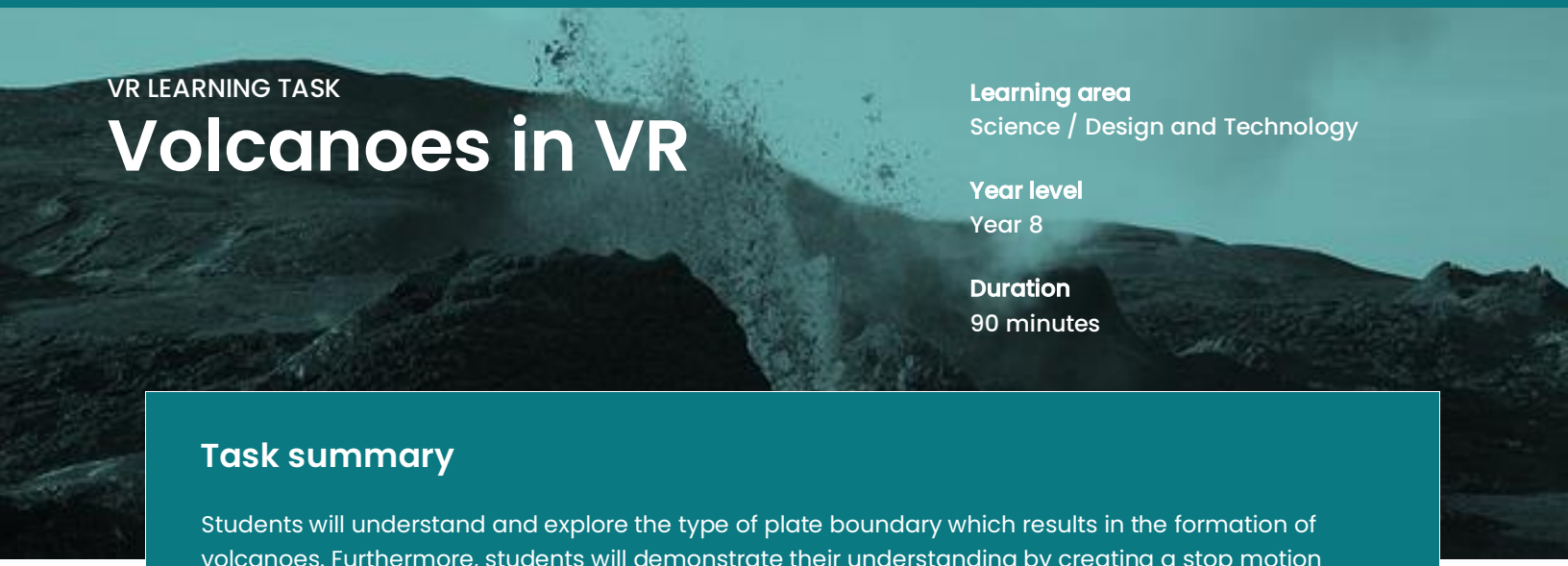

VR LEARNING TASK

# Volcanoes in VR

**Learning area**
Science / Design and Technology

**Year level**
Year 8

**Duration**
90 minutes

## Task summary

Students will understand and explore the type of plate boundary which results in the formation of volcanoes. Furthermore, students will demonstrate their understanding by creating a stop motion animation of converging plates. At the conclusion of the lesson, students will discuss how they could potentially develop an early warning system which could be used to reduce the associated casualties.

| | |
|---|---|
| **Session overview** | Students will identify how the Earth's surface changes due to extreme geological events, like volcanic eruptions, as a consequence of tectonic plate movements, based on their completion of the Volcanoes Experience Board and a short, simple animation. |
| **Digital technologies** | ✓ VR<br>☐ AR<br>☐ Robotics<br>☐ Drones<br>☐ Other _____ |
| **Required resources** | **Hardware:**<br>• Immersive Virtual Reality (IMVR) headsets<br>• Handheld Virtual Reality (HHVR) headsets<br>• Devices<br>• Smartboard / Interactive whiteboard<br>• Laptops or tablets<br><br>**IMVR app:**<br>• Google Earth VR - Students can explore different parts of the world in VR. For this task, teachers can get students to use the search function to view Budj Bim and Mount Gambier. They can also search for other volcanoes from anywhere in the world.<br><br>**VR videos:**<br>• Volcanos - An Immersive Experience (Extended Version) - 360°/3D(4:52) - A VR video that shows a simulated experience of viewing a volcanic eruption and explaining how extreme weather used to be viewed by humans in ancient times. |

- How Volcanoes Affect Earth's Climate Over Millions of Years 360° I NOVA I PBS(2:07) - Watch how volcanoes belch carbon dioxide and other gasses into the atmosphere, which has slowly changed Earth's climate for millions of years.

