinosaur. Give them time to research their dinosaur and brainstorm their presentation. Then, distribute the Storyboard worksheet on page 79.

Next, discuss what you expect as far as content, including what the presentation should tell about each dinosaur, how many cards or slides should be included, and how they should cite their resources in a bibliography. (The groups will more than likely need multiple copies.) If possible, allow the students to spend some time at the computer searching for photos, links, or other elements they’d like to include in their presentation. Encourage the use of original artwork and sounds.

Distribute the Multimedia Presentation Checklist on page 78. Allow multiple work sessions for planning and the actual creation of the presentation. Then, plan a class “showing” of each group’s presentation.

The computer tools you use will depend on what is made available to your school. Some programs that may enhance the project include the word processing and desktopting software available on the market. Other tools include a digital camera, a scanner, and even an audiocassette tape. Another way to go is to create a poster per storyboard and use the posters in the presentation. The choices are limitless! However, be sure that students are comfortable using the tools before they start. Also, when students present the project to the class, allow them to use the computer to enhance it.
MULTIMEDIA PRESENTATION CHECKLIST

Name ________________________________

Planning
® Have I researched the topic and decided how to show it in a presentation?
® Have I developed a Storyboard?
® Have I selected which tools I need to complete the task?
® Has each slide or card been designed and numbered?

Content
® Does my presentation clearly explain something or answer a question?
® Does my information support the content: not too silly if the subject is serious and vice versa?
® Did I include a table of contents?
® Are all my references properly cited on a bibliography or reference card?
® Did I include an “about the author(s)” card?

Design
® Is it easy to work through the presentation?
® Are font choices okay? (Try to use 3 font types or fewer.)
® Is the text free of spelling, grammar, and punctuation errors?
® Are the graphics clear?
® Is the presentation interesting?

Presentation
® Have I rehearsed the presentation?
® Have I completed a “dry run” in front of others to make sure the presentation will run smoothly?
Use these boxes as you’re designing each screen for your presentation about your dinosaur.
2. Create a Web Site: Dinosaur Digs

This second project will allow you to take full advantage of all technology has to offer while at the same time strengthening the knowledge gained during the unit of study. The next few pages explain what items to include on a web page, but they do not explain how to set up a web site. Learning Resources, Inc. offers a wonderful book to explain how to do this. It’s called LER 2282 Technology in the Classroom: Web Page Creation.

If your students have already experimented or are ready to learn about web page development, creating a web page covering what happens at a dinosaur dig is another great way to “show what they know.” Their site should focus on the locations of major digs, the people involved in the dig, and the type of fossils that have been discovered. The steps in this book explain how to create a compelling web site. They do not provide directions on how to build the actual web site.

First, spend time viewing web sites. Discuss what makes an effective web site as well as what makes a poor web site. (The checklist on page 81 gives some insight on good and poor websites.) Introduce a topic for your students’ web development project, and divide them into groups of two or three. Next, discuss what you expect in terms of content. Suggest covering the following points, but allow students the opportunity to provide their own input:

- locations of major digs or possibly choose one dig to highlight
- people involved in the dig
- types of fossils that have been found

Give students time to brainstorm and research their topic for their web site, and then distribute the Web Site Flow Chart worksheet on page 82. If possible, allow the students to spend some time at the computer experimenting with design elements and searching for movies, photos, links, or other elements they’d like to include as part of their web site. Encourage the use of original artwork and sounds.

Any other additional information should be reviewed and approved by you. You should also take this time to mention whether students should include bibliography information and if so, how to cite their references.

Distribute the Web Design Checklist from page 81. Allow multiple work sessions for planning and then the actual creation of the web pages. If possible, post the sites to the school server to allow other classes within the school to view the pages. Give students ample time to view each group’s site.
WEB DESIGN CHECKLIST

Name ________________________________________________________________

☑ Did I create a flow chart?

☑ Is my site’s goal clear?

☑ Is the site divided with different subject matter on different pages?

☑ Is the text easy to read?

☑ Have spelling and punctuation been checked on each page?

☑ Are there links at the bottom of each page so the user can navigate back to the top of the page, the home page, the table of contents, or related information on the subject?

☑ Is there a balance between graphics and text?

☑ Are font and point size similar?

☑ Do all links work correctly?
Use this flow chart to help you think through the design and structure of your web site.

Name ______________________________________________
Assessment Tools

You’ve done your job. The content was incredible, the “hands-on” learning opportunities were abundant, and the delivery was no doubt sublime! Now let’s see how much actual “learning” took place. There are a number of great ways to assess student learning. We’ve included some of these methods within the next few pages, complete with rubrics and actual assessments you can photocopy and have students take.

