



Core Concepts

Resistant Materials

Themes (these can be disciplinary/procedural or substantive/declarative)		Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Design and presentation skills	1.1	Students can select research and exploration, such as the study of different movements, to identify and understand user needs.	Students can select research and exploration, such as the study of a range of different cultures and movements, to identify and understand user needs.	Students can select research and exploration, such as the study of a range of different cultures and movements, to independently identify and understand user needs.	Students can select research and exploration, such as the study of a range of different cultures and movements, to independently identify and understand user needs to create an innovative and create final prototype.	Students can select research and exploration, such as the study of a range of different cultures and movements, to independently identify and understand user needs to create an innovative and create final prototype.	Students will independently collate research that is relevant to the context.	Students will independently collate research that is relevant to the context.
	1.2	Students illustrate and communicate design ideas using annotated sketches, 3-D modelling, oral presentations and computer-based tools.	Students illustrate and communicate design ideas using annotated sketches, detailed plans, 3-D, oral and digital presentations.	Students illustrate and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools	Students illustrate and communicate design ideas using a range of annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools	Students illustrate and detail design ideas using a range of annotated sketches such as isometric and 2-point perspective, detailed orthographic plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools	Students will adapt design strategies to various scenario's that are applicable to the context	Students will adapt design strategies to various scenario's that are applicable to the context
	1.3		Students can identify and use a variety of approaches looking at a range of design movements, to generate creative ideas and avoid stereotypical responses	Students can identify and use a variety of approaches, to generate creative ideas and avoid stereotypical responses	Students can identify and use a variety of approaches across a range of scenarios, to generate creative ideas and avoid stereotypical responses	Students can identify and use a variety of approaches to create an innovative and creative prototype, to generate creative ideas and avoid stereotypical responses	Students will identify and use a wide variety of approaches across several scenarios to develop appropriate outcomes.	
	1.4			Identify and solve their own design problems and understand how to reformulate problems given to them	Identify and solve their own design problems independently and understand how to reformulate problems given to them	Identify and solve their own design problems independently and understand how to reformulate problems given to them to produce creative outcomes	Students will begin to take creative risks to foster innovation in their work.	
	1.5			Students can develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations		Students develop detailed, working specifications to inform the design of innovative, functional, appealing products that respond to needs of a real-life client in a variety of situations		Students will create their own specifications relating to the open scenario's given.
Making Skills	2.1	Students select from and use specialist tools, techniques, processes, equipment and machinery, including computer-aided manufacture	Students select from and use specialist tools, techniques, processes, equipment and machinery.	Students select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture	Students select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture across a range of various projects and material disciplines	Students select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture to create an innovative and functional prototype	Students will learn more advanced techniques for creating sublimation print designs	
	2.2		Students can identify and use a wide variety of approaches across several scenarios to develop appropriate outcomes.	Students can select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties	Students can select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties across a range of various projects and material disciplines	Students can select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties to create an innovative and functional prototype.	Students will have the knowledge to independently make a range of Design products increasing in complexity	Students will have the knowledge to independently make a range of Design products increasing in complexity



