Digging into the Past
Pre-Visit Materials

Pre-Visit Activities
Howard B. Owens Science Center

Digging into the Past Pre-Visit

The Pre-visit activities are linked to the pre-requisite skills and knowledge that each student arriving for this particular program, should have experienced at their home school.

An Introduction to the Program:

Digging into the Past is designed as an enrichment program for third grade students. It supports the county curriculum and third grade Next Generation Science Standards (NGSS). During the two hour program students will engage in asking questions, supporting a claim with evidence and reasoning (CER) along with making observations of real and model fossils and live animals. Overall, the program will allow students to:

Observe fossils and animals to explore how

- Some kinds of plants and animals that once lived on Earth are no longer found anywhere.
- Fossils provide evidence
    - about the types of organisms that lived long ago and
    - also about the nature of their environments.

NGSS

DCI

3.Interdependent Relationships in Ecosystems: Environmental Impacts on Organisms

LS4.A: Evidence of Common Ancestry and Diversity

Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (Note: moved from K-2) (3-LS4-1)

- Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1)

LS4.C: Adaptation

- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

Cross-cutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (3-LS2-1),(3-LS4-3)

Science and Engineering Practices

1. Asking questions (for science) and defining problems (for engineering)
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems. (3-LS4-1

On the following pages are listed some optional activities that can assist in preparing the students for their visit. Each teacher can determine which activities they will use based on the amount of time they have prior to arriving. The county Houghton Mifflin Harcourt (HMH) 3rd grade Science TE, Unit 6 Fossils and DE Science Techbook Unit Survival and Extinction, Lesson *"Extinction"* Course Grade 3 - for use with NGSS (NEW) have a number of good activities readily available to PGCPS teachers as well as the one's listed here.

Activity 1: Vocabulary Development

Teacher Materials (depend on the Vocabulary Development Activity chosen)

- Houghton Mifflin Harcourt (HMH) 3rd grade Science TE, Unit 6 Fossils and DE Science Techbook Unit Survival and Extinction, Lesson *"Extinction"* Course Grade 3 - for use with NGSS (NEW)
- For foldable activity
  - Teacher directions for foldable
  - 1 copy of sample pictures (optional)

Student Materials

- Houghton Mifflin Harcourt (HMH) 3rd grade Science SE, Unit 6 Fossils and DE Science Techbook Unit Survival and Extinction, Lesson *"Extinction"* Course Grade 3 - for use with NGSS (NEW)
- For foldable activity
  - 1 set of picture cards (optional)
  - 1 81/2 x 11 piece of white paper or construction paper

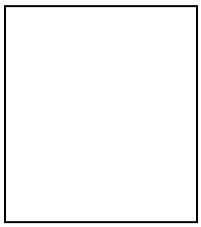
If your class has already completed Unit 6 Fossils in the HMH Dimension series, you may wish to take a day, prior to visiting to reread and review the main vocabulary terms: **fossil, extinct, aquatic, terrestrial,** and **paleontologist (pg. 365)** and have students revisit the pictures and captions of the text. If your students have not completed this section of the book yet, then preview the chapter by taking a picture walk (examining the pictures and reading the captions, studying the bold words). Other activities that can help your students to develop the necessary vocabulary:

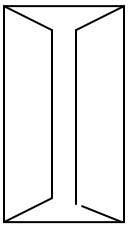
- create a journal entry with a picture and using one or more of the vocabulary words
- create a KWL chart of "what they already **know**" from their reading and experiences, and "what they **want** to know or learn" when they come on their trip, then they can complete the "what they **learned"** part as a follow up after the program
- Six-tab foldable to illustrate and/or define the vocabulary words (Each building has a copy of Dinah Zike's foldable book for detailed instructions on a four-tab foldable.)- They can get help from the glossary in the back of their science textbook also for definitions but it is always best if students try to come up with their own words first. A simple set of directions with diagrams can be found on the next page. Also included is a student picture page that can be copied and used to illustrate the front of each tab on the foldable. Students may also want to draw their own pictures.
- Use the DE Science Techbook interactive glossary for the words **fossil**, **dinosaur, prehistoric** and **sedimentary rock**. Students can read the definitions, watch the animations, watch the videos and look at the images. They can choose their favorite resource to share with the class and tell why. Also they can add to the foldable and make it a 8-tab foldable instead of 4-tab foldable to include the additional words of **prehistoric** and **sedimentary rock**. (When following the foldable directions fold the paper in 3rds instead of half to get 6 doors instead of four.)

Directions for a 6-8 Door Foldable

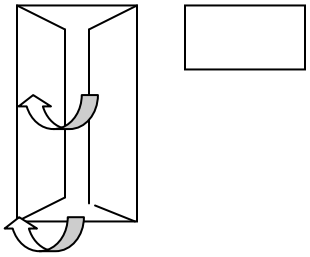
(These directions can be found in Dinah Zike's Big Book of Science: Elementary K-6 on page 23, a copy of which should be available from your school science coordinator. I have modified the directions of a Four-Door Foldable.)

