7th Grade Science

MONDAY 3/23	- Students will be asked to read Chapter 6 - Lesson 1 and fill in the Lesson Outline. - They will also be asked to define the Vocab from Lesson 1.
TUESDAY 3/24	- Students will be asked to read the Adaptation NewsELA Article and answer the questions.
WEDNESDAY 3/25	- Students will be asked to complete worksheet pages 9 and 13.
THURSDAY 3/26	- Students will be asked to read the Fossil NewsELA Article and answer the questions - Students will also be asked to complete worksheet pages 19 and 20.
FRIDAY 3/27	- Students will be asked to complete worksheet pages 18 and 22.

Name _____ Date _____ Class _____

Lesson Outline LESSON 1

Fossil Evidence of Evolution

A. The Fossil Record

1. _____ are the preserved remains or evidence of once-living organisms.
2. All the fossils ever discovered on Earth make up the _____.
3. Fossils help scientists figure out what species that no longer _____ looked like when the organisms were alive.

B. Fossil Formation

1. Most fossils are formed of the _____ parts of an organism.
2. Sometimes when the remains of an organism get buried in mud, wet sand, or other sediments under a body of _____, the molecules that formed the remains get replaced by _____ in the water.
   - **a.** This type of fossil formation is called _____.
   - **b.** Most mineralized fossils are formed of shell or _____, but wood can also become a mineralized fossil.
3. In _____, a fossil forms when a dead organism is compressed over time and pressure drives off the organism's liquids and gases.
4. Sometimes organisms or parts of organisms make a(n) _____ in sand or mud.
   - **a.** The kind of fossil that forms as an impression in rock is called a(n) _____.
   - **b.** If the impression gets filled with sediments that harden to rock, a(n) _____ is the result.
   - **c.** Molds and casts show only _____ features of organisms.
5. The preserved evidence of the activity of an organism, such as its tracks, is called a(n) _____ fossil.
6. In rare cases, the original _____ of an organism can be preserved, such as _____ frozen in ice.

C. Determining a Fossil's Age

1. Scientists cannot date most _____ directly. Instead they usually find the age of the _____ around the fossils.

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Lesson Outline continued

2. In _____ dating, scientists determine the relative order in which rock layers were deposited.
   a. In a(n) _____ rock formation, the older layers of rock are below the younger layers of rock.
   b. Relative-age dating has helped scientists figure out the order that _____ have appeared on Earth.
3. Absolute-age dating is more _____ than relative-age dating and involves _____ isotopes that decay to become stable isotopes over time.

D. Fossils over Time

1. The _____ is a chart that divides Earth's history into different time units.
2. Earth's history is divided into four _____.
3. Earth's most recent eon—the _____ eon—is subdivided into three _____.
4. Neither eons nor eras are _____ in length.
5. When scientists began developing the geologic time scale in the 1800s, they did not have _____ dating methods, so they marked time boundaries with _____.

E. Extinctions

1. When the last individual organism of a species dies, a(n) _____ has occurred.
   a. A(n) _____ extinction occurs when many species die off within a few million years or less.
   b. The fossil record shows evidence of _____ mass extinctions during the Phanerozoic eon.
   c. Extinctions can occur if the _____ changes quickly; for example, as a result of a metorite impact.
   d. Extinctions can also occur if the environment changes _____; for example, as a result of the formation of mountain ranges.
2. The fossil record contains clear evidence of the extinction of species over time as well as evidence of the appearance of many new _____.

