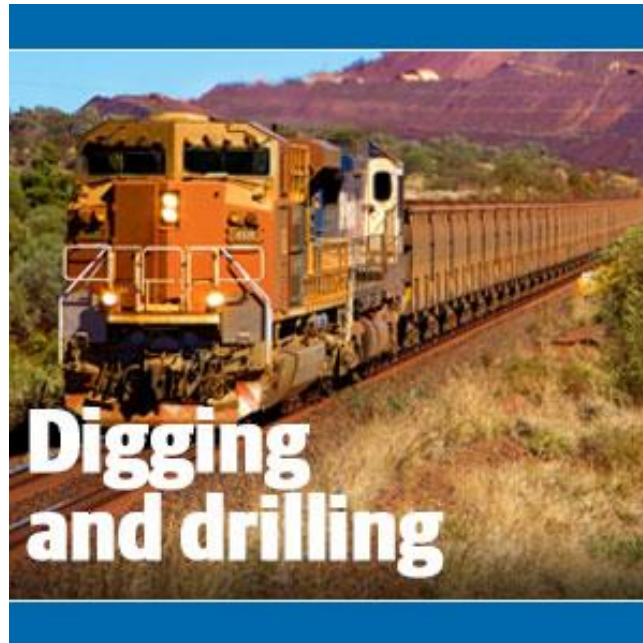


ANSWER GUIDE:

Digging and drilling



Term 4, 2019

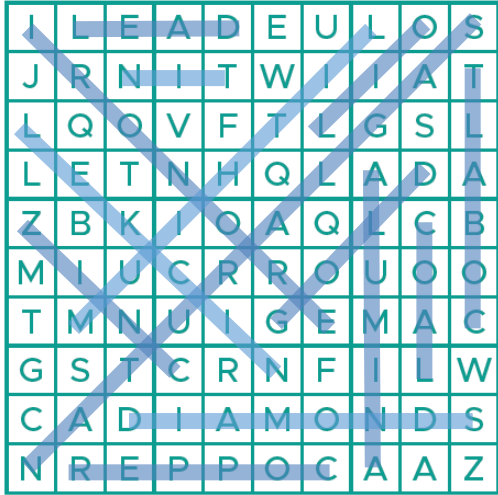
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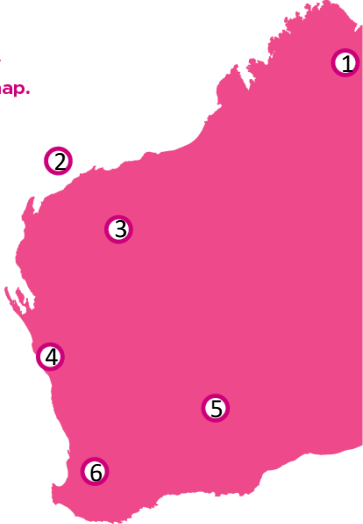
Part 1: The wealth of our State

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Activity title	Answers
'Investigate' – ochre colours	<p>Yellow: limonite</p> <p>Red: Hematite</p> <p>Both of these substances are iron ores.</p>

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Activity title	Answers
True or false?	<p>As well as being used as a source of energy, fossil fuels are used in the production of crayons, road tar, dishwashing liquids, DVDs, medicines and plastic lunchboxes.</p> <p> <input checked="" type="checkbox"/> True <input type="checkbox"/> False </p>
Metal	<p>1. What is the metal these ores contain? Malachite and cuprite both contain COPPER</p> <p>2. What are some things this metal is used for? Copper is an excellent conductor of electricity, and it is primarily used in electrical systems, such as household wiring, generators, motors and transformers.</p> <p>It is also widely used for piping, decorative cladding and other architectural fixtures such as locks, faucets and handles, cookware and musical instruments.</p> <p>Students may list other uses.</p>
Wordfind	
'Connect' – commodity prices	Students' responses will reflect commodity prices of the day.

