Game 1	**Anoxic Shock** - Stromatolites (cyanobacteria supported by a calcium carbonate structure) emitting oxygen to repel anaerobic microbes. The first photosynthetic organism.	**Literacy**	**Numeracy**	**ICT Capability**	**Critical & Creative Thinking**	**Personal & Social Capability**	**Ethical Understanding**	**Intercultural Understanding**
Biological Sciences	Biological Science - ACSSU149 - Cells are the basic units of living things, and then as many others as possible.	Word Knowledge	Recognising & using patterns & relationships	Applying social & ethical protocols & practices using ICT	Analysing, synthesing & evaluating reasoning & procedures	Social Management		Interacting & empathising with others
	Elaborations 1. Unicellular organisms such as cyanobacteria were the first to produce the oxygen in the Early Earth. They changed the chemistry of the early Earth's atmosphere in addition to oxidising the iron ions sourced either from hydrothermal Black Smokers or from the eroded material of Earth's early continents. The oxdised iron ions combined with the oxygen to form the iron oxide layers of Banded Iron Formations (BIFs).	Visual Knowledge	Using fractions, decimals, percentages, rations, rates	Communicating with ICT				
Chemical Sciences	Chemical Sciences - ACSSU225 - Chemical change involves substances reacting to form new substances.	Text Knowledge	Using spatial reasoning	Managing & Operating ICT				
	Elaborations: 1. The combination of iron ions in seawater with oxygen produced by photosynthesis from cyanobacteria is responsible for the production of iron layers within the BIF.	Comprehending texts through listening, reading, viewing	Interpreting statistical information					
	Biological Science - ACSSU150 - Science Understanding - Multicellular organisms contain systems of organs carrying out specialised functions that enable them to survive and reproduce.		Using measurement					
	Elaborations 1. Similar to the human cardio-vasular system or the digestive system, this is the begining of the journey of iron ore, from ions to minerals to ore can be used as an analogue to represent the pit to port transportation of iron ore.							
	Chemical Sciences - ACSSU152 - Differences between elements, compounds and mixtures can be described at a particle level.							
	Elaborations: 1. Iron Ore is an ionic compound, a solid with a crystal structure. It is a mineral or combination of minerals known as magnetite, hematite, goethite or limonite. It comprises a mixture of iron and oxygen atoms.							
Earth and Space Sciences	Earth and Space Sciences - ACSSU153 - Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales.							
	Elaborations: 1. Iron ore is a mineral in combination with other minerals to form the BIF. It is a non-renewable resource which was formed >2.4b years ago in the Early Earth Oceans of the Archaean.							
Game 2	**Archaean Adventure** - Hydrothermal vents (Black and White Smokers) on the seafloor in ancient times > 2.5 billion years ago were the source of elements such as iron for the formation of the iron layers in BIF. The Black and White Smokers are an important variable in the formation of BIFs, the iron and chert layers are a chemical precipitates, known as chemical sedimentary rocks. Overall, the BIF is also a known as a sedimentary rock.	Word Knowledge	Estimating & calculating with whole numbers	Applying social & ethical protocols & practices using ICT	Inquiry, identyfing, exploring & organising information & ideas	Social Management		Interacting & empathising with others
	For this game each team has a specific role to play in managing and controlling the submarine and its four ROV(s) as they explore to find the 'smokers' through the depths of the ancient seafloor of Archaean Oceans. This game reflects the importance of teams in an automated future world and one run from Remote Operating Centers (ROCs)	Visual Knowledge	Recognising & using patterns & relationships	Creating with ICT	Generating ideas, possibilites & actions			
Physical Sciences	Physical Sciences - ACSSU155 - Energy appears in different forms, including movement (kinetic energy), heat and potential energy, and energy transformations and transfers cause change within systems.	Text Knowledge	Using fractions, decimals, percentages, ratios, rates	Communicating with ICT	Reflecting or thinking & processes			
		Comprehending texts through listening, reading, viewing	Interpreting statiscal information	Managing & operating with ICT	Analysis, synthesing & evaluating reasoning & procedures			
Earth and Space Sciences	Earth and Space Sciences - ACSSU153 - Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales.		Using measurement					
	Elaborations: 1. Considering the role of forces and energy in the formation of different types of rocks and minerals.							
	2. The role of energy in the movement of the ROV							
	3. The role of hydrothermal energy from within the Earth to create the 'smokers' and their unique ecosystems.							
	Science as a Human Endeavour - ACSHE135 - Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations.							
	Science as a Human Endeavour - ACSHE136 - People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity.							
	Elaborations: 1. Considering the role of technology which supports science and technology to explore and discover new geological landscapes and the ecosystems they provide.							
