Lesson Title	Edible Dinosaurs-The Fossil Record
Length of Lesson	2 class periods
Created By	Claire Babineaux
Subject	General Science
Grade Level	8th
State Standards	3a, d
DOK Level	2, 3
DOK Application	2: classify, relate, interpret 3: investigate, cite evidence, draw conclusions
National Standards	C, D
Graduate Research Element	The graduate student has an extensive background in geology. The fossil record can give clues as to the depositional environment as to which the preserved organisms resided.

Student Learning Goal:
The learning goal for the students in this lesson is to understand what the fossil record is, what the fossil record represents, the processes by which a fossil forms, and the connection to adaptation and diversity. The main focus of this lesson will be the defining terms and processes of the water cycle.

State Standards:
3. Compare and contrast the structure and functions of the cell, levels of organization of living things, basis of heredity, and adaptations that explain variations in populations.

a. Analyze how adaptations to a particular environment (e.g., desert, aquatic, high altitude) can increase an organism's survival and reproduction and relate organisms and their ecological niches to evolutionary change and extinction. (DOK 3)

d. Describe heredity as the passage of instructions from one generation to another and recognize that hereditary information is contained in genes, located in the chromosomes of each cell. (DOK 2)

National Standards:
C: (Reproduction and Heredity) The characteristics of an organism can be described in terms of a combination of traits. Some traits are inherited and other result from the interaction with t he environment. *These characteristics can be studied in the fossil record.*

(Populations and ecosystems) A population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem. *Populations are studied in the fossil record.*

D: (Earths History) Fossils provide important evidence of how life and environmental conditions have changed over time.

Materials Needed (supplies, hand-outs, resources):
Powerpoint, Worksheet, edible dino dig (see teacher's notes)

Lesson Performance Task/Assessment:
The task/assessment for the students will be a PowerPoint lesson about the fossil record, a guided discussion on the processes that are associated with how fossils are created, and how the fossil record can help determine the history of the earth through evidence of depositional environments.

Lesson Relevance to Performance Task and Students:
Being in the Southeastern United States in Central Mississippi, the students are in a region where the rocks are extremely old and the fossils present are from a specific time period.

Anticipatory Set/Capture Interest:
In order to capture the interest of the students, the teacher can show the students samples of fossils from the area.

Guided Practice:
This lesson was written as a two day lesson, in which the first day will be a PowerPoint lecture in order to provide the students with background knowledge to proceed on to lab activity.

Following the lesson on the background information on the fossil record, the teacher can then proceed to lead the students in a discussion of the fossil record. The following are some questions to consider:

1. In your own words, describe a fossil.
2. Describe a method of dating a fossil for age?
3. What does a fossil reveal (i.e. what can it tell us)?
4. What is the largest span of time on the Geologic Time Scale?
5. What is a mass extinction?

Instructions for the edible Dino dig lab activity can be found in the teacher's notes.

Independent Practice:
For independent practice, the students will complete the worksheet provided. The students should use the notes they took during the PowerPoint lesson and their book to answer the questions on the worksheet.

Also, the students will maintain a certain amount of independence during the lab activity.

Remediation and/or Enrichment:

Remediation: Individual IEP will be followed. Additionally, the teacher may have the students work together in pairs.

Enrichment: The teacher may implement an extra credit assignment for the students to present what they have learned about the fossil record and the geologic time scale.

Check(s) for Understanding:
In order to check for a thorough understanding of the concepts presented in this lesson, the following questions can be considered:

1. What is gradualism?
2. What is era?
3. Why is it important to understand the fossil record?
4. What is a half life and how does it relate to radioactive dating?
5. What are the different types of fossils?

Closure:
The closure for this lesson can be a teacher led discussion on how the fossil record applies to the graduate student's research and how the fossil record is being studied further at Mississippi State University in different applications, such as Archaeology and Historical Geology.

Possible Alternate Subject Integrations:
Biology: taxonomy can be studied for the anatomy of the organisms that are preserved.
Math: Age can be determined by use of half lives and radioactive dating.

Teacher Notes:
The edible Dino Dig will be composed of four stations:

Station 1-build an archaeological dig site to find preserved fossils.

- 24 bite size sugar cookies shaped like trilobites
- Matrix composed of crushed cookies and graham crackers.
- Container to hold
- Tooth picks and string to mark off dig area

Station 2-build an example rock record with different candies

- Long clear tube/glass vase
- 12 different types of candies to represent different rock layers

Station 3- represents a river stream in which there are fossils in which a scientist will sieve for specimens

- Jelly beans to represent river rocks and gravel.
- Starburst carved into shapes to represent the fossil specimens
- A net or sieve with holes big enough to allow jelly beans through but not the starburst

<u>Station 4</u>-fossil specimens borrowed from Mississippi State University professor/ guest professor of geology comes in to show students actual specimens found in Mississippi and around the world.