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|  | | **Castle Academy**  **Design and Technology Curriculum Map - Autumn** | | | | | |  |
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|  | Year 1 | | Year 2 | Year3 | Year 4 | Year 5 | Year 6 | |
| Aspect | **Mechanisms** | | **Textiles** | **Mechanical Systems** | **Structures** | **Mechanical Systems** | **Textiles** | |
| Focus | **Sliders and Levers**  *Making Toys* | | **Templates and Joining Techniques**  *Creating a Character* | **Levers and Linkages**  *Human Joints* | **Shell Structures / Shell Structures using Computer-Aided Design (CAD)**  *Containers for equipment* | **Cams**  *Viking Longboat* | **Combining Different Fabric Shapes / Using CAD in Textiles**  *Tool / Equipment Belt* | |
| Prior Learning | * Early experiences of working with paper and card to make simple flaps and hinges. (EYFS) * Experience of simple cutting, shaping and joining skills using scissors, glue, paper fasteners and masking tape. (EYFS) | | * Explored and used different fabrics. (EYFS) * Cut and joined fabrics with simple techniques. (EYFS) * Thought about the user and purpose of products. (Yr1) | * Explored and used mechanisms such as flaps, sliders and levers. (Yr1 Autumn) * Gained experience of basic cutting, joining and finishing techniques with paper and card. (Yr2 Autumn /Yr1 Summer) | * Experience of using different joining, cutting and finishing techniques with paper and card. (Yr3 Autumn) * A basic understanding of 2-D and 3-D shapes in mathematics and the physical properties and everyday uses of materials in science. (Yr3/4 Maths and Science) | * Experience of axles, axle holders and wheels that are fixed or free moving. (Yr1 Summer) * Basic understanding of different types of movement. (Yr3/4 DT) * Experience of cutting and joining techniques with a range of materials including card, plastic and wood. (Yr3 Autumn/Spring) * An understanding of how to strengthen and stiffen structures. (Yr4 Autumn) | * Experience of basic stitching, joining textiles and finishing techniques. (Yr4 Spring) * Experience of making and using simple pattern pieces. (Yr4 Spring) | |
| Design | * Generate ideas based on simple design criteria and their own experiences, explaining what they could make. * Develop, model and communicate their ideas through drawings and mock-ups with card and paper. | | * Design a functional and appealing product for a chosen user and purpose based on simple design criteria. * Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, mock-ups and information and communication technology | * Generate realistic ideas and their own design criteria through discussion, focusing on the needs of the user. * Use annotated sketches and prototypes to develop, model and communicate ideas. | * Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and purpose of the product. * Develop ideas through the analysis of existing products and use annotated sketches and prototypes to model and communicate ideas. | * Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources. • Develop a simple design specification to guide their thinking. * Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views. | * Generate innovative ideas by carrying out research including surveys, interviews and questionnaires. * Develop, model and communicate ideas through talking, drawing, templates, mock-ups and prototypes and, where appropriate, computer aided design (CAD). * Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification. | |
| Make | * Plan by suggesting what to do next. * Select and use tools, explaining their choices, to cut, shape and join paper and card. * Use simple finishing techniques suitable for the product they are creating. | | * Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing. * Select from and use textiles according to their characteristics | * Order the main stages of making. * Select from and use appropriate tools with some accuracy to cut, shape and join paper and card. * Select from and use finishing techniques suitable for the product they are creating. | * Order the main stages of making. * Select and use appropriate tools to measure, mark out, cut, score, shape and assemble with some accuracy. * Explain their choice of materials according to functional properties and aesthetic qualities. * Use finishing techniques suitable for the product they are creating | * Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team. * Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. * Work within the constraints of time, resources and cost. | * Produce detailed lists of equipment and fabrics relevant to their tasks. * Formulate step-by-step plans and, if appropriate, allocate tasks within a team. * Select from and use a range of tools and equipment to make products that are accurately assembled and well finished. * Work within the constraints of time, resources and cost | |
| Evaluate | * Explore a range of existing books and everyday products that use simple sliders and levers. * Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria. | | * Explore and evaluate a range of existing textile products relevant to the project being undertaken. * Evaluate their ideas throughout and their final products against original design criteria. | * Investigate and analyse books and, where available, other products with lever and linkage mechanisms. * Evaluate their own products and ideas against criteria and user needs, as they design and make. | * Investigate and evaluate a range of existing shell structures including the materials, components and techniques that have been used. * Test and evaluate their own products against design criteria and the intended user and purpose | * Compare the final product to the original design specification. * Test products with the intended user, where safe and practical, and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. * Consider the views of others to improve their work. * Investigate famous manufacturing and engineering companies relevant to the project. | * Investigate and analyse textile products linked to their final product. * Compare the final product to the original design specification. * Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. * Consider the views of others to improve their work. | |
