Design & Technology
3i Statement
Design and Technology Curriculum

“Design is not just what it looks like and feels like. Design is how it works.”
Steve Jobs

What is the intention of the KS1 and KS2 Design and Technology Curriculum?

Design and Technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others’ needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

We are very aware of living in a technological age and therefore aim to present our pupils, from a very early age, with problem-solving activities utilising their natural creativity. We follow the process of planning, designing, building, testing and evaluating so that learning derives equally from all outcomes. We work with a wide range of materials commonly found in our daily lives and encourage our pupils to make their own choices about which are best suited for a task.

The National Curriculum for Design and Technology aims to ensure that all pupils:

- Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- 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
- Critique, evaluate and test their ideas and products and the work of others
- Understand and apply the principles of nutrition and learn how to cook.

How will this be implemented?

Our federation uses the National Curriculum in England 2014 framework for Design and Technology as the basis for its curriculum planning. We develop our medium term plans using a range of sources, including commercial on-line resources available from Design and Technology Association, the National Stem Centre and other curriculum providers. While there are opportunities for pupils of all abilities to develop their skills and knowledge in each teaching unit, the planned progression built into the Design and Technology curriculum means that the pupils are increasingly challenged as they move through the academy.

Design and Technology is taught by individual class teachers who take responsibility for planning, resourcing and delivering this area of the curriculum. Overall responsibility for ensuring that there is a suitable risk assessment in place for this subject lies with the subject coordinator who will ensure that this has been reviewed by the Principal.
In the Harris Federation, we make Design and Technology an enjoyable learning experience. Pupils undertake a Design and Technology project at least three times a year. Lessons take place weekly as this ensures that knowledge can be hierarchically built upon both within a year group and across the whole academy.

Each Academy uses a variety of teaching and learning styles in Design and Technology lessons. The principle aim is to develop pupil’s knowledge, skills and understanding in this area. Teachers ensure that the pupils apply their knowledge and understanding when developing ideas, planning and making products and then evaluating them. We do this through a mixture of whole-class teaching and individual/group activities. Within lessons, we give pupils the opportunity both to work on their own and to collaborate with others, listening to other pupil’s ideas and treating these with respect. Pupils critically evaluate existing products, their own work and that of others. They have the opportunity to use a wide range of materials and resources, including ICT.

The learning opportunities can be divided into three main areas.

**Investigative, Disassembly and Evaluative Activities (IDEAs)**

These activities provide opportunities for the pupils to explore existing products and to gain skills, knowledge and understanding which can be applied in a design and make assignment.

**Focused Practical Tasks (FPTs)**

Focused practical tasks provide opportunities to learn and practice particular skills and knowledge.

**Design and Make Assignments (DMAs)**

A design and make assignment provides an opportunity for the pupils to combine their skills, knowledge and understanding to develop products that meet a perceived need, for example a shield for a warrior. (In general DMAs in Key Stage One will tend to be shorter in duration and, as pupils move towards the end of Key Stage Two, their designing and making will become more complex and therefore more time consuming.)

**Early Years Foundation Stage**

We teach Design and Technology in our Nursery and Reception classes as an integral part of the topic work covered during the year and as set out in the Early Years Foundation Stage Framework which underpin the curriculum planning for children aged three to five. We encourage the development of skills, knowledge and understanding that help pupils make sense of their world as an integral part of the academy’s work. This learning forms the foundations for later work in Design and Technology. These early experiences include asking questions about how things work, investigating and using a variety of construction kits, materials, tools and products, developing making skills and handling appropriate tools and construction material safely and with increasing control. We provide a range of experiences that encourage exploration, observation, problem solving, critical thinking and discussion. These activities, indoors and outdoors, attract the pupil’s interest and curiosity.
The national curriculum states that in:

**Key Stage 1**
Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts, for example, the home and academy, gardens and playgrounds, the local community, industry and the wider environment.

**When designing and making, pupils should be taught to:**

**Design**
- Design purposeful, functional, appealing products for themselves and other users based on design criteria
- Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology.

**Make**
- Select from and use a range of tools and equipment to perform practical tasks, for example, cutting, shaping, joining and finishing.
- Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics.

**Evaluate**
- Explore and evaluate a range of existing products.
- Evaluate their ideas and products against design criteria.
- Technical knowledge
- Build structures, exploring how they can be made stronger, stiffer and more stable.
- Explore and use mechanisms, for example, levers, sliders, wheels and axles, in their products.

**Key Stage 2**
Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts, for example, the home, school, leisure, culture, enterprise, industry and the wider environment.

**When designing and making, pupils should be taught to:**

**Design**
- Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.
- Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.
Make

- Select from and use a wider range of tools and equipment to perform practical tasks, for example, cutting, shaping, joining and finishing, accurately.
- Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.

