Home Learning TV – Lesson Plan

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| **Segment lesson planning details** |  |
| Title for segment: | Puia - volcanoes |
| Year levels *(e.g. Yrs1 – 3)*: | 4-6 |
| NZC learning areas/ KCs:  | Planet Earth and Beyond; Science capability - interpreting representationsKCs - thinking; using language, symbols and text |
| Purpose of lesson:(What learners will learn based on the above) | Maps can provide a wide variety of information; map keys help us to interpret mapsScience is one way of explaining the natural worldVolcanoes have been part of New Zealand’s landscape for a long timeModels help us understand things we cannot see because of their size or the time it takes for them to happen |
| Success Criteria – students will be able to:(how they will know when they have learnt it) | Begin to interpret the keys of mapsDescribe a simple model that explains how volcanoes form [cracked boiled egg, puzzle pieces, fists pushing up against each other or pulling apart]Give a simple explanation for why New Zealand has volcanic eruptions and earthquakes |
| **Segment content/context details *(describe)*** |
| Māori content/context: | Connecting with origin stories and whakatauki/knowledge systems | Pasifika content/context: | Connecting with origin stories/knowledge systems |
| Learning Support content/context: | Use of analogies to illustrate science conceptsUse of animation to illustrate/explain links between concepts | Other (specify): |  |
| **Segment production details** |
| Teacher talking time: | Around 25 minutes, including videos. | Studio requirements: | White board and pens; screen for images and videos |
| Equipment requirements: | None |
| **Segment links and attachments *(list all links to recordings or attachments, the source and confirm that copyright permissions are granted)*** |
| Links to recordings /resources |  |
| Attachments  |  |
| **Segment plan content** |
| Stage | Teaching strategies linked to purpose  | Learning tasks and activities | High level script (key points/questions for presenter)  |
| **Beginning of lesson:**Activating prior learning and relationships | Establishing/re-establishing relationships  |  | Kia ora koutou, ngā mihi nui ki runga o te kaupapa o te rā.[Presenter shares an anecdote to connect with students. Space for feedback if any has come in via text/email.] |
|  | Making connections between episodes, noting the links between different disciplines/areas of science. |  | In these pūtaiao sessions, we will always be doing some writing or drawing, so make sure you’ve got your science journal or some paper and a pencil. If you’re watching this with someone, you can talk about things, too.For those of you who’ve been watching our previous episodes, you will remember that we talked about forces. Did you end up making a paper airplane? How well did it fly? If you’ve ever flown on an airplane, maybe on holiday or to move to Aotearoa to live, I bet you are glad that the plane you were riding in flew better than the paper airplane you built! |
| **Main part of lesson (a)**  | Using observation and inference to access prior knowledge about volcanoes.Maps are a way to represent information.Science is a way of understanding the world. As more information comes to light, our knowledge systems change to accommodate new information.  | Filename: MtEden\_2589\_Lloyd Homer\_GNS Science copy.jpg<https://www.sciencelearn.org.nz/images/715-mt-eden>Practising observing and making inferencesUsing a key to help understand the map.Filename: **VOL\_NZR\_ART\_01\_DeterminingAucklandVolcanicRisk\_AVF\_MAP\_GNS\_.jpg**<https://www.sciencelearn.org.nz/images/716-auckland-volcanic-field>Using images to connect with the context.Filename: R**angitoto\_colindamckie \_123rf\_120885994\_l.jpg**Making connections with explanations of the past.**Rūaumoko\_KiwaDigitalLtd.jpg**  | Today, we’re going to be talking about things that have A LOT of force. Here’s a little hint. Just like last time we met, we’ll start with an image that’s linked to our topic. Look carefully at today’s image - what observations can you make?[show image] A scientific observation is one that only includes what you can see, hear, feel, smell or taste with your own senses. What can you see? Pop a few words in your science journal. I’m going to talk about my observations while you write yours down or chat with someone else in the room. I can see* green grass and some trees
* lots of buildings, with some tall buildings in the background
* there’s a hill
* the hill has a hole in the centre
* and it looks like there are some rings around the hole.

