

Unit Design

Unit Title: Digging into the Past

Course/Grade Level: Life Science/7th Grade

Subject/Topic Areas: History of life and fossil evidence

Designed by: Marlee Tierce Time Frame:

Brief Summary of the Unit:

Students will

- make simulated fossils and models of fossils,
- review the principles of geology, major geologic events impacting climate, layering and resulting changes in layers, how the process of rock formation impacts fossils,
- simulate different kinds of fossils and where they are found
- research endangered and extinct species,
- research the geologic timetable,
- report on fossil evidence and biographies.

Stage 1: Unpacking the Standards:

Major emphasis:

S7L5. Students will understand evolution of living organisms through inherited characteristics that promote survival.

c. Explain how the fossil record found in sedimentary rock provides evidence for the long history of changing life forms

Related Content standards:

Biomes, Competition, Relationships, Selective Breeding, Environmental conditioning, Sunlight as a source of energy

Characteristics of Science

S7CS1. Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.

S7CS4. Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities.

S7CS5. Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.

S7CS6. Students will communicate scientific ideas and activities clearly.

S7CS7. Students will question scientific claims and arguments effectively.

S7CS8. Students will investigate the characteristics of scientific knowledge and how it is achieved.

S7CS10. Students will enhance reading in all curriculum areas

Big Ideas: Evidence, Fossils, Changing Life forms, History of the Earth

Students will understand that

- Scientists use evidence to explain the history of life on the Earth.
- Some organisms have survived Earth's changing surface and climate.
- Some organisms have not survived Earth's changing surface and climate.
- Organisms have changed through time.
- Rock formations provide evidence.
- From Earth's rocks we can learn about changes that have occurred in the Earth's surface, we can find evidence of changes in the Earth's climate, and we can find evidence of organisms of long ago.
- Fossils are the most important source of information about life on Earth in the distant past.
- The order in which rocks are layered is an important clue to Earth's history.
- Layers are usually formed horizontally, with the oldest rock strata on the bottom and the youngest on top.
- Dating rocks allows scientists to study the most ancient rocks and refer to the history as a geologic timetable.
- The state fossil of Georgia is the shark tooth, and they can be as old as 375 million years old.
- Scientists can learn many things about organisms of long ago, such as their development, body structure, habits, and the climate in which they lived.
- Organisms have changed through time and older species are ancestors of younger ones.
- Index fossils had a short, well-known time of existence and are used to determine the age of rocks precisely.
- Many thousands of layers of sedimentary rock provide evidence for the long history of the earth and for the long history of changing life forms whose remains are found in the rocks.
- More recently deposited rock layers are more likely to contain fossils resembling existing species.
- Fossils are formed in many different ways:
 - Remains covered in sediment
 - in tar pits, swamps, or quicksand
 - Organisms frozen in ice or mud
 - Insects trapped in sap of trees
 - Casts of remains
 - Petrified or turned to stone,
 - Fossil prints in sediment
 - Changed into coal

To understand, students will need to consider such questions as

- How can fossils tell us what ancient environments were like?
- Evidence left by early people is called artifacts. Some examples are arrowheads, ancient beads, and animal skins used as clothing. Why do you think we don't call them fossils?

- Why was Nebraska the first state to require oceanography as a part of its science curriculum?
- Why have fossilized sea life been found in rock at the top of Mt. Everest and the remains of a lush tropical rainforest been found buried under miles of ice and snow at the South Pole?
- Can you find fossils where you live? Where do you think you would go to look for fossils?
- Do all organisms adapt or die?
- How do scientists accurately depict organisms from only a fragment of the organism found in a fossil? Or do they?

To understand, students will need to

Know:

How to use the scientific language correctly,

What is a fossil?

How do we obtain fossil evidence?

Biographies of paleontologists and geologists such as William Smith, Georges Cuvier, and Alexandre Brongniart, Alfred Wallace, and Charles Darwin

Geologic Timetable

The difference between threatened, endangered and extinct organisms

Be able to

Make simulated fossils—prints, casts, molds, etc.

