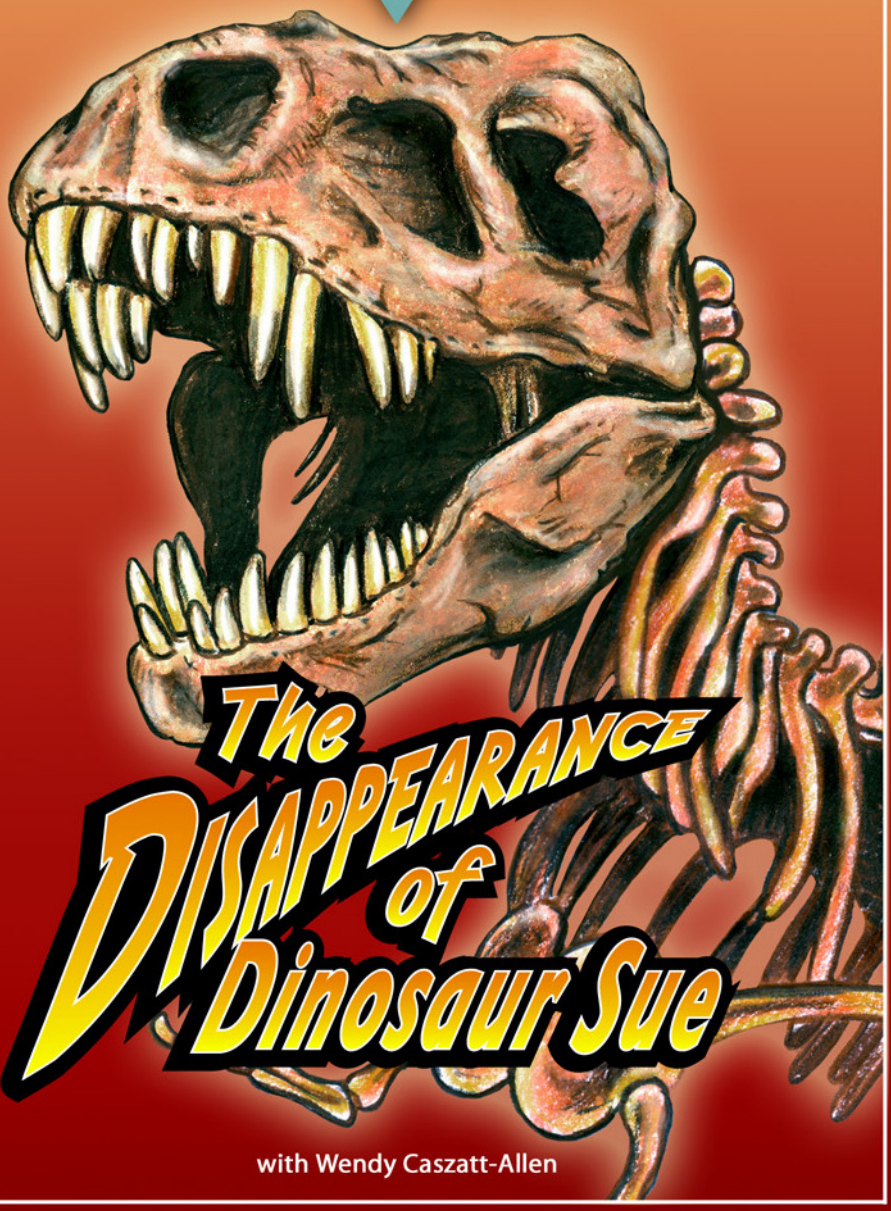
BOOK #1

PALEOJOE'S
DINOSAUR DETECTIVE CLUB



The DISAPPEARANCE of Dinosaur Sue

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:

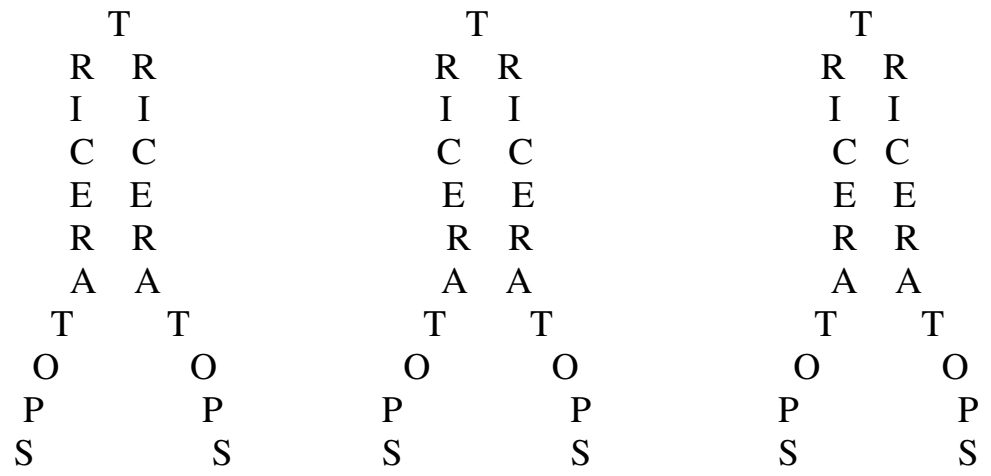
1. Students explore concrete poems from poetry books.
2. Ask, "What do all these poems have in common?"
   *Words shaped like a picture
3. Students use knowledge about dinosaurs to create concrete poems about types of dinosaurs.
   *Use Dinosaur Reference Cards for facts.
4. Share concrete poems.

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.

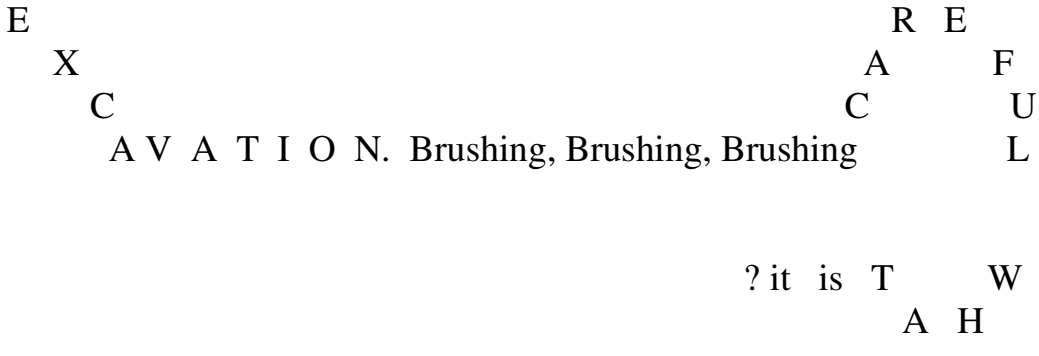
Concrete Poem Examples:

Grade 1-2 Dinosaur:



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

Grade 3-6 Dinosaur or Paleontology



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: Real vs. Not-Real Theme Unit

Summary: Students will investigate the theme of "real vs. not real" things as it threads through *Secret Sabertooth.* Students will gather information while reading and periodically discuss findings with the whole class. Using gathered information, students will participate in guided discussions questions about the real vs. not-real theme.

Materials: Large Chart Paper
Black Notebooks (one for each student)
-Put together using attached pages.
-Surround each notebook with black construction paper
-Staple for each student.
Guided Discussion Questions: Real vs. Not-Real theme

Procedure for Grades 1-2:

1) Read Aloud *Secret Sabertooth* in stages (around 2 weeks).

2) While reading, students are detectives who find things that are real or not-real.

3) Teacher records findings on a class T-chart as students share.

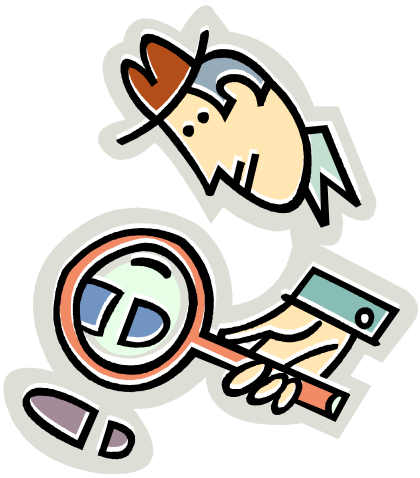
Procedure for Grades 3-6:

1) Students read *Secret Sabertooth* in stages, reading in novel groups or independently.