Adaptation

By National Geographic Society on 03.21.19
Word Count **880**
Level **MAX**

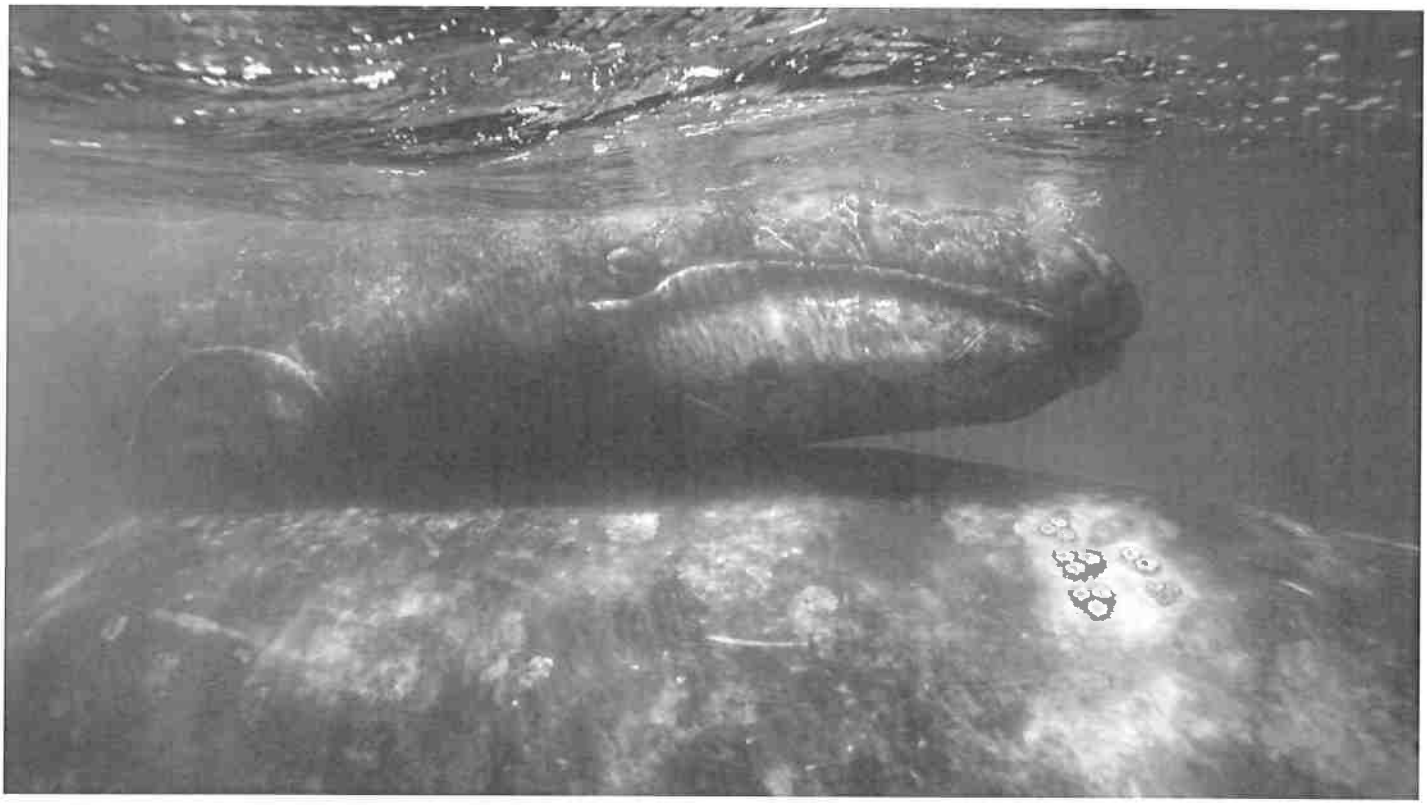


Image 1. A gray whale calf sits on top of its mother's back. They are seen here in the San Ignacio Lagoon, in Baja California South, Mexico. Gray whale mothers migrate thousands of miles every year from the Arctic to give birth in warm waters. Photo by: Francois Gohier/UIG via Getty Images

An adaptation is a mutation, or genetic change, that helps an organism, such as a plant or animal, survive in its environment. Due to the helpful nature of the mutation, it is passed down from one generation to the next. As more and more organisms inherit the mutation, the mutation becomes a typical part of the species. The mutation has become an adaptation.

Structural And Behavioral Adaptations

An adaptation can be structural, meaning it is a physical part of the organism. An adaptation can also be behavioral, affecting the way an organism acts.

An example of a structural adaptation is the way some plants have adapted to life in the desert. Deserts are dry, hot places. Plants called succulents have adapted to this climate by storing water in their thick stems and leaves.

Animal migration is an example of a behavioral adaptation. Gray whales migrate thousands of miles every year as they swim from the cold Arctic Ocean to the warm waters off the coast of

Mexico. Grey whale calves are born in the warm water, and then travel in groups called pods to the nutrient-rich waters of the Arctic.

Some adaptations are called exaptations. An exaptation is an adaptation developed for one purpose, but used for another. Feathers were probably adaptations for keeping the animal warm that were later used for flight, making feathers an exaptation for flying.

Some adaptations, on the other hand, become useless. These adaptations are vestigial: remaining but functionless. Whales and dolphins have vestigial leg bones, the remains of an adaptation (legs) that their ancestors used to walk.

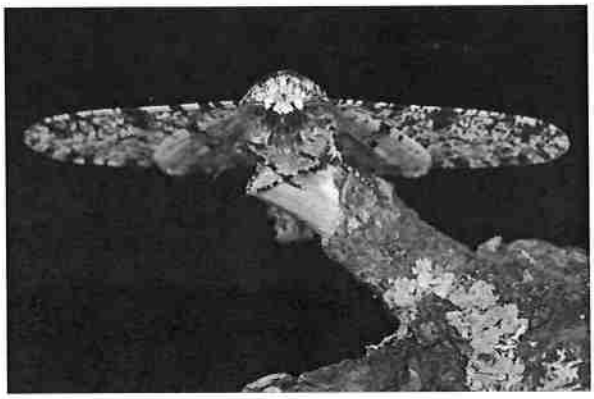
Habitat

Adaptations usually develop in response to a change in the organisms' habitat.

