

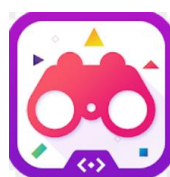
Journey to the Centre of Earth

Band level: Years 5 to 6 (Beginner level activities)

Description: Students will explore the Earth as a system using Augmented Reality and the Merge Cube. This lesson is a deeper look into the Terraforming Earth section of the Merge Explorer app. Here students can experience the “anatomy” of the Earth and see how volcanoes and earthquakes are created.

Resources:

- iPad, (no internet required)
- Merge cubes
- Mega Merge Cube (optional)
- MERGE Explorer app
- Worksheet



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, squishy black 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:

Band/Year Level	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. Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems.
Year 5 to Year 6	
	Content Descriptions: Digital Technologies: Knowledge and Understanding Examine the main components of common digital systems and how they may connect together to form networks to transmit data (ACTDIK014) Digital Technologies: Process and Production skills Define problems in terms of data and functional requirements drawing on previously solved problems (ACTDIP017)
Year 6	Science Achievement Standard By the end of Year 6, students ... explain how natural events cause rapid change to Earth's surface.
	Content Descriptions: Science Understanding: Sudden geological changes and extreme weather events can affect Earth's surface (ACSSU096)
Level 4	General Capabilities ICT Capabilities <ul style="list-style-type: none"> ● Locate, generate and access data and information ● Select and use hardware and software ● Understand ICT systems Critical and creative thinking <ul style="list-style-type: none"> ● Locate, generate and access data and information ● Imagine possibilities and connect ideas



Whole class activity: Explore Phase The teacher introduces the students to the concept of looking inside the earth through Augmented Reality and using the Terraforming 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 Terraforming 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><i>Journey to the Core</i> What does Earth look like from the Inside?</p> <p>Students explore the layers of the Earth while they hold and interact with each layer, toggleing the layers on and off to get a closer view.</p>	<p><i>Plates are burning</i> What are tectonic plates and where are they found?</p> <p>Students learn that floating plates on the Earth's Mantle can be very large. The module will visualize the plates on the Earth's Crust. Let students try to identify each of the plates by selecting one at a time.</p>
<p><i>The Art of Subduction</i> How do tectonic plates move, and what happens when they move?</p> <p>Students learn about the various ways tectonic plates move and discover what sometimes happens when tectonic plates converge! They will hold and interact with a subduction zone, and make inferences about the cause of earthquakes and volcanoes.</p>	<p><i>Lava & Volcanology</i> How do tectonic plates move, and what happens when they move?</p> <p>Students learn that sometimes when tectonic plates move, they allow magma to push its way to the surface and create a volcano. They'll hold and learn about the basic anatomy of a volcano, and watch as ash and smoke fill the air.</p>



Author: Sue Carter

This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/). Computer Science Education Research (CSER) Group, The University of Adelaide.





Terraforming Earth

Essential Questions

- Do Earth events happen quickly or slowly?
- What is an earthquake?
- What is a volcano?
- What are Earth's layers?

Activity

1. Earth is our home planet - a giant ball of rock and metal floating in space. What does the ground look like on Earth? If we could drill a big hole down into Earth's center, what do you think we would see? Today, we are going to explore Earth's layers – the different parts inside of Earth. We will also learn how the biosphere, hydrosphere, and atmosphere interact with Earth's layers. We will learn about volcanoes and earthquakes, too. Let's go on a journey together!!
2. Using your Merge Cube, access the "Terraforming Earth" Topic Card inside the Merge Explorer app. Look at the image at the very top and read the introduction. What do you think the red lines are showing?
3. Look at activity one to view Earth's layers. We live on the crust, the outermost layer. Tap on each layer to see what it looks like by itself, then use the slider to separate each layer to see how they fit together. Can you identify the innermost and outermost layers? Think about the geosphere, or the solid parts of Earth. How do they interact with the liquid part of Earth, or the hydrosphere? The oceans and crust meet at the seafloor and shorelines. What about the atmosphere, where does it touch Earth's surface? The atmosphere, or gases surrounding Earth, wraps around all of Earth.
4. Now, read about tectonic plates in activity two. Where do you think tectonic plates are located? In the activity you can see that the plates are located in Earth's mantle. Tap on each plate to see it alone from all the others. Do these plates look similar or different from Earth's continents? Below the cube, you will see buttons to view volcanoes and earthquakes. Look at each one then think about where earthquakes and volcanoes tend to occur – on the inside of plates or on the edges? Why do you think that is?
5. Activity three describes how the plates in Earth's mantle move. Can you name all three ways? What happens as the plates slide over and under each other? As



one plate slides under the other, what happens to the land? What is a subduction zone? Look at the subduction zone from all angles to get a better understanding, and see if you can speed up the rate of subduction!

6. In activity four, you'll read about how volcanoes occur and will interact with a model of an erupting volcano. Where does the lava come from? How can lava get from inside Earth to the surface? Can you name all of the parts of a volcano?

Assessment

1. Video recording: Create a video where you model or describe Earth's layers, volcanoes, and earthquakes by giving a pretend news show.
2. Class Notebook: Answer the Essential Questions in your science notebook.

