Earthquake explorers – Stage 3

Earth and Space Strand

Term	1	2	3	4	Weeks	1	2	3	4	5	6	7	8	9	10	11

Outcome	Lesson Sequence – Overview	Resources	Word Wall
ST3-10ES-S explains regular events in the solar system and geological events on the Earth's surface • use visual materials such as photographs, animation or video to observe and describe the effects of earthquakes • represent what they think they know about the causes and effects of earthquakes. **ST3-1WS-S** plans and conducts scientific investigations to answer testable questions and collects and summarises data to communicate conclusions • contribute to class discussions about the effects of earthquakes and the resulting changes to the Earth's surface • use talk to share ideas about earthquakes	# Lesson 1 Earthquake encounters – Lesson focus p11 • To capture students' interest and find out what they think they know about how sudden geological changes or extreme weather conditions can affect Earth's surface. • To elicit students' questions about the causes and effects of earthquakes. Students: • *use visual materials to observe the effects of earthquakes* • *create a storyboard using observations from the visual materials* • *discuss ideas and questions for a TWLH chart.*	**For the class** • visual materials (see 'Preparation') • class science journal • word wall • TWLH chart (see 'Preparation') **For each student** • science journal	change continents converge core crust damage data diagram disaster diverge Earth earthquake epicentre geology Gondwanaland

• contribute to the class TWLH chart and word wall • understand the purpose and features of a storyboard • understand the purpose and features of a glossary.			*graph* *intensity* *investigation* *Laurasia* *magnitude* *mantle* *model* *Modified Mercalli scale* *movement* *observation* *photograph* *plate boundary* *pressure* *Richter scale* *seismic waves* *seismogram* *seismologist* *seismology*
ST3-10ES-S explains regular events in the solar system and geological events on the Earth's surface • describe the difference between earthquake magnitude and intensity • describe and discuss the use of the Richter and Modified Mercalli scales • analyse numerical and factual information. ST3-1WS-S plans and conducts scientific investigations to answer testable questions and collects and summarises data to communicate conclusions • use talk to discuss their findings with other students	# Lesson 2 Energetic earthquake – Lesson focus p17 • To provide shared experiences of how the effects, magnitude and intensity of earthquakes are measured. Students: *• read and analyse numerical and factual information about the measurement of earthquakes* *• observe the effects of earthquakes and discuss and compare them.*	**For the class** • class science journal • word wall • TWLH chart • 1 enlarged copy of 'Richter scale' (Resource sheet 3) • 1 enlarged copy of 'Modified Mercalli scale' (Resource sheet 4) **For each team** • role wristbands or badges for Director, Manager and Speaker • each team member's science journal • 1 copy of 'Earthquake hits Newcastle: Eyewitness account' (Resource sheet 1) per team member • 1 enlarged copy of 'Question placemat' (Resource sheet 2) per team member • 1 copy of 'Modified Mercalli scale' (Resource sheet 4) (see 'Preparation') • 1 envelope	

- read, discuss and analyse factual information - understand the purpose and features of a factual recount - use a 'Question placemat' to record factual information.			*seismometer* *surface* *tectonic plate* *timeline* *transform* *weather* *vibration*
ST3-10ES-S **explains regular events in the solar system and geological events on the Earth's surface** - describe tectonic plate movement - represent their understanding of tectonic plate movement using a plasticine model - discuss and compare the layers of the egg model with the layers of the Earth. **ST3-1WS-S** **plans and conducts scientific investigations to answer testable questions and collects and summarises data to communicate conclusions** - use talk to describe tectonic plate movement - discuss and describe the layers of the egg model	# Lesson 3 <u>Unearthing quakes – Lesson focus p27</u> To provide students with hands-on, shared experiences of modelling the changes to the Earth's surface which cause earthquakes. **Session 1 Modelling earthquakes** <u>Students:</u> *• use models to explore the Earth's tectonic plates and the plate movement that results in earthquakes* *• discuss the use of scientific models to represent a scientific idea* *• use plasticine and an egg to represent their understanding of tectonic plate movement.* **Session 2 Interior insights (Optional)** <u>Students:</u> *• use an egg as a model of the internal structure of the Earth* *• compare the layers of the egg with the layers of the Earth.*	**Session 1** **For the class** - class science journal - word wall - TWLH chart 3 sets of 2 plasticine pieces (see 'Preparation') - several small blocks (eg, wooden or plastic) **For each team** - role wristbands or badges for Director, Manager and Speaker - each team member's science journal 1 hard-boiled egg with cracked shell (see 'Preparation') *Optional*: magnifying glass, digital camera or microscopic camera **Session 2** **For the class** - class science journal - word wall - TWLH chart 1 knife	

and the layers of the Earth • contribute to a class discussion about tectonic plates.		• 1 enlarged copy of 'On the inside' (Resource sheet 5) **For each team** • role wristbands or badges for Director, Manager and Speaker • each team member's science journal • 1 half of a hard-boiled egg with cracked shell (see 'Preparation')
ST3-10ES-S **explains regular events in the solar system and geological events on the Earth's surface** • review their understanding of earthquakes and plate movement using factual texts • make and use a plasticine model to explain tectonic plate movement. **ST3-1WS-S** **plans and conducts scientific investigations to answer testable questions and collects and summarises data to communicate conclusions** • use written language and models to demonstrate their understanding of earthquakes and	# Lesson 4 __Explaining earthquakes – Lesson focus p36__ • To support students to represent and explain their understanding of changes to the Earth's surface which causes earthquakes. • To introduce students to current scientific views about earthquakes and tectonic plates. **Session 1 Plates on the move** __Students:__ • *read and discuss a factual text about earthquakes* • *use plasticine and descriptions to represent their understanding of tectonic plate movement.* **Session 2 Changes over time** __Students:__ • *discuss the movement of tectonic plates and suggest reasons for movement.*	**Session 1** **For the class** • class science journal • word wall • TWLH chart • 1 overhead transparency copy of 'Plates on the move' (Resource sheet 6) • *Optional*: video camera or digital camera **For each team** • role wristbands or badges for Director, Manager and Speaker • each team member's science journal • 1 copy of 'Plates on the move' (Resource sheet 6) per team member • 2 plasticine pieces per team member • toothpicks