A famous example of an animal adapting to a change in its environment is the English peppered moth. Prior to the 19th century, the most common type of this moth was cream-colored with darker spots. Few peppered moths displayed a mutation of being grey or black.

As the Industrial Revolution changed the environment, the appearance of the peppered moth changed. The darker-colored moths, which were rare, began to thrive in the urban atmosphere. Their sooty color blended in with the trees stained by industrial pollution. Birds couldn't see the dark moths, so they ate the cream-colored moths instead. The cream-colored moths began to make a comeback after the United Kingdom passed laws that limited air pollution.

Speciation



Sometimes, an organism develops an adaptation or set of adaptations that create an entirely new species. This process is known as speciation.

The physical isolation or specialization of a species can lead to speciation.

The wide variety of marsupials in Oceania is an example of how organisms adapt to an isolated habitat. Marsupials, mammals that carry their young in pouches, arrived in Oceania before the land split with Asia. Placental mammals, animals that carry their young in the mother's womb, came to dominate every other continent, but not Oceania.

Koalas, for instance, adapted to feed on eucalyptus trees, which are native to Australia. The extinct Tasmanian tiger was a carnivorous marsupial and adapted to the niche filled by big cats like tigers on other continents. Marsupials in Oceania are an example of adaptive radiation, a type of speciation in which species develop to fill a variety of empty ecological niches.

The cichlid fish found in many of Africa's lakes exhibit another type of speciation, sympatric speciation. Sympatric speciation is the opposite of physical isolation. It happens when species share the same habitat. Adaptations have allowed hundreds of varieties of cichlids to live in Lake Malawi. Each species of cichlid has a unique, specialized diet: One type of cichlid may eat only insects, another may eat only algae, another may feed only on other fish.

Coadaptation

Organisms sometimes adapt to and with other organisms. This is called coadaptation. Certain flowers have adapted their pollen to appeal to the hummingbirds' tastes. Hummingbirds have adapted long, thin beaks to extract the pollen from certain flowers. In this relationship, the hummingbird gets food, while the plant's pollen is distributed. The coadaptation is beneficial to both organisms.

Mimicry is another type of coadaptation. With mimicry, one organism has adapted to resemble another. The harmless king snake (sometimes called a milk snake) has adapted a color pattern that resembles the deadly coral snake. This mimicry keeps predators away from the king snake.

The mimic octopus has behavioral as well as structural adaptations. This species of octopus can mimic the look and movements of animals such as sea snakes, flatfish, jellyfish and shrimp.

Coadaptation can also limit an organism's ability to adapt to new changes in their habitat. This can lead to co-extinction. In southern England, the large blue butterfly adapted to eat red ants. When human development reduced the red ants' habitat, the local extinction of the red ant led to the local extinction of the large blue butterfly.

Vestigial Adaptations

Vestigial organs are adaptations that have become useless. In humans, vestigial organs include the appendix, thought to be left over from when the human diet was primarily vegetation; the coccyx, a vestigial tail; and gill slits that are found in human embryos, though embryos never breathe through them.

URL: https://www.nationalgeographic.org/encyclopedia/adaptation-survival/

Quiz

1 Which choices could be considered adaptations?

1. *a frog having strong jumping legs*
2. *a giraffe stretching its neck to eat*
3. *a bear hibernating in winter*
4. *a bird having long feathers for flight*

(A) 1, 2 and 3

(B) 2, 3 and 4

(C) 1, 3 and 4

(D) 1, 2 and 4

2 Which paragraph in the section "Speciation" BEST supports the idea that animals can adapt in ways that allow multiple species to survive together in a common area?

(A) Sometimes, an organism develops an adaptation or set of adaptations that create an entirely new species. This process is known as speciation.

(B) The wide variety of marsupials in Oceania is an example of how organisms adapt to an isolated habitat. Marsupials, mammals that carry their young in pouches, arrived in Oceania before the land split with Asia. Placental mammals, animals that carry their young in the mother's womb, came to dominate every other continent, but not Oceania.

(C) Koalas, for instance, adapted to feed on eucalyptus trees, which are native to Australia. The extinct Tasmanian tiger was a carnivorous marsupial and adapted to the niche filled by big cats like tigers on other continents. Marsupials in Oceania are an example of adaptive radiation, a type of speciation in which species develop to fill a variety of empty ecological niches.

(D) The cichlid fish found in many of Africa's lakes exhibit another type of speciation, sympatric speciation. Sympatric speciation is the opposite of physical isolation. It happens when species share the same habitat. Adaptations have allowed hundreds of varieties of cichlids to live in Lake Malawi. Each species of cichlid has a unique, specialized diet: One type of cichlid may eat only insects, another may eat only algae, another may feed only on other fish.

