Year 5

YEAR 5 — DESIGN TECHNOLOGY CAREERS

Pupils encounter modern design, manufacturing and sustainable food careers.

CULTURE & SEASONALITY

WE COULD BE...

Chefs • Food Developers • Sustainable Food Specialists

Explore how professionals balance culture, nutrition, seasonality, sustainability and customer preferences when developing food products.

CAREER ENCOUNTER

Bakery, farm, farm shop, supermarket, chef or local food producer.

CAD IN TEXTILES

WE COULD BE...

CAD / Textile Designers • Manufacturing Technologists

Discover how CAD and CAM are used to create, modify and manufacture textile products, and how digital technology shapes modern industry.

CAREER ENCOUNTER

Digital designer, textile professional or manufacturing company.

CAMS

WE COULD BE...

Mechanical Engineers • Manufacturing Engineers

Explore how engineers use cams and mechanical systems to transform movement, prototype solutions and improve performance.

CAREER ENCOUNTER

Engineering or manufacturing company.

YEAR 5 — DESIGN TECHNOLOGY KNOWLEDGE

Substantive knowledge • Disciplinary knowledge and skills

CULTURE & SEASONALITY

SUBSTANTIVE KNOWLEDGE

- Food-product design is influenced by culture, dietary needs, nutrition, seasonality and sourcing.
- Ingredients may be local, seasonal, organic or Fairtrade; responsible sourcing affects sustainability.
- Dietary terms include gluten, dairy, allergy and intolerance.
- A wider repertoire includes kneading, beating, rubbing in, rolling and shaping.

DISCIPLINARY KNOWLEDGE & SKILLS

- Research existing products, cultural preferences, dietary needs and ingredient provenance.
- Carry out sensory evaluations and present findings to inform design decisions.
- Adapt a basic recipe; measure, cut, shape and combine ingredients safely/hygienically.
- Develop a design brief/specification and evaluate the final product against user, nutrition and sustainability criteria.

CAD IN TEXTILES

SUBSTANTIVE KNOWLEDGE

- CAD can generate, modify, scale, save and print pattern pieces; CAM can support manufacture.
- Digital design can improve accuracy, repeatability and efficient use of materials.
- Textile construction develops seams, seam allowances, hems, wadding, reinforcement and finishing.
- CAD/CAM are part of modern textile design and manufacture.

DISCIPLINARY KNOWLEDGE & SKILLS

- Research user needs through surveys/interviews/questionnaires and create a design specification.
- Use CAD to generate/modify/scale patterns and digital graphics; compare with manual methods.
- Plan manufacture; cut, stitch, reinforce, finish and possibly apply CAM accurately.
- Critically evaluate design, manufacture, functionality, innovation and fitness for user/purpose.

CAMS

SUBSTANTIVE KNOWLEDGE

- Cams and followers transform rotary input into oscillating or reciprocating output.
- Cam shape and position affect the follower's movement.
- Components include cam, follower, axle, shaft, crank, handle and housing.
- Accuracy, alignment and secure construction affect mechanical performance.

DISCIPLINARY KNOWLEDGE & SKILLS

- Investigate cam mechanisms and different movement outputs; identify input/process/output.
- Test pre-cut cams and prototype component positions before final construction.
- Measure, mark, drill and join accurately, using G-clamps/appropriate tools safely.
- Communicate with exploded diagrams; construct, test, diagnose problems and refine a cam mechanism.

Year 5 — Celebrating Culture and Seasonality

Cooking and Nutrition

Prior learning being retrieved

Years 1–4 food hygiene, sensory evaluation, balanced diets, provenance and practical preparation/cooking techniques.

New knowledge / skill introduced

Pupils consider cultural preferences, dietary needs, local/seasonal/organic/Fairtrade ingredients, nutritional value and techniques such as kneading, beating, rolling and shaping.

Why this? Why now?

Practical knowledge is secure enough for pupils to make broader decisions about culture, availability, sustainability and individual needs.

What does this prepare pupils for?

Prepares for Year 6 culture and seasonality, where pupils retrieve and apply food-design knowledge with greater independence.

