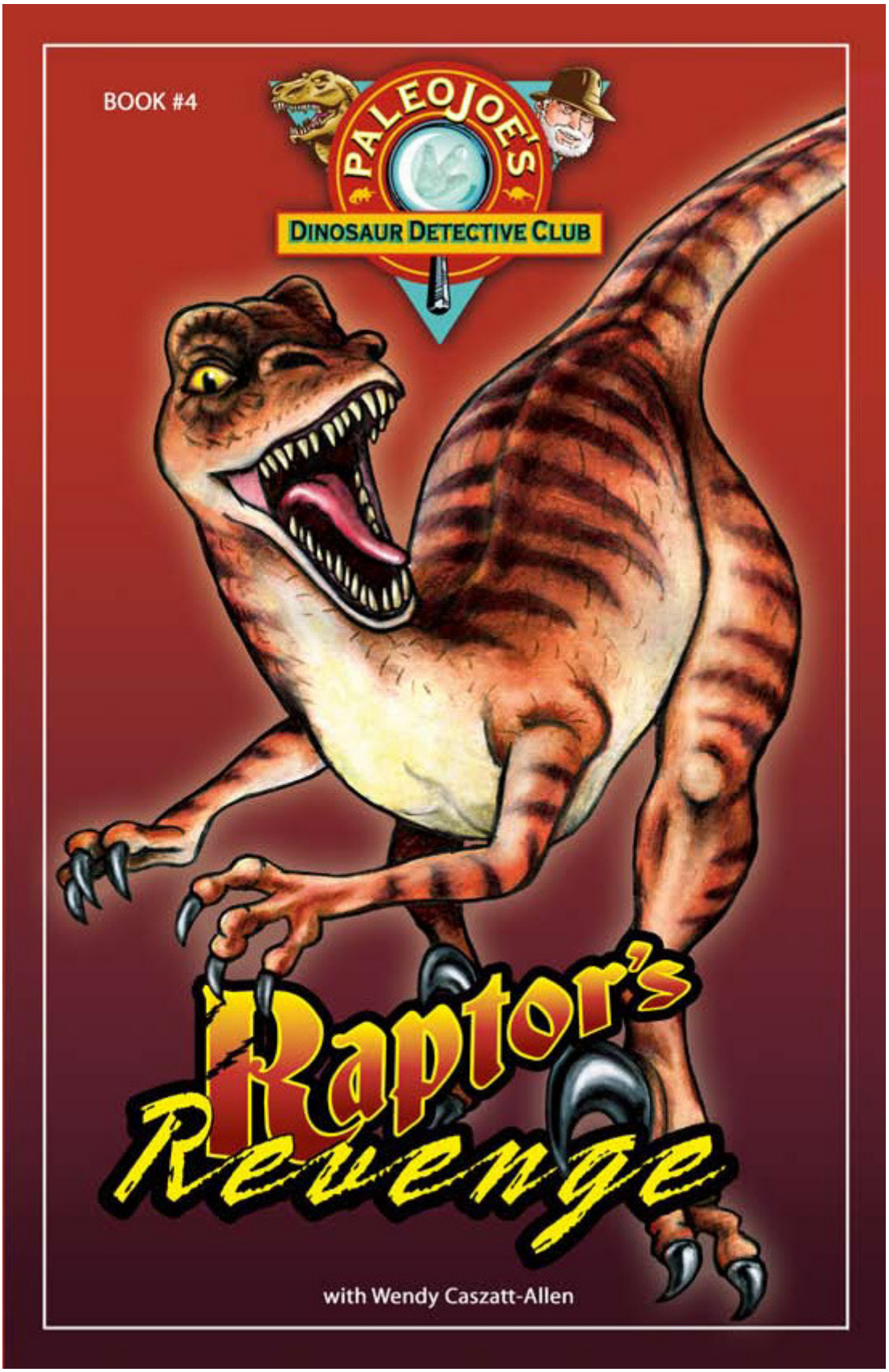

BOOK #4
PALEOJOE'S
DINOSAUR DETECTIVE CLUB
Raptor's Revenge
with Wendy Caszatt-Allen

Activity: Dinosaur Concrete Poem

Summary: Students will learn about concrete poems by looking at examples, and they will create concrete poems about paleontology.

Materials: Examples of Concrete Poems from poetry books
Dinosaur Reference Cards (attached)

Grades 1-2 Procedure:

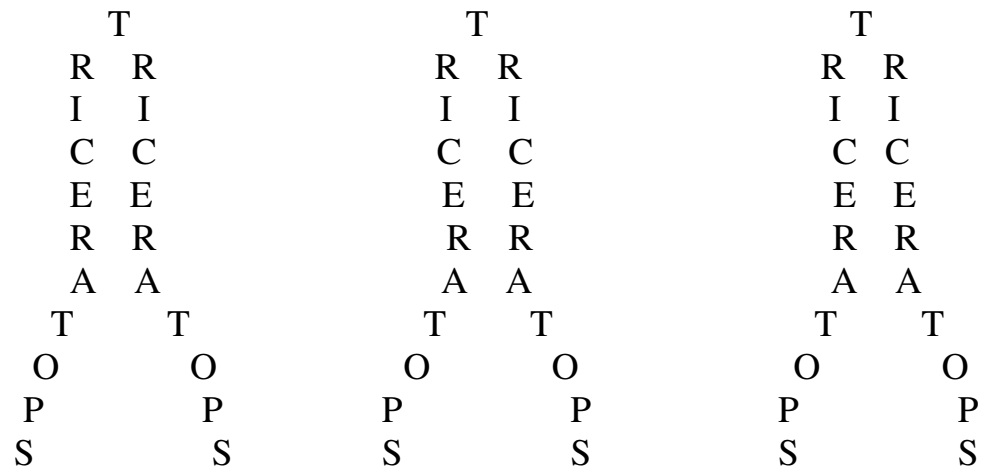
1. Students explore concrete poems from poetry books.
2. Ask, "What do all these poems have in common?"
   *Words shaped like a picture
3. Students use knowledge about dinosaurs to create concrete poems about types of dinosaurs.
   *Use Dinosaur Reference Cards for facts.
4. Share concrete poems.