2) Students act as detectives who record things that are real or not-real in black notebooks as they read.

-Periodically assemble the real and not-real things on a class chart.

3) Ask "Guided Discussion Questions" (attached) to discuss class chart.



_____'s

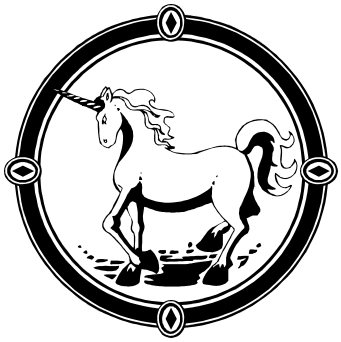
Black Notebook

Is It Real?

Or

Is It Not-Real?

Page	Things that Are Real:



Page	Things that Are Not-Real:

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:

4) **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.

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

6) **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?

_____

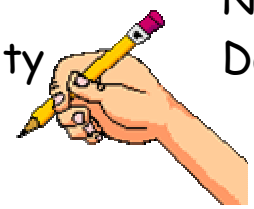
_____

_____

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:

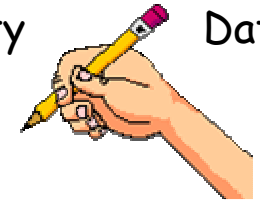
_____

_____

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: Guided Discussion Questions: Real vs. Not-Real Theme Unit

Materials: Real vs. Not Real Class Chart

Recommended guided discussion questions:

Chapter 8-

Why is it a serious crime to fake fossils?
Why is it dangerous to attempt to pass non-reality off as reality?

Chapter 15-

Shelly thinks that it is silly to think of the horn being a unicorn horn because it isn't. Is Shelly better off to "believe" in the unicorn horn by using her imagination or not?

Chapter 19-

Why do you think Dakota's essay was better than Shelly's?
Why is reality by itself not enough?

Chapter 28-

Why is imagination important?
Why is imagination important to science?

Chapter 29-

Can fake be good?

Activity: "Nefarious" Find

Summary: Students will understand the meaning of the word "nefarious," and they will gather examples of characters that might be described as "nefarious."

Materials: Large Chart Paper

Procedure for Grades 1-6:

1) Students listen as *Secret Sabertooth* is read aloud, or students read independently.

2) Stop at page 83 to talk about the word "nefarious."

   -List some characters that you think are nefarious from *Secret Sabertooth* or other stories.

3) Collect characters throughout book as you read on in this story and in book and others in the series.

Activity: Plot Sequencing

Summary: Students sequence the plot of *The Disappearance of Dinosaur Sue*.

Materials for Grades 1-2: Plot Pieces (6 worksheets)
Materials for Grades 3-4: Plot Sequencing (worksheet)

Procedure for Grades 1-2:

1) Read *The Disappearance of Dinosaur Sue* aloud (in sections).

2) Break students into 6 groups (3-5 students per group).

3) Give each group one piece of paper with a sentence from the plot (read sentence to each group).

4) Each group draws a picture of what is happening in their plot piece.

5) Affix the first and last plot sequencing pieced to the board. Groups share their plot piece with the class and decide where to affix it on the board (sequencing it with the groups who have already shared).

Procedure for Grades 3-4:

1) After reading *The Disappearance of Dinosaur Sue,* organize students into pairs.

2) Give each pair of students the 8 plot pieces (worksheet). Students organize the pieces into the plot sequence.

3) As a whole-group discussion, have groups share their sequences and decide the correct order together.

(First)

Before Shelly could enter the Tombs, Bob asked Shelly a dinosaur question, "Name the best known Sauropod."

Shelly correctly answered, "Brontosaurus," and entered the Tombs.