- Insta360 VR: Flying Over Iceland Volcano - A Virtual Reality Experience(1:39) - A VR experience viewing an erupting volcano.

- Lassen Volcanic National Park in 360° Virtual Reality(3:28) - This is a brief virtual VR tour of Lassen Volcanic National Park, which is home to several volcanoes. Its peaks tell the story of its eruptive past and hot water continues to shape the land.

- Volcano Eruption 360/VR Video - Minecraft Animation(4:55) - A Minecraft animation in VR showing a volcanic eruption.

- TO THE EARTH'S CORE 360° - VR Video (3:08) - A 360 experience taking viewers on a journey to the centre of the Earth.

- The 4 Tectonic Plate Boundaries and the Hazards they Create (5:35) - A video explaining the different type of plate boundaries.

**Apps:**

- Any modelling or animating software such as Minecraft EDU or stop motion apps like Stop Motion Studio.

**Teaching resources**:

- Teaching deck - download a copy for your own use.
- Student digital notebook - download a copy and distribute it to students via email or the learning management system.

**Miscellaneous:**

- Materials for stop motion animation e.g. paper, modelling clay, Lego, felt et

## Other resources to try (optional)

**Tutorials:**

- 01 First Steps - Stop Motion Studio Tutorial(2:08) - A short tutorial to introduce the basic steps of using Stop Motion Studio.

**Miscellaneous:**

- VR/AR Safety Poster

## Planning and preparation

*NOTE: This learning task may be introduced in the middle or at the end of the unit.*

**Assumptions**

For session 1, students should have:

- Prior lessons on geological changes and extreme weather events.
- Prior lessons on basic tectonic plate movements and types of plate boundaries.
- Briefing on the safe and proper use of HHVR and IMVR equipment.
- Basic training in using Google Earth VR.
- Basic knowledge and skills needed for the chosen volcanic modelling or animating approach (e.g., Minecraft EDU, Stop Motion Studio, etc).



Developed by Shai Coggins & Vicki Mennillo & Sara White

**Additional preparations for teachers**
Teachers should make sure that:

- all apps are installed and working properly.
- all devices and batteries are fully charged and in working order.
- suggested videos have been reviewed and deemed suitable for their respective students.
- all additional materials such as presentation decks are reviewed and ready for use.
- HHVR headsets and devices are distributed or allocated accordingly before the lesson starts, if possible, to save time.
- students may also be pre-assigned in groups to save time.
- students have the required log-ins/access if using Minecraft EDU and/or another creation app.
- if using a stop-motion animation, resources such as coloured paper, modelling clay etc. will be needed.

**Additional notes**

- If using IMVR resources, teachers should plan for creating learning stations depending on the number of IMVR headsets available at the site and the number of students in each class.

## Task Sequence

**1**

**Prior knowledge**
(5 - 10 mins)

Using slide 2 of the teaching deck, as a class, discuss what students remember about extreme geological events from a previous lesson:

- What types of extreme geological events do they remember? (e.g., earthquakes, volcanic eruptions, landslides, etc)
- Using the theory of plate tectonics, explain how a volcano can be formed? How do they know (provide evidence)?
- What types of plate boundary interaction results in a volcano? (Allow students to use their hands to demonstrate the movement if they don't know the name e.g. convergent boundary)
- Can they locate an active volcano?

**2**

**Provocation**
(5- 10 mins)

**Video:** Watch the video on slide 3 of the teaching deck as a class: Volcanos - An Immersive Experience (Extended Version) - 360°/3D (4:53)
Show an example of the student digital notebook and guide students on how to fill out the Y chart using text boxes.

- What did they SEE on the video?
- What did they THINK while watching the video?
- What did they FEEL while watching the video?

