Active Planet

Change and natural forces

Fieldwork Education
Improving Learning

fieldworkeducation.com/curriculums/primary-years/ipc

Contents

Basic Information

This section details the time allocation for this unit of work, links to other subjects and Assessment for Learning opportunities.

Timings

This unit of work is intended to last about 11 weeks.

The following suggested timings are approximate guides and are dependent on each school's individual context.

	No of Hours	No of Weeks
Entry Point, Knowledge Harvest, Explain the Theme	8	1
Geography	16	2
Technology	8	1
Science	18	2 ¼
Music	8	1
History	6	¾
Art	4	½
Physical Education	4	½
Society	6	¾
International	4	½
Exit Point	6	¾

Links to other IPC subjects

ICT & Computing

This unit has been specifically updated to cover the learning goals for ICT & Computing. Although ICT & Computing does not appear as a discrete subject in the unit, relevant ICT & Computing learning goal coverage has been added to the route planner.

Geography

Links to geography are provided at the end of tasks where appropriate.

Language Arts links

Suggestions of how to include links to Language Arts are provided where appropriate at the end of tasks.

Learning Goals

Art Learning Goals

Children will:

- **2.03 Be able to use art as a means of self expression**
- **2.04 Be able to choose materials and techniques which are appropriate for their task**
- **2.05 Be able to explain their own work in terms of what they have done and why**
- **2.06 Be able to talk about works of art, giving reasons for their opinions**

Geography Learning Goals

Children will:

2.01 Know how particular localities have been affected by human activities

2.02 Know how particular localities have been affected by natural features and processes

- **2.05 Be able to use geographical terms**
- **2.07 Be able to make simple maps and plans of familiar locations**
- **2.08 Be able to use maps at a variety of scales to locate the position and geographical features of particular localities**
- **2.09 Be able to use secondary sources to obtain geographical information**
- **2.11 Be able to communicate their geographical knowledge and understanding to ask and answer questions about geographical and environmental features**

2.12 Understand how places fit into a wider geographical context

2.13 Understand that the quality of the environment can be sustained and improved

History Learning Goals

Children will:

2.01 Know about the main events, dates and characteristics of the past societies they have studied

2.02 Know about the lives of people in those periods

2.04 Be able to give some reasons for particular events and changes

2.05 Be able to gather information from simple sources

International Learning Goals

Children will:

2.01 Know about some of the similarities and differences between the different home countries and between them and the host country

2.02 Know about ways in which these similarities and differences affect the lives of people

Music Learning Goals

Children will:

2.01 Know how a number of musicians - including some from their home country and the host country - organise sounds and use them expressively

2.02 Know how a number of musicians - including some from their home country and the host country - choose sounds and instruments which are appropriate for their task

2.03 Be able to recognise and explore the ways that sounds can be organised and used expressively

2.04 Be able to sing in tune and with expression

2.05 Be able to perform simple pieces rhythmically using a limited range of notes

2.07 Be able to compose simple pieces to create intended effects

2.08 Be able to choose sounds and instruments which are appropriate for their task

2.09 Be able to improve their own work, having regard to the intended effect

2.10 Be able to explain their own work in terms of what they have done and why

2.11 Be able to talk about pieces of music, giving reasons for their opinions

2.13 Understand how musical elements are combined and varied to create different effects

Physical Education Learning Goals

Children will:

- **2.03 Be able to choose appropriate skills and movements to suit a task**
- **2.04 Be able to plan actions and movements**
- **2.05 Be able to take part in a range of individual, pair, small group and team activities**
- **2.06 Be able to perform a range of activities with control and coordination**

Science Learning Goals

Children will:

- **2.01a Be able to carry out simple investigations**
- **2.01b Be able to prepare a simple investigation which is fair, with one changing factor**
- **2.01c Be able to predict the outcome of investigations**
- **2.01d Be able to use simple scientific equipment**
- **2.01e Be able to test ideas using evidence from observation and measurement**
- **2.01f Be able to link evidence to broader scientific knowledge and understanding**
- **2.01g Be able to use evidence to draw conclusions**

2.02 Be able to gather information from simple texts

2.04 Understand some of the effects of what they learn on people's lives

2.27 Know that temperature is a measure of heat

2.28 Know that some changes in materials are reversible and others are irreversible

2.29 Know about the changes that occur when materials are mixed

2.31 Be able to compare common materials and objects according to their properties

2.32 Be able to distinguish between solids, liquids and gases

Society Learning Goals

Children will:

2.05 Know that people in different countries have different traditions, celebrations and ways of living

2.08 Understand that people's health and safety can be affected by a variety of factors including food, climate, rules, and the availability of resources

Technology Learning Goals

Children will:

- **2.02 Be able to design and make products to meet specific needs**
- **2.03 Be able to make usable plans**

  2.04 Be able to make and use labelled sketches as designs
- **2.05 Be able to use simple tools and equipment with some accuracy**
- **2.06 Be able to identify and implement improvements to their designs and products**
- **2.07 Be able to identify the ways in which products in everyday use meet specific needs**
- **2.08 Be able to suggest improvements to products in everyday use**

ICT & Computing Opportunities

The table below shows you where you can cover the following ICT & Computing Learning Goals.

Task	Goals
Art Extension Task	2.4, 2.5
Art Task 1	2.1, 2.2, 2.5
Geography Task 1	2.2, 2.4
Geography Task 2	2.1, 2,2, 2.4, 2.5, 2.8
Geography Task 4	2.4
Geography Task 6	2.4, 2.5
History Extension Task	2.4
History Task 1	2.4
International Extension Task	2.4
International Task 1	2.2, 2.4, 2.5
Science Task 2	2.2, 2.4
Society Task 1	2.4
Technology Extension Task	2.4, 2.8
Technology Task 1	2.1, 2.4
Technology Task 3	2.1, 2.2, 2.4, 2.8

Assessment for Learning

Are your children busy, or are they busy learning? This is the question that we need to be able to answer throughout each IPC unit – what improvements are being made to children's learning as a result of studying this theme?

There are ***three areas of learning*** to reflect on, and ***three types of learning*** to assess.

The Three Areas of Learning: Academic, Personal and International

The three *areas* include **academic, personal and international learning**. To reflect on these, you will need access to the IPC Learning Goals for each subject (including International) and the IPC Personal Goals – a list of these can be found in Appendix A of the IPC Implementation File. You can also find a full list of IPC Learning Goals in the Assess section of the Members' Lounge.

The Three Types of Learning: Knowledge, Skills and Understanding

The three *types* of learning include **knowledge, skills and understanding.** We believe that differentiating between knowledge, skills and understanding is crucial to the development of children's learning. We also believe that knowledge, skills and understanding have their own distinct characteristics that impact on how each is planned for, learned, taught, assessed and reported on. The implications of these differences are therefore far-reaching and deserve proper consideration.

Knowledge refers to factual information. Knowledge is relatively straightforward to teach and assess (through quizzes, tests, multiple choice, etc.), even if it is not always that easy to recall. You can ask your children to research the knowledge they have to learn but you could also tell them the knowledge they need to know. Knowledge is continually changing and expanding – this is a challenge for schools that have to choose what knowledge children should know and learn in a restricted period of time.

The IPC does not provide examples of knowledge assessment (tests or exams) as the knowledge content of the curriculum can be adapted to any national curricula requirements.

Skills refer to things children are able to do. Skills have to be learned practically and need time to be practiced. The good news about skills is the more your practice, the better you get at them! Skills are also transferable and tend to be more stable than knowledge – this is true for almost all school subjects.

The IPC supports skills tracking and assessment through the IPC Assessment for Learning Programme. This programme includes Teachers' Rubrics, Children's Rubrics and Learning Advice.

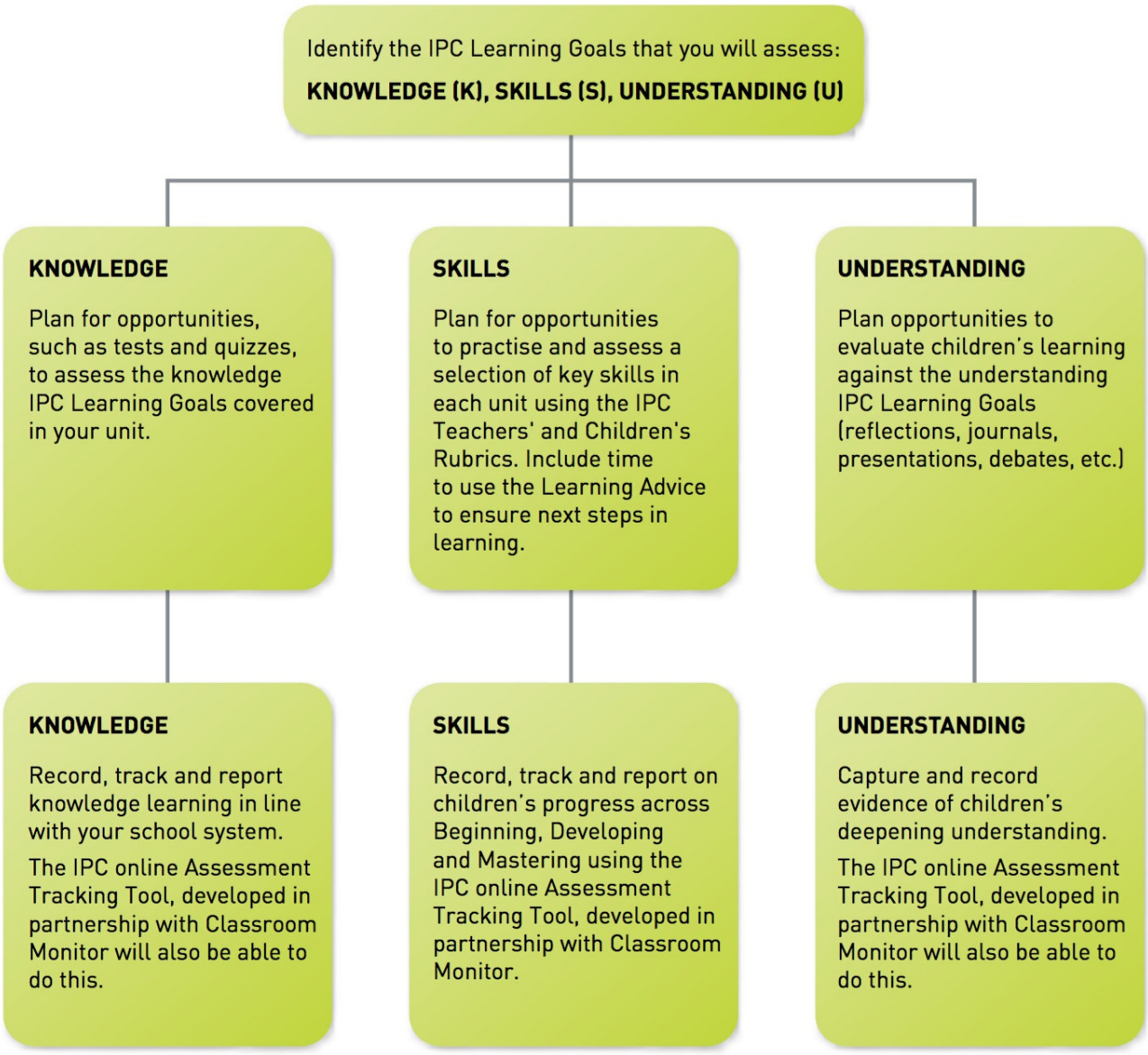
Understanding refers to the development or 'grasping' of conceptual ideas, the 'lightbulb' moment that we all strive for. Understanding is always developing.

The IPC units can't assess understanding for you, but they do allow you to provide a whole range of different experiences through which children's understandings can deepen.

*(**Please note:** as well as the IPC Assessment for Learning Programme, we also offer an online Assessment Tracking Tool, developed in partnership with Classroom Monitor. Please email members@fieldworkeducation.com for more information on how to sign up to this tool.)*

Planning for Assessment

Once you have planned for the different IPC Learning Goals for each subject it is important to plan for assessment opportunities within each unit of work. Assessment needs to be balanced but rigorous to ensure that the children have learned what we planned for them to learn. The diagram below illustrates the processes you may want to use to ensure this happens.



Helping Children Reflect on Their Own Learning

In addition to teacher assessment, it is also vital to include children in reflecting on their learning and setting next steps for improvement. Ask the children to carry out self-assessments throughout each unit (using the Children's Rubrics to assess skills, and other methods chosen by the school for knowledge and understanding).

They could use the following headings to list/make notes on their newly acquired knowledge, skills and

understanding – 'new things I now **know',** 'new things that I can **do**' and 'new things I am beginning to **understand**'.

Ask the children to evaluate different aspects of their learning – what did they do well, what could improve next time and how, what did they find the most/least interesting? How did they prefer to learn – as an individual/in pairs/small groups/large groups/as a whole class? What was their preferred method of researching and recording - writing/talking/making, etc.? This evaluation aspect will also support the development of the IPC Personal Goals.

Further Information

For more information on assessment, and knowledge, skills and understanding, please refer to:

- The IPC Implementation File
- The Assessment for Learning Implementation File
- The IPC Self-Review Process

Or contact the Membership Support team at members@fieldworkeducation.com

The Entry Point

Explain to the children that their school, because it is securely built, is going to be a disaster relief centre for everyone in the local area to come to if there is an earthquake.

Ask the children to plan what they will do when everyone arrives. They should think about:

- What a relief centre does, e.g. offers emergency advice, basic first aid, shelter and food
- What supplies it needs, e.g. water, food and blankets
- How they will obtain supplies
- Which rooms will be used
- How many people the centre can accommodate
- How they will know who has arrived, e.g. they could keep a register
- What they will do with the younger children to help them pass the time
- How they will tell people what is happening
- Who the manager of the centre will be

Ask the children to write and perform announcements for the television, telling people what to do in the case of an emergency. These could be videoed by yourself or the children.

Safety note: as with all school activities, please ensure you carry out all necessary health and safety procedures and checks.

Knowledge Harvest

After the entry point, explain to the children that you are all going to find out what they know about the theme 'active planet'. Can they suggest reasons why this unit has this name?

