

COMPUTING/ICT: CURRICULUM CONTENT AND PROGRESSION FRAMEWORK

Aims and Rationale

We have chosen to identify discrete strands in our computing curriculum in order to ensure that the breadth of study is maintained. We understand that this subject is multi-faceted and want to ensure that it does not become narrowed to information retrieval and publication. As indicated in the National Curriculum Programme of Study, we recognise the importance of computer science, information technology and digital literacy within the discipline. We believe that by breaking these strands down further teachers will be able to focus upon specific aspects in more detail. We recognise that e-safety is of vital importance in the modern world and have incorporated this as a discrete strand throughout the framework. In order to teach computer science effectively, we have built a sequence of progression that incorporates computational thinking, starting points, developing algorithms, and learning programming constructs (*Bagge 2019*). We do not use any single scheme of work for this, but teachers will draw from a range of resources in order to teach the most effective lessons for their children: "It's perhaps preferable to think in terms of adapting, rather than adopting, schemes of work developed by others, whether commercial or otherwise." (*NAACE 2013*) Likewise, we have not selected a single programming language that we will teach children throughout each Key Stage, but will teach the principles of programming so that children are able to adapt their knowledge to different programs and resources.

Topics/Themes/Texts: (To be decided by individual schools)

The key things we want children to know/be able to do

FOUNDATION

- Use and retrieve simple activities on Purple Mash
- Program Bee-Bots to follow a simple path.

Computer Science

- To make a floor robot move.
e.g. Bee-Bot, Bluebot, Code-a-pillar, Code & Go Mouse, Cubetto
- To complete a simple program on a computer.
e.g. 2Go, MiniMash activity, online counting game
- To make choices about the buttons and icons pressed, touched or clicked on.

E-Safety

- To ask an adult when you want to use the Internet.
- To explain to an adult when something worrying or unexpected happens while using the Internet.
- To be kind to friends.
- To talk about the amount of time spent using a computer / tablet / game device.
- To be careful with technology devices.

Handling Data

- To explain different kinds of information such as pictures, video, text and sound.

Creative Use Of Media

- To move objects on a screen.
- To create shapes and text on a screen.

	• To use technology to show learning. e.g. Take photos, videos, use voice recording devices • To select and use technology for particular purposes. Technology In Our Lives • To talk about technology that is used at home and in school. • To operate simple equipment. e.g. music players, toys with knobs and pulleys • To use a safe part of the Internet to play and learn.
YEAR 1	
Topics/Themes/Texts: (To be decided by individual schools)	The key things we want children to know/be able to do
	Computer Science

• Use Bee-Bots to write and debug a set of instructions in relation to a given task • Begin to explore coding through Purple Mash and Scratch	• To give instructions to others and follow their instructions to move around. • To describe what happens when a button is pressed on a robot. e.g. Bee-Bot, Blue-Bot, Code-a-pillar, Code & Go Mouse, Cubetto • To press buttons in the correct order to make a robot do what you want. • To describe what actions are needed to make something happen and begin to use the word algorithm. • To begin to predict what will happen for a short sequence of instructions. • To begin to use software/apps to create movement and patterns on a screen. e.g. 2Go, Light-Bot • To use the word debug when correcting mistakes when programming.
• To understand how to be safe on the internet • To understand what is safe and how to report unsafe information https://www.childnet.com/resources/smartie-the-penguin Child-friendly Search Engines DO NOT encourage the children to use www.google.com as the content cannot be controlled. www.kidrex.org www.safesearchkids.com (google-based) www.searchypants.com	E-Safety • To keep a password private. • To explain what personal information is. • To tell an adult when unexpected or worrying content is found online. • To talk about why it's important to be kind and polite. • To recognise an age appropriate websites & games. • To agree and follow sensible e-Safety rules.
(2Simple 2Count) • Use a set of items and group them according to various attributes: colour, shape, size etc • Count the number of items in each group. • When the pictogram is complete use it to count each category.	Handling Data • To explain the different ways in which information can be shown. • To use technology to collect information for a purpose,

