DESIGN & TECHNOLOGY KS3

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Year 7

Students rotate around different modules for Design & Technology and for Food & Nutrition. The order of which students do this varies under a carousel system.

TERM 1 content and skills	TERM 2 content and skills	TERM 3 content and skills	EXTENDED CURRICULUM (trips/visits/after school activities)
Students design or redesign and make a piece of **cereal packaging** for our Graphic Design unit and a **free gift** design/ prototype Skills, Knowledge & Understanding include: **Design** • Research & packaging analysis • Design specification • Using inspiration to improve creative responses • Isometric drawing technique • Rendering and colour enhancement • Enlargement and scaling techniques • Typography • Character development • Layout design • Net development • Sketching and design communication • Annotation • 3d modelling skills in Tinkercad, using CAD • 2d design skills in 2dDesign Tools, using Computer-Aided-Design • Modelling and experimenting **Make** • Card-based modelling, scoring, folding and cutting	Students are introduced to **working with wood** and build skills using hand tools and machinery in a workshop environment. They focus on skill, accuracy and safety to construct a box to contain wooden puzzles. The tangram is a traditional Chinese mathematical puzzle. Students also create a second wooden puzzle of their own design. They also look at **safety in Toy Design**, standards and legislation. Skills, Knowledge & Understanding include: **Design** • Researching historical context • investigating and analysing other similar products • Understanding user needs for the design of toys, including safety • Searching for & using inspiration to improve creative responses • Planning, annotated sketches • problem solving, modelling • technical drawing • 2d Computer-Aided-Design - box lid net **Make** • Introduction to Health & Safety in the workshop	**Food and nutrition** This introduction of cooking and nutrition is 'Brilliant Breakfasts and Other Tasty Things' and includes aspects of cooking and nutrition that builds confidence and mastery of a range of basic skills to include kitchen organisation, knife skills, use of the hob, grill and oven. Theory is woven into practical tasks, as well as dedicated theory sessions **Make** practical tasks with outcomes that include: • Vegetable crudites and a creamy houmous dip • Croque Monsieur • Pop tarts • Savoury scones • Layered couscous salad • Pea and mint frittata • Chunky vegetable sauce • Cereal bars **Evaluate** • Reflecting on the success of dishes • Identifying developing skills • Assessing mastery of skills • Sensory analysis **Technical Knowledge**	

• Safe use of craft knives and cutting equipment • Considering and selecting other materials and finishes to adapt an existing net • 3d modelling and printing – collectible toy • Considering use of 3d printer (CAM). Pupils will learn about 3d printing as a prototyping tool and some pupils may have the opportunity to 3d print a design developed using Tinkercad. • Hand modelling • There is an opportunity to make a pocket torch 'free gift' as an extension task. This includes revisiting KS2 basic electronics. **Evaluate** • Package analysis enables students to evaluate existing designs and to understand the functions of packaging. • Investigating 3dCAD and CAM – 3d printing • Testing and evaluating iterations during development • Evaluate and refine, against specification • Considerations of sustainability in packaging • Target markets, advertising for nutrition and health and impacts on society **Technical Knowledge** • Understand about the functions of packaging • Developing functioning nets • Properties of card • Structural packaging and net features, including tabs, tucks, slots, etc • Simple electronics revisited	• Marking out accurately using specialist equipment • Cutting and finishing wood using hand tools and equipment • Cutting and drilling wood using machinery • Working with 2 types of manufactured board, taking into account their properties • Assembling accurately using adhesive, pins and hand tools • Using a range of wood finishes • Laser cutting and Computer-Aided-Manufacture • Printing to correct size • Cutting, scoring, folding card • Safe use of craft knives and cutting equipment **Evaluate** • Testing the effectiveness of the finished product • writing an evaluation • investigating and analysing existing toys • laser-cutting and CAM • Understanding toy safety & testing in design & manufacture • Safety standards, signs & symbols, sustainability **Technical Knowledge** • Timber-based materials and their properties • Toy safety standards	• personal, food and kitchen hygiene • The 4Cs. • product labelling • the effect of sugar • food groups and the principles of the Eatwell Guide • basic functions of micro and macro nutrients • the importance of breakfast and making healthy choices. ***For 2023, we are very happy to have been selected to take part in Jamie Oliver's Ministry of Food School's programme pilot. This is a new and exciting resource aimed at teaching young people how to cook. We will therefore be making pancakes, soup, chicken fajitas and guacamole, fish cakes and lemony green beans, burger and coleslaw, veggie chilli, stir fried noodles and chickpea curry with rice.***	
Assessment: • Knowledge, Understanding & Evaluating • Designing & Communicating • Prototyping, Planning & Making	**Assessment:** • Knowledge, Understanding & Evaluating • Designing & Communicating • Prototyping, Planning & Making	**Assessment:** • Knowledge, Understanding & Evaluating • Designing & Communicating • Prototyping, Planning & Making	

