

## Candidate 5 evidence

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1a)	Rubber is a suitable choice of material because it has a firm texture and good gripping qualities.
	Painted tubular mild steel is suitable because it has a high resistance to corrosion when applied with a finish like paint. Tubular mild steel also has a good strength-weight ratio.
	ABS is a suitable choice of material as ABS is shatter resistant.
	ABS is also chemical resistant so that it is easy to clean.
	Nylon is a suitable choice of material because of its self-lubricating abilities which allow it to seal slipping and allows for rotating components.
	Nylon is also light meaning that it doesn't carry too much weight to the product.
1b)	For the garden <sup>digger</sup> <del>digger</del> the mild steel frame would be extrusion moulded due to the unigommed cross-section across the frame. The ABS wheels would be injection moulded as this would provide the intricate detail necessary.
	For the sand digger the fixings would be die-casted because of how easily repeatable the process is.

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1c)	<p>One way anthropometrics has influenced design is that the handles of the diggers need to be wide enough for a human hand to fit smoothly around it.</p> <p>Another way is that the height of the seat must be at the right height for the human body in a seated position to touch the ground easily for the average person.</p> <p>Another way is <sup>that</sup> <del>the</del> the width of the handles must be at roughly the same width as the shoulder blades of a human so that they don't have to excessively stretch.</p> <p>One way that physiology has <del>influenced</del> <sup>influenced</sup> design is that the weight of the handlebars must be light enough for <del>a</del> <del>person</del> anyone to lift the scoop upwards.</p>
1d)	<p>One <del>influence</del> <sup>influence</sup> by function is that the scoops must be able to collect dirt and lift it up.</p> <p>Another influence by function is that the digger needs to be able to rotate 360° around the central point (sand digger).</p> <p>Another influence of function is that the digger must be able to move its wheels and easily (road digger).</p> <p>One influence of safety is that the digger must be stable when rotating (sand <del>digger</del> <sup>digger</sup>).</p> <p>Another influence of safety is that the seat and the frame must be stable to <del>prevent</del> <sup>reduce</sup> the likelihood of people falling off.</p>

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1e)	<p>One way that efficiency could be <del>xxx</del> increased is that templates could be used to allow for more products repeated at a <del>quicker</del> quicker rate.</p> <p>Another way that efficiency could be <del>impp</del> improved is that CNC drilling can be used to allow for accurate placements faster and more accurately than a human.</p> <p>Another way that efficiency could be improved is through the use of a Gantt chart which can set the pace for what tasks have to be done at certain times making the manufacturers more organised and efficient.</p>	
2a)	<p>Thermosetting plastics are suitable because they are shatter resistant meaning components won't be all over the place.</p> <p>They are also suitable as they won't deform when exposed to higher temperatures.</p>	
2b)	<p>Compression moulding is <del>not</del> suitable for manufacture as the process is easily repeatable and can be done quickly to allow for batch/mass production.</p> <p>It is also suitable because of the economies of scale for which the utensils are being produced, potentially allowing for increase in profits.</p>	

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2c)	One idea generation technique would be morphological
	analysis. Morphological analysis puts ideas into 2 categories,
	Aspects and Attributes, aspects are the sub-family or
	an attribute (Red, Blue, Green being aspects for colour) and attributes
	are the main category (Colour, Shape, Size, Theme for example).
	These
	These would then be mixed and matched to produce different
	ideas.
	Another generation technique is technology transfer. Technology
	transfer is where you take the solution of something from another
	product and use it to solve the problem of your product.
	This can be taken from many products and lead to new ideas.
3a)	One benefit of standard components for the consumer
	is that it saves time assembling the product as things
	won't have to dry or set in possible position.
	Another benefit is that it is simplistic and requires less
	skill/experience to use.
3b)	One benefit of CAD software is that elements of the product
	can be easily altered to suit the occasion.
	Another benefit is that it can <sup>stress</sup> be tested by CAD simulation
	before the product is manufactured.
	Another benefit is that there is a library of standard components
	which saves the user time from having to draw each component.

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3c)	<p>An impact that <del>is</del> <del>gully</del> <del>of</del> automated <sup>production</sup> <del>workforce</del> has on workforce is that billing images will decrease due to there being less workers needed for the job which could lead to unemployment.</p> <p>Another impact this has is that the demand for a skilled workforce is reduced as automation allowed for less experienced workers to do just as well as skilled workers because they'll mostly monitor the progress.</p>
4a)	<p>One advantage 3D printing has over traditional manufacture is that production speeds are faster due to it mainly being on a computer and <del>produced</del> <sup>produced</sup> from info on a computer.</p> <p>Another advantage is that 3D printing is cheaper overall as initially set up costs (such as the 3D printer) starts high but production is much lower than initial costs whilst traditional manufacture has a somewhat low set up cost but increases throughout production.</p>
4b)	<p>Assuming that a target market has already been established a questionnaire/survey would be suitable for trying to narrow <del>to</del> the specific factors they would like to have incorporated. <del>incorporated</del> Information could include: colour, sizes, themes, materials, etc.</p>

