

## Part 1 Taking a broad view

Activity No	Activity Name	Lesson type	Activity Description	Optional
1.1	<a href="#">A big Earth</a>	Engage & Explore	Students are encouraged to view the Earth on a range of different scales.	
		Digital		
		Short		
1.2	<a href="#">A systems view of the Earth</a>	Explain & Elaborate	Students are introduced to an Earth systems approach through an analysis of their local environment and a consideration of the whole planet.	
		Hands-on & Digital		
		Medium		
1.3	<a href="#">We've got gas</a>	Explore & Explain	The atmosphere and hydrosphere are explored, including possible origins of atmospheric gases and water on Earth.	
		Hands-on & Digital		
		Medium		
1.4	<a href="#">Let there be life</a>	Explain & Elaborate	It is presumed that students have completed quite detailed study already into features of life on Earth, the fossil record, and ecosystems. This <b>diagnostic assessment</b> activity focusses on the interactions between the biosphere and other Earth systems. This builds on understanding they already have about the structure and function of ecosystems, and the requirements of living things.	
		Evaluate		
		Short		
		Classroom		
1.5	<a href="#">Deep time</a>	Explain & Elaborate	Students explore ways of modelling deep time, to better understand the significant of time periods measured in hundreds of million and billions of year.	
		Classroom		
		Short		
1.6	<a href="#">The deep Earth</a>	Evaluate	In this <b>diagnostic assessment</b> activity students revise their understanding of the Earth's structure and the properties of its various layers.	
		Digital		
		Short		

## Part 2 Tectonics – A planet on the move

Activity No	Activity Name	Lesson type	Activity Description
2.1	<a href="#">Earth surface jigsaw</a>	Engage & Explore	Students complete an activity fitting present day continents of the southern hemisphere together to form the supercontinent Gondwana.
		Classroom	
		Short	
2.2	<a href="#">Ring of Fire</a>	Explain & Elaborate	Patterns of earthquakes and volcanic eruptions around the Pacific Ocean allow students to map the margins of a major tectonic plate.
		Classroom & Digital	
		Medium	
2.3	<a href="#">Plates on the move</a>	Explore & Explain	Students learn about Wegener's theory of plate tectonics and in particular the ways in which tectonic plates interact.
		Digital	
		Medium	
2.4	<a href="#">Ocean floor conveyors</a>	Explain, Elaborate & Evaluate	Simulations provide students with models of how new crustal material is created. Students test their understanding through an on-line <b>formative assessment</b> activity.
		Digital	
		Medium	
2.5	<a href="#">Movement beneath the surface</a>	Explain & Elaborate	Students model the forces that act deep beneath the Earth's surface using techniques used by Earth scientists.
		Hands-on & Digital	
		Medium	
2.6	<a href="#">From tectonics to landforms</a>	Elaborate & Evaluate	Students apply their understanding of tectonic processes to explain the appearance of different landforms. The <b>Notebook</b> activities contain <b>formative assessment</b> .
		Digital	
		Short	
2.7	<a href="#">A dynamic Earth</a>	Explain, Elaborate & Evaluate	A <b>formative assessment</b> exercise where students review their understanding of Earth's structure and movements, before designing and presenting a travel brochure and poster for geo-tourism.
		Classroom & Digital	
		Long	

## Part 3 Your BIG systems investigation

Activity No	Activity Name	Lesson type	Activity Description	Optional
3.1	<a href="#"><u>Your BIG systems investigation</u></a>	Engage, Explore, Explain, Elaborate & Evaluate	Students actively engage in a BIG Systems Investigation; that is, conduct experimental, field and data analysis to gain insight into an environmental or local issue. They learn to appreciate the nature of big systems research and the need for collaboration when investigating complex environmental issues and systems. This investigation can be a useful <b>formative assessment</b> activity.	
		Classroom & Digital		
		Long		