Step 1. Make a shutter fold by turning the paper lengthwise (the long side) and folding each side to the center of the paper.

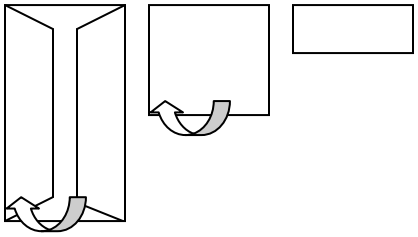




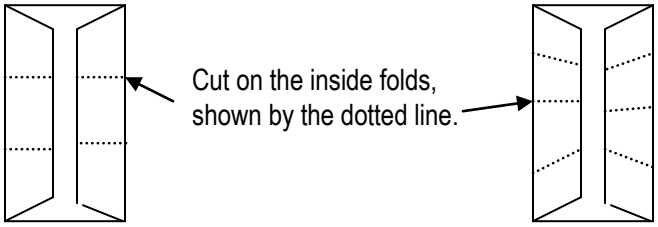
Step 2a. To have six doors on the foldable, fold the shutter fold in thirds, starting at the bottom.



Step 2b. To have eight doors on the foldable, fold the shutter fold in half and then in half again.

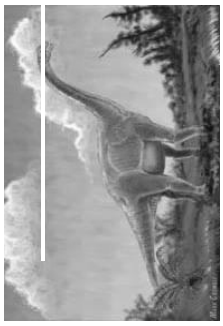


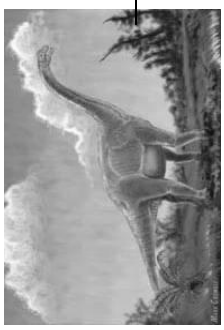
Step 3. Unfold the paper. Cut on the small inside folds you just made. These will create the "doors". Only cut to where you made the shutter folds at the beginning. Depending on the number of folds you will now have either 3 or 4 doors on each side of the shutter fold.





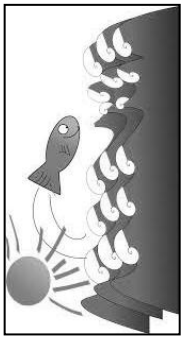
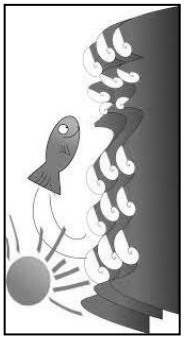
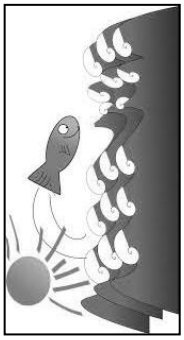







extinct extinct extinct extinct



Activity 2: Measuring Fossil Length **Suggested Time: 20-30 minutes**

Teacher Materials: (optional)

- 1 dual scale ruler or single-sided ruler with centimeters (if the ruler is clear you can use it on an overhead projector)
- 1 Copy of Measuring Fossil Length- Making the Science Connection (the teacher may wish to make this into an overhead or use it on a visualizer to model the correct way to measure to the nearest centimeter)
- visualizer or overhead projector (optional)

Student Materials:

- 1 copy of *Measuring Fossil Length*, optional *Measuring Fossil Length: Making the Science Connection*
- 1 dual scale rule or single-sided ruler with centimeters

Procedure:

Since the math standard in 3rd grade is to measure to the nearest ½ inch or ¼, the can use the fossil sheet to practice this math concept If you wish to make the connection to science you may wish to discuss that scientists do not use the standard measurement system, but metric. This is because all scientists in the world use the metric system to record data. This is called the International System of Standards (or ISS). The teacher should review the different types of units for measuring length in standard measurement (inch, foot, and yard) and the metric units (millimeter, centimeter, meter). Have students observe both sides of the ruler and discuss how to tell which side is the standard measurement side and which side uses metric. Modification: If students keep using the wrong side, teachers may wish to tape over the side of the ruler with a piece of masking tape the students aren't using until students get use to using that side. If the teacher is only going practice measuring with the ½ in and ¼ inch measurement, use the fossil picture page.