| Technical Knowledge | * Explore and use sliders and levers. * Understand that different mechanisms produce different types of movement. * Know and use technical vocabulary relevant to the project. | | * Understand how simple 3-D textile products are made, using a template to create two identical shapes. * Understand how to join fabrics using different techniques e.g. running stitch, glue, over stitch, stapling. * Explore different finishing techniques e.g. using painting, fabric crayons, stitching, sequins, buttons and ribbons. * Know and use technical vocabulary relevant to the project. | * Understand and use lever and linkage mechanisms. * Distinguish between fixed and loose pivots. * Know and use technical vocabulary relevant to the project. | * Develop and use knowledge of how to construct strong, stiff shell structures. * Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes. * Know and use technical vocabulary relevant to the project. | * Understand that mechanical systems have an input, process and an output. * Understand how cams can be used to produce different types of movement and change the direction of movement. * Know and use technical vocabulary relevant to the project. | * A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics. * Fabrics can be strengthened, stiffened and reinforced where appropriate. | |
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|  | Year 1 | | Year 2 | Year3 | Year 4 | Year 5 | | Year 6 |
| Aspect | **Structures** | | **Food** | **Mechanical Systems** | **Textiles** | **Structures** | | **Electrical Systems** |
| Focus | **Freestanding Structures**  *Building playground equipment* | | **Preparing Fruit and Vegetables**  *Food from around the world* | **Pneumatics**  *Forces and movement* | **2-D Shape to 3-D Product**  *Reusable products* | **Frame Structures**  *Shelter Building* | | **More Complex Switches and Circuits**  *Security Alarms* |
| Prior Learning | * Experience of using construction kits to build walls, towers and frameworks. (EYFS) * Experience of using of basic tools e.g. scissors or hole punches with construction materials e.g. plastic, card. (EYFS) * Experience of different methods of joining card and paper. (EYFS) | | * Experience of common fruit and vegetables, undertaking sensory activities i.e. appearance taste and smell. (EYFS) * Experience of cutting soft fruit and vegetables using appropriate utensils. (EYFS) | * Explored simple mechanisms, such as sliders and levers, and simple structures. • Learnt how materials can be joined to allow movement. (Yr1 Autumn) * Joined and combined materials using simple tools and techniques. | * Have joined fabric in simple ways by gluing and stitching. (Yr2 Autumn) * Have used simple patterns and templates for marking out. (Yr2 Autumn) * Have evaluated a range of textile products (Yr2 Autumn) | * Experience of using measuring, marking out, cutting, joining, shaping and finishing techniques with construction materials. (Yr4 Autumn/Year 3 Autumn) * Basic understanding of what structures are and how they can be made stronger, stiffer and more stable. | | * Understanding of the essential characteristics of a series circuit and experience of creating a battery powered, functional, electrical product. (Yr4 Summer) * Initial experience of using computer control software and an interface box or a standalone box, e.g. writing and modifying a program to make a light flash on and off. (Yr4 Summer) |
| Designing | * Generate ideas based on simple design criteria and their own experiences, explaining what they could make. * Develop, model and communicate their ideas through talking, mock-ups and drawings. | | * Design appealing products for a particular user based on simple design criteria. * Generate initial ideas and design criteria through investigating a variety of fruit and vegetables. * Communicate these ideas through talk and drawings. | * Generate realistic and appropriate ideas and their own design criteria through discussion, focusing on the needs of the user. * Use annotated sketches and prototypes to develop, model and communicate ideas. | * + Generate realistic ideas through discussion and design criteria for an appealing, functional product fit for purpose and specific user/s.   + Produce annotated sketches, prototypes, final product sketches and pattern pieces. | * Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web-based resources. * Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost. * Generate, develop and model innovative ideas, through discussion, prototypes and annotated sketches. | | * Use research to develop a design specification for a functional product that responds automatically to changes in the environment. Take account of constraints including time, resources and cost. * Generate and develop innovative ideas and share and clarify these through discussion. * Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams. |
