



# LESSON PLAN

## ROCK LAYERS GRADES 6-8

### SUMMARY

Students engage in an activity to figure out Earth's history.



**MS-ESS1-4.** Construct a scientific explanation based on evidence from rock strata for how the geologic timescale is used to organize Earth's 4.6-billion-year-old-history.

**MS-ESS2-3.** Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of past plate motions..

Science & Engineering Practices	Connections to Classroom Activity
<p><b>Constructing Explanations and Designing Solutions</b></p> <p><b>Analyzing and Interpreting Data</b></p> <p><b>Scientific Knowledge Is Open to Revision in Light of New Evidence</b></p>	<ul style="list-style-type: none"> <li>• Students use evidence from the photographs of the rock layers, Generation Genius video, and class discussion to create an explanation of how rock layers and fossils formed.</li> <li>• Students make careful observations of the qualitative data presented in the photos of the rock layers.</li> <li>• Students revise their models based on new information.</li> </ul>
Disciplinary Core Ideas	Connections to Classroom Activity
<p><b>ESS1.C: The History of Planet Earth</b></p> <p>The geologic timescale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale.</p>	<ul style="list-style-type: none"> <li>• Students engaged in several activities to figure out how scientists have figured out some things about Earth's 4.6-billion-year history.</li> </ul>

### ESS1.C: The History of Planet Earth

Tectonic processes continually generate new ocean seafloor at ridges and destroy old seafloor at trenches.

### ESS2.B: Plate Tectonics and Large-Scale System Interactions

Maps of ancient land and water patterns, based on investigations of rocks and fossils, made clear how Earth's plates have moved great distances, collided, and spread apart.

- The Generation Genius video discusses the role earthquakes can play in surfacing rock layers.
- Students figure out and discuss how fossil evidence allows scientists to figure out what Earth might have looked like in the past.

#### Cross Cutting Concepts

#### Connections to Classroom Activity

##### Scale, Proportion, and Quantity

##### Patterns

- Students use the rock layers to figure out information about the geologic time scale.
- Students engage in making observation of Earth's layers to figure out the relative age of the layers and the things they contain.

## DURATION

60 min.

## MATERIALS

- Rock layer photographs



## ENGAGE

Ask students, "Do you think middle school students can make scientific discoveries?" Let students discuss this question, then tell students you came across a really cool video the other day where kids make a huge scientific find. Ask students to create a T-chart. Write *Notice* on one heading and *Wonder* on the second. Tell them to record observations in the notice column and questions in the wonder column. Play the video, [Boys dig up Ice Age-era fossils while playing in backyard.](#)

Have students discuss what they notice and wonder in small groups for five minutes. Each group will need to share what they noticed and wondered when time is up.

Ask groups to share their collective observations and record them on the board to reference later in the lesson. Common observations include the following: they found the bones in the backyard, they got to keep the bones, and the jawbone was huge! Questions could include the following:

- How did the bone get in the backyard?
- When did mastodons live in the United States?
- What happened to the mastodons?
- How did mastodons go extinct?
- How do scientists know how old the bones are?
- How do scientists know when it lived?

Tell students that there are many hidden things in the layers of Earth. Ask students if they have ever found a fossil and

have them share with the class.

Next, have students draw a model of how they think that mastodon fossils got buried in the ground and how would scientists know that it was from the Ice Age, about 11,000 years ago?

When students have completed their model, have them share them with a partner or small group to look for similarities and differences. When students are done, give them a few minutes to add to or revise their model.



## EXPLORE

Tell students that scientists can figure out many different things from the rock layers. Have students get into groups of five and give each group a copy of the rock layer photos. Do a “round robin,” having each student pass the photos along when time is up. As students look at each photo, have them take notes on what they see.

When completed, ask students what they noticed in the photos. Students will notice that some of the rock layers are different colors, some are in a distinct pattern, and some layers are the same color, but it is still noticeable where the layers are. Next, ask students what they think scientists can figure out just from observing the rock layers. Students may comment that a scientist could figure out what the layers are made out of based on the color, and they might be able to tell if there are fossils in the rock layers and even how old the layers are.