tectonic plate movement • use scientific language to describe three types of plate movement • understand the purpose and features of factual texts • understand the purpose and features of a timeline.		• several small pieces of cardboard (7 cm x 4 cm approximately) **Session 2** **For the class** • class science journal • each student's science journal • word wall • TWLH chart • 1 overhead transparency copy of 'Map of the continents' (Resource sheet 7) • 1 overhead transparency copy of 'Map of the plate boundaries' (Resource sheet 8) • 1 overhead transparency copy of 'Continent formation: 160 million years ago' (Resource sheet 9) • 1 overhead transparency copy of 'Continent formation: 60 million years ago' (Resource sheet 10) • coloured overhead markers • overhead projector • 1 roll of toilet paper (see 'Preparation') • 5 self-adhesive notes (see 'Preparation')	
ST3-10ES-S explains regular events in the solar system and geological events on the Earth's surface	# Lesson 5 ### Earthquakes down under – p50 • To support students to investigate and compare earthquake activity in Australia and neighbouring countries.	**For the class** • class science journal • word wall • TWLH chart • large map of Australia	

• interpret evidence of and describe earthquake activity for Australia • represent results as a graph • compare and suggest reasons for the difference in earthquake magnitude and frequency between Australia and neighbouring countries. **ST3-1WS-S** **plans and conducts scientific investigations to answer testable questions and collects and summarises data to communicate conclusions** • read and analyse earthquake data • collect and interpret earthquake information • use a graph to record and represent findings contribute to a class discussion about the difference in earthquake activity between Australia and neighbouring countries.	<u>Students:</u> *• review what they have learned about earthquakes* *• compare and discuss data about the occurrence of earthquakes in Australia and neighbouring countries* *• suggest reasons for the higher rate of occurrence of earthquake activity in some of Australia's neighbouring countries.*	• 1 overhead transparency of 'Map of the continents' (Resource sheet 7) • coloured overhead markers • 15 red self-adhesive dots • 15 blue self-adhesive dots **For each student** • science journal • 1 copy of 'Earthquakes around the world' (Resource sheet 11) • 1 copy of 'Earthquake information: 1–15 December 2011' (Resource sheet 12)	

ST3-10ES-S	**Lesson 6**	**For the class**	
explains regular events in the solar system and geological events on the Earth's surface	<u>So you want to be a seismologist? – Lesson focus p57</u>	• class science journal	
• review their understanding of the Richter and Modified Mercalli scales	• To support students to investigate and model how scientists collect information about earthquakes.	• word wall • TWLH chart • 1 small table • 1 felt-tip pen	
• explain that seismologists use scientific instruments to observe, measure and record earthquake activity	<u>Students:</u> • *review their understanding of how earthquakes are measured* • *make a simple seismometer.*	• 1 x 30 cm ruler • 1 length of paper (see 'Preparation')	
• explain that a seismologist is a scientist who studies earthquakes.		**For each team**	
ST3-1WS-S		• role wristbands or badges for Director, Manager and Speaker	
plans and conducts scientific investigations to answer testable questions and collects and summarises data to communicate conclusions		• each team member's science journal	
• use talk to describe the Richter and Modified Mercalli scales		• 1 small table • 1 felt-tip pen • 1 x 30 cm ruler	
• contribute to a class discussion about how scientists study and record information about earthquakes		• 3 lengths of paper (see 'Preparation')	
• discuss and describe what the seismogram tells us about earthquake magnitude.			

ST3-10ES-S **explains regular events in the solar system and geological events on the Earth's surface** • explain that the Earth's surface is made of tectonic plates that move • describe three types of plate movement • discuss the causes and effects of earthquakes • describe the scales that are used to measure the intensity and magnitude of earthquakes • describe how seismologists measure and record earthquake activity. ST3-1WS-S **plans and conducts scientific investigations to answer testable questions and collects and summarises data to communicate conclusions** • use talk to present a 'seismologist' report to an audience • use oral, written and visual forms to present their understanding of earthquakes	# Lesson 7 **<u>On location – Lesson focus p61</u>** • To provide opportunities for students to represent what they know about how sudden geological changes or extreme weather conditions can affect Earth's surface and to reflect on their learning during the unit. <u>Students:</u> *• present a 'seismologist' report from a recent earthquake* *• reflect on their learning during the unit*	**For the class** • class science journal • word wall • TWLH chart • 1 enlarged copy of 'Earthquake presentation planner' (Resource sheet 13) • 1 enlarged copy of 'Quality matrix and Radar chart' (Resource sheet 14) • coloured markers **For each student** • science journal • 1 copy of 'Earthquake presentation planner' (Resource sheet 13) • 1 copy of 'Quality matrix and Radar chart' (Resource sheet 14)	

• reflect on their learning in a science journal entry.			