Now I’m going to make some inferences - I’m going to think what this might be, based on my observations. What do you think this is? What did the person next to you think?I think this is a photo of Tāmaki Makaurau Auckland because I recognise some of the buildings in the background and the Auckland Harbour Bridge. Did you see the bridge, too?I know that there are some big maunga, or mountains, around the city. This one is called Maungawhau. It was used as a pa a long time ago. The rings you can see are terraces built by the Tāmaki people who lived there. Imagine doing all of that work by hand - there were no big digging machines back then!Another amazing fact about Maungawhau is that it’s actually a volcano. Yep, the city of Tāmaki Makaurau is built on a volcanic field. There are 49 volcanoes in and around Auckland! Relax, these volcanoes are considered extinct, meaning they’re not active - they’re sound asleep, and probably won’t wake up again.[Perhaps an anecdote about living in a city with sleeping volcanoes.]I’m going to write the word volcano - puia on the whiteboard - why don’t you do the same in your science journal. [Presenter spells v-o-l-c-a-n-o - p-u-i-a as he writes it.] Draw a quick sketch of a volcano and draw it sleeping, because that’s what most of our puia do in Aotearoa.It wasn’t always like this, though. Over a 250,00 year period, Tāmaki Makaurau had lots of active volcanoes, rumbling and erupting and shaping the land.Let’s look at this map. If you live in Auckland, you might recognise the outlines on the map. [show image] This map is different to maps I usually look at, so I will use the key in the lower right hand corner. Each of the dots represents a volcano. The mawhero-pink colour shows where ash was deposited. Ash is often blown out of a volcano. Think about a fireplace if you have one, or what’s left behind after a campfire. That grey stuff is called ash. I bet you know what ash looks like.The whero-red colour shows where lava or scoria, a type of volcanic rock, were deposited.Can you find Maungawhau/Mt Eden? [Point to it on the map.]What kind of deposits are around this old volcanic site? It’s all whero.[Show image of Mt Eden again.]Let’s look back at the photo. Maungawhau is actually a huge mound of scoria. The dip in the middle is the crater that was created during the last eruption about 15,000 years ago. No people were living in Aotearoa at that time. Fast forward a few thousand years and Māori were living in Tāmaki Makaurau when Rangitoto erupted. It was about 600 years ago and it formed an island in the Hauraki Gulf. That must have been terrifying!It’s always good to have an explanation of why things - like Rangitoto erupting - happen. In Māori mythology, Rūaumoko is Atua of volcanic eruptions and earthquakes. Rūaumoko is the youngest son of Ranginui and Papatūānuku. After Rangi and Papa were separated, Rangi cried so much that his tears caused floods. To stop Rangi’s tears, their sons turned Papa face down so Papa and Rangi could no longer look at each other. Rūaumoko was a little fellow, still in his mum’s arms, so when she was turned over, Rūaumoko went to the world below. Tama-kaka gave him ahi - fire - to keep him warm. It’s Rūaumoko’s movements under the ground that cause earthquakes and volcanic eruptions.Hawaiians have Pele, the goddess of fire and volcanoes - who is unpredictable and can get angry at times. The legends make sense, don’t they? They explain the movement of the Earth caused by earthquakes and volcanoes and the heat that comes from volcanic eruptions. Māori and Pacific peoples carefully observe the world around them and use stories and whakatauki to explain why some things happen the way they do. This knowledge is still passed down through generations. Do your families have stories about why things are the way they are? |