Show the children pictures of the aftermath of earthquakes, erupting volcanoes, tsunamis, etc., and ask them to write down what they think is happening or has happened in each picture.

They could record their ideas as a word cloud, if you wish:

- **wordle.net/create**

Or use a mind-mapping tool such as Inspiration 9:

- **inspiration.com/global**

At this point, the information on the knowledge harvests will be incomplete because it is the intention that the children will add to the information as they progress through the unit.

Display the knowledge harvests prominently in the classroom where the children can easily access them. Update them regularly, adding new knowledge and information as the children learn more about earthquakes and volcanoes.

The Big Idea

The tectonic plates that form the Earth's crust are always moving. Even the smallest movement can cause huge earthquakes, volcanoes and tsunamis that devastate communities across wide areas. If we can understand what is happening underground we can learn to predict and protect ourselves in the future.

Reviewed 1.1 - 20/02/2019

Explaining The Theme

In Geography, we'll be finding out:

- About how the Earth is formed
- What a volcano island is and where they are in the world
- What causes an earthquake
- How earthquakes can be measured

In Technology, we'll be finding out:

- What makes buildings strong
- About protective clothing and equipment
- About how to put together a survival kit

In Science, we'll be finding out:

- About solids, liquids and gases in volcanoes
- What happens when a volcano erupts
- What happens when rock melts
- How volcanoes can give off poisonous gas

In Music, we'll be finding out:

- How to use instruments to make sound pictures
- How to compose our own piece of music

In History, we'll be finding out:

- About the devastation of Pompeii

In Art, we'll be finding out:

- About hot and cold colours

- About using different materials and techniques to represent a volcano

In Physical Education, we'll be finding out:

- How to use lots of different sequences of movement to show the story of volcanoes

In Society, we'll be finding out:

- About legends associated with volcanoes
- Why people continue to live in volcanic areas despite the dangers

In International, we'll be finding out:

- About international organisations that work after natural disasters
- About the knock-on effects of earthquakes and volcanic activity

Note: *this unit has been specifically updated to cover the learning goals for ICT & Computing. Although ICT & Computing does not appear as a discrete subject in the unit, relevant ICT & Computing learning goal coverage has been added to the route planner.*

The Big Picture

The Earth's layers

Our planet is covered with a layer of rock called the crust, on which soil (where plants and trees grow) has built up. The crust is made up of many separate pieces or plates, which are constantly moving. These plates move in different directions; some nearer together, others further apart.

Underneath the crust of the Earth there is a hot layer called the mantle. While at the centre of the Earth it is intensely hot, causing rocks to begin to melt and flow in currents. This very hot, semi-liquid rock (or magma) rises to the top of the mantle because hot rocks are lighter than cooler ones. This red-hot magma then forces its way out through faults in the Earth's crust and erupts in volcanoes. This volcanic activity has been happening on Earth for billions of years, and the huge quantities of cooled rock have formed the landscape as we know it today.

Active volcanoes

"About 1,900 volcanoes on Earth are considered active, meaning they show some level of activity and are likely to explode again." (**environment.nationalgeographic.co.uk, 2011**)

Volcanoes are studied by volcanologists, who look for advance warning that an eruption is about to happen.

There are only two places where volcanoes can be found:

- On the edges of theEarth's plates
- Over a hot spot beneath the Earth's crust (e.g. Kiiauea and Mount Loa in Hawaii)

Some notable volcanoes from history:

Vesuvius

Hot volcanic ash and rocks erupting from Mount Vesuvius buried the towns of Pompeii and Herculaneum in Italy in AD 79. Vesuvius has erupted several times since and scientists believe it to be one of the most dangerous volcanoes in the world.

Mount Fuji

Mount Fuji in Japan has been active for thousands of years. It last erupted in 1707 and is now considered dormant though it is one of the most closely monitored volcanoes in the world. Some scientists think an eruption in the future is likely.

Krakatoa

36,000 people died and the island almost completely disappeared when Krakatoa erupted in Indonesia in 1883. Pyroclastic flows of hot ash, rocks and pumice and the gigantic tsunamis that followed devastated the region. Global temperatures fell as a result.

Rocks

- **Igneous rocks** such as granite are among the oldest rocks on Earth. They were 'formed from fire', hence the name 'igneous'; and were the first rocks to cool down before there was any life on our planet. As they cooled down, crystals formed. Look closely for three crystals in granite: quartz which looks like glass, feldspar which is pink in colour and mica which is black.
- **Sedimentary rocks** are formed in one of two ways: by weathering, which is the wearing down of rocks by wind, water and ice; or by compression of the dead remains of plants and animals. These sediments pile up and press down one on top of the other, and over millions of years harden to make layers of rock. Sand becomes sandstone; shells and sea creatures turn into limestone or chalk; plant remains form coal, and mud turns into shale.
- **Metamorphic rocks** begin as one type of rock and are later changed ('morphed') into another kind by intense heat and pressure. Many metamorphic rocks are formed deep beneath the Earth's surface and are the result of the movement of tectonic plates or the heating up of nearby rocks by molten magma from inside the Earth's core. The new rocks can look totally different; their structure and often their colour can change. For example, limestone becomes marble, shale becomes slate and sandstone becomes quartzite.

How is soil made?

Soil is rocks broken up and worn down by the wind, rain, rivers, sea, frost, and glaciers. It takes hundreds, if not thousands of years to wear away even small amounts of rock. The first plants on Earth were able to grow on bare rock – they were probably lichens. When the lichens died their remains were mixed with the surface of the rock to make just a little soil, enough for some mosses and ferns to grow. When these died they left a richer soil, enabling more plants to grew, which in turn attracted small animals to make their homes among the plants. When these animals died their remains made the soil even better.

Tectonic plates

Where the Earth's plates meet is called a fault line. The most famous of these is the San Andreas fault, which is the boundary between the Eastern Pacific and the North American plates. The city of San Francisco is built on this fault line. As the Earth's plates try to slide past each other the rough movement causes the ground to shake violently. Although many thousands of earthquakes occur each year, only a small number cause serious damage. The shaking might last only a few seconds but the destruction that follows in urban areas can be devastating. If one plate slides under another the displacement of water can cause huge tsunamis.

The Richter Scale

The strength of the waves or tremors of an earthquake are measured on a 1-10 scale called the Richter Scale, though other measures, e.g. the Mercalli Scale, can be used.

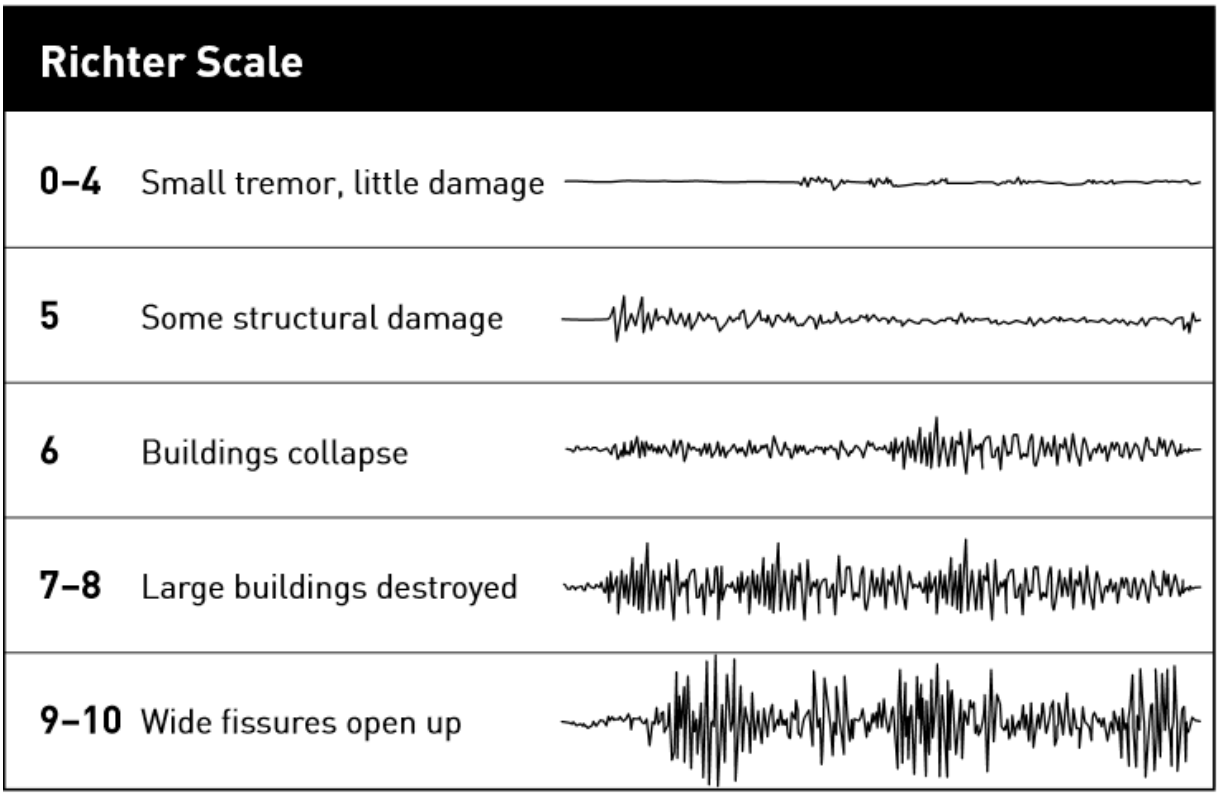
A significant amount of scientific activity is focused on trying to predict earthquakes and volcanoes to give warnings to people who live in high-risk areas.

Engineers are always experimenting with ways of designing earthquake-proof buildings, but these are expensive and beyond the financial reach of most disaster-prone areas.

International rescue and medical teams have been set up to move quickly to disaster areas. Rescue teams often use special sniffer-dogs to pick up the scent of people buried under collapsed buildings. Earthquake

rescue work is very dangerous because aftershocks affect areas for days after the main earthquake, causing even more buildings to collapse.

This is an example of different levels of earthquakes numbered on the Richter Scale and how they may look on a seismograph:



Some recent devastating earthquakes and tsunamis:

- **Indian Ocean 2004** – an earthquake in the Indian Ocean of 9 on the Richter scale, caused a massive tsunami that killed over 200,000 people in 14 countries.
- **Pakistan 2005** – an earthquake of 7.6 on the Richter scale killed 75,000 people; its aftershocks were felt in neighbouring countries.
- **Eastern Sichuan, China 2008** – almost 5 million people were left homeless and over 69,000 people died in an earthquake that measured 7.9 on the Richter scale.
- **Haiti 2010** – a devastating earthquake, measuring 7.3 on the Richter scale, displaced 1.3 million people and more than 200,000 people were killed.
- **Japan 2011** – a destructive earthquake measuring 8.9/9.0 on the Richter scale, struck Japan. The result of which caused devastating damage with blackouts, floods and landslides. The earthquake also triggered a tsunami (with waves up to 10 meters) along Japan's Pacific coast. Over 15,000 people were confirmed dead, 6023 injured and 3382 people missing as a result of the disaster.
- **Nepal 2015** – in April a 7.8 magnitude earthquake rocked Nepal, centred on its capital city, Kathmandu. The quake was caused by the country's main fault line, which runs for over 1000km from east to west. As a result of the initial quake and its many powerful aftershocks, hundreds of buildings

were destroyed – including major damage to four UNESCO World Heritage sites in the Kathmandu valley. At the time of writing, the death toll was yet to be confirmed, but many thousands have died or been badly injured. International search and rescue efforts are active in the region, helping to look for survivors and provide aide for the many who have been made homeless by the tragic event. Charities such as the British Red Cross and UNICEF are also actively raising funds to help those affected by the disaster.

Interesting facts about volcanoes:

- The tallest volcano on Earth is Maura Kea in Hawaii, rising 30,000 feet from the ocean floor
- The largest volcano in our solar system is Olympus Mons on Mars – it is three times higher than Mount Everest (National Geographic, 2011)
- Indonesia has 130 volcanoes – it has more volcanoes than any other country in the world
- In 1963, a volcano erupted under the sea near to Iceland and formed a new island known as Surtsey (meaning 'fire giant')
- The temperature of molten lava can exceed 1,000oC (1,832°F) When Mount St Helens (Washington USA) erupted in 1980, the explosions blew the top off the mountain, reducing its height by 1,350 feet (400 m)
- The eruption of the Icelandic volcano, Eyjafjallajökull, in 2010 led to a huge ash cloud drifting across Europe. It halted flights in over 20 different countries and hundreds of thousands of passengers were affected by the event.

Geography Learning Goals

Children will:

2.01 Know how particular localities have been affected by human activities

2.02 Know how particular localities have been affected by natural features and processes

2.05 Be able to use geographical terms

2.07 Be able to make simple maps and plans of familiar locations

2.08 Be able to use maps at a variety of scales to locate the position and geographical features of particular localities

2.09 Be able to use secondary sources to obtain geographical information

2.11 Be able to communicate their geographical knowledge and understanding to ask and answer questions about geographical and environmental features

2.12 Understand how places fit into a wider geographical context

2.13 Understand that the quality of the environment can be sustained and improved

Geography Task 1

Learning Goals

- **2.05 Be able to use geographical terms**
- **2.08 Be able to use maps at a variety of scales to locate the position and geographical features of particular localities**
- **2.09 Be able to use secondary sources to obtain geographical information**

Research activity

The children should discuss as a class what they know about volcanoes. They should research using the internet and other sources to answer each of the following questions:

- What do volcanoes look like?
- Where can volcanoes be found?
- What are the different states of volcanoes called? (dormant, active, extinct, etc.)
- What happens when volcanoes erupt? (both what we can see and what happens under the surface)

The following websites and books provide a useful starting point:

- **geography4kids.com/files/earth_volcano.html** – Geography4Kids.com explains how volcanoes are formed.
- **https://www.cosmeo.com/braingames/virutal_volcano.../** – Cosmeo website has an interactive build-your-own virtual volcano that allows you to change magma viscosity and gas levels to create different types of volcano.
- **geology.sdsu.edu/how_volcanoes_work/Krakatau.html** – Geology SDSU website has information about how volcanoes work, with a case study of the Krakatau eruption of 1883.
- **https://www.youtube.com/watch?v=HRjLw1x8Q3o&t=407s** – YouTube has this video of the eruption of Mount Etna, Sicily, 2000

*(To watch a YouTube video in **safe mode**, scroll to the bottom of the page and click on the '**safety**' tab which brings up the '**Safety mode**' information. Under this section, select the '**on**' option, then click '**save**')*

- ***Volcanoes Around the World***, Geography Now series , by Jen Green, Wayland, 2008
- ***Volcanoes (Usborne Beginners)***, by Stephanie Turnbull, Usborne Publishing, 2007
- ***Volcanoes and Other Natural Disasters***, by Harriet Griffey, DK Publishing, 1998

Recording activity

The children could make drawings of volcanoes in their sketchbooks so that they can be used in the later Art tasks for ideas and review.