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Evaluate and Analyse	3.1	Students can analyse the work of past and present professionals and others to develop and broaden their understanding	Students can analyse the work of several past and present professionals and others to develop and broaden their understanding	Students can analyse the work of past and present professionals of your own choice to develop and broaden their understanding	Students can analyse the work of several past and present professionals and others across a range of projects and contexts to develop and broaden their understanding	Students can analyse and detail the work of past and present professionals of your own choice to develop and broaden their understanding and influence their own development work.	Students will research artists and designers to influence their own work.	Students will research artists and designers to influence their own work.
	3.2		Students can test, evaluate and refine their ideas and products, taking into account the views of intended users and other interested groups	Students can test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups	Students can test, evaluate and refine a range of ideas and products against specifications in several projects, taking into account the views of intended users and other interested groups	Students can test, evaluate, iterate and refine a range of ideas and products against a comprehensive specification, taking into account the views of intended users and other interested groups throughout the design process.		Students will work on their own creative process and use this to direct their ongoing developments to a final realised piece.
	3.3			Students can investigate new and emerging technologies	Students can investigate new and emerging technologies and their useful applications within DT	Students can investigate new and emerging technologies and their useful applications within DT and exploring innovative ways to use them within prototypes created.	Students will experiment with a range of new materials and media through projects and ways to use these innovatively in their outcomes.	Students will experiment with a range of new materials and media through projects and ways to use these innovatively in their outcomes.
	3.4			Students can evaluate developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists	Students can evaluate and consider in their own work, developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists	Students can evaluate and consider in their own work, developments in design and technology, modern materials, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists	Students will reflect on their work throughout, detailing considerations for environmental and social considerations	
Technical Knowledge	4.1	Students can select appropriate materials based upon their working properties to achieve functioning solutions	Students can select appropriate materials based upon their working properties and the performance of structural elements to achieve functioning solutions	Students can select appropriate materials based upon their working properties and the performance of structural elements to achieve functioning solutions in personalised prototypes	Students can select appropriate materials based upon their working properties and the performance of structural elements to achieve functioning solutions in a range of personalised prototypes	Students can select appropriate materials based upon their working properties and the performance of structural elements to achieve functioning solutions in an innovative and complex personalised prototype	Students will research and develop their understanding of a range of materials across a range of projects, applying these into the final outcomes.	Students will research and develop their understanding of a range of materials across a range of projects, applying these into the final outcomes.
	4.2	Students can give examples of advanced mechanical systems used in their products enable changes in movement and force				Students can explain how a range of more advanced mechanical systems can be used in their products to enable changes in movement and force		
	4.3			Students can give examples of how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]		As part of a live brief students understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]		
	4.4			Students can apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers].		Students can apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers] as needed to address independent design briefs.		



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Core Technical Principles	5.1		Students can give examples of the impact of new and emerging technologies on buildings and the place of work, tools and equipment.		Students can give examples of the impact of new and emerging technologies on: The design and organisation of the workplace including automation and the use of robotics. Buildings and the place of work, tools and equipment.	Students will explore new and emerging technologies when developing their own outcomes within the separate projects.	Students will explore new and emerging technologies when developing their own outcomes within the separate projects.	
	5.2	Students can investigate and justify sustainability of a given material	Students can investigate and justify sustainability issues in materials choices and selections	Students can investigate and justify how a product lifecycle works, look into the lifecycle of a range of materials.	Students can investigate and justify a range of materials and how their sustainability can negatively or positively affect a product.	Students will be able to apply their knowledge and understanding of different material construction methods and properties to a wide range of samples and products	Students will be able to apply their knowledge and understanding of different material construction methods and properties to a wide range of samples and products	
	5.3	Students can identify cultures and changes in fashion that can affect a products style.	Students can identify cultures and changes in fashion through a range of design movements that can affect a products style.		Students can identify cultures and changes in fashion through a range of design movements that can be used to effectively inspire a products style.	Students can identify cultures and changes in fashion through a range of design movements that can affect a products style.	Students will receive open themes to interpret as they wish for projects, they will look into trends and fashions and consider these when addressing these themes	Students will receive open themes to interpret as they wish for projects, they will look into trends and fashions and consider these when addressing these themes
	5.4			Students can explain how are products designed and made considering needs of society and the environment.	Students can explain how products are designed and made considering needs of society and the environment. Understand the impact on people created by good/bad design through ergonomics and anthropometrics	Students can explain how products are designed and made considering needs of society and the environment. Understand the impact on people created by good/bad design through ergonomics and anthropometrics. Understand environmental considerations of materials including global warming and localised pollution.		
	5.5			Students can demonstrate the use of crumble to programme a circuit to perform different tasks, to provide functionality to products and processes. The use lamps to provide functionality to products and processes.	Students can demonstrate how to apply the systems based approach to create a flow chart to plan QC into a products manufacture.	Students can demonstrate and explain a range of systems based approaches and examples of input, process and outputs in everyday products		
	5.6	Students have an overview and understanding of using a range of materials including timbers and polymers.	Students have an overview and understanding of using a range of materials including timbers and polymers.	Students have an overview and understanding of using a range of materials including timbers, papers and boards and polymers.	Students have an overview and understanding of using a range of materials including timbers, papers and boards, metals and polymers.	Students have an overview and understanding of using a range of materials including timbers, papers and boards, metals, polymers and textiles.	Through the range of projects students will develop expertise in a range of materials including timbers, papers and boards, metals, polymers and textiles.	Through the range of projects students will develop expertise in a range of materials including timbers, papers and boards, metals, polymers and textiles.
	5.7	Students can explain how mechanisms can create specific movements and where these can be used.			Students can explain the functions of mechanical devices to produce linear, rotary, reciprocating and oscillating movements.	Students can explain the functions of mechanical devices to produce linear, rotary, reciprocating and oscillating movements. Also the changing magnitude and direction of force through use of levers		
	5.8				Students can identify a range of renewable and non-renewable energy sources.	Students can identify a range of renewable and non-renewable energy sources and impacts on the environment positive and negative		



