



# *Computing Progression of skills*

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Computer science

Hardware

Information technology

Digital literacy

- Learning how to operate a camera to take photographs of meaningful creations or moments

- Learning how to explore and tinker with hardware to develop familiarity and introduce relevant vocabulary

- Learning how to operate a camera

- Recognising that a range of technology is used in places such as homes and schools

- Learning what a keyboard is and how to locate relevant keys

- Learning what a mouse is and developing basic mouse skills such as moving and clicking

- Learning how to explore and tinker with hardware to find out how it works

- Understanding that computers and devices around us use inputs and outputs, identifying some of these

- Learning where keys are located on the keyboard

- Learning how to operate a camera

- Understanding what a computer is and that it's made up of different components

- Recognising that buttons cause effects and that technology follows instructions

- Learning how we know that technology is doing what we want it to do via its output.

- Using greater control when taking photos with tablets or computers

- Developing confidence with the keyboard and the basics of touch typing

- Understanding what the different components of a computer do and how they work together

- Drawing comparisons across different types of computers

- Learning what a server does

- Learning about the purpose of routers

- Learning that external devices can be programmed by a separate computer

- Learning the difference between ROM and RAM

- Recognising how the size of RAM affects the processing of data

- Understanding the fetch, decode, execute cycle

- Learning about the history of computers and how they have evolved over time

- Using the understanding of historic computers to design a computer of the future

- Understanding and identifying barcodes, QR codes and RFID

- Identifying devices and applications that can scan or read barcodes, QR codes and RFID

- Acknowledging that corruption can happen within data during transfer (for example when downloading, installing, copying and updating files)

Computer science

Networks and data representation

Information technology

Digital literacy

<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Understanding what the internet is</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Learning what a network is and its purpose</li> <li>• Identifying the key components within a network, including whether they are wired or wireless</li> <li>• Recognising links between networks and the internet</li> <li>• Learning how data is transferred</li> </ul>	<ul style="list-style-type: none"> <li>• Consolidating understanding of the key components of a network</li> <li>• Understanding that websites &amp; videos are files that are shared from one computer to another</li> <li>• Learning about the role of packets</li> <li>• Understanding that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration</li> </ul>	<ul style="list-style-type: none"> <li>• Learning the vocabulary associated with data: data and transmit</li> <li>• Learning how the data for digital images can be compressed</li> <li>• Recognising that computers transfer data in binary and understanding simple binary addition</li> <li>• Relating binary signals (Boolean) to the simple character-based language, ASCII</li> <li>• Learning that messages can be sent by binary code, reading binary up to 8 characters and carrying out binary calculations</li> <li>• Understanding how bit patterns represent images as pixels</li> </ul>	<ul style="list-style-type: none"> <li>• Understanding that computer networks provide multiple services</li> </ul>
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Computer science

Computational thinking

Information technology

Digital literacy

- Using logical reasoning to read simple instructions and predict the outcome

- Learning that decomposition means breaking a problem down into smaller parts

- Articulating what decomposition is

- Using decomposition to explain the parts of a laptop computer

- Solving unplugged problems by decomposing them into smaller parts

- Decomposing animations into a series of images

- Decomposing a program into an algorithm

- Using logical reasoning to predict the behaviour of simple programs

- Using decomposition to solve unplugged challenges

- Decomposing a game to predict the algorithms used to create it

- Using decomposition to explore the code behind an animation

- Using decomposition to understand the purpose of a script of code

- Decomposing a program without support

- Using past experiences to help solve new problems

- Developing the skills associated with sequencing in unplugged activities

- Using logical reasoning to predict the behaviour of simple programs

- Using decomposition to decompose a story into smaller parts

- Using repetition in programs

- Using decomposition to help solve problems

- Decomposing a story to be able to plan a program to tell a story

- Writing increasingly complex algorithms for a purpose

- Learning that an algorithm is a set of step by step instructions used to carry out a task, in a specific order

- Developing the skills associated with sequencing in unplugged activities

- Learning what abstraction is

- Understanding that computers follow instructions

- Identifying patterns through unplugged activities

- Predicting how software will work based on previous experience

- Writing more complex algorithms for a purpose

- Follow a basic set of instructions

- Learning that an algorithm is a set of step by step instructions used to carry out a task, in a specific order