• Display print outs. • Explore interests the children have which can also be used to create similar pictograms. 2simple 2graph • Tallying (counting in 5s). • Turn tallying into a graph/chart (Select appropriate) • Demonstrate how to read from the top of the bar across to the scale • Pay attention to the chart's numeric axis where the scale might not always show in 1s. • Practise reading scales that count in 2s / 5s etc. Sound Activity Ideas • Use simple recording devices to record sounds / voice and playback. • Fix to objects around the class (table / chair / computer / window) with voice recording modelling appropriate phrases / vocabulary / questions etc • Record a “mystery sound” / “mystery person’s voice” from somewhere in the school. Can the children identify what / where / who it is? Get the children to do the same. • To make links to data handling in maths CURRICULUM LINKS ENGLISH Record a story, recount, poem or postcard they have written. MATHS Sequencing events in chronological order. Recording time – Eg. Make a 5 second recording.	including photos, video and sound. • To sort different kinds of information and present it to others. e.g. Venn Diagram, 2Count • To add information to a pictograph and talk about what is found out.
2CreateASuperStory (Simple Mode) A simple story editor that includes pages and an area for pictures. Simple animations can then be chosen for the pictures. CURRICULUM LINKS	Creative Use Of Media • To be creative with different technology tools. e.g. 2Paint, take digital photos and use in a collage

ENGLISH Story writing – stories with familiar settings/range of cultures /fantasy worlds Stories and rhymes with predictable and repetitive language. MATHS The story could be structured around the days of the week. Eg. “On Monday...”. Sequencing events in chronological order.	• To use technology to create and present ideas. e.g. poster, e-book • To use the keyboard or a word bank on a device to enter text. • To save information in a special place and retrieve it again.
Make links to Destination Space and Inventions topics. Investigate pioneers of computer technology e.g Tim Berners Lee, Ada Lovelace, Katherine Johnson.	Technology in Our Lives • To recognise the ways we use technology in our classroom, home and community. • To use links to websites/bookmarks to find information. • To begin to identify some of the benefits of using technology.
YEAR 2	

Topics/Themes/Texts: (To be decided by individual schools)	The key things we want children to know/be able to do
• Use Purple Mash activities confidently • Start to create strings of code in Scratch	Computer Science • To give instructions to a friend (using forward, backward and turn) and physically follow their instructions. • To describe the order things need to be done to make something happen and talk about this as an algorithm. • To program a robot or software to do a particular task. • To look at a completed algorithm program and predict what will happen. • To use programming software to make objects move. e.g. 2Code, Logo, <u>J2Code - Turtle</u> • To watch a program execute and spot where it goes wrong so that it can be debugged.
	E-Safety • To explain why you need to keep a password and personal information private. • To describe the things that can happen online that you must tell an adult about. • To talk about why you should go online for a short amount of time. • To talk about why it is important to be kind and polite online and in real life. • To know that not everyone is who they say they are on the Internet.
	Handling Data • To talk about the different ways we use technology to collect information, including a camera, microscope or sound recorder. • To make and save a chart or graph using the data we collect.

	e.g. 2Count, 2Graph - To talk about the data that is shown in a chart or graph. - To start to understand a branching database. e.g. <u>J2Data - Branch</u>, 2Question, paper-based database - To tell you what kind of information you could use to help you investigate a question.
	Creative Use Of Media - To use technology to organise and present ideas in different ways. - To use the keyboard on devices to add, delete and space text for others to read. - To talk about an online tool that will help to share ideas with other people. - To save and open files on the device being used.
	Technology in Our Lives - To explain why we use technology in the classroom, home and community. - To start to understand that other people have created the information we use. - To identify benefits of using technology including finding information, creating and communicating. - To explain the differences between the Internet and things in the physical world.
YEAR 3	
Topics/Themes/Texts: (To be decided by individual schools)	The key things we want children to know/be able to do