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	<p>Another research technique would be to put the product up against an existing products and compare to see what may need to be altered/improved.</p>
	<p>Information gathered could be stability for balance, sizes, material usage, seal of the products.</p>
	<p>Another research technique would be to have helpers use the product and explain how they feel and what is happening through a user trial.</p>
	<p>Info gathered could be: how the user feels when <sup>using</sup> <del>putting on</del> the product, any and all potential issues such as injuries, allergy and specific sizes.</p>
4ci)	<p>The purpose of a <del>from</del> Product Design Specification is to give specific parameters that a product must follow. An example of information found here would be dimensions of the product.</p>
4cii)	<p>The purpose of a Technical Specification is to give an <del>and</del> analysis of the technicality of the product. An example of information found here would be the materials of the product and the process used to manufacturing the product.</p>

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5a)	<p>The golden coloured body and handle of the products contrasts with the silver coloured lid and end pouring end of the kettle.</p> <p>The kettle and its components are mostly round shaped such as the main body, the base of the kettle, the lid of the kettle, and the knob to heat up the kettle.</p> <p>The kettle is a modern style with plain colours and little to no pattern whatsoever.</p> <p>The feel of the kettle is relatively smooth with no <del>rough</del> <sup>underlying</sup> grip from something rubber based.</p>	
5b)	<p>Another method of protecting IPR would be Copyright. Copyright is used to protect any published products (books, movies, songs)</p>	
6)	<p>Ergonomists have the role of testing the ergonomics of a product to see what materials have what textures.</p> <p>Ergonomists usually co-operate with Materials Specialists and Production Specialists to analyse what materials have a certain <del>texture</del> <sup>texture</sup> and how that texture can be achieved through production.</p>	

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	<p>Market Researchers have the role of looking through the market and seeing what products are trending and how well a product would do in the marketplace. Market Researchers usually co-operate with Accountants and the Project Managers to analyse what product / aspect of a product is popular and inform whether or not a product would <del>sucess</del> <sup>sucess</sup>.</p>
	<p>Project Managers have the role of briefing the team on the <del>the</del> product that <del>is</del> <sup>is going</sup> to be produced. <del>Project</del> <sup>Project</sup> Managers usually co-operate with the whole design team to evaluate progress and take note of any setbacks.</p>
7a)	<p>One method of identifying the material used in a car would be to put the materials (Metals in this case) through a magnetic test. A magnetic test determines whether or not a product is ferrous or non-ferrous, if the material is magnetic then it is a ferrous metal and vice versa.</p>
	<p>One method of identifying the material used in cases would be to put the materials through a float test. A float test determines how heavy a <del>product</del> <sup>material</sup> is, if the material floats then it is relatively light for its size and if it sinks then it is heavy for its size.</p>



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	<p>One method of identifying the material used in cases would be to put the materials through a flame test. A flame test determines the specific characteristics of a product such as its flame colour, scent given off, soles-extinguish<sup>ion</sup> and whether or not it leaves molten trails once heated.</p>
	<p>One method of identifying the material used in jewellery would be to analyse the aesthetic qualities of the material. These qualities include the look, texture, transparency, weight when held.</p>
7a)ii)	<p>One way how manufacturing features are used to aid production of guitars is through the use of templates, templates help retain the shape of every guitar produced to be the same saving time having to do each one individually and reducing the risk of human errors.</p> <p>Another way this aids the manufacture of guitars is with CNC drilling to help drill each hole as accurately and precisely as possible, further reducing the risk of human errors.</p>

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7b)	One step that can be taken is to make the product from
	recyclable materials to reduce waste.
	Another step that can be taken is to design the product <del>close</del> <sup>closer</sup>
	to the target market so that there is less transport needed
	reducing <del>reducing</del> pollution.
	Another step that can be taken is to make the product out of
	different segments so that if they were to be separated, the
	segments can be reused in other products.
	Another step taken is to allow for products to stack, so
	that if transport is needed, then more products can make the
	trip, saving time, money <del>on</del> <sup>on</sup> fuel and less pollution overall.
8)	During the preliminary section of design sketch models
	would be used to generate ideas, communicate those ideas
	to the rest of the team and also lead to further development of
	future ideas.
	Between the preliminary and productive sections of design,
	block models would be used to test how the product feels
	and the position of each minor component so that production
	can be smooth or altered.
	During the production <del>stage</del> <sup>section</sup> of design prototype models
	would be used to <del>test</del> <sup>test</sup> if the function of the product is working
	and would give a rough idea of the final products function.

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