Rayner Stephens
HIGH SCHOOL

Curriculum Intent

for

Design Technology

Design Technology is about viewing the world around us. To look at where we are now in the 21st century, and where we could be in the future. To know about past and present designers, inventors and innovators and aspire to become people that design and shape the world. In an increasingly technological society we aim to encourage students to think independently and be creatively when working on a problem. We intend to teach students to be problem solvers in a safe learning environment and explain that making mistakes is okay, and part of the development of process. To build upon theory using research and ideas across all subjects and then apply it to solve real world issues. Design Technology is an inspiring practical subject using a broad range of subject knowledge such as mathematics, science, engineering, computing, food science and art. High-quality We aim to empower students to become the people who will solve the issue of tomorrows world. For example, climate change and the quality of life. Design Technology education makes an essential contribution to the creativity, culture, wealth and well-being of the human race and how we can help the world around us.

Design Technology

Rayner Stephens High School

Y11

Final GCSE Exam

Core content and specialist knowledge: Revise and practice exam papers in preparation for your final exam in DT.

EXAM REVISION

AO3: Evaluate and Test Gain feedback throughout your project and test your final product. Have you met your specification?

AO2: Realise Design ideas: Manufacture your product using skills and processes used throughout your DT journey.

AO2: Develop Design Ideas Develop your sketches and communicate ideas. Using modelling techniques.

AO2: Generate Design Ideas Develop your sketches and communicate ideas. Develop them using various design techniques.

AO1: Specification and Brief Clarify the needs and wants of the project writing your own brief and design specification.

Y10

Materials: What materials will be appropriate for your product? What materials are sustainable?

Product research/ analysis

Design:

Make: Addition processes and wood joints. Using skills to develop high quality craftsmanship products.

Testing: Use various testing and modelling methods to develop your product.

Evaluate: What skills have you developed? Test your product and consider how you would improve it.

GCSE NEA CONTEXTS

AO1: Investigate the design possibilities: What is the design context? What research can you carry out to gather ideas?

Apply Sustainability 6 R's knowledge

Evaluate: What skills have you developed? Test your product and consider how you would improve it.

Design: CAD What is computer aided design? Learn to use the basics of Photoshop to design products.

Evaluate: What skills have you developed? Test your product and consider how you would improve it.

Make: Develop your design through iterative processes and modelling, testing & evaluating before making a final product.

Design:

Pewter Casting Project

Materials research

Recall Sustainability 6 R's

Recall Health and Safety

Baseline Assessment

Y9

Recall: CAD What is computer aided design? Are you able to use the basics of 2D software to design products.

Design: CAD What is computer aided design? Learn to use the basics of 3D software to design products.

Modelling: Will my product work? What can I do to improve it?

Make: Can you make an accurate product using machines and tools independently?

Evaluate: What skills have you developed? Test your product and consider how you would improve it.

Recall Sustainability 6 R's

Evaluate: What makes a good drawing? How can you improve your skills?

Isometric Drawing

Evaluate: At each stage of making, how can you improve your product? Would you change any thing?

Make

Design

Bottle Balance Project

Materials research

Recall Health and Safety

Baseline Assessment

Research Sustainability 6 R's

Y8

Introduction to CAD What is computer aided design? Learn to use the basics of 2D software to design products.

Design: CAD What is computer aided design? Learn to use the basics of 2D software to design products.

Make: What is CAM? Use the laser cutter to produce your final product.

Evaluate: How has CAD / CAM helped you to make a product?

Introduction to Sustainability 6 R's

Evaluate: What makes a good drawing? How can you improve your skills?

Oblique Drawing

Mechanisms: Motions, gears, levers, pulleys, etc.

Evaluate: Does your product work? How can you fix problems?

Y7

Materials: Working with MDF, cutting and finishing techniques.

Make

Design

Materials research

Introduction to the workshop: Health and Safety

Baseline Assessment: What do you already know about DT?

A wide range of fun and exciting mini projects that teach you valuable skills in the workshop. Understanding different materials and how they work.