Tests
A well-written test is the granddaddy of all assessment tools. If you’ve included everything you want the students to know, a test can be a very reliable measure. We’ve included two types of tests for this unit: 1.) a Q&A test, and 2.) a multiple choice, matching, and True or False test.

Rubrics
Rubrics allow students and teachers to record their perceptions and opinions. Whenever using rubrics, it’s important to encourage honest reporting on the students’ part. We’ve included two rubrics in this section — one for the student and one for the teacher.

Journals
Journals are great assessment tools. Requiring students to keep a journal as you study a topic serves two purposes:
1. It causes the student to recall the information they’ve just studied.
2. It helps you determine just how much information they took away from the lesson, which you can use to determine the points that need to be re-taught.

The sample journal page included in this book has the following areas:
1. What we studied today. This encourages students to recap the day’s learning.
2. My experience with this topic. Students use this space to share their own experiences with the topic, such as their familiarity with fossils and dinosaurs, experiences with these topics, or the fact that they have done the same experiment before in another class. If students discuss the latter in this section, encourage them to write about what the experiment demonstrates.

3. Questions I still have. This is an excellent area for you to identify what students do not understand or to take the learning to the next level. This space allows students to ask any questions they still have surrounding the subject.

Science Logs
Reading a student’s Science Log will give you clear feedback on whether he or she understood the scientific concept associated with the experiment. Throughout the lessons in Step 6, we’ve included Science Logs for students to fill out when they conduct an experiment. Even though you might provide students with directions for completing each experiment, it’s important for them to write down exactly what they did, what materials they used, what the results were, and what they feel the reasons were for the outcome. If what they write is correct and scientifically true, great! If not, you’ll know what to review in your upcoming lessons.

A Note About Assessing Projects
While the projects in Step 5: Plan a Project provide a great way to reinforce learning, they can be tricky to assess — especially if the projects are group activities. Always monitor each group’s performance. Make sure each person is doing a fair amount of the work. If possible, include a peer assessment as part of the overall grade. Be aware that projects don’t always cover a complete topic, but rather portions of a topic. Therefore, never base a student’s grade for the unit of study solely on a project. We have included some sample project assessment pages throughout this chapter on pages 85-86 for Step Five: Plan a Project.
Name ___________________________ Date ____________

What we studied today:
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________

My experiences with this topic:
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________

Questions I still have:
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
## Peer ASSESSMENT RUBRIC

### Student-to-Student Assessment

<table>
<thead>
<tr>
<th>Expectations</th>
<th>Actual Performance</th>
<th>Never</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Always</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>My teammate was helpful.</td>
<td></td>
<td>1 point</td>
<td>2 points</td>
<td>3 points</td>
<td>4 points</td>
<td></td>
</tr>
<tr>
<td>My teammate listened to the ideas presented and participated in group decisions.</td>
<td></td>
<td>1 point</td>
<td>2 points</td>
<td>3 points</td>
<td>4 points</td>
<td></td>
</tr>
<tr>
<td>My teammate contributed a fair amount of work toward the final outcome.</td>
<td></td>
<td>1 point</td>
<td>2 points</td>
<td>3 points</td>
<td>4 points</td>
<td></td>
</tr>
<tr>
<td>My teammate accepted criticism and redirection in a positive manner.</td>
<td></td>
<td>1 point</td>
<td>2 points</td>
<td>3 points</td>
<td>4 points</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>1 point</td>
<td>2 points</td>
<td>3 points</td>
<td>4 points</td>
<td></td>
</tr>
</tbody>
</table>

**Total Points**

Evaluator’s Name: ___________________________________________________________

Comments: __________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

Subject’s Name: ______________________________________________________________

Comments: __________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________
## Teacher Assessment

<table>
<thead>
<tr>
<th>Expectations</th>
<th>Actual Performance &amp; Point Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor</td>
</tr>
<tr>
<td>Organization</td>
<td>1 point</td>
</tr>
<tr>
<td>Content</td>
<td>1 point</td>
</tr>
<tr>
<td>Mechanics</td>
<td>1 point</td>
</tr>
<tr>
<td>Design</td>
<td>1 point</td>
</tr>
<tr>
<td>Presentation</td>
<td>1 point</td>
</tr>
<tr>
<td>Other</td>
<td>1 point</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Total Points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Group Members: ________________________________________________________________

Subject’s Name: ________________________________________________________________

Teacher’s Comments: ___________________________________________________________

_____________________________________________________________________________

Organization: ________________________________________________________________

_____________________________________________________________________________

Content: ________________________________________________________________

_____________________________________________________________________________

Mechanics: ________________________________________________________________
UNDERSTANDING DINOSAURS ASSESSMENT

Name______________________________________________________     Date _____________________________

True or False

Read each sentence below. Write a T on the line if it is true or an F on the line if it is false.