Evaluate

- Investigate and analyse a range of existing products.
- Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
- Understand how key events and individuals in design and technology have helped shape the world.

Technical Knowledge

- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.
- Understand and use mechanical systems in their products, for example, gears, pulleys, cams, levers and linkages.
- Understand and use electrical systems in their products, for example, series circuits incorporating switches, bulbs, buzzers and motors.
- Apply their understanding of computing to program, monitor and control their products.

Cooking and Nutrition

As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating.

Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life.

Pupils should be taught to:

Key Stage 1

- Use the basic principles of a healthy and varied diet to prepare dishes
- Understand where food comes from.

Key Stage 2

- Understand and apply the principles of a healthy and varied diet
- Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques
- Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.
As a federation we have decided on the end of key stage outcomes that we want our pupils to know as the part of the content of our design and technology curriculum. We have allowed flexibility for it to be covered and revisited over a two year period to support pupils in gaining a deeper understanding of this knowledge.

See Appendix for the ‘end of key stage milestones’ we have laid out for KS1, lower KS2 and upper KS2 to cover.
How will we judge the impact of the design and technology curriculum?

The design and technology curriculum will make a profound and positive impact on the outcomes of every pupil. The structure enables us to return to core knowledge and skills throughout the course, imbedding key practises and understanding.

Core knowledge of each unit is supported by a knowledge organiser which details the key learning points, vocabulary and key questions. This is sent home in advance of the unit, allowing pupils to make a head start on their learning. It is our expectation that the knowledge on our organiser is known by all.

We endeavour to create strong and appropriate links with other subjects to enhance the curriculum and learning experience, predominantly but not exclusively with maths, literacy, science, computing, music, PSHE, geography, history and PE.

Our teachers rely on a range of assessment tools to provide data on the knowledge and skills pupils have, their progress and their development points.

This includes:
- assessment for learning
- challenge tasks
- enquiry tasks
- standards of learning in books and products
- quizzing, multiple choice and end of unit questions
- pupil voice
## End of Key Stage Milestones: Design and Technology

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| **Understanding context, users and purposes** | Across KS1 pupils should:  
work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment  
state what products they are designing and making  
say whether their products are for themselves or other users  
describe what their products are for  
say how their products will work  
say how they will make their products suitable for their intended users  
use simple design criteria to help develop their ideas | Across KS2 pupils should:  
work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment  
describe the purpose of their products  
indicate the design features of their products that will appeal to intended users  
explain how particular parts of their products work  
In early KS2 pupils should also:  
gather information about the needs and wants of particular individuals and groups  
develop their own design criteria and use these to inform their ideas  
In late KS2 pupils should also:  
carry out research, using surveys, interviews, questionnaires and web-based resources  
identify the needs, wants, preferences and values of particular individuals and groups  
develop a simple design specification to guide their thinking |
| **Generating, developing, modelling and communicating ideas** | Across KS1 pupils should:  
generate ideas by drawing on their own experiences  
use knowledge of existing products to help come up with ideas  
develop and communicate ideas by talking and drawing  
model ideas by exploring materials, components and construction kits and by making templates and mock-ups  
use information and communication technology, where appropriate, to develop and communicate their ideas | Across KS2 pupils should:  
share and clarify ideas through discussion  
model their ideas using prototypes and pattern pieces  
use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas  
use computer-aided design to develop and communicate their ideas  
In early KS2 pupils should also:  
generate realistic ideas, focusing on the needs of the user  
makes design decisions that take account of the availability of resources  
In late KS2 pupils should also:  
generate innovative ideas, drawing on research  
makes design decisions, taking account of constraints such as time, resources and cost |
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| **Planning** | Across KS1 pupils should:  
- plan by suggesting what to do next  
- select from a range of tools and equipment, explaining their choices  
- select from a range of materials and components according to their characteristics | Across KS2 pupils should:  
- select tools and equipment suitable for the task  
- explain their choice of tools and equipment in relation to the skills and techniques they will be using  
- select materials and components suitable for the task  
- explain their choice of materials and components according to functional properties and aesthetic qualities  

In early KS2 pupils should also:  
- order the main stages of making  

In late KS2 pupils should also:  
- produce appropriate lists of tools, equipment and materials that they need  
- formulate step-by-step plans as a guide to making |
| **Practical skills and techniques** | Across KS1 pupils should:  
- follow procedures for safety and hygiene  
- use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components  
- measure, mark out, cut and shape materials and components  
- assemble, join and combine materials and components  
- use finishing techniques, including those from art and design | Across KS2 pupils should:  
- follow procedures for safety and hygiene  
- use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components  

In early KS2 pupils should also:  
- measure, mark out, cut and shape materials and components with some accuracy  
- assemble, join and combine materials and components with some accuracy  
- apply a range of finishing techniques, including those from art and design, with some accuracy  