Grades 3-6 Procedure:

1. Students explore concrete poems from poetry books.
2. Ask, "What do all these poems have in common?"
   *Words shaped like a picture
3. Students use knowledge about dinosaurs to create concrete poems about a type of dinosaur or something having to do with paleontology.
   *Use Dinosaur Reference Cards for facts
4. Share concrete poems.

Concrete Poem Examples:

Grade 1-2 Dinosaur:



Eats vegetables. Uses three horns to protect himself from enemies.

Grade 3-6 Dinosaur or Paleontology

E R E
X A F
C C U
A V A T I O N. Brushing, Brushing, Brushing L

? it is T W
A H

Activity: Name Your Own Dinosaur (Latin/Greek Root Study)

Summary: Students will explore the names of dinosaurs and create new creatures using Latin / Greek roots.

Materials: Dinosaur Reference Cards
Latin Root Pieces website (Grades 5-6 only)
Website: www.enchantedlearning.com/subjects/dinosaurs/allabout/Nameroots.shtml

Grade 3-4 Procedure:

1. Discuss 2-3 of the different dinosaur cards. Focus on why each dinosaur name makes sense.

   Example: brontosaurus "thunder-lizard"
   pterodactyl "winged-fingers"

2. Ask "What would happen if we combined qualities of each of these dinosaurs into one animal?
   -What would it look like?
   -What would you call it?
   (example: pterobrontodactyl)

3. Students draw a picture of and name "new" dinosaurs.

4. Students make reference cards for new dinosaurs.
   (See attached blank reference cards.)

5. Share.

Grade 5-6 Procedure:

1. Discuss 2-3 of the different dinosaur cards. Focus on how each dinosaur name fits with the Latin / Greek roots.
   -Use website to construct "new" dinosaurs.

2. Students create new dinosaurs (combining 2-3 known dinosaurs or making "new" dinosaurs out of Latin / Greek roots).

   Example of "new" dinosaur:
   Penta "five" + Ops "eyes" +Saurus "lizard"=Pentaopsaurus
   (A large lizard-like dinosaur with 5 eyes)

Activity: "Baby Elephant Walk" Song

Summary: Students will become familiar with "Baby Elephant's Walk" so that they will understand references in *The Disappearance of Dinosaur Sue* and *Raptor's Revenge*.

Materials: Copy of "Baby Elephant's Walk"
(http://www.jacquedee63.com/babyelephantwalk.html)

Grade 1-6 Procedure:

1. Listen to song to gain familiarity with the tune.

2. Have kids move to the music as the music leads.

3. (Optional) Have the students create words to the tune like Shelly does in book 4.

Activity: Risk-Taking Theme Unit

Summary: Students will read PaleoJoe book(s) while finding and analyze risks that the characters take.

Materials: Any Combination of *PaleoJoe* Series Books
Large Chart Paper
My Life Risks worksheet(attached)
Risk-Booklet for each student (attached)
Rewrite the Risk worksheet (attached)

Procedure for Grades 3-4:

1) **Day One:**
   Discuss what it means to take a risk. Students share examples of times when they have taken a risk. Record examples on chart paper.

2) **Day Two (and following):**
   Students read PaleoJoe book(s) and record risks that the characters are taking in their risk booklets.

3) **Culmination Activity** (when books / risk booklets finished):
   *Rewrite the Risk activity (attached)

Name_____

Date_____

My Life Risks

Directions: List as many risky actions that you can find from your life (past or present).

Risky Action	Did you choose to do it? YES	NO
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

PaleoJoe Risks Booklet

Risks I found in the book:

_____

Name_____

Book page #_____

Character(s):_____

Risky Action:

_____

_____

_____

Would you have taken this risk? (Circle one) YES NO

Why or why not?

_____

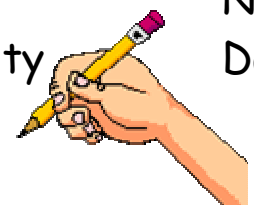
_____

_____

Did the character take the risk? (circle one) Yes No

Name_____

Culminating Activity
Rewrite the Risk



Date_____

Directions: Shelly and Dakota take many dangerous risks as young detectives. Luckily, their risks always seem to work out for them. Pick one of their dangerous risks, and think of a way they could have been good detectives while being safer. Rewrite that part of the story to include a less risky alternative.

Original Risk
Book Title _____
Character(s)_____
Risk_____
_____

New Risk:

_____

_____

_____

_____

_____

_____

_____

Activity: Risk-Taking (Pros and Cons) Theme Unit

Summary: Students will read PaleoJoe books(s) while finding and analyze risks that the characters take.

