Year 12- A-Level Product Design

West Kirby Grammar School

Learning about this topic is important because:
"Inclusive Design" plays a critical role in encouraging empathy and user-centric thinking. It helps students create products that meet the diverse needs of a wide audience. Beyond just accessibility, it fosters an understanding of ethical issues, social impact, and economic considerations. Inclusive design also meets legal requirements and is increasingly in demand by society. It promotes innovation, strengthens social responsibility, and equips students with valuable skills for their future careers.

This builds on:
A-Level inclusive design takes the core principles from GCSE DT and elevates them by demanding a comprehensive, empathetic, and research-driven approach to creating products that serve everyone.

This leads to:
Integrating inclusive design into your A-Level work not only elevates the quality and impact of your projects but also aligns your design practice with modern, ethical, and market-driven demands.

We will learn:

- Principles of inclusive design
- Accessibility considerations
- Addressing diverse user needs
- Universal design concepts
- Problem-solving skills
- Ethical implications
- Research methods
- Evaluating user feedback
- Ergonomics in design

We will develop/practise skills including:

Research Methods: Develop skills in inclusive research techniques to gather meaningful data from a variety of users.

Problem-Solving Skills: Cultivate innovative thinking and problem-solving approaches to overcome design challenges related to inclusivity.

Some of the vocabulary that we will use includes:
Inclusive, diversity, universal design, accessibility, usability, adaptability, user-centric design.

You could learn more about this topic by:
Explore texts on inclusive design, such as "Inclusive Design for a Digital World" and other titles that provide deeper insights into the principles and applications of accessibility.

Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are:

Class notes, retrieval practice questions, Homework tasks, past paper questions, assessments.

Year 12- A-Level Product Design

West Kirby Grammar School

Learning about this topic is important because:
"Iconic Designers" Learning about iconic designers is not just about history—it helps A-Level Product Design students become better designers by improving their creativity, understanding of design principles, and ability to justify their own work.

This builds on:
By studying iconic designers, A-Level students build on their GCSE DT foundation by developing a more advanced, critical, and professional approach to product design. They move from basic design principles to in-depth analysis, innovation, and real-world application—preparing them for higher education or careers in design and engineering.

This leads to:
Studying iconic designers is not just theoretical—it directly strengthens exam performance and NEA coursework by providing real-world context, historical knowledge, and design inspiration. Understanding design icons allows students to analyse, justify, and innovate more effectively, which is crucial for high-scoring answers and successful project outcomes.

We will learn:

- Design Movements & Styles
- Design Principles
- User-Centred Design
- Sustainability & Ethics
- Materials & Manufacturing.
- Aesthetic & Functional Innovation

We will develop/practise skills including:

- Critical Analysis Skills – Evaluating existing designs and applying knowledge in exam answers and coursework.
- Stronger NEA skills and justifications – Using famous designers to support design choices, research, and evaluation.

Some of the vocabulary that we will use includes:

Modernism, Bauhaus, Postmodernism, Dieter Rams – "10 Principles of Good Design", Philippe Starck, Charles & Ray Eames.

You could learn more about this topic by:

BBC's The Genius of Design – A detailed history of industrial design.
Dezeen & Designboom – Online design magazines featuring interviews with designers.

Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are:

Class notes, retrieval practice questions, Homework tasks, past paper questions, assessments.

A-Level Product Design- “Papers & Boards”

West Kirby Grammar School

Learning about this topic is important because: Papers and boards are widely used in packaging, advertising, and product protection. Understanding their properties and applications is key to developing sustainable and innovative design solutions.	
This builds on: KS4 knowledge of material properties, basic paper types, and introductory modelling with card and board.	
This leads to: More advanced understanding of packaging design, technical specification writing, and sustainable product development.	
We will learn: Characteristics and manufacturing processes of paper and board. Types such as cartridge, corrugated, duplex, and foil-lined boards. Environmental considerations, including recyclability and biodegradability.	We will develop/practise skills including: Testing material performance. CAD/CAM prototyping with card. Designing for sustainability and mass production.
Some of the vocabulary that we will use includes: GSM, corrugation, duplex board, pulp, laminates, die cutting	You could learn more about this topic by: Examining real-world packaging solutions, exploring case studies in sustainable packaging, or visiting local print or packaging manufacturers.
Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: Knowledge tested with exam style questions	

A-Level Product Design- “Polymers”

West Kirby Grammar School

Learning about this topic is important because: Polymers are among the most versatile materials in modern design, with applications in everything from packaging to medical devices. Knowing how to work with them is essential for informed design decisions.	
This builds on: Prior study of thermoplastics and thermosets at GCSE level.	
This leads to: More complex project work, including industrial manufacturing techniques and sustainable material choices.	
We will learn: Types of polymers and their properties. How polymers are formed, processed, and recycled. Environmental and ethical considerations in their use.	We will develop/practise skills including: Polymer identification and testing. CAD for polymer products. Workshop techniques like vacuum forming, line bending, and injection moulding.
Some of the vocabulary that we will use includes: Thermoplastic, thermosetting, polymerisation, monomer, extrusion, biodegradability.	You could learn more about this topic by: Watching how everyday polymer products are made, exploring plastic alternatives, or reading industry blogs on sustainable materials.
Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: Knowledge tested with exam style questions	