Activity title	Answers
'Explore' – match invention with demand	<div> <div>petroleum</div> <div>silicon</div> <div>lithium</div> <div>uranium</div> <div>aluminium</div> </div> <div> <div>nuclear power and nuclear weapons</div> <div>soft drink cans</div> <div>plastic</div> <div>rechargeable batteries</div> <div>computers</div> </div>
'Explore' – resource industry milestones	<p>Match the following resource industry milestones to the right place on the map.</p> <div> <div>1849 WA's first lead mine established, near Northampton</div> <div>1883 A major deposit of coal found near Collie</div> <div>1892 Gold discovered in Coolgardie</div> <div>1964 Oil is discovered on Barrow Island</div> <div>1966 Production of iron ore starts at Tom Price</div> <div>1979 One of the world's largest diamond deposits is found at Lake Argyle</div> </div> <div> <div>4</div> <div>2</div> <div>6</div> <div>5</div> <div>3</div> <div>1</div> </div> 
'Investigate' – uses of coal and coal by-products	<div> <div>concrete</div> <div>✓</div> <div>rubber bands</div> <div></div> <div>medicines</div> <div>✓</div> <div>rayon and nylon fabric</div> <div>✓</div> </div>
Looming shortages	<p>Students can list three of the following:</p> <div> <div>Cerium</div> <div>Erbium</div> <div>Gadolinium</div> <div>Lanthanum</div> <div>Neodymium</div> <div>Promethium</div> <div>Scandium</div> <div>Thulium</div> <div>Yttrium</div> <div>Dysprosium</div> <div>Europium</div> <div>Holmium</div> <div>Lutetium</div> <div>Praseodymium</div> <div>Samarium</div> <div>Terbium</div> <div>Ytterbium</div> </div>

Activity title	Answers
Who am I?	<ol style="list-style-type: none"> Lang Hancock Augustus Charles Gregory Patrick "Paddy" Hannan

Part 2: Out of the ground

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Activity title	Answers															
Fracking	<table><tr><th>Argument</th><th>For</th><th>Against</th></tr><tr><td>Renewable energy can't yet meet global demand, and fracking can provide sufficient energy until green energy catches up.</td><td>✓</td><td></td></tr><tr><td>Studies suggest that fracking releases toxic compounds into the air that are dangerous to the environment and human health.</td><td></td><td>✓</td></tr><tr><td>The process uses massive amounts of water, much of which is currently not able to be recovered.</td><td></td><td>✓</td></tr><tr><td>Fracking will create thousands of jobs and carries tremendous economic benefits.</td><td>✓</td><td></td></tr></table> <p>Students will have own additional arguments for or against fracking.</p>	Argument	For	Against	Renewable energy can't yet meet global demand, and fracking can provide sufficient energy until green energy catches up.	✓		Studies suggest that fracking releases toxic compounds into the air that are dangerous to the environment and human health.		✓	The process uses massive amounts of water, much of which is currently not able to be recovered.		✓	Fracking will create thousands of jobs and carries tremendous economic benefits.	✓	
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Project partners	<ul style="list-style-type: none">• Woodside• BHP Billiton Petroleum (North West Shelf) Pty Ltd• BP Developments Australia Pty Ltd• Chevron Australia Pty Ltd• Japan Australia LNG (MIMI) Pty Ltd• Shell Australia Pty Ltd															

PAGE 2

Activity title	Answers
Not a 9 to 5 job	Students will have their own responses.
A tool for every job	<ul style="list-style-type: none"> • Giant dump trucks have wheels that are twice as tall as a person and each TYRE can cost \$40,000. • BUCKET wheel excavators are the largest machines found on a mine site. • Jumbos drill holes into a mine wall so that EXPLOSIVES can be inserted and blast the rock wall underground. • Some hydraulic shovels are so big they could hold an entire HOUSE in their scoop. • Some companies are starting to convert beam pumps which pump oil so that they can operate on SOLAR energy.


Activity title	Answers		
Closed but not forgotten	<ul style="list-style-type: none">• Black Diamond Lake: COAL• Langford Park: Bauxite• Wittenoom: Asbestos		
Staying Safe	Explosions	C	Ensure that flammable chemicals are stored safely and regularly check ventilation systems.
	Rock falls or cave-ins	G	Schedule controlled collapses to pro-actively remove any rocks that might be loose.
	Fires	E	Install firefighting equipment throughout the site and train staff to identify fire hazards.
	Electrical hazards	F	Install circuit breakers and put up signs warning of high voltage wiring and cables.
	Exposure to dust or toxic fumes	D	Provide appropriate breathing apparatus and install alarms which detect dangerous gases.
	Vehicle hazards	A	Create traffic plans for vehicles and ensure workers wear hi-viz safety vests.
	Noise	B	Use earplugs and sound level meters.