Year 8

Students rotate between Design & Technology Moodlight project and Food & Nutrition for their double lessons.
The order of which students do this varies under a carousel system, in half year blocks.
In single lessons, inclusive design and the DOT project is taught all year.

Food and nutrition

When working in Food and Nutrition, your child will have the opportunity to develop new skills and learn how to cook. In addition, how to make informed decisions about diet and health.

Design

To adapt recipes to:

- Make use of leftovers
- Adjust to the consumers preferences
- Factor recipes up or down
- Reduce waste
- Meet a specific dietary need
- Increase nutritional content
- Reduce the cost

Make

To further develop a bank of dishes to make and adapt, including meat, fish and alternative protein dishes:

- Decorated focaccia
- Peach cobbler
- Loaded potato skins
- Coconut and chickpea curry
- Chilli con carne
- Marble pear tray bake
- Sizzling stir fry
- Calzone
- Fish goujon wrap

Inclusive design encourages students to develop and understanding and empathy for people in life situations different from their own. In this unit, students are given a series of challenges and encouraged to analyse, design, develop, model and make. They are reflective about every aspect of their work. We use resources from Cambridge University's Designing Our Tomorrow (DOT project) for a large part of this unit.
Inclusive design challenges include:
• Design for Disability (Cerebral Palsy)
• Design for Mental Health
DOT project focus:

- Design for the Blind / Visually impaired
- Design for Rheumatoid Arthritis

Skills, Knowledge & Understanding include:

Design

- Task and context analysis
- investigating and analysing other similar products
- Understanding and identifying user needs and problems
- Primary research encouraging experimentation, testing and empathy
- Problem-solving and analysis
- Annotated sketches
- Range of innovative ideas, focusing on user-centred design
- Design development
- Iterative designing
- 3d modelling

Make

The **mood light** project is predominantly an electronics based make task, with aspects of designing. A mood light can enhance the ambiance of a space and contain decorative elements. This can be customised or themed to a celebration or a social, environmental, cultural or ethical theme. Alternatively, the product can be developed as a night light, based on the idea that at some stage in their development young children are afraid of the dark. The envisaged outcome is a battery powered glow-in-the dark device, suitable for a chosen target market.
The project includes a number of focused practical tasks such as constructing a light sensitive circuit and manufacturing a thermoplastic product enclosure by vacuum forming. The anticipated final outcome will include the circuit housed in a vacuum-formed case, mounted on a hardboard base. The light emits through light-emitting acrylic, laser cut in various shapes. The addition of vinyl cut graphics can add a 2d design in the form of a silhouette.

Skills, Knowledge & Understanding include:

Design

- Responding to given design briefs
- Identification of needs and design impacts – social, environmental, cultural or ethical considerations
- Analysis of similar existing products
- Designing from a specification
- Design inspiration - design eras including Art nouveau and Art Deco investigate design history, learning about design movements. Their designs take on a range of influences, inspired