Elaboration: Have students measure to the nearest centimeter. Start by having students look at the ruler and notice that every 5th line is longer than the others. This line is the halfway point and will help them round up to the nearest centimeter. Start by having the students use the ruler on the paper and decide how long each line is. You can use the extra sheet, provided "Measuring **Fossil Length: Making the Science Connection**" Modification: If they have trouble with the halfway point, have them use their pencils to make the halfway point longer and more pronounced. Also you can have the students draw a line straight up from the ruler to the object they are measuring. Be careful, students don't always draw the straightest lines. Then have them use their own rulers to measure some fossil pictures to tell how long or how wide the fossil is. Be sure the student starts measuring at the zero mark and not the end of the ruler. (They are not always the same.) Extension 1: Have students measure common objects in the room to the nearest ¼ inch, ½ in or centimeter. For example, the desk, chalkboard eraser, poster hanging in the room, science book etc… Extension 2: Show students how the centimeter ruler is separated into 10 parts and each part can be written as a decimal. Then have them write the exact measurement. Extension 3: Have students graph the length of each of the fossils (be sure they don't use the width of the shark's tooth).

Create a Station: This measurement sheet along with several real objects could be placed at a center for students to visit. Print the sheet on card stock (you may also wish to laminate to avoid students writing on or put it in a wipe off folder). Have students write their answers on a separate sheet of paper.

Answer Key

The unit symbol for centimeter is cm

	Nearest whole number	Exact Measurement		Exact Measurement	Nearest Whole Centimeter	Exact	Nearest ½ or ¼ of Inch
1	3 cm	3.1 cm	Trilobite fossil length	2.8 cm	3 cm	10/16 in- 5/8 in	½ in
2	11 cm	11.2 cm	Shrimp fossil length	2.6	3 cm	1 1/8 in	1 in
3	6 cm	5.8 cm	Fish fossil length	6 cm	6 cm	2 5/16 in	2 ¼ in
4	9 cm	8.9 cm	Shark fossil tooth length	2.5 cm	3 cm	1 in	1 in
			Shark fossil tooth width	1.9	2 cm	12/16 in- ¾ in	¾ in

Student Name_____ Date _____

Measuring Fossil Length : Making the Science Connection

What unit symbol do we use for centimeter? _____

Use the ruler on the paper to measure each line to the nearest centimeter.

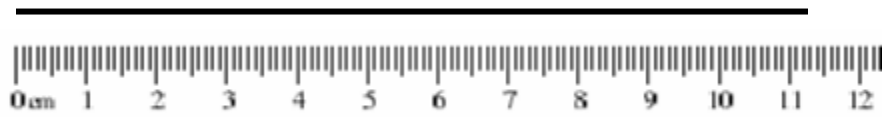
Example

Ex._8 cm___

So the measurement to the nearest whole number would be 8 cm.

1._____

2._____



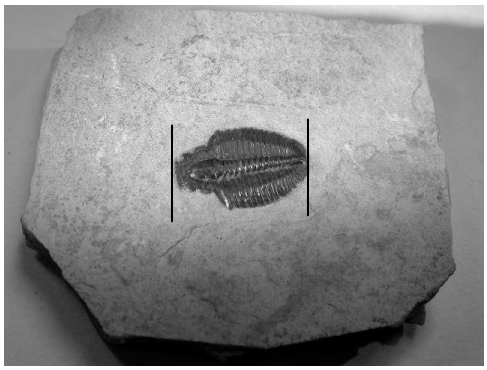
3. _____

4._____

Measuring Fossil Length

A fossil is something that has been left behind by a plant or animal of the past. Sometimes the fossil might be a piece of bone or an imprint left in rock. Use your own ruler to measure these pictures of fossils to the nearest _____. Start and stop lines have been added to the fossil picture to help you with your measurements.

Trilobite fossil length _____



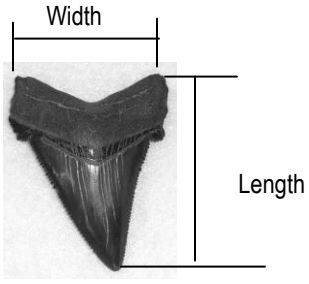
Shrimp fossil length _____

Fish fossil length_____

Shark tooth fossil

Length ____

Width _____



Activity 2: Exploring Fossils (optional activity) **Suggested Time: 20-30 minutes**

Teacher Materials:

- access to Discovery Education (DE streaming) or DE Techbook
- laptop or computer that can connect to a TV or LCD Projector
- TV or LCD projector
- Downloaded video clips for Exploring Fossils
- Guided questions to use with the video

Description of video Exploring Fossils (15:44):

Discusses how fossils are formed, why they're important, ways in which they're classified, and how they're used in modern life. *Exploring Fossils*. Visual Learning Company, 2008. Full Video Discovery Education. Date of Access 25/3/2017. http://www.discoveryeducation.com. (This does come in a Spanish version).

Student Materials:

- Journal or paper to write answers

Background information on using Discovery Education (DE streaming)

Videos from Discovery Education/DE Streaming are divided into video clips or segments. Therefore, it is not necessary to always show the entire video. You need only show the segments of the video that best fit the instructional needs of the class. Following the name of each segment is a set of parentheses with numbers in them. The numbers represent the length of the segment in minutes and seconds.