3 How can plant spines and bird migrations be categorized as adaptations?

(A) Plant spines a structural adaptation, while the bird migration is a behavioral adaptation.

(B) Bird migration is a structural adaptation, while the plant spines is a behavioral adaptation.

(C) They are both structural adaptations.

(D) They are both behavioral adaptations.

4 Which piece of evidence BEST explains WHY the darker English peppered moths were more likely to survive during the Industrial Revolution?

(A) Prior to the 19th century, the most common type of this moth was cream-colored with darker spots. Few peppered moths displayed a mutation of being grey or black.

(B) As the Industrial Revolution changed the environment, the appearance of the peppered moth changed. The darker-colored moths, which were rare, began to thrive in the urban atmosphere.

(C) Their sooty color blended in with the trees stained by industrial pollution. Birds couldn't see the dark moths, so they ate the cream-colored moths instead.

(D) The cream-colored moths began to make a comeback after the United Kingdom passed laws that limited air pollution.

5 Which situation is MOST likely to cause sympatric speciation?

(A) Galapagos tortoises developing differently on 2 different islands

(B) changes in 2 deer populations after an earthquake separates them

(C) a forest bird population dividing into 2 as they eat different seeds

(D) Oceania splitting up to separate Koalas and Tasmanian tigers

6 Read the selection below.

> *Some adaptations, on the other hand, become useless. These adaptations are vestigial: remaining but functionless. Whales and dolphins have vestigial leg bones, the remains of an adaptation (legs) that their ancestors used to walk.*

Why did the author include this selection?

(A) to show that certain animal species don't need any structural adaptations in order to survive

(B) to introduce the idea that animals can have structural adaptations that they wind up not needing

(C) to highlight the importance of environmental changes on adaptions and exaptations

(D) to provide support for the idea that ocean animals are more likely to have useless adaptations

7 Some fish that live in pitch-dark caves have things that look like eyes but do not see.

Are their eyes best described as an exaptation or a vestigial adaptation?

(A) an exaptation because the eyes no longer have a useful function

(B) an exaptation because the eyes changed once fish moved into caves

(C) a vestigial adaptation because the eyes no longer have a useful function

(D) a vestigial adaptation because the eyes changed once fish moved into caves

8 What is the MOST LIKELY reason the author included the information about the blue butterfly and the red ants?

(A) to illustrate that coadaptation does not ensure survival

(B) to explain why coadaptation causes animals to change the food that they eat

(C) to describe the negative impact that humans have had on endangered species

(D) to suggest that southern England experiences a lot of co-extinction

Name _____ Date _____ Class _____

Content Vocabulary

LESSON 1

Fossil Evidence of Evolution

Directions: *In the puzzle below, each number will correspond to one letter of the alphabet. For example, 7 = I. Shaded letters will not be used. Crack the code by using the clues for hints. After you read the clues and fill in the blanks, complete the chart with the number that corresponds to each letter you have used.*