Design Technology Celebrating culture and seasonality

Investigative and Evaluative Activities	Children use first hand and secondary sources to carry out relevant research into existing products to include personal/cultural preferences, ensuring a healthy diet, meeting dietary needs and the availability of locally sourced/seasonal/organic ingredients. This could include a visit to a local bakery, farm, farm shop or supermarket e.g. What ingredients are sourced locally/in the UK/from overseas? What are the key ingredients needed to make a particular product? How have ingredients been processed? What is the nutritional value of a product? Research **key chefs** and how they have promoted seasonality, local produce and healthy eating. Children carry out sensory evaluations of a variety of existing food products and ingredients relating to the project. The ingredients could include those that could be added to a basic recipe such as herbs, spices, vegetables or cheese. These could be locally sourced, seasonal, Fair Trade or organic. Present results in e.g. tables/graphs/charts and by using evaluative writing.Use a range of questions to support children's ability to evaluate food ingredients and products e.g. What ingredients help to make the product spicy/crisp/crunchy etc? What is the impact of added ingredients/finishes/shapes on the finished product?
Focused Tasks	Demonstrate how to measure out, cut, shape and combine e.g. knead, beat, rub and mix ingredients. Demonstrate how to use appropriate utensils and equipment that the children may use safely and hygienically. Techniques could be practised following a basic recipe to prepare and cook a savoury food product. Ask questions about which ingredients could be changed or added in a basic recipe such as types of flour, seeds, garlic, vegetables. Consider texture, taste, appearance and smell. When using a basic dough recipe, explore making different shapes to change the appearance of the food product e.g. Which shape is most appealing and why?

ingredients, yeast, dough, bran, flour, wholemeal, unleavened, baking soda, spice, herbs

fat, sugar, carbohydrate, protein, vitamins, nutrients, nutrition, healthy, varied, gluten, dairy, allergy, intolerance, savoury, source, seasonality

utensils, combine, fold, knead, stir, pour, mix, rubbing in, whisk, beat, roll out, shape, sprinkle, crumble

design specification, innovative, research, evaluate, design brief

Design Technology Celebrating culture and seasonality

Design	Develop a design brief and simple design specification with the children within a context that is authentic and meaningful. This can include design criteria relating to nutrition and healthy eating. Discuss the purpose of the products that the children will be designing, making and evaluating and who the products will be for. Ask children to generate a range of ideas encouraging innovative responses. Agree on design criteria that can be used to guide the development and evaluation of the children's product. Using annotated sketches, discussion and information and communication technology if appropriate, ask children to develop and communicate their ideas.
Make	Ask children to record the steps, equipment, utensils and ingredients for making the food product drawing on the knowledge, understanding and skills learnt through IEAs and FTs.
Evaluate	Evaluate the work as it progresses and the final product against the intended purpose and user reflecting on the design specification previously agreed.

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design specification, innovative, research, evaluate, design brief

Year 5 — Using Computer-Aided Design in Textiles

Textiles / Digital Design

Prior learning being retrieved

Year 2 templates/joining and Year 4 pattern pieces, seams, seam allowances, stitching, fabric suitability and 3D textile construction.

New knowledge / skill introduced

Pupils use CAD to generate, modify, scale, save and print patterns. They investigate textile properties and develop seams, wadding, hems and possible CAM.

Why this? Why now?

Manual pattern construction is secure, so pupils can compare it meaningfully with modern digital design and manufacture.

What does this prepare pupils for?

Culminates primary textiles and transfers design, prototype, manufacture and evaluation skills to increasingly sophisticated DT contexts.

Design Technology Using computer aided design in textiles

Investigative and Evaluative Activities	Children investigate and evaluate a range of existing textiles products and how they have been constructed using disassembly, and evaluate what the fabric shapes look like, how the parts have been joined, how the product has been strengthened and stiffened, what fastenings have been used and why. Investigate work by designers and their impact on fabrics and products. Use questions to develop understanding e.g. Is the product functional or decorative? Who would use this product? What is its purpose? What design decisions have been made? Do the textiles used match the intended purpose? How has it been made? What has been used to enhance the appearance? Is the design innovative? Children investigate properties of textiles through investigation e.g. exploring insulating properties, water resistance, wear and strength of textiles.
Focused Tasks	Develop computer-aided design (CAD) skills by using pattern making software to generate, modify, scale, save and print pattern pieces. Recognise that designs can be easily modified and repeated on the computer without the need for a physical product. Investigate using art packages on the computer to design prints that can be applied to textiles using iron transfer paper. Develop skills of 2-D paper pattern making using CAD and create a 3-D paper or Dipryl mock-up of a chosen product. Remind/teach how to pin a pattern on to fabric ensuring limited wastage, how to leave a seam allowance and use different cutting techniques. Develop skills of threading needles and joining textiles using a range of stitches, building upon children's earlier experiences of stitches e.g. improving appearance and consistency of stitches and introducing new stitches. If available, demonstrate and allow children to use sewing machines to join fabric with close adult supervision. Develop skills of sewing textiles by joining right side together and making seams. Children should investigate how to sew and shape curved edges by snipping seams, how to tack or attach wadding or stiffening and learn how to start and finish off a row of stitches.