## Part 4 Climate science

Activity No	Activity Name	Lesson type	Activity Description
4.1	<a href="#">Our atmosphere</a>	Engage & Explore	Students use a comparison between the conditions on Earth and on the Moon to learn about the significance of Earth's atmosphere.
		Classroom & Digital	
		Short	
4.2	<a href="#">Atmospheric layers</a>	Explore, Explain & Elaborate	Students learn about the layers above Earth and greenhouse gasses. The historical developments concerning the ozone hole are presented as a case study for environmental concern on a global scale.
		Hands-on & Digital	
		Long	
4.3	<a href="#">Carbon cycle</a>	Explain & Elaborate	Students use diagrams and digital resources to learn more about the carbon cycle. This is a revision activity to encourage students to relate the build-up of greenhouse gases (caused by human activity) to changes in the carbon cycle. Understanding the carbon cycle on a global scale should help students understand how changes in different parts of the world have a cumulative impact on the atmosphere.
		Classroom & Digital	
		Medium	
4.4	<a href="#">Is the climate changing?</a>	Explain & Elaborate	Students discuss what they already know in terms of extreme weather events and the public debate on climate change. Students relay any experiences they have had in regard to extreme weather, or experiences their parents may have had. Students then complete the <b>Notebook</b> questions (and linked digital videos and science websites) to understand key definitions and ideas associated with climate change.
		Classroom & Digital	
		Medium	
4.5	<a href="#">Greenhouse effect</a>	Explain & Elaborate	Students investigate the greenhouse effect as it occurs in an actual greenhouse, focussing on the relationship between trapped energy and temperature. Students also investigate the properties of infra-red radiation.
		Hands-on & Digital	
		Long	
4.6	<a href="#">Human influences</a>	Elaborate	Students use the diagrams and video resources to learn about global warming and the enhanced greenhouse effect. The <b>Notebook</b> questions encourage them to consolidate their learning and synthesise their knowledge in simple explanations. The <i>Find out more</i> section provides an opportunity for students to evaluate the carbon footprint of their own school.
		Digital	
		Medium	

Activity No	Activity Name	Lesson type	Activity Description	
4.7	<a href="#">Oceans, ice and climate change</a>	Engage, Explore & Explain	<p>The hands-on activity is largely exploratory and designed to stimulate student thinking on the differences in sea ice and ice sheets, and their relative impacts on sea-level rise. It also raises questions about our ability to model in the lab what is happening on a much larger scale and over a longer period of time.</p> <p>The digital activities focus more on scientific ventures in Arctic and Antarctica – and the search for scientific evidence of climate change.</p> <p>The <b>Notebook</b> and <i>Find out more</i> resources are important for a holistic view of the roles the oceans and polar regions play in our quest to understand what is happening on a big scale to Earth.</p>	
		Hands-on & Digital		
		Long		
4.8	<a href="#">Ocean acidification</a>	Explore, Explain, Elaborate & Evaluate	<p>Students design and conduct an investigation of the effects of different levels of acidity on sea shells to understand the effect of ocean acidification. This task can be a useful <b>summative assessment</b> task for science inquiry skills.</p>	
		Hands-on & Digital		
		Long		
4.9	<a href="#">Climate and biodiversity</a>	Explain & Elaborate	<p>Using a case-study analysis of different species (e.g. ring-tail possum) and by exploring the work of scientists, students learn and appreciate the implications of climate change for biodiversity.</p>	Optional
		Classroom & Digital		
		Medium		
4.10	<a href="#">Communicating climate change</a>	Elaborate & Evaluate	<p>In this <b>summative assessment</b> task students design and create a presentation to convey to a target audience the important aspects of climate change. The presentation could take the form of a poster, PowerPoint, blog, cartoon/graphic novel or play.</p>	Optional
		Classroom & Digital		
		Long		
4.11	<a href="#">Sample test</a>	Evaluate	<p>A sample <b>summative test</b> and <b>marking scheme</b> is available to teachers by request from <i>Science by Doing</i> (<a href="mailto:sbd@science.org.au">sbd@science.org.au</a>). You may need to adapt the test to the needs of your students.</p>	Optional
		Classroom		
		Medium		

Last modified: May 2019