Simulate/explain changes in organisms through earth's history

Research theories—Natural Selection

Explain geologic dating

Explain how index fossils show evidence of ages of rocks

Sketch evidence of rock layering and fossil evidence

Stage 2

What evidence will show that students understand?

Performance Task:

Part One:

You are a paleontologist working on a new dig. You have found evidence of a new organism.

Make a display to show your findings:

1. Classification based on the evidence you have located
2. Environment of the organism
3. How did the organism get its food? Give examples of evidence from fossil remains.
4. Where did the organism live? How do you know?
5. Why is the organism no longer alive?
6. What is the organism most like? Compare the fossil remains to a current organism.

Other Evidence (quizzes, tests, prompts, observations, dialogues, work samples, etc.)

Quizzes: Vocabulary—selected response

Constructed response about extinct, threatened, and endangered organisms

Tests:	Examples of adaptation Selected response test about evidence (Examples included in samples) Matching evidence found in fossils to changes in food getting: beaks and feet
Observation:	Sketches of rock layers and fossil evidence Simulations of fossil production Simulations of fossil digs
Reports:	Research on geological events, fossil finds in Georgia, and biographies Cartoon or PowerPoint presentation of major geological events impacting climate changes Group reports (jigsaw reporting) of biographies
Diagram:	Label and sequence pictures depicting fossil formation Geologic Timetable
Self Assessment:	Journal of questions and contemplations (See list of sample questions.) Rubric on simulations

Language Marlee's students will use in this unit are not necessarily the same terms that would be found on a standardized assessment:

evidence, archeology, paleontology, sedimentary rock, extinction, fossil, mold, print, cast, index fossil, layers, superposition, uniformitarianism, relative dating, ice age evidence, KT event, petrified, amber, tar, remains, adaptation, diversity

Sample Self Assessment Questions

- What did you accomplish today?
What strengths do you think you showed in your work?
- How did you feel about the topic we investigated today?
- How well do you think you understood the activity we did today?
- What questions do you have about what we did today?
- Are there some things you don't understand?
- What do you think is the most important thing you learned in science this week?

Sample Tasks and Activities

- Index Fossils

"Fossil Fill," AIMS Newsletter, Volume XIII, Number 9, April, 1999

Key Question: How can we use fossils to date the relative age of a set of rocks?

Focus: Through three experiences students will learn how paleontologists use the Principle of Superposition to determine the relative ages of fossils.

1. Layering and index fossils
2. Nonsense words to determine position
3. Cards of fossil sketches to determine position

- Making fossils— Recipe for modeling clay that hardens for fossil simulations:
Materials: 1 ½ cups cold water, 1 cup cornstarch, 2 cups baking soda, food coloring optional
Directions: Add food coloring, if desired, to water and mix additional ingredients in sauce pan. Cook over medium heat for 4 to 5 minutes, stirring constantly until consistency of mashed potatoes. Cover with damp cloth to cool. Knead until smooth. It can be kept in an airtight container. It will harden overnight and can be painted when dry.
- Activities and Resources on the web: <http://www.glc.k12.ga.us>
- Released Tests from other states
<http://edinformatics.com/testing/testing.htm>
- “Is There a Site Here?” A program for Learning about Archaeology within the Science Curriculum by the Georgia Department of Transportation.
Archaeology and the Prehistory of Georgia Department of Education
Contact: Eric Duff, (404) 699-4406, eric.duff@dot.state.ga.us
- Georgia State Fossil—in 1976, the shark tooth was designated the official state fossil. Probably one of the most sought-after fossils by amateur collectors, the shark tooth is a relatively common fossil in the Georgia coastal plain. In fossil form, the shark tooth can be traced back 375,000,000 years. Fossilized shark teeth are found in a range of colors—from the more common blacks and grays to whites, browns, blues and reddish browns.

Stage 3—Plan Learning Experiences and Instruction

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20