Materials:

My Life Risks (attached)
Risk-Booklet for each student (attached)
Rewrite the Risk (attached)

Procedure for Grades 5-6:

1) **Day One:**

-Discuss what it means to take a risk. Students share examples of times when they have taken a risk. Record examples on chart paper.

-Discuss reasons for or against taking a risk:
Ask, "What would be a "pro" argument for taking a risk?"
Ask, "What would be a "con" argument for taking a risk?"

-Students risks they have or have not taken
Students complete My Life Risks worksheet (attached).

2) **Day Two (and following):**

Students record risks that the characters take (or choose not to take) in their risk booklets while they read any of the *PaleoJoe* books.

3) **Culmination Activity** (when books / risk booklets finished):

*Rewrite the Risk Activity (attached).

Name_____

Date_____

My Life Risks

Directions: List as many risky actions that you can find from your life (past or present).

Risky Action	Did you choose to do it? YES	NO
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

*Pick one risky action to explain at least 2 pros and 2 cons that you might have been thinking when deciding whether to take the risk or not. (Write it on the back)

PaleoJoe Risks Booklet

Risks I found in the book:

_____

Name_____

Book page #_____

Character(s):_____

Risky Action:

_____

_____

_____

Pros for taking the risk:

_____

_____

Cons for not taking the risk:

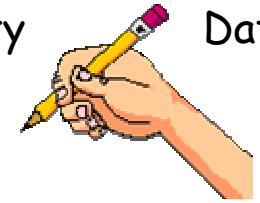
_____

_____

Did the character take the risk? (circle one) Yes No

Name_____

Culminating Activity
Rewrite the Risk



Date_____

Directions: Shelly and Dakota take many dangerous risks as young detectives. Luckily, their risks always seem to work out for them. Pick one of their dangerous risks, and think of a way they could have been good detectives while being safer. Rewrite that part of the story to include a less risky alternative.

<u>Original Risk</u>
Book Title _____
Character(s)_____
Risk_____
_____

<u>New Risk:</u>

_____

_____

_____

_____

_____

_____

_____

_____

_____

Activity: A Dinosaur Like Me

Summary: Students will personify dinosaurs in order to compare themselves to a specific dinosaur.

Materials: Dinosaur Reference Cards
Pre-writing organizer (attached)

Procedure for Grades 3-6:

In Chapter 4 of *Raptor's Revenge*, Shelly said Dakota was looking like a Dunkleosteus when he had his mouth open like an "o."

1) Students look through the dinosaur reference cards, and decide which dinosaur they are the most like.
   -Grades 3-4 focus on physical qualities.
   -Grades 5-6 incorporate personality and physical traits.

2) Students write paragraphs about why they are like their chosen dinosaur.
   -Use the pre-writing organizer before writing (attached).

Name_____

Which Dinosaur Are You Like?
Pre-writing Organizer

Topic Sentence: I am like the _____ for many reasons.	
Dinosaur	Me
These are all the reason that I think the _____ is a lot like me.	

Example:

Topic Sentence: I am like the Deinonchus for many reasons.	
Dinosaur	Me
The Deinonchus' name means "terrible claws."	My fingernails grow very quickly, so sometimes it looks like I have "claws."
The Deinonchus is 10 feet long, which is fairly short for a dinosaur.	I am 5'2", which has also been short compared to many of the people I know.
The Deinonchus is a carnivore, which means it eats meat.	I like to eat meat with every meal, so I eat a lot of meat, too!
A Deinonchus has quick-moving legs so it can catch its prey.	I am a pretty fast runner, too!
These are all the reason that I think the Deinonychus is a lot like me.	

Activity: Ms. Pierceson Similes

Summary: Students will identify similes used by the author and try to describe something (person, place, thing) using similes.

Materials for Grades 3-6: *Raptor's Revenge*
(Meeting of Ms. Pierceson and Shelly)

Procedure for Grade 3-6:

1) Point out some of the similes that the author uses when Ms. Pierceson and Shelly meet for the first time.

   "as though she were looking….broccoli"
   "helmet-like covering"
   "like it was made of metal"

2) Ask, "What do these descriptions have in common?"
   *All describe using a comparison to something

3) Students write a description of something (person, place, thing) using similes.

4) Share descriptions.

Activity: Raptor's Revenge Discussion Topics/Questions

Summary: Students will participate in guided discussions and write responsively to the text.

Materials: *Raptor's Revenge*

Procedure for Grades 3-6:

Foreshadowing- There are many clues throughout the book that pointed to how the mystery would be solved. At the end of the book, try to find some of these clues and talk about how the author was using a strategy called "foreshadowing."

- Examples of foreshadowing:
  - -The throat lozenge wrapper
  - booby trap
  - coyote recording
  - hollow sloth
  - smell

Ignorance and Greed- The book speaks about these being two bad human qualities.

- How do these qualities connect to the buying and selling of fossils?
- How do these qualities connect to Bob committing the crime?

Imagination vs. Reality (or Real vs. Not-Real)- This theme is prevalent in book 3, *Secret Sabertooth*. In book 4, *Raptor's Revenge*, Bob is captured because of the power of imagination.

- If Bob had not had an imagination, would he have been caught?
- How did Shelly and Dakota rely on imagination to capture the vandal?