| Making | * Plan by suggesting what to do next. * Select and use tools, skills and techniques, explaining their choices. * Select new and reclaimed materials and construction kits to build their structures. * Use simple finishing techniques suitable for the structure they are creating. | | * Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely. * Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product. | * Order the main stages of making. * Select from and use appropriate tools with some accuracy to cut and join materials and components such as tubing, syringes and balloons. * Select from and use finishing techniques suitable for the product they are creating. | * Plan the main stages of making. * Select and use a range of appropriate tools with some accuracy e.g. cutting, joining and finishing. * Select fabrics and fastenings according to their functional characteristics e.g. strength, and aesthetic qualities e.g. pattern. | * Formulate a clear plan, including a step-by-step list of what needs to be done and lists of resources to be used. * Competently select from and use appropriate tools to accurately measure, mark out, cut, shape and join construction materials to make frameworks. * Use finishing and decorative techniques suitable for the product they are designing and making. | | * Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components. * Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product. * Create and modify a computer control program to enable an electrical product to work automatically in response to changes in the environment |
| Evaluating | * Explore a range of existing freestanding structures in the school and local environment e.g. everyday products and buildings. * Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria. | | * Taste and evaluate a range of fruit and vegetables to determine the intended user’s preferences. * Evaluate ideas and finished products against design criteria, including intended user and purpose | * Investigate and analyse books, videos and products with pneumatic mechanisms. * Evaluate their own products and ideas against criteria and user needs, as they design and make. | * Investigate a range of 3-D textile products relevant to the project. * Test their product against the original design criteria and with the intended user. * Take into account others’ views. * Understand how a key event/individual has influenced the development of the chosen product and/or fabric. | * Investigate and evaluate a range of existing frame structures. * Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests. * Research key events and individuals relevant to frame structures. | | * Continually evaluate and modify the working features of the product to match the initial design specification. * Test the system to demonstrate its effectiveness for the intended user and purpose. * Investigate famous inventors who developed ground-breaking electrical systems and components. |
| Technical Knowledge | * Know how to make freestanding structures stronger, stiffer and more stable. * Know and use technical vocabulary relevant to the project. | | * Understand where a range of fruit and vegetables come from e.g. farmed or grown at home. * Understand and use basic principles of a healthy and varied diet to prepare dishes, including how fruit and vegetables are part of The Eatwell plate. * Know and use technical and sensory vocabulary relevant to the project. | * Understand and use pneumatic mechanisms. * Know and use technical vocabulary relevant to the project. | * Know how to strengthen, stiffen and reinforce existing fabrics. * Understand how to securely join two pieces of fabric together. * Understand the need for patterns and seam allowances. * Know and use technical vocabulary relevant to the project. | * Understand how to strengthen, stiffen and reinforce 3-D frameworks. * Know and use technical vocabulary relevant to the project. | | * Understand and use electrical systems in their products. * Apply their understanding of computing to program, monitor and control their products. * Know and use technical vocabulary relevant to the project. |
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|  | Year 1 | | Year 2 | Year3 | Year 4 | Year 5 | | Year 6 |
| Aspect | **Mechanisms** | |  | **Food** | **Electrical Systems** | **Food** | | **Mechanical Systems** |
| Focus | **Wheels and Axles**  *Making a vehicle* | |  | **Healthy and Varied Diets**  *Lunch on the road* | **Simple Circuits and Switches**  *Light* | **Celebrating Culture and Seasonality**  *Savoury Food* | | **Pulleys or Gears**  *Vehicles* |
| Prior Learning | * Assembled vehicles with moving wheels using construction kits. (EYFS) * Explored moving vehicles through play. (EYFS) * Gained some experience of designing, making and evaluating products for a specified user and purpose. (EYFS) * Developed some cutting, joining and finishing skills with card. (EYFS) | |  | * Know some ways to prepare ingredients safely and hygienically. (Yr2 Spring) * Have some basic knowledge and understanding about healthy eating and The Eatwell plate. (Yr2 Spring) * Have used some equipment and utensils and prepared and combined ingredients to make a product. (Yr2 Spring) | * Constructed a simple series electrical circuit in science, using bulbs, switches and buzzers. (Yr4 Science) * Cut and joined a variety of construction materials, such as wood, card, plastic, reclaimed materials and glue. (Yr2/3 DT) | * Have knowledge and understanding about food hygiene, nutrition, healthy eating and a varied diet. (Y3 Summer) * Be able to use appropriate equipment and utensils, and apply a range of techniques for measuring out, preparing and combining ingredients. (Yr3 Summer) | | * Experience of axles, axle holders and wheels that are fixed or free moving. (Yr5 Autumn) * Basic understanding of electrical circuits, simple switches and components. (Yr6 Spring) * Experience of cutting and joining techniques with a range of materials including card, plastic and wood. (Yr5 Autumn/Spring) * An understanding of how to strengthen and stiffen structures. (Yr5 Spring) |
