Manufacturing Processes and Techniques : Prototyping Materials, Processes and Considerations		
Calendar	**Big Question/Theme**	**Small Questions**
September to October	1. How can materials and processes be used to make iterative models? 2. How can materials be manipulated and joined in different ways in a workshop environment when making final prototypes? 3. How do designers and manufacturers ensure accuracy when making prototypes and products?	1. What materials are commonly used by professionals when making models? 2. How can modelling materials be cut to size? 3. How can modelling materials be manipulated? 4. What adhesives can be used to join similar and dissimilar modelling materials? 5. What are the different ways that designers model products? 6. What is meant by rapid prototyping? 7. What is CAD, CAM and CAE? 8. Why is the study of anthropometrics and ergonomics important when modelling and prototyping?

Manufacturing Processes and Techniques : Physical and Working Properties of Timbers / Sources and Origins of Timbers

Calendar	Big Question/Theme	Small Questions
November to January	TIMBERS PART 1 ❑ What are the physical and working properties of timber? ❑ Which timbers are selected when used in products for different functions? TIMBERS PART 2 ❑ How are timbers sourced and where do they come from? ❑ What are the physical and working properties of manufactured boards?	TIMBERS PART 1 ❑ How are woods classified? ❑ What is the difference between a hardwood and a softwood? ❑ What are the physical and working properties of common softwoods? ❑ What are the physical and working properties of common hardwoods? TIMBERS PART 2 ❑ What is conversion? ❑ What are the differences between slab/plain sawn timber & modern/traditional sawn timbers? ❑ What is seasoning? ❑ Where do timbers come from? ❑ What is the ecological impact of using timbers? ❑ What is the FSC? ❑ What are manufactured boards? ❑ What is meant by the term veneer? ❑ What is meant by the term slicing and peeling? ❑ What are the characteristics of MDF, blockboard, chipboard and plywood?

Manufacturing Processes and Techniques : Picture Frame

Calendar	Big Question/Theme	Small Questions
PROJECT BOOKLET		
November to January	❑ What is meant by the term structural Integrity? ❑ What is meant by the term casting? ❑ How are abrasive papers used to improve the surface finish of materials? ❑ How are drills and files used to shape materials? ❑ What surface finishes can be applied to timbers to improve the physical and aesthetic properties?	❑ How can products be designed to ensure they have the sufficient strength required when in use? ❑ What is meant by the term reinforcing? ❑ How are surfaces prepared so that a surface finish can be applied? ❑ How are products held securely/safely when shaped and formed? ❑ What surface finishes can be applied to materials to improve both the physical appearance and functionality?

Manufacturing Processes and Techniques : Spaceclaim CAD

Calendar	Big Question/Theme	Small Questions
PROJECT BOOKLET		
November to January	How do industry professional use digital design tools when developing design ideas? What is meant by the terms CAD, CAM, CAE? What is meant by the term rapid prototyping and what is 3d printing?	

Manufacturing Processes and Techniques : Commonly Available Forms of Timber PART 3 / Standard Components PART 3

Calendar	Big Question/Theme	Small Questions
KNOWLEDGE BOOKLET		
January to February	TIMBERS PART 3a ❑ What is meant by the term ‘stock form’? TIMBERS PART 3b ❑ What standard components are commonly used with timbers and can you suggest when designing products which you would use and why?	TIMBERS PART 3a ❑ What is PAR and rough sawn? ❑ Can you identify the differences between planks, boards, strips, dowel, square section and mouldings? TIMBERS PART 3b An in-depth look at all of the pre-manufactured components listed below : ❑ Screws ❑ Caps and cups ❑ Nails ❑ Hinges ❑ Stays ❑ Handles ❑ Locks ❑ Catches

Manufacturing Processes and Techniques : Picture Frame

Calendar	Big Question/Theme	Small Questions
PROJECT BOOKLET		
January to February	❑ How do you combine different materials of a similar type to create effective and modern designs? ❑ How do you set up and machine timbers to create high quality outcomes? ❑ Why is it important to develop technical drawings and making plans before manufacturing products? ❑ How do you use abrasive paper to prepare timbers for a final surface finish? ❑ How do you use pre manufactured components to improve functionality in a product?	❑ How do you interpret a technical drawing to determine what the final outcome will look like? ❑ How do you establish the order of manufacture? ❑ How do you set up and use the table router to cut rebates and grooves? ❑ How do you use a thicknesser to achieve an accurate overall thickness of a timber strip? ❑ How can you cut a mitre joint using hand tools and machines? ❑ How can you quickly and accurately glue a mitre joint picture frame? ❑ What grades of glass paper are most effective in achieving a smooth surface finish to timber before applying beeswax. ❑ How do you accurately mark out and cut the MDF and acrylic to be housed within the picture frame? ❑ How do you secure the MDF and Acrylic with pre manufactured components.

Manufacturing Processes and Techniques : Manipulating and Joining PART 4

Calendar	Big Question/Theme	Small Questions
KNOWLEDGE BOOKLET		
March to May	TIMBERS PART 4 ❑ How do you shape, fabricate, construct and assemble high quality prototypes from timber and manufactured board? ❑ What is meant by the terms wastage, addition and deforming?	TIMBERS PART 4 ❑ What tools are used to ‘mark out’ timbers and manufactured boards? ❑ What saws are used to cut timbers and manufactured boards? ❑ Which drills and drill bits are used when working with wood? ❑ How are files, chisels, planes used to shape some woods and manufactured boards? ❑ What methods of sanding are there? ❑ What is routing? ❑ What is the difference between carcass and frame construction? ❑ What common methods of frame and carcass construction are often seen when working with timber and manufactured board? ❑ What is laminating and steam bending?

Manufacturing Processes and Techniques : Desk Tidy

Calendar	Big Question/Theme	Small Questions
PROJECT BOOKLET		
March to May	❑ Can you develop a range of design ideas that would meet the brief of a simple wooden desk tidy that can hold a variety of stationery equipment. ❑ How do you determine which concept is most marketable and has the best potential. ❑ How do you produce drawings that provide detail of construction and assembly to a third party. ❑ How do you develop a plan for making? ❑ What is a material order form?	❑ How do you develop a design sheet that clearly shows your design thinking to a third party? ❑ How do you annotate your design ideas to help communicate information that can't be shared via a drawing? ❑ How do you improve the overall 'look' of a design sheet to help sell your concept? ❑ The iterative process should help you get from a simple drawing to knowing 'how' to make your product. What is the iterative design process and how does it work? ❑ How do you create drawings that provide all technical information needed in the making of the process? ❑ How do you produce an order form that can be passed to a third party for cutting out? ❑ How do you produce a plan for making that describes how the desk tidy is manufactured. Can you provide details about what resources are required, what tools and machines are required and what health and safety may need to be adhered too. ❑ How do you follow a plan for making and technical drawings to manufacture a high quality final outcome?