• Use Chromebooks confidently to access activities and information • Use Purple Mash activities including secure messaging/ emailing • Use Scratch for code	Computer Science • To break an open-ended problem up into smaller parts. • To put programming commands into a sequence to achieve a specific outcome. • To keep testing a program and recognise when it needs debugging. • To use repeat commands. • To describe the algorithm that is needed for a simple task. • To detect a problem in an algorithm which could result in unsuccessful programming.
	E-Safety • To talk about what makes a secure password and why they are important. • To protect personal information when doing different things online. • To use the safety features of websites as well as reporting concerns to an adult. • To recognise websites and games appropriate for my age. • To make good choices about how long is spent online. • To ask an adult before downloading files and games from the Internet. • To post positive comments online.
	Handling Data • To talk about the different ways data can be organised. • To search a ready-made database to answer questions. • To collect data help me answer a question. • To add to a database. • To make a branching database. • To use a data logger to monitor changes and can talk about the information collected.

	Creative Use Of Media • To create different effects with different technology tools. • To combine a mixture of text, graphics and sound to share ideas and learning. • To use appropriate keyboard commands to amend text on a device, including making use of a spellchecker. • To evaluate work and improve its effectiveness. • To use an appropriate tool to share work online.
	Technology in Our Lives • To independently save and retrieve work on the Internet, the school network or a personal device. • To talk about the parts of a computer. • To discuss ways to communicate with others online. • To describe the World Wide Web as the part of the Internet that contains websites.

	• To use search tools to find and use an appropriate website. • To think about whether I can reuse online content (movies, text, images) from the WWW.
YEAR 4	
Topics/Themes/Texts: (To be decided by individual schools)	The key things we want children to know/be able to do
• Use Chromebooks with confidence e.g. to access information, activities and complete tasks across a range of situations; understand digital citizenship and what e-safety means. • Write complex code in Scratch in order to address a task and develop debugging skills • Navigate the internet safely, understand its benefits and drawbacks	Computer Science • To use logical thinking to solve an open-ended problem by breaking it up into smaller parts. • To use an efficient procedure to simplify a program. • To use a sensor to detect a change which can select an action within my program.

	• To know that there is a need to keep testing my program while putting it together. • To use a variety of tools to create a program. • To recognise an error in a program and debug it. • To recognise that an algorithm will help me to sequence more complex programs. • To recognise that using algorithms will also help solve problems in other learning such as Maths, Science and Design and Technology.
	E-Safety • To choose a secure password when I am creating an account. • To talk about the ways you can protect yourself and friends from harm online. • To use the safety features of websites as well as reporting concerns to an adult. • To know that anything posted online can be seen by others. • To choose websites and games that are appropriate for my age. • To help friends make good choices about the time they spend online. • To talk about why it is needed to ask a trusted adult before downloading files and games from the Internet. • To comment positively and respectfully online.
	Handling Data • To organise data in different ways. • To collect data and identify where it could be inaccurate.

	• To plan, create and search a database to answer questions. • To choose the best way to present data to an audience. • To use a data logger to record and share readings with others.
	Creative Use Of Media • To use photos, video and sound to create an atmosphere when presenting to different audiences. • To explore new media to extend what I can achieve. • To change the appearance of text to increase its effectiveness. • To create, modify and present documents for a particular purpose. • To use a keyboard confidently and make use of a spellchecker to write and review my work. • To use an appropriate tool to share my work and collaborate online. • To give constructive feedback to friends to help them improve their work and refine my own work.
	Technology in Our Lives • To tell whether a resource being used is on the Internet, the school network or my own device. ("The Cloud"). • To identify key words to use when searching safely on the World Wide Web. • To think about the reliability of the information is read on the World Wide Web. • To tell how to check who owns photos, text and clipart. • To create a hyperlink to a resource on the World Wide Web.

