This is the day that the Lord has made; let us rejoice and be glad in it. Psalm 118

How do we Grow Finchampstead Engineers?

Cycle A

Rosefinch Y1

Bullfinch Y1/2

Autumn Even

Project: To design and make a finger or glove puppet. (Templates and joining techniques)

Designing: 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.

Making: 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. **Evaluating**: 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.

Technical knowledge and understanding: 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.

Spring Odd

Project: to design and make a balanced meal for someone training for a Polar expedition. (Preparing a healthy, balanced meal)

Designing: Design appealing products for a particular user based on simple design criteria; Generate initial ideas and design criteria through investigating a balanced diet; Communicate these ideas through talk and drawings.

Making: Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely; Select from a range of ingredients according to their characteristics e.g. colour, texture and taste to create a chosen product.

Evaluating: Taste and evaluate a range of food to determine the intended user's preferences; Evaluate ideas and finished products against design criteria, including intended user and purpose.

Technical knowledge and understanding: Understand where a range of foods come from e.g. farmed or grown at home; Understand and use basic principles of a healthy and varied diet to prepare dishes, Know and use technical and sensory vocabulary relevant to the project.

Summer Odd

Project: To design, create and build houses in Tudor style using cardboard boxes and paint in order to create a small scale 'Old London' (Free standing structures)

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.

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.

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.

Technical knowledge and understanding: Know how to make freestanding structures stronger, stiffer and more stable; Know and use technical vocabulary relevant to the project.

Cycle B

Rosefinch Y1

Bullfinch Y1/2

Autumn Odd

Project: to design and make a fruit salad. (Preparing fruit and vegetables)

Designing: 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.

Making: 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.

Evaluating: 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.

Technical knowledge and understanding: 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.

Spring Even

Project: to design and create a moon buggy with working axles (Wheels and axles)

Designing: generate initial ideas and simple design criteria through talking and using own experiences; Develop and communicate ideas through drawings and mock-ups.

Making: 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.

Evaluating: Explore and evaluate a range of products with wheels and axles; Evaluate their ideas throughout and their products against original criteria.

Technical knowledge and understanding: Explore and use wheels, axles and axle holders; Distinguish between fixed and freely moving axles; Know and use technical vocabulary relevant to the project.

Summer Even

Project: use sliders and leavers to create a pirate ship on the sea moving picture (Mechanisms)

Designing: 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.

Making: 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.

Evaluating: 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.

Technical knowledge and understanding: Explore and use sliders and levers; Understand that different mechanisms produce different types of movement; Know and use technical vocabulary relevant to the project.

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How do we Grow Finchampstead Engineers?

Cycle A

Chaffinch Y3/4

Autumn Even	Spring Odd	Summer Odd
Key question (Food**)** **Designing** • 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. **Making** • 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. **Evaluating** • 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. **Technical knowledge and understanding** • 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.	**Key question (**Shell structures**)** • 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. • 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. • 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. • 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.	**Key question** (Mechanical systems - Pneumatics) •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. • 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. • 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. • Understand and use pneumatic mechanisms. • Know and use technical vocabulary relevant to the project.

Cycle B

Chaffinch Y3/4

Autumn Odd	Spring Even	Summer Even
Key question (Mechanical systems - Levers and linkages) **Designing** • 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. **Making** • 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. **Evaluating** • 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. **Technical knowledge and understanding** • Understand and use lever and linkage mechanisms. • Distinguish between fixed and loose pivots. • Know and use technical vocabulary relevant to the project	**Key question (T**extiles – 2D to 3D shapes**)** **Designing** • 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. Making • 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. **Evaluating** • 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. • Consider others' views. • Understand how a key event/individual has influenced the development of the chosen product and/or fabric. **Technical knowledge and understanding** • 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.	**Key Question** (Electrical systems - Simple circuits and switches) **Designing** • 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. **Making** • 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. **Evaluating** • 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. **Technical knowledge and understanding** • 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

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How do we Grow Finchampstead Engineers?

Cycle A

Goldfinch Y5/6

Autumn Even

Can we design, make and evaluate boot liners for preventing frostbite at Everest Basecamp? (Textiles)

Designing • 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. • Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification. **Making** • 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. **Evaluating** • 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 and understanding** • 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.

Spring Odd

Can we make a moving model to represent a space scene? (Cams)

Designing • 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. **Making** • 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. **Evaluating** • 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. **Technical knowledge and understanding** • 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.

Summer Odd

Is it easy to prepare an environmentally sustainable meal? (Food)

Designing • 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. **Making** • 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. **Evaluating** • 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, considering the views of others when identifying improvements. • Understand how key chefs have influenced eating habits to promote varied and healthy diets. **Technical knowledge and understanding** • 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 & use technical vocabulary.

Cycle A

Goldfinch Y5/6

Autumn Odd

Can we design a security system for Troy? (Electrical systems)

Designing • Use research to develop a design specification for a functional product that responds automatically to changes in the environment. Consider constraints including time, resources and cost. • Generate and develop ideas and share and clarify these through discussion. • Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams. **Making** • Formulate a step-by-step plan, listing tools, equipment, materials and components. • Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product. • Create & modify a computer control program to enable an electrical product to work automatically in response to changes in the environment. **Evaluating** • Evaluate and modify the working features of the product to match the initial design spec • Test the system to demonstrate its effectiveness for intended user and purpose. • Investigate famous inventors who developed ground-breaking electrical systems/components. **Technical knowledge &understanding** • Understand / use electrical systems in their products. • Apply understanding of computing to program, monitor and control products. • Know and use relevant technical vocabulary

Spring Even

How were homes built in the iron age? (Frame Structures)

Designing • 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. **Making** • 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. **Evaluating** • 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. **Technical knowledge and understanding** • Understand how to strengthen, stiffen and reinforce 3-D frameworks. • Know and use technical vocabulary relevant to the project

Summer Even

Can we design a fairground rise for Jurassic Park? (pulleys/gears)

Designing • Generate innovative ideas by carrying out research using surveys, 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. **Making** • Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans 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. **Evaluating** • Compare final product to original design specification. • Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. • Consider views of others to improve their work. • Investigate famous manufacturing & engineering companies relevant to the project. **Technical knowledge/understanding** • Understand mechanical and electrical systems have an input, process and an output. • Understand how gears and pulleys can be used to speed up, slow down, change the direction of movement. • Know and use technical vocabulary.