A	B	C	D	E	F	G	H	I	J	K	L	M
								7				

N	O	P	Q	R	S	T	U	V	W	X	Y	Z

1. a chart of Earth's past

						I			I							
16	2	26	23	26	16	7	25	13	7	6	2	22	25	17	23	2

2. change over time

	I					I									I		
19	7	26	23	26	16	7	25	17	23	2	12	26	23	24	13	7	26	15

3. evidence of an organism's activity

									I	
13	4	17	25	2	20	26	22	22	7	23

4. occurs when no individuals of a species remain

			I				I		
2	8	13	7	15	25	13	7	26	15

5. atoms of the same element that have different numbers of neutrons

I							
7	22	26	13	26	11	2	22

6. all fossils ever discovered on Earth

				I						
20	26	22	22	7	23	4	2	25	26	4	10

7. impression of an organism in rock

6	26	23	10

8. similar cells that work together

	I				
13	7	22	22	24	2

9. fossil copy of an organism in a rock

25	17	22	13

Name _____ Date _____ Class _____

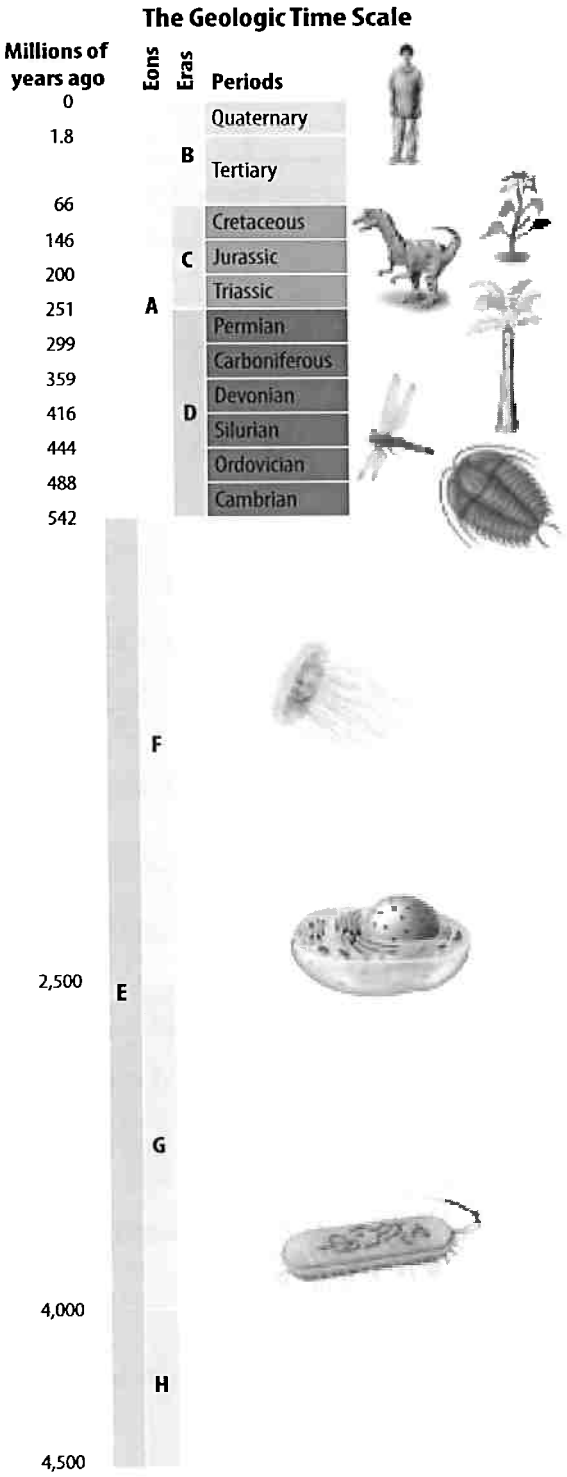
Content Practice A

LESSON 1

Fossil Evidence of Evolution

Directions: *On the line before each label, write the letter of its correct location on the scale.*

1. _____ Archean
2. _____ Cenozoic
3. _____ Hadean
4. _____ Mesozoic
5. _____ Paleozoic
6. _____ Phanerozoic
7. _____ Precambrian
8. _____ Proterozoic



Turtles the size of a car once roamed Earth; scientists just found their fossils

By Reis Thebault, Washington Post, adapted by Newsela staff on 02.25.20
Word Count **673**
Level **MAX**