To use Discovery Education (DE streaming) the teacher can login in through the CLEVER portal and go to DE TECHBOOK or STREAMING. Once at the site, the teacher can simply type in the name of the video or video segment in the search block and the video will appear. It is always best for the teacher to preview the video before showing it to the students. Also, it is a good idea to download the video clip to the computer desktop or save it to a disk. This will avoid any Internet streaming problems on the day the video clip is used.

Procedure for Activity

1. **Download** the full video to watch it all at once. Download each of the individual segments to watch one segment at a time. It is a good idea to create a folder on your desktop and download all the clips inside the folder. That way it is easy to find them when showing them to students. If you choose to play the video and segments live from the Discovery Education (DE streaming) site, be aware that sometimes the video clip can pause while streaming due to high levels of activity on the Internet. Also, sometimes the Internet goes down. That is why it is highly recommended to download the clips in advance.

2. Have students watch the Discovery Education (DE streaming) video Exploring Fossils (15:44) all at once or one segment at a time. There are 10 segments: "Exploring Fossils: Intro?" (0:47), "Fossils" (1:17), "The Importance of Fossils" (1:53), "Fossil Formation"(2:04), "Petrification" (1:09), "Molds, Casts and Imprints"(2:41), "Preserved Remains (1:18), "Fossils in Our Lives" (1:35), "Exploring Fossils: Summing Up" (1:13), "Exploring Fossils: Video Assessment" (1:46) .

3. Ask the students the guided video questions. Video Watching Strategy: Show the entire video through once and then pause between segments during the second viewing for discussion. Prior to showing a segment ask students to watch and listen for a specific detail or answer to a question. This video has special interactive questions that have been marked for Turn and Talk. Pause the video and allow students to discuss before continuing the video.

Guided Video Questions:

Segment Number	**Name of Segment**	**Question**	**Answer**
1	"Exploring Fossils: Intro?" (0:47)	What is one question you may learn the answer to during the video? (only need to list one)	What are fossils? What are some of the different kinds of fossils? How are fossils formed? Why are fossils important?
2	"Fossils" (1:17)	**You Compare:** How are fossilized footprints different from recent handprints **(turn and talk)**	Footprints millions of years old
3	Importance of Fossils" (1:53)	Why are fossils important? What do we call scientists that study fossils? What do we call the study of fossils?	Tell us when and where they lived and how they lived. Paleontologists Paleontology
4	Fossil Formation"(2:04)	**You Predict**: What will happen to the banana peel when left on the shelf for several days**? (turn and talk)** What helps fossils form? What parts form fossils the easiest?	Prediction: Rot/Decay Quick burial in sediment (to avoid decay and scavengers) Left alone for very long time Hard parts like bones, teeth and claws (don't decay as easy)
5	Petrification" (1:09),	What is petrification? What are some samples of petrification?	Replacement of cells by minerals to turn it to stone Trees, bones and shells
6	"Molds, Casts and Imprints"(2:41)	**You Decide:** How do you think these dinosaur tracks were formed? **(turn and talk)** What is a mold?	Walked in wet mud that dried and hardened Empty hollowed out space left in rock when organism

		What is a cast?	has decayed When a mold fills in with sediment and forms a rock copy of the original organism
7	Preserved Remains (1:18)	Name one way things can be preserved almost with no change?	Tar, amber (tree sap), ice
8	"Fossils in Our Lives" (1:35),	**You Decide:** What substances are used to heat homes, produce electricity and fuel cars? **(turn and talk)** Where does cement come from?	Might include- oil, coal, gas- all called Fossil fuels Limestone which is a type of rock that is the remains of marine organisms
9	"Exploring Fossils: Summing Up" (1:13)	Look at your question from section one and see if you can answer it.	Answers will vary
10	"Exploring Fossils: Video Assessment" (1:46)	1. _____ are the ancient remains of once living things. 2. _____ is the scientific study of fossils and ancient life. 3. A key to fossil formation is a quick _____ by sediments. 4. These logs were preserved by the process of _____. 5. A _____ fossil is a copy of the original organism.	1. Fossils 2. Paleontology 3. Burial 4. Petrification 5. Cast

DE Science Techbook

DE Science Techbook is a digital resource available to all PGCPS K-8 teachers. If you do not know your username and password please contact your media specialist or the science office. DE Science Techbook has an entire unit called Survival and Extinction that is aligned with the Next Generation Science Standards (NGSS) listed under 3rd grade. There are four subunits within the unit. The subunit titled "Extinction: aligns with the standards for this program.

If you are unfamiliar with DE Science Techbook it is laid out like a 5 E's lesson plan with video clips, hands on activities, e-reading activities and simulations. Depending on the technology available in your school and with your students you can assign the students activities to complete on their own, set up a station (s) in your classroom or complete the activities using a teacher computer together. The entire lesson is great!