
Fossils

MATERIALS

FOR EACH STUDENT:

Hand lenses	Student Science Notebooks
Box & T-Chart	Matching Fossils Pictures
Matching Fossils Descriptions	Copy of KWL from Part One

FOR CLASS:

Transparency of Box & T-Chart	Transparency of KWL from Part One
Matching Fossils Descriptions	

PROCEDURE

1. Review the last session on fossils and concepts such as:
 - It takes special conditions to make a fossil.
 - Fossils give us clues to life and the environment of long ago.
 - Fossils help us understand plant and animal species over time.
2. Pass out the Box & T-Chart to use when comparing the Brachiopod fossil and the Trilobite fossil.
3. Once again, show the Brachiopod and Trilobite fossils to each student. Ask students to discuss how the Brachiopod and Trilobite fossils are the same.
4. Ask students to share their responses.
5. Capture some responses on the white board or overhead projector.
6. Next, ask students to enter responses about how the two fossils are the same in the top box of the Box & T-Chart on their own paper. Information can come from their own knowledge, their partner or from the group discussion. (see sample)
7. Move to the lower portion of the Box & T-Chart. Ask students to turn to their partner to discuss how these two fossils are different. Capture some of the responses on the board.
8. Ask students to enter responses in the T part of the chart both from the initial group discussion about the differences and their discussions with their partner. (see sample)

9. Have students attach the Box & T-Chart to their science notebooks.

EXTENSION: Have students do a second Box & T-Chart with two fossils (theirs and their partner's) to extend their understanding of similarities and differences.

10. Hand out the **Matching Fossils Exercise** – PICTURE PAGE:

- Students cut the pictures apart and mix them up on their desktop.

11. Hand out the **Matching Fossils Exercise** – DESCRIPTIONS WITH BLANKS:

- Students match the picture that best shows what the words are saying and tape it down to the page.

12. Hold a final discussion about what has been learned.

13. Pass out the KWL sheet from Day One and ask students to complete the data sheet by writing what they have learned about fossils. When finished, students place the completed KWL into their notebooks.

14. Note to Teacher: The products from these lessons (eg. Box & T-Chart, Observations Organizer, Comparisons Writing Frame or Matching of Fossils Exercise) can be used as formative assessments from which a teacher can “mine” information about student understanding. Teachers need to realize that formative assessment is not intended to be a graded event but a way to inform instruction.

Science Standards

**Standards
for Grades
2–3**

**EALR 4: Life Science
Big Idea: Biological Evolution (LS3)
Core Content: *Variation of Inherited Characteristics***

In prior grades students learned that some objects are alive and others are not, and that many living things can be classified as either plants or animals. In grades 2–3 students learn about variations in inherited characteristics. That is, when plants and animals reproduce, the offspring closely resemble their parents. But the offspring are not exactly the same as their parents. Variations among plants and animals can help them survive changing conditions. Those plants and animals unable to survive and reproduce become extinct. Fossils represent the remains of plants and animals, including some that are extinct. Many extinct plants and animals looked something like plants and animals that are alive today, while others were very different from anything alive today. This topic engages students in looking closely at plants and animals and noticing similarities and subtle differences. It also lays the foundation for later study of Evolution and of Earth History.

	Content Standards <i>Students know that:</i>	Performance Expectations <i>Students are expected to:</i>
2–3 LS3D	<i>Fossils</i> are often similar to parts of plants or animals that live today.	<ul style="list-style-type: none"> Observe <i>fossils</i> and <i>compare</i> them to similar plants or animals that live today (e.g., <i>compare</i> a <i>fossil</i> fern with a similar fern that grows today, a dinosaur leg bone with the leg bone of a reptile that lives today, a mastodon and an elephant).
2–3 LS3E	Some <i>fossils</i> are very different from plants and animals that live today.	<ul style="list-style-type: none"> Conclude from <i>fossil evidence</i> that once there were <i>species</i> on Earth that are no longer alive (e.g., T-Rex, trilobites). Given pictures of animals that are <i>extinct</i> (e.g., dinosaurs, mammoths), <i>describe</i> how these animals are different from animals that live today.

**Standards
for Grades
4–5**

**EALR 4: Earth and Space Science
Big Idea: Earth History (ES3)
Core Content: *Focus on Fossils***

In prior grades students learned that fossils represent the remains of plants and animals that lived long ago. In grades 4–5 students learn that fossils also provide evidence of environmental conditions that existed when the fossils formed. Most fossils are imprints formed when plants or animals died in a watery environment and were covered with mud that eventually hardened into rock. Fossils can also form in other ways, as when dissolved minerals seep into a piece of wood and harden into rock, or an animal that is frozen in ice that never thaws. Fossils provide evidence of the kinds of plants and animals that lived on Earth in the past, as well as environmental conditions that prevailed at the time the fossils were formed.

	Content Standards <i>Students know that:</i>	Performance Expectations <i>Students are expected to:</i>
4–5 ES3A	Different kinds of events caused the formation of different kinds of <i>fossils</i> .	<ul style="list-style-type: none"> Describe an event that could cause the formation of a given fossil (e.g., the plant or animal may have been buried in sediment that hardened into rock and left an imprint, or dissolved minerals may have seeped into a piece of wood and hardened into rock).
4–5 ES3B	By studying the kinds of plant and animal <i>fossils</i> in a layer of rock, it is possible to <i>infer</i> what the <i>environment</i> was like at the time and where the layer formed.	<ul style="list-style-type: none"> <i>Infer</i> from a picture of several fossils in a layer of rock the <i>environmental</i> conditions that existed when the <i>fossils</i> were formed (e.g., fish <i>fossils</i> would indicate that a body of water existed at the time the <i>fossils</i> formed).