Next, have students work in their small groups and have them try to order the rock layers on one of the pictures from oldest to youngest. Tell them to include an explanation of why they ordered the layers the way that they did.

Have students share their explanation of the rock layers and their age. If students are not in agreement, have both groups argue from evidence about what layers they believe formed first. When all students agree, confirm the oldest layers are on the bottom. Prompt students to think about the video from the beginning of the class. The paleontologist stated that the mastodon lived in North and Central America during the Ice Age and went extinct about 11,000 years ago. In their small groups, have students use the pictures to brainstorm ideas about how paleontologists could use the rock layers to figure out when and where an organism lived.

Have students share their ideas during a whole-group discussion. Ask one group to share their ideas about how paleontologists use the rock layers. Using talk moves, invite other groups to the discussion. Talk moves prompts could include:

- Does anyone have anything they would like to add to that?
- Who has something similar they would like to share?
- Are there other ideas that connect to the one that was just shared?



## EXPLAIN

After the discussion, tell students they have some great ideas about how scientists use the rock layer to figure out things about Earth’s history and where and when different organisms lived. Tell students you have a video that will help explain some additional information about Earth’s history.



## WATCH THE GENERATION GENIUS ROCK LAYERS VIDEO AS A GROUP

After the video, discuss the information students learned from the video. Ask students to share the most interesting thing they learned.



## ELABORATE

Last, have students revisit their initial models. Ask students to revise their individual models to include an explanation for how scientists use the rock layers to determine the relative age of the fossils they find.

Have students present their models to the class individually or in a gallery walk.



## EVALUATE

There are multiple ways to assess your students' understanding of this topic. The exit ticket is an opportunity for students to use the science ideas they built in the lesson in a new context. Alternatively, you can use the Kahoot! quiz (which provides downloadable scores at the end of the game) and/or the paper quiz. All these resources are located right below the video in the assessment section.



## EXTENSION

Have students read the article [Rare Jellyfish Fossils found in Wisconsin](#). When students are done reading have students explain what Wisconsin must have looked like in the past based in the information from the article.





