Design, Technology & Computer Science Curriculum Statement 2022-2023

Computer Science Intent

From Charles Babbage's pioneering Difference Engine and Ada Lovelace's early coding to ARM microchips, the UK has a long history of innovation and development in computer technologies. The industry employs over 900, 000 people[1] and software engineering alone contributes £125 billion to the UK's GDP[2].

> "A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through information and communication technology – at a level suitable for the future workplace and as active participants in a digital world." (DfE, 2013[3])

Through our rich and varied curriculum, pupils will enjoy positive experiences and learn how to develop skills in computational thinking and application from block based coding, through to text based languages and basic robotics..

Students will learn to:

- Develop the underpinning knowledge of how to plan and construct algorithms and code
- Work with a range of coding approaches and techniques as they progress through the school, building on learning from primary school and developing to appropriate levels for GCSE and Advanced Level qualifications, if desired
- Build and apply a repertoire of knowledge in order to solve real life problems and to test and improve code so that it works efficiently and effectively.
- Develop knowledge and skills in the use of information technologies to enhance and support their learning across the wider curriculum
- Develop a high level of digital literacy and awareness about the risks and benefits of computer use.

[1] https://www.statista.com/statistics/284968/it-software-and-computer-services-economy-employment-in-the-united-kingdom-uk/, 19/07/2022

[2] https://www.bsa.org/news-events/news/software-supports-ps125-billion-of-uks-gdp-millions-of-software-industry-related-jobs-and-billions-in-rd-investment, 19/07/2022

[3] https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study/national-curriculum-in-england-computing-programmes-of-study, 18/07/2022

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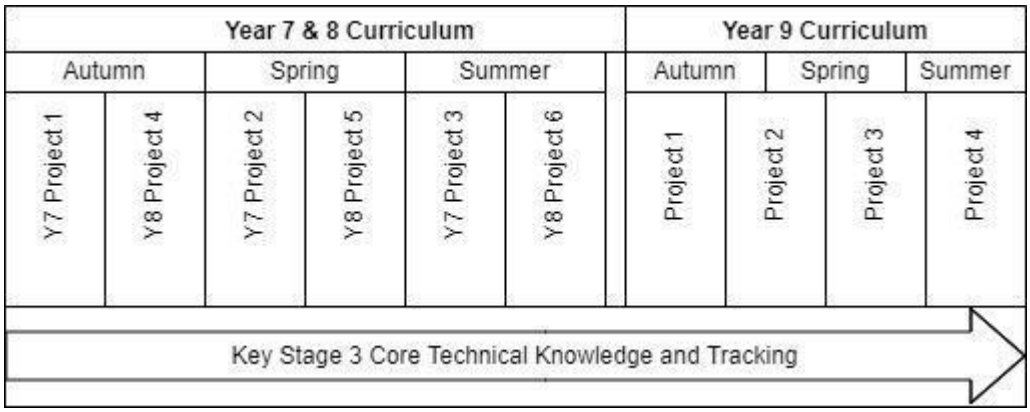
Implementation

At Key Stage 3 pupils are taught computer science as part of the Design and Technology curriculum. They are placed in mixed ability groups. In years 7 and 8 they receive 4 lessons per fortnight and rotate between material areas once a term completing approximately 12-13 weeks per cycle. In year 9 they receive 4 lessons per fortnight and rotate 4 times in the year completing approximately 9-10 weeks per cycle.

The KS3 schemes of work are inspired by the National Curriculum Programmes of STudy (2014) and the CAS (Computing at School) Progression map. Students in year 7, 8 and 9 usually spend one unit of work on computing before moving on to other DT topics.

Students who meet the requirements in year 6 may also be offered the option to study the STEM programme. This allows students 7 hours a cycle in years 7&8 and 6 in year 9. As well as following a slightly broader curriculum in DT they also complete computer science learning to greater depth covering coding skills up to GCSE level in year 7&8.

Fig. 1 Key Stage 3 Curriculum Model



At Key Stage 4 pupils opt to study the subjects with options being taken in year 9 for a curriculum start in year 10. They receive 5 lessons per fortnight throughout years 10 and 11. Students lfollow accredited programmes at either GCSE for Computer Science or Cambridge National Certificate for Creative iMedia.

At Key Stage 5 students again opt as part of transition to post 16 education. In year 12 they receive 8 hours per fortnight throughout the first year of their courses. In year 13 they receive 9 hours per fortnight. Courses offered include the Advanced Level Computer Science and the Cambridge Technicals Extended Certificate in IT at Level 3.

All lessons are taught in specialist facilities with rooms available for each material area and some rooms with a multi-material capability. Computer and CAD/CAM facilities are available throughout the department with 2 dedicated Computer Science rooms, 3 more multi-purpose suites and availability of chromebooks for teachers without computer access in their rooms.

The department offers a range of extra-curricular activities from Engineering and STEM clubs to slot car racing and ‘Girls who Code’. As we recover from the effects of Covid we will gradually increase the number of visits and trips we conduct. Recent trips have included ‘Girls on Track’ - year 7 girls trip to the Extreme-E racing event. In addition, support lessons and revision programmes are offered

as required and have in the previous year included sessions in the school week, during half terms and holidays.