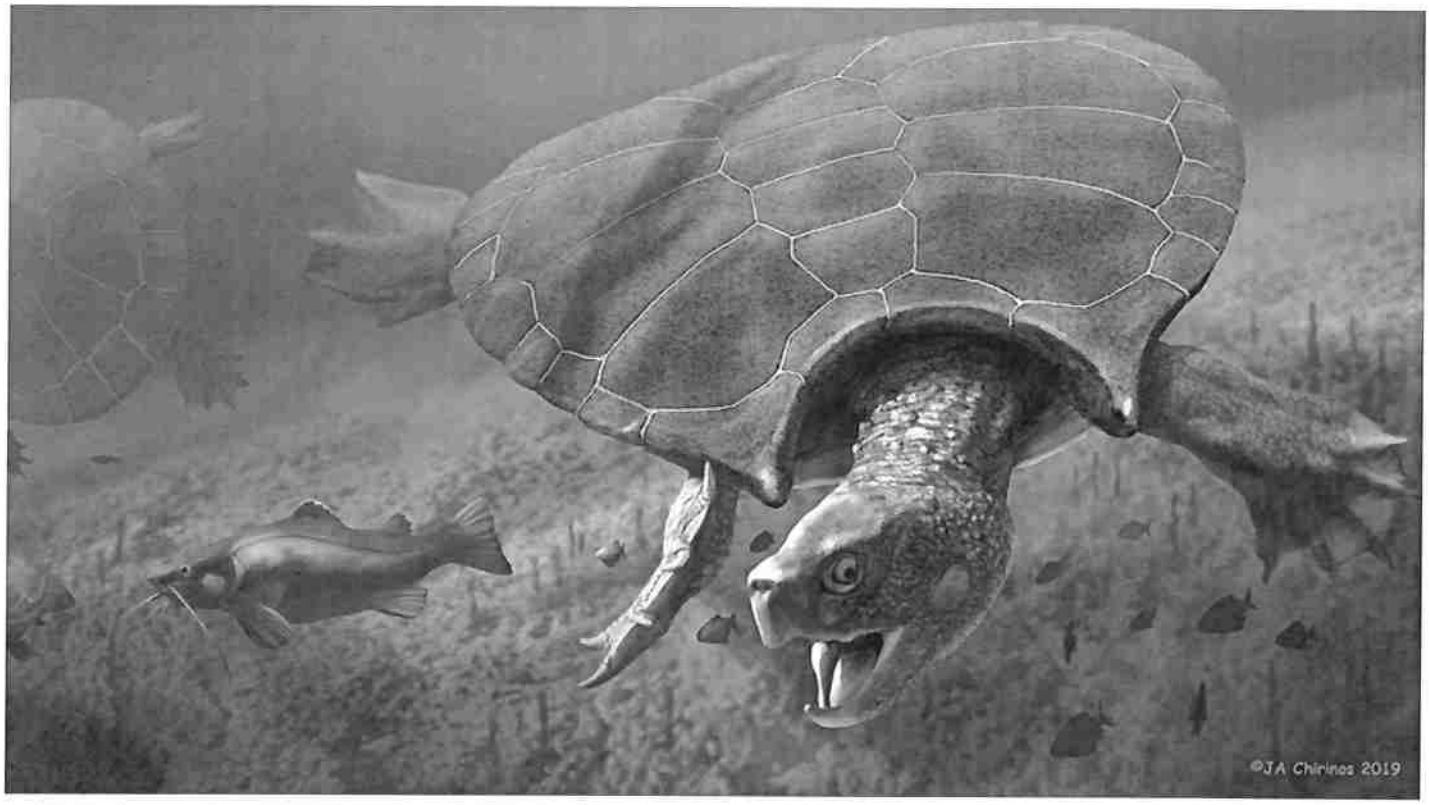


Image 1. A reconstruction of the giant turtle Stupendemys geographicus swimming in freshwater. Image: Jaime Chirinos/University of Zurich

In the swamps of northern South America some 10 million years ago, quotidian life-or-death battles unfolded at an epic scale. Giant caimans, in the same family as alligators, stalked the wetlands of modern-day Venezuela and Colombia. They slunk along at 30 feet, snout to tail. Among their most formidable prey was the Stupendemys geographicus. The Stupendemys geographicus is a colossal turtle. Little was known about this turtle, until now.

New research, published February 12 in the journal Science Advances, reveals important findings about the Stupendemys. The turtle is a now-extinct freshwater turtle. The research details the discovery of one of its shells. The shell is the largest-known turtle shell found to date. It is nearly 9 1/2 feet long. The animal would have resembled, in length and weight, a medium-sized car.

The hulking reptile was about 100 times the size of its closest living relative, the Amazon river turtle. It was twice the size of the largest living turtle, the marine leatherback, the researchers estimated. The new findings provide the most thorough accounting yet of the Stupendemys. The

findings help scientists answer crucial questions about what may have been the largest turtle to ever live.

"For almost four decades, we didn't have new and excellently preserved fossils of this turtle," said Edwin Cadena. Cadena is a paleontologist at the Universidad del Rosario in Colombia. He is one of the study's lead researchers. "Many questions - about its diet, if there were differences between males and females, and even if we were dealing with one or more giant turtle species - were completely unknown," Cadena said.

The recently unearthed fossils were dug up in northern Venezuela and Colombia's Tatacoa Desert. Thanks to the fossils, Cadena and his co-authors have been able to fill in some of the unknowns, which have lingered since the 1970s, which was when the animal was first described. It now appears likely that Stupendemys geographicus was the lone species of giant turtle living in the region at that time, he said. There were also differences between the sexes and their diet was diverse and omnivorous.

Among their most surprising discoveries, Cadena said, was the presence of sturdy, front-facing horns on the shells of the males. This was "something completely new for such a giant turtle," he said. The researchers hypothesize that the horns were used as "weapons in male-male combat behaviors." Deep scrapes in the horn of one fossil indicated they may have been used by turtles tangling over territory, they said.

Cadena and his team found more marks, too, some that told of their fearsome, frantic fights with the Purussaurus. Purussauruses were the giant caimans that roamed the northern Neotropics during the Miocene epoch, the same time and place as the Stupendemys. The scars from their skirmishes are still visible today.

Some of the Stupendemys fossils had bite marks and punctured bones. One shell had a tooth embedded in it.

Earth's landscape at the time of the Stupendemys bore little resemblance to today's topography. The turtle's habitat has turned to desert. Back then though, it was humid and swampy. The Andes weren't yet fully formed and the Orinoco and Amazon rivers cut different paths.

A sprawling wetland and lake system meant plenty of room for massive animals, especially the Stupendemys. The turtle spent most of its days at the bottom of freshwater streams and small lakes, Cadena said. They likely lived across the whole northern part of South America.

But those ideal conditions were not to last. Over time, plate tectonics pushed the Andes higher. This disrupted the water systems and drastically reduced the scope of their habitat, the researchers wrote.

