

KS3 Design and Technology Curriculum Map 2021-2022

For 2021/22, the practical element has been increased across KS3 in the current year, due to the disruptions to the previous academic year.

	Autumn Term	Spring Term	Summer Term
Year 7	<p>Unit / component</p> <p><u>DT: Design and Technology (Product Design)</u></p> <p><u>Topic 1: Materials</u> Investigation using practical materials.</p> <p>The categories for each material group: Polymers; Timbers; Metals; Fabrics; Paper and Board.</p> <p>Range of properties and uses for the materials covered.</p> <p><u>Topic 2: Material Origins</u> Investigations into the source and origin of materials. Material origins of: Timbers; Polymers; Metals; Fabrics e.g. cotton; Paper and/or Board.</p> <p><u>Topic 3: Origins to stock forms</u> Stock forms for various materials such as polymers, metals and timbers. The shape and form of materials in school stores and commercially.</p>	<p>Unit / component</p> <p><u>Topic 1: Properties</u> Investigate a range of materials that possess properties of 8 key definitions: Absorbency; density; ductility; fusibility; hardness; malleability; strength; toughness. Materials that have these properties. Products that require these properties.</p> <p><u>Topic 2: Biomimicry</u> What is Biomimicry? How it used to avoid 'design fixation'.</p> <p>Design and modelling project: Biomimicry in design. To include: aesthetics; ergonomics; user requirements. Developing skills in the accurate use of card and modelling tools.</p>	<p>Unit / component</p> <p><u>Topic 1: The Lifecycle Assessment.</u> What is the L.C.A.? Application of knowledge to discover the L.C.A. of various products. Focus upon the L.C.A. of a cotton T-shirt.</p> <p><u>Topic 2: Display to Demonstrate the L.C.A. of a Cotton T-shirt.</u> Creating a 3D display for the L.C.A. of a Cotton T-shirt. Using craft tools with a variety of materials. The use of tolerances and templates. Students can work in classroom environments with this practical element. Pair working is encouraged to build skills in collaborative design and teamwork.</p>

Unit / component	Unit / component	Unit / component
<p><u>DT: Design and Technology (Product Design)</u></p> <p><u>Topic 1: Industrial processes.</u> Investigating a wide range of manufacturing processes that are used in industry.</p> <p>Investigations include important aspects of each process: Stage by stage description Sustainability issues Scales of production The Industrial processes are: Vacuum forming; line bending; injection moulding; laser cutting; blow moulding; turning; extrusion; weaving; die cutting; offset lithography.</p> <p><u>Topic 2: Product analysis.</u> Application of knowledge to identify manufacturing methods for a range of products. Evaluate products and suggest improvements in design and manufacturing.</p> <p><u>Topic 3: The Lifecycle Assessment.</u> Re-call from Y7. What is the L.C.A.? Application of knowledge to discover the L.C.A. of various products. Focus upon the L.C.A. of a school seat / chair.</p> <p><u>Topic 4: Origin to Stock Form.</u> Re-call from Y7. Origin to stock form of cotton T-shirt. Origin to stock form for: plywood; sheet steel; sheet polymers.</p>	<p><u>Main Project: Designing and Modelling: Main Project.</u></p> <p><u>Topic 1: Designing</u> Designing using a design brief. Completing research and further product analysis with a focus on the school seat.</p> <p>Developing design skills.</p> <p>Sketching 3D; the use of crating.</p> <p>How to fully annotate designs. Using knowledge of processes from Term 1 and materials from Y7 to annotate designs. Include awareness of the L.C.A. to ensure complete annotation.</p> <p>Design annotation reflects learning in materials and processes. Evaluation including how the final design meets the supplied brief and specification. Fully evaluate the design in terms of the L.C.A.</p> <p><u>Topic 2: Design Development</u> Creating an assessment / analysis of design ideas to inform development.</p> <p>Rendering designs with the use of shade and colour. How to fully annotate designs with materials and processes.</p>	<p><u>Main Project (cont.)</u></p> <p>To include: aesthetics; ergonomics; user requirements; costings; lifespan.</p> <p><u>Topic 3: Making Models</u> Making Models: Developing skills in the accurate use of card and modelling tools. Developing and using templates. Working to a tolerance.</p> <p><u>Topic 4: Electronics</u> Basic electronic components: batteries, LED's, switches. Incorporating electronic components into designs and models.</p> <p><u>Topic 5: CAD/CAM</u> CAD: Computer Aided Design. Creating 3D images of designs on computer. Development of designs using computers. Engineering Drawings. Robotics and the Impact of automation. Scales of production.</p> <p><u>Topic 6: Evaluating</u> How to test and evaluate models. Full evaluation of the design against the design brief and specification.</p>