Science Standards

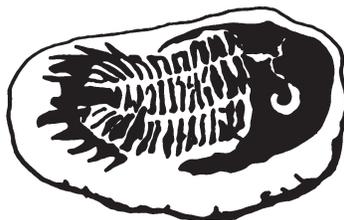
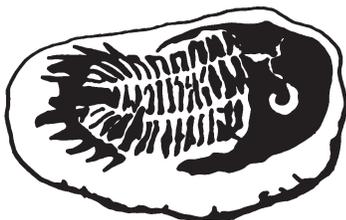
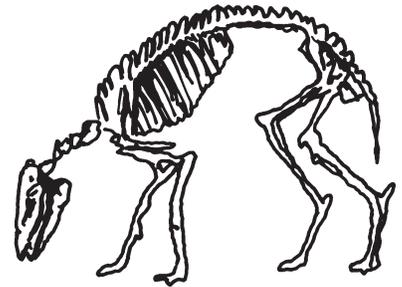
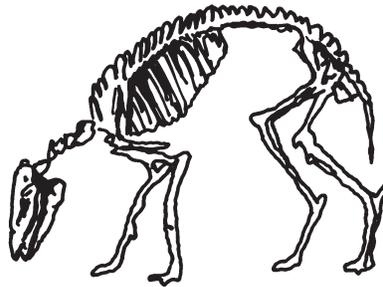
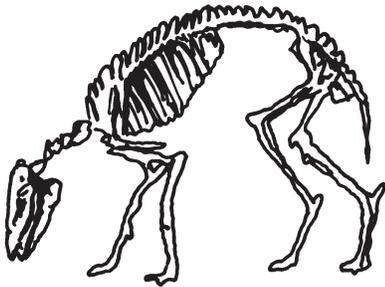
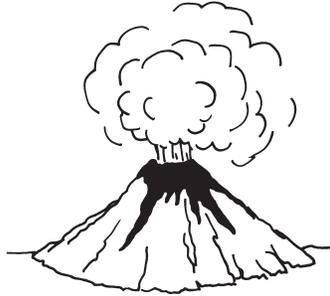
Standards for Grades 4–5	EALR 4: Life Science Big Idea: Biological Evolution (LS3) Core Content: <i>Heredity and Adaptation</i>	
In prior grades students learned about variations in inherited characteristics. In grades 4–5 students learn that some differences in inherited characteristics may help plants and animals survive and reproduce. Sexual reproduction results in offspring that are never identical to either of their parents and therefore contributes to a species' ability to adapt to changing conditions. Heredity is a key feature of living plants and animals that enables changes in characteristics to be passed on and for species to change over time. Fossils provide evidence of what ancient extinct plants and animals looked like.		
	Content Standards <i>Students know that:</i>	Performance Expectations <i>Students are expected to:</i>
4–5 LS3D	<i>Fossils provide evidence that many plant and animal species are extinct and that species have changed over time.</i>	<ul style="list-style-type: none"> • <i>Compare and contrast fossils with one another and with living plants and animals to illustrate that fossils provide evidence that plant and animal species have changed over time.</i>

Sample Response on the Box & T-Chart

BOX & T-CHART

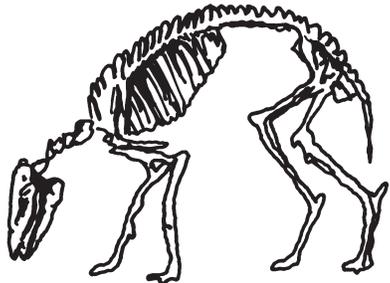
Similarities	Both are fossils, lived long ago, are no longer living organisms, and lived in water.	
Differences	BRACHIOPOD not extinct has ridges does not have exoskeleton	TRILOBITE extinct has segments has exoskeleton

Matching Fossils Pictures



Matching Fossils Descriptions

<p>Lava flows, mud slides, and layers of sediment can all play a part in covering an organism as it slowly forms into a fossil.</p> <p>EALR 4: 4–5 ES3A</p>	
<p>Fossils of leaves, such as ferns, may look similar to plants that exist today.</p> <p>EALR 4: 2–3 LS3D</p>	
<p>Fossils that resemble animals that still live today, show us ways they changed (evolved) as they adapted to their changing environment.</p> <p>EALR 4: 2–3 LS3D; EALR 4: 4–5 LS3D</p>	
<p>A paleontologist is a scientist that carefully observes and describes fossils such as dinosaur bones found in the earth.</p>	
<p>Fossil animals, such as the extinct trilobite, give clues to animals and environments that must have existed long ago.</p> <p>EALR 4: 2–3 LS3E; EALR 4: 4–5 ES3B</p>	

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<p>A paleontologist is a scientist that carefully observes and describes fossils such as dinosaur bones found in the earth.</p>	
<p>Fossil sea animals, such as the extinct trilobite, give clues to an ocean environment that must have existed long ago.</p> <p>EALR 4: 2–3 LS3E; EALR 4: 4–5 ES3B</p>	