At some point, their huge size, which had come to signify their success on Earth and the conquering of their environment, was no longer enough to keep them alive. In the early Pliocene, around 5 million years ago, they became extinct.

Quiz

1 Read the conclusion below.

The Stupendemys got into many vicious fights.

Which sentence from the article provides the BEST support to the statement above?

(A) The hulking reptile was about 100 times the size of its closest living relative, the Amazon River turtle.

(B) There were also differences between the sexes and their diet was diverse and omnivorous.

(C) Some of the Stupendemys fossils had bite marks and punctured bones.

(D) In the early Pliocene, around 5 million years ago, they went extinct.

2 One conclusion a reader could make after reading the article is that the Stupendemys is likely the largest turtle to ever have existed.

Which of the following statements accurately paraphrases evidence from the article to support the conclusion?

(A) The Stupendemys is two times the size of the largest turtle alive today.

(B) The Stupendemys was 30 feet long and was hunted by giant caimans.

(C) The Stupendemys was 100 times bigger than any other turtle fossil.

(D) The Stupendemys was longer than two medium-sized cars put together.

3 Which answer choice accurately characterizes Edwin Cadena's reaction to finding horns on the Stupendemys's shell?

(A) He did not have much of a reaction to it because he knew about the horns from the other fossils.

(B) He did not expect it because this was the first time they found horns on a such a large turtle.

(C) He was relieved because it proved his idea that the Stupendemys had horns before he found the fossils.

(D) He was excited because it helped him to learn that the Stupendemys ate both animals and plants.

4 Read the following selection.

But those ideal conditions were not to last. Over time, plate tectonics pushed the Andes higher. This disrupted the water systems and drastically reduced the scope of their habitat, the researchers wrote.

Why did the author include this information?

(A) to explain a major problem that the Stupendemys experienced

(B) to explain why the Stupendemys thrived in its environment

(C) to show that the Stupendemys easily adapted to hard situations

(D) to show that the Stupendemys always had to fight to stay alive

Name _____ Date _____ Class _____

Key Concept Builder LESSON 1

Fossil Evidence of Evolution

Key Concept How do fossils form?

Directions: *Answer each question in the space provided.*

Fossil Formation			
What are the different types of fossils?	What conditions existed for this type of fossil to form?	How did this type of fossil form?	Does this fossil show physical structure, movement, or behavior—or all three?
1.			
2.			
3.			
4.			
5.			

Name _____ Date _____ Class _____

Key Concept Builder LESSON 1

Fossil Evidence of Evolution

Key Concept How do fossils form?

Directions: *On each line, write the letter(s) of the term(s) that correctly matches the description. Some terms will be used more than once.*