Unit / component	Unit / component	Unit / component
<p><u>DT: Design and Technology (Product Design)</u></p> <p><u>Topic 1: Industrial Processes:</u> Investigating a wide range of manufacturing processes that are used in industry. Advanced processes building upon Y8. CAD/CAM: Computer Aided Design and Computer Aided Manufacturing systems; Robotics; Rapid Prototyping; 3D printing.</p> <p><u>Practical Element:</u> Production of a display piece for Rapid Prototyping. Developing design skills and practical skills to communicate the information. Developing practical skills: use of plastics, timbers and modelling materials to produce moving sections for the display.</p> <p>Printing and finishing methods: Automated systems for varnishing; laminating; embossing and printing (offset lithography). Scales of production and the economies of scale.</p> <p><u>Topic 2: Designing for Specific User-Groups</u> What are specific user-groups? How are groups designed for? Research: Investigating user-groups as well as products. Investigating materials and processes to use in products. Using primary and secondary research. The use of questionnaires and interviews.</p> <p>Design a product for Cycle Safety. Designing packaging for products. Full annotation, using knowledge gained.</p>	<p><u>Major Design and Make Project:</u> <u>Topic 1: Using a Context: Explore Possibilities</u> Iteration of the design process and designing for focus groups. Explore the context.</p> <p><u>Topic 2: Investigating</u> How to carry out meaningful investigating that includes the work of others. Use of primary and secondary research.</p> <p><u>Topic 3: Design Brief and Specification</u> Producing a design specification that links to research findings: User requirements; form; function; materials; scale of production and cost; sustainability.</p> <p><u>Topic 4: Designing</u> Further development of designing skills. How to develop designs using practical modelling materials. Developing design skills: 3D drawing; rendering to represent materials and textures. Fully annotating designs. Designs contain additional research.</p> <p>Electronics, including a range of components and more intricate circuits.</p>	<p><u>Topic 5: Development of Designs</u> Making Models and prototypes: Developing skills in the accurate use of card and modelling tools. Developing and using templates. Working to a tolerance.</p> <p>How to test and evaluate models as an on-going process. Understanding the purpose of models and what they show.</p> <p>Making Models: Developing skills in the accurate use of card and modelling tools. Developing and using templates. Working to a tolerance.</p> <p>Use of CAD to further develop models and arrive at a final design. Detailed understanding of Engineering Drawings.</p> <p>Ethical design and designing for specific users.</p> <p>Continue Main Project: Iteration of the design process and designing for focus groups. How to develop designs using CAD and presenting as Engineering Drawings.</p> <p>Workshop practices. Health and Safety; Risk Assessment; tools and machines.</p> <p><u>Topic 5: Evaluating</u> Test and evaluate models. Full evaluation of the design against the design brief and specification. Suggest improvements for commercial manufacture</p>