Assessment

For all pupils in year 7, Baseline testing provides initial data with which to guage ability, prior learning and is used to inform teaching and learning from that point as well as where pupils may need additional support or intervention for lost learning. Baseline tests are carried out early in the Autumn term and data is recorded on a department tracking sheet.

At Key Stage 3 Assessment is managed in line with Academy policy using a 4 tier model. The model starts at 'Developing' level progressing to 'Secure', 'Advanced' and 'Exceptional'. Assessment criteria for each unit are created in line with the DATA / CAS progression documents, but there are also specific generic DT descriptors for parents and pupils which give a holistic view of a pupil's attainment for each of years 7, 8 and 9 (See below).

Pupils are tested twice a term regardless of which unit they are working on. One test assesses core and the other specialist knowledge and progress. These are recorded and tracked within the department and we are currently developing our practice in this area to improve consistency of practice and pupil progression across time and across material areas.

Pupil progress is also tracked using whole school tracking systems and data analysis tools such as 4Matrix with regular termly data captures.

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Assessment Criteria - Year 7

Description of skill **Year 7**	Developing	Secure	Advanced	Exceptional
DESIGNING - Understanding contexts, users and purposes	Shows a little understanding of Technology's impact on society. Can identify a celebrity designer or chef. Can follow, with support, a provided brief and specification, showing an emerging awareness of users needs.	Shows some understanding of Technology's impact on society and will be aware that some people are famous as designers, computer scientists or chefs. Can follow a provided brief and specification to an extent, showing an awareness of users needs.	Shows clear understanding of Technology's impact on society and recognises a small number of influential designers, computer scientists and chefs. Brief and specification will be teacher led but starting to show some ability to adapt to needs and requirements	Shows and communicates deeper understanding of Technology's impact on society. Can recognise a range of influential designers, computer scientists and chefs and is able to explain their achievements. Can create basic design briefs and manufacturing specifications that may lack detail and have minimal justification
DESIGNING - Generating, developing, modelling and communicating ideas	Can generate a single idea with no consideration of use, user or materials. Modelling to test ideas will be minimal and communication difficult to understand or have no relevance to subject matter. Graphic communication will be weak and in 2D	Can generate an idea with little consideration of use, user or materials. Modelling to test ideas will be basic and communication difficult to understand or have little relevance to subject matter. Graphic communication will be mainly in 2D	Can generate simple ideas with obvious relevance to needs but limited functionality. Modelling is very basic or non-existent using a single method to test their design ideas meeting requirements only superficially. Communication is still mainly reliant on 2D design but 3D drawing skills are developing. Orthographic drawing skills are starting to be developed.	Can generate basic ideas with clear relevance to needs and some limited consideration of functionality, aesthetics and innovation. Modelling is basic, using a limited number of methods to test their design ideas. Communication is more advanced with both 2D and 3D techniques and some effective rendering employed as well as some meaningful annotation. Orthographic drawing skills are evident at a basic level with some dimensional information.
COMPUTATIONAL THINKING	Start to show some weak understanding of computational thinking.	Shows some understanding of computational thinking - may be able to explain some of the terms: decomposition, pattern recognition, abstraction and algorithms	Shows clear understanding of and demonstrates a basic level of independent computational thinking. Demonstrates basic skills in decomposition, pattern recognition, abstraction and algorithms	Children show clear understanding of and demonstrate competence in computational thinking. Can clearly demonstrate skills in decomposition, pattern recognition, abstraction and algorithms
MAKING - Planning	Can, with support, follow a simple flowchart. Design ideas will show little or no development. Can, with support, follow a simple production plan and read a cutting list. Can, with support, use pre-designed templates and patterns.	Can follow a simple flowchart. Design ideas will show little development beyond basic shape. Can follow a simple production plan and can read a cutting list as well as produce pre-designed templates and patterns.	Can create a simple flowchart. Design ideas may show some detail of construction techniques and materials and they will produce a simple cutting list. Can use pre-designed patterns and templates and may develop basic ones of their own	Can create a complex flowchart and simple pseudocode. Design ideas will show detail of development as exploded and cross sectional views, demonstrating construction techniques, materials and processes. Can produce an effective and partly costed cutting list. Can produce their own simple templates and patterns.
MAKING - Practical skills and techniques	Can, with support, follow instructions and use simple blockly code to create very basic programs. Will show little understanding of appropriate tools and equipment, and needs lots of support in using them appropriately and safely.	Can follow instructions and use simple blockly code to create basic programs. Will show a little understanding of appropriate tools and equipment but may need lots of support in using them appropriately and safely.	Can independently use blockly code to create programs with some complexity in the code. Shows some understanding of appropriate tools and equipment but may need some support in using them appropriately and safely.	Can independently create complex blockly code which works effectively, with few errors. Shows a good understanding of appropriate tools and equipment and will need little support in using them appropriately and safely.
EVALUATING - Existing products and own ideas	Can, with support, compare their products against the original specification and identify one way of improving them. Can, with scaffolding, evaluate other products at a simple level and identify a way they impact on the world.	Can compare their products against the original specification and can identify one or two ways of improving them. They can evaluate other products at a simple level and identify some ways they impact on the world.	Can evaluate their products against the original specification and identify several ways of improving them. They actively involve others in the testing of their products. Can disassemble and evaluate other products and identify some ways they impact on the world.	Can test, evaluate and refine their ideas and products against their specification, taking into account the views of intended users and other interested groups. Can disassemble and accurately evaluate other products and identify several ways they impact on the world and consider their possible life cycle.
TECHNICAL KNOWLEDGE - Making products work	Can label the key aspects of the BBC Microbit and start to use basic technical terminology. Will have little awareness of material types and manufacturing processes. Can recognise a simple mechanism.	Can recognise the key aspects of the BBC Microbit and use basic technical terminology. Will have some awareness of material types and manufacturing processes. Can recognise simple mechanisms.	Children identify the key aspects of the BBC Microbit and use technical terminology appropriately They have good awareness of material types and manufacturing processes and recognise a small range of simple mechanisms.	Children describe the key aspects of the BBC Microbit and confidently use technical terminology. They can identify the main material types and some examples of each as well as manufacturing processes, and they recognise a range of mechanisms.
COOKING AND NUTRITION - Where food comes from	Knows how one food item is produced, processed and sold. They may have little awareness of where foods come from.	Knows how some foods are produced, processed and sold. They will have some awareness of where foods come from. May begin to understand that people choose different types of food.	Know how foods are produced, processed and sold in different ways, e.g. conventional and organic farming, fair trade. Understand 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	Know how to compare the cost of food when planning to eat out or cook at home and show awareness of the influence of food marketing, advertising and promotion on their own diet and purchasing behaviour
COOKING AND NUTRITION - Food preparation, cooking and nutrition	Will struggle to understand the importance of healthy eating and that food provides energy and nutrients. Little or no awareness of how to store, prepare and cook food safely and hygienically. Can, with much support, select and prepare ingredients, use utensils and electrical equipment. Can, with much support, understand how to use taste, texture and smell to decide how to season dishes and combine ingredients. Can, with support, follow a simple recipe with some accuracy.	Can partly understand the importance of healthy eating and that food provides energy and nutrients. Will show some awareness of how to store, prepare and cook food safely and hygienically and to use date-mark and storage instructions on food and drinks. Can, with support, select and prepare ingredients, use utensils and electrical equipment and will understand you can apply heat in different ways. Can, with support, understand how to use taste, texture and smell to decide how to season dishes and combine ingredients. Can follow a simple recipe with some accuracy.	Can demonstrate a good understanding of the importance of a healthy and varied diet as depicted in the Eatwell Guide. Know that food provides energy and nutrients in different amounts; that they have important functions in the body; and that people require different amounts during their life. Know how to taste and cook a broader range of ingredients and healthy recipes using utensil and equipment safe. Show awareness of how to actively minimise food waste such as composting fruit and vegetable peelings and recycling food packaging. Can begin to adapt and use their own recipes	Can demonstrate a strong understanding of the importance of energy balance and the implications of dietary excess or deficiency, e.g. malnutrition, maintenance of a healthy weight. Can use utensils and equipment confidently, safely and accurately and will develop recipes to account for a range of needs, wants and values. Can use a wider range of cooking techniques to include stir frying and sauteing. They will actively seek to minimise food waste when cooking.