Ask the children to make a clay or Plasticine model showing a cross-section of a volcano. They should be able to explain to others in the class what each part of the volcano is called. They can work in pairs or individually for this task.

They should be able to describe the following:

- Crater
- Cone
- Ash cloud
- Lava
- Lateral vent
- Central vent
- Magma

The children should then mark where volcanoes can be found throughout the world on a large map. Display the map prominently on the wall.

ICT link: show the children how to use Google Earth (**earth.google.com**) to find volcanoes and earthquakes on a world map. Go into 'Layers' then 'Gallery' then check the boxes 'Earthquakes' and 'Volcanoes'. They can zoom in to view photographs of volcanoes and the latest information on their status.

Personal Goals

- Communication
- Enquiry
- Thoughtfulness

Geography Task 2

Learning Goals

2.01 Know how particular localities have been affected by human activities

2.02 Know how particular localities have been affected by natural features and processes

2.05 Be able to use geographical terms

2.08 Be able to use maps at a variety of scales to locate the position and geographical features of particular localities

2.09 Be able to use secondary sources to obtain geographical information

2.11 Be able to communicate their geographical knowledge and understanding to ask and answer questions about geographical and environmental features

Research activity

Working in pairs or small groups, ask the children to choose a volcano to research.

They could choose:

- A volcano from the home or host countries
- A famous volcano from history, e.g. Vesuvius in Pompeii
- A volcano that they think people should know more about

They should research this case study, looking at:

- The current status of the volcano (dormant, etc.)
- The location of the volcano and of any local cities or towns that might be affected by an eruption, etc.
- The history of the volcano (past eruptions, etc.)
- If they think any activity is likely in the near future

Recording activity

Ask each pair or small group to prepare a digital presentation of their researched volcano using a collaborative software tool of their choice, such as Prezi (**prezi.com**), Google Slides (**google.co.uk/slides/about**), Zoho (**zoho.com/docs/show.html**), Bunkr

(**bunkrapp.com**), Prezentit (**prezentit.com**) or Keynote (**apple.com/uk/mac/keynote**).

Unless you are using Google docs in school already, you will need to sign up for a free account and ask your children to sign up too. It is advisable to give them a password which you can remember, as children tend to forget them! Explain that they when they have finished, they will take it in turns to present their work to the rest of the class. During the presentations, they will evaluate each other's work using an online evaluation system. Explain that to create an interesting presentation, they will need to include a range of media, for example:

Media type	Example 1	Example 2	Example 3
Digital images	Edited, annotated screenshots from Google Earth	Photos or scanned images of work from their art sketchbooks or from models they have made	Curated images from referenced sources, edited to create meaningful addition to presentation
Digital audio	Podcast, radio show format	Q&A format using phone-in questions technique	Scripted and enacted interviews with 'specialist volcanologists'
Video	Scripted and enacted interviews with 'specialist volcanologists'	Curated video comprised of edited clips from a range referenced sources	Independently created animated GIFS of volcanic eruptions using software such as **www.abcya.com/animate_classic.htm**

Explain that throughout this task, the children will be learning how networks such as the internet and internet services can enable collaboration and communication. Using these types of web tools, they can even continue working together on their presentation at home!

Demonstrate how a collaborative software of your choice can be used synchronously by multi users. Most online collaborative software has a "Share" button in the top-right hand corner.

Collaborators are invited using their email addresses. They will receive a link to the presentation.

If you are using Prezi for the first time, there are some helpful tutorials here:

- **prezi.com/support/manual/collaboration-tutorial**

If your children have not used software collaboratively in this way before, it is a good idea to give them some time to 'play' and experiment with the collaborative feature.

Take this opportunity to teach the children why it is important to use technology safely,

respectfully and responsibly. As you are demonstrating your chosen software, deliberately 'vandalise' what your online co-worker is doing. Discuss the consequences of your actions. Also demonstrate how it is possible to see who is responsible for any edits that are made. Explain that it is important that we behave responsibly online, just as we need to in real life. Ask children what they would do if they encountered bad behavior on a collaborative website. Discuss strategies, for example, not responding to the cyber bully and telling an adult. Remind children that there are many collaborative services available online, such as social networking sites like Facebook. Although they are too young to be using these sites, it is still important to remind them never to share personal information such as full names, addresses or telephone numbers. Also issue a reminder that they should never share photos or webcams with anyone they meet online unless they know them and their parents are aware.

The websites listed at the end of this task provide a useful starting point for children to research information for their presentation. Children will need to be reminded to use their critical thinking skills when evaluating the validity and relevance of web-based information.

Remind them to check the website domain name – is it owned by an official or educational organization? How can they tell?

Some common domain names include:

- **bbc.co.uk** - the website is created and maintained by the British television and radio broadcasting association BBC
- **.edu** - the website is created and maintained by an educational institution
- **.gov** - the website is government controlled
- **.com** - the website is commercial and may be trying to sell something
- **.org** - the website has been developed by an organisation – what is their purpose?
- **.net** - the website is part of a network infrastructure, similar to .com

Encourage the children to also check:

- **The author** - who wrote the information? Are they reliable and experts in their field? Can you find out information about them?
- **The date** – is the website up-to-date? When was the information published?
- **The information** – is it useful? Is it what you are looking for? Remember to cite any sources you use in your own work.

Useful links for research on volcanoes include:

- **https://www.britishmuseum.org/whats_on/...** – the British Museum website has information on the devastating eruption of Vesuvius in Pompeii, Italy 79 AD.
- **https://www.youtube.com/channel/...** – VolcanoDiscovery is a Youtube channel which hosts a series of videos with real footage of erupting volcanoes from around the world.
- **kids.nationalgeographic.com/kids/games/puzzlesquizzes/quizyournoodle-volcanoes** – the National Geographic Kids website has a fun interactive quiz for children, testing

their knowledge on volcanoes.

- **https://www.volcanodiscovery.com/photos/volcanoes.html** – the Volcano Discovery website has a photo gallery of volcanoes including Kilaeua and Stromboli, plus images of ash clouds, lava flows, gas bubbles and boiling mud.

Children will need several lessons to research, create and complete their presentations. It is important to allow time to enable the children to share their finished presentations with each other and to receive feedback on their work. Peer assessment helps children to more clearly understand what makes an effective presentation. By using web tools to evaluate the presentations collaboratively, you can teach the children how the range of internet services has enabled their volcano presentation project to be so effective, enabling collaboration and communication. You could co-construct a simple rubric with the children to evaluate the presentations against, such as:

Element	Beginning	Developing	Mastering
Clarity	The presentation could be better organized and is not always easy to understand	Most of the presentation is easy to understand	All aspects of the presentation are very clear
Interest	The presentation has a few interesting featurest	The presentation is interesting although could be improved through the addition of more interesting facts	The presentation is very interesting and reflects careful and focused research

Element	Beginning	Developing	Mastering
Logic	There does not seem to be a particular order in the way the information is presented	Information is presented in a clear order	Information is presented logically with different media types being used to show data in the most appropriate format
Effectiveness	The presentation mainly consists of one or two media types	The presentation includes more than two types of media to maintain interest	The presentation includes a range of media which clarify the information

There are a range of free web tools which enable collaborative online evaluation. Simply convert your assessment rubric into an electronic survey using a free web tool such as Easy Polls (**easypolls.net**), Kwik Surveys (**kwiksurveys.com**), Free Online Surveys

(**freeonlinesurveys.com**) and Survey Monkey (**surveymonkey.com**).

Send the survey link to the children prior to the lesson, who should then use it to give feedback after each presentation. The survey should include the name of each presenter as the first question. Check to make sure you have enabled children to re-take the survey an unlimited amount of times so that they can submit their evaluations for all the presentations.

Personal Goals

- Communication
- Cooperation
- Enquiry
- Resilience
- Respect
- Thoughtfulness

Geography Task 3

Learning Goals

2.01 Know how particular localities have been affected by human activities

2.02 Know how particular localities have been affected by natural features and processes

2.05 Be able to use geographical terms

2.07 Be able to make simple maps and plans of familiar locations

2.08 Be able to use maps at a variety of scales to locate the position and geographical features of particular localities

2.09 Be able to use secondary sources to obtain geographical information

2.11 Be able to communicate their geographical knowledge and understanding to ask and answer questions about geographical and environmental features

2.12 Understand how places fit into a wider geographical context

Research activity

Ask the children if they have ever seen a real volcano or visited a volcanic region. Discuss where it was and what they did. Is there any volcanic scenery in the home or host country? Tell the children that volcanoes are important tourist attractions in many countries.

Divide the class into small groups. Give each group one volcanic region to research, for example:

- **Iceland** – research geysers, hot springs and geothermal-heated pools
- **Hawaii** – research the unique species of animals and plants found here
- **USA, Yellowstone Park** – research the Old Faithful Geyser
- **Italy** – research Italy's volcanoes Mount Etna, Stromboli, Vesuvius

The children should find out what attracts tourists to these particular volcanic areas. Ask them, what do the tourists like to do here? They should locate and label these areas on the world map from Geography Task 1.

Recording activity

Ask the children to imagine they are tour guides and to plan a day trip to the area they have researched.

In their groups, they should be able to:

- Make a list of the tourist activities available in the area, e.g. hiking, bathing, photography, etc.
- Advise on the suitability of the trip for the young and the old
- Describe the main geographical features of the region
- Draw an imaginary tourist map of the area based on their plan
- Role play one activity taken from their day as a tour guide

Personal Goals

- Adaptability
- Communication
- Enquiry
- Thoughtfulness

Geography Task 4

Learning Goals

- **2.05 Be able to use geographical terms**
- **2.08 Be able to use maps at a variety of scales to locate the position and geographical features of particular localities**
- **2.09 Be able to use secondary sources to obtain geographical information**

2.12 Understand how places fit into a wider geographical context

Research activity

The children should use atlases and reference books to research where the Earth's plates meet. Stick an enlarged world map onto thin card and cut along the lines of the tectonic plates. Using this model, discuss what happens when the plates move apart, against or underneath each other.

Now compare the locations of where earthquakes occur to where volcanoes are found. Can the children offer any explanations for what they discover?

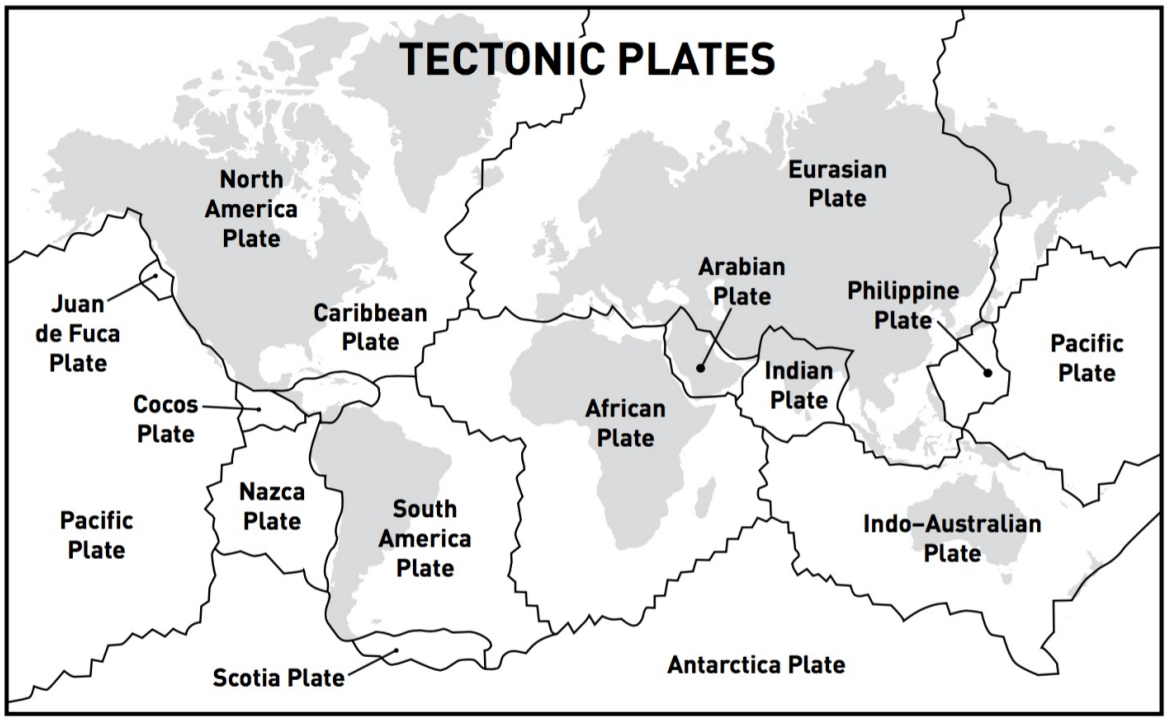
The following websites and books provide a useful starting point (**Note**: these sites do feature advertising.):

- **https://www.education.com/resources/earth-science.../** – Kids Geo website has a 'Geology for Kids' section with information, diagrams and maps on the geology that explains plate tectonics.
- **https://www.youtube.com/watch?v=e7ho6z32yyo -** Youtube hosts this video about what causes earthquakes, why they're so deadly, and what is being done to help buildings sustain their hits.
- ***Earthquake, Go Facts Natural Disasters series***, by Ian Rohr, A & C Black, 2006

Recording activity

The children can add this information to the world map from Task 1.

