Knowledge organiser - Computing - Year 8 - Autumn HT1

National Curriculum Strand:

- [x] Computer Science
- [ ] Digital Literacy
- [ ] Information Technology

Key Computing concepts

Data representation - Graphics

Careers that might use this knowledge

Graphic designer

Game developer

Advertising executive

Progression path

Can justify the choices they have made in creating new images and the efficiency of the tools they have used

Can create a range of images fit for purpose using different tools

Recognises the difference between raster and vector images and their use

Is aware that bitmaps are made up of pixels and there are other types of image which can be made

Can combine shapes to create images on a computer

Can create and access images on a computer using different programs

Know that computers can display images

Key Vocabulary

Vector	Raster	Bitmap	Pixel
Binary	RGB	Path	Stroke
Scalability	Logo	Polygon	File extension
Layers	Union / Merge	Icon	Hex color

Prior knowledge:

Within Key Stage 2, pupils should be Pupils should be taught to: 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. This may have included various aspects of digital media creation, such as: Stop-frame animation; Photo editing of raster graphics; Video production: Planning, filming, and editing short videos including graphics and titles; Desktop publishing: combining word and graphical elements to produce a complete layout.

Leading to:

Students studying GCSE Computer Science will focus further on this area . This may includes: Introduction to Raster and Vector Graphics: Students learn about the main types of digital gfx. Raster graphics are made up of pixels, while vector graphics are composed of paths defined by mathematical equations; File Formats: Students learn about the associated file formats for each type of graphic; Software Tools: introduced to open-source applications that can be used to create both raster and vector gfx. Practical Application: Students get hands-on experience creating their own graphics using software tools. They learn how to manipulate and edit these graphics to achieve desired outcomes. Copyright and Licensing: The curriculum also covers the importance of following appropriate copyright laws when using and creating digital graphics.

Key Questions pupils should have the knowledge to answer

What are graphics? Graphics are pictures, drawings, animations, or any visual elements created on a computer or by hand to make things look more interesting and to help explain ideas better. They can be anything from simple icons you see on your phone to complex animations in video games.

How are raster graphics made? These are made up of tiny dots called pixels. When you zoom in, you can see each individual pixel. Photos you take with your phone are raster graphics.

How vector graphics made? These are made using mathematical formulas. They can be resized without losing quality. Logos and icons are often vector graphics because they need to look sharp at any size.

What are raster graphics used for? Raster graphics are used for detailed images like photos, web graphics, digital art, game textures, and printed media.

What are vector graphics used for? Vector graphics are used for logos, icons, and illustrations as they can be resized without losing quality or detail.

What are the benefit and drawbacks of raster graphics? Raster graphics are excellent for detailed and realistic images but can become pixelated when resized beyond their original dimensions. They often have large file sizes and can be challenging to edit without quality loss.

What are the benefit and drawbacks of vector graphics? Vector graphics can be resized without losing quality and are ideal for logos and icons. However, they are less suitable for detailed, photo-realistic images and can be complex to create for intricate designs.

Name some raster file formats and programs to create them.

Raster File Formats:

JPEG (JPG): Common for photos and web images / PNG: Supports transparency, often used for web graphics / GIF: Supports simple animations and limited colours / BMP: Uncompressed format, used for high-quality images / TIFF: Used for high-quality image storage, often in printing and publishing.

Programs to Create Raster Graphics: Adobe Photoshop / GIMP / Microsoft Paint / Corel Painter / Preview (macOS)

Name some vector file formats and programs to create them.