In late KS2 pupils should also:  
- accurately measure, mark out, cut and shape materials and components  
- accurately assemble, join and combine materials and components  
- accurately apply a range of finishing techniques, including those from art and design  
- use techniques that involve a number of steps  
- demonstrate resourcefulness when tackling practical problems |
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| **Own ideas and products** | Across KS1 pupils should:  
  • talk about their design ideas and what they are making  
  • make simple judgements about their products and ideas against design criteria  
  • suggest how their products could be improved | Across KS2 pupils should:  
  • identify the strengths and areas for development in their ideas and products  
  • consider the views of others, including intended users, to improve their work  
  • in early KS2 pupils should also:  
    • refer to their design criteria as they design and make  
    • use their design criteria to evaluate their completed products  
  • in late KS2 pupils should also:  
    • critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make  
  • evaluate their ideas and products against their original design specification |
| **Existing products** | Across KS1 pupils should explore:  
  • what products are  
  • who products are for  
  • what products are for  
  • how products work  
  • how products are used  
  • where products might be used  
  • what materials products are made from  
  • what they like and dislike about products | Across KS2 pupils should investigate and analyse:  
  • how well products have been designed  
  • how well products have been made  
  • why materials have been chosen  
  • what methods of construction have been used  
  • how well products work  
  • how well products achieve their purposes  
  • how well products meet user needs and wants  
  • in early KS2 pupils should also investigate and analyse:  
    • who designed and made the products  
    • where products were designed and made  
    • when products were designed and made  
    • whether products can be recycled or reused  
  • in late KS2 pupils should also investigate and analyse:  
    • how much products cost to make  
    • how innovative products are  
    • how sustainable the materials in products are  
    • what impact products have beyond their intended purpose |
| **Key events and individuals** | Not a requirement in KS1 | Across KS2 pupils should know:  
  • about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products |

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<th>Key Stage 2</th>
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| **Making products work** | Across KS1 pupils should know:  
  • about the simple working characteristics of materials and components  
  • about the movement of simple mechanisms such as levers, sliders, wheels and axles  
  • how free-standing structures can be made stronger, stiffer and more stable  
  • that a 3-D textiles product can be assembled from two identical fabric shapes  
  • that food ingredients should be combined according to their sensory characteristics  
  • the correct technical vocabulary for the projects they are undertaking | Across KS2 pupils should know:  
  • how to use learning from science to help design and make products that work  
  • how to use learning from mathematics to help design and make products that work  
  • that materials have both functional properties and aesthetic qualities  
  • that materials can be combined and mixed to create more useful characteristics  
  • that mechanical and electrical systems have an input, process and output  
  • the correct technical vocabulary for the projects they are undertaking  
  • in early KS2 pupils should also know:  
    • how mechanical systems such as levers and linkages or pneumatic systems create movement  
    • how simple electrical circuits and components can be used to create functional products  
    • how to program a computer to control their products  
    • how to make strong, stiff shell structures  
    • that a single fabric shape can be used to make a 3-D textiles product  
    • that food ingredients can be fresh, pre-cooked and processed  
  • in late KS2 pupils should also know:  
    • how more complex electrical circuits and components can be used to create functional products  
    • how to program a computer to monitor changes in the environment and control their products  
    • how to reinforce and strengthen a 3-D framework  
    • that a 3-D textiles product can be made from a combination of textile shapes  
    • that a recipe can be adapted by adding or substituting one or more ingredients |
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| **Where food comes from** | Across KS1 pupils should know:  
• that all food comes from plants or animals  
• that food has to be farmed, grown elsewhere (e.g., home) or caught | Across KS2 pupils should know:  
• that food is grown (such as tomatoes, wheat and potatoes), reared (such as pigs, chickens and cattle) and caught (such as fish) in the UK, Europe and the wider world |
|  |  | in late KS2 pupils should also know:  
• that seasons may affect the food available  
• how food is processed into ingredients that can be eaten or used in cooking |
| **Food preparation, cooking and nutrition** | Across KS1 pupils should know:  
• how to name and sort foods into the five groups in the eatwell plate  
• that everyone should eat at least five portions of fruit and vegetables every day  
• how to prepare simple dishes safely and hygienically, without using a heat source  
• how to use techniques such as cutting, peeling and grating | Across KS2 pupils should know:  
• how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source  
• how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking  
• that a healthy diet is made up from a variety and balance of different food and drink, as depicted in The eatwell plate  
• that to be active and healthy, food and drink are needed to provide energy for the body  
• that recipes can be adapted to change the appearance, taste, texture and aroma  
• that different food and drink contain different substances – nutrients, water and fibre – that are needed for health |