

Design & Technology

Key Stage 3

Curriculum document





1. Philosophy

Six underlying attributes at the heart of Oak's curriculum and lessons.

Knowledge and vocabulary is explicitly taught across units and lessons so that pupils build on what they already know to develop powerful knowledge.

Knowledge is **sequenced** and mapped coherently so that pupils make meaningful connections

Curriculum **flexibility** enables schools to tailor their use of Oak to their curricula and context.

Addresses the needs of all learners through adherence to **accessibility** guidelines and requirements.

Rigorous application of the science of learning and best practise ensures learning is **informed by evidence**.

Commitment to **diversity** in our teaching, our teachers and in the language, texts and media we use so that all pupils feel positively represented.



2. Units



KS3 Design & Technology is formed of 11 units and this is the recommended sequence:

Unit Title	Recommended year group	Number of lessons
1 Understanding fibres and fabrics	Year 7	4
2 Catering for needs	Year 7	4
3 Core design skills	Year 7	4
4 Textiles technology and sustainability	Year 8	4
5 Future food and the application of science	Year 8	4
6 Packaging pop-outs	Year 8	6
7 Pet tech	Year 8	6
8 Chilled ready meals	Year 9	4
9 Para-triathlete design challenge	Year 9	6

10 Design in the natural world

Year 9

5

11 Future tech now!

Year 9

4





3. Lessons

Unit 1 Understanding fibres and fabrics

4 Lessons

Lesson number	Lesson question	About the lesson
1.	Technical textiles	<p>Pupils will learn</p> <ul style="list-style-type: none">• use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesive• use a broad range of manufacturing techniques including handcraft skills and machinery to manufacture products precisely <p>Disciplinary knowledge</p> <ul style="list-style-type: none">• Primary dietary knowledge <p>Equipment</p> <ul style="list-style-type: none">• Scrap fabric (light coloured/white), Vegetables (e.g. beetroot, onions, red cabbage, saucepan, water, elastic bands, needle, thread <p>Guidance warnings</p> <ul style="list-style-type: none">• Equipment requiring safe usage. <p>Guidance details</p>

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.



Supervision level

- Adult supervision recommended
-

2.

Modification of materials

Pupils will learn

- investigate and develop skills in modifying the appearance of materials including textiles and other manufactured materials e.g. dying and appliqué (safe vegetable dyes)
- use a wider, more complex range of materials, components and ingredients, taking into account their properties

Disciplinary knowledge

- Primary dietary knowledge

Equipment

- Scrap fabric (light coloured/white), Vegetables (e.g. beetroot, onions, red cabbage, saucepan, water, elastic bands, needle, thread

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended



3.

Fibres to fabric

Pupils will learn

- about textile fibre sources e.g. natural and synthetic and fabrics e.g. plain and woven
- how to select and modify patterns and use in textile construction

Disciplinary knowledge

- Primary dietary knowledge

Equipment

- Scrap fabric (light coloured/white), Vegetables (e.g. beetroot, onions, red cabbage, saucepan, water, elastic bands, needle, thread

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended



4.

The impact of fashion

Pupils will learn

- the positive and negative impact that products can have in the wider world

Disciplinary knowledge

- Primary dietary knowledge

Equipment

- Scrap fabric (light coloured/white), Vegetables (e.g. beetroot, onions, red cabbage, saucepan, water, elastic bands, needle, thread

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-





Lesson
number

Lesson question

About the lesson

1.

Recipe development

Pupils will learn

- how to use a broader range of preparation techniques and methods when cooking, e.g. stir frying, steaming, blending
- how to store, prepare and cook food safely and hygienically
- follow procedures for safety and hygiene and understand the process of risk assessment
- how to competently use a range of cooking techniques for example, selecting and preparing ingredients; using utensils and electrical equipment

Equipment

- Basic food equipment

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended



2.

Minimising waste

Pupils will learn

- how to competently use a range of cooking techniques for example, selecting and preparing ingredients; using utensils and electrical equipment
- how to taste and cook a broader range of ingredients and healthy recipes, accounting for a range of needs, wants and values
- how to actively minimise food waste such as composting fruit and vegetable peelings and recycling food packaging

Equipment

- Basic food equipment

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-

3.

An introduction to what influences our food choices

Pupils will learn

- how to adapt and use their own recipes
- use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations
- produce ordered sequences and schedules for manufacturing products they design, detailing resources required
- produce costings using spreadsheets for products they design and make

Equipment

- Basic food equipment

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-



4.