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Assessment Criteria - Year 8

Description of skill **Year 8**	Developing	Secure	Advanced	Exceptional
DESIGNING - Understanding contexts, users and purposes	Shows some understanding of Technology's impact on society and will be aware that some people are famous as designers, computer scientists or chefs. Can follow a provided brief and specification to an extent, showing an awareness of users needs.	Shows clear understanding of Technology's impact on society and recognises a small number of influential designers, computer scientists and chefs. Brief and specification will be teacher led but starting to show some ability to adapt to needs and requirements	Shows and communicates deeper understanding of Technology's impact on society. Can recognise a range of influential designers, computer scientists and chefs and is able to explain their achievements. Can create basic design briefs and manufacturing specifications that may lack detail and have minimal justification	Can clearly and effectively communicate deep understanding of Technology's impact on society. They will be knowledgeable about influential designers, computer scientists and chefs, being able to discuss and explain their influence. They will produce an adequate manufacturing specification containing sufficient detail with some justification.
DESIGNING - Generating, developing, modelling and communicating ideas	Can generate an idea with little consideration of use, user or materials. Modelling to test ideas will be basic and communication difficult to understand or have little relevance to subject matter. Graphic communication will be mainly in 2D	Can generate simple ideas with obvious relevance to needs but limited functionality. Modelling is very basic or non-existent using a single method to test their design ideas meeting requirements only superficially. Communication is still mainly reliant on 2D design but 3D drawing skills are developing. Orthographic drawing skills are starting to be developed.	Can generate basic ideas with clear relevance to needs and some limited consideration of functionality, aesthetics and innovation. Modelling is basic, using a limited number of methods to test their design ideas. Communication is more advanced with both 2D and 3D techniques and some effective rendering employed as well as some meaningful annotation. Orthographic drawing skills are evident at a basic level with some dimensional information.	Can generate imaginative ideas having some consideration of functionality, aesthetics and innovation. Modelling is sufficient, using a variety of methods to test their design ideas, meeting several requirements Communication is detailed and effective, using a range of techniques, effective rendering and annotation. Orthographic drawing is well developed, accurate and well dimensioned.
COMPUTATIONAL THINKING	Shows some understanding of computational thinking - may be able to explain some of the terms: decomposition, pattern recognition, abstraction and algorithms	Shows clear understanding of and demonstrates a basic level of independent computational thinking. Demonstrates basic skills in decomposition, pattern recognition, abstraction and algorithms	Children show clear understanding of and demonstrate competence in computational thinking. Can clearly demonstrate skills in decomposition, pattern recognition, abstraction and algorithms	Shows clear understanding of and demonstrates high levels of competence in computational thinking. Can demonstrate skills in decomposition, pattern recognition, abstraction and algorithms
MAKING - Planning	Can follow a simple flowchart. Design ideas will show little development beyond basic shape. Can follow a simple production plan and can read a cutting list as well as produce pre-designed templates and patterns.	Can create a simple flowchart. Design ideas may show some detail of construction techniques and materials and they will produce a simple cutting list. Can use pre-designed patterns and templates and may develop basic ones of their own	Can create a complex flowchart and simple pseudocode. Design ideas will show detail of development as exploded and cross sectional views, demonstrating construction techniques, materials and processes. Can produce an effective and partly costed cutting list. Can produce their own simple templates and patterns.	Can create complicated, multipart flowcharts and effective pseudocode. Design ideas will show clear and effective detail of development as exploded and cross sectional view, demonstrating construction techniques, materials and processes. Can produce a detailed and fully costed cutting list. Can produce good quality, accurate templates and patterns.
MAKING - Practical skills and techniques	Can follow instructions and use simple blockly code to create basic programs. Will show a little understanding of appropriate tools and equipment but may need lots of support in using them appropriately and safely.	Can independently use blockly code to create programs with some complexity in the code. Shows some understanding of appropriate tools and equipment but may need some support in using them appropriately and safely.	Can independently create complex blockly code which works effectively, with few errors. Shows a good understanding of appropriate tools and equipment and will need little support in using them appropriately and safely.	Can independently create complex blockly code and show some skill in text based code to create efficient and effective programs. Can independently identify appropriate tools and equipment, using them appropriately, safely and independently.
EVALUATING - Existing products and own ideas	Can compare their products against the original specification and can identify one or two ways of improving them. They can evaluate other products at a simple level and identify some ways they impact on the world.	Can evaluate their products against the original specification and identify several ways of improving them. They actively involve others in the testing of their products. Can disassemble and evaluate other products and identify some ways they impact on the world.	Can test, evaluate and refine their ideas and products against their specification, taking into account the views of intended users and other interested groups. Can disassemble and accurately evaluate other products and identify several ways they impact on the world and consider their possible life cycle.	Can select appropriate methods to evaluate their products in use and modify them to improve performance, taking on board feedback from user groups. Can produce short reports, making suggestions for improvements. Can disassemble and accurately evaluate other products and identify several ways they impact on the world and consider cradle to grave lifecycles and circular economy approaches.
TECHNICAL KNOWLEDGE - Making products work	Can recognise the key aspects of the BBC Microbit and use basic technical terminology. Will have some awareness of material types and manufacturing processes. Can recognise simple mechanisms.	Children identify the key aspects of the BBC Microbit and use technical terminology appropriately They have good awareness of material types and manufacturing processes and recognise a small range of simple mechanisms.	Children describe the key aspects of the BBC Microbit and confidently use technical terminology. They can identify the main material types and some examples of each as well as manufacturing processes, and they recognise a range of mechanisms.	Children describe and explain the key aspects of the BBC Microbit and Confidently and accurately use technical terminology They can identify and categorise the main material types and several examples of each as well as appropriate manufacturing processes, and they recognise a wide range of mechanisms.
COOKING AND NUTRITION - Where food comes from	Knows how some foods are produced, processed and sold. They will have some awareness of where foods come from. May begin to understand that people choose different types of food.	Know how foods are produced, processed and sold in different ways, e.g. conventional and organic farming, fair trade. Understand 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	Know how to compare the cost of food when planning to eat out or cook at home and show awareness of the influence of food marketing, advertising and promotion on their own diet and purchasing behaviour	Can calculate and compare the cost of food when planning to eat out or cook at home and will demonstrate strong understanding of the influence of food marketing, advertising and promotion on their own diet and purchasing behaviour
COOKING AND NUTRITION - Food preparation, cooking and nutrition	Can partly understand the importance of healthy eating and that food provides energy and nutrients. Will show some awareness of how to store, prepare and cook food safely and hygienically and to use date-mark and storage instructions on food and drinks. Can, with support, select and prepare ingredients, use utensils and electrical equipment and will understand you can apply heat in different ways. Can, with support, understand how to use taste, texture and smell to decide how to season dishes and combine ingredients. Can follow a simple recipe with some accuracy.	Can demonstrate a good understanding of the importance of a healthy and varied diet as depicted in the Eatwell Guide. Know that food provides energy and nutrients in different amounts; that they have important functions in the body; and that people require different amounts during their life. Know how to taste and cook a broader range of ingredients and healthy recipes using utensil and equipment safe. Show awareness of how to actively minimise food waste such as composting fruit and vegetable peelings and recycling food packaging. Can begin to adapt and use their own recipes	Can demonstrate a strong understanding of the importance of energy balance and the implications of dietary excess or deficiency, e.g. malnutrition, maintenance of a healthy weight. Can use utensils and equipment confidently, safely and accurately and will develop recipes to account for a range of needs, wants and values. Can use a wider range of cooking techniques to include stir frying and sauteing. They will actively seek to minimise food waste when cooking.	Can show that they know how to use nutrition information and allergy advice panels on food labels to help make informed food choices. Can use an even broader range of preparation techniques and methods when cooking, e.g. steaming, blending; how to modify recipes and cook dishes that promote current healthy eating messages. They will be very competent in the principles of cleaning, preventing cross contamination, chilling, cooking food thoroughly and reheating food until it is steaming hot.