**Explicit Knowledge:** *This activity could be moved to HHVR station as an additional research task.*
(Check for understanding - pre assessment opportunity). Using slide 4 of the teaching deck, watch the video The 4 Tectonic Plate Boundaries and the


Developed by Shai Coggins & Vicki Mennillo & Sara White

| | |
|---|---|
| | Hazards they Create(5:35) and complete the table. Students may check their answers on slide 5. |
| **3**<br>**Activities**<br>(45–60 mins) | **Station introduction: (5 mins)**<br><br>1. Tell students that the class will be working in groups that will go through three learning stations. Explain the tasks that need to be completed in each station and say that the groups will have approximately 15 minutes in each station. Students can add their VR experience reaction to the Volcanoes Experience Board.<br><br>2. Set up and explain the following stations to students using slide 8 of the teaching deck, then begin rotations of about 15 minutes in groups.<br><br>**Station 1: IMVR** - Each group will have approximately 15 minutes on this station (4 to 5 minutes per student). Students should be aware that they would be working with partners, helping each other put headsets on, and ensuring each student would stay within the 'virtual fence'.<br>1. Mount Kilauea, Hawaii, USA: One of the most active volcanoes in the world, known for its frequent eruptions and lava flows.<br><br>2. Mount Vesuvius, Italy: Famous for its eruption in AD 79, which destroyed the Roman cities of Pompeii and Herculaneum.<br><br>3. Mount Fuji, Japan: An iconic symbol of Japan, Mount Fuji is a dormant volcano with a perfectly symmetrical cone.<br><br>4. Mount St. Helens, Washington, USA: Known for its catastrophic eruption in 1980, which dramatically changed the landscape of the area.<br><br>At each location, students will discuss with their partners the types of plate boundaries in each location. Students will aim to accurately describe the plate movement and provide evidence to support their claim.<br><br>**Challenge:** Find the ring of fire. How do you think it formed?<br><br>**Station 2: HHVR** - Students will view the provided VR videos and answer the reflection questions found on slide 6/7 slide the student digital notebook. Students may also go on Google Earth on their devices to view additional volcanoes in 3D.<br>*Optional: Add the explicit knowledge activity (slide 4 from the student notebook).*<br><br>**Station 3: Animation Creation** - Students will create a Stop Motion animation demonstrating a volcanic eruption as a result of moving tectonic plates. They may use felt, paper, clay, to depict the movement. |

This activity can be differentiated through a voice over. Provide support students with a word bank to use when describing plate movements. Allow extension students to show how convection currents move the plates.

NOTE: Students may need extra time to complete their animations. This may be assigned as a work-in-progress or as homework.

## 4

**Check for understanding**
(5- 10 mins)

To conclude this learning task, teachers can ask students to present their animations or email them for assessment.

To generate discussion and extend high potential students, discuss how an early warning system could be created or used to prevent casualties in a volcanic region.

Teachers can also facilitate a discussion about the VR experiences the students encountered.

| Differentiation for students with additional needs | Extension ideas | Video tips |
|---|---|---|
| Students who may experience motion sickness from Google Earth VR, can use the Google Earth web browser.<br><br>Students may be more comfortable viewing the VR animation in a browser window on their device.<br><br>Students can complete the provocation task using concrete materials, such as sticky notes with their ideas. | **Science:** Students analyse the composition from volcanic-rich soil samples and compare it to soil in non-volcanic areas. From this, students discuss the advantages and disadvantages of living close to volcanoes.<br><br>Students use the links provided to conduct their research:<br>• British Geological Survey - Living with Volcanoes<br>• Science ABC - Why is volcanic soil so fertile?<br>• World Atlas - Why is volcanic soil fertile?<br><br>**Design & Technology:** Students can design a greenhouse suitable for Volcanic regions. | The video for this learning task talks about how to use Google Earth to search for volcanoes in 3D mode. |



Developed by Shai Coggins & Vicki Mennillo & Sara White

## Curriculum Connections

### Australian Curriculum Version 9.0

**Year 8 - Science**
Investigate tectonic activity including the formation of geological features at divergent, convergent, and transform plate boundaries, and describe the scientific evidence for the theory of plate tectonics (AC9S8U03)

**Year 8 - Design and Technology**
**Generate, test, iterate, and communicate design ideas, processes, and solutions using technical terms and graphical representation techniques, including using digital tools (AC9TDE8P02)**

### Cross-curriculum priorities

- ☐ Aboriginal and Torres Strait Islander Histories and Cultures
- ☐ Asia and Australia's Engagement with Asia
- ☐ Sustainability

### General capabilities

- ☐ Literacy
- ☐ Numeracy
- ✓ Digital Literacy
- ✓ Critical and creative thinking
- ☐ Personal and social capability
- ☐ Ethical understanding
- ☐ Intercultural understanding


Developed by Shai Coggins & Vicki Mennillo & Sara White