As a further activity, you could divide the class into groups, naming each group after one of the tectonic plates, including the following:



- Eurasian
- African
- Indian-Australian
- Antarctic
- Pacific
- North American
- South American
- Caribbean

Ask the children in each group to join hands to form the boundary of their 'plate' and stand next to the group (or 'plate') that they adjoin on the world map. Which of the groups make up the 'ring of fire'?

Ask each group to add the name of their tectonic plate to the mind map.

Personal Goals

- Enquiry
- Thoughtfulness

Geography Task 5

Learning Goals

2.12 Understand how places fit into a wider geographical context

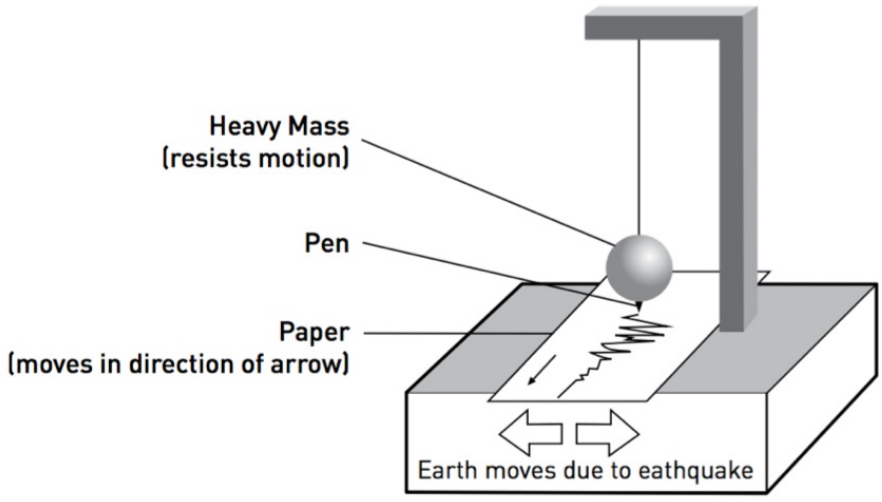
Research activity

Tell the children that the strength of earthquakes is measured by an instrument called a seismograph and it uses the Richter scale.

The children can make a simple seismograph. They will need:

- A cardboard box (without a lid)
- A felt-tip pen
- Sticky tape
- A pencil
- Modelling clay
- String
- A piece of card

The open part of the box will be the front of the instrument. Make a hole in the top of the box. Roll clay around the felt-tip pen to weight it. Tie one end of string around the top of the pen and thread the other end through the hole in the box and tie it around the middle of the pencil. Roll the string around the pencil so that the tip of the pen just touches the bottom of the box and tape the pencil onto the top of the box. Put the card in the bottom of the box so that the pen tip can just mark the card. Shake or tilt the box and the pen will mark the card, creating your own seismograph.



The children should now test their seismograph using different activities, e.g. in a car, on a train, walking smoothly, etc.

Recording activity

The children should take their findings from the tests of their seismographs and divide the different activities into their own 'Richter Scale'.

Personal Goals

- Communication
- Enquiry

Geography Task 6

Learning Goals

2.01 Know how particular localities have been affected by human activities

2.02 Know how particular localities have been affected by natural features and processes

2.05 Be able to use geographical terms

2.07 Be able to make simple maps and plans of familiar locations

2.08 Be able to use maps at a variety of scales to locate the position and geographical features of particular localities

2.09 Be able to use secondary sources to obtain geographical information

2.11 Be able to communicate their geographical knowledge and understanding to ask and answer questions about geographical and environmental features

2.12 Understand how places fit into a wider geographical context

Research activity

Tell the children that earthquakes release energy in the form of waves travelling through the ground. You could liken it to the ripples on a pond when a stone is thrown into it. The waves radiate outwards from the epicentre – the centre of the earthquake. The ground shakes and this causes landslides, collapsed buildings, destroyed roads and services (see the big picture).

Ask the children to build small houses using dominoes or building bricks and a piece of card for a roof, and place near the edge of a table. Many people in earthquake zones live in the simplest of houses, built not too differently from this one. Then ask them to hit the opposite edge of the table with their hand (not too hard!). Do the same on the edge by the house using the same amount of force.

The children should watch this very closely, and you might like to film the process and play it back in slow motion for the children to watch.

Recording activity

In the research activity above, the children will have visualised the edge of the table as the plate boundary and observed what happens to buildings located in earthquake zones.

Ask the children to compare the photographs and videos of their research activity and compare these with photographs taken from the sites of real earthquakes.

The following resources provide a useful starting point:

- **google.co.uk/images** – Google Images has hundreds of searchable photographs. Search 'Haiti earthquake', 'Japan earthquake 2011' or 'Nepal earthquake 2015'.
- **earthquake.usgs.gov/learn/kids/sciencefair.php** – USGS website has a page of Science Fair Project Ideas for teachers on the theme of earthquakes.
- **www2.scholastic.com/browse/article.jsp?id=3753355** – Scholastic News Online has news reports for children about earthquake disasters (type 'earthquake news' into the search engine)
- **bbc.co.uk/news/world-asia-32479909** – a BBC news report on the devastating Nepal earthquake, with maps and 'before and after' photographs.
- ***Natural Disasters, Eyewitness Guides series***, by Claire Watts, Dorling Kindersley, 2006
- ***Earthquakes & Tsunamis (Usborne Beginners)***, by Emily Bone, Usborne Publishing, 2012

(This activity is extended further in Technology Task 1.)

Language Arts link: the children should think of three words to best describe what happened in the research activity. Ask them to think of three verbs, three nouns and three adjectives, all describing what they saw. The children could then write a short poem or rap song about earthquakes using the words they have chosen. Invite the children to read out their poem or perform their song to the class.

Personal Goals

- Enquiry
- Thoughtfulness

Geography Extension Task

Learning Goals

2.11 Be able to communicate their geographical knowledge and understanding to ask and answer questions about geographical and environmental features

2.13 Understand that the quality of the environment can be sustained and improved

Extension activity

The children should research a country/area that suffers from earthquakes (such as California and Japan), and the ways that they have responded and adapted to living in earthquake zones.

Consider the use of 'earthquake proof' buildings. Prompt the children to research and answer the following questions:

- What are the buildings like?
- What happens to the buildings when there is an earthquake?
- What are the buildings made of?
- Have any of these buildings fallen down during an earthquake?

Many countries where earthquakes occur don't have 'earthquake-proof' buildings, e.g. Turkey. Why do the children think this is? (Cost, availability of materials, etc.) What do the children think should be done in these countries?

Divide the class into three groups and give one of the following scenarios describing what should be done to each group:

- Develop some earthquake-proof buildings that everyone should run to if there is an earthquake
- Build cheap buildings that will fall down in an earthquake but are cheap to replace
- Only build earthquake-proof buildings and if people can't afford to live there they should move somewhere else.

Each group should prepare a short presentation for their scenario, looking at the advantages and disadvantages.

Once all the groups have presented their ideas, the class as a whole should decide what the best idea is. You should encourage them to come up with their own ideas – the best solution doesn't have to be one of the scenarios.

Personal Goals

- Adaptability
- Communication
- Cooperation
- Enquiry
- Morality
- Respect
- Thoughtfulness

Technology Learning Goals

Children will:

- **2.02 Be able to design and make products to meet specific needs**
- **2.03 Be able to make usable plans**
- 2.04 Be able to make and use labelled sketches as designs
- **2.05 Be able to use simple tools and equipment with some accuracy**
- **2.06 Be able to identify and implement improvements to their designs and products**
- **2.07 Be able to identify the ways in which products in everyday use meet specific needs**
- **2.08 Be able to suggest improvements to products in everyday use**

Technology Task 1

Learning Goals

- **2.02 Be able to design and make products to meet specific needs**
- **2.03 Be able to make usable plans**
- 2.04 Be able to make and use labelled sketches as designs
- **2.05 Be able to use simple tools and equipment with some accuracy**
- **2.06 Be able to identify and implement improvements to their designs and products**

Research activity

Remind the children of Geography Task 6 (and the Geography Extension Task if completed). Set the children a challenge to find out what is the best shape for an earthquake-proof building. Start with a class discussion. List possible building shapes – tall, short, narrow, wide, pyramidal, square, rectangular, circular, dome-shaped, L-shaped, etc.

Consider the work of key architects and designers who have created earthquake-resistant structures in earthquake zones in Japan, New Zealand and California. The following websites provide useful background information:

- **science.howstuffworks.com/engineering/structural/earthquake-resistant-buildings.htm** – HowStuffWorks website has useful information for teachers about the design of earthquake-proof buildings.
- **imaginationstationtoledo.org/content/2011/03/can-you-build-an-earthquake-proof-building** – Imagination Station has videos of building structures being tested on real-life shake tables.

Together with the class, agree on your design criteria, for example, an earthquake-proof building needs to be:

- Flexible or bendy at its base so that it moves when the ground moves
- Symmetrical so that the forces acting on the building are equal, e.g. L and T shapes twist and distort so are not suitable
- Without ornamentation so that it causes less damage to people if it does fall
- Lower to the ground so that it doesn't topple easily
- Strong at the joints so that it doesn't fall apart when shaken

Divide the class into small groups or pairs. Provide them with a variety of materials that they can use to create their buildings, e.g. dominoes, wooden blocks and sugar cubes make good 'bricks' lollipop sticks, drinking straws and corrugated card could be used to make 'roofs' double-sided sticky tape is useful for joining the bricks and roof, etc.

Encourage them to draw plans on paper first, detailing their thoughts and ideas about their design and the materials they will need to construct it. They could create cross-sectional drawings, exploded diagrams or computer-aided designs.

Provide reference books on building design and architecture. The following websites also provide a useful starting point:

- **https://www.theguardian.com/cities...** - This article from The Guardian website goes into detail about the measures that different cities around the world are taking to earthquake-proof their buildings.
- **https://practicalaction.org/earthquake-resistant-housing-4** - The Practical Action website offers information about how improved building technology can save homes.

Recording activity

Ask the children to construct their buildings using the materials provided.

Allow the children to choose from a wide range of tools and equipment to perform the practical tasks accurately, e.g. they need to choose the best tools for cutting, shaping, joining and finishing their buildings.

When the buildings are complete, invite the children to test their buildings' strength using a 'shake table'. The shake tests need to be fair so that the results are as accurate as possible.

Ask them to consider the following questions:

- Are taller buildings most likely to fall first?
- Are pyramidal shapes stronger?
- How can can you strengthen your building using a frame?
- How could you make a domed building?

As a class, discuss the children's buildings and the results. The children should evaluate their own buildings against the design criteria they set out at the start of the task, and consider any feedback from others in order to improve their work.

How are buildings normally reinforced in real life? Concrete walls are reinforced with vertical steel beams and rods. But earthquake-proof buildings use cross-shaped (x) beams and they have a more flexible foundation structure that can move when the ground moves. Some even use springs in their foundations.

Personal Goals

- Adaptability
- Communication
- Enquiry
- Resilience
- Thoughtfulness

Technology Task 2

Learning Goals

2.02 Be able to design and make products to meet specific needs

2.04 Be able to make and use labelled sketches as designs

2.07 Be able to identify the ways in which products in everyday use meet specific needs

2.08 Be able to suggest improvements to products in everyday use

Research activity

As a class, study photographs of volcanologists working on site in active volcanic areas.

Talk about the protective clothes they wear:

- Heat-resistant protective body suits
- Helmets with large, tinted visors protect their face and eyes
- Padded gloves and thick-soled boots

Look at photographs of the special equipment and technology they use:

- Metal probes to collect lava samples
- Heat-resistant thermometers
- Video cameras to film volcanic activity

List the jobs a volcanologist does:

- Observing signs of activity on the surface
- Measuring ground temperature and speed of lava flow
- Sampling rocks, lava and ash deposits
- Understanding what is happening underground
- Predicting future eruptions and giving advance warnings

Recording activity

Ask the children, in pairs or individually, to design a new piece of protective clothing, equipment or technology for a volcanologist, working on the site of an active volcano.

The children's designs should be an inventive solution, making one aspect of the volcanologist's job easier, safer or more accurate. Encourage the children to think creatively and not be too constrained by current technology.

Ask them to make labelled sketches of their designs and make presentations of their ideas to the rest of the class.

Personal Goals

- Adaptability
- Communication
- Enquiry
- Thoughtfulness

Technology Task 3

Learning Goals

2.07 Be able to identify the ways in which products in everyday use meet specific needs

Research activity

Ask the children to think about the items they might include in their family's survival kit for use in the event of a natural disaster, such as an earthquake, in their local area.

The list could include:

- Torch and whistle
- Rope and string
- Tent, sleeping bags and blankets
- Map and compass
- First aid kit
- Some basic tools, e.g. bucket, shovel, etc.
- High energy biscuits and dehydrated food
- Bottled water and water purifying tablets
- Basic utensils
- Warm clothing, e.g. hats, scarves, socks, etc.
- Mobile phone
- Safety helmet
- Oxygen mask

The following website provides a useful starting point:

- **fema.gov/kids/dizarea.htm** – FEMA for Kids website has information on natural disasters including earthquakes and volcanoes, as well as disaster survival advice.

Recording activity

Based on their research, ask groups of children to draw or collect together those items they think are essential for inclusion in their survival kit. They should label the items, saying why they are included and how they would be used.

Invite the children to comment on each other's ideas.

Language Arts link: read survivors' accounts to the class or ask the children to create their own survivors' stories. They might be a survivor from a recent earthquake or tsunami. Invite them to tell their stories in the form of comic strips, poems, songs, eyewitness accounts and reports, and so on.

You could ask the children to draw large-scale maps (these could be imaginary), showing the location of the disaster, how close they were to the danger zone and the route their evacuation or escape took.

Personal Goals

- Adaptability
- Communication
- Thoughtfulness

Technology Extension Task

Learning Goals

2.02 Be able to design and make products to meet specific needs

2.03 Be able to make usable plans

2.04 Be able to make and use labelled sketches as designs

Extension activity

Challenge the children to design and build a rescue robot that could find survivors after an earthquake. What features does a rescue robot need to have?

