QUESTIONING 1 SPECIFICATION			KNOWLEDGE	COMPREHENSION	APPLICATION
Human Centred Design	User Needs	Most important, critical to success	What are the user needs that must be met?	Why does the product need to work for the user in this way? What benefit will the user experience?	How might the product work for the user?
	User Wants	Optional extras	What are the user wants that could be met?	What effect does meeting the user's wants have here?	Include some of the user's wants in the design specification if appropriate. What happens if you satisfy some or all of the wants?
	Functional Ergonomics	Ease of operation affecting the function	List the ways the solution will need to be designed for the user interact well with it. What are the primary and affordances it will need?	Why doe the product need to work in a particular way? How does the product help or hinder the task it is designed for? What effects does it have on the user? What are it's main effects when being used?	Use what you've understood and previously learned to improve the functional ergonomics of the product. Try to simplify the product whilst keeping or improving the same functionality.
CRITICAL DIMENSIONS	Human Dimensions	Anthropometrics	Which measurements of the human body will need to be used to design the product around?	Why have those measurements been used? What range of people have the measurements been taken from?	Have the correct measurements been used and used effectively?
	Component Dimensions	Standard components	Which standard components could be used?	Why have these components been chosen for use on this product. What processes were used to put them in place?	Take the components out and replace them? Use the components in a different context. Select appropriate components for another product.
	Environment Dimensions	Interior, Exterior, Geological	What are the sizes of the relevant spaces that the solution will be used in?	Describe what you understand about how the dimensions of the environment will impact the design of the product.	Apply your understanding of the dimensions of the environment of use to generate concepts that take full account of those dimensions.
ENVIRONMENTS OF USE	Functional Requirements	The range of conditions the solution must work in	What range of different conditions will the solution need to cope with? What range of temperatures? What range of humidity? What pressure will it work under? (Underwater, vacuum, sand, radiation, weather, dust etc)	Explain why the product must function in those range of environments. Explain how it will be designed and made to function in those environments.	Apply your understanding of the range of conditions that the product must function to select materials. How will you need to design the solution to deal with that range of functional requirements
CIRCULAR ECONOMY	Reduce Waste & Pollution	Materials	Which materials might be selected to minimise waste, pollution and environmental damage?	What physical and working properties do the materials need that will determine the material chosen. How will material choice be affected by Circular Economy principles.	Suggest alternative materials for different components and explain the positive and negative effects they would have on function and the circular economy.
		Manufacture	What industrial manufacturing methods and techniques could be used to minimise waste?	Explain which manufacturing processes you could choose would reduce or minimise waste.	Plan out how you will mark out and manufacture your work to minimise waste.
	Keep products and materials in use	Durability	How might you ensure that the solution will last as long as possible? What materials, components and manufacturing methods could you use?	Describe how the conditions of use, material stresses, and product functionality will affect the durability of the solution.	Select durable materials and create a product that can be well engineered in the workshop.
		Maintenance	How might the solution be designed to be easy to disassemble so that components or sub-assemblies can be replaced by non-professionals. (Right to Repair)	Describe alternative methods of manufacture and assembly that would allow the product to be easier to maintain.	Which methods of manufacture and assembly could you design in to your solution?
	Regenerate Natural Resources	Sustainable sourcing, environmental repair	What materials might be used that come from a source that is renewable? Which renewable sources might the energy used come from? Which sustainable frameworks might the suppliers work under?	Describe and explain why sourcing materials from a sustainable source helps create a Circular Economy.	How will you source sustainable materials? What materials are available to in school that are sustainable.
SDG	Sustainable Development Goals	Which SDG's are helped? Which SDG's are undermined	List the SDG's that the solution will meet, and rank them in order of importance (relative to the users).	Describe how you might go about meeting the SDG's. Describe which are the important SDG's you solution is targeting and why you would do it.	Take aspects of the product that meet the SDG's and re-use them in your own design or improve the aspects of the product that need to be better.
STYLING	Delight the User	Aesthetics appeal to all the senses and the user's personal narrative	How might the solution be designed to appeal to all the senses to delight the user?	Describe and explain how the cool, satisfying, amazing, and pleasing aspects make you feel. And say why they do: Why do they delight you or other people?	
	The effect of function on form…	…and visual semantics	Which aspects of the solution MUST work no matter what? How might this affect the appearance of the design?	Explain how the form of the object has been designed to make the product function better.	
	Fashion Trends	Short term initial sales achieved	What relevant current fashions and trends might be useful to make a solution more attractive and desirable to the user and others?	Why have these trends been used? Who would the trends appeal to? Who would reject the product because of the fashion trends used?	
	Circular Economy effects on Styling	Aspects of styling influenced by CE needs	How might meeting and promoting the needs of a circular economy affect the styling of the solution?	Explain how choosing some materials and manufacturing processes will allow the product to contribute the Circular Economy.	
COSTING ISSUES	Efficient waste free manufacture	Minimise material use, waste and processing	How might the solution be designed to minimise the use of material? Which manufacturing techniques might be chosen to efficiently use and not waste material and energy?	Describe and explain the reasoning behind the designer's choices for waste reduction in styling, material selection and assembly.	How do you plan to ensure efficient use of materials in a school workshop environment?
		Minimise energy use and waste	How might energy use, waste and pollution be minimised in manufacture?	Describe and explain the reasoning behind the your choices for waste reduction in manufacturing processes.	How will you ensure efficient energy and waste reduction in a school workshop environment?
		Minimise labour costs in relation to quality and profit (fairly)	What blend of manufacturing methods and techniques* could be combined to maximise quality but minimise cost (from robotics to CNC to manual skilled labour to manual unskilled)	Explain how costs are kept down whilst quality will remain high because of these choices.	Suggest and justify alternative methods of manufacture and ways of working that could further improve the use of labour
	Maximise Quality	Excellent Design	What are the most important things to do during the design process to ensure excellence in the design of the solution?	Explain why those processes will be carried out in your designing.	How will you plan and execute those processes in school.
		Precise Engineering	What are the most important things to plan and to carry out during manufacture that ensure a precisely engineered solution?	Explain why these processes will be carried out in your designing,	How will you plan and carry out these engineering processes effectively in the school workshop.