Unit = Yr10/11 Specialist Principals	Road Map				
	Assessment Grades				

Themes	Learning Goals/Outcomes/Content			
Knowledge focus: How do you use primary and secondary data?	**Primary and secondary data** In this lesson students will learn about what primary and secondary data are and how they can be used to inform design research. *Lesson objectives* By the end of this lesson students should be able to: • understand what primary data is • understand what secondary data is • use both types of data to understand client and user needs.			
Knowledge focus: How do you construct a design brief and specification?	**Design brief and manufacturing specification** In this lesson students will learn how to write a Design Brief and a Manufacturing Specification. *Lesson objectives* By the end of this lesson students should: • understand what a design brief is and be able to write their own • know what a manufacturing specification is and be able write one for their own product.			
Knowledge focus: What are the Environmental, social and economic challenges?	**Environmental, social and economic challenge** In this lesson students will learn about the environmental, social and economic issues that designers could face when creating new product ideas. *Lesson objectives* By the end of this lesson students should: • understand about mining, drilling and farming and their environmental impacts • understand about deforestation and the environmental impact it has on the world • understand about which processes contribute to global warming and atmospheric pollution • understand the social issues in the design and manufacture of products and the need for fair trade in the world.			
Knowledge focus: How can you be influenced by t eh work of others?	**The work of others** In this lesson students will learn about the work of others and investigate how this can influence their own work. *Lesson objectives* By the end of this lesson students should: • understand the style and influence of Sir Alec Issigonis and Marcel Breuer • understand the style and influence of Alessi and Braun.			
Knowledge focus: How can you generate creative designs?	**Generating design ideas** In this lesson students will learn the techniques for generating design ideas as well as creating their own set of design ideas. *Lesson objectives* By the end of this lesson students should be able to:			

	• understand the different design strategies that can be used to help designing • create a set of initial design ideas by using the iterative design process.			
Knowledge focus: What are initial designs?	**Initial design ideas** In this lesson students will use their knowledge of design strategies to generate a set of initial design ideas. *Lesson objectives* By the end of this lesson students should be able to: • use the design brief to create a set of initial design ideas by using the iterative design process.			
Knowledge focus: How can you model accurately?	**Cardboard modelling (1)** Over the next two lessons, students should create a card model of their design idea(s) that they feel are the most successful. *Lesson objectives* By the end of this lesson students should be able to: • understand how to card model a design • understand how to evaluate and improve a design using a card model.			
Knowledge focus: How can you develop using modelling?	**Cardboard modelling (2)** Over the next two lessons, students should create a card model of their design idea(s) that they feel are the most successful. *Lesson objectives* By the end of this lesson students should: • understand how to card model a design • understand how to evaluate and improve a design using a card model.			
Knowledge focus: What is design development?	**Design development** In this lesson students will use photos of their model to develop their idea ready for the final design. *Lesson objectives* By the end of this lesson students should be able to: • understand how to use the model to help develop a design idea • use exploded/parts drawings to help with the designing.			
Knowledge focus: How do you use skecthup?	**3D CAD final model (1)** In these lessons students will create their final design idea using 3D CAD to visualise and render the final design (students may need two lessons to complete this depending on their capabilities). *Lesson objectives* By the end of this lesson students should: • be able to create a final design using 3D CAD (Google sketchup) • understand why 3D CAD is a powerful tool in communicating a design to the client.			
Knowledge focus: How can I create my design in skecthup?	**3D CAD final model (2)** In these lessons students will create their final design idea using 3D CAD to visualise and render the final design (students may need two lessons to complete this depending on their capabilities). *Lesson objectives* By the end of this lesson students should: • be able to create a final design using 3D CAD (Google sketchup) understand why 3D CAD is a powerful tool in communicating a design to the client**.**			