“What’s gone missing?” PaleoJoe asked.
“Sue?”

PaleoJoe tells Shelly, “There are things about this case which I don’t like. It feels too dangerous. You can’t come.”

As PaleoJoe and Shelly entered the museum room, Shelly saw the enormous platform where Sue once stood. There was no giant *T. rex*.

PaleoJoe and Shelly go to a museum in Germany to see if the "new" *T. Rex* is actually Sue.

The new T. Rex was not Sue. There was no broken rib.

Shelly and PaleoJoe visit the Higgenbottom mansion, and see suspicious tents set up in the backyard.

(Last)

Shelly and PaleoJoe notice a broken rib on the dinosaur that Higgenbottom was "digging up" in his backyard.

Name_____
Date_____

The Disappearance of Dinosaur Sue : Plot Sequencing

Directions: Cut out the following plot pieces and put them into the correct plot sequence on the floor.

Before Shelly could enter the Tombs, Bob asked Shelly a dinosaur question, "Name the best known Sauropod." Shelly correctly answered, "Brontosaurus," and entered the Tombs.	PaleoJoe and Shelly go to a museum in Germany to see if the "new" *T. Rex* is actually Sue.
Shelly and PaleoJoe notice a broken rib on the dinosaur that Higgenbottom was "digging up" in his backyard.	Shelly and PaleoJoe visit the Higgenbottom mansion, and see suspicious tents set up in the backyard.
As PaleoJoe and Shelly entered the museum room, Shelly saw the enormous platform where Sue once stood. There was no giant *T. rex*.	PaleoJoe tells Shelly, "There are things about this case which I don't like. It feels too dangerous. You can't come."
"What's gone missing?" PaleoJoe asked. "Sue?"	The new T. Rex was not Sue. There was no broken rib.

Activity: Fossil Find

Summary: Students find and identify common fossils along with examining the process of fossilization.

Materials for Gr. 1-2: one tray of a large assortment of rocks with and without fossils per group (they can be collected or purchased); Fossils Tell of Long Ago by Aliki Brandenberg; Fossil Identification Cards (filled in to match your specific specimens); an assortment of fossil books

Materials for Gr. 3-6: one tray of a large assortment of rocks with and without fossils per group (they can be collected or purchased); coal sample; fossil identification books; blank Fossil Identification Cards

Procedure for Gr. 1-2:

1) Show students the large assortment of rocks. Paleontologists, like PaleoJoe, encounter these all of the time. Tell them to search the pile for interesting specimens. As fossils are spotted, shift to a fossil find.
2) Read Fossils Tell of Long Ago. Discuss PaleoJoe and his fossils.
3) Pass out fossil identification cards that you have filled in with data and a picture. Students identify their fossils using the cards.
4) Gather so students share the actual fossils, the name, and an interesting fact about it. Imagine the animal's habitat, activities, enemies, etc. Were any of our fossils mentioned in the book(s)? Do you think fossils are important?

Procedure for Gr. 3-6

1) Show students the large assortment of rocks. Paleontologists, like PaleoJoe, encounter these all of the time. Tell them to search the pile for interesting specimens. As fossils are spotted, shift to a fossil find.
2) What is a fossil? How is a fossil formed? Who finds and studies fossils? What are some names of fossils?
3) Show pictures from fossil books.
4) Pass out fossil identification books. Students identify their fossils and create identification cards for each (they sketch or print out picture).
5) Gather so students can share the actual fossils, the name, and an interesting fact about it. Imagine the animal's habitat, activities, enemies, etc. as they report. Were any of these mentioned in the book(s)?
6) Are fossils important? Why? Show coal. Is this a fossil? What other fossil fuels are there

Activity: Permineralization

Summary: Students observe and discuss petrification and simulate one of the processes of fossilization (permineralization).

Materials: sponges; warm water; food coloring; spoon; salt; pan or dish; petrified wood sample

Procedure:

**This can be done as a demonstration for younger students; older students can work in small groups to permineralize the sponge.