A-Level Product Design- “Timbers”

West Kirby Grammar School

Learning about this topic is important because: Timbers are a core material in design due to their beauty, versatility, and sustainability. Understanding them supports both traditional and modern manufacturing.	
This builds on: KS3 and KS4 practical projects involving softwoods, hardwoods, and manufactured boards.	
This leads to: Greater ability to select and work with timbers in structural and aesthetic applications.	
We will learn: Categories and types of timbers. Their sources, properties, and environmental impact. How to shape, join, and finish timber effectively.	We will develop/practise skills including: Timber selection based on performance. Use of hand and machine tools. Advanced joinery techniques.
Some of the vocabulary that we will use includes: Grain, seasoning, knots, dovetail, mortise and tenon, veneering, sustainability.	You could learn more about this topic by: Visiting woodworking exhibitions, workshops, exploring architecture that uses timber structurally.
Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: Knowledge tested with exam style questions	

A-Level Product Design- “Metals”

West Kirby Grammar School

Learning about this topic is important because: Metals are crucial in engineering and product design for their strength and durability. Knowing how to work with and select metals is vital for functional products.	
This builds on: KS4 basics in working with aluminium, steel, and casting techniques.	
This leads to: Complex structural design and understanding of metal forming techniques in industry.	
We will learn: Ferrous and non-ferrous metal properties. Industrial and workshop forming, joining, and finishing techniques. Impact of corrosion and how to prevent it.	We will develop/practise skills including: Metal cutting and shaping. Joining techniques like brazing or riveting. Surface finishing (e.g. powder coating, polishing).
Some of the vocabulary that we will use includes: Alloy, annealing, malleability, tensile strength, galvanisation, fabrication.	You could learn more about this topic by: Exploring engineering case studies or museum exhibitions on metalwork.
Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: Knowledge tested with exam style questions	

A-Level Product Design- “Scales of Production”

West Kirby Grammar School

Learning about this topic is important because: Understanding how products are made at different scales—from one-off to mass production—is crucial for choosing appropriate methods and materials.	
This builds on: KS4 concepts of one off, batch, mass and continuous production.	
This leads to: Deeper understanding of cost, tooling, automation, and production planning.	
We will learn: Characteristics of job, batch, mass, and continuous production. Impact on cost, quality, and speed.	We will develop/practise skills including: Designing for different scales of production. Tooling and jig design. Evaluating production methods.
Some of the vocabulary that we will use includes: Jigs, fixtures, standardisation, tolerance, lean manufacturing, automation.	You could learn more about this topic by: Watching factory tours on YouTube or researching supply chains in global companies.
Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: Knowledge tested with exam style questions	

A-Level Product Design- “Commercial Manufacturing”

West Kirby Grammar School

Learning about this topic is important because: It helps you understand how products are made at scale in real-world industries, balancing efficiency, cost, quality, and sustainability.	
This builds on: Basic understanding of materials and production processes from GCSE and earlier units.	
This leads to: Careers in manufacturing, design engineering, and industrial production.	
We will learn: How products are made using advanced manufacturing techniques. The role of assembly lines, automation, and outsourcing. The importance of quality control and lean manufacturing.	We will develop/practise skills including: Designing for efficient manufacture. Evaluating manufacturing methods for different scales. Using real-world examples in design justifications.
Some of the vocabulary that we will use includes: CNC, automation, batch production, Kaizen, outsourcing.	You could learn more about this topic by: Touring factories (virtually or in-person), watching documentaries like *How It's Made*, or researching companies like Dyson or IKEA.
Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: Knowledge tested with exam style questions	

A-Level Product Design- “Commercial Manufacturing”

West Kirby Grammar School

A-Level Product Design “Computer Systems”

West Kirby Grammar School

Learning about this topic is important because: Digital tools are essential in modern design and manufacturing. Understanding how computer systems are used ensures your work is current and efficient.	
This builds on: Basic CAD/CAM from KS3/4 and digital literacy.	
This leads to: Digital design, automated production, and Industry awareness.	
We will learn: The components of computer systems used in design and manufacturing. Types of design software and file formats. How data is transferred and stored for production.	We will develop/practise skills including: File management and exporting formats for CAM. Safe and effective use of networks, servers, and digital tools. Integrating systems in workflow planning.
Some of the vocabulary that we will use includes: CNC, CAD/CAM, STL, cloud storage, G-code, file compatibility.	You could learn more about this topic by: Exploring digital manufacturing platforms, watching tutorials on CAD/CAM workflows, or following tech blogs.
Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are:	

A-Level Product Design “Digital Design & Manufacture”