Assessment Criteria - Year 9

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Description of skill **Year 9**	Developing	Secure	Advanced	Exceptional
DESIGNING - Understanding contexts, users and purposes	Shows clear understanding of Technology's impact on society and recognises a small number of influential designers, computer scientists and chefs. Brief and specification will be teacher led but starting to show some ability to adapt to needs and requirements	Shows and communicates deeper understanding of Technology's impact on society. Can recognise a range of influential designers, computer scientists and chefs and is able to explain their achievements. Can create basic design briefs and manufacturing specifications that may lack detail and have minimal justification	Can clearly and effectively communicate deep understanding of Technology's impact on society. They will be knowledgeable about influential designers, computer scientists and chefs, being able to discuss and explain their influence. They will produce an adequate manufacturing specification containing sufficient detail with some justification.	Can clearly and effectively communicate deep understanding of Technology's impact on society. They will be knowledgeable about influential designers, computer scientists and chefs, being able to discuss and explain their influence. They will produce a fully justified, detailed manufacturing specification.
DESIGNING - Generating, developing, modelling and communicating ideas	Can generate simple ideas with obvious relevance to needs but limited functionality. Modelling is very basic or non-existent using a single method to test their design ideas meeting requirements only superficially. Communication is still mainly reliant on 2D design but 3D drawing skills are developing. Orthographic drawing skills are starting to be developed.	Can generate basic ideas with clear relevance to needs and some limited consideration of functionality, aesthetics and innovation. Modelling is basic, using a limited number of methods to test their design ideas. Communication is more advanced with both 2D and 3D techniques and some effective rendering employed as well as some meaningful annotation. Orthographic drawing skills are evident at a basic level with some dimensional information.	Can generate imaginative ideas having some consideration of functionality, aesthetics and innovation. Modelling is sufficient, using a variety of methods to test their design ideas, meeting several requirements Communication is detailed and effective, using a range of techniques, effective rendering and annotation. Orthographic drawing is well developed, accurate and well dimensioned.	Can generate imaginative ideas, fully considering functionality, aesthetics and innovation. Modelling is advanced, using a wide variety of methods to test design ideas, meeting all requirements. Communication is detailed and effective, using a wide range of techniques, effective rendering and annotation. Orthographic drawing is well developed, accurate and fully and accurately dimensioned.
COMPUTATIONAL THINKING	Shows clear understanding of and demonstrates a basic level of independent computational thinking. Demonstrates basic skills in decomposition, pattern recognition, abstraction and algorithms	Children show clear understanding of and demonstrate competence in computational thinking. Can clearly demonstrate skills in decomposition, pattern recognition, abstraction and algorithms	Shows clear understanding of and demonstrates high levels of competence in computational thinking. Can demonstrate skills in decomposition, pattern recognition, abstraction and algorithms	Fully understands and demonstrates very high levels of competence in computational thinking. Can demonstrate high level skills in decomposition, pattern recognition, abstraction and algorithms
MAKING - Planning	Can create a simple flowchart. Design ideas may show some detail of construction techniques and materials and they will produce a simple cutting list. Can use pre-designed patterns and templates and may develop basic ones of their own	Can create a complex flowchart and simple pseudocode. Design ideas will show detail of development as exploded and cross sectional views, demonstrating construction techniques, materials and processes. Can produce an effective and partly costed cutting list. Can produce their own simple templates and patterns.	Can create complicated, multipart flowcharts and effective pseudocode. Design ideas will show clear and effective detail of development as exploded and cross sectional view, demonstrating construction techniques, materials and processes. Can produce a detailed and fully costed cutting list. Can produce good quality, accurate templates and patterns.	Can create complicated, multipart flowcharts and effective pseudocode. Design ideas show clear and effective annotated detail of development as 2D / 3D, exploded and cross sectional views, demonstrating construction techniques, materials and processes. Can produce a detailed and fully costed cutting list. Can produce high quality, accurate templates and patterns.
MAKING - Practical skills and techniques	Can independently use blockly code to create programs with some complexity in the code. Shows some understanding of appropriate tools and equipment but may need some support in using them appropriately and safely.	Can independently create complex blockly code which works effectively, with few errors. Shows a good understanding of appropriate tools and equipment and will need little support in using them appropriately and safely.	Can independently create complex blockly code and show some skill in text based code to create efficient and effective programs. Can independently identify appropriate tools and equipment, using them appropriately, safely and independently.	Can independently create complex blockly code and show high level skill in text based code to create efficient and effective programs. Can independently identify and select appropriate tools and equipment, using them accurately, appropriately and safely.