Game 3	**The Outback Trail** - A factual, conversationlist game aimed at creating greater awareness of the unique geology which supports the Australian Landscape, its resources and the role that it played for First Nations People. It explores water, rock and what is known as the world's first mine for Aboriginal Ochre.	Word Knowledge	Estimating & calculate with whole numbers	Applying social & ethical protocols & practicising using ICT	Inquiry, identifying, exploring & organising information & ideas	Social Management	Understanding ethical concepts and issues	Interacting & empathising with others
	Science as a Human Endeavour - ACSHE226 - Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures.	Visual Knowledge	Recognising & using patterns & relationships	Investigating with ICT	Generating ideas, possibilites & actions	Self-awareness	Exploring values, rights & responsibilities	Recognising culture & developing respect
	Elaborations:	Text Knowledge	Using spatial relationships	Creating with ICT	Reflecting, thinking & processes			
	1. Investigating how Aboriginal and Torres Strait Islander Peoples connect knowledge from the disciplines of physics, chemistry, biology and geology in the development of material culture.	Comprehending texts through listening, reading, viewing		Communicating with ICT				
		Composing texts through speaking, writing & creating		Managing & operating with ICT				
Earth and Space Sciences	Earth and Space Sciences - ACSSU153 - Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales.	Grammar Knowledge						
	Science as a Human Endeavour - ACSHE136 - People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity							
	Elaborations:							
	1. Develop an understanding of conceptual science in the world around them through examining abiotic and biotic features of an environment and studying how First Nations people utilised its resources in a sustainable manner.							
Game 4	**Uncover** - A conversational game aimed at showcasing how ore minerals are discovered, the different careers involved in the process and the environmental and social governance framework that supports exploration practices in Australia. The communication and relationships between all types of community stakeholders and the exploration companies is highlighted, and noted as a key driver of partnership success.	Word Knowledge	Recognising & using patterns & relationships	Applying social & ethical protocols & practicising using ICT	Inquiry, identyfing, exploring & organising information & ideas	Social Management	Understanding ethical concepts & issues	Interacting & empathising with others
	Science as a Human Endeavour - ACSHE136 - People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity	Visual Knowledge	Interpret statistical information	Investigating with ICT	Generating ideas, possibilities & actions	Self-awareness	Reasoning in decision making actions	Recognising culture & developing respect
	Elaboration 1:	Text Knowledge	Using measurement	Creating with ICT	Reflecting or thinking & processes		Exploring values, rights & responsibilites	
	An exploration into the various STEM roles and processes associated with identifying and locatiing an ore resource, supported by the essential environmental and social governance associated with all community stakeholders and First Nations culture and heritage.	Comprehending texts through listening, reading, viewing		Communicating with ICT				
	Science as a Human Endeavour - ACSHE135 - Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations.	Composing texts through speaking, writing & creating		Managing & operating with ICT				
	Elaboration 1: The role of mineral exploration is a safe and sustainable practice in Australia which is governed by a framework which engages all stakeholders and one which benefits its stakeholders.	Grammar Knowledge						
	Science as a Human Endeavour - ACSHE226 - Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures.							
	Elaborations:							
	1. The identification and location of a potential ore resource, collaboration with community stakeholders is dependent on a system which is underpinned by STEM enterprising and technical skills and ones which require the latest technology and scientific understanding to ensure the safety of all members, the environment and the preservation of First Nations Culture and History.							
Earth and Space Sciences	Earth and Space Sciences - ACSSU153 - Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales.							
	Elaboration:							
	1. The formation of rocks which contain Nickel, an essential green technologies metal.							
Physical Sciences	Physical Sciences - ACSSU155 - Energy appears in different forms, including movement (kinetic energy), heat and potential energy, and energy transformations and transfers cause change within systems.							
	Elaboration:							
	1. Energy is used by a number of different geophysical techniques to understand the structures which occur underneath the earth's surface and which may contain and/or conceal a potential ore deposit.							
Chemical Sciences	Chemical Sciences - ACSSU152 - Differences between elements, compounds and mixtures can be described at a particle level.							
	Elaboration:							
	1. Nickel bearing rock is comprised of a combination of minerals, nickel ore is a mineral. Different elements of the periodic table occur in association with Nickel ore and can be used to help locate a potential ore deposit.							
Game 5	**Coring and Exploring** - is a collaborative classroom game which requires each team to discuss their facts to decide what is the best answer that describes the rock or mineral.	Word Knowledge	Recognising & using patterns & relationships	Applying social & ethical protocols & practices using ICT	Generating ideas, possibilities & actions	Social Management		
Earth and Space Sciences	Earth and Space Sciences - ACSSU153 - Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales.	Visual Knowledge	Interpreting statistical information	Communicating with ICT	Anaylsing, synthesising & evaluating reasoning & procedures			
	Elaboration:	Comprehending texts through speaking, listening, viewing		Managing & operating ICT				Interacting & empathising with others
	1. An array of different rocks and minerals typically associated with iron ore deposits are presented with their identifying facts.							
Chemical Sciences	Chemical Sciences - ACSSU152 - Differences between elements, compounds and mixtures can be described at a particle level. Elaborations: 1. Iron Ore and other minerals are ionic compounds, a solid with a crystal structure. It is a mineral or combination of minerals known as magnetite or hematite. It comprises a mixture of iron and oxygen atoms.							