Year 7 – Design Technology Rotation						
Curriculum intent	The aim of the Design Technology curriculum is to ensure that all students have the confidence and ability to work in a practical environment. Students will understand why we study Design Technology and how designers, inventors and inventions have changed the world around us. Year 7 students will investigate new and emerging technologies and computer aided design. Students will be able to understand that Design Technology is about problem solving and not about getting things right the first time. In year 7 students will be reintroduced to mechanical systems and know about movement and force. They will build upon their design skills in order to make, test and evaluate ideas until a functional solution has been made.					
Term	**Autumn 1 (HT1)**	**Autumn 2 (HT2)**	**Spring 1 (HT3)**	**Spring 2 (HT4)**	**Summer 1 (HT5)**	**Summer 2 (HT6)**
Knowledge	<u>Mechanisms</u> Learners will develop their technical vocabulary and understanding of the four types of motion and then conduct a practical research into gears and pulleys, so they build an understanding of how these can be used to transmit power. Why study Design Technology? How do things move? Why do we have gears in our cars? How mechanical systems enable changes in movement and force. <u>Oblique Drawings</u> Learning how to draw oblique is a valuable skill as it is a simple type of technical drawing of graphical projection used for producing three-dimensional (3D) images of objects.	<u>CAD/CAM</u> Computer-aided design is the use of computers to aid in the creation, modification of a design. Learners will learn to use 2D Design software to increase the productivity of their design ideas, improve the quality and accuracy of products, to create a database for manufacturing. CAD output is in the form of electronic files for printing using a laser cuter to manufacture pieces of work and then assemble. How have designers changed the world? Investigate new and emerging technologies. 3D printing CAD/CAM.	<u>Mechanisms</u> Learners will develop their technical vocabulary and understanding of the four types of motion and then conduct a practical research into gears and pulleys, so they build an understanding of how these can be used to transmit power. How do things move? Why do we have gears in our cars? How mechanical systems enable changes in movement and force. <u>Oblique Drawings</u> Learning how to draw oblique is a valuable skill as it is a simple type of technical drawing of graphical projection used for producing three-dimensional (3D) images of objects.	<u>CAD/CAM</u> Computer-aided design is the use of computers to aid in the creation, modification of a design. Learners will learn to use 2D Design software to increase the productivity of their design ideas, improve the quality and accuracy of products, to create a database for manufacturing. CAD output is in the form of electronic files for printing using a laser cuter to manufacture pieces of work and then assemble. How have designers changed the world? Investigate new and emerging technologies. 3D printing CAD/CAM. Making products and considering their impact on the natural world.	<u>Structures</u> Frame structures and their components are explored in the second part of the project, with learners gaining an understanding of types of load each is suitable for. The role of triangulation and techniques for strengthening structures are developed as understanding grows. <u>Sustainability</u> Making products and considering their impact on the natural world. What do Architects do? Look at structural elements and clients' needs to achieve functional solutions.	<u>Sustainability</u> Sustainable Design: Making products and considering their impact on the natural world. Sustainability: Sustaining life on our planet for future generations. Making products and considering their impact on the natural world. Use all the creative and technical knowledge you have learnt to identify, test, develop and then make a solution to a real world issue.

