



Science Unit: *Fossils and the Changing Earth*

Lesson 4: *The Fossil Record and Deep Time*

School Year: 2016/2017

Developed for: Sir Sandford Fleming, Vancouver School District

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Grade level: Presented to grade 6-7; appropriate for grades 4 - 7 with age appropriate modifications

Duration of lesson: 1 hour+

Notes: This lesson could be done as two separate lessons: one lesson examining fossils, and one lesson exploring the geologic timeline

Objectives for students:

1. Gain an appreciation of the vast scale of geologic time (“Deep Time”)
2. Learn about major events in the history of the earth and in the evolution of life on earth
3. Observe and identify a collection of fossil organisms

Materials:

- Set of fossils for students to examine (see note at end of lesson on how to obtain)
- Tape measure
- Rope to set up timeline (optional)
- [Slide show](#)

Printable PDFs included with this lesson:

- [Answer sheet](#) (1 per group)
- [Fossil ID sheets](#) (2-3 per fossil)
- [Event sheets](#)
- [Time to Distance conversion for geologic events](#).



In the Classroom

- Show video: [Our history in 1 minute](#)
- Geology gives us the clues to put together this story

Explanation:

- What are fossils? Go over the [four points to remember](#) about fossils using the slide show if you wish
- Show students a modern shell or piece of wood and fossil equivalent, and briefly discuss how fossils form. (this can be discussed in more detail in a later lesson)
- Explain the matching activity to students
- Students need to handle fossils GENTLY. Do not carry them around; only pick up with BOTH hands to examine.



Science Activity: Directed Observation of Fossil Collection

Setup

1. Label the containers for the fossils in your collection with letters. Each organism gets one letter. For example, if you have several types of fossil shark teeth, these would all be labelled with the same letter.
 2. Set the fossils around the room. I like to set them up in order of the geologic age of the organism's first appearance (so bacteria would be first, mammals last).
 3. Set up a table with 2 -3 copies of each organism ID sheet (these can be left loose rather than stapled together).
 4. Set up the timeline around the classroom
- Let the students have 5 minutes to briefly look at all the fossils
 - Then split students into groups of two. Each group gets a matching exercise handout.
 - Tell students to pick an organism ID sheet and try to find the matching fossil; when they find the fossil, write the name of the organism on the line corresponding to that fossil station.
 - Tell students that some fossils may be tricky to identify. They should also keep in mind that the fossils may only represent a part of the organism, or a trace fossil. If a group get stuck, they should move on to another ID sheet.

Discussion/Geologic Timeline:

- After the students have finished the ID exercise walk through the timeline with them and discuss the events.
- Point out fossils that correspond to the events. For example, if you have a stromatolite fossil, point it out at the "oxygen in atmosphere" event
- Rewatch "our history in 1 minute" and point out the events

Wrap-up discussion

- What is and is not a fossil? You may want to show the students some items and discuss (dead leaf, picture of a mummy, a bone, a striped rock, a picture of a hominid fossil).
- Have the students ideas about fossils changed because of this exercise?
- What are some of the reasons we study fossils?

Vocabulary:

Deep Time	The vast, 4.5 billion-year expanse of earth history
Fossil	Evidence of a once living organism, preserved in rock
Organism	A living thing
Proportional:	Having a constant ratio to another quantity
Scale:	The proportion that a representation of an object has to the object itself
Trace fossil	A fossil trace of an organism (footprint, feces, burrow) rather than a fossil of the organism itself



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Extensions

1. Students could choose one of the fossils they particularly liked and research it
2. Students could choose one of the orders of life, and do a poster of organisms in that order (like The Animal Book).

How to Obtain a Classroom Set of Fossils

- University Geology departments. You may be able to borrow fossils from your local university geology department.
- Rock and Mineral shops or science museum shops. Rock and mineral shops will probably have specimens of some of the more common fossils, and the samples will likely be bigger and more interesting - and more representative of local geology - than collections available online. In the Vancouver area, I recommend Amethyst Creations on 4th avenue. Students are typically keenly interested in dinosaur fossils (including coprolites, which are fossilized feces) and megalodon teeth.
- Gem and Mineral shows.
- Local Paleontology clubs
- Online. Online scientific suppliers, such as Boreal, sell mineral and rocks kits
- Outreach organizations. Contact science outreach organizations, such as [Scientists and Innovators in the Schools](#) or [APEGBC](#) to arrange a visit by a paleontologist.

References

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8. <<http://static.ehe.osu.edu/sites/beyond/penguins/downloads/assessment-probes/apr08-fossil-probe.pdf>> Is it a Fossil? Beyond Penguins and Polar Bears. [fossil assessment probes]
9. <<http://www.ucmp.berkeley.edu/education/explotime.htm>> Explorations Through Time. University of California Museum of Paleontology. [online educational modules for elementary and secondary students].
10. <<http://www.amnh.org/explore/ology/paleontology>> Paleontology: the Big Dig. American Museum of Natural History [online games and activities about paleontology]