Health and safety: preparation and hygiene

Pupils will learn

- how to taste and cook a broader range of ingredients and healthy recipes, accounting for a range of needs, wants and values
- how to actively minimise food waste such as composting fruit and vegetable peelings and recycling food packaging

Equipment

- Basic food equipment

Guidance warnings

- Equipment requiring safe usage.

Guidance details

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Supervision level

- Adult supervision recommended
-





**Lesson
number**

Lesson question

About the lesson

1. Graphic communication

Pupils will learn

- develop and communicate design ideas using annotated sketches

Equipment

- Paper, pencil, coloured pencils, PlayDoh/blu tack, computer (TinkerCad), Product to observe and/or disassemble.

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-

2.

The world of design

Pupils will learn

- about an increasing range of designers, engineers, chefs, technologists and manufacturers and be able to relate their products to their own designing and making

Equipment

- Paper, pencil, coloured pencils, PlayDoh/blu tack, computer (TinkerCad), Product to observe and/or disassemble.

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-



3.

An introduction to CAD & 3D modelling

Pupils will learn

- use 2D and begin to use 3D CAD packages to model their ideas
- produce 3D models to develop and communicate ideas

Equipment

- Paper, pencil, coloured pencils, PlayDoh/blu tack, computer (TinkerCad), Product to observe and/or disassemble.

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-



4.

Technical drawings



Pupils will learn

- products through disassembly to determine how they are constructed and function

Equipment

- Paper, pencil, coloured pencils, PlayDoh/blu tack, computer (TinkerCad), Product to observe and/or disassemble.

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
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Lesson number	Lesson question	Pupils will learn
1.	True cost of fashion - what fabrics do we have in the home?	<ul style="list-style-type: none">• the positive and negative impact that products can have in the wider world• work confidently within a range of relevant domestic, local and industrial contexts, such as the home, health, leisure, culture, engineering, manufacturing, construction, food, energy, agriculture and fashion
2.	Designing products for different lifestyles	<ul style="list-style-type: none">• consider the influence of a range of lifestyle factors and consumer choices when designing products• products considering life cycle analysis
3.	Designing products for your future	<ul style="list-style-type: none">• how products can be developed considering the concept of 'cradle to grave'• the concept of circular economy approaches in relation to product development and consumption

4.

What is in your wardrobe?

- new and emerging technologies
 - produce short reports, making suggestions for improvements
-





Lesson
number

Lesson question

About the lesson

1.

Food processing and organic farming

Pupils will learn

- that food is produced, processed and sold in different ways, e.g. conventional and organic farming, fair trade
- new and emerging technologies

2.

Cooking techniques and preparing food safely

Pupils will learn

- how to store, prepare and cook food safely and hygienically
- how to use utensils and electrical equipment

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended

3. Dietary variety

Pupils will learn

- consider the influence of a range of lifestyle factors and consumer choices when designing products
- that people choose different types of food and that this may be influenced by availability, season, need, cost, where the food is produced, culture and religion
- consider additional factors such as ergonomics, anthropometrics or dietary needs



4. New technologies in food production

Pupils will learn

- about an increasing range of designers, engineers, chefs, technologists and manufacturers and be able to relate their products to their own designing and making
 - new and emerging technologies
-



Lesson
number

Lesson question

About the lesson

1.

Designing for others

Pupils will learn

- work confidently within a range of relevant domestic, local and industrial contexts, such as the home, health, leisure, culture, engineering, manufacturing, construction, food, energy, agriculture and fashion
- use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations

Equipment

- Corrugated cardboard, greyboard, cartonboard, cutting mat, scissors, steel rule, craft knife, small home product / tool, cardboard packaging

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended

2.

Design influence in our design ideas

Pupils will learn

- combine ideas from a variety of sources
- decide which design criteria clash and determine which should take priority

Equipment

- Corrugated cardboard, greyboard, cartonboard, cutting mat, scissors, steel rule, craft knife, small home product / tool, cardboard packaging
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3.

Sketching and modelling out your design ideas

Pupils will learn

- develop and communicate design ideas using annotated sketches
- produce 3D models to develop and communicate ideas

Equipment

- Corrugated cardboard, greyboard, cartonboard, cutting mat, scissors, steel rule, craft knife, small home product / tool, cardboard packaging

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-



4.