Skills	• Health and safety • 4 types of motion • 3 classes of lever • Linkages in action • Gears • Pulleys • Pop-up celebration card • Graphics based covering sketching in 2D and 3D • Practical	• Computer-aided design • Computer-aided manufacture • Identifying modification • Automaton • The 6 R's • Precious plastics • Sustainable Timber • The morals of sustainability • Practical	• Health and safety • 4 types of motion • 3 classes of lever • Linkages in action • Gears • Pulleys • Pop-up celebration card • Graphics based covering sketching in 2D and 3D • Practical	• Computer-aided design • Computer-aided manufacture • Identifying modification • Automaton • The 6 R's • Precious plastics • Sustainable Timber • The morals of sustainability • Practical	• Natural and manmade structures • Frame structures and their components • Triangulation and strengthening structures • Practical outcome • Identifying modification	• The 6 R's • Precious plastics • Sustainable Timber • The morals of sustainability • Practical
Assessments	Mechanisms Test with high value question. Outcome from card levers project and evaluation. Oblique drawings. Practical outcome - model and working prototype.	Quality control check against design specification and evaluation. Sustainability test, with high value question.	Mechanisms Test with high value question. Outcome from card levers project and evaluation. Oblique drawings. Practical outcome - model and working prototype.	Quality control check against design specification and evaluation. Sustainability test, with high value question.	Sustainability test, with high value question.	Sustainability test, with high value question.
Enrichment	https://learning.sciencemuseumgroup.org.uk/resources/?subject=design-and-technology	https://www.bbc.co.uk/bitesize/guides/znmnb9q/revision/1	https://learning.sciencemuseumgroup.org.uk/resources/?subject=design-and-technology	https://www.bbc.co.uk/bitesize/guides/znmnb9q/revision/1	https://www.bbc.co.uk/bitesize/guides/znmnb9q/revision/1	https://www.bbc.co.uk/bitesize/subjects/zfr9wmn

Year 7 Design and Technology Autumn Term Knowledge Organiser

Key Vocabulary:

1	Rotary	Rotation around a fixed axis is a special case of rotational motion. Familiar examples of rotary include a washing machine drum and wheels on the bus go round and round.
2	Linear	Linear motion is one-dimensional motion along a straight line, and can therefore be described mathematically using only one spatial dimension. Familiar examples of linear include a train moves on a straight line track and drawing a straight using a ruler.
3	Oscillating	Oscillation is the repetitive or periodic variation of some measure about a central value (often a point of equilibrium). Familiar examples of oscillation include a swinging pendulum and alternating current.
4	Reciprocating	Reciprocating is a repetitive up-and-down or back-and-forth linear motion. It is found in a wide range of mechanisms, including reciprocating engines and pumps. Familiar examples of reciprocating include jumping up and down on a trampoline and using a coping saw to cut a piece of wood.
5	Fulcrum	A fulcrum is the support about which a lever pivots.
6	Load	Something lifted up and carried or a mass or weight supported by something.
7	Effort	The power directly applied to a machine to lift a load is called Effort.

Mechanisms

8 Mechanisms - What are they?

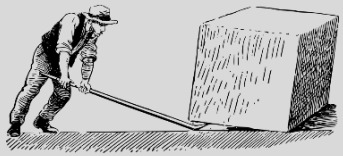
In engineering, a mechanism is a device that transforms input forces and movement into a desired set of output forces and movement. Mechanisms generally consist of moving components.

Mechanical motion is defined as one of the four types of motion that you will find in a mechanical system. The different types of motion are: rotary, linear, oscillating and reciprocating.

9 Lever - What is it?

A lever is a simple machine consisting of a beam or rigid rod pivoted at a fixed hinge, or fulcrum. A lever is a rigid body capable of rotating on a point on itself.

On the basis of the locations of fulcrum, load and effort, the lever is divided into three types.



10 Gear Train - What is it?

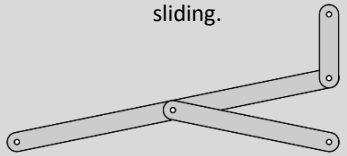
A gear train is a mechanical system formed by mounting gears on a frame so the teeth of the gears engage. Gear teeth are designed to ensure the pitch circles of engaging gears roll on each other without slipping, providing a smooth transmission of rotation from one gear to the next.

Gear ratio of the pitch circles of mating gears defines the speed ratio and the mechanical advantage of the gear set.

2D Design

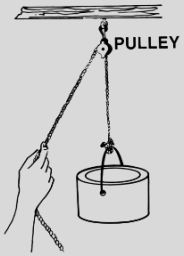
13 Linkage - What is it?

A mechanical linkage mechanism is an assembly of bodies connected to manage forces and movement. The movement of a body, or link, is studied using geometry so the link is considered to be rigid. The connections between links are modelled as providing ideal movement, pure rotation or sliding.



