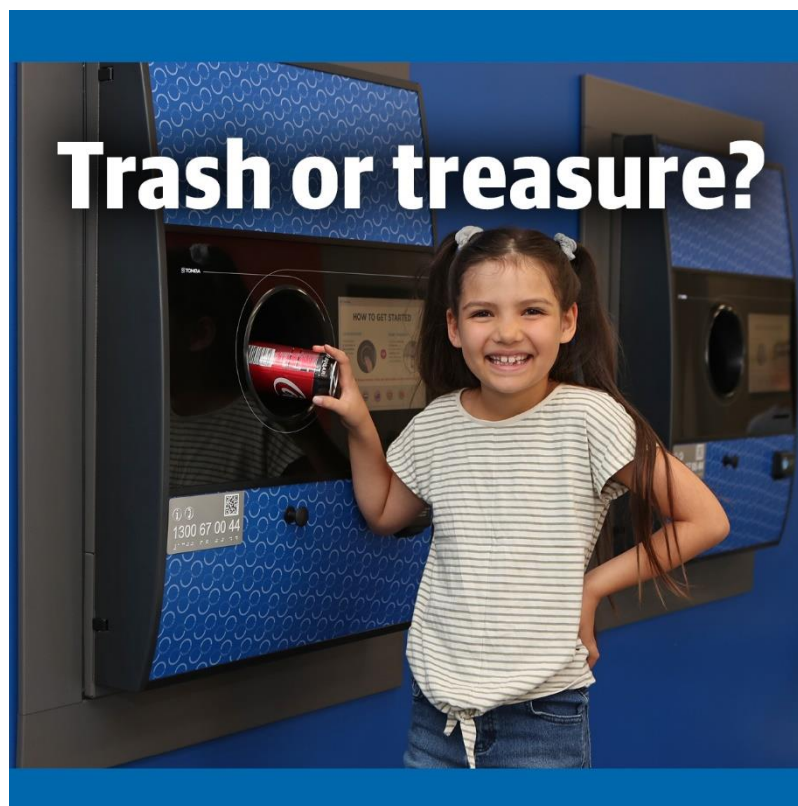


## ANSWER GUIDE

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**Term 1, 2021**

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# Part 1: Glorious glass

PAGE 1

Activity title	Answers
Glass galore	

PAGE 2

Activity title	Answers
The secret of glass making	<p>Student's own response.</p> <p>Could be they felt important being the few who knew how, provided them with a job as not many people could do it, could charge more because it was rare, etc.</p>
Early production	<p>Glass blowing involves inflating molten glass with a blowpipe to make a 'glass bubble' that can be moulded into a desired shape. One end of the blowpipe is inserted into the furnace collecting a "gob" of molten glass. It is then rolled on a flat slab to create the shape, being reheated as needed to keep the glass malleable. To give the glass the final shape the blow pipe holding the glass is placed onto a steel stand and the glassblower blows into the blow pipe while rotating it, again reheating as required. Steel tweezers are used to remove the glass from the blow pipe. The finished glass object is then slowly cooled to avoid breakage.</p>
Glass in nature	<p>Obsidian is produced when sand shoots out of an erupting volcano, melts in the red hot lava and solidifies when it cools. It ranges in colour from dark green to black and resembles a glossy rock. Obsidian has been used by people since the Stone Ages as a tool for cutting, spear tips and for ceremonial purposes. Today obsidian is used for jewellery and sometimes surgical instruments as it is sharper than a metal blade.</p>

Activity title	Answers
Explore	<p>Renewable: able to be used without running out. Eg. solar energy and hydropower</p> <p>Non-renewable: There is a finite quantity which cannot be replenished. Once it has been used up there won't be anymore.</p> <p>All are non-renewable</p>
Explore	Use less where possible and recycle what we do use to reduce the need for raw materials
Stealing sand	All are true