• Tuna pasta bake **Evaluate** To review performance to include: • mastery of skills • independent working • organization • time management • skills and processes • safety and hygienic practices • following a method To complete a sensory evaluation to include: • Hedonic scale judgement • Sensory analysis (star diagram) • Evaluative comments for improvements in the future **Technical Knowledge** • To explore environmental issues surrounding food choices. • How to make informed decisions about diet and health To understand the food science relating to: • Gelatinisation • Dextrinisation • Coagulation • How to keep food safe on its journey from store to school and back home again. • To use and identify a range of food preparation techniques.	• Modelling using a variety of modelling materials – card, corrugated card, Styrofoam, modelling clay, felt, textiles • 3d modelling, such as Sketchup / Tinkercad • Iterative design development, through concept modelling, designing and evaluating • Revising and consolidation of skills with hand tools and cutting equipment • Revisiting Health & Safety practices • Selecting appropriate materials and tools • Safe use of Glue gun • Selecting appropriate adhesives and fixing methods **Evaluate** • Existing products analysis enables students to evaluate strengths and weaknesses, including features, materials, functions, ergonomics and technologies (including relevant new and emerging technologies) • Testing and evaluating iterations during development and of the finished product • writing an evaluation, focusing on user needs and problems identified • Understanding the impact of D&T upon individuals & society and the responsibilities of designers, through understanding inclusive design and user-centred design **Technical Knowledge** • 3d product modelling-based materials and their properties and structural performance (eg. Styrofoam; corrugated card) • Using past knowledge of inputs and outputs, plus recognising intelligent technologies such as sensors used in existing products, to inform own ideas (eg. Sensors to aid designing for the blind)	by the work of others, famous designers and iconic designs and styles from the past. • Orthographic projection drawing technique • Modelling and planning • CAD 2d **Make** • Electronic circuit production • Soft soldering techniques • Risk assessment • Component symbols and circuit diagrams • Using moulds / formers / draft angles • Vacuum forming technique • Building on craft knife skills (using sheet polymers) • Hand drills • Use of sanding machine • Laser cut acrylic and selection of materials • Safe use of Glue gun • Vinyl cutting • CAD 2d – CAM production • Development of a 3D product from a 2D plan **Evaluate** • Testing the circuit and functioning moodlight product • Testing with intended target market in intended environment • Evaluating the finished product • Considering its social, environmental, cultural or ethical impact • Improved and alternative design proposals **Technical Knowledge** • Polymer materials and their properties • Manufacturing methods, including vacuum forming and laser cutting / engraving	

• To develop understanding about how food is produced, processed and sold. • To apply knowledge about the Eatwell Guide and tips for healthy eating to new task, focusing on nutrients found within food groups to develop balanced meals and menus.		• Electronic components and their functions, inputs and outputs • Light-sensitive sensor switch to control night time light output (LDR) • Controlling components, such as the sensitivity of the sensor, to control output and to understand that this could be programmable. • Understand how more advanced electrical and electronic systems can be powered and used in lighting (for example, movement as an input or solar as source of power).	
Assessment: • Knowledge, Understanding & Evaluating • Designing & Communicating • Prototyping, Planning & Making	**Assessment:** • Knowledge, Understanding & Evaluating • Designing & Communicating • Prototyping, Planning & Making	**Assessment:** • Knowledge, Understanding & Evaluating • Designing & Communicating • Prototyping, Planning & Making	
Year 9 ***Students rotate around short mini projects for the first half of the year, based on a 'Coffee Shop theme'.*** ***Students then rotate between Design & Technology and Food & Nutrition for the latter half of year 9.***			
Option Choices Taster Mini projects (Coffee Shop theme): Pupils are given the opportunity to work in each of the subject specialisms we offer at KS4 level. They will spend 6 weeks in each area, carrying out activities which develop their knowledge, skills and understanding in the wider curriculum of D&T, but also allowing pupils to have an experience of each specialism, leading up to their year 9 option choices. Our Graphics and Construction areas are combined into one unit. **Key specialisms:** • **Graphical Communication** – Café branding • **Construction and the Built Environment** – sign design	**Food and Nutrition** When working in Food and Nutrition, your child will have the opportunity to develop new skills and learn how to cook. In addition, how to make informed decisions about diet and health. In preparation for KS4, pupils undertake an introduction to hospitality and catering. **Design** • Plan and design dishes adapted for specific groups of people, nutritional or sensory improvements. **Make** • Select, prepare and cook a range of different ingredients • Further develop a bank of dishes to make and adapt now and in the future	**Sustainable Living – mini NEA:** architectural design, scale modelling & group work tasks completed over an 8-9 week period. Pupils will have the opportunity to develop a range of design and 3d modelling skills. They will collaborate to produce a scaled architectural model for a chosen client. The task has an emphasis upon sustainability and requires students to identify the needs of stakeholders, develop creative solutions, yet work within the parameters of repurposing a shipping container as the basis of their design for a 'tiny house' or small living accommodation. Skills, Knowledge & Understanding include: **Design** • Interpreting a brief • Identifying user needs • Researching existing solutions and environments	