Modelling skills used in idea generation **Pupils will learn**

- understand the performance of structural elements to achieve functioning solutions
- produce 3D models to develop and communicate ideas

Equipment

- Corrugated cardboard, greyboard, cartonboard, cutting mat, scissors, steel rule, craft knife, small home product / tool, cardboard packaging

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-



5.

Production processes used in prototyping of design ideas

Pupils will learn

- select appropriately from specialist tools, techniques, processes, equipment and machinery, including computer-aided manufacture
- test, evaluate, refine their ideas and products against a specification, taking into account the views of intended users and other interested groups

Equipment

- Corrugated cardboard, greyboard, cartonboard, cutting mat, scissors, steel rule, craft knife, small home product / tool, cardboard packaging

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended



6.

Mass production of products

Pupils will learn

- use a broad range of manufacturing techniques including handcraft skills and machinery to manufacture products precisely
- follow procedures for safety and hygiene and understand the process of risk assessment

Equipment

- Corrugated cardboard, greyboard, cartonboard, cutting mat, scissors, steel rule, craft knife, small home product / tool, cardboard packaging

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-





Lesson
number

Lesson question

About the lesson

1.

Bionic animals

Pupils will learn

- use learning from mathematics to help design and make products that work

Equipment

- Micro:bit, computer/ipad (internet access), cardboard, paper

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended

2.

How we use systems in designing

Pupils will learn

- how to apply the concepts of feedback in systems
- consider additional factors such as ergonomics, anthropometrics or dietary needs

Equipment

- Micro:bit, computer/ipad (internet access), cardboard, paper

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended



3.

Systems used in new technologies

Pupils will learn

- use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations
- use learning from science to help design and make products that work

Equipment

- Micro:bit, computer/ipad (internet access), cardboard, paper

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-



4.

Pet tech: home of the future

Pupils will learn

- how to apply computing and use electronics to embed intelligence in products that respond to inputs
- use CAD and related software packages to validate their designs in advance of manufacture

Equipment

- Micro:bit, computer/ipad (internet access), cardboard, paper

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-



5.

Programming: music to my ears

Pupils will learn

- develop and communicate design ideas using annotated sketches
- use mathematical modelling to indicate likely performance before using physical materials and components, for instance when developing circuits or gearing systems
- make use of sensors to detect heat, light, sound and movement such as thermistors and light dependant resistors

Equipment

- Micro:bit, computer/ipad (internet access), cardboard, paper

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended



6.

Pets on the GO!

Pupils will learn

- how to use software and hardware to develop programmes and transfer these to programmable components for example, microcontrollers
- how to make use of microcontrollers in products they design and manufacture themselves

Equipment

- Micro:bit, computer/ipad (internet access), cardboard, paper

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-





Lesson
number

Lesson question

About the lesson

1.

How can we ensure that a meal has the correct balance of nutritional value for the body?

Pupils will learn

- the importance of energy balance and the implications of dietary excess or deficiency, e.g. malnutrition, maintenance of a healthy weight
- how to use nutrition information and allergy advice panels on food labels to help make informed food choices
- the principles of cleaning, preventing cross contamination, chilling, cooking food thoroughly and reheating food until it is steaming hot
- how to compare the cost of food when planning to eat out or cook at home

Equipment

- Frozen/chilled ready meals (or packaging for analysis). Variety of food stuffs and food equipment.

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended



2.

How can we prepare ingredients for a ready meal?

Pupils will learn

- how to use a broader range of preparation techniques and methods when cooking, e.g. stir-frying, steaming, blending
- how to modify recipes and cook dishes that promote current healthy eating messages
- how to use date-mark and storage instructions when storing and using food and drinks
- how to select and prepare ingredients

Equipment

- Frozen/chilled ready meals (or packaging for analysis). Variety of food stuffs and food equipment.

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-

3.

How to analyse and develop a dish for a ready meal

Pupils will learn

- select appropriately from a wider, more complex range of materials, components and ingredients, taking into account their properties such as water resistance and stiffness
- how to use taste, texture and smell to decide how to season dishes and combine ingredients
- create production schedules that inform their own and others' roles in the manufacturing of products they design

Equipment

- Frozen/chilled ready meals (or packaging for analysis). Variety of food stuffs and food equipment.

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended



4.

When designing a chilled ready meal, what client needs should you be aware of?