KS4 Design and Technology (Product Design) Curriculum Map 2020-2021

	Autumn Term	Spring Term	Summer Term
Year 10 DT PRODUCT DESIGN	<p>Unit / component</p> <p><u>Topic 1: Energy Generation and Storage / Renewable Energy</u> How electricity is generated: How the power station works and how the national grid serves the country. How energy can be stored Renewable energy sources: Solar; wind; hydro-electricity including Tidal; biofuel; nuclear. Global news and latest trends.</p> <p><u>Topic 2: Ethical Design</u> Ethical design and 'designed obsolescence', including planned and perceived obsolescence. Off-shore manufacture; working conditions and the law. The L.C.A. as an ethical issue.</p> <p><u>Topic 3: Technology in Manufacturing</u> Just-in-Time and Flexible manufacturing systems</p> <p><u>Topic 4: Realising</u> A practical project Making a product from and Engineering Drawing Improving practical skills with a range of tools and machines. Additional theory topics: Jigs and Fixtures; Tolerances; Planning Manufacture; Quality Control and Quality Assurance.</p> <p><u>Topic 6: Origin to Stock Form: Advanced Processes.</u> Plywood and Steel</p>	<p>Unit / component</p> <p><u>Designing for Specific User groups.</u> NEA (Coursework) Iteration. Addressing coursework requirements using a selected current context.</p> <p><u>Topic 1: Analysis of the context.</u> Further iteration of the design process to ensure autonomous working routines. Detailed analysis of the context and potential user-group.</p> <p><u>Topic 2: Investigating.</u> Completing a detailed investigation with a range of primary and secondary research methods. The context and the potential user groups are fully investigated.</p> <p><u>Topic 3: Brief and Specification</u> Detailed design brief and specification. The specification references research. Fully justify all points made.</p> <p><u>Topic 4: Designing</u> Introduction to a range of media: Use of tracing and pro-markers for rendering. Further development of 3D drawing techniques.</p>	<p>Unit / component</p> <p><u>Topic 4: Designing (cont.)</u></p> <p><u>Topic 5: Development.</u> Developing use of CAD. Some use of modelling and prototyping</p> <p><u>The N.E.A. (Non-Examined Assessment)</u> From 1st June. Producing the NEA design and make project to the assessment requirements.</p> <p>Analysis of the chosen context Investigating Design brief and specification</p> <p>To be continued in Year 11.. Generating design ideas Developing and modelling design ideas Manufacturing Testing and evaluating</p>

Year 10 CONSTRUCTION

Unit / component

UNIT 1 CONSTRUCTION TECHNOLOGY –EXTERNAL EXAM

Learning aim A understand the structural performance required for low-rise construction

Topic A1: Performance requirements

stability

fire resistance

thermal insulation

sound insulation

weather resistance

sustainability

Topic A.2: Common structural forms for low-rise construction

traditional cavity wall construction

cross-wall construction

panel and cladding systems

timber-framed construction

Learning aim B explore how sub-structures are constructed

Topic B.1 Preconstruction work

Topic B.2 Sub-structure groundworks

Learning aim C: Explore how superstructures are constructed

Topic C.1 Superstructures – walls

Topic C.2 Superstructures – floors

Topic C.3 Superstructures – roofs

(Jan 2022 exam)

Unit / component

UNIT 3 CONSTRUCTION AND DESIGN

In this unit you will:

B understand a client's needs to develop a design brief for a low-rise building

Topic B.1 Understanding a client's needs

Topic B.2 Understanding the constraints on design

Topic B.3 Production of a client brief for a low-rise building

C produce a range of initial sketch ideas to meet the requirements of a client brief for a low-rise building.

Topic C.1 Generation of initial sketch ideas to facilitate development of the final design solution

UNIT 5 – Exploring Carpentry and Joinery Principles and Techniques

In this unit you will:

B develop practical skills using safe techniques to produce a timber frame.

Topic B.1 Health and safety

Topic B.2 Construction of a timber frame

(Practical skills building for this unit)

Unit / component

UNIT 5 – Exploring Carpentry and Joinery Principles and Techniques

In this unit you will:

A understand tools, materials and equipment used in carpentry and joinery

Topic A.1 Tools, materials, equipment and information for carpentry and joinery

Topic A.2 Safe use and storage of the carpentry and joinery tools, materials and equipment

B develop practical skills using safe techniques to produce a timber frame.

Topic B.1 Health and safety

Topic B.2 Construction of a timber frame

UNIT 1 CONSTRUCTION TECHNOLOGY –EXTERNAL EXAM

(Resit May 2022)

Unit / component

Component 3 Health and Wellbeing external assessment

AO1 Demonstrate knowledge and understanding that affect health and wellbeing

Definition of health and wellbeing:

- Physical and lifestyle.
- Economic factors
- Environmental factors

The impact of life events relating to relationship changes and changes in life circumstances.