• **Design & Technology (product engineering**) – cake stand design • **Hospitality & Catering (Food & Nutrition)** – Menu planning and coffee shop themed food Skills, Knowledge & Understanding include: **Design** • Task and context analysis • Investigating and analysing café brands, typography, colour, imagery and signage • Understanding and identifying user needs and wants, plus environmental context, including the exploration of cultures • Producing a mood-board to inspire ideas • Mind-mapping a wide range of innovative and unique ideas • Annotated 2d sketches • Design development – logo, typography & brand • Linework, drawing accuracy • Use of iPad for CAD • Selecting front of house equipment • Adapting dishes • Plan sign design and layout • Decorating techniques • Developing a justified design specification, including function, aesthetics, durability, plus other identified requirements • Designing ideas in the mode of Alessi, both in terms of aesthetics and materials, to create non-stereotypical responses • Annotated sketches • Design development strategy – SCARED technique to explore design modification • Card modelling • 2d CAD use to modify an existing template for a cake stand design	• Apply temperature control for safe storage, hot-holding and cooking of food • Keep safe when preparing particularly high risk foods and be able to explain and apply personal, kitchen and food safety rules. **Evaluate** • To further develop knowledge of issues surrounding eating out and the responsibility of the hospitality and catering industry to provide healthy choices To review performance to include: • mastery of skills • independent working • organization • time management • skills and processes • safety and hygienic practices • following a method To complete a sensory evaluation to include: • Hedonic scale judgement • Sensory analysis (star diagram) • Evaluative comments for improvements in the future **Technical Knowledge** • an emphasis on technical skills, and making links to the vocational context of the hospitality and catering industry • Allergies and intolerances • Anaphylaxis first aid training • Maintain a healthy and active lifestyle, developing an understanding of the	• Using biomimicry and biophilic design to improve creative responses • Creating mood-boards to inspire ideas • 2-point perspective drawing technique • 2d orthographic drawings, including plan designs, elevations • Annotated sketching and design communication, developing previous drawing skills • 3d modelling skills in SketchUp, using CAD • Planning and drawing accurately to scale • Planning collaboratively to distribute design and make tasks **Make** • Scaled modelling and selecting suitable modelling materials • Selecting and planning appropriate tools, equipment, materials and finishes **Evaluate** • Evaluating design concepts during their development; reviewing with team members to make decisions and modifications • Evaluation informs the whole creative process, encouraging pupils to be reflective of their own work and of others' **Technical Knowledge** • Understand about aspects of sustainable renewable energy technologies, such as the use of solar panels, wind generators, ground source heat pumps • Structural architectural features, including sheet corrugation, beams and triangulation	

Make • Final design proposal using graphical equipment / programmes and drawing accuracy in 2d • Sweet potato muffins • Mini spanakopita • Cardamon buns • Working from a technical specification • Reinforcement of previous techniques learned in year 7, including marking out, cutting, filing, bonding • Using mdf • Precision and accuracy • Selecting from a range of paint finishes, including primer, emulsion, matt, sheen and gloss work. • Painting and decorating techniques • Prepare CAD accurately for Computer-Aided-Manufacture (laser cutting) • Select from laser cutting techniques, including cutting & engraving • Assemble flat-pack laser cut card prototype • Consideration of suitable material properties **Evaluate** • Existing café and brand analysis enables students to evaluate strengths and weaknesses, including features, materials, functions, aesthetics and suitability for Target Market. • Skills and processes used in the production of dishes • Time and organisation management • Professional sign designer and decorator – using their work as influence • Evaluate final sign design and practical work, taking into account the views of others	importance of a variety of nutrients, especially micro-nutrients and proteins • Ages and stages: understanding the nutritional needs of specific groups of people		

• Analysing the work of Alessi, past and present to develop an understanding of how these post-modern designs explore creativity, form, function, materials and aesthetics to create unique products • Know some advantages of using the laser cutter for prototyping • Test and evaluate ideas and prototype against specification, taking into account the views of others • Refine ideas, in light of evaluations **Technical Knowledge** • Understanding the properties of mdf and its suitability for modelling the prototype, including structural characteristics, advantages and disadvantages. • Understand the performance of structural elements in the design of the card prototype, to achieve a functioning solution through strength, rigidity and flatpack assembly. • Know the advantages and limitations of using acrylic as an alternative material for the cake stand prototype • Allergies and Intolerances • Anaphylaxis first aid response • Menu planning • Front of house equipment			
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