Outline of Lesson Plans

Lesson 1: What is a dinosaur?

Objectives:
1. Student will be able to define dinosaur and will learn when and for how long dinosaurs lived on earth. Students will also gain an understanding of how dinosaurs lived.
2. Students will learn by asking questions about dinosaurs.
3. Students will learn to spell and define terms in the content area of the unit.

Ask students to give a definition of dinosaur. Offer a more complete definition:
- A dinosaur is a special kind of reptile that lived over 65 million years ago.
- What made dinosaurs different were the special holes in its head that no other reptiles had—Archosaur.
- There are many different kinds of dinosaur families.
- Dinosaurs existed for over 150 millions years.

There are over 3000 different kind of dinosaurs. We will learn about some of them.

Students will write down questions they have about dinosaurs. These questions along with some of the questions from the Interest Survey are put into a bag. The students will pass the bag around, each picking out one question and reading it out loud to the class. The student will then attempt to answer the question. If the student feels unable to answer the question, he or she chooses another student to answer whose hand is raised. If no one in the class can answer the question, it will go into a “question bank”, which will be written on chart paper to be answered later as the unit progresses. During each lesson, as new information is introduced, some of these questions will be answered.

Read “Dinosaur For A Day” by Jim Murphy (1992) aloud to the class. Talk about how difficult it was for a dinosaur to live and take care of its young while they were constantly watching out for predators. Ask students to give examples of other animals today who live as this dinosaur did, caring for their young while watching out for predators.

We will use content area terms as Spelling words. The following list of words will be posted in the classroom:

<table>
<thead>
<tr>
<th>dinosaur</th>
<th>reptile</th>
<th>bipedal</th>
<th>quadrupedal</th>
</tr>
</thead>
<tbody>
<tr>
<td>fossil</td>
<td>Triassic</td>
<td>Jurassic</td>
<td>Cretaceous</td>
</tr>
<tr>
<td>locomotion</td>
<td>herbivore</td>
<td>carnivore</td>
<td>omnivore</td>
</tr>
<tr>
<td>herds</td>
<td>predators</td>
<td>theory</td>
<td></td>
</tr>
</tbody>
</table>

The class will read each word aloud and will offer definitions for the words. Any definitions unknown will be looked up by the students in the classroom dictionaries and written next to the words. Students will do a word search and/or crossword puzzle with the new words (1-2-3 Word Search Maker, Crossword Weaver, at www.varietygames.com)
Lesson 2: Researching Dinosaurs

Objectives:
1. Students will learn different facts about a pre-chosen group of dinosaurs.
2. Students will learn how to group their own dinosaurs by the time period in which they lived, what they ate, how big they were, including their size in relation to humans, and how they moved.

Students each pick the name of one dinosaur out of a bag. This is the dinosaur they will work with for the rest of the unit. Students will begin looking for a picture of their dinosaur in the resource books available (see reference list) as well as on the [www.enchantedlearning.com](http://www.enchantedlearning.com) and [www.lessonplans.com](http://www.lessonplans.com) web sites. Students will either sketch a large picture of their dinosaur using *Draw 50 Dinosaurs* (Ames, 1977), listening to the *Drawing Dinosaurs* poem on the *Wee Sing Dinosaurs* cassette tape (Beall, Nipp, and Klein, 1991), or they can print one out from one of these web sites.

Note to students: Scientists do not know what color dinosaurs were, because color is something that cannot be determined from looking at fossils. Play the song *Dinosaur Colors* from the *Wee Sing Dinosaurs* cassette tape (Beall, Nipp, and Klein, 1991). Students can take turns following along with the words to the song with the accompanying illustrated song book.

Students color their dinosaurs any color they choose. While they color they will listen to many other songs and poems from the *Wee Sing Dinosaurs* cassette (Beall, Nipp, and Klein, 1991) that contain facts about dinosaurs (*Where did they live?*; *What’s for lunch?*; *Big, Bigger, Biggest; Dining; How Big is a Dinosaur?*; *When?*; *Little Dinosaurs; Whew!*), and will be encouraged to sing or recite along with the tape. After they finish decorating their dinosaurs, the students will begin researching them. Students with special needs will pair up with non-special needs students to find facts about their dinosaurs. If necessary, these student pairs may work on one dinosaur rather than two.