AO2 Interpret health indicators

AO3 Design a person centred health and wellbeing improvement plan

AO4 Demonstrate knowledge and understanding of how to overcome obstacles relating to health and wellbeing improvement plan

A Factors affecting health and wellbeing

B1 Physiological indicators

- pulse (resting and recovery rate after exercise)
- blood pressure
- peak flow
- body-mass index (BMI).
- Using published guidance to interpret data relating to these physiological indicators.
- The potential significance of abnormal readings: risks to physical health.

B2 Lifestyle indicators

- Smoking
- alcohol consumption
- inactive lifestyles.

C1 health and wellbeing improvement plan

The importance of a person-centred approach that takes into account an individual's needs, wishes and circumstances. Information to be included in plan:

Unit / component

Component 3 Health and Wellbeing external assessment Feb 2022

B1 Physiological indicators

B2 Lifestyle indicators

C1 health and wellbeing improvement plan

C2 Obstacles and implementing plans

(continue Component 3 exam in Feb 2022)

Component 1 Human Lifespan development

A Understand human growth and development across life stages and the factors that affect it.

A1 Human growth and development across life stages

A2 factors that effecting growth and development

B Investigate how individuals deal with life events

B1 Different types of life events

B2 Coping with change caused by life events

Unit / component

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Component 3 Health and Wellbeing external assessment (resit May 2022)

recommended actions to improve health and wellbeing, short-term (less than six months) and long-term targets, appropriate sources of support (formal and/or informal).

C2 Obstacles and implementing plans

Potential obstacles: o emotional/psychological – lack of motivation, low self-esteem, acceptance of current state

- time constraints – work and family commitments o availability of resources – financial, physical, e.g. equipment
- unachievable targets – unachievable for the individual or unrealistic timescale
- lack of support, e.g. from family and friends
- other factors specific to individual – ability/disability, addiction
- barriers to accessing identified services.

Y11 DT PRODUCT DESIGN

Unit / component

- ★ Topic 1: **The N.E.A. (Non-Examined Assessment)**
producing the NEA design and make project to the assessment requirements.

Analysis of the chosen context
Investigating
Design brief and specification
Generating design ideas
Developing and modelling design ideas
Manufacturing

Unit / component

- ★ Topic 1: **The N.E.A. (Non-Examined Assessment)**
producing the NEA design and make project to the assessment requirements.

Developing and modelling design ideas
Manufacturing
Testing and evaluating

Unit / component

- ★ Topic 2: **Examination Preparation**
Topics covered based upon outcomes so far, including tests and internal examinations.

Core technical Principles

New and Emerging Technologies
Energy Generation and Storage
Developments in new Materials
Systems Approach to Designing
Materials and their Working Properties

Specialist Technical Principles

Selection of Materials and Components
Forces and Stresses
Ecological and Social Footprint
Sources and Origins of Materials
Working Properties of Materials
Stock Forms
Scales of Production
Specialist Technical Processes
Surface Treatments and Finishes

Designing and Making Principles

Investigation: Primary and Secondary Data
Environmental, Social and Economic Challenge
The Work of Others
Design Strategies
Communication of Designs
Prototypes
Tolerances
Material Management

Unit / component

- ★ Topic 1

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Specialist Tools and Equipment
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Topic B.1 Health and safety

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UNIT 2- Scientific and Mathematical Applications for Construction

In this unit you will:

A understand the effects of forces and temperature changes on materials used in construction

Topic A.1 Effect of forces

Topic A.2 Changes in Temperature

Unit / component

UNIT 2- Scientific and Mathematical Applications for Construction

In this unit you will:

A understand the effects of forces and temperature changes on materials used in construction

Topic A.1 Effect of forces

Topic A.2 Changes in Temperature

B use mathematical techniques to solve construction problems.

Topic B.1 Algebraic and graphical methods

Topic B.2 Mensuration

Topic B.3 Trigonometry

UNIT 1 CONSTRUCTION TECHNOLOGY –EXTERNAL EXAM

(Resit May 2022)

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Unit / component

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Unit / component

Component 3 external assessment Feb 2022

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(continue Component 3 exam in Feb 2022)

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