Sarcasm- Sarcasm is used a lot in *Raptor's Revenge.* Point out situations where the characters are sarcastic.

- What does it show about the characters who use it?
- How do other characters respond to it?
- Should we use it? When?

Cleveland's Change of Attitude- Cleveland changed in his attitude throughout the book.

- How did he change?
- Why did he change?
- Which is the "real" Cleveland?

"Sharp"- The sharpness of objects and people seems to be highlighted by the author.

- Make a list of the "sharp" things of the book (Ms. Pierceson, petroglyphs, bones, eagle, utahraptor claw, cats claws)
- Talk about why this theme of "sharp" would have been emphasized by the author.

Activity: Building Bones

Summary: After considering what impacts the type of material and structure used for a culture's homes, students construct and evaluate their own "bone cabin".

Materials: Popsicle sticks; glue guns; glue; picture models of frame construction; Styrofoam peanuts or small bone replicas (maybe even the candy?)

Procedure:

1) Brainstorm different types of houses that were or are built by various cultures. In the past (and even present in some cultures), what determined the type of home built? Where do they get their materials? How does the climate affect building plans and materials?
2) Discuss the bone cabin from chapter 26 in Raptor's Revenge. How would they have constructed it? Would fossilized bone make a good construction material? Was it a good use of the bones? Do you think you can build a bone cabin?
3) Provide students with the materials listed above in order to plan and make a "bone cabin." Students should construct a framework out of the sticks first (have reference books on structures available) and then attach the "bones" to fill in the siding.
4) How did it work? Can you see through any parts of your structure? Display the variety of bone cabins throughout the room.

Activity: Birds, Reptiles, and Dinosaurs, Oh My!

Summary: Students compare characteristics and behaviors of birds, reptiles, and dinosaurs on a triple Venn diagram. After discussing evolution, they decide if they feel birds evolved from dinosaurs.

Materials: reference materials; Venn student paper; Venn class chart.

Procedure:

****Could be adapted for younger students by doing a double Venn and fewer categories.

1) Have a triple Venn diagram on the board with the following titles on the circles: has a sibling; is nine (or ten depending on the age of class) years or older; has a pet. Students walk in and place their names on the correct spot. Review how a Venn diagram works.
2) In Raptor's Revenge the characters discuss the relationship between birds and dinosaurs. What are some things they had in common? How were they different? What if we compare birds and today's reptiles—do they have any similar qualities? What if we compared all three?
3) Students make a triple Venn diagram comparing facts and features for birds, today's reptiles, and dinosaurs. Use the list below as a reference or have students research characteristics and examples of their choosing.

*young hatch from eggs	*feathers
*keen eyesight	*talons
*scales	*cold-blooded
*ability to fly	*bipedal
*carnivore	*herbivore
*protective of eggs	*thin-walled bones
*gizzards/stones to help with digestion	
*wings	*teeth

4) For discussion afterwards, have each student record one characteristic in its correct space on the a class Venn diagram. See if all agree with the placement of the features.
5) What is evolution? Do you think birds evolved from dinosaurs? What are other examples of evolution that you know?

Activity: Geometric Dinos

Summary: Students identify geometric shapes and solids alone and within another shape (a dinosaur!). They then use their geometric properties to create their own dinosaur.

Materials: geometric shapes and solids for modeling; cut-outs of geometric shapes and solids; construction paper; gluestick; dinosaur books

Procedure:

*For students who haven't read Raptor's Revenge, proceed to reviewing geometric shapes and solids step #3.

1) In Raptor's Revenge, Shelly and Dakota saw petroglyphs on the walls of Calamity Canyon. These etchings (most likely done eight hundred years ago by the Fremont Indians) used geometric shapes (trapezoids, squares, circles) to depict human figures and actions.
2) Read the passage on p. 137. What is a trapezoid? What would it look like with a square on top? Possibly a head and body? Review geometric shapes with students including the following: rectangle, square, oval, circle, trapezoid, rhombus, triangle, pentagon, hexagon, and octagon. Expanding the lesson to geometric solids such as cone, pyramid, cylinder, sphere, cube, and rectangular prism would also be beneficial.
3) Show some pictures of dinosaurs. Do you see any geometric shapes (or solids) in their features? What part of the dinosaur is similar to a triangle? A rectangle? An oval? A cone? A cylinder?
4) Using various size cut-outs of geometric shapes and solids, students will design their geometric dinosaur. Provide students with dinosaur books to give them ideas, but tell them to be creative in their placement of shapes. Students should use a variety of shapes and solids; there is no limit on the number of each used.
5) Students can name and display their geometric creations. Sharing their geometric features is a good review for all.

Name _____

Percentages

After the third vandalism incident at the Balboa Museum, Bob had to reassemble the scattered bones of a skeleton. He said that 96% of this skeleton was recreated, not found. That means _____ of _____ bones were replicas and _____ were actually found.

Use your skills to find the percentages in the problems below. Write the letter of the problem in the space above its answer. Some letters will not be used.

_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
33	60	20	25	75	24	50	15	100	63

R. 75% of 100 = _____

E. 20% of 50 = _____

T. 50% of 30 = _____

R. 100% of 63 = _____

A. 25% of 80 = _____

P. 25% of 200 = _____

L. 80% of 50 = _____

U. 33% of 99 = _____

A. 50% of 48 = _____

T 75% of 80 = _____

O. 10% of 1000 = _____

H. 33% of 75 = _____

Activity: Place Value Game

Summary: Students practice and compare place value from the hundreds place (gr. 1) to the billions place (gr. 6)**.**

Materials: small cards with numbers 0-9 (several sets per partner group); place value mat with number of places to match your particular grade level; cards with < and > .

