



Long Term Plan & Curriculum Intent Map Motor Vehicle 2021 22

SUBJECT: Design & Technology

Department Curriculum intent:

Design and technology is an inspiring and rigorous and practical subject. Creativity and imagination are encouraged, so pupils design and make products to solve real world problems within a variety of contexts. Studying design technology helps to prepare our young people for living and working in a rapidly changing technological world. At North Durham Academy this is achieved by teaching our students technical understanding as well as building upon other disciplines such as maths, science, engineering, computing and art. Pupils are encouraged to take risks throughout the design process to become effective and innovative problem solvers whilst creating unique designs. Through the analysis of past and present design and technology products, the develop an understanding of positive design on the world that we live in.

At Key Stage 3 (Y7,8,9) all students study DT within a rotation including Graphics, food, Resistant Materials with STEM flowing throughout. In DT lessons students are encouraged to develop confidence and practical expertise using a variety of materials to create a range of good quality products. It is our aim to develop independent, competent learners who progressively increase their subject knowledge. We look to develop and improve their ability to work independently to produce high quality products for a wide range of users.

We aim to challenge student's intellectual, creative and practical abilities during problem solving activities, whilst developing the personal skills they will need when entering employment, and vital life skills whilst being an effective and positive member of the local community.

Qualities we aim to develop in students:

| | |
|------------------------------|--------------------------------|
| Social skills | Practical / hand skills |
| Technical skills & knowledge | Use of CAD CAM |
| Creative thinking | Materials/ingredient knowledge |
| Problem solving | Safe working practice |

Related Documents:

- LTP - Overview of Activities
- MTP's
- Assessment Grids

National Curriculum - Design Technology

Aims

| The national curriculum for design and technology aims to ensure that all pupils: | Year 7 | | | | Year 8 | | | | Year 9 | | | |
|---|---|---|--|---|--|--|--|--|------------------|--|---|--------------------------|
| | Food & Nutrition | Resistant materials – Man Vs Machine | Graphics -How to make a card dance | Digital technology | Food & Nutrition | Resistant materials- Picture frame | Graphics – Action figure | Engineering – Coat Hook | Food & nutrition | Resistant Materials - Gum ball dispenser | Product design -Speaker | Food – Cultural Cuisines |
| <ul style="list-style-type: none"> develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world | | -Generating design ideas -Hand skills -CAD skills | -Generating design ideas -Hand skills | -Introduction to programming | | -Generating design ideas -Hand skills -CAD CAM skills | -Generating design ideas | -Generating design ideas -Use of CAM | | -Generating design ideas -CAM designs /sketch up /2D design. | -Generating design ideas -CAM designs /sketch up /2D design. | |
| <ul style="list-style-type: none"> build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users | | -Hand skills -CAD skills -Card prototyping | -Hand skills -Prototyping | | | -Hand skills -CAD skills -Casting | -Prototyping /modelling | -Use of CAD CAD to product produce quality product. -Increase materials knowledge Metal, Woods. | | | -Sketch up design ideas | |
| <ul style="list-style-type: none"> critique, evaluate and test their ideas and products and the work of others | -smoothie -pizza wheels -chicken nuggets -egg fried rice -savoury seasonal scones | -Product analysis -Peer evaluation | -Product analysis -Annotating design ideas -Evaluating prototypes -Evaluating final product | -Evaluate products performance | -Stir fry -life stage practical -fakeaways product | -Product analysis -Annotating design ideas -Evaluating final product | -Product analysis -Self /peer evaluation | -Product analysis -Testing and evaluating their work. | | -Design annotations /self-evaluation | -Design annotations /self-evaluation | |
| <ul style="list-style-type: none"> understand and apply the principles of nutrition and learn how to cook | | | | | | | | | | | | |
| Design | | | | | | | | | | | | |
| <ul style="list-style-type: none"> use research and exploration, such as the study of different cultures, to identify and understand user needs | -smoothie sensory analysis -Seasonality scones end project | -Product analysis | -Product analysis -Design Specification | | -Stir fry -life stage practical -fakeaways product | -Product analysis -Design Specification | -Product analysis -Client profile | -Client profile -Product analysis | | | -Product analysis -client profile | |
| <ul style="list-style-type: none"> identify and solve their own design problems and understand how to reformulate problems given to them | -Seasonality scones end project | | -Identifying suitable mechanisms | -Problem solving in making robot move around the road map | -Fakeaway Project | -Generating design ideas -Casting /mould making. | -Developing design nets | -Use knowledge of CAD CAM to produce a creative original outcome. | | --Use knowledge of CAD CAM to produce a creative original outcome. | -Generating design ideas | |
| <ul style="list-style-type: none"> develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations | | -Design specification | -Design specification | | | -Design specification | Design specification | | | | | |
| <ul style="list-style-type: none"> use a variety of approaches [for example, biomimicry and user-centred design] to generate creative ideas and avoid stereotypical responses | | -Generating design ideas 3D drawing /shading -card prototypes / 2D design | -Generating design ideas Rendering techniques, CAD | | | -Generating designs / Isometric drawing / 2D design/ Shading skills. | -Generating designs / Isometric drawing / 2D design/ Shading skills. | -Develop new hand skills/ metal work. -Use knowledge of CAD CAM to produce a creative | | | -Generating design ideas / Sketch up | |