Knowledge focus: What factors influence material stock selection?	**Selecting materials and stock sizes** In this lesson students will learn about the three key factors when deciding on materials: functional need, cost and availability. *Lesson objectives* By the end of the lesson students should: • understand how functional need can influence the choice of materials • understand how cost can influence the choice of materials • understand how availability can influence the choice of materials • be able to create a cutting list based on sizes and materials choices.			
Knowledge focus: What are the common sources of materials?	**Sources of materials** In this lesson students will learn about the primary sources of materials and the main processes involved in converting them into workable forms. *Lesson objectives* By the end of the lesson students should: • understand where timber-based materials come from and how they are seasoned ready for manufacturing • understand how metal is extracted from ore and the process of refining them ready for manufacturing • understand how polymers are manufactured from crude oil and the processes of fractional distillation and cracking.			
Knowledge focus: What re common forces and stresses?	**Forces and stresses** In this lesson students will learn about the different forces and stresses that can be placed on materials and how materials can be modified to withstand greater forces or stresses *Lesson objectives* By the end of the lesson students should: • understand the different forces that can be present on materials • understand how materials can be modified to withstand greater forces.			
Knowledge focus: How to measure and mark out accurately	**Measuring and marking out** In this lesson students will learn about the tools and techniques needed to measure and mark out to minimise wastage of the materials. *Lesson objectives* By the end of the lesson students should: • understand about the different tools used for measuring and marking out • understand about the different methods for economically marking out on materials • be able to economically mark out using the correct tools on the pieces of material.			
Knowledge focus: How do you cut various materials?	**Cutting (1)** In this lesson students will learn about the cutting tools that can be used to shape woods, metals and polymers. This will cover two lessons of time to allow students to cut and shape the materials accurately. This lesson should be taught in the workshop where possible. *Lesson objectives* By the end of the lesson students should: • understand why we use a specific tool to cut a particular material • be able to use the tools to try cutting straight and curved lines in each material			

	• be able to select and use the correct tool when cutting the pieces of the project.			
Knowledge focus: How do you cut various materials?	**Cutting (2)** In this lesson students will learn about the cutting tools that can be used to shape woods, metals and polymers. This will cover two lessons of time to allow students to cut and shape the materials accurately. This lesson should be taught in the workshop where possible. *Lesson objectives* By the end of the lesson students should: • understand why we use a specific tool to cut a particular material • be able to use the tools to try cutting straight and curved lines in each material • be able to select and use the correct tool when cutting the pieces of the project.			
What techniques can you use to shape materials?	**Shaping (1)** In this lesson students will learn the theory about how timbers, polymers and metals can be shaped. They will then have the opportunity to shape their own materials for their projects (three lessons). *Lesson objectives* By the end of the lesson students should: • understand which tools are used to shape the different materials (timber, polymers and metals) • be able use this knowledge to successfully shape their own pieces of material.			
Knowledge focus: What techniques can you use to shape materials? (continued)	**Shaping (2)** In this lesson students will learn the theory about how timbers, polymers and metals can be shaped. They will then have the opportunity to shape their own materials for their projects (three lessons). *Lesson objectives* By the end of the lesson students should: • understand which tools are used to shape the different materials (timber, polymers and metals) • be able use this knowledge to successfully shape their own pieces of material.			
What techniques can you use to shape materials? (continued)	**Shaping (3)** In this lesson students will learn the theory about how timbers, polymers and metals can be shaped. They will then have the opportunity to shape their own materials for their projects (three lessons). *Lesson objectives* By the end of the lesson students should: • understand which tools are used to shape the different materials (timber, polymers and metals) • be able use this knowledge to successfully shape their own pieces of material.			
Knowledge focus: What are the various scales of production?	**Scales of production** In this lesson students will learn about the links between commercial processes and scales of production. *Lesson objectives* By the end of the lesson students should: • understand what a prototype/one-off product is			

	• understand what kinds of products are manufactured using batch production • understand what kinds of products are manufactured using mass production • understand what kinds of products are manufactured using continuous production.			
Knowledge focus: How do you apply quality control techniques?	**Quality control** In this lesson students will learn about the application and use of quality control to assist in the manufacturing of products. *Lesson objectives* By the end of the lesson students: • understand how quality control can be achieved in timber-based products • understand how quality control can be achieved in metal-based products • understand how quality control can be achieved in polymer-based products • understand how you can apply quality control checks to the manufacturing of a product.			
Knowledge focus: What are commercial processes and surface finishes?	**Commercial processes and surface finishes** In this lesson students will learn about the different surface treatments and finishes that can be applied to timbers, metals and polymers. Once the students have planned the finishes they should spend time preparing and finishing their product. *Lesson objectives* By the end of the lesson students should: • understand which finishes can be applied to timbers and why they are needed • understand which finishes can be applied to metals and why they are needed • understand which finishes can be applied to polymers and why they are needed • be able to make choices about the finishes that need to be applied to their personal valet design and apply them to enhance the functional and aesthetic properties.			
Knowledge focus: How to analyse and evaluate a project and product	**Analysis and evaluation of prototypes** In this lesson students will evaluate and analyse the success of their prototype product and suggest potential future modifications. Depending on resources available, this could span two lessons of time. *Lesson objectives* By the end of the lesson students should: • understand why evaluation is important understand how to evaluate the success of a product.			