EVALUATING - Existing products and own ideas	Can evaluate their products against the original specification and identify several ways of improving them. They actively involve others in the testing of their products. Can disassemble and evaluate other products and identify some ways they impact on the world.	Can test, evaluate and refine their ideas and products against their specification, taking into account the views of intended users and other interested groups. Can disassemble and accurately evaluate other products and identify several ways they impact on the world and consider their possible life cycle.	Can select appropriate methods to evaluate their products in use and modify them to improve performance, taking on board feedback from user groups. Can produce short reports, making suggestions for improvements. Can disassemble and accurately evaluate other products and identify several ways they impact on the world and consider cradle to grave lifecycles and circular economy approaches.	Can select appropriate methods to evaluate their products in use and modify them to improve performance, taking on board feedback from user groups. Can produce more detailed reports, clearly identifying improvements. Can disassemble and accurately evaluate other products and identify several ways they impact on the world and consider cradle to grave lifecycles and circular economy approaches.
TECHNICAL KNOWLEDGE - Making products work	Children identify the key aspects of the BBC Microbit and use technical terminology appropriately They have good awareness of material types and manufacturing processes and recognise a small range of simple mechanisms.	Children describe the key aspects of the BBC Microbit and confidently use technical terminology. They can identify the main material types and some examples of each as well as manufacturing processes, and they recognise a range of mechanisms.	Children describe and explain the key aspects of the BBC Microbit and Confidently and accurately use technical terminology They can identify and categorise the main material types and several examples of each as well as appropriate manufacturing processes, and they recognise a wide range of mechanisms.	Children explain the key aspects of the BBC Microbit and Klaw - using them independently to a high level. Confidently and accurately use technical terminology They can identify and categorise the main material types and numerous examples of each as well as appropriate manufacturing processes, and they recognise a very wide range of mechanisms.
COOKING AND NUTRITION - Where food comes from	Know how foods are produced, processed and sold in different ways, e.g. conventional and organic farming, fair trade. Understand 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	Know how to compare the cost of food when planning to eat out or cook at home and show awareness of the influence of food marketing, advertising and promotion on their own diet and purchasing behaviour	Can calculate and compare the cost of food when planning to eat out or cook at home and will demonstrate strong understanding of the influence of food marketing, advertising and promotion on their own diet and purchasing behaviour	Can accurately calculate and compare the cost of food when planning to eat out or cook at home and will demonstrate a high level of understanding of the influence of food marketing, advertising and promotion on their own diet and purchasing behaviour
COOKING AND NUTRITION - Food preparation, cooking and nutrition	Can demonstrate a good understanding of the importance of a healthy and varied diet as depicted in the Eatwell Guide. Know that food provides energy and nutrients in different amounts; that they have important functions in the body; and that people require different amounts during their life. Know how to taste and cook a broader range of ingredients and healthy recipes using utensil and equipment safe. Show awareness of how to actively minimise food waste such as composting fruit and vegetable peelings and recycling food packaging. Can begin to adapt and use their own recipes	Can demonstrate a strong understanding of the importance of energy balance and the implications of dietary excess or deficiency, e.g. malnutrition, maintenance of a healthy weight. Can use utensils and equipment confidently, safely and accurately and will develop recipes to account for a range of needs, wants and values. Can use a wider range of cooking techniques to include stir frying and sauteing. They will actively seek to minimise food waste when cooking.	Can show that they know how to use nutrition information and allergy advice panels on food labels to help make informed food choices. Can use an even broader range of preparation techniques and methods when cooking, e.g. steaming, blending; how to modify recipes and cook dishes that promote current healthy eating messages. They will be very competent in the principles of cleaning, preventing cross contamination, chilling, cooking food thoroughly and reheating food until it is steaming hot.	Can show that they use nutrition information and allergy advice panels on food labels to help make well-informed food choices. Can select and choose from a full range of preparation techniques and methods when cooking. Demonstrate that they can modify recipes and cook dishes that promote current healthy eating messages. They will be highly competent in the principles of cleaning, preventing cross contamination, chilling, cooking food thoroughly and reheating food until it is steaming hot.

