Curriculum Toolkit for Computing

National Curriculum Key Stage 1 Overview

Pupils should be taught to:

- understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions;
- create and debug simple programs;
- use logical reasoning to predict the behaviour of simple programs;
- use technology purposefully to create, organise, store, manipulate and retrieve digital content;
- recognise common uses of information technology beyond school;
- use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

National Curriculum Key Stage 2 Overview

Pupils should be taught to:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts;
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output;
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs;
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web, and the opportunities they offer for communication and collaboration;
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content;
- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information;
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

	Year 1
Online Safety	• Identify what things count as personal information and who they share that with. • Identify some of the potential risks associated with the online world. • Agree and follow sensible online safety rules, e.g. taking pictures, sharing information, storing passwords. • Communicate safely and respectfully using a range of digital devices. • Develop strategies for managing concerns online, seeking help when needed. • Demonstrate how to safely open and close applications and log on and log off from websites.
Handling Data	• With support, collect data (e.g. numerical, research facts). • Look at how data is represented digitally. • Contribute to and interpret a pictogram.
Multimedia	• Use a range of technology to create digital content. • With support, begin to access, save and retrieve work and online content. • Use paint programs to create pictures. • Record and play back sounds. • Use cameras to record an activity. • Begin to use index fingers (left and right hand) and use thumbs to press the space bar to build words and sentences.
Programming	• Physically follow and give each other instructions. • Give commands to control direction and movement, including straight, forwards, backwards, turn. • Begin to predict what will happen when a set of instructions is executed. • Execute a program on a floor robot to achieve an algorithm. • Use the word debug to correct any mistakes when programming a floor robot.
Understanding Technology	• Talk about the internet. • Recognise and give examples of technology in their environment. • Explore some simple information sources including age appropriate websites.

	Autumn	**Spring**	**Summer**
Content	**Online safety-** Lee and Kim Animal Magic ThinkUKnow advice **Understanding technology** Identify technology How tech is used Technology game- ABCYa Computer Safari **Programming** Intro algorithms Robot friends	**Online safety-** DigiDuck Smartie the Penguin **Multimedia** Pictures based on topic work- 2Paint, 2 Publish Begin writing- 2Create Printable keyboards to practise typing	**Online safety-** Jessie and Friends Episode 2 Common Sense Grade K **Handling data** Tally charts Pictograms- 2Count or j2e **Multimedia** Take pictures Record videos- Learnpads Record sounds- USB mics Create an animation **Programming** Beebots Predict Debug

	Year 2
Online Safety	• Identify what things count as personal information and who they share that with. • Identify some of the potential risks associated with the online world. • Agree and follow sensible online safety rules, e.g. taking pictures, sharing information, storing passwords. • Communicate safely and respectfully using a range of digital devices. • Develop strategies for managing concerns online, seeking help when needed. • Demonstrate how to safely open and close applications and log on and log off from websites.
Handling Data	• Ask questions and consider how they will collect information. • With support, create paper/object decision trees and explore a branching database. • Collect data, generate charts to find answers (e.g. pictogram).
Multimedia	• Use a range of technology to create digital content. • Begin to access, save and retrieve work and online content. • Understand how and when to use the ENTER, SHIFT, CAPS LOCK, DELETE and BACKSPACE keys. • Use both hands on the keyboard. • Create documents adding in text and images. • Use a variety of tools and effects in paint programs. • Explore the effects of sound, music, animation and video.
Programming	• Begin to identify an algorithm to achieve a specific purpose. • Create and debug programs to achieve specific goals. • Give commands to control direction and movement, including straight, forwards, backwards, turn. • Plan and predict the behaviour of simple programs. • Explore outcomes when giving instructions in a simple online program e.g. 2Go • Discuss similarities and differences between floor robots and on screen robots.
Understanding Technology	• Understand the benefits of using technology. • Recognise and give examples of technology in the wider environment. • Recognise age-appropriate websites. • Use links to websites. • Discuss whether information online is true or not.