computer aided design (CAD), computer aided manufacture (CAM) font, lettering, text, graphics, menu, scale, modify, repeat, copy, flip design brief, design criteria, design decisions, innovative, prototype seam, seam allowance, wadding, reinforce, right side, wrong side, hem, template, pattern pieces names of textiles and fastenings used, pins, needles, thread, pinking shears, fastenings, iron transfer paper annotate, functionality, innovation, authentic, user, purpose, evaluate, mock-up, prototype

Design Technology Using computer aided design in textiles

Design	Set an authentic and meaningful design brief. Children generate ideas by carrying out research using surveys, interviews, questionnaires and the internet. Develop a design specification for their product. Communicate ideas through detailed, annotated drawings from different perspectives. Drawings should indicate the design decisions made, methods of strengthening, the type of fabrics to be used and the types of stitching that will be incorporated. Produce step-by-step plans, lists of tools equipment, fabrics and components needed. Allocate tasks within a team if appropriate. Develop their design using CAD software to produce pattern pieces and art programmes to produce decoration and design prints that can be applied to textiles.
Make	Make high quality products applying knowledge, understanding and skills from IEAs and FTs. Incorporate simple computer-aided manufacture (CAM) if appropriate e.g. printing on fabric. Use a range of techniques to ensure a well-finished final product that matches the intended user and purpose.
Evaluate	Evaluate both as the children proceed with their work and the final product in use, comparing the final product to the original design specification. Critically evaluate the quality of the design, the manufacture, functionality, innovation shown and fitness for intended user and purpose, considering others' opinions. Communicate the evaluation in various forms e.g. writing for a particular purpose, giving a well-structured oral evaluation, speaking clearly and fluently.

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Year 5 — Cams

Prior learning being retrieved

Year 1 wheels/axles, Year 2 sliders/levers and Year 3 levers/linkages, including input-process-output and movement types.

New knowledge / skill introduced

Pupils learn cam types, followers, axles, shafts, cranks, handles and housings. They use accurate positioning, drilling, G-clamps and exploded diagrams.

Why this? Why now?

Pupils now have the vocabulary and practical accuracy to understand how component shape and position transform movement.

What does this prepare pupils for?

Culminates the mechanisms pathway and prepares pupils to understand engineered systems where geometry, accuracy and alignment affect performance.

Design Technology Cams

Investigative and Evaluative Activities	Discuss with the children different types of movement: rotary, oscillating and reciprocating. Make simple models of different types of cams or have toys in which the cam mechanisms can be seen. Use videos, photographs and computer animations of products that cannot be explored through first-hand experience. Encourage children to look for different types of movement in the home and in school. Use observational drawings and questions to develop understanding of the products in the handling collection and those that children have researched e.g. How innovative is the product? What design decisions have been made? What type of movement can be seen? What types of mechanical components are used and where are they positioned? What are the input movement, process and output movement of the system? How well does the product work? Why have the materials and components been chosen? How well has it been designed? How well has it been made? Children could research and, if possible, visit engineering and manufacturing companies that are relevant to the product they are designing and making e.g. car engine manufacturers
Focused Tasks	Give children pre-cut cams made from MDF or wooden wheels to mount on a piece of board and observe their movement with a follower. Demonstrate how to use a hand drill safely to make an off-centre cam and position it accurately in a housing. Ensure children secure the wheel with a G-clamp and use a piece of scrap wood under the wheel to avoid drilling through the bench hook or table. Stress the importance of measuring accurately and checking before cutting any holes or gluing. It is important to line up the cam and follower otherwise the mechanism may not work smoothly. How high will the cam lift the follower?

cam, snail cam, off-centre cam, peg cam, pear shaped cam

follower, axle, shaft, crank, handle, housing, framework

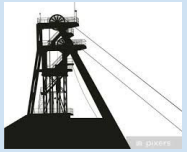
rotation, rotary motion, oscillating motion, reciprocating motion

annotated sketches, exploded diagrams

mechanical system, input movement, process, output movement

design decisions, functionality, innovation, authentic, user, purpose, design specification, design brief

Design Technology Cams



Design	Develop an authentic and meaningful design brief with the children. Children generate innovative ideas by carrying out research including surveys, interviews and questionnaires and develop a design specification for their product, carefully considering the purpose and intended user for their product. Communicate ideas through detailed, annotated sketches from different views and/or exploded diagrams. The drawings should indicate the design decisions made, including the location of the components, how they work as a system and the appearance and finishing techniques for the product. Produce detailed step-by-step plans and lists of tools, equipment and materials needed. If appropriate, allocate tasks within a team.
Make	Make high quality products, applying knowledge, understanding and skills from IEAs and FTs. Children should use a range of decorative finishing techniques to ensure a well finished final product that matches the intended user and purpose.
Evaluate	Evaluate throughout and the final product in use, comparing it to the original design specification. Critically evaluate the quality of the design, the manufacture, functionality, innovation shown and fitness for the intended user and purpose.

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