Vector File Formats:

SVG (Scalable Vector Graphics) / AI (Adobe Illustrator) / EPS (Encapsulated PostScript) / PDF (Portable Document Format) / DXF (Drawing Exchange Format)

Programs for Creating Vector Graphics: Adobe Illustrator / Inkscape / Affinity Designer (macOS) CorelDRAW / Vectr / Gravit Designer

Do you want to know more?

https://www.bbc.co.uk/bitesize/articles/z2tgr82#zm376rd

https://www.bbc.co.uk/bitesize/guides/zpfdwmn/revision/1

https://www.youtube.com/watch?v=seFLJeDZKZM

https://www.youtube.com/watch?v=ywIpBSblBdA

https://www.101computing.net/bitmap-vs-vector-based-graphics/

https://guides.lib.umich.edu/c.php?g=282942&p=1885352

https://filecamp.com/blog/vector-vs-bitmap-images-explained/

Computer Systems Knowledge organiser - Computing - Year 8 - Autumn 2

National Curriculum Strand:

- ■ Computer Science
- ☐ Digital Literacy
- ☐ Information Technology

Key Computing concepts

- System architecture
- Fetch / Execute
- Software/Hardware

Careers that might use this knowledge

- Network Manager
- Software engineer
- Cyber Intelligence Officer

Progression path

- Recognises how different software works within systems alongside an understanding of cybersecurity and networking protocols
- Understands the concepts of binary number systems and how this applies to data storage and machine code language
- Can explain the difference between modern computers and single function mechanisms and machines. Can explain the function of many computer components within the case
- Can name and recognise core components of a computer system. Can explain the basics of how the Internet works and how computers connect to it
- Recognise that computers meet different requirements through the programs on them
- Know that programs can run on computers and computers can do different jobs
- Can recognise examples of computer systems (desktop, laptop, tablet, phone etc)

Key Vocabulary

I/O	Computer	Process	Storage
Storage	Open Source Software	IPv4 / IPv6	Peripheral
Hardware	Software	Program	Main Memory
Central Processing Unit (CPU)	Random Access Memory (RAM)	Hard Disk Drive (HDD)	Solid State Drive (SSD)
Data	Ethernet	IP Address	TCP/IP
Boolean / Logical operator	System Architecture	Operating System	Universal Serial Bus (USB)

Prior knowledge:

In Key Stage 1, pupils learn what algorithms are and how they are implemented as programs on digital devices. They create and debug simple programs.. Students will use logical reasoning to predict the behaviour of simple programs. They should recognise the common uses of information technology beyond school.

At Key Stage 2, pupils learn about computer networks, including the internet, and how they can provide multiple services, such as the World Wide Web. They will use search technologies effectively and understand how results are selected and ranked.

Leading to:

In Key Stage 4, students who take vocational ICT Level 1/2 or Computer Science GCSE will continue to build on their knowledge of computer systems, networks, and operating systems.

Vocational ICT Level 1/2: Students will: Engage in hands-on activities to understand how computer systems work, including hardware and software components. Study the basics of networking, including how different devices connect and communicate. Learn how data is stored, managed, and protected within computer systems. Investigate how ICT is used in various industries and the impact of technology on business operations.

Computer Science GCSE: Students will: Study the architecture of computer systems, including the CPU, memory, and storage. Explore network designed, implemented, and secured, including the principles of cybersecurity. Gain proficiency in programming languages and develop problem-solving skills through coding projects. Learn how data is represented and processed in computers, including binary and hexadecimal systems. Discuss the ethical, legal, and environmental impacts of digital technology on society.

Key Questions pupils should have the knowledge to answer

What is a computer? A modern computer is an electronic device that processes data, runs programs, and connects to the internet, helping us perform tasks like typing, gaming, and browsing.

What is a program? A program is a set of instructions that a computer follows to perform specific tasks, like running a game, solving math problems, or browsing the internet.

What is an operating system? An operating system is software that manages the computer's hardware and software resources, allowing other programs to run.

What are the main components in a computer system? The main parts of a computer system are the CPU, memory, storage, and input/output devices like the keyboard and monitor.

What input devices are there for computers? Input devices for computers include keyboards, mice, touchscreens, microphones, scanners, webcams, and game controllers, allowing users to interact with and control the computer.

What output devices are there for computers? Output devices for computers include monitors, printers, speakers, and projectors, which display or produce information from the computer for the user to see, hear, or print.

How do computer networks work? Computer networks allow computers to connect and share information through wired or wireless connections, enabling communication and data exchange.