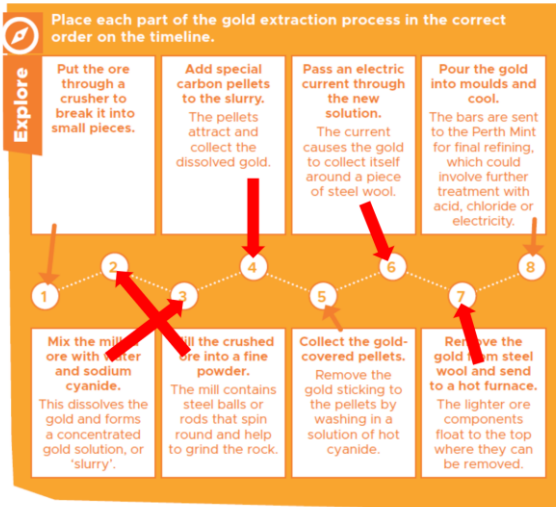
Part 3: Shifting, making, using

PAGE 1

Activity title	Answers
FPSO	Floating, Production, Storage, Offtake

PAGE 2

Activity title	Answers										
From fossicking to metallurgy	<p>Brass Copper (65–90%), zinc (10–35%)</p> <p>Steel Iron (80–98%), carbon (0.2–2%), plus other metals such as chromium, manganese, and vanadium</p> <p>("Stainless steel" contains iron (50%+), chromium (10–30%), plus smaller amounts of carbon, nickel, manganese, molybdenum, and other metals)</p> <p>Bronze Copper (78–95%), tin (5–22%), plus manganese, phosphorus, aluminium, or silicon</p>										
Explore											
From ore to what?	<table border="0"> <tr> <td>bauxite</td> <td>iron</td> </tr> <tr> <td>cuprite</td> <td>lead</td> </tr> <tr> <td>haematite</td> <td>aluminium</td> </tr> <tr> <td>calamine</td> <td>copper</td> </tr> <tr> <td>galena</td> <td>zinc</td> </tr> </table>	bauxite	iron	cuprite	lead	haematite	aluminium	calamine	copper	galena	zinc
bauxite	iron										
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Everyone's responsibility	<p>Instead of buying a brand new...</p> <p>Bike Fix your existing bike, upgrade with a new part, get a second hand bike</p> <p>Roll of clingwrap Use paper bags or wax wraps, cover food with a plate or store food in jars and re-usable containers</p> <p>Glass Christmas tree ornament Make your own tree decorations, swap with friends</p>
Invisible gold	 <p>Place each part of the gold extraction process in the correct order on the timeline.</p> <p>1 Put the ore through a crusher to break it into small pieces.</p> <p>2 Mix the mill ore with water and sodium cyanide. This dissolves the gold and forms a concentrated gold solution, or 'slurry'.</p> <p>3 Mill the crushed ore into a fine powder. The mill contains steel balls or rods that spin round and help to grind the rock.</p> <p>4 Add special carbon pellets to the slurry. The pellets attract and collect the dissolved gold.</p> <p>5 Collect the gold-covered pellets. Remove the gold sticking to the pellets by washing in a solution of hot cyanide.</p> <p>6 Pass an electric current through the new solution. The current causes the gold to collect itself around a piece of steel wool.</p> <p>7 Remove the gold from steel wool and send to a hot furnace. The lighter ore components float to the top where they can be removed.</p> <p>8 Pour the gold into moulds and cool. The bars are sent to the Perth Mint for final refining, which could involve further treatment with acid, chloride or electricity.</p>

PAGE 3

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LNG and LPG	<table><thead><tr><th>TICK TO SHOW WHETHER THE FOLLOWING STATEMENTS RELATE TO LNG OR LPG</th><th>LNG</th><th>LPG</th></tr></thead><tbody><tr><td>■ composed mostly of methane gas</td><td>✓</td><td></td></tr><tr><td>■ composed mostly of propane and butane gas</td><td></td><td>✓</td></tr><tr><td>■ lighter than air, so will dissipate more quickly if there is a leak</td><td>✓</td><td></td></tr><tr><td>■ has a higher energy content, so less gas is required to produce the same amount of heat</td><td></td><td>✓</td></tr><tr><td>■ used in BBQ bottles and as an alternative to petrol in cars</td><td></td><td>✓</td></tr><tr><td>■ used as a 'mains gas' that most Australian home stoves and heaters run on</td><td>✓</td><td></td></tr><tr><td>■ produces less carbon emissions</td><td>✓</td><td></td></tr></tbody></table>	TICK TO SHOW WHETHER THE FOLLOWING STATEMENTS RELATE TO LNG OR LPG	LNG	LPG	■ composed mostly of methane gas	✓		■ composed mostly of propane and butane gas		✓	■ lighter than air, so will dissipate more quickly if there is a leak	✓		■ has a higher energy content, so less gas is required to produce the same amount of heat		✓	■ used in BBQ bottles and as an alternative to petrol in cars		✓	■ used as a 'mains gas' that most Australian home stoves and heaters run on	✓		■ produces less carbon emissions	✓	
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Odd one out	Petrol does not use titanium dioxide.																								

PAGE 4

Activity title	Answers
Explore	<p>Students will have their own answers, eg.</p> <p>Mining trucks can be more than six meters tall. This makes them as <i>tall as a two storey house</i>.</p>