Using the children’s books, dinosaur dictionary and encyclopedia, electronic dinosaur game, song book, and the given web sites (see reference list), the students find and fill out the following facts about their dinosaurs on a worksheet:

- what they ate: herbivore, carnivore, or omnivore (post pictures next to the words to remind students what each mean)
- what period they lived in [show students a time line including the Triassic, Jurassic, and Cretaceous using the resources *Hunting the Dinosaurs* (Dixon, 1987), *Graveyards of the Dinosaurs* (Tanaka, 1998) and *The Age of Dinosaurs* poster]
- how big they were: weight, height, and length
- how they moved (locomotion): bipedal or quadrupedal (show students the examples using dinosaur figures)
- one additional fact about each dinosaur (for instance: it lived in herds)

Students’ dinosaur fact sheets will be mounted with their completed sketches along the walls in the classroom at the student’s eye level. (Students who finish their work early throughout the unit will be allowed to walk around the room and view other students’ work). Additional features will be available to be added to the posters, such as cut-outs of leaves, meat, or eggs, depending on the each dinosaur’s diet. Varying sizes of “adult human” cut-outs will be available as well, for the students to add, showing their size in relation to the dinosaurs’.
Lesson 3: Dinosaur Time Line

Objectives:
1. Students will learn to make a time line showing/plotting the different time periods of history.
2. Students will learn that each time period supported different families of dinosaurs.
3. Students will be able to use information from their research to place their dinosaurs in the appropriate time period in history.

Write the three periods of the dinosaurs on the chalkboard. Using large pieces of construction paper, web sites ([www.enchantedlearning.com](http://www.enchantedlearning.com) and [www.lessonplans.com](http://www.lessonplans.com)), and the resource books available ([Graveyards of the Dinosaurs](#), Tanaka, 1988; [Hunting the Dinosaurs](#), Dixon, 1987; [Vertebrate Life](#), Pough, Janis, and Heiser, 2002), students will create a time line of the Triassic (180 - 225 million years ago), Jurassic (135 - 180 million years ago) and Cretaceous (65 - 135 million years ago) periods in history. Students will plot the number of years ago each period was in relation to the present, labeling the beginning of the time line as when the world began, the point at which human life began, and the end of the time line as the present day.

Explain, showing examples of other time lines, how the different kinds of dinosaurs lived in different periods. Play the poem *Dinosaur Ages* on the *Wee Sing Dinosaur* tape (Beall, Nipp, and Klein, 1991). Repeat the poem several times, and write the words to the poem on the board so the students can recite along with the tape. Have the students cut out silhouettes of their dinosaurs, along with the name of their dinosaurs, printed out from the Enchanted Learning website (above), and place them on the time line in the appropriate period in history, according to the research displayed on their dinosaur fact sheets.
Lesson 4: Dinosaur Tree

Objectives:

1. Students will learn how to make a tree diagram.
2. Students will learn the different ways that dinosaurs can be classified using the information they have researched.

Using pieces of pre-cut construction paper, the students will piece together a tree trunk and branches. The trunk of the tree will be labeled with the word Dinosaurs, while the branches will be labeled from largest to smallest with the different Orders, Suborders, and Genera of dinosaurs. The trunk will be mounted on the wall in the classroom.

The first division of dinosaurs (Orders) is based on the dinosaur’s hip bones. Explain to the students that there are two different types of hips: bird-hipped and lizard hipped (show a picture example of each, found in the resource book *Vertebrate Life*, Pough, Janis, Heiser, 2002 and mount the poster from the American Museum of Natural History, Slayton, 1997). The bird-hipped dinosaurs had hip bones that are in the same position as a bird of today, and accordingly the lizard-hipped dinosaurs had hip bones that are in the same position as are lizards. Using the Enchanted Learning website (www.enchantedlearning.com), the students can look up their dinosaurs to discover if they are bird-hipped or lizard-hipped. Ask for volunteers to place the two largest branches *lizard-hipped* and *bird-hipped* on the trunk.