- Learning that there are different levels of abstraction

- Using an algorithm to explain the roles of different parts of a computer

- Using past experiences to help solve new problems

- Using abstraction to help solve problems

- Using past experiences to help solve new problems

- Assembling instructions into a simple algorithm

- Learning that an algorithm is a set of step by step instructions used to carry out a task, in a specific order

- Following an algorithm

- Using logical reasoning to explain how simple algorithms work

- Using abstraction to identify the important parts when completing both plugged and unplugged activities

- Creating algorithms for a specific purpose

- Using abstraction to identify the important parts when completing both plugged and unplugged activities

- Incorporating loops within algorithms

- Assembling instructions into a simple algorithm

- Learning that computers use algorithms to make predictions

- Explaining the purpose of an algorithm

- Creating algorithms for a specific purpose

- Writing more complex algorithms for a purpose

- Using abstraction to identify the important parts when completing both plugged and unplugged activities

Computer science

Programming

Information technology

Digital literacy

- Following instructions as part of practical activities and games and learning to debug when things go wrong
- Learning to give simple instructions
- Learning that an algorithm is a set of instructions to carry out a task, in a specific order
- Experimenting with programming a Bee-bot/Blue-bot and learning how to give simple commands
- Learning to debug instructions, with the help of an adult, when things go wrong

- Programming a Bee-bot/Virtual Bee-bot to follow a planned route
- Learning to debug instructions when things go wrong
- Developing a how-to video to explain how the Bee-bot works.
- Learning to debug an algorithm in an unplugged scenario

- Using logical thinking to explore software, predicting, testing and explaining what it does
- Using an algorithm to write a basic computer program
- Learning what loops are
- Incorporating loops to make code more efficient

- Using logical thinking to explore more complex software; predicting, testing and explaining what it does
- Incorporating loops to make code more efficient
- Remixing existing code
- Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected

- Understanding that websites can be altered by exploring the code beneath the site
- Coding a simple game
- Using abstraction and pattern recognition to modify code
- Incorporating variables to make code more efficient
- Remixing existing code
- Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected

- Programming an animation
- Iterating and developing their programming as they work
- Beginning to use nested loops (loops within loops)
- Debugging their own code
- Writing code to create a desired effect
- Using a range of programming commands
- Using repetition within a program
- Amending code within a live scenario

- Debugging quickly and effectively to make a program more efficient
- Remixing existing code to explore a problem
- Using and adapting nested loops
- Programming using the language Python
- Changing a program to personalise it
- Evaluating code to understand its purpose
- Predicting code and adapting it to a chosen purpose
- Altering a website's code to create changes

Computer science

Using software

Information technology

Digital literacy

- Using a simple online paint tool to create digital art

- Using a basic range of tools within graphic editing software
- Taking and editing photographs
- Understanding how to create digital art using an online paint tool
- Developing control of the mouse through dragging, clicking and resizing of images to create different effects
- Developing understanding of different software tools

- Developing word processing skills, including altering text, copying and pasting and using keyboard shortcuts
- Using word processing software to type and reformat text
- Using software to create story animations
- Creating and labelling images

- Taking photographs and recording video to tell a story.
- Using software to edit and enhance their video adding music, sounds and text on screen with transitions

- Building a web page and creating content for it
- Designing and creating a webpage for a given purpose
- Use Google online software for documents, presentations, forms and spreadsheets.
- Work collaboratively with others

- Using logical thinking to explore software more independently, making predictions based on their previous experience
- Using a software programme (Sonic Pi or Scratch) to create music
- Using video editing software or animation software to animate
- Identify ways to improve and edit programs, videos, images etc.
- Independently learning how to use 3D design software package TinkerCAD

- Using logical thinking to explore software independently, iterating ideas and testing continuously
- Using search and word processing skills to create a presentation
- Planning, recording and editing a radio play
- Creating and editing sound recordings for a specific purpose
- Creating and editing videos, adding multiple elements: music, voiceover, sound, text and transitions to create a video advert
- Using design software TinkerCAD to design a product
- Creating a website with embedded links and multiple pages

Computer science

Using email and the internet

Information technology

Digital literacy

- Participating in group image searches, led by the teacher

- Searching and downloading images from the internet safely
- Understanding that we are connected to others when using the internet

- Understanding that personal information should not be shared on the internet.
- Learning how to be respectful to others when sharing content online.