What is the difference between hardware and software? Hardware refers to the physical parts of a computer, while software consists of the programs and applications that run on it.

How do different types of software interact with each other? Different types of software work together by following instructions from the operating system to perform tasks and run applications.

What are the basic principles of cybersecurity? Cybersecurity involves protecting computers and data from unauthorized access, attacks, and damage by using security measures like passwords and encryption.

How is data represented in computers? Data in computers is represented using binary code, which is a series of 0s and 1s that the computer can process.

Do you want to know more?	
https://www.youtube.com/watch?v=HB4I2CgkcCo	https://www.bbc.co.uk/bitesize/articles/zx8hpv4
https://www.youtube.com/watch?v=Sfzo4xm5eX8	https://www.bbc.co.uk/bitesize/guides/zcxgr82/revision/1
https://www.youtube.com/watch?v=fkGCLIQx1MI	https://www.bbc.co.uk/bitesize/guides/z4p4jxs/revision/1
https://www.bbc.co.uk/bitesize/articles/z9myvcw	https://teachcomputerscience.com/operating-system-os/

Knowledge organiser - Computing - Year ? - Spring ?

National Curriculum Strand:

- [x] Computer Science
- [ ] Digital Literacy
- [ ] Information Technology

Key Computing concepts

Programming languages

Web design

CSS

Careers that might use this knowledge

Website designer

App developer

Social Media Content Creator

Progression path

Create a responsive website based on user feedback

Create linked pages with a range of objects including tables and image, video and audio showing consistent style throughout to develop a homogenous website

Know that Cascading Style Sheets control the look of pages and can be applied across sites. Use CSS in my own work

Create basic websites using simple HTML code to add content and link pages

Know that HTML (HyperText Markup Language) is used for the creation of websites and online content

Recognise that there are different programming languages which are used to instruct computers

Know that computers are programmed to carry out instructions

Key Vocabulary

HTML	CSS	Hyperlink	Syntax
Format	Layout table	Tags	Hex codes
Responsive	Accessibility	Element	Attribute
Head	Body	WYSIWYG	Browser

Prior knowledge:

At Key Stage 2 , pupils will be introduced to the basics of HTML and web design. They will learn to recognize the common features of a web page, plan the layout of their own web pages, and understand the importance of copyright and fair use of media. Pupils will also gain practical experience in creating web pages using tools like Google Sites, focusing on the aesthetics, navigation paths, and the overall user experience

Leading to:

In KS3, pupils are introduced to web design using HTML and CSS. They will learn how to create web pages, add hyperlinks and images, and apply different formatting styles. At Key Stage 4, they should gain an understanding of how websites are displayed within a browser using HTML and CSS. They may design, write, and debug web pages, incorporating elements such as images, links, and forms. Additionally, they can explore the principles of responsive design, ensuring that web pages adapt to different screen sizes and devices.

Key Questions pupils should have the knowledge to answer

What is HTML? What does it do? Hypertext Markup language is a programming language used to create webpages and sites. It describes for the computer what appears on the page (content), where it appears and how it appears (formatting) as well as linking to other sites (hyperlinks).

What is CSS? What does it do? CSS stands for Cascading Style Sheets. CSS describes how HTML elements are to be displayed on screen, paper, or in other media; CSS saves a lot of work. It can control the layout of multiple web pages all at once. External stylesheets are stored in CSS files, separate from the actual webpage file.

How is HTML5 different to previous iterations? It is much more powerful and has removed the need for separate programs like Flash Player to display page elements (Video etc).

What is a responsive website? A responsive website can tell what type of device is being used and display accordingly. It has removed the need for mobile versions of websites

What is syntax? The structure of the code being used, the order and layout.

Do web designers still use html? Why? It is the fundamental language for creating and structuring web pages. HTML provides the basic building blocks for web content, allowing designers to define elements like headings, paragraphs, images, links, and forms. It ensures that web pages are displayed correctly across different browsers and devices, making it an essential skill for anyone involved in web design and development.

