

Year 5 - Progression of Knowledge and Skills DT

Term	Knowledge	Skills
Autumn Electrical Systems: Wobble Bots Building on existing knowledge of circuits by introducing motors and exploring how they create movement in products.	• .Beginning to understand that electricity flows around a circuit. • Using different components to produce different results from electrical systems. • Creating working electrical circuits with a wider variety of electrical components. • Deconstructing electrical systems to understand how they work.	• Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. • Developing more independence in generating ideas. • Having a broader range of ideas and deeper innovation, requiring pupils to think critically about the practicality and originality of their ideas. • Using a series of prototypes to refine and improve their designs. • Producing lists of equipment, materials and tools. • Creating a step-by-step plan for making. • Selecting materials, components or ingredients based on research or user needs. • Explaining their choices, referring to their research. • Understanding safety rules in detail. • Applying safety instructions consistently. • Balancing aesthetics and functionality in designs. • Considering when best to apply finishing effects. Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. • Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. • Considering alternative materials, tools or techniques that could enhance the product. • Providing feedback that is helpful, specific and encouraging. • Incorporating feedback from peers or users to improve their product further, explaining the changes they made and the impact they had.

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Spring Mechanical systems: Gears and pulleys Investigating the history, mechanics and uses of gears and pulleys. Build a gear-and-pulley mechanism. Design an eco-bike.	• That mechanical systems that use gears in everyday objects (eg bicycle, clock). • That gears and pulleys allow us to transfer movement and force from one part of a mechanical system to another. • That gears allow us to increase the output of a mechanism • That original and innovative ideas are different from what has been made before. • That annotations are detailed labels and comments on diagrams. • That risks are things that might happen. • That hot glue creates a strong bond quickly. • That sustainability means thinking about the materials that were used . • That their final product can still be improved by different materials or techniques. • That evaluating their designs in detail will help them understand its successful and less successful parts. • That feedback should be positive, helpful and specific. • That explaining how they used feedback to improve their design can help them create better products in the future	• Noticing wider-reaching problems or needs in the community. • Identifying a wide range of needs and potential barriers through market research. • Writing complex problem statements. • Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. • Coming up with a broader range of ideas and deeper innovation, requiring pupils to think about their ideas' practicality and originality. • Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams. • Using a series of prototypes to refine and improve their designs. • Consistently apply safety instructions. • Select appropriate scissors to handle delicate cutting tasks and challenging materials. • Cutting patterns and drawings accurately. • In supervised groups, using hot glue guns safely. Recognising that hot glue is useful for joining materials that need a strong bond that sets quickly. • Choosing PVA glue over hot glue for its safety when joining in less intensive projects.

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Spring Mechanical systems: Gears and pulleys Investigating the history, mechanics and uses of gears and pulleys. Build a gear-and-pulley mechanism. Design an eco-bike.	N/A	- Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. - Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. - Considering alternative materials, tools or techniques that could enhance the product. - Providing feedback that is helpful, specific, and encouraging. - Incorporating feedback from peers or users to improve their product further, explaining the changes they made and the impact they had.

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Summer Structures: Bridges Investigating different types of bridges and how structural strength is affected by shape and design.	To understand: - Some different ways to reinforce structures. - Triangles can be used to reinforce bridges. - Material selection is important based on properties. - The material (functional and aesthetic) properties of wood. - The difference between arch, beam, truss and suspension bridges. - How to carry and use a saw safely. To know: - Properties are words that describe the form and function of materials.	- Designing a stable structure that is able to support weight. - Creating a frame structure with a focus on triangulation. - Making a range of different shaped beam bridges. - Using triangles to create truss bridges that span a given distance and support a load. - Building a wooden bridge structure. - Independently measuring and marking wood accurately. - Selecting appropriate tools and equipment for particular tasks. - Using the correct techniques to saw safely. - Identifying where a structure needs reinforcement and using card corners for support. - Explaining why selecting appropriate materials is an important part of the design process. - Understanding basic wood functional properties. - Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary. - Suggesting points for improvements for own bridges and those designed by others.