The children should think about who will use the robot, (e.g. the emergency services) and how it will be used (e.g. to locate survivors buried under rubble). Encourage the children to make a list of what they want their robot to do and how it might achieve this, e.g. the robot's heat-imaging cameras will detect a person's body heat.

Scientists in the United States have developed a pipe-crawling robot that can enter collapsed buildings to look for survivors. The following video shows an example:

- **youtube.com/watch?v=o3deOacWLPo** – YouTube hosts this video demonstrating a pipe robot in action.

*(To watch a YouTube video in **safe mode**, scroll to the bottom of the page and click on the '**safety**' tab which brings up the '**Safety mode** ' information. Under this section, select the '**on**' option, then click '**save**')*

After your discussion each child, or group of children, should create a list of design criteria for their rescue robot. The design criteria might include one or more of the following:

- A motor to steer or drive the robot forwards
- A pulley to lift rubble and heavy loads
- A linkage (like the arm of a crane) to reach high places
- A light to enable rescuers to work at night
- An alarm/buzzer to attract the attention of others
- A magnet to lift iron and steel from the rubble

If you wish, children could go on to build their robots. You can adapt the task to suit the ages and abilities within your class - from a basic cardboard-box robot with simple moving attachments to a more advanced robot that can be programmed and controlled.

The Milepost 3 unit, *Switched on*, provides helpful guidance on building models with control mechanisms. The following websites are also useful for research:

- **active-robots.com/education/primary-5-11-years** – Active Robots website has a wide range of robotic products designed for use in the classroom.
- **shop.legoeducation.com/gb/category/lego-education-wedo-9** – Lego Education website has an online shop of useful robotic products.

How will their robot be designed to move over uneven ground? Does it have long/short articulated legs, or a track system (like a tank) or large and small wheels (like a tractor)?

How will their robot fit into narrow spaces? It might have long, flexible probes with cameras or sound detectors at the end!

The children should sketch out their ideas and annotate their drawings in as much detail as possible using cross-sectional and exploded diagrams or computer-aided design software. Then they should share their ideas with the rest of the class. Which design do all the children agree is the best?

Provide the children with a range of materials and components, including construction materials and electrical components including switches, bulbs, buzzers and motors, as appropriate to the task and your agreed design criteria.

Allow time for the children to build and test their models. Encourage them to make a record of any changes that they have made during the making process.

At the end of the session, ask each child/group should present their robot to the rest of the class. They should talk about their choice of materials, their robot's features and any modifications they made to their model. Invite the rest of the class to ask questions and provide feedback.

When the children are happy with their products, you can proudly display these at the exit point.

Personal Goals

- Adaptability
- Communication
- Resilience
- Thoughtfulness

Science Learning Goals

Children will:

- **2.01a Be able to carry out simple investigations**
- **2.01b Be able to prepare a simple investigation which is fair, with one changing factor**
- **2.01c Be able to predict the outcome of investigations**
- **2.01d Be able to use simple scientific equipment**
- **2.01e Be able to test ideas using evidence from observation and measurement**
- **2.01f Be able to link evidence to broader scientific knowledge and understanding**
- **2.01g Be able to use evidence to draw conclusions**

2.02 Be able to gather information from simple texts

2.04 Understand some of the effects of what they learn on people's lives

2.27 Know that temperature is a measure of heat

2.28 Know that some changes in materials are reversible and others are irreversible

2.29 Know about the changes that occur when materials are mixed

2.31 Be able to compare common materials and objects according to their properties

2.32 Be able to distinguish between solids, liquids and gases

Science Task 1

Learning Goals

2.02 Be able to gather information from simple texts

2.04 Understand some of the effects of what they learn on people's lives

2.27 Know that temperature is a measure of heat

2.28 Know that some changes in materials are reversible and others are irreversible

2.31 Be able to compare common materials and objects according to their properties

2.32 Be able to distinguish between solids, liquids and gases

Research activity

Recall Geography Tasks 1 and 2. Ask the children: what is a volcano made of? Draw a diagram of a volcano on the board (refer back to previous research) and ask the class to label the parts for you. For example:

- Rock
- Magma
- Fire
- Ash
- Smoke
- Clouds

The 'scientists' in your class should recognise that these labels describe different 'materials' or states of matter. A volcano demonstrates all three states – it has solids, liquids and gases. Ask the children to identify and group the parts of the volcano into the three states.

- Solids – rock, ash
- Liquids – magma, clouds
- Gas – smoke (this could be a mixture of volcanic gas and particles)

Where does fire belong? Fire is not a material – it is something that happens to materials when they burn. When something burns the molecules break apart and they are irreversibly changed into a different material. (Link to the Milepost 2 science unit, *Bake It*.) Burning materials combine with oxygen to give off light and heat.

There are different types of rock – can the children recall why this is? Refer to any prior learning (e.g. the Milepost 2 science unit, Footprints from the Past). Recall how rocks are formed. Rocks formed from volcanoes are called igneous rocks. They are formed when rock melts (at above 1,000 degrees C) then cools to become solid again (the DK Find Out! website has an interactive diagram which might help with this explanation: **https://www.dkfindout.com/uk/earth/...**). The children could observe what happens when a bar of chocolate is heated: it melts and turns into a liquid then it cools and solidifies. The children could find out from secondary sources at what temperatures solids melt: compare ice, iron and rock. The Earth's core is over 5,000 degrees Centigrade!

You could ask the children to sort and identify some igneous rocks (e.g. granite and basalt) from a small collection. They can do this on the basis of appearance – igneous rocks contain tiny crystals as a result of their rapid cooling. Metamorphic rocks are smooth because they have been heated and squashed, e.g. marble and gneiss. Sedimentary rocks have visible grains and often contain fossils of seashells or plants, e.g. limestone and sandstone.

Pose the question: why don't we find fossils in volcanic rocks? Recap on how fossils are formed. Any fossils in the magma would be destroyed by the intense heat.

Ask the children if they think the local area has any volcanic rocks. They could find out by collecting some rock samples and identifying these back in the classroom or you could make this a home-learning task.

Recall that soils are formed when rocks are worn down by rain, wind, ice and water. Soils also contain organic matter from dead and decaying plants and animals. When volcanic rocks are worn down they create some of the best soils on Earth. That's why some farmers risk their lives to live and farm in the shadow of dangerous volcanoes. Link to the previous Geography Tasks.

Extension activity

The children could find out how huge volcanic ash clouds from the Icelandic volcanic eruption in 2010 caused problems for airports in 20 countries. The volcano that caused the problems happened to be under the warm waters of the jet stream and this caused the water to vaporise rapidly, rising into the air and then condensing to create clouds that were mixed with ash from the volcano. The ash clouds covered large areas of northern Europe and ash fell down in the rain. (Link to International Task 2.)

You could create a simple water cycle in a bowl, using hot water and a lid of transparent film to demonstrate how the water cycle works. This will allow the children to observe how heating (evaporation) and cooling (condensation) are part of the water cycle and are associated with temperature.

Draw diagrams to show how the water cycle can carry volcanic ash clouds and ash can fall in rain, in regions far from the site of the volcano.

Recording activity

The children should be able to identify and label the parts of a volcano as solids, liquids or gases. They should also be able to describe the properties of each material. They should be aware that materials melt at different temperatures. They will have probably investigated melting ice before (ice melts at 0 degrees C), rock melts at 1,000 degrees C, and iron at 1,500 degrees C.

The children should be able to explain how they were able to group the rocks in their collection by appearance, e.g. using colour, crystals, grains, fossils, smoothness and hardness as criteria. They could take photographs of the various groups or create a display.

The children should recognise that the soils in their local area are rocks that have been worn down over many years and then combined with decaying plants and animals. They will have learned that volcanic rock is very fertile.

Personal Goals

- Enquiry
- Thoughtfulness

Science Task 2

Learning Goals

- **2.01a Be able to carry out simple investigations**
- **2.01b Be able to prepare a simple investigation which is fair, with one changing factor**
- **2.01c Be able to predict the outcome of investigations**
- **2.01d Be able to use simple scientific equipment**
- **2.01e Be able to test ideas using evidence from observation and measurement**
- **2.01f Be able to link evidence to broader scientific knowledge and understanding**
- **2.01g Be able to use evidence to draw conclusions**

2.02 Be able to gather information from simple texts

2.29 Know about the changes that occur when materials are mixed

Research activity

Ask the children to look again at their volcano case study from Geography Task 2. Can they find out what happened inside the volcano when there was any activity or volcanic eruption.

Show the class a video of a volcanic eruption. The children should make notes of what is happening as they watch the video (ash and cloud shooting up out of the volcano, lava streams flowing down the sides, etc.).

The following websites provide a useful starting point:

- **discovery.com/life-topics/other/other-topics-volcano-videos** – Discovery Channel website has a series of videos with real footage of erupting volcanoes from around the world.
- **news.discovery.com/games/volcano-explorer.htm** – Discovery Channel website has an interactive build-your-own virtual volcano that allows you to change magma viscosity and gas levels to create different types of volcano.
- **youtube.com/watch?v=49P4e1DLm6w** – this YouTube video shows teachers how to make a simple volcano.

*(To watch a YouTube video in **safe mode**, scroll to the bottom of the page and click on the '**safety**' tab which brings up the '**Safety mode** ' information. Under this section, select the '**on**' option, then click '**save**')*

The children could build a model of an erupting volcano by mixing vinegar and sodium bicarbonate to give carbon dioxide gas.

You will need:

- Vinegar
- A plastic bottle
- Sodium bicarbonate
- Sand and gravel
- A large dish or tray
- A funnel
- Red food colouring
- Flour

Mix flour and sodium bicarbonate then use the funnel to half fill the bottle with the mixture. Stand the bottle upright in the tray. Pile sand and gravel round the bottle to make a cone. Mix vinegar and food colouring to make a strong red colour. Use the funnel to add the red vinegar to the bottle. Remove the funnel and watch for eruption!

Recording activity

The children should observe the reaction and decide whether this realistically represents a volcanic eruption, explaining their decision. They should then draw a labelled diagram documenting what happened in the experiment, with notes to explain how the experiment was carried out.

Personal Goals

- Communication
- Enquiry
- Thoughtfulness

Science Task 3

Learning Goals

- **2.01a Be able to carry out simple investigations**
- **2.01b Be able to prepare a simple investigation which is fair, with one changing factor**
- **2.01c Be able to predict the outcome of investigations**
- **2.01d Be able to use simple scientific equipment**
- **2.01e Be able to test ideas using evidence from observation and measurement**
- **2.01f Be able to link evidence to broader scientific knowledge and understanding**
- **2.01g Be able to use evidence to draw conclusions**

2.29 Know about the changes that occur when materials are mixed

Research activity

Explain to the children that they are going to conduct an experiment to show what happens when a crack appears in the Earth's crust. (Very hot rocks in the Earth's mantle melt enough to flow slightly and rise through cracks in the Earth's crust. Melted rock moves upwards because it is lighter than cooler rock.)

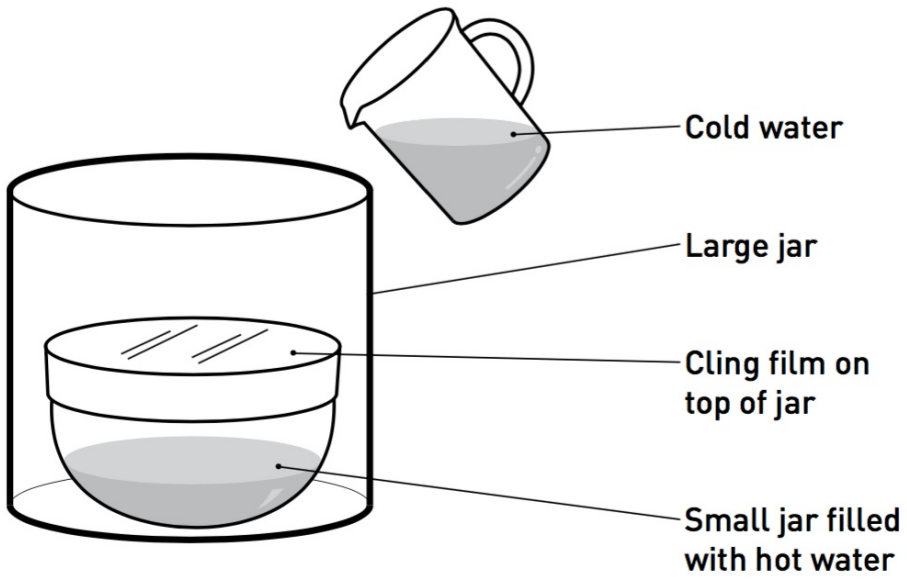
Working in small groups, ask the children to roll clay into a ball and then press on it with a board. What happens to the clay? Now, roll up the clay again. This time, press it with the board and, at the same time, push the board forward. The clay will flow allowing the board to move forward. The Earth's crust moves just like the board.

In small groups, the children will need:

- Dark food colouring
- A small jar
- A large jar
- Transparent food wrapping
- An elastic band
- A sharp pencil

Mix colouring with hot water in the small jar, filling the jar to the brim but not overflowing (be careful with hot water). Cover the top of the small jar with cling film, securing it with the elastic band. Use the pencil to make two small holes in the cover. Put the jar inside the large jar (be careful – it is hot!). Pour cold water into the large jar but not into the small jar. What happens? Why?

(Hot water is lighter or less dense than cold water.)



Recording activity

Ask the children to record their experiment, using these headings:

- What I used
- What I did
- What I found out

Personal Goals

- Communication
- Enquiry
- Thoughtfulness

Science Task 4

Learning Goals

- **2.01a Be able to carry out simple investigations**
- **2.01b Be able to prepare a simple investigation which is fair, with one changing factor**
- **2.01c Be able to predict the outcome of investigations**
- **2.01d Be able to use simple scientific equipment**
- **2.01e Be able to test ideas using evidence from observation and measurement**
- **2.01f Be able to link evidence to broader scientific knowledge and understanding**
- **2.01g Be able to use evidence to draw conclusions**

2.29 Know about the changes that occur when materials are mixed

Research activity

All solids, when heated, melt then flow. Rock is just the same; it flows as lava. But all liquids do not flow at the same speed.