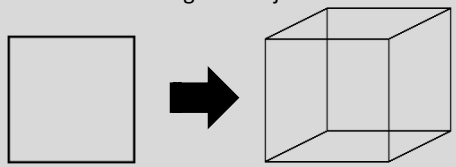
14 Pulley - What is it?

A pulley is a wheel on an axle or shaft that is designed to support movement and change of direction of a taut cable or belt, or transfer of power between the shaft and cable.



15 Oblique Projection

It is a simple type of technical drawing of graphical projection used for producing three-dimensional (3D) images of objects.



16 Evaluation

Designers evaluate their finished products to test whether they work well and if design can be corrected or improved.

It is important to evaluate your work constantly during the project to see if it is on track and so that improvements can be built-in throughout the design process, not just at the end.

Year 7 Design and Technology Summer Term Knowledge Organiser

Key Vocabulary:

1	Structure	The arrangement of and relations between the parts or elements of something complex. A building or other object constructed from several parts.
2	Frame structure	An arrangement of struts and ties to support itself and the load placed on it. Each part is known as a 'member'.
3	Shell structure	A construction, where the skin and the frame of the building are created from one single piece. There are no separate parts and the shell is strong enough to support itself and the loads placed on it.
4	Triangulation	Adding triangles to a structure to improve its strength and rigidity
5	Load	Something lifted up and carried or a mass or weight supported by something.
6	Design Brief	A design brief is a document for a design project developed by a person or team in consultation with the client/customer. They outline the deliverables and scope of the project; function and aesthetics, timing, budget, etc.
7	Specification	It is a list of criteria that the product needs to meet if it is to be successful.
8	Scale Models	A scale model is a physical model which is geometrically similar to an object (known as the prototype). Scale models are generally smaller than large prototypes such as vehicles, buildings. Models built to the same scale as the prototype are called mock-ups.

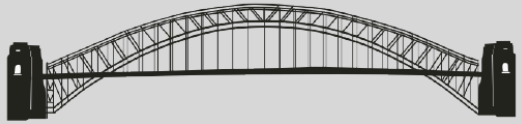
Bridge Structure

9	Paper	A sheet material used for writing on or printing on (or as a non-waterproof container), usually made by draining cellulose fibres from a suspension in water.
10	Cards	Thicker paper with a weight more than 220 GSM and up to 500 GSM.
11	Boards	The industry's name for cardboard and is made from several layers of pulp. Very thick board is made by sticking together sheets of paper or board.
12	Scalpel	A small and extremely sharp bladed instrument These knives were general-purpose tools, designed for cutting and shaping wooden implements, scraping hides, and for other utilitarian purposes.
13	CAD	Designers use computer-aided design (CAD) software such as 2D Design to develop plans, product drawings, building plans and landscaping layouts.
13	Dimension	a measurable extent of a particular kind, such as length, breadth, depth, or height.
14	Diameter	A diameter of a circle is any straight line segment that passes through the centre of the circle and whose endpoints lie on the circle.
15	Radius	A radius of a circle or sphere is any of the line segments from its centre to its perimeter, and in more modern usage, it is also their length. The name comes from the Latin radius, meaning ray but also the spoke of a chariot wheel.

3D Design

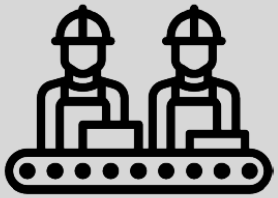
15 Bridge Structure

Building a bridge using Triangulation method.



16 Manufacture - What is it?

The prototypical bridge is quite simple—two supports holding up a beam—yet the engineering problems that must be overcome even in this simple form are inherent in every bridge: the supports must be strong enough to hold the structure up, and the span between supports must be strong enough to carry the loads.



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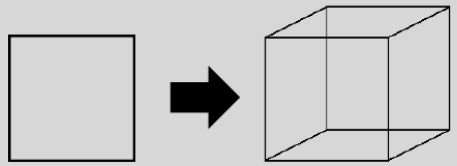

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