

Rocky Roads

Band level: Year 6 and Year 8

Description: Students will explore the Earth's rock layers using Augmented Reality and the Merge Cube. This lesson is a science simulation for a deeper look into the **Rock History of Earth** section of the **Merge Explorer** app. Here students can explore how water can change the earth's landscape and how different rock layers develop with many fossils to be found in them.

Resources:

- iPad, (no internet required)
- Merge cubes
- Mega Merge Cube (optional)
- MERGE Explorer app – **Rock History of Earth**
- Worksheet – **Rock History of Earth**



Prior Student Learning: Merge Cube Magic lesson

What is Augmented Reality? Augmented reality is using technology to superimpose information such as sounds, images and text onto real world objects that we see. It works by adding the digital content onto a live camera feed, making that digital content look as if it is part of the physical world. This could be anything from making your face look like a dinosaur to overlaying digital directions onto the physical streets around you.

What is a Merge Cube? The Merge Cube is a spongy, dense black foam cube with silver markings on all six sides in patterns similar to QR codes. The patterns provide an Augmented Reality trigger that launches when any of the Merge apps are pointed at the cube. It provides a powerful interactive experience in a real world environment where an object (the cube) is enhanced by a 3D digital-generated image that comes to life by using the camera on a digital device.

What is the Merge Explorer App? With the MERGE Explorer app students will learn about topics such as earth science, life cycles, the solar system, anatomy, properties of matter, weather and climate, ecosystems and more. The app provides students with an interactive experience in which digital images, sounds and text can be seen on the Merge Cube. Students can investigate a volcano, examine inside the human body, and hold the earth in the palm of their hands. They can even dissect a frog (humanely)!



Curriculum Links:

Year 5 to 6	<p>Digital Technologies Achievement Standard By the end of Year 6, students explain the fundamentals of digital system components (hardware, software and networks) and how digital systems are connected to form networks.</p>
	<p>Content Descriptions: Examine the main components of common digital systems and how they may connect together to form networks to transmit data (ACTDIK014)</p>
Year 7 to 8	<p>Digital Technologies Achievement Standard By the end of Year 8, students distinguish between different types of networks and defined purposes. They plan and manage digital projects to create interactive information.</p>
	<p>Content Descriptions: Investigate how data is transmitted and secured in wired, wireless and mobile networks, and how the specifications affect performance (ACTDIK023)</p> <p>Acquire data from a range of sources and evaluate authenticity, accuracy and timeliness (ACTDIP025)</p>
Year 6	<p>Science Achievement Standard By the end of Year 6, students ... explain how natural events cause rapid change to Earth's surface.</p>
	<p>Content Descriptions: Science Understanding: Sudden geological changes and extreme weather events can affect Earth's surface (ACSSU096)</p>
Year 8	<p>Science Achievement Standard By the end of Year 8, students ... compare processes of rock formation, including the timescales involved.</p>
	<p>Content Descriptions: Science Understanding: Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales (ACSSU153)</p>



Whole class activity: Explore Phase

The teacher introduces the students to land formations and rock layers through Augmented Reality and using the **Rock History of Earth** section of the MERGE Explorer app (see Attachment A). Explain how the AR happens through the camera of the device and superimposes the image onto the cube. This could be done using the Mega Cube for the whole class to see.

Group work activity: Play Phase

1. Divide the students into pairs or groups and provide an iPad and merge cube to each.
2. Open the Explorer app and navigate to the **Rock History of Earth** section.
3. Read through the topic card information.
4. Interact with each AR activity to explore, discover and learn.
5. Students should be able to answer the following questions.

<p style="text-align: center;"><i>Stone Pathways</i></p> <p>How does water change rock surfaces?</p> <p>Students explore the simulation and use the moving slider to watch how water creates a canyon through the process of erosion over a long period of time. Students could research other examples of this erosion and the rivers involved.</p>	<p style="text-align: center;"><i>Rock Layers</i></p> <p>How are rock layers formed?</p> <p>Students investigate the layers (strata) of rock that make up the earth's crust. The module will visualize how each layer builds up over time. Let students move the slider to see how layers accumulate on top of each other. Match each layer to a time frame in history.</p>
<p style="text-align: center;"><i>Buried Fossils</i></p> <p>Which creatures lived in Earth's history?</p> <p>Students explore fossils that exist in each rock formation layer. Time to dig into the surface and uncover what lies beneath. As students find a fossil they can click on it to learn more about its age and the creature left behind. Find the layer that contains the flying reptiles (pterosaur).</p>	<p style="text-align: center;"><i>Supercontinents</i></p> <p>What happened when Pangea split?</p> <p>Students observe the movement of the Earth's plates over 500 million years. How have the continents changed shape? What has caused such changes in the Earth's crust? Create a timeline of the four main periods of continent development.</p>



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Attachment A



Rock History Earth

Essential Questions

- What are two ways that rocks on the Earth's surface can change over time?
- How can a river form a canyon?
- How do the ages of the rocks layers located at the bottom of the Grand Canyon compare to the layers at the top of the Grand Canyon?
- What formed when the supercontinent Pangea split apart?

Activity:

1. Using your Merge Cube, access the "Rock History of Earth" Topic Card inside Merge Explorer. Read the introduction.
2. Read **Activity One**, "Horseshoe Bend". Now look at the picture of the canyon. How would you describe the shape of the canyon from the image? Why do you think the canyon is shaped in such a way? Press the play button. At the bottom of the screen, you will see a sliding bar. Move the slider slowly from 20 MYA to Current Day. How do you think the rate of erosion would change if the river were to move slower or even dry up completely? The simulation shows the carving of sandstone. How do you think the canyon would change if the water were flowing through a harder rock, such as marble?
3. Now read **Activity Two**, "Layers of Rock," to learn about how those layers of rock appeared in the first place. Using the slider at the bottom of the screen, slowly move towards Current Day, adding layers along the way. Notice the different colorings of each layer in the image. Along the right side of the rock layers, you will see each layer is named. The naming system helps scientists record where individual fossils and other features are located.
4. Go to **Activity Three**, "Layers of Fossils" and read the introduction. Press play to dig deep inside the Earth and uncover some fossils. Keep pressing the shovel to keep digging. What do you notice about the age of the fossils as you dig deeper into the rock layers? How might finding a fossil that appears only in one or two rock layers help scientists determine the age of other fossils?
5. Read the introduction to **Activity Four**, then press the play button to start the activity. What formed as Pangea eventually separated? Stop the slider when you notice the separation of Africa and South America. What time period did the two continents form? Scientists have found similar fossils and rock types on the east coast of South America and the west coast of Africa. How do these findings support the existence of Pangea?

Assessment:

Video Recording: Create a video where you pretend to be a geologist explaining how rock layers are formed and how water and rivers can cause erosion that changes the structure of the landscape. Include what sort of creatures existed and use fossils as examples.

Class Notebook: Answer the Essential Questions in your science notebook.

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