Can I use a WYSIWYG editor professionally? Many professional web designers use WYSIWYG (What You See Is What You Get) editors to streamline their workflow and quickly create visually appealing web pages. These editors allow you to design and edit web pages in a more intuitive, visual way, while still providing the option to view and edit the underlying HTML and CSS code. This can be especially useful for rapid prototyping and making quick adjustments. However, having a solid understanding of HTML, CSS, and JavaScript is essential for fine-tuning and optimizing your designs.

Why is web design important? Web design is crucial because it directly impacts how users perceive and interact with a website. A well-designed website enhances user experience by making it easy to navigate, visually appealing, and accessible on various devices. Additionally, effective web design helps establish credibility, attract and retain visitors, and ultimately achieve the website's goals, whether they are related to information dissemination, e-commerce, or community engagement.

Can't AI just create websites? AI can indeed assist in creating websites by generating code, suggesting design elements, and even optimizing content. However, human web designers bring creativity, intuition, and a deep understanding of user experience that AI can't fully replicate.

Do you want to know more?

https://www.youtube.com/watch?v=pm5OVxpul48

https://www.bbc.co.uk/bitesize/guides/z8nk87h/revision/4

https://www.youtube.com/channel/UCzyuZJ8zZ-Lhfnz41DG5qLw

https://www.khanacademy.org/computing/computer-programming/html-css

https://www.w3schools.com/html/html_css.asp

https://www.guiseleyschool.org.uk/_Resources/Persistent/6/a/f/0/6af064ec3f33ecdd9b308d828c27dd0240099c84/Y9%20KO%20Computing%20Pages.pdf

Knowledge organiser - Computing - Year 8 - Spring 2

National Curriculum Strand:

- [x] Computer Science
- [ ] Digital Literacy
- [ ] Information Technology

Key Computing concepts

- Binary counting
- Data storage
- Image resolution

Careers that might use this knowledge

- Software engineer
- Data scientist
- Graphic design

Progression path

- Can convert without an ASCII grid, including Upper Case. Calculate data storage sizes of files depending on image resolution.
- Can convert from binary to denary independently. Recognise the use of Hex in image creation.
- Can look up ASCII values for symbols and convert to binary. Recognise how colour came to be used in binary.
- Can convert numbers and letters into binary. Create binary images (bitmaps) using 0s and 1s.
- Know every letter and character has it's own ASCII value which is converted into binary.
- Know that computers use binary, which is made of 1s and 0s.
- Know computers do not use the same language as humans.

Key Vocabulary

Binary	Denary	Storage	Hexadecimal
Colour depth	Bit	Byte	Resolution
Sampling	ASCII	Compression	Kb /Mb /Gb /Tb / Pb
Lossy / Lossless	Bit rate	Bitmap	Data packet

Prior knowledge:

Pupils have previously encountered Binary and pixel art. They recognise the different ways data can be stored as text, image, sound and video (amongst others). They know that computers do not use the same language as humans and should recognise that data is translated to be understood by a computer.

Leading to:

Students learn that computers use the binary number system, which consists of only two digits: 0 and 1. They understand how to convert numbers from decimal to binary and vice versa. They know the storage capacity units and how these are measured in bytes and bits. They will explore how different types of data (such as text, images, and sounds) are represented in binary form. Students are introduced to the concept of data compression, including simple methods to reduce the size of files. They will recognise how binary connects to hexadecimal.

Pupils will work with binary and hex further in KS4.

Key Questions pupils should have the knowledge to answer

What is binary? Binary is a base 2 number system invented by Gottfried Leibniz that is made up of only two numbers: 0 and 1. This number system is the basis for all binary code, which is used to write data such as the computer processor instructions used every day

What is ASCII? A code where each number represents a character can be used to convert text into binary. ASCII code takes each character on the keyboard and assigns it a binary number.

