

1.3 LISTEN & DRAW GEOLOGIC TIME

When was crude oil and natural gas formed?

MATERIALS

- 1 piece of oversized paper per student
- Variety of colored pencils to share

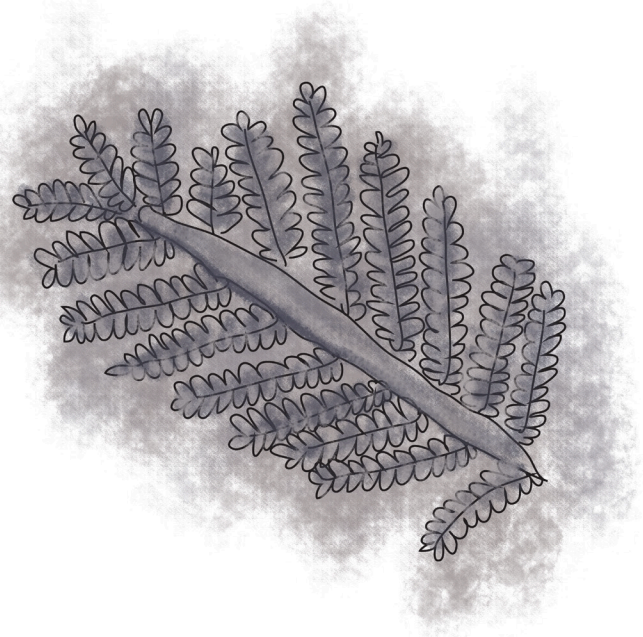
DIRECTIONS

1. Direct the students to fold a piece of paper into three sections and label them Scene 1, Scene 2, and Scene 3.
2. Tell them to listen to the following story carefully and draw explanatory pictures of each geologic age. Read slowly to allow for drawing time. Repeat the story if time allows.
3. Pair and share the results between students. Compare and contrast. What elements did both of you include? What elements are only included in one drawing? What previous knowledge assisted you in doing these drawings?

REFLECTION

Are crude oil and natural gas being formed today?

Era	Period/Epoch	Age (years in millions)	
Cenozoic	Pleistocene	1.8	
	Pliocene	5	
	Miocene	25	
	Oligocene	38	
	Eocene	55	
	Paleocene	65	
Mesozoic	Cretaceous	144	
	Jurassic	213	
	Triassic	248	
Paleozoic	Permian	286	
	Carboniferous	Pennsylvanian	354
		Mississippian	
	Devonian	412	
	Silurian	435	
	Ordovician	492	
	Cambrian	570	
Precambrian			



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TO READ ALOUD

Scene One: the Paleozoic Era

570 million years ago—during a period known as the “Paleozoic Era” [pey-lee-uh-zoh-ik]—a large sea covered much of earth. In this sea lived a vast number of microscopic plants and animals called plankton. Throughout the Paleozoic Era the sea was also alive with trilobites, corals, crinoids, brachiopods, and many other plants and animals. A trilobite was a strange-looking little creature. Small grooves divided its body and hard-segmented shell into three vertical parts. A semicircular shield covered its head. Coral, which still exists today, came in many different sizes, shapes, and colors. Crinoids anchored themselves to rocks on the sea floor with a root-like structure that supported a stalk or column topped by a cup-like cavity, which formed a protective case for a flower. Brachiopods were clam-like animals. Their two-piece dorsal and ventral shells enclosed and protected their soft body parts. Due to their ability to reproduce quickly, the plankton, along with other sea life, were abundant. As these carbon-containing organisms went through their extremely short life cycles and died, their remains sank to the deep sea floor and became covered with the mud, sand, and sediment from the eroding mountains and surrounding areas. Because they were buried so quickly on the deep sea floor, the plankton and other sea creatures lacked oxygen, which is necessary for decay or decomposition.

Scene Two: the Mesozoic Era

320 million years passed, and layers of sediment on the sea floor became thousands upon thousands of feet deep. These layers were filled with dead plankton, fossilized sea creatures, and eroded rock. During the time period known as the

“Mesozoic Era” [mez-uh-zoh-ik], dinosaurs began to roam the Earth and swim in the sea. More than half of the great sea had disappeared because of evaporation, earthquakes, and the filling and layering of sediments on the sea floor. This heat and pressure was responsible for changing the dead organic material into hydrocarbons (substances containing hydrogen and carbon) and causing the remaining inorganic material to change into sedimentary rock, such as limestone, sandstone, and shale.

Scene Three: the Cenozoic Era

250 million years later brings us to present day—the “Cenozoic Era” [see-nuh-zoh-ik]. People now walk the Earth and the dinosaurs have long since disappeared. Erosion and other sediments have now completely filled the ancient seas. The heat and pressure have formed many layers of sedimentary rock, and deep source rock—rock where crude oil and natural gas form. Much of the water that was in the sea is now in the pore spaces of the sedimentary rock. The remaining water evaporated or was pushed into areas where seas or oceans now exist. Over millions of years, temperatures ranging from 150-300 degrees Fahrenheit (66–149°C) have “cooked” the organic materials causing a complex chemical change, creating hydrocarbons called crude oil and natural gas. These hydrocarbons, also known as fossil fuels, have been discovered in Ohio.

As you finish the last scene, keep in mind that there are several theories concerning the formation of crude oil and natural gas. What you have just heard and drawn is the most widely accepted scientific theory.