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Impact

By the end of Key Stage 3, we aim for all pupils to have a good understanding of how we apply computational thinking and IT skills to develop solutions for given needs and problems. They will appreciate the impact that computing and technology as a whole has on society.

Pupils will have developed both theoretical and practical knowledge and improved applied knowledge (skills) through engaging practical activities. They will hold sufficient depth and complexity of knowledge in coding and information skills to facilitate transition to GCSE, as well as appropriate mathematical tools and specialist vocabulary.

We promote a fully inclusive approach to the subject which emphasises that no subject is sacred domain for any particular gender, etc. Pupils will have learned that anyone can thrive and achieve highly across all subject areas and disciplines and this will show through positive engagement in subject take up at Key Stage 4 and 5 as well as in progression to STEM related pathways at Higher Education Level and Apprenticeships.

Take up at KS4 remains high in the Academy with take up in GCSE and Cambridge Nationals generally maintaining numbers each year despite a decline nationally. Currently (21-22) number are:

Cam Nat iMedia:	61
GCSE Comp Sci:	69

Numbers progressing to KS5 are also maintaining their levels with fluctuations in some subjects year on year.

A' Level Comp Sci:	17
Cam Tech L3 IT:	17

Progression to Higher Education in 2021.

For those students who completed studies in 2021 and for whom we have destinations data:

- 10 progressed into Computing or computer related courses and apprenticeships

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Progression

As pupils progress through Key Stage 3, they are given the opportunity to focus on specific areas of the subject such as resistant materials, food technology, engineering, computer science / systems, textiles and graphics. Pupils follow a 'circus' rotation of work in 3 subject disciplines each year from years 7 to 8 and currently 4 in year 9. Most pupils work in mixed ability groups across the key stage, however, a small number of students opt to follow a STEM Futures programme where there is greater emphasis on extending learning and greater challenge.