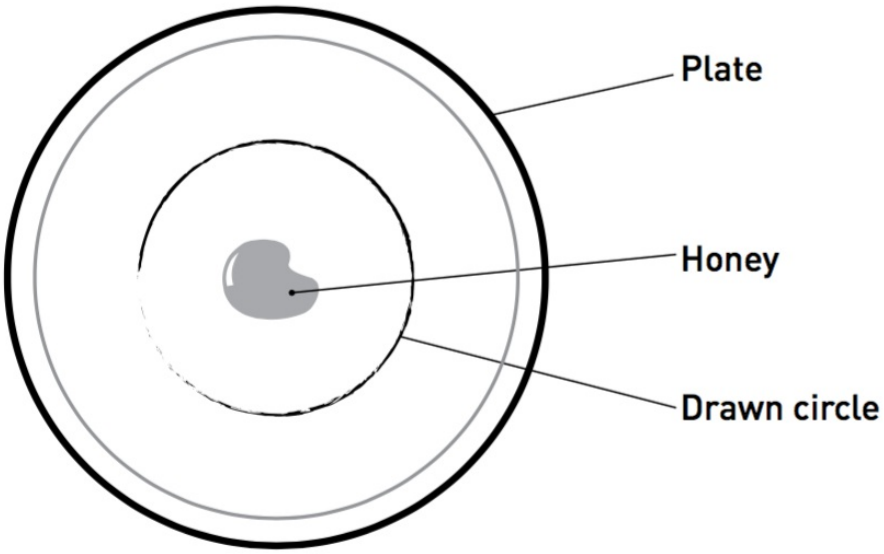
Explain to the children that they are going to conduct an experiment to test this.

Work in pairs. Each pair will need:

- 2 plates
- A pen
- A timer
- Liquid honey
- Washing-up liquid

Ask the children to draw a large circle on each plate. Pour a tablespoon of honey into the middle of one circle. Start the timer. Stop after 30 seconds and mark how far the honey has moved. Reset the timer. Stop and mark again after 30 seconds. Keep repeating until the honey reaches the edge of the circle.

Put the same amount of washing up liquid in the middle of the other plate and repeat the experiment.



Recording activity

Draw graphs to show how long it took each liquid to move.

Discuss the results with the class.

Does the washing-up liquid flow more quickly? Why? Why is it important to use the same amount of liquid? The same-sized circle?

What does this tell the children about volcanoes? (The speed of the lava depends on its consistency.)

What about the direction of the lava flow? What natural 'barriers' would deflect the lava? (Valleys, rivers, etc.)

Personal Goals

- Communication
- Enquiry
- Thoughtfulness

Science Task 5

Learning Goals

- **2.01a Be able to carry out simple investigations**
- **2.01b Be able to prepare a simple investigation which is fair, with one changing factor**
- **2.01c Be able to predict the outcome of investigations**
- **2.01d Be able to use simple scientific equipment**
- **2.01e Be able to test ideas using evidence from observation and measurement**
- **2.01f Be able to link evidence to broader scientific knowledge and understanding**
- **2.01g Be able to use evidence to draw conclusions**

2.28 Know that some changes in materials are reversible and others are irreversible

2.32 Be able to distinguish between solids, liquids and gases

Research activity

When a volcano erupts, molten lava flows from the crater. When it cools it solidifies to form new rock. Melting chocolate and then letting it cool will help to explain this to the children. Can the children think of other solids that can be melted and then return to their original form when cooled?

As a class, in groups, the children should experiment with a range of substances to see which melt and then return to their original form. Children should make predictions beforehand.

Recording activity

Children should record the results of the experiment. Compare these results with their earlier predictions.

Children can go on to create their own report, explaining the experiment and what they have learned about the properties of lava. Remember to eat the chocolate at the end!

Personal Goals

- Communication
- Enquiry
- Thoughtfulness

Science Extension Task

Learning Goals

- **2.01a Be able to carry out simple investigations**
- **2.01b Be able to prepare a simple investigation which is fair, with one changing factor**
- **2.01c Be able to predict the outcome of investigations**
- **2.01d Be able to use simple scientific equipment**
- **2.01e Be able to test ideas using evidence from observation and measurement**
- **2.01f Be able to link evidence to broader scientific knowledge and understanding**
- **2.01g Be able to use evidence to draw conclusions**

2.32 Be able to distinguish between solids, liquids and gases

Extension activity

Erupting volcanoes give off poisonous gases that cannot be seen. In Pompeii the clouds of gas suffocated many inhabitants.

The children should use the internet and other sources to find out what gases are expelled by a volcano when it erupts.

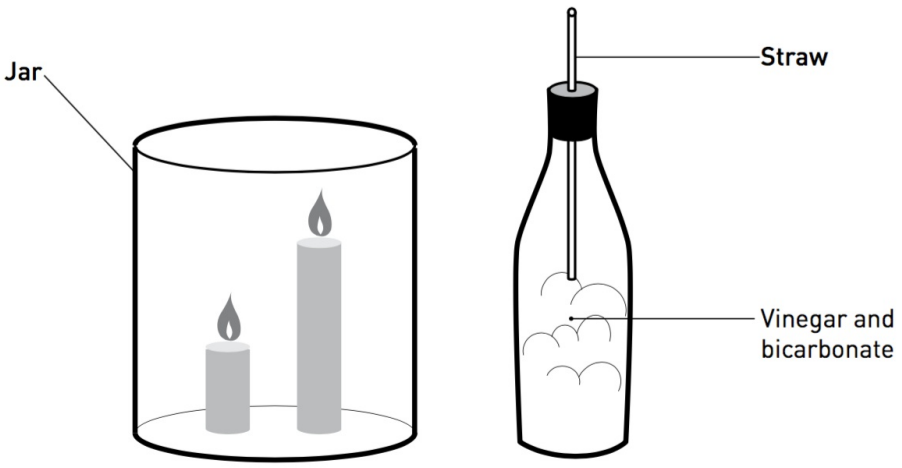
The children can conduct an experiment to show the effects of suffocating gases.

You will need:

- A funnel
- A bottle
- Sodium bicarbonate
- Modelling clay
- A long straw
- Tall and short candles
- Matches
- A large jar

Put sodium bicarbonate in the bottle and add vinegar. Use modelling clay to seal the bottle. Push one end of the straw through the clay. Place tall and short candles in the jar and light them. Direct the free end of the straw into the jar. The short candle will go out as the carbon dioxide from the bottle blocks out the oxygen.

Tell the children what gas is needed to keep the candle alight (oxygen). What gas do humans need to breathe? Can they remember from Task 1 what gas was made by mixing vinegar and sodium bicarbonate (carbon dioxide)?



Ask the children to write about, draw and label the experiment. Then write a short explanation of why they think the candle went out.

Personal Goals

- Communication
- Enquiry
- Thoughtfulness

Music Learning Goals

Children will:

2.01 Know how a number of musicians - including some from their home country and the host country - organise sounds and use them expressively

2.02 Know how a number of musicians - including some from their home country and the host country - choose sounds and instruments which are appropriate for their task

2.03 Be able to recognise and explore the ways that sounds can be organised and used expressively

2.04 Be able to sing in tune and with expression

2.05 Be able to perform simple pieces rhythmically using a limited range of notes

2.07 Be able to compose simple pieces to create intended effects

2.08 Be able to choose sounds and instruments which are appropriate for their task

2.09 Be able to improve their own work, having regard to the intended effect

2.10 Be able to explain their own work in terms of what they have done and why

2.11 Be able to talk about pieces of music, giving reasons for their opinions

2.13 Understand how musical elements are combined and varied to create different effects

Music Task 1

Learning Goals

2.01 Know how a number of musicians - including some from their home country and the host country - organise sounds and use them expressively

2.02 Know how a number of musicians - including some from their home country and the host country - choose sounds and instruments which are appropriate for their task

2.03 Be able to recognise and explore the ways that sounds can be organised and used expressively

2.08 Be able to choose sounds and instruments which are appropriate for their task

2.11 Be able to talk about pieces of music, giving reasons for their opinions

2.13 Understand how musical elements are combined and varied to create different effects

Research activity

Musicians throughout history have been inspired by the natural world; by dramatic landscapes and weather. Some examples you can study include:

- ***Grand Canyon Suite***, by Ferde Grofé, United States
- ***Night on Bald Mountain*** , by Modest Mussorgsky, Russia
- ***An Alpine Symphony***, by Richard Strauss, Germany
- ***Four Sea Interludes***, by Benjamin Britten, United Kingdom
- ***La Mer***, by Claude Debussy, France
- ***Hekla***, by Jón Leifs, Iceland

Jón Leifs was an Icelandic composer who witnessed the eruption of a volcano called Hekla then depicted it through his music.

See link below:

- **youtube.com/watch?v=jHwkwp5eXDE** – YouTube has this amazing footage of an erupting volcano accompanied by the explosive music of Jón Leifs.

*(To watch a YouTube video in **safe mode**, scroll to the bottom of the page and click on the '**safety**' tab which brings up the '**Safety mode**' information. Under this section, select the '**on**' option, then click '**save**')*

Together with the class, choose one or two pieces of music that have been inspired by nature and find out about the composers and the background story behind each piece. Play samples of the music and encourage the children to listen with attention and detail so that

they can recall the sounds. Can they describe how musicians use sounds to paint a picture of a scene or an event in nature? Which instruments do they use to represent waves, rain, snow, wind, fire, thunder, sunset, dawn, etc.? When the children are listening to the music they should identify:

- Instruments
- Techniques - melody, rhythm
- Solos - instruments and voice

The children are later going to use this research to devise a piece of their own music that is inspired by what they have learned about volcanoes.

Listen to a variety of musical sounds that could be connected to volcanoes, e.g. peace and quiet from a dormant volcano, light puffs of smoke and steam, loud crashing eruption, etc.

Make a collection of untuned instruments, e.g. tambourine, drums, cymbals, castanets, triangles and xylophones. Invite the children to explore the different sounds they can make using the instruments, e.g. light puffs of smoke and steam might be represented on the xylophone, and crashing eruptions could be replicated with cymbals and drums. Don't forget that the voice is an instrument too!

Depending on the musical abilities of your children, you could use tuned instruments also, including piano, keyboard and violin.

Recording activity

Ask the children to try to identify the different instruments used and to decide which instruments they might use for volcano sounds.

Are they going to use their voices?

Can the children tell you which instruments make a soft sound or a loud sound? A high sound or a low sound? A long sound or a short sound?

In the tasks that follow, the children are going to combine these sounds to create a piece of music with a structure.

Personal Goals

- Communication
- Cooperation
- Enquiry
- Thoughtfulness

Music Task 2

Learning Goals

2.03 Be able to recognise and explore the ways that sounds can be organised and used expressively

2.04 Be able to sing in tune and with expression

2.05 Be able to perform simple pieces rhythmically using a limited range of notes

2.07 Be able to compose simple pieces to create intended effects

2.08 Be able to choose sounds and instruments which are appropriate for their task

2.09 Be able to improve their own work, having regard to the intended effect

Research activity

Give the children a selection of instruments they decided would be suitable to represent the sounds of a volcano in Task 1.

Ask the children to work in pairs to try to make sounds that represent volcanoes. They should experiment with dynamics (loud or soft), pitch (high or low), rhythm (repeated patterns) and tempo (very slow, slow, medium, fast or very fast).

You might find it useful to divide the children into groups at this stage: one group could get together to create sounds that depict the beginning of the eruption - the low rumblings underground; a second group could create the sounds associated with the loud and explosive impact of the eruption; and the third group could compose the sounds of the calm that comes after the eruption.

The following website will provide a useful reference point for children and teachers:

- **sfskids.org** – San Francisco Symphony Kids' website features games and activities to teach children the basics of music.

Recording activity

The children should now try out their compositions in front of the rest of the class. Encourage the children to play their instruments and use their voices with accuracy, fluency, control and expression.They could use poetry for a solo voice or chorus, which could be accompanied or unaccompanied by other instruments. Do the other children think that they chose good sounds and instruments? Can they say why?

Music combines well with dance and art so it is worth exploring these links here, for example, the volcano paintings the children create in the later Art tasks could be used as video backdrops. The dance that they choreograph in the Physical Education tasks can also be combined in their musical performance.

Personal Goals

- Communication
- Cooperation
- Resilience
- Thoughtfulness

Music Task 3

Learning Goals

2.03 Be able to recognise and explore the ways that sounds can be organised and used expressively

2.07 Be able to compose simple pieces to create intended effects

2.08 Be able to choose sounds and instruments which are appropriate for their task

2.09 Be able to improve their own work, having regard to the intended effect

2.10 Be able to explain their own work in terms of what they have done and why

2.11 Be able to talk about pieces of music, giving reasons for their opinions

Research activity

Working in groups and using a variety of instruments, ask the children to compose a short piece of music that tells the story of a volcano. They could use the activities of one of the volcanoes they have studied so far in this unit as inspiration for this.

Remind the children that not all volcanoes are explosive. Icelandic volcanoes spill streams of lava into the ocean – they don't explode. Mount Etna spits and spurts lava. Vesuvius, however, is an explosive volcano.

Tell the children that the sounds they create have to combine, like the words in a sentence. So sounds in music have pauses, like commas and full stops, and they have harmonies and textures that are like verbs and adjectives. A piece of music also has to have a beginning, a middle and an ending. It needs a structure or a plan.

Recording activity

Once the groups have had time to practice, they can perform their piece for the rest of the class. The audience should listen carefully and decide what 'story' the music is telling. Is the volcano dormant or erupting? Can the children make a guess at the type of volcano it might be?

Ask the children to offer suggestions to improve each other's work (choice of instrument, tempo, dynamics, pitch, rhythm, etc.). If the children decide to incorporate these suggestions they can re-perform their piece for the class.

Can the children work out ways of writing down their music so they could perform it again in the same way?