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Specialist Technical Principles	6.1	Students can select appropriate timber materials to make a product	Students can select appropriate timber and polymer materials to make a product	Students can select appropriate timber paper & board and polymer materials to make a product	Students can select appropriate timber paper & board, metals and polymer materials to make a product	Students can select appropriate timber paper & board, metals, textiles and polymer materials to make a product.	Through the range of projects students will develop expertise in a range of materials including timbers, papers and boards, metals, polymers and textiles.	Through the range of projects students will develop expertise in a range of materials including timbers, papers and boards, metals, polymers and textiles.
	6.2			Students can identify and explain how materials can be reinforced	Students can identify and explain how materials can be reinforced and stiffened.	Students can identify and explain how materials and objects can be manipulated to resist and work with forces and stresses. Tension, compression, bending, torsion and shear.		
	6.3		Students can define what the 6R's covers		Students can define what the 6R's covers and how it can be implemented in your own design work.	Create a prototype that considers all aspects of the 6R's and how it can be implemented to improve the designs sustainability.	Students will develop prototypes whilst considering their sustainability throughout the creative process.	Students will develop prototypes whilst considering their sustainability throughout the creative process.
	6.4	Students can identify how material properties can affect its suitability for applications.	Students can identify how physical and mechanical properties can affect a materials suitability for applications.	Students can identify how physical and mechanical properties can affect a materials suitability for a range of applications.	Students can identify and explain how physical and mechanical properties can affect a range of materials suitability for a range of applications.	Students can identify and apply to their own prototype how physical and mechanical properties can affect a range of materials suitability for a range of applications.	Students will develop prototypes whilst considering their sustainability throughout the creative process.	Students will develop prototypes whilst considering their sustainability throughout the creative process.
	6.5					Students can select appropriate stock forms, shapes and sizes of a range of materials.	Students will be able to link stock sizes and forms to CAM outputs through developing and making prototypes.	
	6.6					Students can select appropriate materials and components considering scales of production and referencing the processes used in mass production.	Students will evaluate a range of materials for scale and full size application	Students will evaluate a range of materials for scale and full size application
	6.7	Students can select basic specialist techniques and processes to produce a final outcome using a selection of materials.	Students can select specialist techniques and processes to produce a final outcome using some materials.	Students can select specialist techniques and processes to produce a complex final outcome using a range of materials.	Students can select a range of tools, equipment and processes that can be used to shape, fabricate, construct and assemble high quality prototypes, as appropriate to the materials and/or components being used	Students can select a range of tools, equipment and processes used independently to shape, fabricate, construct and assemble high quality prototypes, as appropriate to the materials and/or components being used.	Students will independently create innovative and creative final outcomes to a professional standard using a range of tools, equipment and processes.	Students will independently create innovative and creative final outcomes to a professional standard using a range of tools, equipment and processes.
	6.8	Students can select and apply appropriately a selection of finishes independently	Students can select and apply appropriately a selection of finishes to a high standard	Students can select and apply appropriately a wide range of finishes to a high standard	Students can select and apply appropriately a wide range of finishes applicable to a range of materials to a high standard	Students can select and apply appropriately a wide range of finishes applicable to a range of materials to a high standard independently	Students will select appropriate finishes from a wide range of finishes independently	Students will select appropriate finishes from a wide range of finishes independently