| | | | | | | | | | | | | | |
|--|--|--|---|--|--|--|--|---|--|--|--|--|--|
| | | | | | | | | | original outcome. | | | | |
| <ul style="list-style-type: none"> develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations | | -Design annotations -plan for manufacture | -Generating design ideas - annotations | -Detailed flow chart & mathematical modelling in programming | | | -Generating design ideas -Design annotations -CAD design -plan for manufacture | -Generating design ideas -Design annotations | -Generating design ideas/ isometric drawing -Final design /sketchup | | -3D modelling in sketch up -Designing using 2D design | -3D modelling in sketch up -Designing using 2D design | |
| Make | | | | | | | | | | | | | |
| <ul style="list-style-type: none"> select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture | | -Handmade product -Using machinery | -Card modelling /cutting shaping, folding. | -Introduction to programming /coding | | | -Planning for manufacture -Making/ wood work skills / casting / engraving | -Cutting skills -Cam skills | -Hand /machine skills, forming steel hook. -Use of CAD CAM to produce the back board. | | -CAD CAM skills in manufacturing | -CAM skills in manufacturing -Soldering | |
| <ul style="list-style-type: none"> select from and use a wider, more complex range of materials, components and ingredients, considering their properties | -smoothie -pizza wheels -chicken nuggets -egg fried rice -savory seasonal scones | -Plastics /Acrylic | -Card types | | | -Stir fry -life stage practical -fakeaways product | -Wood/ soft/hardwood and their origins? | -Packaging | -Materials and their properties -Metal forming, Plywood/acrylic. | | | | |
| Evaluate | | | | | | | | | | | | | |
| <ul style="list-style-type: none"> analyse the work of past and present professionals and others to develop and broaden their understanding | | -Product analysis of existing products | -Product analysis of existing examples | | | | -Product analysis of existing examples | -Product analysis of existing examples | -product analysis | | | | -Product analysis |
| <ul style="list-style-type: none"> investigate new and emerging technologies | | -CAM skills | | -How can programming & robotics change our society | | | -CAM skills | - Smart/modern materials | | | | | -CAD programming -Cam Skills. |
| <ul style="list-style-type: none"> test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups | | - Modelling card prototype | -Modelling card prototype | - Evaluate product performance against spec | | | | - Modelling card prototype | -Prototyping -Evaluation | | | | -Self evaluation |
| <ul style="list-style-type: none"> understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists | | -Impact of the selected materials | -Impact of the selected materials | -The impact of programming and robotic on society. | | | -Impact of the selected materials -Origins of selected materials | | -impact of materials on the environment | | | | |
| Technical knowledge | | | | | | | | | | | | | |
| <ul style="list-style-type: none"> understand and use the properties of materials and the performance of structural elements to achieve functioning solutions | | -Acrylic /forming & joining | -Card/ structural possibilities. movement | | | | -Properties of hard / soft wood / pewter | | -Material properties within practical work | | | | -Joining methods |
| <ul style="list-style-type: none"> understand how more advanced mechanical systems used in their products enable changes in movement and force | | | -Card mechanisms/ folding , transferring motion through mechanisms. | - Robotics -Transferring motion from motor to wheels. | | | | | | | | -Mechanisms, moving parts within the product. | |
| <ul style="list-style-type: none"> understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs] | | | | -Programming input /output. -Line sensors. | | | | | | | | | -Electronical components -Soldering -inputs /outputs |
| <ul style="list-style-type: none"> apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors] and control outputs [for example, actuators] using programmable components [for example, microcontrollers] | | | | -Micro bits -Programming input /output. -Line sensors. | | | | | | | -CAD CAM skills Programming the laser cutter | -CAD CAM skills Programming the laser cutter | |
| Aims/Technical Knowledge: Cooking & Nutrition | | | | | | | | | | | | | |
| <ul style="list-style-type: none"> Understand and apply the principles of nutrition and health | -Eatwell Guide, food diary -final design and make project -food allergy & intolerances | | | | | | -Nutrients provided by the Eatwell Guide -Nutritional needs of different life stages -Fakeaway Project | | | | | -Spaghetti bolognese link -mini roast dinner link -chicken skewers -savory roly poly bread link | -food choice -multi-cultural cuisines -own choice menu |
| <ul style="list-style-type: none"> Cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet | -pizza wheels -chicken nuggets -egg fried rice -savory seasonal scones | | | | | -Stir fry, -meatballs -spaghetti bolognese- Lasagne -cottage pie -fakeaways product | | | | | -spaghetti bolognese -mini roast dinner -chicken skewers -ravioli -Dim sum -chips & mayo -teriyaki chicken -savory roly poly bread -crumpets | -own choice dish has to be savoury product | |
| <ul style="list-style-type: none"> Become competent in a range of cooking techniques [for example, selecting and preparing ingredients, using utensils and electrical equipment. Applying heat in different ways, using awareness of taste, texture and smell to decide how to season dishes and combine ingredients, adapting and using their own recipes] | -smoothie -pizza wheels -chicken nuggets -egg fried rice -savory seasonal scones | | | | | -Stir fry, -meatballs -spaghetti bolognese- Lasagne -cottage pie -fakeaways product | | | | | -spaghetti bolognese -mini roast dinner -chicken skewers -ravioli -Dim sum -chips & mayo -teriyaki chicken | -multi-cultural cuisines using a range of cooking methods | |