Activity title	Answers
Beverage bottles	<ol style="list-style-type: none"> <li>1. precise amounts of silica sand, soda ash, limestone and cullet (recycled glass) is fed into the furnace</li> <li>2. over a day, ingredients melt together, forming honey-like molten glass</li> <li>3. molten glass is poured out with timed shears cutting it to make cylindrical gobs the exact size needed to make a bottle</li> <li>4. a mould makes a mini version of the bottle shape</li> <li>5. in a blow mould, compressed air stretches and hollows it to the shape of the final bottle</li> <li>6. reheated, then gradually cooled to prevent cracking</li> <li>7. sprayed with a lubricant to help them move through the machinery</li> <li>8. inspected by machinery for imperfections, then inspected by a person</li> </ol>
Reuse, recycle	<div> <div> <p><b>possible barriers</b></p> <div> <p>Some drinks are made in other states or countries.</p> <p>Retailers sell a wide variety of glass bottled beverages.</p> <p>Modern hygiene requirements.</p> <p>Customers not willing to make the extra effort to return them.</p> </div> </div> <div> <p><b>potential issue</b></p> <div> <p>The place of purchase may not have the time or space needed to sort bottles to return to each manufacturer.</p> <p>When bottles are not returned new replacement bottles need to be made.</p> <p>Transporting costs and energy required to return bottles to manufacturer may be higher than cost and energy requirement of recycling.</p> <p>Each manufacturer would need their own sterilisation equipment to ensure bottles stay sterile until refilled.</p> </div> </div> </div>
Recycling glass	<p>Glass keeps its colour after recycling so coloured glass will add colour to new glass products. Green glass is recycled to make green glass, brown glass is recycled to make brown glass etc. If green and brown cullet were mixed together they would create a new muddy brown colour which manufacturers wouldn't have a use for.</p>

**PAGE 3 cont.**

Activity title	Answers
Feeling hot, hot, hot!	Less fossil fuels needed, less emissions produced, less raw materials needed to make the glass, furnaces last longer so do not need to be replaced as often, less glass in landfill.
Lost to litter	Possible answers: Ask an adult first, don't pick up broken glass, bring a bag or box to put collected containers in, check that there are no animals inside, check the area is safe to go into (eg. long grass may have snakes), rinse them out ASAP to avoid attracting insects, use tongs or gloves, wash your hands afterward...
Broken glass	Broken glass should go in a kerbside recycling bin. Glass should never go in the general waste bin, and glass bottles must be whole to be returned to Containers for Change.

**PAGE 4**

Activity title	Answers
Closing the loop	Closed-loop recycling  Closed-loop recycling is preferable as the materials can continually be recovered and used to make new products. This means less raw materials are required (both the ingredients and the fossil fuels used to create energy) so less habitat needs to be disturbed by mining; less energy is needed for production so less emissions are produced; less waste goes to landfill
Burning to start earning	Wine bottles and cordials are not intended as single serve drink on-the-go containers. As they are most commonly poured into a glass and consumed at home or a restaurant, rather than out-and-about, they are not often littered. Beer bottles and glass soft drink bottles are usually single serve and unfortunately are commonly littered so the 10c refund will hopefully encourage recycling rather than littering. Glass wine and cordial bottles should go in kerbside recycling, and WA is already doing a good job of recycling them.)

## Part 2: Awesome aluminium

PAGE 1

Activity title	Answers
Multi-use metal	

PAGE 2

Activity title	Answers																														
Fast facts	<table><thead><tr><th>True</th><th>False</th><th></th></tr></thead><tbody><tr><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td>lightweight</td></tr><tr><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td>strong</td></tr><tr><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td>rusts easily</td></tr><tr><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td>malleable (easily shaped)</td></tr><tr><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td>good conductor of electricity and heat</td></tr><tr><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td>absorbent</td></tr><tr><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td>combustible (burns)</td></tr><tr><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td>ductile (can be made into thin wire)</td></tr><tr><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td>can be combined with other metals to improve their properties</td></tr></tbody></table>	True	False		<input checked="" type="checkbox"/>	<input type="checkbox"/>	lightweight	<input checked="" type="checkbox"/>	<input type="checkbox"/>	strong	<input type="checkbox"/>	<input checked="" type="checkbox"/>	rusts easily	<input checked="" type="checkbox"/>	<input type="checkbox"/>	malleable (easily shaped)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	good conductor of electricity and heat	<input type="checkbox"/>	<input checked="" type="checkbox"/>	absorbent	<input type="checkbox"/>	<input checked="" type="checkbox"/>	combustible (burns)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ductile (can be made into thin wire)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	can be combined with other metals to improve their properties
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Making the metal	<p>Bauxite ore is crushed and mixed in a tank with hot water, <u>caustic</u> soda and lime. This solution leaches a compound called <u>alumina</u> out of the bauxite. The alumina (which is made up of aluminium and oxygen) is filtered and <u>dried</u> into a white powder and then transported to a <u>smelter</u>. There the powder is dissolved in a hot bath of sodium aluminium fluoride and a powerful electric <u>current</u> is passed through it. The electricity <u>separates</u> the aluminium from the oxygen. The metal falls to the <u>bottom</u>. This is then melted and cast into ingots.</p>																														