| Design | * Generate initial ideas and simple design criteria through talking and using own experiences. * Develop and communicate ideas through drawings and mock-ups. | |  | * Generate and clarify ideas through discussion with peers and adults to develop design criteria including appearance, taste, texture and aroma for an appealing product for a particular user and purpose. * Use annotated sketches and appropriate information and communication technology, such as web-based recipes, to develop and communicate ideas. | * Gather information about needs and wants and develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups. * Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated sketches, cross-sectional and exploded diagrams. | * Generate innovative ideas through research and discussion with peers and adults to develop a design brief and criteria for a design specification. * Explore a range of initial ideas and make design decisions to develop a final product linked to user and purpose. * Use words, annotated sketches and information and communication technology as appropriate to develop and communicate ideas | | * Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources. * Develop a simple design specification to guide their thinking. * Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views. |
| Make | * Select from and use a range of tools and equipment to perform practical tasks such as cutting and joining to allow movement and finishing. * Select from and use a range of materials and components such as paper, card, plastic and wood according to their characteristics. | |  | * Plan the main stages of a recipe, listing ingredients, utensils and equipment. * Select and use appropriate utensils and equipment to prepare and combine ingredients. * Select from a range of ingredients to make appropriate food products, thinking about sensory characteristics. | * Order the main stages of making. * Select from and use tools and equipment to cut, shape, join and finish with some accuracy. * Select from and use materials and components, including construction materials and electrical components according to their functional properties and aesthetic qualities | * Write a step-by-step recipe, including a list of ingredients, equipment and utensils * Select and use appropriate utensils and equipment accurately to measure and combine appropriate ingredients. * Make, decorate and present the food product appropriately for the intended user and purpose | | * Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team. * Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost. |
| Evaluate | * Explore and evaluate a range of products with wheels and axles. * Evaluate their ideas throughout and their products against original criteria. | |  | * Carry out sensory evaluations of a variety of ingredients and products. Record the evaluations using e.g. tables and simple graphs. * Evaluate the ongoing work and the final product with reference to the design criteria and the views of others. | * Investigate and analyse a range of existing battery-powered products. * Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work. | * Carry out sensory evaluations of a range of relevant products and ingredients. Record the evaluations using e.g. tables/graphs/charts such as star diagrams. * Evaluate the final product with reference back to the design brief and design specification, taking into account the views of others when identifying improvements. * Understand how key chefs have influenced eating habits to promote varied and healthy diets. | | * Compare the final product to the original design specification. * Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. * Consider the views of others to improve their work. * Investigate famous manufacturing and engineering companies relevant to the project. |
| Technical Knowledge | * Explore and use wheels, axles and axle holders. * Distinguish between fixed and freely moving axles. * Know and use technical vocabulary relevant to the project. | |  | * Know how to use appropriate equipment and utensils to prepare and combine food. * Know about a range of fresh and processed ingredients appropriate for their product, and whether they are grown, reared or caught. * Know and use relevant technical and sensory vocabulary appropriately. | * Understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers. * Apply their understanding of computing to program and control their products. * Know and use technical vocabulary relevant to the project. | * Know how to use utensils and equipment including heat sources to prepare and cook food. * Understand about seasonality in relation to food products and the source of different food products. * Know and use relevant technical and sensory vocabulary. | | * Understand that mechanical and electrical systems have an input, process and an output. * Understand how gears and pulleys can be used to speed up, slow down or change the direction of movement. * Know and use technical vocabulary relevant to the project. |
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