1) How might an organism become a fossil? One of the most common ways is through petrification: a partial or complete changing of an organism into rock. Show petrified wood if available. What happened to this tree millions of years ago? How did it become a rock/fossil? There are several ways an organism may be turned to stone—we can try one of them in the classroom—and it will just take a few days.
2) Add about 3 tablespoons of salt to a glass of warm water. Stir in the salt until it completely dissolves.
3) Add a few drops of food coloring.
4) Put a sponge in the dish and pour the colored, salted water over it.
5) Squeeze out and then resoak the sponge to work the water all the way through the sponge.
6) Let your salt sponge dry for a few days. If you want to make it a little more exciting, you can bury it in some sand and let it dry there like a fossil bone in the earth.
7) When you examine the sponge (or dig it up), it will be very stiff. You may see crystals in it if you hold it up to the light. The sponge has become "permineralized" like a fossil. In permineralization, minerals in the water (such as calcite, silica, or iron) fill open spaces that once held soft tissue (of a tree or animal). In this experiment, the salt and color remain in the sponge, filling the spaces, just as the minerals remain during the fossilization process. If the hard parts of the bones are replaced by minerals, this is called replacement.

Activity: Great Impressions

Summary: Students make cast fossils, observe properties, and identify the fossils' origin.

Materials for Gr. 1-2: various rocks, shells, leaves, feathers, flowers, plastic animal models, bones, or even recognizable items from the present gathered by teacher or students; modeling clay (or Playdoh if desired)

Materials for Gr.3-6: various rocks, shells, leaves, feathers, flowers, plastic animal models, bones, or even recognizable items from the present gathered by teacher or students; modeling clay (or Playdoh if desired); Plaster of Paris

Procedure for Gr. 1-2:

1) Fossilization and fossils reviewed. Show and review names of various fossils. What were the fossils of the past? What do you think the fossils of the future are going to look like? Could we make a fossil?
2) Students select an item for creating a fossil. They form a layer of clay and then press the item firmly into the clay layer. Carefully remove the item making sure the impression is deep and textured.
3) Put fossils and the original items in a mixed up fashion on a table. Students take turn finding a match.

Procedure for Gr. 3-6:

1) Fossilization and fossils reviewed. Show and review names of various fossils. What were the fossils of the past? What do you think the fossils of the future are going to look like? Today we'll find out.
2) Students select an item for creating a fossil. They form a layer of clay and then press the item firmly into the clay layer. Carefully remove the item making sure the impression is deep and textured.
3) Pour Plaster of Paris into the depression within the clay. Let harden overnight.
4) Remove the clay carefully. Mix up the fossils and the original items on a large tray. Students take turns matching the fossils with the original objects.

Activity: Soil Match

Summary: Students observe and record properties and components of soil (earth materials) in order to match a small sample to its origin.

Materials: sand and soil samples from a variety of sources (3-5 different varieties depending on grade level) each in a different container; depression slides; magnifying lenses and/or microscopes; student page or class chart

Procedure:

1) Show students a tub of soil. What are names for this material? Where is it found? What is it really? How is it made? What are its properties? Are all soils the same? Discuss the organic and inorganic components of soil.
2) In The Disappearance of Dinosaur Sue, PaloeJoe recognizes the soil from the Field Museum as matching the soil in South Dakota. He knew the soil was not matrix (soil around a fossil) because Sue's bones were completely cleaned before being exhibited. He deciphered that it must be related to her disappearance. Today students will use properties of soil to see if they can match a small sample with a larger sample.
3) Students are given slides labeled "Soil 1", "Soil 2", etc. with a small sample of each. Students examine the soil with a hand lens or microscope looking for properties and components. They share/record significant findings on a class chart or student page.
4) Students bring their recordings and samples to the larger tubs (labeled with the location they were taken from). They try to match up their sample with the bigger sample. Younger students can place their slide by the tub it matches; older students can record their predictions.
5) Gather and compare/contrast the soils. What properties gave the best clues to the soil's location? What organic and inorganic components were observed?
6) Reveal the identifications of each soil and discuss their successes and/or difficulties.

