

**Lesson Topic:** Geologic Time

**Objective:**

Students will be able to:

1. Analyze the geologic time scale.
2. Explain the creation of the geologic time scale.
3. Understand the difference between geologic time and human time scales.
4. Compare and contrast relative and absolute dating.

**Time Required:** 75 minutes

**Materials Needed:**

- Teacher computer with internet access
- Projector/Smartboard
- 1 computer/laptop/iPad per student with internet access
- Roll of toilet paper
- Creating a Geologic Time Scale Handout (attached)

**Teacher Preparation:**

- Assign a Legends of Learning Instructional [Quick Play](#) playlist for the day(s) you will be teaching the lesson.
  - Instructional - Middle School - Geologic Time
- Assign a Legends of Learning Content Review [Quick Play](#) playlist for the day(s) you will be teaching the lesson.
  - Content Review - Middle School - Geologic Time
- Before class, mark up the toilet paper roll with major eras and events that took place on the geological time scale. Do this carefully. You must know how many sheets are on the roll to mark it correctly. Use the following as a [guide](#).

**Engage (5-10 minutes):**

1. Lead a 1 minute discussion about how scientists use absolute dating to figure out the age of rock stratum.
2. Explain to the students that scientists organize this information (along with a lot of other information) into what is called a geologic time scale.
3. Have two students hold the roll of toilet paper. And have one student start to unravel it slowly. As they unravel it point out some of the major events that are taking place.
4. Once the roll is completely undone (this could take several times around the classroom, you may need a larger room such as the auditorium or gym) ask the students to compare the age of Earth versus the age of living things.
  - a. Answer: The Earth is much much older and living things have barely been around.
5. Ask students to then compare the amount of time humans have been alive to the time all living things have been on Earth.
  - a. Humans have been around for only a very small percentage of the time.
6. Explain to students: "I have just demonstrated an example of a geologic time scale. During your lesson today, you will learn how these time scales were created."

**Explore (40 minutes):**

1. Have your students [sign in to Legends of Learning](#). Instruct students to complete the Instructional playlist.
2. As students complete the assigned game, students should fill out the Creating a Geologic Time Scale Handout.
3. Assist students as needed during game play, pause playlist if you need to address content or questions to the entire class.

**Explain (10 minutes):**

1. Review the answers to the handout Creating a Geologic Time Scale by recreating the chart on the whiteboard. Have your chart go horizontal instead of vertically like the students.
2. As you review that chart and answers clarify any misconceptions that students may have.

**Elaborate (5 minutes):**

1. The geologic time scale is often used to show how life evolved on Earth. But what would this time scale look like in a different form, like a 24 hour day?
2. Show the students the following video (stop after 1:35): [The Evolution of Life on Earth](#)
3. Ask: What are some major differences between the geologic time scales discussed in class and the one on the video?
  - a. *The one on the video did not break the timeline up into eras.*
4. Ask: *Why do you think it took so long for humans to evolve?*
  - a. *Answers will vary, many students may discuss the climate of Earth.*

**Evaluate (10 minutes):**

1. Have your students [sign in to Legends of Learning](#). Instruct students to complete the Content Review playlist.
2. [Analyze student results](#) to determine what concepts need to be a focus for reteaching.

**Additional Lesson Strategies:**

- To use Legends for additional instruction, create a [custom playlist](#) with an [instructional game](#) and pre and post [assessment](#).
- To use Legends for a quick formative assessment, create a 5-question [assessment](#) in a [playlist](#).
- To use Legends for a student-directed experience, create a [targeted freeplay](#) playlist.
- Encourage students to play on their own at home in [Legends of Learning: Awakening](#) for a student-driven experience including avatars, battling, and quests all centered around topics they are covering in class.

**Creating a Geologic Time Scale**

Name / Pd: \_\_\_\_\_

Directions: While playing the first game in Legends of Learning, fill in the chart below.

The following chart will indicate how a Geologic Time Scale is created based on climate change, evolution of life, sudden changes, and absolute dating. For each stratum, fill in the correct spot on the chart.

Stratum	Drawing of the fossil	Sudden / Major Event	Radiometric Dating	Presumed Era
1				
2				
3				
4				
5				
6				
7				

8				
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Directions: Use the chart to answer the following questions:

1. When you found a fossil, what clues were given that helped you place the fossil in the correct time frame?
2. What conclusion can you draw about a fossil that exists in the second strata of earth and a fossil that exists in the fourth strata of earth?
3. As you went deeper into the Earth's strata the rocks/fossils become ( *older / younger* ) and the organisms that you found became ( *less / more* ) complex.
4. Each change in era is usually accompanied by a sudden/major event that took place on Earth. Why do you think that two go together?
5. How does the creation of the geological time scale (like your chart) use both absolute and relative dating?