	Autumn	**Spring**	**Summer**
Content	**Online safety-** Hector's world ThinkUKnow advice **Understanding technology** How tech is used in jobs- link to topic Computers at work video Audience of websites- compare Reliability of websites Who websites belong to **Programming** Beebots Make mazes Create treasure hunts	**Online safety-** Smartie the Penguin Jessie and Friends Episode 3 **Multimedia** Draw pictures based on topic 2Paint 2Publish Write a story- 2Createastory Create a simple animation	**Online safety-** Common Sense Grade 1 **Handling data** Graphs- 2Graph or j2e Branching databases- paper 2Investigate or j2e branch **Multimedia** Typing games- ABCYa Begin to use word **Programming** 2Go Programming

	Year 3
Online Safety	• Reflect and review their online activity. • Identify what is appropriate and inappropriate behaviour on the internet, recognising the term cyberbullying. • Identify a range of potential risks including identifying ways of seeking support and reporting concerns. • Agree and follow sensible online safety rules, e.g. taking pictures, sharing information, storing passwords. • Show respect for content by acknowledging sources and commenting respectfully on other's work.
Handling Data	• Identify, collect and manipulate different types of data. • Discuss the different ways data can be organised. • Construct and use a branching database. • Present data for a purpose and audience.
Multimedia	• Explore the effectiveness of different search engines. • Use applications and devices to communicate ideas, work and • messages. • Save, retrieve and evaluate work. • Use multimedia to enhance communication e.g. photos, video and sound). • Create documents experimenting with fonts, size, colour, and alignment for emphasis and effect. • Use ICT tools to create musical phrases. • Increase fluency in typing, using individual fingers.
Programming	• Use logical thinking to solve an open-ended problem by breaking it up into smaller parts. • Give a set of instructions to follow and predict what will happen. • Plan and enter a sequences of instructions on a robot to achieve specific outcomes, debugging the sequence where necessary. • Sequence pre-written lines of programming in order. • Use a range of both digital and physical devices.
Understanding Technology	• Understand and give examples that computers accept inputs and produce outputs. • Understand and use the school server network to save and retrieve work. • Discuss the parts of a computer. • Discuss the owner of online information. • Begin to understand how the internet works.

	Autumn	Spring	Summer
Content	**Online safety-** Captain Kara **Understanding technology** Barefoot Network Hunt activity Look inside a computer Save and retrieve work to pupils drive List inputs and outputs What does the internet look like. Build a computer Remote control **Multimedia** Typing skills- Dancemat typing Change fonts, size, colour- Word Save an image from the internet Use copy and paste	**Online safety-** Common Sense Grade 2 **Multimedia** Edit pictures linking to topic- Skitch app Collaborate on learning- Padlet Create an animation Explore effects of sounds **Programming** Unplugged activities- off screen	**Online safety-** Common Sense Grade 2 **Handling data** Branching databases- j2e branch Top Trumps Maths games **Programming** On screen logo j2e

	Year 4
Online Safety	• Reflect and review their online activity. • Identify what is appropriate and inappropriate behaviour on the internet, recognising the term cyberbullying. • Identify a range of potential risks including identifying ways of seeking support and reporting concerns. • Agree and follow sensible online safety rules, e.g. taking pictures, sharing information, storing passwords. • Show respect for content by acknowledging sources and commenting respectfully on other's work.
Handling Data	• Identify, collect and manipulate different types of data. • Retrieve information from a pre-prepared database, asking straightforward questions. • Plan and create a database to answer questions. • Present data in appropriate format for an audience.
Multimedia	• Use keyboard shortcuts and spellcheck effectively. • Explore the use of video, animation, and green screening for a specific audience. • Create, modify and evaluate documents for a specific purpose. • Modify photos for a specific purpose using a range of effects. • Choose different effects appropriately including font sizes and bullet points.
Programming	• Create and debug programs. • Refine algorithms to improve efficiency. • Use sensors to trigger an action e.g. turning the lights on/off on a Probot. • Create an algorithm and a program that will use a simple selection command. • Begin to use different effects e.g. repetition and loops.
Understanding Technology	• Use search tools to find and use appropriate websites, using strategies to improve search results. • Explain how individual web pages can be found e.g. hyperlink or URL. • Recognise and describe services offered by the internet e.g. communication and collaboration.

	Autumn	**Spring**	**Summer**
Content	**Online safety-** Band runner game Play, Like, Share **Understanding technology** Create a blog- Padlet Access websites- URL or hyperlinks Difference between search bar and address bar Terms and conditions What is World Wide Web How does the internet work **Multimedia** Improve use of word Create a Powerpoint- link to topic Learn shortcut keys	**Online safety-** Common Sense Grade 3 **Multimedia** Create an animation Record video-greenscreening Edit phots Collaborate learning- Padlet **Programming** What is programming, debugging, algorithm videos Beebots- make your own games	**Online safety-** Common Sense Grade 3 **Handling data** Databases- excel Intro to spreadsheets Wizards Apprentice Maths games **Programming** Hour of code weblinks