PAGE 2 cont.

Activity title	Answers
WA leading the way	Note: Using an online map such as whereis.com you can do a directions search using each location as a 'stop' to get a map showing all seven locations at the same time. The mines and refineries are all located relatively close together. The mines are located where there is a natural supply of bauxite and the refineries are located nearby so the bauxite can be transported easily for refining.
Smelter shortcomings	Student's own response. Possible answers: lots of things are made with aluminium so we need more of it, if we stopped the people who produce it would be out of a job, not enough people recycle their aluminium so we need to keep making more, Australia has a lot of bauxite...

PAGE 3

Activity title	Answers						
Aluminium making the news	8,000						
Aluminium aircraft	fuselage, wing panes, rudder, exhaust pipes, door, floor, seats, engine turbines, cockpit instrumentation, wheels						
Aluminium in the kitchen	It's not for a particular purpose but rather a result of the manufacturing process. It is difficult to make rollers with a tiny enough gap to produce thin foil. So for the final and thinnest roll, two sheets go through the rollers together. When they are later separated, the two inside surfaces are matte (as they were pressed together) while the outer surfaces are shiny (having had the rollers smooth them).						
Why recycle?	<div>Possible answers:</div> <table> <tr> <td>Less new aluminium required to be made</td><td>Less bauxite mining required means less habitat disturbed by mining. No smelting process required so no fluoride gas emissions caused.</td></tr> <tr> <td>Uses less energy than making 'new' aluminium</td><td>Less non-renewable fossil fuels used to generate electricity and less greenhouse gas emissions created.</td></tr> <tr> <td>Less sent to landfill or littered</td><td>More space in landfill for non-recyclables. Less threat to wildlife from discarded cans.</td></tr> </table>	Less new aluminium required to be made	Less bauxite mining required means less habitat disturbed by mining. No smelting process required so no fluoride gas emissions caused.	Uses less energy than making 'new' aluminium	Less non-renewable fossil fuels used to generate electricity and less greenhouse gas emissions created.	Less sent to landfill or littered	More space in landfill for non-recyclables. Less threat to wildlife from discarded cans.
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Activity title	Answers
To infinity and beyond	Three hours
Recycling aluminium	
Investigate	<p>Clean aluminium foil: collect and scrunch into balls of at least 5cm diameter then put in your yellow-lid kerbside recycling bin. This includes Easter egg foil – collect the small pieces until you have enough to scrunch into a ball.</p> <p>Damaged pots and pans: take to scrap metal companies</p> <p>Mobile phones: Send to Mobile Muster, drop off available at some Officeworks stores</p> <p>Note: <a href="http://recycleright.wa.gov.au">recycleright.wa.gov.au</a> (or the Recycle right app) has a search function to find out which bin different waste items should go in. For things that are recyclable but cannot go in your household recycling bin, it provides suggestions of alternative recycling providers.</p>
Helping the planet, helping each other	Student's own response.
Your school 'can' fundraise	Student's own response.

## Part 3: Popular plastic

### PAGE 1

Activity title	Answers
Plastic everywhere	Student's own response. Possible answers: shoes, lunchbox, clothing, spectacles, furniture, ruler, drink bottle, watch, pen, toothbrush, bread bag...
One-of-a-kind word find	Student's own design.