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Designing and Making Principles	7.1				Students can select primary and secondary data to understand client and/or user needs		Students will make valid links between both primary and secondary research that they have undertaken.	
	7.2			Students can write a design brief and produce a design and manufacturing specification		Students can write a design brief and produce a design and manufacturing specification independently.	Students will plan their own schedules and production plans	Students will plan their own schedules and production plans
	7.3	Students can carry out and analyse investigations in order to identify problems and needs	Students can carry out and analyse investigations in order to identify problems and needs	Students can carry out and analyse investigations in order to identify problems and identify the clients specific needs		Students can carry out and analyse detailed investigations in order to identify and analyse problems and identify the clients specific needs	Students research relevant content for each project, this is used to inform design ideas and developments	Students research relevant content for each project, this is used to inform design ideas and developments
	7.4				Students can investigate, analyse and evaluate (two designers)	Students can investigate, analyse and evaluate (two designers) and should investigate the work of a minimum of two companies	Students will be able to analyse, evaluate and justify the work of others in terms of context, composition, media, techniques, formal elements.	Students will be able to analyse, evaluate and justify the work of others in terms of context, composition, media, techniques, formal elements.
	7.5	Students can design and develop their own ideas	Students can design and develop their own ideas in response to given themes	Students can independently design and develop their own ideas in response to given themes	Students can independently design explore and develop their own ideas in response to given themes across a range of scenarios	Students can independently design explore and develop their own ideas in response to given themes across a range of scenarios to produce a complex final outcome.	Students will research and experiment in the style of artists/designers, they will conduct observational drawings and secondary materials	Students will research and experiment in the style of artists/designers, they will conduct observational drawings and secondary materials
	7.6	Students can create freehand sketching, isometric drawings of final outcomes	Students can create freehand sketching, isometric drawings of final outcomes	Students can create freehand sketching, isometric drawings of final outcomes and orthographic projections for construction	Students can create freehand sketching, isometric drawings of final outcomes and orthographic projections for construction and flow charts to plan making	Students can create freehand sketching, isometric drawings of final outcomes and orthographic projections for construction and flow charts to plan making independently	Students will use a range of traditional hand-drawn techniques, 3D modelling (physical) and CAD modelling independently	Students will use a range of traditional hand-drawn techniques, 3D modelling (physical) and CAD modelling independently
	7.7	Students can design and make an outcome to meet the needs of the user.	Students can design and make an outcome to meet the needs of the user and address the context	Students can design and make an outcome to meet the specific needs of the user and address the context in an innovative way.	Students can design and make several outcome to meet the specific needs of the user and address the context in an innovative way.	Students can design and make a highly complex outcome to meet the specific and detailed needs of the user and address the context in an innovative way.	Students will independently create innovative and creative outcomes demonstrating complexity to a highly professional standard	Students will independently create innovative and creative outcomes demonstrating complexity to a highly professional standard
	7.8	Students can demonstrate the use of specialist techniques and processes appropriate for the material	Students can demonstrate the use of a range of specialist techniques and processes appropriate for the material	Students can use specialist techniques and processes appropriate for the variety of materials being used within the prototype.	Students can use a range of specialist techniques and processes appropriate for the material across a range of separate projects	Students can use specialist techniques and processes appropriate for the variety of materials being used within the complex and innovative prototype.	Students will have the knowledge to independently make a range of Design products increasing in complexity and to a professional standard	Students will have the knowledge to independently make a range of Design products increasing in complexity and to a professional standard