1. Dinosaurs are still alive today.  ______
2. Fossils are the remains of dinosaurs. ______
3. “Prehistoric” means before humans started recording history. ______
4. Dinosaurs roamed the earth 100 years ago. ______

Fill in the Blank

Fill in the blank to complete each sentence.

5. A __________________ eats meat.
6. A __________________ eats plants.
7. Many dinosaurs hatched from _________________.
8. A meat-eating dinosaur had _________________ teeth.

Multiple Choice

Circle the correct answer that finishes the sentence.

9. Most 4-legged dinosaurs were:
   A. carnivores     B. herbivores     C. lonely
10. The plant eater’s enemy was usually a:
    A. carnivore      B. herbivore     C. man
11. Meat eaters had:
    A. large jaws     B. sharp claws    C. both
12. Dinosaurs are:
    A. extinct       B. still alive in some places    C. good pets
13. Dinosaurs lived:
    A. 10 years ago   B. millions of years ago    C. 100 years ago
14. This animal has probably been around as long as or longer than dinosaurs:
    A. jellyfish     B. dog     C. cat
1. In the space provided below, describe the job of a paleontologist. 

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

2. How do paleontologists find out what a dinosaur ate?

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

3. What parts of a dinosaur are hard to determine?

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

4. List two defenses dinosaurs had:
   a.) 
   b.)

5. List two common characteristics of meat-eating dinosaurs:
   a.)
   b.)

6. List two common characteristics of plant-eating dinosaurs:
   a.)
   b.)
What’s the Dinosaur Question?

It’s been an interesting few weeks. You’ve worked hard to ensure student learning. You’ve required a lot of your students. Everyone, including you, knows a lot more today than you did a few weeks ago. It’s time to celebrate your success!

You’ve just covered tons of great scientific information. What better way to wrap up the unit than with a fun, fast-paced, informative game show?

1. You’ll Need Questions and Answers
   Assign each student a dinosaur topic. If you’ve taught each of the lessons in Step 6 of this book, it’ll be a good idea to stick with the topics: Fossils, Paleontology, the Early Life of the Dinosaurs, Herbivores or Carnivores?, More About Herbivores, More About Carnivores, Small Dinosaurs, Large Dinosaurs, Extinction, and Prehistoric Animals that Still Exist Today.

   Photocopy and cut apart the form on page 90. Give two forms to each student. Instruct them to write their topic at the top of the form and then write two questions and answers that are related to their assigned topic.

2. You’ll Need a Set and a Buzzer
   Your classroom bulletin board will do fine as the backdrop. Make heading signs for each topic assigned, and staple them across the top of the bulletin board. Staple the question forms by topic to the board, with its blank side showing.

   Decide on a buzzer. You could use small bells, whistles, blocks, chimes … ask the school music teacher for ideas. Remember, you’ll need four or five — one for each contestant.

3. You’ll Need Contestants
   Divide the class into groups of four or five. Have each group pick a name for themselves having to do with dinosaurs.

4. You’ll Need an Audience
   You know all game shows have audiences to clap and cheer for the contestants. Why should your show be any different? We’ve included an invitation in this section for you to send out. Fill it out, make multiple copies, and encourage the students to decorate the invitations. Then, distribute the invitations to parents, other classes, school administrators, and friends.

5. Show Time!
   The set is ready, the contestants are prepped, and the audience has arrived. It’s time to play! Assign one non-contestant student to keep score. Remind the audience to remain silent when a contestant is answering, and remind players of the rules.

   For simplicity, point values will remain constant: 50 points per round. Contestants choose the topic they want when taking their turn. A form will be pulled at random and the question will be read. Contestants must “buzz” in first in order to answer. If the first contestant to buzz in is correct, his or her team gets to choose the next topic. Each team’s members take turns playing, and go to the end of the line once they have had a chance to provide an answer. When all the forms have been read, point values are added up, and the team with the most points wins.
What’s the Dinosaur Question?

Topic: ________________________________________________________________

____________________________________________________________________

Answer: ______________________________________________________________

____________________________________________________________________

Question: ____________________________________________________________

____________________________________________________________________

What’s the Dinosaur Question?

Topic: ________________________________________________________________

____________________________________________________________________

Answer: ______________________________________________________________

____________________________________________________________________

Question: ____________________________________________________________

____________________________________________________________________

What’s the Dinosaur Question?

