Curriculum Intent
Year 8 Design and Technology

PRIORITIES IN WHOLE SCHOOL CURRICULUM INTENT

Enjoyment of learning
Knowledge acquisition and recall
Extensive vocabulary
Effective communication through writing, speaking & listening, and use of technology
Numeracy
Critical evaluation of information
Enterprise and problem-solving
Working with others

KEY QUESTIONS TO CONSIDER

1.Why has content been selected? Is there sufficient focus on the most powerful knowledge, concepts, and skills?Content on CAM toys and sustainability equips students with essential engineering skills and environmental awareness, focusing on critical concepts in mechanics and design.

2. Does learning provide sufficient challenge? Is there sufficient challenge for all learners in all year groups? Learning activities are tailored to offer appropriate challenges for all abilities, using differentiated tasks to engage students and encourage deeper exploration.

3. Why is learning sequenced in this way? Does the sequence enable students to build on prior learning and learn in increasing breadth and depth over time? The sequence starts with foundational concepts of mechanisms, allowing students to build on prior knowledge and progress to more complex sustainable design applications.

4. How is learning sequenced or spaced to promote long-term memory? Learning is spaced through iterative projects that encourage design refinement, supported by regular reflection and assessments to strengthen retention and connections to prior knowledge.

SUBJECT CURRICULUM INTENT

Design and Technology (D&T) empowers students to engage in hands-on learning that prepares them for careers in design and industry. By focusing on projects like designing CAM toys, students not only develop essential engineering skills but also gain insights into sustainability and the environmental impact of their designs. The curriculum incorporates advanced tools like laser cutters to keep pace with industry trends. Through exploring manufacturing processes and new technologies, students apply a variety of skills, from hand tools to virtual modelling and CNC machines. Additionally, D&T fosters critical thinking, enabling students to make aesthetic, economic, moral, social, and technical judgments in their designs and when assessing others' work.

PDE Links

- Developing responsible, respectful and active citizens who are able to play their part and become actively involved in public life as adults.
- Developing students' character, which is defined as a set of positive personal traits, dispositions and virtues that informs their motivation and guides their conduct so that they reflect wisely, learn eagerly, behave with integrity and cooperate consistently well with others – this gives students
- What is the impact of human activity?
- What is the impact of modern lifestyle on the planet?

Essential knowledge

- Students will need to be able to identify the different materials used and their properties.
- What is the difference between the different categories of materials
- Be able to identify the different Cams and range of movements.
- Students will be able to identify the different range of movements (liner, rotary, reciprocating)
- Understand the core principles of sustainability and its links to the environment
- Be able to understand the inputs and outputs of mechanical mechanisms

Essential Skills

- Students will be able to select the correct tools to complete their projects
- Students will be able to use the different types of machinery at a basic level
- They will be able to use new machinery safety and understand the PPE for each machine
- Be able to use a range of hand tools and marking tools
- Students will be able to drill, cut and shape accurately
- Student will be able to make complex models using card
- They will be able to design on stock forms

YEAR 8					
	KNOWLEDGE	**CONCEPTS**	**SKILLS**	**RATIONALE**	**FUTURE DEVELOPMENT**
	Recycling project Students will have a basic understanding and knowledge about different materials, their life cycles and the importance of the 3 R's (Recycle, Reduce, Reuse) Students will know the positive and negative impacts of each material. (Plastic, Timber, Metal) Students will know how to design and make something for a target market, following specification criteria. Students will also understand what a mechanism is and how they work, knowing the difference between levers and linkages. Students will learn how to construct and layer materials appropriately. Students will be able to complete the project with target criteria in place, and designing for a purpose. They will understand and know how to alter and improve an existing mechanism. Learning how to up and down scale, creating different angles	**Design** Students will learn how to produce user-centred products. They will design their own mechanisms, drawing influence from existing designs. **Make** Students will learn the basics of each material and understand how to utilise them effectively. **Evaluate** Students will understand the social issues in the design and manufacture of products, including the importance of fair trade. **Technical Knowledge** Understand where timber-based materials come from and how they are seasoned for manufacturing. Learn how metal is extracted from ore and the refining processes necessary for manufacturing. Understand how polymers are manufactured from crude oil, including fractional distillation and cracking. Explore the environmental factors associated with each material, including the impacts of mining, drilling, and farming. Discuss deforestation and its	Literacy- Writing, evaluating, methodology, fact sheets, persuasive writing. Maths- Measurements, multiplication, angles. Students will know the positives and benefits of each material, and be able to use them in a sustainable manner. Students will know how they can reuse products to sustain using new resources. Students will have the skills to identify what they need to find out and research to ensure their product is targeted appropriately. Students will have the skills of being able to pick the correct mechanism chieve the right movement. Students will learn how to adapt mechanisms to get the outcome they want. use the design brief to create a set of initial design ideas by using the iterative design process.	The reason we deliver this project is because it allows students to understand the purpose and uses of each material and understand the affects they all have. This will help students in later life because they need to know how to recycle and dispose of materials. Our students are the future, they need to understand how we can prevent global warming and other factors which are effecting our environment and wildlife. Students will be able to evaluate and analyse the success of their prototype product and suggest potential future modifications.	Students to learn about finite materials and different types of energy.