West Kirby Grammar School

Learning about this topic is important because: Digital technologies are transforming how products are designed and made. Mastery of digital tools is essential for modern designers.	
This builds on: Your previous experience with CAD, CAM, and rapid prototyping.	
This leads to: Efficient, innovative, and iterative design practice, ready for higher education or industry.	
We will learn: The benefits and limitations of digital manufacturing. How to iterate, simulate, and test ideas digitally. Rapid prototyping techniques.	We will develop/practise skills including: Advanced CAD modelling. 3D printing and laser cutting. Using digital simulations to test ideas.
Some of the vocabulary that we will use includes: Rendering, slicing, prototyping, simulation, iteration.	You could learn more about this topic by: Learning Fusion 360 or SolidWorks, exploring design simulation platforms, or watching industry prototyping workflows.
Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are:	

A-Level Product Design “Design Communication”

West Kirby Grammar School

Learning about this topic is important because: Clear communication of design ideas is essential to collaborate, persuade, and plan effectively in any design field.	
This builds on: Drawing, annotating, and modelling skills from KS3/4.	
This leads to: Professional-level presentation of design work and clearer idea development.	
We will learn: Effective sketching and rendering techniques. Layouts for design sheets and portfolios. Verbal and visual communication techniques.	We will develop/practise skills including: Freehand sketching and technical drawing. CAD visualisations and orthographic projection. Presenting ideas clearly and convincingly.
Some of the vocabulary that we will use includes: Isometric, exploded view, rendering, annotation, perspective.	You could learn more about this topic by: Looking at design portfolios, studying architecture or industrial design books, or following sketching tutorials online.
Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are:	

A-Level Product Design “Design Methods”

West Kirby Grammar School

Learning about this topic is important because: It teaches structured ways to approach complex design problems, ensuring thoughtful and user-centred outcomes.	
This builds on: Basic design cycle knowledge and project planning from GCSE.	
This leads to: More professional, reflective, and strategic design practice—essential for university and industry-level work.	
We will learn: Different methods of generating, developing, and evaluating ideas. How to use divergent and convergent thinking. How iterative design works in real-world contexts.	We will develop/practise skills including: Brainstorming and mind mapping. User research and persona creation. Structured idea evaluation and testing.
Some of the vocabulary that we will use includes: Iterative design, mood board, SWOT analysis, design specification.	You could learn more about this topic by: Reading design case studies, human-centred design, or using design thinking toolkits.
Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are:	

A-Level Product Design “Design influences”

West Kirby Grammar School

Learning about this topic is important because:

Design is shaped by culture, politics, art, and technology—understanding influences deepens your creative insight.

This builds on:

Your prior knowledge of design history, trends, and aesthetics.

This leads to:

Stronger design context in coursework, more informed design decisions, and clearer stylistic identity.

We will learn:

- Key movements such as Bauhaus, Memphis, and Modernism.
- How to analyse the impact of design on society—and vice versa.
- The role of social, moral, and ethical issues in design evolution.

We will develop/practise skills including:

- Critical analysis of products and movements.
- Applying stylistic features to your own design work.
- Referencing designers and their philosophies.

Some of the vocabulary that we will use includes:

Form follows function, postmodernism, minimalist, functionalist, retro, human factors.

You could learn more about this topic by:

Visiting design museums, reading *Design Museum: 100 Ideas That Changed Design*, or watching design documentaries.

Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are:

Essays, mood board presentations, and style-based design tasks.

- Design movement research poster.
- Movement-inspired product concept.
- Written reflection on design influence.

A-Level Product Design “Designers & their work”

West Kirby Grammar School

Learning about this topic is important because:

Studying successful designers helps you understand different approaches and philosophies that inspire innovation.

This builds on:

Contextual studies and analytical skills developed throughout the course.

This leads to:

Deeper conceptual understanding and personal creative development.

We will learn:

- About influential designers like Dieter Rams, Philippe Starck, and Margaret Calvert.
- Their design principles, values, and impact.
- How to research and reflect on their work.

We will develop/practise skills including:

- Research and analysis.
- Comparing different design ideologies.
- Integrating designer principles into your own practice.

Some of the vocabulary that we will use includes:

Sustainability, usability, aesthetics, form, signature style, ethos.

You could learn more about this topic by:

Reading biographies, watching design interviews (e.g., *Abstract* on Netflix), or researching their key products.

Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are:

Designer profiles, analysis of iconic products, and presentation tasks.

- Designer case study.
- Annotated timeline of work.
- Design inspired by chosen designer.

A-Level Product Design “Modern & Smart Materials”

West Kirby Grammar School

Learning about this topic is important because:

Emerging materials are driving innovation across industries—knowing them allows you to push creative and technical boundaries.

This builds on:

Material properties knowledge from previous units (timbers, metals, polymers, etc.).

This leads to:

Future-facing design solutions and better material selection in projects.

We will learn:

- What modern and smart materials are.
- Their properties, applications, and limitations.
- How to use them responsibly and innovatively.

We will develop/practise skills including:

- Matching material to function.
- Evaluating materials for sustainability and performance.
- Prototyping with new materials.

Some of the vocabulary that we will use includes:

Shape memory alloy, thermochromic, photochromic, carbon fibre, nanomaterials, conductive textiles.

You could learn more about this topic by:

Following materials libraries (e.g., Material Connexion), TED Talks on innovation, or industry case studies.

Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are:

Product analysis, sample investigations, and material selection justifications.

- Modern material research task.
- Smart material concept product.
- Materials comparison chart.