YEAR 5	
<i>In Upper Key Stage 2, all projects should, where possible, have a brief to be creatively met and evaluated against by pupils (audience, purpose criteria, composition).</i>	
Topics/Themes/Texts: (To be decided by individual schools)	The key things we want children to know/be able to do
- Confidently and appropriately access Chromebooks as a learning tool across a range of situations - Write and debug code to operate control devices or Scratch - Use ICT appropriately to research and inform learning	Computer Science - To decompose a problem into smaller parts to design an algorithm for a specific outcome and use this to write a program. - To refine a procedure using repeat commands to improve a program. - To use a variable effectively. e.g. Scores, Timers - To change an input to a program to achieve a different output. - To use 'if' and 'then' commands to select an action. - To talk about how a computer model can provide information about a physical system. - To use logical reasoning to detect and debug mistakes in a program. - To use logical thinking, imagination and creativity to extend a program.
	E-Safety - To protect my password and other personal information. - To explain the need to protect oneself and friends and the best ways to do this, including reporting concerns to an adult.

	• To know that anything I post online can be seen, used and may affect others. • To talk about the dangers of spending too long online or playing a game. • To explain the importance of communicating kindly and respectfully. • To discuss the importance of choosing an age-appropriate website or game. • To explain why I need to protect my computer or device from harm. • To know which resources on the Internet I can download and use.
	Handling Data • To use a spreadsheet and database to collect and record data. • To choose an appropriate tool to help collect data. • To present data in an appropriate way. • To search a database using different operators to refine my search. • To talk about mistakes in data and suggest how it could be checked.
	Creative Use Of Media • To use text, photo, sound and video editing tools to refine work. • To use the skills already developed to create content using unfamiliar technology. e.g. across chromebook to laptop technology/ software.

	- To select, use and combine the appropriate technology tools to create effects that will have an impact on others. - To select an appropriate online or offline tool to create and share ideas. - To review and improve my own work and support others to improve their work.
	Technology in Our Lives - To describe different parts of the Internet. - To use different online communication tools for different purposes. - To use a search engine to find and evaluate appropriate information on the WWW and check its reliability. - To describe the different parts of a webpage. - To find out who the information on a webpage belongs to.
YEAR 6	
Topics/Themes/Texts: (To be decided by individual schools)	The key things we want children to know/be able to do
<i>In Upper Key Stage 2, all projects should, where possible, have a brief to be creatively met and evaluated against by pupils (audience, purpose criteria, composition).</i>	
- Use different software and apps to create programs - Complete online safety activities including publicising to others - Know that an 'algorithm' is a specific set of instructions used to control a function. - Follow a simple algorithm.	Computer Science- - To be able to design and deconstruct a problem into smaller steps. - To explain and write/program each of the steps in an algorithm. - To evaluate the effectiveness and efficiency of an algorithm while continually testing the programming of that algorithm for "bugs".

• Know that algorithms have to be accurate in order to work properly. (practical games eg. giving specific instructions to move from point A-B or how to complete a specific task Eg. complete a maze blindfolded) • Know that software relies on codes to run and that a range of different coding languages exist. (eg. look at the source code of some websites)	• To recognise when there is a need to use a variable to achieve a required output. • To use a variable and operators to stop a program. • To use different inputs (including sensors) to control a device or onscreen action and predict what will happen. • To use logical reasoning to detect and correct errors in algorithms and programs.
• To understand how to keep themselves and others safe on the internet, assessing risks in different situations • To understand what is safe and how to report unsafe information • Use of thinkuknow website • Knowing that the pressure to behave in an unacceptable, unhealthy or risky way can come from a variety of sources both on and offline, including people we know and the media • Understanding that the internet has many benefits and the need to balance time spent on and offline and adhere to the age rating of social media and computer games • Selecting appropriate tools to collaborate and communicate confidently and safely with others • Knowing how to 'lock'/password protect computers and documents	E-Safety • To understand the need to use and protect a strong password and other personal information. • To explain the consequences of sharing too much about oneself online. • To support friends to protect themselves and make good choices online, including reporting concerns to an appropriate body. • To explain the consequences of spending too much time online or on a game. • To explain the consequences to oneself and others of not communicating kindly and respectfully. • To protect a computer or device from harm on the Internet.

