Year 6

YEAR 6 — DESIGN TECHNOLOGY CAREERS

Specialist career links show how DT, science, computing and sustainability connect in the workplace.

FRAME STRUCTURES

WE COULD BE...

Structural Engineers • Architects • Construction Engineers

Explore how professionals design structures that are strong, stable, functional and safe using materials, triangulation and reinforcement.

CAREER ENCOUNTER

Architect, structural engineer, construction professional or local project.

COMPLEX CIRCUITS

WE COULD BE...

Electrical • Electronics • Automation Engineers

Discover how engineers combine circuits, sensors, inputs, outputs and computer control to create systems that respond to their environment.

CAREER ENCOUNTER

Engineer, technician, automation professional or manufacturing company.

CULTURE & SEASONALITY

WE COULD BE...

Food Technologists • Development Chefs • Sustainable Producers

Explore how professionals balance culture, nutrition, customer needs, sourcing and sustainability when developing food products.

CAREER ENCOUNTER

Development chef, bakery, farm, supermarket or local food producer.

YEAR 6 — DESIGN TECHNOLOGY KNOWLEDGE

Substantive knowledge • Disciplinary knowledge and skills

FRAME STRUCTURES

SUBSTANTIVE KNOWLEDGE

- Frame structures may be temporary/portable or permanent.
- Triangulation, reinforcement and material choice increase strength and stability.
- Structural geometry affects performance; weak points can be stiffened/strengthened.
- Frame materials may include paper tubes/straws and square-section wood.

DISCIPLINARY KNOWLEDGE & SKILLS

- Investigate/annotate real frame structures and analyse construction, material choice and innovation.
- Compare square/triangular frameworks; add diagonals and test reinforcement.
- Use junior hacksaws, G-clamps, bench hooks and hand drills accurately where appropriate.
- Develop a specification/step plan, prototype, construct accurately and iteratively improve after testing.

COMPLEX SWITCHES & CIRCUITS

SUBSTANTIVE KNOWLEDGE

- Electrical systems may use series/parallel circuits, multiple outputs and sensors.
- Inputs include switches and LDRs; micro/reed switches respond in different ways.
- A controlled system uses input → process/decision → output.
- Computer programs can monitor/control products so they respond automatically.

DISCIPLINARY KNOWLEDGE & SKILLS

- Research automated products and investigate sensors/switches in working circuits.
- Make secure electrical connections; avoid short circuits and fault-find systematically.
- Write/modify control programs using inputs, outputs and decisions; test with components/interfaces.
- Create a design specification/circuit representation, integrate the system and critically evaluate effectiveness.

CULTURE & SEASONALITY

SUBSTANTIVE KNOWLEDGE

- Nutrition, culture, dietary requirements, seasonality and responsible sourcing influence food design.
- Ingredient provenance, processing and availability affect design decisions.
- Sensory evidence can justify ingredient, finish and shape choices.
- A design specification brings together user needs, nutrition, sustainability and practical constraints.

DISCIPLINARY KNOWLEDGE & SKILLS

- Use first-hand/secondary research and sensory evaluation to make evidence-informed choices.
- Select and apply a broad range of preparation/cooking techniques confidently and hygienically.
- Develop a brief/specification, record stages/equipment/ingredients and adapt recipes independently.
- Evaluate critically against specification, user needs, sensory qualities and responsible sourcing; refine using evidence.

Year 6 — Frame Structures

Structures

Prior learning being retrieved

Year 1 freestanding structures and Year 3 shell structures: strength, stability, stiffness, material choice and accurate joining.

New knowledge / skill introduced

Pupils investigate portable/permanent frame structures, triangulation, reinforcement, paper tubes and possibly wood with junior hacksaws, G-clamps and drills.

Why this? Why now?

Pupils can now explain how structural geometry and reinforcement affect performance, not simply whether a structure stands.

What does this prepare pupils for?

Culminates structures and prepares pupils for secondary DT principles: triangulation, reinforcement, material selection and iterative improvement.

Design Technology Frame structures

Investigative and Evaluative Activities	Children investigate and make annotated drawings of a range of portable and permanent frame structures, e.g. tents, bus shelters, umbrellas. Use photographs and web-based research to extend the range e.g. How well does the frame structure meet users' needs and purposes? Why were materials chosen? What methods of construction have been used? How has the framework been strengthened, reinforced and stiffened? How does the shape of the framework affect its strength? How innovative is the design? When was it made? Who made it? Where was it made? Children could research key events and individuals related to their study of frame structures e.g. Stephen Sauvestre – a designer of the Eiffel Tower; Thomas Farnolls Pritchard – designer of the Iron Bridge. They could also learn about locally important design and technology activity related to their project.
Focused Tasks	Use a construction kit consisting of plastic strips and paper fasteners to build 2-D frameworks. Compare the strength of square frameworks with triangular frameworks. Ask the children to reinforce square frameworks using diagonals to help develop an understanding of using triangulation to add strength to a structure. Demonstrate how paper tubes can be made from rolling sheets of newspaper diagonally around pieces of e.g. dowel. Ask children to use these tubes and masking tape or paper straws with pipe cleaners to build 3-D frameworks such as cubes, cuboids and pyramids. How could each of the frameworks be reinforced and strengthened? Demonstrate the accurate use of tools and equipment. Develop skills and techniques using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames, as appropriate. Demonstrate skills and techniques for accurately joining framework materials together e.g. paper straws, square sectioned wood. Ask children to practise these, mounting their joints onto card for future reference.