Explain to the students that the second division (Suborders) of the branches on the dinosaur tree is based on whether the dinosaurs stood upright or not and what they ate. Show the students again the models of bipedal and quadrupedal dinosaurs, explaining their meaning. Write the following words on the board and ask if any student remembers what each word means the dinosaurs ate: herbivores (plants), carnivore (meat), and omnivore (eggs, meat, and plants). Play the song *Eggs* from the *Wee Sing Dinosaur* tape (Beall, Nipp, and Klein, 1991). Ask if anyone can remember what a predator is from the Spelling word list. List the 5 suborders on the board by name. Have the students look them up on the Enchanted Learning website and write up next to their names the Order they belong to. Explain to the students, showing picture examples (*Dinosaur Textbook*, Lucas, 1994) as well as models, about the specialness of the dental battery of the Ornithopod, the armor of the Thyreophora, and the frilled head of the Marginocephalia. Get volunteers to place the second largest branches *bipedal predators*, *quadrupedal herbivores*, *armored quadrupedal herbivores*, *bipedal “dental cavity” herbivores*, and *“frilled-headed” herbivore* on the tree in the appropriate area (based on the information given on the board).

From these branches will hang the long palm-like leaves of the Giant Club Moss tree (show example, *Science Close Up: Fossils*, Bell, 1992) that existed during the Mesozoic Era of the dinosaurs. The students will each take a leaf and will write on them the name of their dinosaur (genus). Based on the information they found in their research, and the information given on the board, the students will decide on what branch of the tree their dinosaurs should be placed and will mount them.
Lesson 5: The Extinction of the Dinosaurs

Objectives:

1. Students will develop an understanding of scientific theory.
2. Students will learn about the most popular theories for the extinction of dinosaurs, and will formulate their own opinion/theory based on what they have learned.
3. Students will plot their choices of theories on a graph, and will answer questions based upon the results.

Discuss the many differing popular theories for the demise of the dinosaurs, include:

- slow changes in climate, the weather became too cold for the dinosaurs to live–ice age
- disease struck the dinosaurs and wiped them out
- an asteroid hit the earth, evidenced in the Yucatan Peninsula area, and clouds of dust blocked the sun for long periods of time (2 months –2 years), possibly effecting the weather for years afterwards
- increased volcanic activity
- small mammal-like rats started eating the eggs of the dinosaurs–competition
- lowering of the ocean causing the loss of habitat (rivers and mountains)

Play the *What Happened?* song from the *Wee Sing Dinosaur* tape (Beall, Nipp, and Klein, 1991).

Create a graph of the theories that have been discussed and the number of students in the class. Add an additional group of “Other,” for students who may have trouble picking only one theory to choose. Number (1-7) and color code (red, orange, yellow, green, blue, purple, and black) the theories on the board or chart paper and have the students write the number of their choice on small slips of paper. Collect the papers and have volunteers sort them by numbers. Using squares of colored paper, have volunteers come up and plot the graph on the wall of the classroom.

When the graph is complete, ask the students questions based on the graph’s results:

- Which theory has the most supporters?
- Which theory has the least supporters?
- How many more people supported number _____ (plug in different numbers here depending on the results) over number _____?
- What percentage of the class chose theory number 1? 2? 3? 4? 5? 6? 7?
Lessons 6 and 7: Fossils

Objectives:

1. Students will learn to define the term fossil.
2. Students will learn what conditions are necessary for a fossil to form.
3. Students will learn how a river’s flow can determine what bones will be fossilized.

Ask for a student volunteer to define fossil. Go over the definition again if necessary:
Fossils are
• remains of plants or animals that died long ago but did not completely disappear, rather they were saved from decay
• bones, teeth, eggs, feces, skin prints, foot prints, and the wood from trees (show sample of petrified wood) that have turned slowly to stone over a minimum of a 10,000 year period
• bones, etc. that were covered by sand and mud soon after the animal or plant died, or left an impression

Explain that fossils are actually “accidents of nature,” that would otherwise not have been preserved, because usually a dead animal’s flesh would be eaten, the bones scattered, and finally pounded to dust by wind and weather.