Procedure:

1) Numbers are a major part of all of the PaleoJoe books. They represent the number of years, the amount of specimens, the amount of money, various sizes of prehistoric animals, and more.
2) Review place value up to the appropriate level of your students. Practice reading numbers, telling place values of numbers, comparing numbers, and writing numbers in expanded form.
3) Explain the Place Value Game by modeling the play of two students. Put a set of cards (multiple sets of 0-9) face down between two players. Players take turns picking a card and placing it on the place value mat. Once a card is laid, it is played and cannot be moved. When all place value spaces are filled in, students can read their numbers to each other, write their numbers in expanded form, record their numbers on a class chart, and/or use the < > signs between them.
4) There are many variations of the Place Value Game: making the highest number, making the lowest number, making the number closest to 500,000, allowing one trade at the end, etc.

Example Place Value Mat for up to 100,000s place.

Activity: Chasing Rainbows

Summary: Students deduce the color of a particular dinosaur, draw it, and surround it with painted habitat.

Materials: crayons or pastels, watercolors, paper; reference books

Procedure:

1) PaleoJoe and the Dinosaur Detectives know so much about dinosaurs even though they roamed the earth over 65 million years ago. What do paleontologists know about dinosaurs? No one has ever seen a dinosaur, so how do they know this information? What might they not know? What else would you like to know about the dinosaurs, if we could really see one?
2) Read Uneversaurus by Professor Potts to the class.
3) Discuss the different possibilities and the reasons that a dinosaur might have been a particular color.
4) Make a crayon or pastel drawing of a dinosaur in its habitat. Use your imagination and reasoning to create your picture. Embellish with watercolor. Bring your picture to life!
5) Share your picture with the class. Tell your dinosaur's name and why you chose the colors that you did.

Activity: Dinosaur Mix-up

Summary: Students sort bone pieces (or animal parts) based on their characteristics and reassemble a skeleton (or animal).

Materials: rulers; markers; scissors; paper bags; pictures of three different animals or skeletons copied on card stock (depending on age group); There are also dinosaur skeleton puzzles available commercially if desired.

Procedure:

1) Discuss the Old Bone Room in Book 3 or Bone Mine in Book 4. How do scientists sort the bones and figure out which bones go together? Do the bones they find always belong to the same animal?
2) Have the students use a ruler to draw a division pattern on the back of each of the animals on the card stock. (The younger the age group, the fewer the pieces.) Cut out the animal pieces and place them all together in a paper sack.
3) Exchange bags. Students examine each piece, determine the appropriate animal, and reassemble the cardstock pictures.

*The complexity of the activity could be varied easily for younger or older students.

* A website with drawings to use for your puzzle- www.mcps.k12.md.us/schools/knollses/dinosaurs/DINOGR/Allo.gif
*www.dinosaurdiscovery.com/dinosaur-kits.html This site has dinosaur skeleton puzzles of four different dinosaurs.

Activity: Scavenger Hunt

Summary: Students will use standard measurement and measurement conversion skills to compare actual dinosaur body size, body part size, and egg size with common articles of the same size.

Materials: Scavenger Hunt Sheet; tape measures; Actual Size by Steve Jenkins

Procedure:

1) In Raptor's Revenge, we learn the Utahraptor's claw is an amazing 15 inches long. Show this amount on the measuring tape. Have students convert that measurement into feet and inches. How big is your fingernail? Show other actual sizes from the picture book if desired.

2) When reading about the sizes of dinosaurs, it's hard to really imagine the reality of how large they were. Today is the day their size becomes real. Small groups receive a tape measure, recording paper, pencils, and Scavenger Hunt Sheet. Each group is responsible for finding items that are the approximate size of the dinosaur item listed on the sheet. Students record and do some measurement conversions along the way.

3) Reflect on the students' discoveries.

Scavenger Hunt Sheet

Group Name _____

1. Find an object the same size as a Triceratops skull: 10 feet long.

   _____. Convert to inches:_____

2. Find an object the size of a Deinocheirus claw. 10 inches long.

   _____. What fraction of a foot is that?_____

3. Find an object the size of the Utahraptor slasher claw. 15 inches long.

   _____. Is that more or less than half a yard?____

4. Find an object the size of a Sauropod egg. 1 foot long and 10 inches wide.

   _____. Convert to inches:_____

5. Find an object the size of a T-rex tooth. 9 inches long.

   _____. How many half-inches is that?_____

6. Find an object the size of a Mussaurus baby. 16 inches long.

   _____. Convert to feet and inches:_____

7. Find an object the size of a Hadrosaur footprint. 1 foot long.

   _____. How many footprints equal a mile?____

8. Find an object the size of a Compsognathus dinosaur. 2 feet long.

   _____. Convert to yards:_____

9. Find an object the size of a Protoceratop egg. 6 inches.

   _____. Convert to feet: _____

Book 4 – Raptor's Revenge

Bird/Dinosaur Relationship:
http://www.ucmp.berkeley.edu/diapsids/avians.html

- Discusses 'Are Birds Really Dinosaurs?'
- Also gives objections to the theories.