_____ **1.** Original tissues of the organism can be preserved.

_____ **2.** Sediment fills an impression left in the sand.

_____ **3.** organism buried in the sand

_____ **4.** Dead organism is compressed over time.

_____ **5.** preserves an organism's movement

_____ **6.** a fossil copy of the organism in a rock

_____ **7.** includes mammoths frozen in ice

_____ **8.** Tracks fill with sediment that hardens.

_____ **9.** Minerals in water replace an organism's original material and harden into rock.

_____ **10.** Pressure drives off gases and liquids, leaving an outline of plant leaves, fish, and insects.

_____ **11.** An impression of an organism is left in rock.

_____ **12.** The process requires mud or sand.

_____ **13.** Some organisms have been preserved in tar pits.

_____ **14.** Only the external features of the organism are shown.

_____ **15.** can result in a fossil of wood

_____ **16.** preserves the internal structure of an organism

A. mineralization

B. carbonization

C. molds and casts

D. trace fossils

E. original material

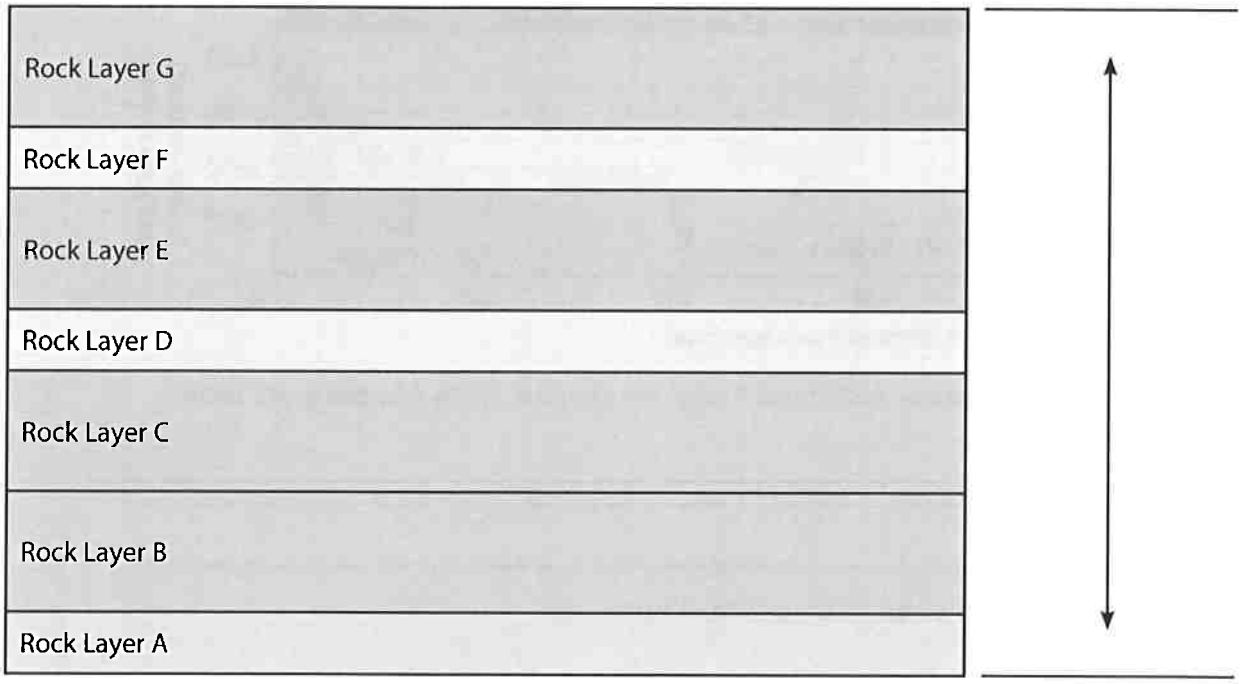
Name _____ Date _____ Class _____

School to Home **LESSON 1**

Fossil Evidence of Evolution

Directions: *Use your textbook to respond to each statement.*

1. The diagram below represents a group of undisturbed rock layers. Draw one fossil in each of these rock layers: B, C, E, and G.



2. Write the terms *older* and *younger* on the correct lines on either end of the arrow to correctly indicate the ages of the rocks in the rock layer diagram.
3. Look at the fossil you drew in rock layer C.
   a. Which fossil (or fossils) are older? _____
   b. Which fossil (or fossils) are younger? _____
4. Which fossil is the youngest? _____
5. What method of fossil dating does this activity represent? _____
6. Which type of rock is most likely found in layers B, C, E, and G? Explain your reasoning.

   _____
7. If rock layers A, D, and F are igneous rock, which type of dating could also be carried out? Explain your response.

   _____

   _____

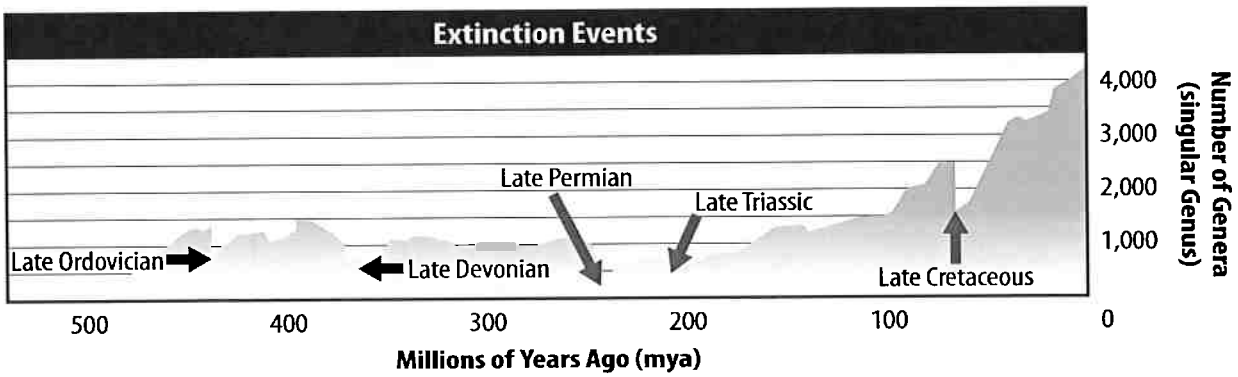
Name _____ Date _____ Class _____

Key Concept Builder **LESSON 1**

Fossil Evidence of Evolution

Key Concept How are fossils evidence of biological evolution?

Directions: *Use the diagram to answer each question or respond to each statement on the lines provided.*



1. What is suggested when many fossils are found in one rock layer, but none are found in the layer above it?

2. Within what period of time can a mass extinction occur?

3. **Compare** the environmental change that causes extinction with the environmental change that causes gradual species change.

4. How many major extinction events have occurred in Earth's history?

5. **List** the order of extinction events from the earliest time period to the most recent.