	Year 5
Online Safety	• Discuss online usage and choices, including excessive use, personal information, password security and consider their digital footprint. • With adult support, consider and use privacy and security settings on a range of digital devices, including how to protect devices from viruses. • Explore and engage safely in online communities including blogs and messaging, learning how to be a good online citizen. • Check the validity of data and information they gather, including showing respect to privacy and copyright. • Recognise a range of potential online risks, including knowing how and where to seek support if they see something unexpected or worrying.
Handling Data	• Collect, record and analyse information using spreadsheets. • Solve problems and present answers using data tools. • Input data and create formulas for spreadsheets. • Present data for a variety of purposes.
Multimedia	• Use a range of technology to communicate and share their ideas. • Select the appropriate program for purpose and effect. • Insert a picture/text/graph/hyperlink from the internet or personal file. • Develop presentations with the use of transitions and hyperlinks. • Save, retrieve, evaluate and modify their work. • Record, collect and use audio to support work.
Programming	• Design, create, debug and refine programs to achieve a specific goal. • Use repetition and loops to improve the efficiency of a program. • Use logo software to develop procedures. • Use a range of programming language. • Use variables to refine and extend a program. • Discuss similarities and differences of different programming languages.
Understanding Technology	• Understand and explain how computer networks works. • Understand that the internet is a collection of computers and explain how it works. • Recognise that there is a difference between the internet and the World Wide Web. • Begin to find out who the information on a webpage belongs to.

	Autumn	**Spring**	**Summer**
Content	**Online safety** Common Sense Grade 4 **Understanding technology** What is the internet How is information stored What is a network **Multimedia** Add hyperlinks in Powerpoints- make an advent calendar Use Publisher- invitations, leaflets Create a GIF Choose appropriate software **Programming** Scratch	**Online safety** Newsround BBC Horrible Histories **Multimedia** Collaborate on learning- book reviews on Padlet Create a video- greenscreening news report of Young Voices Create a word cloud **Programming** Microbits or Algoid/Lightbot	**Online safety** Digizen game and video CBBC **Handling data** Spreadsheets- excel Simon Haughton spreadsheet activities Graphs- excel **Programming** Online logo- turtle academy

	Year 6
Online Safety	• Discuss online usage and choices, including excessive use, personal information, password security and consider their digital footprint. • With adult support, consider and use privacy and security settings on a range of digital devices, including how to protect devices from viruses. • Explore and engage safely in online communities including blogs and messaging, learning how to be a good online citizen. • Check the validity of data and information they gather, including showing respect to privacy and copyright. • Recognise a range of potential online risks, including knowing how and where to seek support if they see something unexpected or worrying.
Handling Data	• Select the most appropriate application to construct a range of data for different purposes. • Know how to interpret data, including spotting inaccurate data and comparing data. • Use the whole data process – generate, process, interpret, store, and present information – realising the need for accuracy and checking plausibility. • Plan investigations using the outcomes from a data logger to show findings.
Multimedia	• Select and make effective use of digital resources and devices for purpose and effect. • Publish an animation/movie using a movie editing package to edit/refine and add titles. • Evaluate the effectiveness of their work, making appropriate changes and supporting others to do the same. • Collaborate on shared documents. • Use online tools to make, create and share documents and presentations.
Programming	• Increase confidence in the process to plan, program, test and review a program. • Increase programming language including html code. • Follow and modify a sequence of instructions e.g. in a flowchart. • Test a program, recognising when it needs to be debugged. • Challenge themselves by making increasingly complex programs.
Understanding Technology	• Discuss and describe the way search results are selected and ranked. • Explain copyright and acknowledge sources of information. • Connect a computing device to various inputs/outputs. • Build upon their knowledge of how the internet works, explaining data as packets.

	Autumn	**Spring**	**Summer**
Content	**Online safety** Common Sense Grade 5 **Understanding technology** What is the internet Label web pages How search engines work Explore search engines Copyright Connecting input/output devices **Multimedia** Collaborative learning-Padlet Record videos- link to topic Create an animation **Programming** Scratch What makes a good website?	**Online safety** Jigsaw Digital footprint E-safety quiz **Multimedia** Select appropriate software Use all Microsoft software Online presentation tools- Prezi, Zoho **Programming** Investigate HTML and websites X Ray goggles Barefoot HTML	**Online safety** NSPCC BBC Own It **Handling data** Simon Haughton Theme Park spreadsheet Data Logger Revisit all **Programming** Create a website- trinket