Raptors: http://unews.utah.edu/p/?r=040306-2

- Giant Raptor Dinosaur Discovered in Utah Monument.

Dinosaur National Monument:
http://www.nps.gov/history/museum/exhibits/dino/

- Look at the Douglass Quarry and check out the virtual tour. See the bones in the wall!
- Look in the multi-media section and watch a slideshow of how a fossil is taken from discovery, to study and then display.

Butch Cassidy and the Sundance Kid:
http://www.thewildwest.org/interface/index.php?action=275

- Information about Butch Cassidy and the Sundance Kid.

Video White Water Rafting:
http://video.google.com/videoplay?docid=5668623412822120016&q=white+water+rafting+yampa+river&total=3&start=0&num=10&so=0&type=search&plindex=2

- Two-minute video of Whitewater rafting the Green and Yampa Rivers through Dinosaur National Monument with OARS (Outdoor Adventure River Specialists).

Video Dinosaur National Monument:
http://video.google.com/videoplay?docid=-4440561017729314842&q=dinosaur+national+monument&total=23&start=0&num=10&so=0&type=search&plindex=5

- Three-minute video of a trip taken August 2007.

Journal With Links:
http://www.dinosauria.com/jdp/jdp.htm

- Archaeopteryz, Ancient Birds, and Dinosaur-Bird Relationships.
- Dinosauria.
- Dromaeosaurids.
- Fossilization.
- Impact Theories and Extinction Events.
- Legal Issues.
- News and New Discoveries
- Miscellaneous

Activity: History of the Earth in Inches

Summary: Students conceptualize and measure the age of the earth and major earth events by using a much smaller scale.

Materials Gr. 1-2: master sheet, string with timeline markings, cards with name of each earth event, markers
Materials Gr. 3-6: master sheet, 38 ft. string for each group, permanent marker, small cards for writing earth events, tape, measuring tape, yardstick, rulers

Procedure Gr. 1-2:

1) How old are you? How old am I? How old is your grandparent? How old is the earth? Show what 4.5 billion looks like as a number. What does that mean? If the earth is that old, how long ago did the dinosaurs live? Show 200,000,000 years ago. It's hard to understand these numbers—let's look at the history of the earth in a different way.
2) Provide each student with a card labeled with an earth event and its corresponding measurement. Have them draw a picture that represents his/her event on the card.
3) Lay the string in a large space. Each student sits or stands by the appropriate marking on the string when done. Call out the first event and measurement; the first student stands and shows his/her picture and place on the string. Repeat for the subsequent events/students.
4) Discuss the results. Where would your birthday fit on the string?

Procedure: Gr. 3-6:

1) How old are you? How old am I? How old is your grandparent? How old is the earth? Show what 4.5 billion looks like as a number. What does that mean? If that earth is that old, how long ago did the dinosaurs live? Show 200,000,000 years ago. It's hard to understand and compare the ages of things with these numbers—let's look at the history of the earth in a different.
2) Provide each group with the master sheet, 38 ft. string, permanent marker, cards, tape, and measuring equipment. They are to show a timeline of the history of the earth by measuring, marking, and taping a label on their string.
3) When groups are done, they lay their strings right next to each other and compare. Discuss the results. Do our histories match? What surprised you? Where would your birthday fit on the string?

LENGTH OF STRING FROM START	YEARS AGO	EVENTS
38 feet	4.5 billion	Earth begins
29 feet	3.5 billion	Life begins
25 feet	3 billion	First fossils form (algae, bacteria)
5 feet	600 million	Jellyfish, sponges and worms
4 feet	480 million	First primitive fish
40 inches	400 million	Earliest land plants
35 inches	350 million	Amphibians and early land animals
31 inches	310 million	First reptiles
27 inches	270 million	Reptiles rule
20 inches	200 million	Age of Dinosaurs begins
18 inches	180 million	Flowering plants
16 inches	160 million	Birds appear, dinosaurs abundant
7 inches	70 million	Modern birds develop
6.5 inches	65 million	Dinosaurs gone
5 inches	50 million	Birds and mammals
0.5 inches	5 million	First Humans
Thickness of a fingernail	10,000	Last Ice Age Over

Activity: Dinosaurs On the Move

Summary: Students investigate dinosaur physical features and movements in order to create a flipbook.

Materials: Paper pieces cut to 4" x 3" pencils; markers; scissors; staplers

Procedure:

1) Ask the students if they noticed a little secret on the pages of each Dinosaur Detective book. Each has its own flipbook showing the movement of a dinosaur involved in the story. Have students flip through to observe the movements.
2) Brainstorm the ways that dinosaurs moved. Have books available to research the physical features and movements of dinosaurs.
3) Cut white printer paper in 4 inches x 3 inches pieces for the pages of the book. Distribute twenty per student. What steps need to be taken to make a flipbook? Do you think numbering pages would be helpful on the back? What will give the best results?
4) Have the students choose a dinosaur and make a flipbook that demonstrates the dinosaur's movement. Make a cover with the name of the dinosaur and staple all of the pages.
5) Exchange books with other class members to see the different choices and how they move.

Activity: Mapping the Dinosaur Detectives

Summary: Students will locate on a U.S. map and describe the geography of the places the Dinosaur Detectives visit in each book. They will use cardinal and intermediate directions, estimate distances using the map scale, and calculate actual distances in miles to map their journeys.