Gr. 3-6 Name_____

Soil Match

Soil Sample	Properties of the Soil (color, texture, sizes)	Organic Components	Inorganic Components	Soil Match (What location is it from?)
Soil #1				
Soil #2				
Soil #3				
Soil #4				
Soil #5				

Gr. 1-2 Name_____

Soil Match

Soil Sample	*Properties of the Soil* What does look and feel like?	*Location* Where was it found?
Soil #1		
Soil #2		
Soil #3		

Activity: How Big is Dinosaur Sue?

Summary: Students research, measure, calculate, compare, and graph the lengths of various objects to Dinosaur Sue.

Materials: measuring tape or string that is at least 42 ft. long; yardsticks, rulers, calculators, student page, encyclopedias

Procedure:

1) In The Disappearance of Dinosaur Sue, PaleoJoe informs Shelly that Sue was 42 ft. long. Brainstorm items that students think are 42 ft. long. Reveal the length of Sue with a tape measure or string measured to 42 ft.
2) How many inches is 42 ft.? Do the math to discover it is 504 inches. So if I (you, the teacher) am ____ inches long/tall, how many of me would it take to equal one Sue? Discuss and do the math.
3) Students will now be asked to find how many of certain items it would take to equal the length of Sue. Students select (or you select for them) a variety of objects with a variety of lengths, measure or research each object's length, and do the calculations.
4) Students design a graph (including the scale they need) showing how many of each item matches one Sue. Share results and graphs.
5) Know that you realize how big 42 ft. is, how do you think the culprits removed Sue from the Field Museum?

Name_____

How Big is Dinosaur Sue?

Sue, the T-rex skeleton housed the Field Museum, was 42 ft. long.

How many inches long is she?_____

Find the lengths of six objects with a variety of lengths. Measure or research the lengths and record in the table below. Calculate the number of each object it would take to equal the length of Sue. Use your data to create a graph.

Name of Object	Length in inches	How many of the object would equal Sue
Me		

Name_____

How Big is Dinosaur Sue?

Graphing Data

Sue Me

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: 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 a 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.

Web Sites for Paleontology Curriculum
2007-2008

Book 1 – The Disappearance of Dinosaur Sue

PaleoJoe Home Page: http://www.paleojoe.com/

Sue at the Field Museum:
http://www.fieldmuseum.org/sue/

- Gives info about Sue with statistics, discovery, purchase, timeline, preparation and mounting, state connections, facts.
- Images of Sue.
- Just for Kids – can make a dinosaur flip book, solve a mystery word puzzle, do a word search.
- Educator Resources – click on Sue Files in middle of page or go to http://www.fieldmuseum.org/thesuefiles/ This link puts students in the shoes of a paleontologist studying Sue. The story is fiction but the scientific info is accurate.
- Online Sue Quiz – take the quiz and get the answers.
- Sue e-Cards – send e-Cards to family and friends.

Wikipedia on Sue:
http://en.wikipedia.org/wiki/Sue_(dinosaur)

ChipperWoods Bird Observatory – Dinosaurs & Birds Related:
http://www.wbu.com/chipperwoods/photos/dinos.htm

- Shows pictures of Sue and her injured bones.

National Parks Service Badlands:
http://www.nps.gov/badl/

- Has frequently asked questions about fossils, excavations.
- Download a Badlands Visitor Guide.
- Has a webcam.

Black Hills Institute: http://www.bhigr.com/

- Involved in many paleontology excavations.
- Has links to eight Tyrannosaurus rex skeletons – Sue, Stan, Bucky, Duffy, Wyrex.

Dinosaurs at the Black Hills Institute:
http://www.wmnh.com/wmbhi000.htm

- Gives a "Resume" of Sue.

Current Digs: http://www.dinoruss.com/dig.html

Dinosaur Digs You Can Join:
http://www.dinoruss.com/dinodigs.html

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: 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!

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.

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.

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.
This is something of a classic, in no small part because of its intriguing and enticing illustrations, as it tells the story of a class that travels back to the time of the dinosaurs.

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