| **Main part of lesson (b)** | Scientists ask questions and carry out investigationsScientists often use models to explain concepts or ideasVolcanoes have different features | Filename**: Ruapehu-Erupts-GEONET\_Jun-96-lge.jpg**https://lh4.googleusercontent.com/t366k2k9AdcmPJb68a34s6c75XCzRJ1zOu1QR6Flz8FUwmopjrYTsW-szEjDAzbmXUH_26BVGomHN2SmacNejec5Gb-qfT5-0UPEFAL78SzhHRb6n2e32BXJY4isVg<https://www.sciencelearn.org.nz/images/1035-mt-ruapehu>Linking with an everyday experience to understand a simple model about cracks in the Earth’s crust. Filename: **CrackedEgg\_Bohdan Lytvynenko\_123RF\_97456275.jpg**Filename: **SV0887a Tectonic plates, volcanoes and earthquakes RECUT.mov** VIMEO:<https://vimeo.com/410021929>Focus questions for viewing the videoPuzzle pieces are a simple way to model the concept of tectonic plates.Filename: **Tectonic-plate-boundariesUoW\_SLH.jpg**Interpreting symbols on a map or diagram; physical activity to enact a simple model to visualise tectonic movementAdditional practice at interpreting a mapFilename: **TheConversation\_ART\_Expedition reveals the violent birth the continent Zealandia\_RingOfFire copy.jpg**Animation to help explain concepts. Filename: **SVx plateflames.mov** VIMEO LINK:<https://vimeo.com/410021953> NOTE - no soundNew burning ring of fire animationMaking cultural connections.Images to connect with the different types of puia in AotearoaFilename: **MtTaranaki\_pstedrak \_123RFltd129706515.jpg**Filename: **MtCargillwinter.jpg**Filename: **Taupo-28761-lge\_GEONET.jpg**Filename: **VOL\_SCI\_ART\_01\_TypesOfVolcanoes\_Lake\_Rotorua.jpg**https://lh3.googleusercontent.com/oNLNQqGhe62o3sQVSxTRrubMmep8u2LqEPXOFVCw9uVY9vlaw0ZdMiTbyDCLcyFc63eem_ANBLhkxDH2b8ZvYUaWG_uNBmlloDJSDHvD6yjy0DrA6YLvi6ymbfaLlAFilename: **SVx Caldera Formation.mov** VIMEO:<https://vimeo.com/410056637> | People who are scientists are careful observers, too, and they’re interested in understanding how and why things happen. Scientists make observations - like we did earlier - and do investigations to help us all understand natural events like volcanic eruptions. So what is a volcano? We usually think of volcanoes as upside down ice cream cones with smoke coming from the top – and it’s true for some volcanoes like Mt Ruapehu. This is a photo of it erupting in 2007. You can see the plume of ash and steam.[show image] Scientists have a broader definition of a volcano. They say a volcano is an opening in the Earth’s crust where lava, ash, steam or gases come out. The Earth’s crust is the layer that covers the Earth - the ground we walk on. It’s actually pretty deep - between 5-50 km deep - that’s a long way down. I’d like you to draw an egg - an oval shape.You know how a hardboiled egg has a shell around it? When you tap the egg with a spoon, it cracks the shell. If you look at this image, you’ll see pieces of egg shell with cracks between them. [Show image]Draw some cracks on your eggshell.This is kind of what happens with the Earth’s crust. There are really, really huge pieces of the Earth’s crust - scientists call these pieces tectonic plates - papaneke. [show text - tectonic plate - papaneke] The plates have cracks between them and it’s along those cracks - those openings - where volcanoes happen. Let’s watch this video - it explains the link between tectonic plates, volcanoes and earthquakes really well. As you watch, listen for what the narrator says about puzzle pieces.[show video]What did you see in the video? When the map of the Earth was split up into puzzle pieces, did you see the burning embers underneath? That made me think of Rūaumoko and the story of the heat beneath the Earth! Let’s take a closer look at the map that shows the tectonic plates and their edges or boundaries. This is a map of the entire world. [Point out a few places on the map - Australia, Canada etc.]Can you find Aotearoa? It’s kind of tricky, isn’t it? It’s actually hiding behind these two arrows pointing towards each other. Aotearoa was created by the Australian plate and the Pacific plate pushing against each other. Why don’t you draw two arrows pointing toward each other? They represent what is happening deep under our feet, here in New Zealand.Perhaps you can stand up and help me demonstrate the way tectonic plates can move.When you see places on the map where the arrows point towards each other, the tectonic plates are bumping and pushing into each other. Put your fists together to demonstrate the tectonic plates pushing each other.