All teachers are made aware of any disadvantaged pupils on the department class lists and all teachers are reminded of their responsibility to ensure that any obstacles to learning are removed. The department supports the needs of all pupils regardless of any potential barriers as we believe in 'success for all'. Close tracking of all pupils is being developed and will become an intrinsic part of monitoring in DT&CS to ensure all pupils' progress is regularly reviewed and intervention/support provided where appropriate.

While we use the circus system to expose students to a wide range of materials and manufacturing methods, we recognise that this can result in 'spikey' progress. Students identify and engage with, and progress at different rates in different material areas. To ensure that students develop a strong, consistent understanding of Technology as a whole and progress more evenly across the curriculum, we endeavour to construct the curriculum to ensure core DT skills and knowledge are delivered progressively, regardless of when in the circus they are experienced.

Core knowledge and skills are mapped according to the Computing in Schools progression pathways (Table 1). Coverage is mapped across each unit of work and teachers employ professional knowledge to ensure that challenge and progression are supported according to the prior learning and achievement of their students.

	Computer Progression Pathways					
Level	Algorithms	Programming & Development	Data & Data Representation	Hardware & Processing	Communication & Networks	Information Technology
BELOW Y7	A1.Shows an awareness of tasks best completed by humans or computers. A2. Designs solutions by decomposing a problem and creates a sub-solution for each of these parts (decomposition). A3. Recognises that different solutions exist for the same problem.	PD1. Understands the difference between, and appropriately uses if and if, then and else statements. PD2. Uses a variable and relational operators within a loop to govern termination. PD3. Designs, writes and debugs modular programs using procedures. PD4. Knows that a procedure can be used to hide the detail with sub-solution (procedural	DDR1. Performs more complex searches for information e.g. using Boolean and relational operators. DDR2. Analyses and evaluates data and information, and recognises that poor quality data leads to unreliable results, and inaccurate conclusions.	HP1. Understands why and when computers are used. HP2. Understands the main functions of the operating system. HP3. Knows the difference between physical, wireless and mobile networks.	CN1. Understands how to effectively use search engines, and knows how search results are selected, including that search engines use 'web crawler programs'. CN2. Selects, combines and uses internet services. CN3. Demonstrates responsible use of technologies and online services, and knows a range of ways to report concerns.	IT1. Makes judgements about digital content when evaluating and repurposing it for a given audience. IT2. Recognises the audience when designing and creating digital content. IT3. Understands the potential of information technology for collaboration when computers are networked. IT4. Uses criteria to evaluate the quality of solutions, can identify improvements making some refinements to the solution, and future solutions.

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		abstraction).				
Y7	A4. Understands that iteration is the repetition of a process such as a loop. A5. Recognises that different algorithms exist for the same problem. A6. Represents solutions using a structured notation. A7. Can identify similarities and differences in situations and can use these to solve problems (pattern recognition).	PD5. Understands that programming bridges the gap between algorithmic solutions and computers. PD6. Has practical experience of a high-level textual language, including using standard libraries when programming. PD7. Uses a range of operators and expressions e.g. Boolean, and applies them in the context of program control. PD8. Selects the appropriate data types.	DDR3. Knows that digital computers use binary to represent all data. DDR4. Understands how bit patterns represent numbers and images. DDR5. Knows that computers transfer data in binary. DDR6. Understands the relationship between binary and file size (uncompressed). DDR7. Defines data types: real numbers and Boolean. DDR8. Queries data on one table using a typical query language.	HP4. Recognises and understands the function of the main internal parts of basic computer architecture. HP5. Understands the concepts behind the fetch-execute cycle. HP6. Knows that there is a range of operating systems and application software for the same hardware.	CN4. Understands how search engines rank search results. CN5. Understands how to construct static web pages using HTML and CSS. CN6. Understands data transmission between digital computers over networks, including the internet i.e. IP addresses and packet switching.	IT5. Evaluates the appropriateness of digital devices, internet services and application software to achieve given goals. IT6. Recognises ethical issues surrounding the application of information technology beyond school. IT7. Designs criteria to critically evaluate the quality of solutions, uses the criteria to identify improvements and can make appropriate refinements to the solution.
Y8	A8. Understands a recursive solution to a problem repeatedly applies the same solution to smaller instances of the problem. A9. Recognises that some problems share the same characteristics and use the same algorithm to solve both (generalisation). A10. Understands the notion of performance for algorithms and appreciates that some algorithms have different performance characteristics for the same task.	PD9. Uses nested selection statements. PD10. Appreciates the need for, and writes, custom functions including use of parameters. PD11. Knows the difference between, and uses appropriately, procedures and functions. PD12. Understands and uses negation with operators. PD13. Uses and manipulates one dimensional data structures. PD14. Detects and corrects syntactical errors.	DDR9. Understands how numbers, images, sounds and character sets use the same bit patterns. DDR10. Performs simple operations using bit patterns e.g. binary addition. DDR11. Understands the relationship between resolution and colour depth, including the effect on file size. DDR12. Distinguishes between data used in a simple program (a variable) and the storage	HP7. Understands the von Neumann architecture in relation to the fetch-execute cycle, including how data is stored in memory. HP8. Understands the basic function and operation of location addressable memory.	CN7. Knows the names of hardware e.g. hubs, routers, switches, and the names of protocols e.g. SMTP, iMAP, POP, FTP, TCP/IP, associated with networking computer systems. CN8. Uses technologies and online services securely, and knows how to identify and report inappropriate conduct.	IT8. Justifies the choice of and independently combines and uses multiple digital devices, internet services and application software to achieve given goals. IT9. Evaluates the trustworthiness of digital content and considers the usability of visual design features when designing and creating digital artifacts for a known audience. IT10. Identifies and explains how the use of technology can impact on society. IT11. Designs criteria for users to