Topic: ________________________________________________________________

____________________________________________________________________

Answer: ______________________________________________________________

____________________________________________________________________

Question: ____________________________________________________________

____________________________________________________________________

What’s the Dinosaur Question?

Topic: ________________________________________________________________

____________________________________________________________________

Answer: ______________________________________________________________

____________________________________________________________________

Question: ____________________________________________________________

____________________________________________________________________
Our class has just completed an incredible unit on dinosaurs, and now we’d like to challenge each other in a game! Come see what you think.

What? A live Round of What’s the Dinosaur?

When?

Where?

What Time?
Answer Key

Page 11: Dinosaur Vocabulary Practice
1. prehistoric
2. carnivore
3. herbivore
4. skeleton
5. egg
6. dinosaur
7. fossils
8. paleontologist
9. extinct

Page 12: Dinosaur Vocabulary Crossword Puzzle
Across
1. Triceratops
2. carnivores
3. sand
4. fossils
5. theropod

Down
6. Tyrannosaurus rex
7. extinct
8. egg
9. dinosaurs

Page 28: Activity 1: Show What You Know: Fossils
1. human – E
2. leaf – D
3. shell – A
4. large dinosaur – C
5. bird – B

Page 33: Paleontology Puzzle
Page 38: Show What You Know: Scrambled Eggs
1. hatch
2. nest
3. fossil
4. eggshell
5. paleontologist
6. dinosaur

Page 44: Dinosaur Food Match
Meat eaters: Tyrannosaurus rex
Plant eaters: Triceratops, Stegosaurus

Page 53: Show What You Know: Dinasaur Match
1. Albertosaurus
2. Oviraptor
3. Compsognathus
4. Stegosaurus
5. Triceratops
6. Diplodocus

Page 58: Show What You Know: Small Dinosaurs Word Scramble
1. A. meat 6. F. hand
2. B. baby 7. G. brain
3. C. fast 8. H. bird
5. E. beak 10. J. five

Page 63: Show What You Know: Large Dinosaur Crossword Puzzle
Across
1. meat
2. sharp
3. lizard
4. neck

Down
5. tails
6. horns
7. plant
8. four

Page 72: Show What You Know: Past to Present
1. Oviraptor – B
2. Mussaurus – C
3. Psittacosaurus – D
4. Triceratops – A

Page 87: Understanding Dinosaurs Assessment
1. F
2. T
3. T
4. F
5. carnivore
6. herbivore
7. eggs
8. sharp

Page 88: Understanding Dinosaur Q&A Assessment
1. answers may vary
2. plant eaters had dull, rounded teeth and meat eaters had sharp teeth
3. color, sounds, and interactions
4. protective armor, ability to run fast
5. sharp teeth, walked on 2 legs
6. dull teeth, walked on 4 legs, have defenses
7. were laid on the ground, had soft shells, may have been very large
8. climate changes or a catastrophic event
paleontologist

prehistoric

reptile

sand

Apatosaurus (ah-PAT-oh-SORE-us)

Carcharodontosaurus (kar-kar-o-don-toh-SORE-us)
sharp teeth

skeleton

small brain

theropod
<table>
<thead>
<tr>
<th>Compsognathus</th>
<th>Corythosaurus</th>
</tr>
</thead>
<tbody>
<tr>
<td>(comp-sog-NAY-thus)</td>
<td>(koh-rith-oh-SORE-us)</td>
</tr>
<tr>
<td>Diplodocus</td>
<td>Edmontosaurus</td>
</tr>
<tr>
<td>(di-PLOH-de-kus)</td>
<td>(ed-mon-toh-SORE-us)</td>
</tr>
<tr>
<td>Microvenator</td>
<td>Mussaurus</td>
</tr>
<tr>
<td>(mik-roh-ven-AH-tor)</td>
<td>(mus-OR-us)</td>
</tr>
<tr>
<td>Oviraptor</td>
<td>Psittacosaurus</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>(OHV-ih-RAP-tor)</td>
<td>(si-TAK-oh-SORE-us)</td>
</tr>
<tr>
<td>Saltopus</td>
<td>Stegosaurus</td>
</tr>
<tr>
<td>(SALT-oh-pus)</td>
<td>(STEG-uh-sore-us)</td>
</tr>
<tr>
<td>Triceratops</td>
<td>Tyrannosaurus rex</td>
</tr>
<tr>
<td>(try-SERRA-tops)</td>
<td>(tie-RAN-oh-SORE-us REX)</td>
</tr>
</tbody>
</table>