Pupils will learn

- research the health and wellbeing, cultural, religious and socio-economic contexts of their intended users
- consider the influence of a range of lifestyle factors and consumer choices when designing products
- consider additional factors such as ergonomics, anthropometrics or dietary need
- about the influence of food marketing, advertising and promotion on their own diet and purchasing behaviour

Equipment

- Frozen/chilled ready meals (or packaging for analysis). Variety of food stuffs and food equipment.
-





Lesson
number

Lesson question

About the lesson

1.

What do 'ergonomics' and 'anthropometrics' mean?

Pupils will learn

- consider additional factors such as ergonomics, anthropometrics or dietary needs

Equipment

- Basic modelling equipment (including paper / fabrics).

2.

How can a specification help a designer focus on the function and form of a product?

Pupils will learn

- analyse where human values may conflict and compromise has to be achieved
- use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations

Equipment

- Basic modelling equipment (including paper / fabrics).

3.

How can a designer prioritise design decisions that need to be made?

Pupils will learn

- combine ideas from a variety of sources decide which design criteria clash and determine which should take priority
- understand how to reformulate design problems given to them
- take creative risks when making design decisions

Equipment

- Basic modelling equipment (including paper / fabrics).
-



4.

How can materials be tested to check they are fit for purpose and then applied to a design?

Pupils will learn

- products that they are less familiar with using themselves
- communicate their plans clearly so that others can implement them
- match and select suitable materials considering their fitness for purpose

Equipment

- Basic modelling equipment (including paper / fabrics).

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-





5. Can you plan a presentation of your work and justify your design decisions?

Pupils will learn

- give oral and digital presentations and use computer-based tools

Equipment

- Basic modelling equipment (including paper / fabrics).

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-

6. Develop a specification for a product a para-triathlete might use

Pupils will learn

- develop design specifications that include a wider range of requirements such as environmental, aesthetic, cost, maintenance, quality and safety
- research the health and wellbeing, cultural, religious and socio-economic contexts of their intended users

Equipment

- Basic modelling equipment (including paper / fabrics).
-



Lesson
number

Lesson question

About the lesson

1.

Using nature to solve design problems

Pupils will learn

- combine ideas from a variety of sources
- use a variety of approaches, for example biomimicry and user-centred design, to generate creative ideas and avoid stereotypical responses

2.

How can nature be used to inspire function and form?

Pupils will learn

- develop and communicate design ideas using annotated sketches
- new and emerging technologies

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended



3. Can nature make us more environmentally accountable?

Pupils will learn

- products considering life cycle analysis
- how products can be developed considering the concept of 'cradle to grave'
- the concept of circular economy approaches in relation to product development and consumption

4. Has nature had an impact on the design of new materials?

Pupils will learn

- understand the properties of materials, including smart materials, and how they can be used to advantage

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended

5. How can designers use 'biomimicry' and 'biomorphic' for inspiration?

Pupils will learn

- work confidently within a range of relevant domestic, local and industrial contexts, such as the home, health, leisure, culture, engineering, manufacturing, construction, food, energy, agriculture and fashion
-



Lesson
number

Lesson question

About the lesson

1.

Could you cope without microcontrollers in your life?

Pupils will learn

- how to make use of microcontrollers in products they design and manufacture themselves
- how to apply computing and use electronics to embed intelligence in products that respond to inputs
- how materials can be cast in moulds

Equipment

- Micro:bit, electronics resources (various)

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended

2.

Can products be of use at the end of their life?

Pupils will learn

- how products can be developed considering the concept of 'cradle to grave'
- the concept of circular economy approaches in relation to product development and consumption

Equipment

- Micro:bit, electronics resources (various)

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-



3.

How has technology changed to meet the demands of the consumer?

Pupils will learn

- consider the influence of a range of lifestyle factors and consumer choices when designing products
- develop design specifications that include a wider range of requirements such as environmental, aesthetic, cost, maintenance, quality and safety

Equipment

- Micro:bit, electronics resources (various)

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-



4.

What new technologies are being developed that are changing the way we live and work?

Pupils will learn

- new and emerging technologies
- products that they are less familiar with using themselves
- about an increasing range of designers, engineers, chefs, technologists and manufacturers and be able to relate their products to their own designing and making

Equipment

- Micro:bit, electronics resources (various)

Guidance warnings

- Equipment requiring safe usage.

Guidance details

- This lesson includes some physical activity and equipment beyond pen, paper or pencil. Please make sure your child is adequately supervised.

Supervision level

- Adult supervision recommended
-