Why do computers use binary code? The short answer: hardware and the laws of physics. Every number in your computer is an electrical signal, and in the early days of computing, electrical signals were much harder to measure and control very precisely. It made more sense to only distinguish between an "on" state. So, the early room-sized computers used binary to build their systems, and even though they used much older, bulkier hardware, we've kept the same fundamental principles. So you may be thinking, "why only 0 and 1? Couldn't you just add another digit?" While some of it comes down to tradition in how computers are built, to add another digit would mean we'd have to distinguish between different levels of current—not just "off" and "on," but also states like "on a little bit" and "on a lot."
The problem here is if you wanted to use multiple levels of voltage, you'd need a way to easily perform calculations with them, and the hardware for that isn't viable as a replacement for binary computing. It indeed does exist; it's called a ternary computer, and it's been around since the 1950s, but that's pretty much where development on it stopped. Ternary logic is way more efficient than binary, but as of yet, nobody has an effective replacement for the binary transistor, or at the very least, no work's been done on developing them at the same tiny scales as binary

What is hexadecimal? Hex is base 16, it uses the numbers 0-9 and a-f. It gives more choices and represents nibbles of binary data

How is data stored on a computer? Computers store data using binary code, which consists of 0s and 1s, in storage devices like hard drives and SSDs. These storage devices use various technologies, such as magnetic, optical, and flash memory, to retain data even when the computer is turned off.

How are images made using binary? Bits are used to make images by representing each pixel as a combination of binary digits, which define the pixel's colour. By arranging these coloured pixels in a grid, computers create detailed images that we see on screens.

How are sound and video stored as binary? Bits are used to make sound by representing audio signals as a series of binary digits. These bits define the sound's frequency, amplitude, and duration, which are then processed by a digital-to-analogue converter to create audible sound waves. To store video in bits, each frame of the video is encoded as a series of binary digits, just like images. These frames are then played in rapid succession to create the illusion of motion, resulting in a seamless video experience by sampling throughout the file. Sampling involves capturing frames of the video or audio at regular intervals, while the bit rate determines the amount of data used to represent each frame and the overall quality of the file.

What is colour depth? Colour depth in a bitmap is the number of bits used to represent each pixel's colour. Higher colour depth means more colours and detailed images.

What is image resolution? Image resolution refers to the amount of detail an image holds. It's usually measured in pixels, with higher resolution images containing more pixels and therefore more detail. Essentially, the higher the resolution, the clearer and sharper the image will appear. Higher res images have a larger file size due to the greater number of pixels. To work out the file size for an image, you need to consider the image's resolution and colour depth. Here's a simple formula: File Size=Resolution (width × height) × Colour Depth

Do you want to know more?

https://www.youtube.com/watch?v=tdmeXcDX-Uc

https://www.youtube.com/watch?v=a3Y_ZvOr0K0

https://www.youtube.com/watch?v=HlOTuCFtuV8

https://www.youtube.com/watch?v=pmY7pOQCOr8

https://www.youtube.com/watch?v=Xpk67YzOn5w

https://www.bbc.co.uk/bitesize/guides/zpfdwmn/revision/1

https://www.youtube.com/watch?v=Xpk67YzOn5w

https://senecalearning.com/en-GB/revision-notes/ks3/computer-science/national-curriculum/4-1-1-binary

Knowledge organiser - Computing - Year 8 - Summer 1

National Curriculum Strand:

- ■ Computer Science
- □ Digital Literacy
- □ Information Technology

Key Computing concepts

- Computer networks
- Data transmission and packets
- Search engines

Careers that might use this knowledge

- Telecommunications engineer
- Web developer
- Network manager

Progression path

- Innovatively connects historical communication methods (e.g., semaphores) to advancing concepts like edge computing or AI-driven networks. Can critically evaluate potential future developments in communication technologies. Communicates understanding clearly, using precise terminology and real-world examples.
- Explores deeper implications of networking advancements (e.g., societal impacts of the internet). Analyses limitations and benefits of past and present technologies.
- Demonstrates detailed understanding with examples (e.g., describing how IP addresses enable communication). Applies understanding to explain modern technologies like 5G or IoT.
- Understand that data can be split into packets for transmission across networks. Explains terms accurately. Understands the role of networks and transfer protocols like TCP/IP.
- Shows a basic understanding of how networks work and terms like "data packet." Able to describe some differences between wired and wireless networks with guidance.
- Understand that hardware is needed to create computer networks
- Recognise that computers can share information with other computers