### PAGE 2

Activity title	Answers												
Plants to plastics	Student's own response. Possible answers: current concerns about plastics are that they are made with non-renewable fossil fuels, their production creates greenhouse gases, waste plastic lasts for hundreds of years and gives off toxic chemicals as it degrades...												
From ground and lab	2060 – birth year = answer. Eg. Born 2012 = 48 years old (2060 – 2012 = 48) Born 2011 = 49 years old Born 2010 = 50 years old Born 2009 = 51 years old												
Plastic in the past	<table border="1"> <tr> <td>1930s</td><td>E. Transparent sticky tape</td></tr> <tr> <td>1940s</td><td>B. Nylon stockings</td></tr> <tr> <td>1950s</td><td>A. Plastic bags</td></tr> <tr> <td>1960s</td><td>D. Acrylic paints</td></tr> <tr> <td>1970s</td><td>F. Plastic beverage bottles</td></tr> <tr> <td>1980s</td><td>C. Plastic money</td></tr> </table>	1930s	E. Transparent sticky tape	1940s	B. Nylon stockings	1950s	A. Plastic bags	1960s	D. Acrylic paints	1970s	F. Plastic beverage bottles	1980s	C. Plastic money
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Mountains of waste	True												
Ocean garbage	Pacific												



Activity title	Answers												
Different types for different uses	<a href="https://www.preciousplasticmargaretriver.com/collections/all">https://www.preciousplasticmargaretriver.com/collections/all</a> Possible answers: drinking cups, surfboard fins, combs, bowls, plant pots, wet bags												
Stop it, or swap it	<p>Student's own response. Possible answers:</p> <table border="1"> <tr> <td></td><td>Could swap for:</td></tr> <tr> <td>cling wrap</td><td>Beeswax wrap. Reusable containers.</td></tr> <tr> <td>zip lock bag</td><td>Reusable container, empty yoghurt tub, use a peg/clip/hair tie/rubber band to close up original packet.</td></tr> <tr> <td>textas</td><td>Pencils, wax crayons.</td></tr> <tr> <td>sticky tape</td><td>Washi tape, biodegradable tape, glue, use string/ribbon.</td></tr> <tr> <td>disposable cutlery</td><td>BYO cutlery to wash and use again, bamboo cutlery.</td></tr> </table>		Could swap for:	cling wrap	Beeswax wrap. Reusable containers.	zip lock bag	Reusable container, empty yoghurt tub, use a peg/clip/hair tie/rubber band to close up original packet.	textas	Pencils, wax crayons.	sticky tape	Washi tape, biodegradable tape, glue, use string/ribbon.	disposable cutlery	BYO cutlery to wash and use again, bamboo cutlery.
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Recycled plastic products	Soft drink bottle and shampoo bottle are the only ones that can be recycled again.												
The future of plastic?	<p><input checked="" type="checkbox"/> Bioplastic generally costs more than conventional plastic.</p> <p><input checked="" type="checkbox"/> Crops grown to produce bioplastics can absorb carbon dioxide from the air.</p> <p><input checked="" type="checkbox"/> Bioplastics only decompose in the right conditions.</p> <p><input checked="" type="checkbox"/> Bioplastics can contaminate conventional plastic recycling.</p> <p><input checked="" type="checkbox"/> Bioplastics are made from renewable resources.</p> <p><input checked="" type="checkbox"/> Bioplastics release fewer toxic chemicals when incinerated (burnt).</p>												

Activity title	Answers								
Businesses taking responsibility	Student's own response.								
WA's Plan for Plastics	<table border="0"> <tr> <td>STRAWS</td><td>COTTON BUDS</td></tr> <tr> <td>PLATES</td><td>MICROBEADS</td></tr> <tr> <td>CUTLERY</td><td>PRODUCE BAGS</td></tr> <tr> <td>BALLOONS</td><td>TAKEAWAY PACKAGING</td></tr> </table>	STRAWS	COTTON BUDS	PLATES	MICROBEADS	CUTLERY	PRODUCE BAGS	BALLOONS	TAKEAWAY PACKAGING
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Recycling made easy	Student's own response.								