| | | | |
|--|---|--|---|
| | | | Mechanical devises |
| | <p>Cross curricular links:</p> <p>Science - Selection of materials and components Engineering - Orthographic drawing Technical knowledge CAD CAM skills Informing design decisions Communication of design ideas Design strategies Selection of materials and components Tools, equipment & techniques Maths - Sketch up design MM Orthographic drawing Communication of design ideas Art & design – generating design ideas</p> | <p>Cross curricular links:</p> <p>Science -Sustainability and the environment Production techniques and systems Energy generation Energy storage Engineering - CAD CAD Manufacturing specification Technical skills Production techniques and systems Energy generation Energy storage Tolerance Maths - Manufacturing specification Tolerance IT – CAD CAM Production techniques and systems Energy storage Business studies - Industry & Enterprise Sustainability and the environment</p> <p>Cultural - Sustainability and the environment People Culture and systems Energy generation</p> | <p>Cross curricular links:</p> <p>Science -Modern materials Smart materials Composite materials Electronic systems processing Mechanical devises Engineering -Joining methods Finishing methods Handle /hinge manufacture. Mechanical devises Materials Management Maths -Orthographic drawing Electronic systems processing Mechanical devises IT – CAD CAM Electronic systems processing Mechanical devises</p> <p>Cultural- Electronic systems processing Materials Management 3.Client profile 4.Product analysis</p> |

| Year 11 | | | |
|---------------------------|--|---|---|
| | Autumn | Spring | Summer |
| Year 11 Practical | <ul style="list-style-type: none"> 3902-105 Vehicle Electrical Systems 102 Vehicle Engine Cooling Systems | <ul style="list-style-type: none"> 007 Introduction to Vehicle Transmission Systems 001 Introduction to Vehicle Engine Lubrication Systems | Final assessment – routine service, maintenance and vehicle road worthiness inspection, including writing of report and feedback of finding to assessor. |
| Year 11 Theory | <p>Lesson focus :</p> <p>Theoretical and knowledge building to support workshop skills training outlined above.</p> <p>Additional training provided where required and skills gaps identified during reviews and smart target setting</p> | <p>Lesson Focus:</p> <p>Theoretical and knowledge building to support workshop skills training outlined above.</p> <p>Revision sessions on all vehicle units, mock exams, practical assessments and student presentations</p> | <p>Lesson focus :</p> <p>Theoretical and knowledge building to support workshop skills training outlined above.</p> <p>Additional training provided where required and skills gaps identified during reviews and smart target setting</p> <p>If all work is completed and signed off, delivery can commence of Level 2 Automotive and or some welding units can be attached to the qualification.</p> |
| Year 11 Assessment | On-going Assessment (unit dependant), smart target setting, timely reviews. | On-going Assessment (unit dependant), smart target setting, timely reviews. | |
| Year11 Homework | Attend booster Complete any unfinished CA sheets/practical work Online Exam questions Linked to section 8 design & making | Attend booster Complete any unfinished CA sheets/practical work Online Exam questions Linked to section 1 Key ideas in DT, 2 materials and systems, 3 Materials | Attend booster Complete any unfinished CA sheets/practical work Online Exam questions Linked to section 4 Paper & board, 5 Wood metals polymers, 6 Textiles, 7 Electronics & mechanical systems. |
| | STEM links: | STEM links: | STEM links: |
| | Cross curricular links: | Cross curricular links: | Cross curricular links: |