[Point to another place on the map, such as Japan or South America where the plates are colliding and do another demonstration.]There are places on the map where the arrows are moving beside each other, like on the coast of North America. [demonstrate the movement] These plates are trying to move past each other. They can get caught up and when the pressure builds - boom - an earthquake.The third type of movement is when the plates slide apart from each other. [Demonstrate by slowly pulling fists apart.] We see this happening in the oceans.Let’s look at another world map. Can you find Aotearoa? It’s in this light green patch here. Now watch as I trace my finger along all of these red dots. This is called the Ring of Fire. It’s a sort of circle around the Pacific Ocean, where most of the world’s volcanoes and earthquakes happen. Let’s put the information from the two maps together. [show animation] Can you see how the Ring of Fire is right around the edge of the Pacific plate? That’s what causes all of the earthquakes and volcanoes.Now you see why we have so many stories about gods and goddesses shaking the ground and causing eruptions! Let’s take a look at the kinds of puia we have in Aotearoa.These are the names that volcanologists, scientists who study volcanoes, have given them.[Show words on the screen]* cone volcanoes - puia keoko
* shield volcanoes - puia pākai
* caldera volcanoes - tāwha

Let’s look at examples of these types of volcanoes in Aotearoa. You might even live close to one, or have visited one when visiting whānau or going on holiday.Mt Taranaki is a cone volcano. Its shape is almost perfect. Scientists say it is one of the best examples of a cone volcano in the whole world! It’s been close to 200 years since Taranaki erupted.Down towards the bottom of Te Wai Pounamu - the South Island - is a shield volcano called Kapukataumahaka or Mt Cargill. If you are watching me in Dunedin, is it as cold as it looks in this photo? Brrr. The third type of volcano is called a caldera and it doesn’t even look like a volcano! Lake Taupō is a caldera. It erupted about 2,000 years ago. The eruption was the most violent the world has experienced in the past 5,000 years.A caldera eruption is sometimes called a super volcano because magma, ash and rock gets thrown over a huge area. After the eruption, the land collapses. That’s how Lake Taupō was formed.There’s another caldera not far from Taupō - Lake Rotorua. Like Taupō, the explosion blew heaps of stuff around the place and left a big hole in the ground. Let’s watch this video to see how volcanologists think things happened. |
| **End of lesson:**Learner and parent reflection on learning and engagement and what they can do next | Summary of the lessonScientists use models to demonstrate things we cannot easily experience | Students are invited to create a model of a caldera eruption.Explain how they activity components represent the actual phenomenaSandpit calderaFilename: **Making a Caldera.mp4**VIMEO:<https://vimeo.com/410021894> | Wow. I’m glad that Rotorua blew up nearly a quarter of a million years ago. [Personal anecdote, perhaps, about visiting Rotorua and looking at the boiling mud pools and steam vents.]I’m also glad that most of Aotearoa’s volcanoes are extinct or asleep. We know that some are still active - like Mt Ruapehu and Whakaari/White Island.Today we learned that volcanoes often form where tectonic plates are pushing against each other. Those two arrows we drew earlier can remind us why we sometimes have eruptions and shaky ground here in Aotearoa.If you came to Aotearoa from a different country, did you have eruptions or earthquakes there?Would you like to make a model of a volcanic eruption? Scientists use models when we can’t see the real thing because it’s too dangerous or it just doesn’t happen very often. That’s a good thing, because I wouldn’t want a caldera erupting in my backyard! Later you might be able to make your own magma chamber like the one that was once below Rotorua. To do this, you’ll need a small balloon, some sand or soil and a bamboo skewer. Bury the blown-up balloon underground - it represents the magma chamber we saw in the video. Pop it with the skewer. The air from the balloon represents the magma and hot gases that come rushing out of the magma chamber. What do you think gets left behind? Let’s watch this video to see what happens.[Add a personal comment about the video.]The best bit about this activity is that you can do it again and again. You can experiment to see if a bigger balloon makes a bigger caldera - like Lake Taupō.And next time you have a hardboiled egg, think about tectonic plates when you crack the shell. Maybe you can be like Rūaumoko or Pele and shake things up a bit!Until next time, ka kite ano. |