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PLATE TECTONICS WORKSHOP

LEARNING OBJECTIVES & OUTCOMES

KEY STAGE 2 & 3

Overview

This workshop looks at Earth Structure, tectonic plates of the Earth's crust, and how they interact to form volcanoes and earthquakes. It can be adapted for Key Stage 2 or 3.
The workshop is divided into 3 sections with a short break in between.

Section 1: Plate Tectonics

In this section, students are introduced to the structure of Earth, and explore the different tectonic plates of the Earth's crust. They also look at famous volcanoes and earthquakes and their various geological settings.

	KS2	KS3
KEY VOCABULARY	Inner core, outer core, mantle, crust	Inner core, outer core, mantle, crust, constructive margin, destructive margin, conservative margin
LEARNING OBJECTIVES	The Earth is separated into four main layers The crust of the Earth is broken up into tectonic plates. There are three main types of tectonic plate boundary, depending on whether plates are pushing towards, pulling apart or sliding past one another. Earthquakes and/or volcanoes may occur at these boundaries Volcanoes may occur over mantle hot spots, away from plate boundaries.	The Earth is separated into four main layers, with different physical and chemical properties. The crust of the Earth is broken up into tectonic plates. Constructive, destructive and conservative margins form where the boundaries of tectonic plates interact with one another, each producing their own geological phenomena. Volcanoes may occur over mantle hot spots, away from plate boundaries.
LEARNING OUTCOMES	Describe the 3 main types of plate boundary Explain why volcanoes form at "pull apart" and some "push together" margins	Describe the properties of constructive, destructive and conservative plate margins Explain why volcanoes form at constructive and some destructive margins

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	Explain why large earthquakes occur at "push together" and "slide past" margins.	Explain why large earthquakes occur at conservative and destructive margins
NATIONAL CURRICULUM	• Describe and understand key aspects of: physical geography, including: mountains, volcanoes and earthquakes • Use maps, atlases, globes and digital/computer mapping to locate countries and describe features studied	• Pupils should be taught about: the composition of the Earth, the structure of the Earth, the rock cycle and the formation of igneous rocks. • Understand the key processes in physical geography relating to: geological timescales and plate tectonics; rocks; weather and climate

Section 2: Volcanoes

In this section, students explore volcanoes: What are they, how do they form, and what makes them explosive! In an experiment designed to test liquid viscosity, students predict how the viscosity of lava affects a volcano's shape and eruption type, before considering the hazards posed by different types of volcano

KEY VOCABULARY	Magma, Lava, Igneous, Shield Volcano, Stratovolcano	Magma, Lava, Igneous, Shield volcano, Stratovolcano, Viscous
LEARNING OBJECTIVES	Volcanoes produce differing lava types, depending on their geological setting. Lava types influence the shape and explosiveness of a volcano.	Volcanoes produce differing lava types, depending on their geological setting Lava types influence the shape and explosiveness of a volcano. Lava type is dictated by its chemical composition, which in turn produces different rock types when cooled.
LEARNING OUTCOMES	Describe how lava type influences the shape/profile of a volcano. Name 1-2 examples of shield volcanoes and stratovolcanoes	Describe how lava type influences the shape/profile of a volcano. Name 1-2 examples of shield volcanoes and stratovolcanoes Describe some of the hazards to humans associated with volcanic activity
NATIONAL CURRICULUM	• Pupils should be taught to: compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) • Pupils might work scientifically by: observing rocks, using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals	• Develop contextual knowledge of the location of globally significant places • Communicate geographical information in a variety of ways, including through maps, numerical and quantitative skills and writing at length • Pupils should be taught about: pressure in liquids, increasing with depth; upthrust effects, floating and sinking.

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Section 3: Earthquakes

In this section, we explore earthquakes. Looking first at how they occur, students will then see the effects of different waves produced by earthquakes and how each effects the surface of Earth. Students will explore ways for humankind to mitigate the impact of Earthquakes on the lives of those living in earthquake-prone regions. Finally, they will compete together to see who can build the best earthquake-proof building!

KEY VOCABULARY	Friction, strain, seismic, epicenter	Friction, strain, seismic, focus, epicenter, P-Wave, S-Wave, Surface wave
LEARNING OBJECTIVES	Earthquakes occur when strain building between 2 tectonic plates is released. Different types of waves are produced by Earthquakes, each with their own individual effects; scientists can use some of these to monitor earthquakes. Earthquakes cannot be predicted; instead, communities need to build infrastructure that can survive the shaking of an earthquake.	Earthquakes occur when strain building between 2 tectonic plates (at a conservative or destructive margin) is released. Different types of waves are produced by Earthquakes, each with their own individual effects; scientists can use some of these to monitor earthquakes. Earthquakes cannot be predicted; instead, communities need to build infrastructure that can survive the shaking of an earthquake.
LEARNING OUTCOMES	Explain why strain builds up between plates Explain how this leads to earthquakes occurring Design a structure to resist the shaking effects of Earthquakes	Explain why strain builds up between plates Explain how this leads to earthquakes occurring Describe the shapes and properties of different types of waves released by Earthquakes Design a structure to resist the shaking effects of Earthquakes
NATIONAL CURRICULUM	• Describe and understand key aspects of human geography including: types of settlement and land use, economic activity • Understand the processes that give rise to key physical and human geographical features of the world and how these are interdependent • Pupils should be taught to: recognise that environments can change and that this can sometimes pose dangers to living things	• Understand how human and physical processes interact to influence, and change landscapes, environments and the climate; and how human activity relies on the effective functioning of natural systems • Interpret maps in the classroom and the field, including using grid references and scale, topographical and other thematic mapping, and aerial and satellite photographs • Interpret a range of sources of geographical information, including maps, diagrams, globes, aerial photographs and Geographical information Systems (GIS) • Pupils should be taught about: waves that need a medium to travel, waves transferring energy, reflection at a surface, waves in matter