frame structure, stiffen, strengthen, reinforce, triangulation, stability, shape, join, temporary, permanent design brief, design specification, prototype, annotated sketch, purpose, user, innovation, research, functional

Design Technology Frame structures

Design	Discuss the brief of designing and making a small-scale frame structure e.g. Who is the intended user and what is the purpose of the frame structure? Will it be permanent, or can it be easily dismantled? What materials will you use? How will it be joined? How will it be reinforced? How will it be finished? Children should be encouraged to generate innovative ideas, drawing on their research. Ask children to develop a simple design specification to guide their thinking. Children should produce a detailed, step-by-step plan, listing tools and materials. Children's sketches should be annotated with notes to help develop and communicate their ideas. Encourage children to model their ideas first using materials such as paper, card and paper straws e.g. How will you make it stable? How will it stand up? How could you make it stronger? Where are the weak points? How could you reinforce them? What tools and materials will you need? How can you improve the design?
Make and Evaluate	Encourage children to make their products with accuracy. They should regularly evaluate their work and their completed product, drawing on their design specification, and thinking about the intended purpose and user.

frame structure, stiffen, strengthen, reinforce, triangulation, stability, shape, join, temporary, permanent design brief, design specification, prototype, annotated sketch, purpose, user, innovation, research, functional

Year 6 — Complex Switches and Circuits

Electrical Systems / Computing

Prior learning being retrieved

Year 4 simple circuits and switches: series circuits, bulbs, buzzers, inputs/outputs, fault finding and manual switch control.

New knowledge / skill introduced

Pupils investigate LDRs, micro/reed switches, multiple outputs and possible parallel circuits. They write control programs using inputs, outputs and decisions.

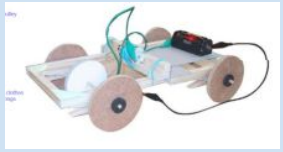
Why this? Why now?

After manual circuits, pupils can now combine DT, science and computing to create products that respond automatically to the environment.

What does this prepare pupils for?

Culminates electrical systems through sensing, control, automation, programming and systems integration.

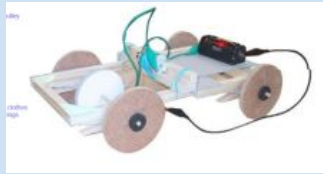
Design Technology Complex switches and circuits



series circuit, parallel circuit, names of switches and components, input device, output device, system, monitor, control, program, flowchart function, innovative, design specification, design brief, user, purpose

Investigative and Evaluative Activities	Using research, discuss a range of relevant products that respond to changes in the environment using a computer control program such as automatic nightlights, alarm systems, security lighting e.g. Who have the products been designed for and for what purpose? How and why is a computer control program used to operate the products? What input devices, e.g. switches, and output devices, e.g. bulbs, have been used? Investigate electrical sensors such as light dependent resistors (LDRs) and a range of switches such as push-to-make switches, push-to-break switches, toggle switches, micro switches and reed switches. To gain an understanding of how they are operated by the user and how they work, ask the children to use each component to control a bulb in a simple circuit. Remind children about the dangers of mains electricity. Children could research famous inventors related to the project e.g. Thomas Edison – light bulb
Focused Tasks	Through teacher demonstration and explanation, recap measuring, marking out, cutting and joining skills with construction materials that children will need to create their electrical products. Demonstrate and enable children to practise methods for making secure electrical connections e.g. using automatic wire strippers, twist and tape electrical connections, screw connections and connecting blocks. Drawing on science understanding, ask the children to explore a range of electrical systems that could be used to control their products, including a simple series circuit where a single output device is controlled, a series circuit where two output devices are controlled by one switch and, where appropriate, parallel circuits where two output devices are controlled independently by two separate switches. Drawing on related computing activities, ensure that children can write computer control programs that include inputs, outputs and decision making. Test out the programs using electrical components connected to interface boxes or standalone boxes. Teach children how to avoid making short circuits.

Design Technology Complex switches and circuits



Design	Develop an authentic and meaningful design brief with the children. Ask the children generate innovative ideas by drawing on research and develop a design specification for their product, carefully considering the purpose and needs of the intended user. Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams. Drawings should indicate the design decisions made, including the location of the electrical components and how they work as a system with an input, process and output. 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. Create and modify a computer control program to enable the product to work automatically in response to changes in the environment.
Evaluate	Critically evaluate throughout and the final product, comparing it to the original design specification. Test the system to demonstrate its effectiveness for the intended user and purpose.

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purpose

Year 6 — Celebrating Culture and Seasonality

Cooking and Nutrition

Prior learning being retrieved

Full food progression from Years 1–5, especially Year 5 culture, nutrition, seasonality, dietary need and sourcing.

New knowledge / skill introduced

Pupils apply research, sensory evaluation, ingredient sourcing and practical skills through a design brief/specification, considering user, purpose and nutrition.

Why this? Why now?

Revisiting the unit in Year 6 lets pupils demonstrate secure, independent use of nutrition, culture, sustainability and practical competence.

What does this prepare pupils for?

Culminates cooking and nutrition so pupils leave primary able to make informed choices about culture, dietary need, provenance and responsible sourcing.

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? 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? Research key chefs and how they have promoted seasonality, local produce and healthy eating.
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. 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.
Make and Evaluate	Evaluate the work as it progresses and the final product against the intended purpose and user reflecting on the design specification previously agreed.

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