		environmental consequences. Analyse processes that contribute to global warming and atmospheric pollution. Understand the inputs and outputs of different mechanisms and the order of levers.			
Term 2	**CAM TOY PROJECT** Students learn how CAM mechanism's function, specifically how rotary motion is converted into linear motion, providing a foundational understanding of mechanical principles. The project teaches students the stages of the design process, from identifying a problem to ideation, prototyping, and testing, emphasising the importance of iteration and refinement. Students explore creative design solutions by experimenting with various shapes and functionalities, fostering innovative thinking and personal expression in their work. Students gain insights into the properties of different materials used in their designs, including their advantages and limitations for specific applications. The project promotes awareness of the environmental impact of material choices and design decisions, encouraging responsible design practices. Students develop teamwork skills by collaborating with peers, sharing ideas, and giving and receiving constructive feedback, mirroring real-world design environments. Through testing and feedback, students learn to critically assess their designs and make necessary improvements, highlighting the iterative nature of effective design. Hands-on experience with tools and techniques related to creating cam mechanisms equips students with practical skills in design and technology.	**Design** Students start with the challenge of creating a functional toy, progressing through ideation, prototyping, and testing. This critical approach fosters exploration and iteration, essential in any design field. **Creativity and Innovation** Students develop their own toy designs, experimenting with different shapes, movements, and functionalities to encourage innovative thinking and personal expression. **Make Mechanics of Motion** The project introduces students to cam mechanisms, illustrating how rotary motion is transformed into linear motion. This foundational knowledge enhances their understanding of basic engineering principles. **Integration of Theory and Practice**	In the Year 8 CAM (Cam Mechanism) toy project, students develop a range of valuable skills that align with the project's concept of exploring mechanical movement and design principles. Here are the key skills they learn: **Understanding Mechanics of Motion** Students learn how different cam designs function to convert rotary motion into linear movement. This foundational knowledge helps them grasp basic engineering principles, enhancing their understanding of how mechanisms work. **Design Thinking** The project fosters critical thinking as students engage in the design process. They identify problems, brainstorm solutions, and iterate through prototypes, learning to approach design challenges methodically. **Creativity and Innovation** By developing their own toy designs,	The rationale for the Year 8 CAM (Cam Mechanism) toy project is learning practical application and skill development The transition to CAM mechanisms builds on previously learned concepts in mechanics. By linking new knowledge to prior subjects, students can consolidate their understanding of how different mechanisms operate, reinforcing foundational principles. Students with an interest in engineering will find this project particularly beneficial. Understanding cam mechanisms lays the groundwork for comprehending more complex systems, such as gears and linkages, which are essential in various engineering fields. The project provides practical, hands-on experience that helps students visualise and understand the mechanics of motion. By engaging directly with the materials and tools, they gain insights into how theoretical concepts translate into real-world applications. Students learn to evaluate and analyse the success of their prototypes. This critical assessment encourages them to reflect on their design choices, consider user feedback, and identify areas for improvement. It fosters a mindset of continuous improvement, essential in	Enhancing discussions around eco-friendly materials and sustainable design practices can deepen students' understanding of environmental impact in product development. Introducing a wider variety of mechanisms (e.g., gears, levers) could broaden students' understanding of mechanical principles and enhance their creativity in design.

		Linking theoretical concepts with practical application allows students to apply classroom knowledge to real-world scenarios, enhancing problem-solving abilities. **Evaluate** Students evaluate their designs by testing prototypes and gathering feedback. This iterative process emphasises refinement and teaches that initial ideas can evolve into better solutions. **Collaboration and Communication** The project encourages teamwork, fostering collaboration among students as they share ideas and provide constructive feedback, mirroring real-world design practices. **Technical Knowledge** Discussions on sustainability encourage students to consider the environmental impact of their material choices and design decisions, fostering responsible future designers.	students enhance their creativity. They experiment with various shapes, movements, and functionalities, encouraging them to think outside the box and express their unique ideas. **Practical Skills in Prototyping** Hands-on construction of the CAM toys helps students develop practical skills in using tools and materials. They learn techniques for cutting, assembling, and testing their prototypes, gaining confidence in their craftsmanship. **Application of Theory to Practice** Students apply theoretical concepts to real-world scenarios, deepening their understanding of design and technology. This integration helps them see the relevance of classroom knowledge in practical applications. **Collaboration and Teamwork** The project often involves group work, fostering collaboration and communication skills. Students learn to share ideas, provide feedback, and work together effectively, mirroring real-world engineering and design environments. **Critical Evaluation and Problem-Solving**	both design and engineering. By allowing students to design their own toys, the project nurtures creativity and innovation. Students are encouraged to explore different solutions to design challenges, enhancing their problem-solving skills. The emphasis on suggesting potential modifications to their prototypes teaches students the importance of iteration in the design process. They learn that design is not static but an evolving process that can be improved over time based on testing and evaluation. The skills and knowledge gained from this project prepare students for future studies and careers in design, engineering, and technology. By understanding cam mechanisms, students are better equipped to tackle more complex engineering challenges.	

			Through testing and evaluation, students learn to critically assess their designs. They gather feedback and make necessary adjustments, developing problem-solving skills that are vital in any design context. **Sustainability Awareness** Discussions around material choices and their environmental impact teach students about sustainability. This awareness helps them make responsible decisions in their design process, preparing them to be conscientious designers. **Documentation and Reflection** Keeping a project journal or manufacture diary encourages students to document their design process, reflections, and improvements. This practice enhances their ability to articulate their thoughts and decisions.		