- Learning to log in and out of an email account
- Writing an email including a subject, 'to' and 'from'
- Sending an email with an attachment
- Replying to an email
- Identifying useful terms and phrases for search engines

- Understanding why some results come before others when searching
- Understanding that information on the internet is not all grounded in fact

- Developing searching skills to help find relevant information on the internet
- Understanding how apps can access our personal information and how to alter the permissions.

- Understanding how search engines work

Using data

- Representing data through sorting and categorising objects in unplugged scenarios
- Representing data through pictograms
- Exploring branch databases through physical games

- Introduction to spreadsheets
- Representing data in tables, charts and pictograms
- Sorting data and creating branching databases
- Identifying where digital content can have advantages over paper when storing and manipulating data

- Collecting and inputting data into a spreadsheet
- Interpreting data

- Understanding the vocabulary associated with databases: field, record, data
- Learning about the pros and cons of digital versus paper databases
- Sorting and filtering databases to easily retrieve information
- Creating and interpreting charts and graphs to understand data

- Designing a weather station which gathers and records sensor data

- Understanding how data is collected

- Understanding how barcodes, QR codes and RFID work
- Gathering and analysing data in real time
- Creating formulas and sorting data within spreadsheets

EYFS

Year 1

Year 2

Year 3

Year 4

Year 5

Year 6

Computer science

Wider use of technology

Information technology

Digital literacy

<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Recognising common uses of information technology, including beyond school</li> <li>• Understanding some of the ways we can use the internet</li> </ul>	<ul style="list-style-type: none"> <li>• Learning how computers are used in the wider world</li> </ul>	<ul style="list-style-type: none"> <li>• Understanding the purpose of emails.</li> <li>• Learning what a search engine is</li> <li>• Recognising how social media platforms are used to interact</li> </ul>	<ul style="list-style-type: none"> <li>• Understanding that software can be used collaboratively online to work as a team</li> </ul>	<ul style="list-style-type: none"> <li>• Learn about different forms of communication that have developed with the use of technology.</li> </ul>	<ul style="list-style-type: none"> <li>• Learning about the Internet of Things and how it has led to 'big data'.</li> <li>• Learning how 'big data' can be used to solve a problem or improve efficiency</li> </ul>
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Computer science

Information technology

Digital literacy

- Recognising that a range of technology is used in places such as homes and schools

- Learning to log in and log out

- When using the internet alongside an adult, or independently, learning what to do if they come across something that worries them or makes them feel uncomfortable

- Logging in and out and saving work on their own account

- Understand the importance of a password

- When using the internet to search for images, learning what to do if they come across something online that worries them or makes them feel uncomfortable

- Recognising when someone has been unkind online

- Learning some top tips for staying safe online

- Understanding how we 'share' information on the internet

- Understanding that personal information should not be shared on the internet.

- Learning how to be respectful to others when sharing content online.

- Learning to be a responsible digital citizen; understanding their responsibilities to treat others respectfully and recognising when digital behaviour is unkind

- Learning about cyberbullying

- Learning that not all emails are genuine, recognising when an email might be fake and what to do about it

- Learning that not all information on the internet is factual

- Understanding who personal information should/ should not be shared with

- Recognising what appropriate behaviour is when collaborating with others online

- Recognising that information on the Internet might not be true or correct and that some sources are more trustworthy than others

- Learning about different forms of advertising on the internet.

- Learning about how permissions work and how to change them

- Identifying possible issues with online communication

- Considering the effects of screen-time on physical and mental wellbeing

- Learning about online bullying and where to seek advice

- Understanding the importance of secure passwords and how to create them, along with two-step authentication

- Using search engines safely and effectively

- Recognising that updated software can help to prevent data corruption and hacking

- Considering their digital footprint and online reputation and future implications they may have

- Learning about how to collect evidence and report online bullying concerns