	2. A combination of minerals in a solid mixture is known as a rock. For this example the rock is known as a BIF (Banded Iron Formation).							
Game 6	**Modern Mine** - A conversational game based on the modern mine of 2040, by investigating a world of new technology relating to a decarbonised, digitised and diversified world, as global economies transit from industry 4 to 5.	Grammar Knowledge	Recognising & using patterns & relationships	Applying social & ethical protocols & practices using ICT	Inquiry, identifying, exploring & organising information & ideas	Social Management		
	Science as a Human Endeavour - ACSHE135 - Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations.	Word Knowledge	Interpreting statistical information	Investigating with ICT	Generating ideas, possibilities & actions	Self-awareness		

Game 1	**Anoxic Shock** - Stromatolites (cyanobacteria supported by a calcium carbonate structure) emitting oxygen to repel anaerobic microbes. The first photosynthetic organism.	**Literacy**	**Numeracy**	**ICT Capability**	**Critical & Creative Thinking**	**Personal & Social Capability**	**Ethical Understanding**	**Intercultural Understanding**	
	Elaborations:	Visual Knowledge		Creating with ICT			Understanding ethical concepts & issues	Interacting & empathising with others	
	1. Looks into how new technologies will be integrated into mines of the future, to make them safer, more economic and more environmentally friendly	Text Knowledge		Communicating with ICT			Reasoning in decision making/actions		
	Science as a Human Endeavour - ACSHE226 - Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures.	Comprehending texts through listening, reading, viewing		Managing & Operating with ICT			Exploring values, rights & responsibilities		
	1. New technologies which support a decarbonised and digitised world, require STEM scientists and other professionals to work collaboratively to develop new technologies which align with environmental and social governance frameworks.	Composing texts through speaking, writing, creating							
Physical Sciences	Physical Sciences - ACSSU155 - Energy appears in different forms, including movement (kinetic energy), heat and potential energy, and energy transformations and transfers cause change within systems.								
	Elaborations:								
	1. Energy is used in different forms to power modern mine 2040 processes such as the electric trucks, energy microgrids and other machinery or the waterless tailings dam.								
Game 7	**Keep it Moving** - is a collaborative classroom game where each team is a train, part of a network which is required to get as much iron ore from the pits and spurs to the ports. Teams much work together to get the most iron ore to the pits.	Word Knowledge	Estimating & calculating with whole numbers	Applying social & ethical protocols & practices using ICT	Generating ideas, possibilites & actions	Social Management			
Physical Sciences	Physical Sciences - ACSSU155 - Energy appears in different forms, including movement (kinetic energy), heat and potential energy, and energy transformations and transfers cause change within systems.	Visual Knowledge	Recognising & using patterns & relationships	Communicating with ICT	Reflecting or thinking & processes				
	Elaborations:		Using fractions, decimals, percentages, ratios, rates	Managing & Operating with ICT	Analysing, synthesing & evaluating reasoning & procedures			Interacting & empathising with others	
	1. The railsystem in the Pilbara is the largest in the world, operating 24/7 to transport iron ore from the Pilbara pits to ports in Hedland and Dampier.		Using spatial reasoning						
	Science as a Human Endeavour - ACSHE226 - Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures.		Interpreting statistical information						
	Elaboration:		Using measurement						
	1. Scheduling and utilising a digitised interface to remotely operate trains is a comparitively new technology. Remote Operation Centers (ROCs) are becoming the norm and careers in this field are evolving very fast.								
	Science as a Human Endeavour - ACSHE135 - Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations. Elaborations: 1. Investigate how energy efficiency can reduce energy consumption related to movement along the tracks with the use of diesel power and power generation and storage due to movement downhill from mines to port to move the loads across the terrain. 2. Consider how engineers improve energy efficiency of a range of processes, such as scheduling the trains and realising or losing efficiencies.								
Game 8	**Containing Chaos** - At the ports, it is important to schedule the loading of the ships for their transport to Asian Markets. A collaborative classroom game, the students need to have a conversation to determine how to load the cranes effectively and efficiently.	Word Knowledge	Estimating & calculating with whole numbers	Applying social & ethical protocols & practices using ICT	Generating ideas, possibilities & actions	Social Management			
Physical Sciences	Physical Sciences - ACSSU155 - Energy appears in different forms, including movement (kinetic energy), heat and potential energy, and energy transformations and transfers cause change within systems. Elaborations: 1. This is the port facility and its power to operate effectively to load ore from trains to ships. Consider different energy and fuel required for fixed and moving machinery. Science as a Human Endeavour - ACSHE136 - People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity. Elaborations: 1. Consider how engineers improve energy efficiency of a range of processes, such as scheduling the cranes and realising or losing efficiencies.	Visual Knowledge	Recognising & using patterns & relationships	Communicating with ICT	Reflecting or thinking & processes				
			Using fractions, decimals, percentages, ratios, rates	Managing & operating with ICT	Analysing, synthesing & evaluating reasoning & procedures			Interacting & empathising with others	
			Using spatial reasoning						
			Interpreting statistical information						
			Using measurement						