Students look at photographs (Graveyards of the Dinosaurs, Tanaka, 1998; National Geographic 1996, 1989, 1978) and samples of fossils, and search for fossils in the bagged fossil kits. Students will each receive a handout showing what fossils to look for and telling what they are (marine life–sharks teeth, coral, etc.). While they work, students can listen to the Footprints song on the Wee Sing Dinosaur tape (Beall, Nipp, and Klein, 1991).

Students who finish with the fossil kits early can work with the dinosaur and fossil activities ( quizzes, games and puzzles) on the two web sites, use the electronic dinosaur game, view the facts and pictures of dinosaurs around the room, read the children’s dinosaur resource books, as well as doing dinosaur fun pages (see resource list).

Using a sand table with running water, elevated at one end for river flow, and small toy dinosaur models, students can experiment with the ‘river delta’ concept, and see how dinosaurs that died near a river were randomly covered and later preserved as fossils.

Discuss what can be learned from studying dinosaur fossils:
• what dinosaurs ate can be determined by their teeth
• how they walked can be determined by their footprints and the angle of their vertebræ
• how big they were can be determined by the size of the skeleton, or by the footprint
• their stance (tail in the air or dragging behind) can be determined by their footprints and the existence of ‘drag’ marks
• how fast they could run or move by the distance between the footprints and the size of the skeleton and footprints
Lesson 8: Mapping Dinosaur Fossils

Objectives:

1. Students will learn in which parts of the world dinosaur fossils have been discovered.
2. Students will learn that the world map in the time of the dinosaurs was much different then it is today.
3. Students will use their research data to plot on a world map, the points where their dinosaurs’ fossils were discovered.

Using Graveyards of the Dinosaurs (Tanaka, 1998) as a resource, students will view a world map of the most recent finds of dinosaur fossils. Have the students take turns each reading one of the 19 finds listed aloud to the class. Students will take note if their dinosaurs are listed and write down where their fossils were found. Students whose dinosaurs have not been mentioned, can search the text of this and other resources, including web sites, to find in what part of the world the fossils of their dinosaurs were found.

Share maps of the what the world looked like in the Triassic, Jurassic, and Cretaceous Periods found in the resource books. (Graveyards of the Dinosaurs, Tanaka, 1998). Read the book How Mountains Were Made (Zoehfeld) aloud to the class. Do the experiment at the end of the book with a towel. Have each student experience how mountains are made by the moving of the plates near the core of the earth. Show the class the layers of rock on the poster Geologic Cross Section of the Grand Canyon (1975). Explain how the shifting of the plates effected the shape of the land before, during, and after the time period of the dinosaurs, and how this in turn effected where the fossils of particular dinosaurs are found today.

Explain to the students that fossils have been found all over the world, including in the Arctic Circle and the South Pole. Have the students cut out small silhouettes of their dinosaurs from the website printouts. On a classroom world map have the students place the silhouette in the area that it’s fossils were found.
Lesson 9: Allosaurus

Objectives:

1. Students will learn what it was like to be a dinosaur in the Jurassic Period.
2. Students will learn what scientists go through to discover dinosaur fossils, and determine facts about the dinosaurs from them.

Introduce the movie *Allosaurus* (Haines, 2000). Tell the students that a few years ago the most complete Allosaurus fossil skeleton ever was found in Wyoming. The fossilized bones tell a surprising story of one dinosaur that the scientists nicknamed “Big Al.” At the end of the movie, the scientists show how they were able to find out about “Big Al.”

Review what we have learned in this unit about fossils and Allosaurus.

Watch the movie *Allosaurus*. Stop the movie when necessary to answer questions or clarify something said.

After the movie, ask questions about fossils and Allosaurus.
Discuss what the students thought about the movie.
Lesson 10: Dinosaur and Fossil Review

Objectives:

1. Students will show an understanding of what was learned during this unit by answering questions.
2. Students will be able to identify dinosaur models and group them according to the criteria studied in this unit.

Display the models of dinosaurs on a table. Ask for students to identify them by name, stance, time period, food they ate, and where they lived.

Check the list of questions from lesson one for any that have not yet been answered. Ask the students to answers the questions. Answer any for them that they are unable to answer.