LESSON PLAN

Name: Vickie Buckley
Content Area: Science
Date: April 16, 2002
Unit Topic: Dinosaurs & Fossils
Today's Lesson: (# 6) Discovering Fossils
Grade Level: 2
Duration: 60 - 75 minutes

LESSON RATIONALE

New York State Learning Standards and Key Ideas:

Mathematics, Science, and Technology
Standard 1: Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.
Scientific Inquiry: (1) The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.
Standard 3: Students will understand mathematics and become mathematically confident by communicating and reasoning mathematically, by applying mathematics in real-world settings, and by solving problems through the integrated study of number systems, geometry, algebra, data analysis, probability, and trigonometry.
Number and Numeration: (2) Students use number sense and numeration to develop an understanding of the multiple uses of numbers to communicate mathematically, and the use of numbers in the development of mathematical ideas.
Operations: (3) Students use mathematical operations and relationships among them to understand mathematics
Modeling/Multiple Representation: (4) Students use mathematical modeling/multiple representation to provide a means of presenting, interpreting, communication, and connecting mathematical information and relationships.
Measurement: (5) Students use measurement in both metric and English measure to provide a major link between the abstractions of mathematics and the real world in order to describe and compare objects and data.
Standard 4: Students will understand and apply scientific concepts, principles and theories pertaining to the physical setting and living environment, and recognize the historical development of ideas in science.
Physical Setting: (2) Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.
(3) Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

English Language Arts
Standard 1: Language for Information and Understanding: Students will read, write, listen, and speak for information and understanding. As listeners and readers, students will collect data, facts, and ideas; discover relationships, concepts and generalizations; and use knowledge generated from oral, written, and electronically produced texts. As speakers and writers, they
will use oral and written language that follows the accepted conventions of the English language to acquire, interpret, apply, and transmit information.

Listening and Reading: (1) Listening and reading to acquire information and understanding involves collecting data, facts, and ideas; discovering relationships, concepts, and generalizations; and using knowledge from oral, written, and electronic sources.

Speaking and Writing: (2) Speaking and writing to acquire and transmit information requires asking probing and clarifying questions, interpreting information one's own words, applying information from one context to another, and presenting the information and interpretation clearly, concisely, and comprehensibly.

Standard 4: Language for social interaction: Students will listen, speak, read, and write for social interaction. Students will use oral and written language that follows the accepted conventions of the English language for effective social communication with a wide variety of people. As readers and listeners, they will use the social communications of others to enrich their understanding of people and their views.

Listening and Speaking: (1) Oral communication in formal and informal settings requires the ability to talk with people of different ages, genders, and cultures, to adapt presentations to different audiences, and to reflect on how talk varies in different situations.

Social Studies

Standard 2: Students will use a variety of intellectual skills to demonstrate their understanding of major ideas, eras, themes, developments, and turning points in world history and examine the broad sweep of history from a variety of perspectives.

World History: (4) The skills of historical analysis include the ability to investigate differing and competing interpretations of the theories of history, hypothesize about why interpretations change over time, explain the importance of historical evidence, and understand the concepts of change and continuity over time.

Standard 3: Students will use a variety of intellectual skills to demonstrate their understanding of the geography of the interdependent world in which we live—local, national, and global—including the distribution of people, places, and environments over the Earth’s surface.

Geography: (1) Geography can be divided into six essential elements which can be said to analyze important historic, geographic, economic, and environmental questions and issues. These six elements include: the world in spatial terms, places and regions, physical settings (including natural resources), human systems, environment and society, and the use of geography.

Instructional Objectives:

1. Students will define the term fossil. (Knowledge)
2. Students will identify the parts of plants and animals that can become fossils. (Comprehension)
3. Students will identify the conditions necessary for a fossil to form, and discover where fossils are found. (Comprehension, Analysis)
4. Students will discover and identify fossils and chart their findings. (Analysis)
5. Students will understand how fossils serve as a window to the past. (Comprehension, Application)
Adaptations:

Heather and Charles will work in pairs with Lisa and Patty when researching fossils. Robert and Ken will sit in the front of classroom where lesson is being taught from. The classroom aide will generate a written copy of the K-W-L information from the board for Robert to keep at his desk, and he will receive additional support from the classroom aide and teacher as needed. Mary will be allowed to search for information on fossils in the *National Geographic* magazines, in addition to the resource books available. (Learning modifications) Stacy will carry the fossil brick around for students to view. Jenny will help pass out and collect books and other supplies. (Behavior modifications)

Materials:

- fossils
- markers
- continuous paper
- ‘pair-grouping’ sticks
- ‘fossil’ printout
- colored index cards with fossil facts on them
- K-W-L worksheets
- fossil kits (includes bagged fossils and booklets)
- master fossil booklet with samples of fossils attached
- tally charts for fossil finds
- fossil quiz worksheets
- “Where Were Dinosaurs Found?” worksheets
- resource books (see lesson resources)

**LESSON OPENING**

Anticipatory Set

K-W-L (Stephens and Brown, 2000)

Show students what the K-W-L worksheet looks like. **Say:** Has anyone ever used this kind of worksheet before? (Acknowledge) Today we are going to do a K-W-L on today’s topic, but first I am going to show you how a K-W-L works. (Make a K-W-L chart on the board like the one the students will use) If my topic was “Dogs,” I would write what I know about dogs in the first column titled “What Do I Know?” I know that dogs make good pets, so I will write that in this column (write on board). In the second column I would write what I want to know about dogs. I want to know how to take care of a dog, so I will write that in this column (write on board). Next, I need to do research on how to take care of dogs. I might read a book about dogs to find my answers. When my research is finished, I can write in the last column everything that I have learned about taking care of dogs. I learned that you need to feed, walk, clean, and play with dogs, so I will write these things in this column (write on board). [Modeling]