The children could work on a pictorial form of notation. For example, they could draw symbols to represent each instrument and numbers to indicate the number of beats, letters 'f' or 's' could indicate 'fast' or 'slow', 'h' or 'l', 'high' or 'low', and so on. They will need to decide on a system that makes sense for them and that they will remember.

Ask them, why is it useful to be able to write music down? If they didn't have a system for remembering, what would happen the next time they wanted to perform their volcano piece?

Personal Goals

- Communication
- Cooperation
- Resilience
- Thoughtfulness

Music Extension Task

Learning Goals

2.03 Be able to recognise and explore the ways that sounds can be organised and used expressively

2.10 Be able to explain their own work in terms of what they have done and why

Extension activity

In the previous task, the children devised their own musical notations. In this next task, you could introduce the children to the staff and other standard musical notations.

One way to do this might be to look at the notations on a piece of sheet music. Tell the children that written music is like a language that they can learn to read like the letters on a page that make words and sentences. Some of the children who are learning to play an instrument may already know what some of the symbols mean and can help others in the class.

The following websites are useful:

- **classicsforkids.com/games** – Classics for Kids has some fun music games, including the Note Name Game.
- **http://www.teachingideas.co.uk/notation/name-that-note** – Name That Note is a game which can help children to learn the notes on a musical stave.

Personal Goals

- Communication
- Cooperation
- Enquiry

History Learning Goals

Children will:

2.01 Know about the main events, dates and characteristics of the past societies they have studied

2.02 Know about the lives of people in those periods

2.04 Be able to give some reasons for particular events and changes

2.05 Be able to gather information from simple sources

History Task

Learning Goals

2.01 Know about the main events, dates and characteristics of the past societies they have studied

2.02 Know about the lives of people in those periods

2.04 Be able to give some reasons for particular events and changes

2.05 Be able to gather information from simple sources

Research activity

Locate Pompeii, Italy and nearby towns in an atlas.

Ask the children to find out as much as they can about Pompeii in 79 AD and the eruption of Mount Vesuvius. Draw and annotate an historical timeline of the eruption.

Encourage the children to use information books and the internet to discover what Roman life was like in 79 AD. They should find out what the people of Pompeii were doing at the time of the eruption – they would have been going about their daily lives as normal, unaware of the terrible disaster that was about to happen.

Introduce their research with an eyewitness quotation: "*For several days before the earth had been shaken, but this fact did not cause fear because it was a commonly observed feature in Campania.*" Pliny the Younger, 24-25 August 79 AD (Pliny the Elder, Pliny's uncle was later killed in the eruption.)

The following websites and books provide a useful starting point:

- **eyewitnesstohistory.com/pfpompeii.htm** – Eyewitness to History 'The Destruction of Pompeii, 79 AD' is an edited diary account by Pliny the Younger of the eruption of Vesuvius.
- **awesomestories.com/disasters/pompeii** – Awesome Stories website has this account of the devastating eruption of Vesuvius in 79 AD, together with maps, animations, CGI images and photographs of the excavations.
- ***Escape from Pompeii,*** by Christina Balit, Frances Lincoln Children's Books, 2005
- ***Pompeii,*** Usborne Young Reading series, by Anna Claybourne and Katie Daynes, Usborne Publishing Ltd, 2006

Recording activity

Ask the children to write an eyewitness account of the eruption of Vesuvius in 79 AD. They should choose the character they wish to be, e.g. a Roman general, soldier, farmer, baker, builder, carpenter, housewife, nobleman, poet, philosopher, servant, young child or teenager.

They should try to write and think in character. You could help them do this by starting with some basic role play.

The account should detail everything they saw – people running and hiding in cellars; Vesuvius exploding and people screaming; the smell of smoke and burning; the bitter taste of ash and acid, the intense and melting heat, and so on. Encourage the children to explore the senses in their descriptions and to try to empathise with their character. How did they manage to escape?

Geography link: a Vesuvius-type eruption is sometimes called a 'Plinian' eruption named after Pliny the Younger. Find out about the characteristics and behaviour of Vesuvius-type volcanoes.

Personal Goals

- Adaptability
- Communication
- Enquiry
- Thoughtfulness

History Extension Task

Learning Goals

2.01 Know about the main events, dates and characteristics of the past societies they have studied

2.02 Know about the lives of people in those periods

2.04 Be able to give some reasons for particular events and changes

2.05 Be able to gather information from simple sources

Extension activity

Look at another notable volcanic eruption from the past and find out about its impact and place in history, e.g: 1980 Mount St. Helens, Washington USA.

Study photographs of Mount St. Helens before and after the eruption in May 1980. Ask the children to find out facts about the impact of this event on the region. They should group the facts under 'before' and 'after' headings, e.g:

Before the eruption	Immediately after the eruption	Six months later	Today
			
Called the Mount Fuji of America because of its conical shape. Peaceful, snow capped volcano 2,950 metres (9,680 feet) high.	57 people dead; homes, roads, railways, plants and wildlife destroyed. 90 square miles (230 km) choked with ash. Mount St. Helens 1,300 feet (400 metres) smaller in height. Now a horse-shoe shape.	Plants start to appear. Birds, insects and mammals return. Area is left to return to its natural state.	In 1982, a Mount St. Helens National Volcanic Monument was set up to preserve the area for research, education and recreation. Today, the volcano is still active and growing in height.

The following website provides useful reference:

- **en.wikipedia.org/wiki/1980_eruption_of_Mount_St._Helens** – Wikipedia has this useful article about the eruption of Mount St Helens and its impact.

Personal Goals

- Communication
- Enquiry

Art Learning Goals

Children will:

- **2.03 Be able to use art as a means of self expression**
- **2.04 Be able to choose materials and techniques which are appropriate for their task**
- **2.05 Be able to explain their own work in terms of what they have done and why**
- **2.06 Be able to talk about works of art, giving reasons for their opinions**

Art Task

Learning Goals

- **2.03 Be able to use art as a means of self expression**
- **2.04 Be able to choose materials and techniques which are appropriate for their task**
- **2.05 Be able to explain their own work in terms of what they have done and why**

Research activity

Ask the children to work in pairs to collect pictures and photographs of volcanoes in all their different states. They should refer back to their sketchbooks and the drawings of volcanoes from Geography Task 1. Ask the children to sort and order the pictures sequentially into the various stages of the volcano story.

Look at the colours of the rock, lava, fire and ash in the pictures and photographs. What colours are hot? (Red, pink, orange, yellow) What colours are cold? (Blue, green, grey, white)

Recording activity

Ask the children to mix and record a variety of hot and cold colours in their sketchbooks. Discuss the results together.

Now ask the children to create a piece of art using paint, glued-on materials, layering, etc., to depict a volcanic eruption. Provide a variety of materials and paints for this, e.g. cotton wool could be painted grey to represent smoke and gas, pieces of bark to represent trees growing on the side of the volcano that are being burnt by the lava, orange chiffon to represent flames, and so on. The children can mix the paint themselves to get suitable colours.

Display the artwork on the wall and ask each child to explain their choice of materials and colours, etc.

ICT link: ask the children to create a animated cartoon of a volcanic eruption using the MIT programming software, Scratch (**scratch.mit.edu**).

Demonstrate how to create and change 'Stages', delete and add 'Sprites' and use the image editor to create a 'volcano sprite'. Create several costumes for the volcano sprite and demonstrate how to program these to change when clicked. The following link takes you to an example created especially for this unit:

- **scratch.mit.edu/projects/45823554/#player**

Click on "Look inside" to see how the programming has been created for each sprite. Show children how to access the 'Help' page of the Scratch community and search for animation tutorials. Whilst creating their animated cartoon, children will be involved in designing, writing and debugging (fixing any glitches) a program. By selecting and sequencing the different scripts they will be using sequence, selection and repetition in their program, working with various forms of input and output. They will need to use their resilience and collaboration skills to debug their animations, understanding that the precise instructions they give to the program will be replicated on screen - if something hasn't worked, they will need to look carefully to detect any errors. Testing their animations out on other children will help to reveal any problems and should encourage children to share their ideas and advice.

For more information and detailed lesson plans on Scratch, please see the Milepost 2 unit *Digital Gamers*.

Personal Goals

- Communication
- Enquiry
- Thoughtfulness

Art Extension Task

Learning Goals

- **2.03 Be able to use art as a means of self expression**
- **2.04 Be able to choose materials and techniques which are appropriate for their task**
- **2.05 Be able to explain their own work in terms of what they have done and why**
- **2.06 Be able to talk about works of art, giving reasons for their opinions**

Extension activity

Study photographs and videos of the following:

- Explosive volcanoes
- Lava flowing from craters
- Violent eruptions of rocks and ash

Now show the children some paintings by the artist Jackson Pollock (1912-56) and discuss his technique. Ask the children how they think he could have created these effects in his paintings? Look for any similarities in colour, shape, pattern or form between Pollock's paintings and the volcano photographs. Tell the children that Pollock's technique is known as 'action painting' or Abstract Expressionism. The children could find out more about Jackson Pollock's art and whether his work is seen as being influential or important. Invite the children to share their views and opinions with others in the class. Now challenge the children to create a volcano painting in the style of Jackson Pollock. They should experiment with different ways of applying paint to imitate Pollock's technique.

They should place their paper or canvases on the floor and try spraying, pouring, throwing and dripping the paint on to the surface. They could try hot colours against black backgrounds to reflect the colours of volcanoes.

Some useful websites include:

- **picsearch.com/pictures/artist/jackson%20pollock.html** – Picsearch has a gallery containing hundreds of images of Jackson Pollock paintings.
- **https://www.tate.org.uk/kids/make/make-jackson-pollock** – the Tate Kids website offers instructions for children to create artwork in the style of Jackson Pollock.
- **artsmarts4kids.blogspot.co.uk/2007/09/jackson-pollock-and-lavender-mist.html** – Art Smarts 4 Kids website has a biography of Jackson Pollock written for children. (**Note**: this site does feature advertising.)

Personal Goals

- Adaptability
- Communication
- Enquiry
- Thoughtfulness

Physical Education Learning Goals

Children will:

- **2.03 Be able to choose appropriate skills and movements to suit a task**
- **2.04 Be able to plan actions and movements**
- **2.05 Be able to take part in a range of individual, pair, small group and team activities**
- **2.06 Be able to perform a range of activities with control and coordination**

Physical Education Task

Learning Goals

- **2.03 Be able to choose appropriate skills and movements to suit a task**
- **2.05 Be able to take part in a range of individual, pair, small group and team activities**
- **2.06 Be able to perform a range of activities with control and coordination**

Research activity

Ask the children how a volcano moves when it erupts. Remind them of Science Task 2 (the erupting volcano) and of the images that they have seen of volcanoes throughout the unit.

What movements could they use to show the stages of eruption? (crouching down in a ball, then springing up with arms up, etc.).

Working first alone and then in pairs, ask them to show explosive movements, slow travelling movements, and other movements associated with volcanoes, such as:

- Molten lava flowing down the side of the volcano
- Poisonous gas rolling down the valley
- A burning tree
- An explosion with rocks flying out of the top of the volcano

Recording activity

The children can show their ideas to the rest of the class.

Encourage the children to comment on each other's interpretations and choices of movement.

Personal Goals

- Adaptability
- Communication
- Cooperation
- Thoughtfulness

Physical Education Extension Task

Learning Goals

- **2.04 Be able to plan actions and movements**
- **2.05 Be able to take part in a range of individual, pair, small group and team activities**
- **2.06 Be able to perform a range of activities with control and coordination**

Extension activity

In small groups, the children should develop a sequence of movements that tell the story of an erupting volcano.

The children should practise and perform their sequence to the rest of the class. Ask them to explain their choices of movement.

The children might use an audio recording of their own music compositions to accompany their work (you could record the children's compositions from Music Task 3 for this).

Personal Goals

- Adaptability
- Communication
- Cooperation

Society Learning Goals

Children will:

2.05 Know that people in different countries have different traditions, celebrations and ways of living

2.08 Understand that people's health and safety can be affected by a variety of factors including food, climate, rules, and the availability of resources

Society Task

Learning Goals

2.05 Know that people in different countries have different traditions, celebrations and ways of living

Research activity

Tell the children that people in societies from the past have created legends to explain events or phenomena they didn't understand.

Ask the children to find out about legends associated with volcanoes and earthquakes, including:

- **Italy** – Vulcan was the Roman god of fire, a blacksmith whose forge was said to be located under the island of Vulcano near Sicily and after whom 'volcano' was named.
- **Greece** – Plato's legend of the lost world of Atlantis – a mysterious island shaken by violent earthquakes and giant waves that disappeared beneath the ocean.
- **Hawaii** – Pele, the Hawaiian goddess of volcanoes was believed to live in the active volcano called Kilauea.
- **Popocatépetl** – a volcano named after an Aztec warrior who fell in love with the Emperor's daughter.

Do they know of any local legends from the home or host country explaining physical phenomena or the geography of the region?

Recording activity

The children could record their research by making models, creating storyboards and cartoons or simple animations of the legends they studied.

You could extend the activity further by asking the children to create a legend of their own to explain an earthquake, volcano or tsunami.

Geography link: help the children find out where the city of Atlantis might have been and why it disappeared. Discuss the different theories as a class. Based on their geographical knowledge, ask them which of the theories sounds the most likely explanation.

The following website, video and book provide a useful starting point:

- **unmuseum.org/atlantis.htm** – UnMuseum website analyses Plato's story of Atlantis, using maps to locate the island and geographical knowledge to help understand the origins of the story.
- **history.com/topics/atlantis/videos** – the History Channel features a number of videos exploring the myths and legends surrounding Atlantis.
- ***Atlantis – The Lost City?*** DK Readers series , by Andrew Donkin, Dorling Kindersley, 2000

Personal Goals

- Adaptability
- Communication
- Enquiry
- Thoughtfulness

Society Extension Task

Learning Goals

2.05 Know that people in different countries have different traditions, celebrations and ways of living

2.08 Understand that people's health and safety can be affected by a variety of factors including food, climate, rules, and the availability of resources

Extension activity

Discuss as a class the advantages and disadvantages of living in the shadow of an active volcano. Recall Science Task 1 - volcanic soils are among the most fertile in the world. Make two lists on the board from the children's suggestions, for example:

Advantages:

- Fertile soils benefit farmers
- Tourism brings jobs and money to the area
- Geothermal power provides electricity for homes
- Precious minerals can be found, e.g. gold, silver, copper

Disadvantages:

- Risk to human life
- Risk to plants and animals
- Risk to homes and possessions

Can the children add to the lists?