Key Vocabulary

Header	HTTP(S)	Packet	Protocol
Bandwidth	Network	IP Address	Router
Server	Ethernet	Web browser	Fibre optic
3g/4g/5g	Wifi	IoT	Search Engine

Prior knowledge:

KS2 students will have an awareness of historical and modern communication methods (e.g., postal systems vs. emails) and basic recognition of what a network is. They will understand that that data can be created, stored, and shared electronically (e.g., sending messages or using cloud platforms for projects) and know how files and folders can be used to save and access work.

Leading to:

This knowledge acts as a stepping stone for more complex topics in KS3 such as advanced networking concepts or the basics of cybersecurity. Establishing a basic understanding of concepts like packet-switching and the role of protocols is critical for tackling networking topics in the GCSE curriculum, as well as supporting students with real life technology and use of networks and devices at home.

Key Questions pupils should have the knowledge to answer

What is the difference between the internet and the World Wide Web? The internet is a global network of interconnected computers and servers, enabling data communication between devices. The World Wide Web is a service that operates on the internet, providing access to websites and online content via protocols like HTTP/HTTPS. In simple terms, the internet is the infrastructure, and the web is a service built on top of it.

What is bandwidth, and why is it important? Bandwidth refers to the maximum amount of data that can be transmitted over a network connection in a given amount of time, usually measured in bits per second (e.g., Mbps or Gbps). It determines how quickly data can be sent or received. High bandwidth allows faster downloads, smoother streaming, and better performance when multiple devices use the network simultaneously. Low bandwidth can lead to slow speeds, buffering, or dropped connections.

What are the differences between wireless and wired networks? Wired Networks: Use physical cables (e.g., Ethernet) to connect devices. They are generally faster, more reliable, and less susceptible to interference. However, they limit mobility since devices must stay connected to the cable. **Wireless Networks:** Use radio waves (e.g., Wi-Fi) to transmit data. They allow greater flexibility and mobility but can be affected by interference, physical obstacles, or distance from the router. Wireless networks are also usually slower than wired networks due to shared bandwidth among devices.

How is data transmitted across a network using packets? Data is split into small units called packets for transmission across a network. Each packet contains a portion of the data along with metadata, such as the sender's and receiver's IP addresses and instructions for reassembly. The packets are sent individually across the network, potentially taking different paths, and are reassembled in the correct order at the destination.

What role do IP addresses play in data transmission? IP addresses are unique identifiers assigned to devices on a network. They act like a postal address, ensuring that data packets are sent to the correct destination and received from the correct source. For example, when you visit a website, your device's IP address tells the server where to send the data, and the website's IP address ensures you're accessing the right server.

How has the evolution of communication technologies, like from semaphores to the internet, impacted society? The evolution of communication technologies has drastically improved the speed, reliability, and accessibility of sharing information. Early methods like semaphores were limited in scope and speed, but the internet allows instantaneous global communication, enabling advances in education, commerce, healthcare, and entertainment. However, this evolution has also introduced challenges, such as cybersecurity threats and digital divides.

Do you want to know more?

https://www.bbc.co.uk/bitesize/guides/zc6rcdm/revision/1	https://www.youtube.com/watch?v=3QhU9jd03a0
https://www.bbc.co.uk/bitesize/guides/z8nk87h/revision/1	https://www.youtube.com/watch?v=KjD3KANH-xc
https://www.bbc.co.uk/bitesize/articles/z78nydm	https://www.youtube.com/watch?v=mpFWIZ318eQ
https://aws.amazon.com/what-is/computer-networking/	https://www.youtube.com/watch?v=8sTy8466MoE

Knowledge organiser - Computing - Year 8 - Summer 2

National Curriculum Strand:

- [x] Computer Science
- [ ] Digital Literacy
- [ ] Information Technology

Key Computing concepts

Text Programming

Python syntax

Careers that might use this knowledge

Software / Web developer

Financial Analyst

Data Scientist

AI and Machine Learning Engineer

Cybersecurity Analyst

Progression path

Ensure that code is commented for clarity of further develop and documentation of intent

Develop programs that complete specific tasks with selection and user input

Create programs by modifying examples using IF/ELSE/ELIF

Modify simple programs using basic functions and user inputs

Recognise that Python is a programming language and copy simplistic programs

Know that programs are written in code

Recognise that computers run programs to carry out tasks

Key Vocabulary

Variable	IDE	Function	Procedure
Algorithm	Subroutine	Program	Loop
Iteration	User input	Debug	Syntax
Runtime Error	Code commenting	Selection	IF/ELSE/ELIF

Prior knowledge:

In Key Stage 2 (KS2), UK computing pupils learn the basics of programming, including how to design, write, and debug simple programs. They understand concepts like sequences, selection, and repetition, and use logical reasoning to predict and correct program behavior1. Pupils also learn to solve problems by breaking them down into smaller parts and use variables and various forms of input and output. They gain practical experience by controlling or simulating physical systems through their programs1. Additionally, they are taught to use technology safely and responsibly.

Leading to:

Students studying at GCSE will need to understand the basics of programming, including writing, testing, and debugging. They should be familiar with text programming languages, such as Python, and be able to use pseudocode to plan algorithms before coding. Students need to create flowcharts to visually represent the steps and decisions in their algorithms, which helps in organising their thoughts and make the coding process more efficient. Adding comments to code and documenting the program are crucial practices to explain the purpose and functionality of the code, making it easier for others (or themselves) to understand and maintain. Additionally, they should know how to apply computational thinking to solve problems systematically.

Key Questions pupils should have the knowledge to answer

What is an algorithm? An algorithm is a step-by-step set of instructions used to solve a problem or perform a specific task.

Why learn text programming? Learning text programming develops your problem-solving skills and enables you to create a wide variety of software applications, such as websites and games. It also enhances your understanding of how technology works, preparing you for a range of careers in the digital world.

Where is Python used? Python is used worldwide in fields such as web development (e.g., Google), data science (e.g., Netflix), artificial intelligence and machine learning (e.g., IBM Watson), and scientific research (e.g., NASA).

What is an IDE? An Integrated Development Environment (IDE) is a software application that provides tools to help programmers write, test, and debug their code efficiently in one place.

What is a program? A program is a set of instructions for computers.

What is a function? A function is a named reusable block of code performing tasks. For example, print or you can define your own def add_numbers

What is a variable? A variable stores data values in a named location. The value can change throughout the program.

What are user inputs for? User input is data entered by a user to interact with a program, for example: username or password or pick a number or add favourite colour.

What is the difference between a function and a procedure and subroutine? A function is a block of code that performs a specific task and returns a value. A procedure and subroutine, while similar, usually perform tasks without returning a value; "subroutine" is a general term for both.

How can I repeat instructions with Python? You can repeat instructions in Python using loops, such as for loops or while loops.

What is the difference between syntax, logic and runtime errors? Syntax errors occur when code violates the language's rules, preventing it from running; runtime errors happen during execution, causing the program to crash; logic errors are flaws in the code's logic that produce incorrect results without crashing.

What operators are used in Python? See table ——————————————————————————->

How are logic operators used in programming? Logical operators like `AND`, `OR`, and `NOT` allow programmers to evaluate multiple conditions to control the program's flow based on true or false values. They help make complex decisions within the code, enabling more sophisticated conditional statements.

Operator	Description
<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to
==	Equal to
!=	Not equal to

Do you want to know more?

Code Combat - Python free trial	Learn to code
Programming KS3	https://craft.buzzcoder.com/?lesson=hoc
Python Software	Flappy dinosaur game coding
Learn Python independently	Python Beginners Course