Now we are going to discover what the topic will be for our K-W-L today by reading sign language. (Write seven blanks on the board and have students guess each letter as they are signed to them.) Who can tell me what this letter is? (Call on a student to give the answer and come up and write the letter on the board. Continue until all letters are filled in.) Who can tell me what we are going to learn about today? (Call on volunteer) [Guided Practice]
LESSON BODY

Activities:

1. Pass out K-W-L worksheets. Ask students to write the topic “Fossils” at the top of the worksheet. Have students write one thing that they know about fossils in the first column. [Independent Practice] Ask for student volunteers to share what they know about fossils. Write the factual responses on the board and acknowledge the incorrect responses as “good guesses.” Ask the students to write one thing that they want to know about fossils in the second column. [Checking for Understanding] Call on students to share what they have written in the second column and write the questions on the board K-W-L chart. Add teacher questions as necessary to allow for research of all aspects of fossils. (see colored index cards for ideas not mentioned)

2. Students pick “pair-grouping” sticks to form groups (see Adaptations). Mention to the students that the resource books are paper-clipped on the pages with important information about fossils. Student pairs look through resource books to find information about fossils that will help to answer the questions on the K-W-L chart. Student pairs raise their hands when they have found an answer to a question on the board or some other interesting fossil fact. Write the facts found on continuous paper. Students who finish early can take turns reading the rest of the resource books to each other or share their books with other pairs who have finished. When all facts or answers have been found and written, post the continuous ‘facts’ paper where all the students can read it, and go over each point individually, matching the facts with the questions of the K-W-L on the board. [Guided Practice and Checking for Understanding] Direct the students to fill out the last column of their K-W-L with the new information they have learned about fossils. [Independent Practice]

3. Show the fossil samples to the class. Tell the students what plant or animal left their remains that later became each fossil. Have student helper (see Adaptations) carry around the brick fossil to show the students. Pass the smaller fossils around for students to view. Show photographs of fossils found in the National Geographic magazines (pages are flagged), along with the pictures and photographs in some of the resource books and the Geologic Cross Section of the Grand Canyon poster, showing the layers where fossil dinosaurs are found. (Dinosaur Fun Facts, Flying Dinosaurs, Fossils, and Graveyards of the Dinosaurs)

4. Show the students the “master” fossil booklet pages with the fossil samples attached. Talk about each of the fossils and the animal that it came from. Lay sample fossil pages on the table in the back of the room. Pass out the fossil booklets to each student pair, and tell the students that the fossil kits they will be receiving will have samples of each of the life forms represented in this booklet. Pass out the fossil bag kits, and have the students follow along while you read the first page of the booklet. Call on student volunteers to read each of the remaining pages. [Guided Practice] Instruct the students to begin looking through their bags for fossils, comparing each of their finds with the pictures in the booklets. Ask the students to take turns with their partner, looking for and comparing the fossils. If students have trouble discerning a particular fossil, direct them to the back table to compare what they have found with the samples on the master pages. [Guided Practice]

5. Pass out the student tally sheets. As the students find fossils, have them first tally them on their own fossil tally sheet, and then raise their hands and show and tell what they have found. Next, have
one of the students in the pair come up and tally what they have found on the appropriate line of the class tally chart (located in the front of the room). [Checking for Understanding] When the students have finished fossil hunting, have them total their own tallies of what they have found. Have two student volunteers tally the class results, and ask which fossil was found most often, and which was found the least.

6. Closure: Pass out the Fossil Quiz and say: To answer question number 1 you will need to write one sentence. Fill in the blanks on question number 2 with your answer. On number 3, 4, 5, 6, and 7 circle the answer that you think is best. Answer the questions based on what they have learned today in class. [Checking for Understanding]

LESSON FOLLOW-UP

Independent Practice: Pass out the "Where Were Fossils Found?" worksheet. Go over the directions with the students and instruct them to do it for homework.

Evaluation:
(a) What did I want students to learn?
   -to define the term fossil
   -to identify the parts of plants and animals that can become fossils
   -to identify the conditions necessary for a fossil to form
   -to discover where fossils are found
   -to discover and identify fossils and chart their findings
   -to understand how fossils serve as a window to the past

(b) How will I know they learned it?
   -checking for understanding K-W-L and tally charts
   -fossil quiz responses
   -class discussion
   -student responses
   -independent worksheets

(c) Self-evaluation and modifications (see Reflection)

LESSON RESOURCES

References for Student use:


Resources for Teacher use:

BOCES 2, Department for Exceptional Children. *Explorations in Dinosaurs: Teacher resource packet for the primary grades*. Project ADEPT. (A teacher’s manual of worksheets and activities for students containing information about many different kinds of dinosaurs, including the time periods they lived, theories of extinction, how they are studied today, and what makes a dinosaur a dinosaur)


Geologic Cross Section of the Grand Canyon. (1975) Springdale, Utah: Zion Natural History Association. (Two-sided poster of the cross section of the layers of rock formation of the Grand Canyon area, labeling the different time periods in which each layer was formed)

Gore, R. (1989). What Caused Earth's Great Dyings? *National Geographic*, 175(6), 662-699. (A National Geographic article on evidence of climatic shifts and huge meteorite impacts that may have caused the extinction of the dinosaurs; includes an insert on “the victims and survivors” of extinction and a time line of each occurrence)


Some Invertebrate and Vertebrate Fossils of North America, 20 million years old–booklet