Materials: U.S Wall Map, colored pushpins, colored yarn, reference book/atlas for mileage and geographical information

Procedures:

1) Prior to reading the Dinosaur Detective Club Series, mount a U.S. map on the wall so that the students will be able to locate the starting points and various destinations traveled to by the characters. Color code the yarn and push pins so that each color represents a different book. Make a legend of the colors and which book they represent. For example: Book 1- red yarn, red pushpin, red card with mileage.

2) As each book is read, map the travels of the characters by pinpointing locations and connecting them with yarn. Discuss which direction they went using cardinal and intermediate directions. Estimate the distance using the map scale. Calculate the mileage between locations and tally for the various books.

3) Discuss the geography of the place they visit. What is the climate there? What is the topography? Is there a time change? How long did it take them to get there? How many students have been to these locations?

Activity: Majestic Models

Summary: Students research historical information, physical characteristics, and habits of dinosaurs in order to make a dinosaur museum exhibit.

Materials: clay (art clay, that can be fired and glazed); glaze; clay tools; dinosaur books for reference; kiln; boxes; paint; items for habitats; exhibit cards

Procedure:

1) What is a model? Show a globe, toy car, plastic bug, etc. How are these models the same as the items they represent? How are they different?
2) Have students think about the physical characteristics of dinosaurs. How would they feel? What textures would be on some dinosaurs and not others? What were some unique features they could have? What features need to be included on a model?
3) Have students peruse the dinosaur books. Each student chooses a different kind of dinosaur to make out of clay.
4) Distribute clay blocks to use for each student. Model different pinching techniques that could be used to make the plates, mouth, spikes, etc.
4) Fire. Glaze and fire again.
5) Upon completion, create a classroom museum with mini-dinosaur exhibits. Using a display box of your choosing, students create the habitat for their specific dinosaur. Exhibit cards including the name of the dinosaur, habitat, period it lived, diet and other interesting facts could be displayed on each box.
6) Invite other classes and parents to parade through to view the exhibit.

Activity: Edible Rock Layers

Summary: Students describe how sedimentary rocks are used to understand the history of the earth. They act as scientists as they observe, sketch, and describe properties of edible rocks and match their sample to a scientist's description.

Materials: sedimentary rock samples; Three Musketeers, Milky Way, Kit Kat, and Twix candy bars—all cut in 1x1 inch squares; descriptions of rock samples; small paper plates; paper, pencil

Procedure:

1) Cut up small squares of the candy samples and arrange at a distribution sight. Ask the students to pick out one small sample, place it on a paper plate, and take it back to their seats. Students should select different samples.

2) When reading the Dinosaur Detective Club Series books, discuss how the layers of rock and fossil locations tell a story. Explain that geologists look at rock samples very closely to determine their composition and age. The layers and features found in sedimentary rocks show the history of the earth—animals living at a particular time, changes in the ocean levels, catastrophic events. Show samples of sedimentary rock. Geologists and paleontologists use detailed sketches and descriptive language to describe rock samples because they truly tell the story of the earth.

3) Tell students that they have a slice of sedimentary rock taken from the earth. Students are to make a detailed sketch of their rock sample. They also need to write and describe in detail their rock sample so that another scientist would be able to pick the sample out of a group.

4) In groups of 4-6, students mix up their descriptions and rock samples. Rotate groups so that a new set up students now must match the other student descriptions with the samples. Switch back and determine the success.

5) Read the four given descriptions of the rock samples (page 2) out loud and distribute copies of them. Have the students select the description that they feel matches their rock sample.

6) Reveal the identities. Hand out the left over samples!

Teacher Notes:

1. Three Musketeers
2. Milky Way
3. Kit Kat
4. Twix

Sample 1

Sample has a similarly colored light brown interior with a few small tiny holes. The exterior looks like a fairly regular, dark brown blended crust with some patterning.

Sample 2

Outside: Thin medium brown layer with wavy ripple marks on the bottom

Inside: **Bottom**- dense dark buff layer

Top- shiny, smooth, medium tan layer

Sample 3

Four segments of layered material.

Outside: Thin medium brown

Inside: Alternating light and medium colored material

Sample 4

Outside: Thin medium layer with wavy ripples on the bottom

Inside: **Bottom**- poorly consolidated light tan porous layer

Top- shiny smooth medium tan layer

Activity: Earth: This is Your Life

Summary: Students describe the changes in the history of the earth throughout its 4.5 billion years by constructing an illustrated, informational timeline and role-playing an organism or feature from the past.

Materials: reference books or computer resources; paper; colored pencils; tape; microphone; clip from "This is Your Life" (www.tv.com)

Procedure:

1) In talking about the lifetime of a person, how would you divide his/her life into parts? By the decade—their twenties, thirties? By major events in their life—graduations, marriage, children, travels, retirement? When dealing with the earth's lifetime, it gets a little more complicated. How do scientists divide up such a massive amount of time—4.5 billion years?
2) Provide students with some background regarding the three eras, their division into periods, and how scientists determined this timeframe. What makes us move to a new era or period in the life of Earth?
3) Have partners select a period in the history of the earth (draw from a hat). Each group is responsible for researching and depicting the years, vegetation, climate, plant and animal life, position of continents, and evolutionary stages present during their period.
4) Students connect the periods in sequential order in a colorful timeline to be displayed in the room.
5) In order to share the information, present "Earth: This is Your Life." Show a clip from a show to see the format. Each partner group acts as a living thing or feature present during their particular period. They come out and remind the earth about their qualities and what the earth was like during that period. Earth remembers each flash from the past!