# ROCK LAYER PHOTOGRAPHS

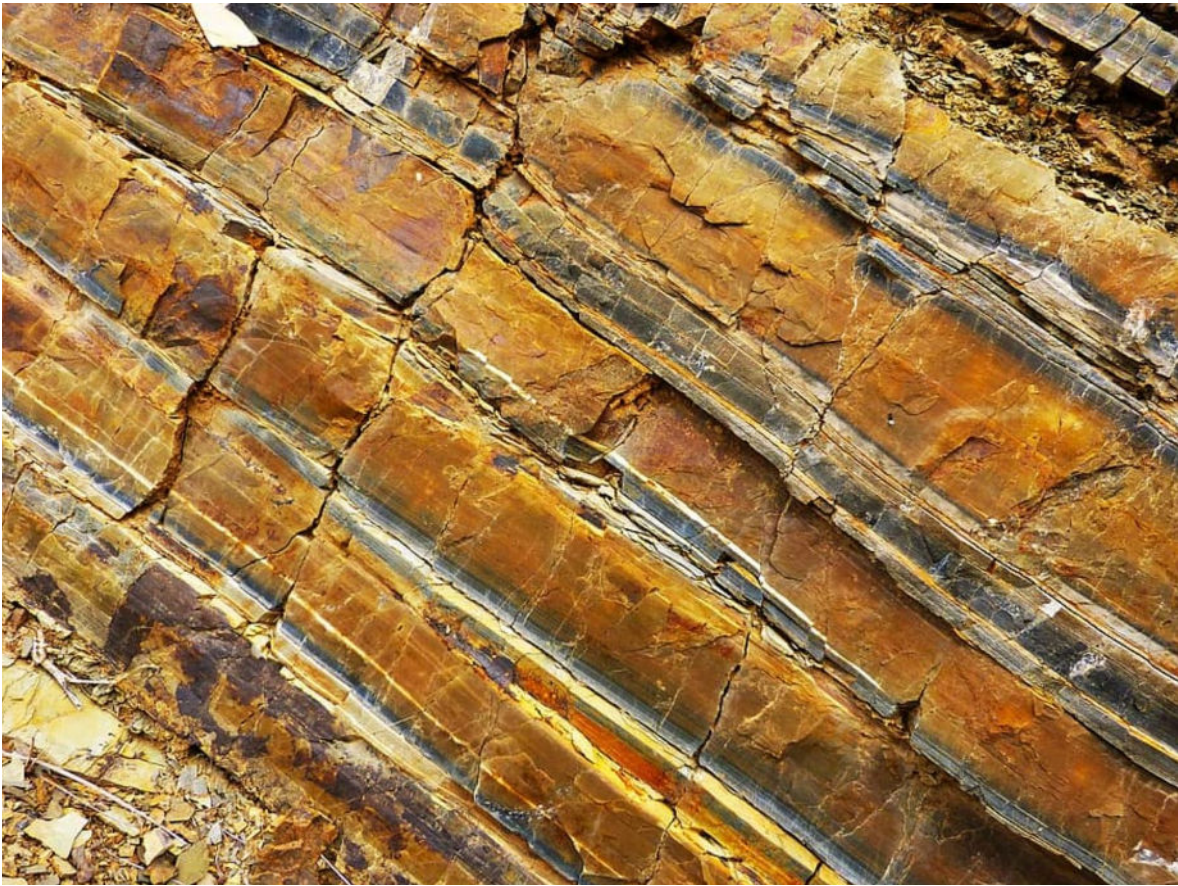


**Painted Desert**  
Painted Desert, north-central Arizona  
Jon Sullivan



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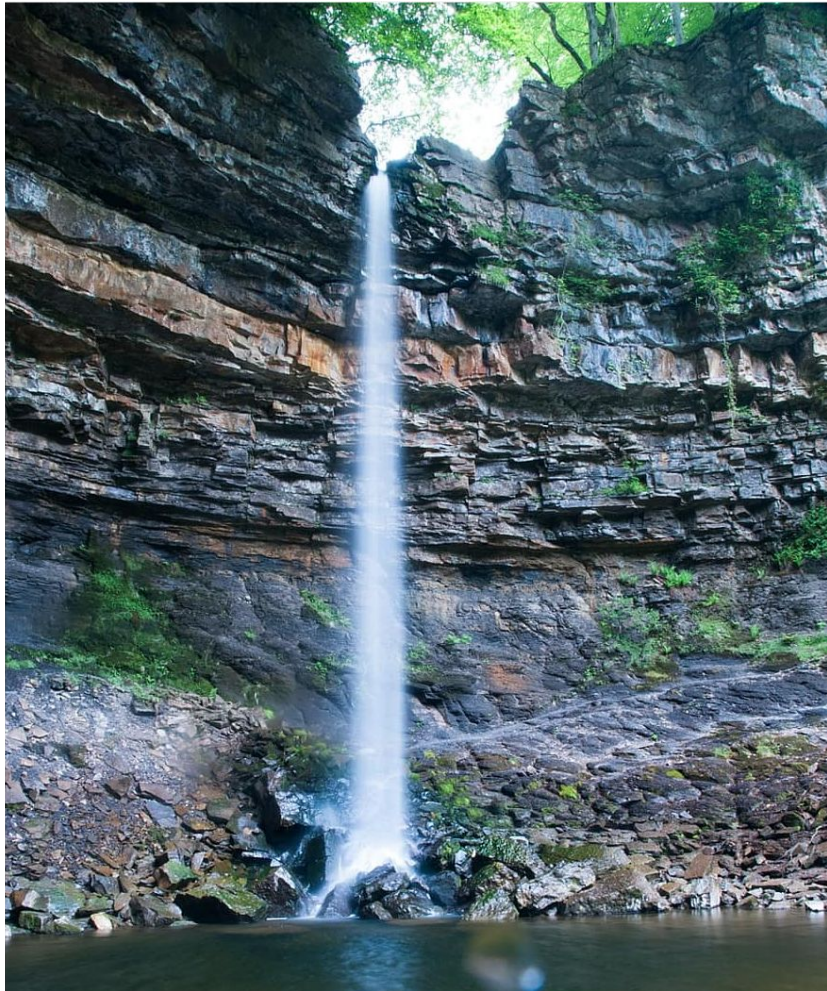
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