



Division of Outdoor Experiences

The Fossil Record

Grade Level: 8

Length of Program: 3, ten-minute sessions (A,B and C)

Setting: Asynchronous Remote Learning

State Standards:

8.ESS.3 A combination of constructive and destructive geologic processes formed Earth's surface.

8.ESS.4 Evidence of the dynamic changes of Earth's surface through time is found in the geologic record.

8.LS.1 Diversity of species, a result of variation of traits, occurs through the process of evolution and extinction over many generations. The fossil records provide evidence that changes have occurred in number and types of species.

Theme:

Explore the earth's history through the fossil record and evolution. Devonian fossil fish found in the area like Dunkleosteus and shark species will be highlights.

Session 1: Fossils

Session 2: Geologic Time

Session 3: Dunkelosteus

Objectives

At the end of the program, student will be able to:

- identify how to interpret the fossil record
- discover how fossils are formed
- understand geologic time and how the earth has changed, in particular the Midwest of North America
- discover what is known as the "Age of Fishes" and the family of fish that produced the armored fish known as Dunkleosteus
- discover evidence that the Midwest, and in particular Ohio, was covered by a shallow arm of the world ocean

Vocabulary (key concept words only)

- Sedimentary Rocks – rocks made of sediments like mud, clay, sand, pebbles, and the bodies of shelled animals like clams
- Limestone – a type of sedimentary rock made from the bodies of shelled animals and often containing fossils
- Shale – a type of sedimentary rock made of clay and mud that often contains fossils
- Sandstone – a type of sedimentary rock made of sand

- Siltstone – a type of sedimentary rock that is a combination of sand, mud and clay that may contain fossils
- Fossil – an imprint of a once living animal or plant in rock; when hard parts of a living entity were replaced by minerals turning them into a fossil

Program Outline:

Video A: Fossils

A. What are fossils?

Parts of plants and animals that have been compressed between layers of sediment and replaced by minerals while keeping the shape of the original organism.

B. Examples of fossils

Brachiopods, trilobites, ferns

C. Who studies fossils?

Paleontologists – animals

Paleo botanists – plants

D. What is the fossil record?

The history of life on earth as told through fossils.

E. How are fossils formed?

1. Parts of plants and animals buried in mud are replaced by minerals left as water runs through them. Their shape becomes a fossil in sedimentary rock.
2. The conditions have to be just right for fossils to form. Very few organisms become fossils.
3. Older fossils are buried in deeper layers of rock; newer are on top. Sometimes the earth shifts and layers rise because of erosion, earthquakes and other natural events.

Video B: Geologic Time Scale

A. The Geologic Time Scale is a complex scale we use to describe and divide the history of the Earth into different sections.

B. The geologic time scale is divided into different measures of geologic time.

1. Eons – the largest measure of geologic time – hundreds of millions of years
2. Eras – smaller than Eons, very significant events in Earth's history are used to determine the boundaries of the eras.
3. Periods – A subdivision of eras. The events that bound the periods are widespread in their extent, but are not as significant as those which bound the eras.
4. Epochs – A further subdivision of periods, but only for the recent portion of the geologic time scale. This is because older rocks have been buried deeply and cannot be accurately interpreted.
5. Ages – about 3 million years; the smallest division in geologic time

Video C: Dunkleosteus

A. Dunkleosteus “Dunk” was an armored fish that lived in the ancient sea that covered North America millions of years ago.

1. Dunk and other armored fish lived during the Devonian period which is called the “Age of Fishes” and went extinct 360 million years ago.

2. The largest Dunk fossil in the world was found in the shale cliffs above the Rocky River near Cleveland, Ohio.

Enrichment:

Fossils:

<https://www.amazon.com/Fossils-Kids-Scientists-Dinosaur-Prehistoric/dp/164739368X>

<https://www.teachervision.com/science/making-fossils>

Geologic Time:

<https://ucmp.berkeley.edu/education/explorations/tours/geotime/guide/index.html>

Dunkleosteus

<https://www.cmnh.org/dunk>

<https://www.clevelandmetroparks.com/parks/visit/parks/rocky-river-reservation/rocky-river-nature-center>