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			structure for that data.			evaluate the quality of solutions, uses the feedback from the users to identify improvements and can make appropriate refinements to the solution.
Y9	A11. Recognises that the design of an algorithm is distinct from its expression in a programming language (which will depend on the programming constructs available). A12. Evaluates the effectiveness of algorithms and models for similar problems. A13. Recognises where information can be filtered out in generalising problem solutions (abstraction). A14. Uses logical reasoning to explain how an algorithm works. A15. Represents algorithms using structured language	PD15. Appreciates the effect of the scope of a variable e.g. a local variable can't be accessed from outside its function. PD16. Understands and applies parameter passing. PD17. Understands the difference between, and uses, both pre-tested e.g. 'while', and post-tested e.g. 'until' loops. PD18. Applies a modular approach to error detection and correction.	DDR13. Knows the relationship between data representation and data quality. DDR14. Understands the relationship between binary and electrical circuits, including Boolean logic. DDR15. Understands how and why values are data typed in many different languages when manipulated within programs.	HP9. Knows that processors have instruction sets and that these relate to low-level instructions carried out by a computer.	CN9. Knows the purpose of the hardware and protocols associated with networking computer systems. CN10. Understands the client-server model including how dynamic web pages use server-side scripting and that web servers process and store data entered by users. CN11. Recognises that persistence of data on the internet requires careful protection of online identity and privacy.	IT12. Undertakes creative projects that collect, analyse, and evaluate data to meet the needs of a known user group. IT13. Effectively designs and creates digital artefacts for a wider or remote audience. IT14. Considers the properties of media when importing them into digital artefacts. IT15. Documents user feedback, the improvements identified and the refinements made to the solution. IT16. Explains and justifies how the use of technology impacts on society, from the perspective of social, economical, political, legal, ethical and moral issues.
GCSE	Designs a solution to a problem that depends on solutions to smaller instances of the same problem (recursion). Understands that some problems cannot be solved computationally.	Designs and writes nested modular programs that enforce reusability utilising sub-routines wherever possible. Understands the difference between 'While' loop and 'For' loop, which uses a loop counter. Understands and uses two dimensional data structures.	Performs operations using bit patterns e.g. conversion between binary and hexadecimal, binary subtraction etc. Understands and can explain the need for data compression, and performs simple compression methods. Knows what a relational database is, and understands the benefits of storing data in	Has practical experience of a small (hypothetical) low level programming language. Understands and can explain Moore's Law. Understands and can explain multitasking by computers.	Understands the hardware associated with networking computer systems, including WANs and LANs, understands their purpose and how they work, including MAC addresses.	Understands the ethical issues surrounding the application of information technology, and the existence of legal frameworks governing its use e.g. Data Protection Act, Computer Misuse Act, Copyright etc.

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			multiple tables.			

Progression across the subject(s) is also facilitated through options processes at key stage transitions.

Fig.1 Budmouth Academy Design, Technology and Computing Programmes of Study and Progression Routes

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Key Stage 3 Mainstream

YEAR 7&8

Graphics: Chocolate Bar Model
Resistant Materials: Slotted Toy
Textiles: Dreamcatcher
Computer Science: Scratch Game Development
Food Technology: Healthy Eating
STEM: Upcycling challenge

YEAR 9

Graphics: Mouse Project
Resistant Materials: Automata
Textiles: Bucket Hat / Tool wrap
Computer Science: Microbit
Food Technology: Healthy Take Aways
STEM: Electronics (in development)

Key Stage 3 STEM

YEAR 7

Graphics: Chocolate Bar Model
Food Technology: Healthy Eating and Food Science
Computer Science1: Scratch Game Development
Computer Science2: Microbit
Computer Science3: Introduction to Python
Computer Science4: Introduction to HTML

YEAR 8

Textiles: Bucket Hat and Textiles science
Engineering: Pewter Casting Jewellery
Resistant Materials: Automata
Resistant Materials: Plastic Boat Project

YEAR 9

Computer Science 5: GCSE: Systems
Computer Science 6: Python - Development
Project 1: Sustainability and upcycling
Project 2: Multi-material Project

Key Stage 4

- GCSE Computer Science
- Cambridge National Creative iMedia
- GCSE D&T Product Design
  - Textiles
  - Graphics
  - Resistant Materials
- GCSE Food and Nutrition
- Cambridge National Engineering Manufacture
- Cambridge National Engineering Design

Key Stage 5

- A' Level Computer Science
- Cambridge Technical in IT
- A' Level D&T Product Design
  - Fashion & Textiles
- A' Level D&T Product Design
- BTEC Engineering