Annotated Bibliography for Dinosaur Detective Series

Fradin, Dennis B. With a little luck : surprising stories of amazing discoveries. Dutton Children's Books, c2006.
This easily accessible book for middle grades includes a chapter on Mary Anning, the princess of paleontology.

Harrison, David L. Cave detectives : unraveling the mystery of an Ice Age cave. Chronicle Books, c2007.
With plenty of color pictures and interesting text for middle grade readers, this book explores a cave and the bones found in it.

Larson, Peter L. Bones rock! : everything you need to know to be a paleontologist. Invisible Cities Press, c2004.
Young readers will learn how to dig for fossils, clean them, keep records, and develop and test theories. Also included are descriptions of projects from the authors' experience, including the excavation of Sue, the Tyrannosaurus Rex.

Marrin, Albert. Secrets from the rocks : dinosaur hunting with Roy Chapman Andrews. Dutton Children's Books, c2002.
Roy Chapman Andrews adventures in the Gobi Desert in Mongolia are talked about in Book 2 of PaleoJoe. This book adds more information that students want on this intriguing expedition.

Kelsey, Elin. Canadian dinosaurs. Maple Tree Press ;, c2003.
Using photos and illustrations along with a rich text, this book focuses on the dinosaurs found in Canada

Kerley, Barbara. The dinosaurs of Waterhouse Hawkins. Scholastic, 2000.
Victorian artist Benjamin Waterhouse Hawkins built life-sized models of dinosaurs as he tried to tell the world about these amazing animals. The lush illustrations and interesting and unique details will appeal to all ages.

Potts, Professor. Uneversaurus. David Fickling Books, c2006.
With humor and enthusiasm, this book offers the reader the chance to speculate on one thing we will never know about dinosaurs—what color they were.

Arnold, Caroline. Dinosaurs with feathers : the ancestors of modern birds. Clarion Books, c2001.
While we think of most dinosaurs as reptilian, this book, with colorful illustrations, offers a discussion of why scientists now believe that there were dinosaurs with feathers.

Aliki. Wild and woolly mammoths. HarperCollins, c1996.
As in all books by Aliki, a simple text and many illustrations are offered to describe the woolly mammoth.

Mash, Robert, 1939-. How to keep dinosaurs. Weidenfeld & Nicolson, 2003.
For a little humor, especially for older readers, take a look at his guide to the care and feeding of the dinosaur that you might decide to keep for a pet.

Fleischman, Paul. Time train. HarperCollinsPublishers, c1991.
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Rohmann, Eric. Time flies. Crown, c1994. Without a single written word, this story uses vibrant illustrations to follow a bird into the museum of natural history where the dinosaurs seem to come alive.

Yolen, Jane. How do dinosaurs say good night? Blue Sky Press, c2000.
There are now several in this series of anthropomorphized dinosaurs setting a good example for picture book readers.

Alphin, Elaine Marie. Dinosaur hunter. HarperCollins, c2003.
This easy reader is set in Wyoming in the 1880s where a young boy finds a dinosaur skeleton on his father's ranch.

Hoff, Syd, Danny and the dinosaur. Harper & Row, c1958.
This is the classic early reader about dinosaurs—a tale of friendship that continues to delight youngsters after all these years.

McLeod, Kate, Outback adventure. DK Pub., 2004.
James and his family find dinosaur footprints as they explore Australia..

Butterworth, Oliver. The enormous egg. Boston : Little Brown, 1956.
This story of a boy and an egg that hatches a dinosaur has become a classic.

Conrad, Pam. My Daniel. Harper & Row, c1989.
A grandmother tells stories of her brother's historical quest for dinosaur bones on their Nebraska farm.

Dickinson, Peter, A bone from a dry sea. Delacorte Press, 1993.
Upper elementary and middle school students love these two parallel stories. A woman of a prehistoric group works to advance her people, and the daughter of a paleontologist is there when important fossil remains are discovered on a dig in Africa.

Richler, Mordecai, Jacob Two-Two and the dinosaur. Knopf :, c1987.
Jacob runs away with him to British Columbia when the lizard, now identified as a Diplodocus, frightens the adults around him. Jacob Two-Two is an appealing and humorous young boy who appeals to early to mid-grade readers.

General Websites for Paleontology and Dinosaurs

Emerson School
2006-2007

The Paleontology Portal: http://www.paleoportal.org/

Strange Science: http://www.strangescience.net/

American Museum of Natural History: Division of Paleontology: http://paleo.amnh.org/

National Geographic News:
http://news.nationalgeographic.com/news/archaeology.html

University of California Museum of Paleontology:
http://www.ucmp.berkeley.edu/

Great Websites for Kids - Dinosaurs:
http://www.ala.org./gwstemplate.cfm?section=greatwebsites&template=/cfapps/gws/displaysection.cfm&sec=2

Children's Museum - Dinosphere:
http://www.childrensmuseum.org/dinosphere/index.html

Classroom Clipart - Dinosaurs:
http://classroomclipart.com/cgi-bin/kids/imageFolio.cgi?direct=Dinosaurs

Understanding Evolution for Teachers:
http://evolution.berkeley.edu/evosite/evohome.html