As a class, discuss the reasons why people continue to live in the world's volcanic areas, despite the dangers. Are they right to do so? Let the children make up their own minds and then share their thoughts with others in the class.

Personal Goals

- Adaptability
- Communication
- Thoughtfulness

International Learning Goals

Children will:

2.01 Know about some of the similarities and differences between the different home countries and between them and the host country

2.02 Know about ways in which these similarities and differences affect the lives of people

International Task

Learning Goals

2.01 Know about some of the similarities and differences between the different home countries and between them and the host country

2.02 Know about ways in which these similarities and differences affect the lives of people

Research activity

Look together at some news reports of an earthquake or volcanic eruption. Use a map to identify the affected areas mentioned in the reports.

Focus on one example, such as:

- Montserrat Volcanic eruption (1995)
- Icelandic ash cloud - Eyjafjallajokull volcano (2010)
- Haiti Earthquake (2010)
- Japan Earthquake (2011)
- Nepal Earthquake (2015)

Ask the children to consider the global 'knock on' effect of the natural disaster. Prompt the children to consider the impact of the disaster on:

- Business in that country
- Business in other countries
- People in that country
- People in neighbouring countries
- People in other countries around the world

You may wish to consider how the news of a disaster is shared. How might the media play a role in informing people? Can this media coverage be negative as well as beneficial? Explore the children's ideas. For example, you may want to consider the area of tourism and how people might be put off from wanting to visit somewhere that is affected by earthquakes or volcanic activity.

Give groups one of the other examples of a natural disaster to research. Provide news reports and book-marked websites to help them find out more about what happened.

Recording activity

Groups should make a short visual and oral presentation on their findings, using maps, photographs and videos to help explain the event and its consequences, both locally and globally. If you wish, children could use presentation software such as Prezi (**prezi.com**) or PowerPoint to organise their images, videos and sound files.

Personal Goals

- Communication
- Enquiry
- Thoughtfulness

International Extension Task

Learning Goals

2.01 Know about some of the similarities and differences between the different home countries and between them and the host country

2.02 Know about ways in which these similarities and differences affect the lives of people

Extension activity

The children should find out about any international groups or agencies that respond to earthquakes, volcanoes and other natural disasters (e.g. Red Cross, UNESCO,Oxfam, ActionAid, etc).

The children should think about the following:

- What do they do?
- Who pays for the equipment and supplies?

Do the children think that these organisations should be able to over-ride local laws when helping after natural disasters? For example, land use or land ownership laws might prevent them from erecting survival tents and providing emergency facilities.

The following websites provide a useful starting point:

- **redcross.org.uk** – British Red Cross website details what they do and where they work, including a video about the 2010 Haiti earthquake recovery programme.
- **unicef.org** – UNICEF International homepage.
- **oxfam.org** – Oxfam International website homepage.
- **actionaid.org** – ActionAid International website homepage.

Divide the class into small groups and ask the children to write a list of rules that all global international agencies should follow to protect themselves and those they are helping.

Ask each group to compare their rules with those of the other groups in the class. As part of the exit point the children could raise funds for an international aid agency of their choice that is currently supporting countries affected by natural disasters.

Personal Goals

- Communication
- Enquiry
- Morality
- Respect
- Thoughtfulness

The Exit Point

For the exit point, the children could create a museum-style exhibition on volcanoes and earthquakes – The Active Planet.

The purpose of the exhibition should be to inform and inspire other children in the school and parents. Aim to make the display as interactive and exciting as possible. The children may choose to ask for a small donation as an entrance fee to the exhibition, which can then be sent to an international aid agency that is currently supporting countries affected by natural disasters.

The children could display the findings of their research across all the different subject areas – transport your visitors back in time to Pompeii with models of Vesuvius and eye-witness reports; some of the children could dress up as characters from legend, e.g. Vulcan and Pele and tell their stories. Demonstrate one of your volcano science experiments (e.g. the erupting volcano); then perform the story of a volcano in music, art and dance. Display photographs or PowerPoint presentations of volcanic scenery and famous volcanoes around the world. Indicate the world's active areas on globes and wall maps and raise awareness of countries that have been affected by natural disasters, and the international aid agencies that support them. Exhibit your earthquake-proof buildings, allowing visitors to test them at a 'shake table' and talk about the contents of your earthquake survival kit. Don't forget to demonstrate your robot rescuers!

Children dressed as volcanologists can show visitors igneous rock samples, e.g. pumice. Other children, acting as 'guides', can inform visitors about the exhibits and take them on a tour, (these could be arranged at set times throughout the day). Video the event, if possible, and create souvenir programmes for parents and children to celebrate all you have learned while studying this unit.

The IPC community would love to see examples of your learning, in any subject, at any stage in the learning process. If you have any pictures or stories you would like to share please visit our Facebook page at **facebook.com/InternationalPrimaryCurriculum**, **tweet @The_IPC** or email **stories@greatlearning.com**.

Resources

For this unit, you will need some, but not necessarily all, of the following:

Equipment

- Vinegar
- Sodium bicarbonate
- Sand
- Gravel
- Red food colouring
- Plastic bottle
- Tray
- Funnel
- Flour
- Small and large jar
- Transparent plastic food covering
- Jug
- Water
- Dark food colouring
- Paper plates
- Liquid honey
- Washing-up liquid
- Timer
- Modelling clay
- Small and large candle
- Long straw
- Chocolate
- Bowl

- Matches
- Card
- Dominoes or building bricks
- Small blocks of wood
- Light oil
- Sandpaper
- Painting materials
- Quick-drying clay
- Needles and threads
- Fabric
- Sticky tape
- Musical instruments
- World maps and globes
- Google Earth (**earth.google.com**)
- Wordle software (**wordle.net/create**)
- Mind-mapping software such as Inspiration 9 (**inspiration.com/kidspiration**) or 2connect **(2simple.com)**
- Animation software such as I Can Animate (**kudlian.net/products/icananimate**) or FluxTime Studio (**fluxtime.com**)
- Electronic survey web tools such as Easy Polls (**easypolls.net/**) Kwik Surveys (**kwiksurveys.com/**), Free Online Surveys (**freeonlinesurveys.com/**) and Survey Monkey (**surveymonkey.com/**)
- Collaborative software such as Prezi (**prezi.com**), Zoho (**zoho.com/docs/show.html**), Bunkr (**bunkr.me/**) Prezentit (**prezentit.com/**) or Keynote for Mac users
- Scratch programming software (**scratch.mit.edu**)

Links

http://www.bbc.co.uk/news/world-asia-32479909
A BBC news report on the devastating Nepal earthquake, with maps and 'before and after' photographs.

http://www.actionaid.org
ActionAid International website homepage

http://www.active-robots.com/education/primary-5-11-years
Active Robots website has a wide range of robotic products designed for use in the classroom.

http://artsmarts4kids.blogspot.co.uk/2007/09/jackson-pollock-and-lavender-mist.html
Art Smarts 4 Kids website has a biography of Jackson Pollock written for children.

http://www.awesomestories.com/disasters/pompeii
Awesome Stories website has this account of the devastating eruption of Vesuvius in 79 AD, together with maps, animations, CGI images and photographs of the excavations.

http://www.redcross.org.uk
British Red Cross website details what they do and where they work, including a video about the 2010 Haiti earthquake recovery programme.

http://www.classicsforkids.com/games/
Classics for Kids has some fun music games, including the Note Name Game.

https://www.dkfindout.com/uk/earth/rocks-and-minerals/how-are-igneous-rocks-formed/
DK Find Out! website has an interactive diagram explaining how igneous rocks are formed.

https://www.education.com/resources/earth-science/?referral_url=kidsgeo.com
Education.com contains information, diagrams and maps on the geology that explains plate tectonics.

http://www.eyewitnesstohistory.com/pfpompeii.htm
Eyewitness to History 'The Destruction of Pompeii, 79 AD' is an edited diary account by Pliny the Younger of the eruption of Vesuvius.

https://www.fema.gov/media-library/assets/documents/34288
FEMA for Kids website has information on natural disasters including earthquakes and volcanoes, as well as disaster survival advice.

http://www.geography4kids.com/files/earth_volcano.html
Geography4Kids.com explains how volcanoes are formed.

http://www.geology.sdsu.edu/how_volcanoes_work/Krakatau.html
Geology SDSU website has information about how volcanoes work, with a case study of the Krakatau eruption of 1883.

http://www.google.co.uk/images
Google Images has hundreds of searchable photographs. Search 'Haiti earthquake, 'Japan earthquake 2011' or 'Nepal earthquake 2015'.

http://science.howstuffworks.com/engineering/structural/earthquake-resistant-buildings.htm
HowStuffWorks website has useful information for teachers about the design of earthquake-proof buildings.

http://imaginationstationtoledo.org/content/2011/03/can-you-build-an-earthquake-proof-building/
Imagination Station has videos of building structures being tested on real- life shake tables.

http://shop.legoeducation.com/gb/category/lego-education-wedo-9/
Lego Education website has an online shop of useful robotic products.

http://www.teachingideas.co.uk/notation/name-that-note
Name That Note is a game which can help children to learn the notes on a musical stave.

http://kids.nationalgeographic.com/kids/games/puzzlesquizzes/ quizyournoodle-volcanoes
National Geographic Kids website has a fun interactive quiz for children, testing their knowledge on volcanoes.

http://www.oxfam.org
Oxfam International website homepage.

http://www.picsearch.com/pictures/artist/jackson%20pollock.html
Picsearch has a gallery containing hundreds of images of Jackson Pollock paintings.

http://www.sfskids.org
San Francisco Symphony Kids' website features games and activities to teach children the basics of music (requires Flash).

http://www2.scholastic.com/browse/article.jsp?id=3753355
Scholastic News Online has a news report for children about the Haiti earthquake.

http://www.sciencekids.co.nz/videos/earth/whatisanearthquake.html
Science Kids has an informative educational video about plate tectonics and earthquakes with photographs of earthquake damage done to buildings and roads. (Note: this site does feature advertising.)

http://www.sciencekids.co.nz/sciencefacts/earth/igneousrocks.html
Science Kids website contains a range of facts about igneous rocks.

https://www.theguardian.com/cities/2017/dec/11/earthquake-proof-city-christchurch-japan-colombia-ecuador
The Guardian website has this article about the measures that different cities around the world are taking to earthquake-proof their buildings.

http://www.history.com/topics/atlantis/videos
The History Channel features a number of videos exploring the myths and legends surrounding Atlantis

https://practicalaction.org/earthquake-resistant-housing-4
The Practical Action website contains information about how improved building technology can save homes in earthquake-prone areas.

https://www.tate.org.uk/kids/make/make-jackson-pollock
The Tate Kids website offers instructions for children to create artwork in the style of Jackson Pollock.

http://www.fema.gov
The US Department of Homeland Security has information on disaster response, assistance and survival.

http://www.unicef.org/
UNICEF International homepage.

http://www.unmuseum.org/atlantis.htm

UnMuseum website analyses Plato's story of Atlantis, using maps to locate the island and geographical knowledge to help understand the origins of the story.

https://earthquake.usgs.gov/earthquakes/
USGS website has information for children and teachers about earthquakes.

https://www.volcanodiscovery.com/photos/volcanoes.html
Volcano Discovery website has a photo gallery of volcanoes including Kilauea and Stromboli, plus photos of ash clouds, lava flows, gas bubbles and boiling mud.

https://www.youtube.com/channel/UCoH0q7ANbf2Im_oi2XgOUSQ
VolcanoDiscovery is a Youtube channel which hosts a series of videos with real footage of erupting volcanoes from around the world.

http://en.wikipedia.org/wiki/1980_eruption_of_Mount_St._Helens
Wikipedia has this useful article about the eruption of Mount St Helens and its impact.

https://www.youtube.com/watch?v=5AUU7e8qSdw
YouTube has this amazing footage of an erupting volcano accompanied by the explosive music of Jón Leifs.

https://www.youtube.com/watch?v=HRjLw1x8Q3o&t=407s
YouTube has this video of the eruption of Mount Etna, Sicily, 2000.

https://www.youtube.com/watch?v=e7ho6z32yyo
YouTube hosts this video about what causes earthquakes, why they're so deadly, and what is being done to help buildings sustain their hits.

http://www.youtube.com/watch?v=49P4e1DLm6w&feature=related
YouTube hosts this video showing teachers how to make a simple volcano.

Books

Atlases

Reference books on volcanoes and earthquakes, including:

Volcanoes (Usborne Beginners), by Stephanie Turnbull, Usborne Publishing, 2007

Volcanoes and Other Natural Disasters, by Harriet Griffey, DK Publishing, 1998

Earthquakes & Tsunamis (Usborne Beginners), by Emily Bone, Usborne Publishing, 2012

Volcanoes Around the World, Geography Now series**,** by Jen Green, Wayland, 2008

Volcanoes, What on Earth series, by Kathryn Senior, Book House, 2005

Natural Disasters, Eyewitness Guides, by Claire Watts, Dorling Kindersley, 2006

Earthquake, Go Facts Natural Disasters series, by Ian Rohr, A & C Black, 2006

Escape from Pompeii, by Christina Balit, Frances Lincoln Children's Books, 2005

Pompeii, Usborne Young Reading series, by Anna Claybourne and Katie Daynes, Usborne Publishing Ltd, 2006

Atlantis – The Lost City? DK Readers series, by Andrew Donkin, Dorling Kindersley, 2000

INTERNATIONAL PRIMARY CURRICULUM

PO Box 76081, London, EC4P 4JY

+44 020 7531 9696

info@fieldworkeducation.com

fieldworkeducation.com/ipc

TheInternationalPrimaryCurriculum

The_IPC

From Fieldwork Education, a part of the Nord Anglia Education family.
Fieldwork Education Ltd, Registered Company 03299897, UK