- Understand the need for data protection and some of the rights of individuals over stored data and how it affects use and storage of data in the real world.
- Compare different graphs and evaluate their usefulness for different types of data & different purposes.
- Recognise the consequences of inaccurate data in the real world: (eg: doctors, banks, police etc).
- Design a form for a survey / questionnaire to collect the required data.
- Collect data and enter it into a database under appropriate field headings.
- Use the database to answer questions by searching and sorting a single field. (eg: how many children have blonde hair?)
- Raise further questions relevant to the data collected.
- Search data on more than one criterion understanding the difference between AND & OR searches. (eg: "How many children have blonde hair AND blue eyes?" and "How many children have blonde OR blue eyes?")
- Select relevant data and appropriate graphs to present to others perhaps as part of a multimedia presentation and evaluate the effectiveness and impact of the data

<http://www.simonhaughton.co.uk/2011/10/developing-database-skills-in-upper-ks2.html>

Also use J2Vote and 2investigate sites

Handling Data

- To select the most effective tool to collect data for an investigation.
- To check the data collected for accuracy and plausibility.
- To interpret the data that is collected
- To present the data collected in an appropriate way.
- To use the skills developed to interrogate a database.

- Use of blogging, email, vlogging, photos, social platforms to produce a project.

Creative Use Of Media

- To talk about: audience, atmosphere and composition when planning a particular outcome.
- To combine a range of media, recognising the contribution of each to achieve a particular outcome.
e.g. editing photos, audio and videos to be used purposefully in a project.

- Select appropriate software for the task/audience.
- Plan structure and layout of a presentation.
- Evaluate and select suitable information and media from a range of electronic resources.
- Understand that images, sounds and text can be subject to copyright and abide by copyright rules when creating a presentation.
- Organise, refine and present information for a specific audience.
- Create a range of hyperlinks to produce a non-linear presentation.
- Choose appropriate techniques to create an effective and well-polished presentation considering the intended audience.
- Make effective use of transitions and animations in presentations.
- Discuss and evaluate the presentations and give reasons for the chosen styles and techniques.

Technology In Our Lives

- To explain the available Internet services needed to use for different purposes.
- To describe how information is transported across computer networks and on the Internet.
- To select an appropriate tool to communicate and collaborate online.
- To talk about the way search results are selected and ranked.
- To check the reliability of a website by cross referencing.
- To describe copyright and acknowledge the sources of information that are found online.

YEAR 7	
Topics/Themes/Texts: (To be decided by individual schools)	The key things we want children to know/be able to do
	Computer Science - To use a graphical programming language to create games involving sequence, selection and iteration. e.g. Kodu and Scratch - To be introduced to physical computing. e.g. Microbit, programmable robots
	E-Safety - To understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting online identity and privacy. - To recognise inappropriate content, contact and conduct and know how to report concerns. e.g. CEOP, Childline - To learn how to ensure passwords are safe and secure.
	Handling Data To be able to put data into a form for graphing, checking the validity. e.g. bar charts summarising research
	Creative Use Of Media To create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability. e.g. taking images from different sources and combining to persuade

Technology In Our Lives

- To learn how to manage, name and share files.
e.g. image size, copyright status, type of image
- To use the advanced search tools to customise searches.
e.g. Research project gathering info and putting on to a Google doc
- To learn how to collaborate on documents.
e.g. Research project gathering info and putting on to a Google doc