Curriculum Intent
for
Computing

A Computing Curriculum for Life improves life skills and life chances through developing knowledge and understanding of Computing and Digital Literacy. We aim to prepare our students for their future by giving them the opportunities to gain knowledge and develop skills that will equip them for an ever changing digital world.

Overall, the computing learning journey creates digital citizens confident in computational thinking and skilled in workplace software. Computing builds resilience, as things go wrong and we need to start again. Resilience is a life skill valuable not just to school but the real world. This allows Rayner students to leave with a mindset and skillset prepared for whatever adventure they choose.
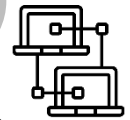
Rayner Stephens
HIGH SCHOOL

Computing Learning Journey

Careers
Software Developer
Applications Programmer
Systems Programmer
Multimedia Programmer
Systems Analyst

Apprenticeships
An IT apprenticeship is a real job in technology that provides you with training, industry-recognised qualifications and a salary.

Ethical, Legal, Environmental :
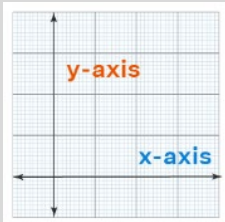Current ethical, legal and environmental impacts and risks of digital technology

University
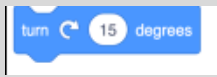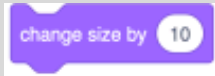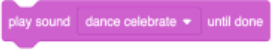A systematic study of algorithmic processes that describe and transform information

Programming:
Data types, programming concepts, Arithmetic operations, Relational operations, Boolean operations, data structures, Input/output, String Handling, Random umber generation, structured programming and subroutines, Robust and secure programming.

Computing @ ASFC Tameside College
Computer Science A level
Digital Games Production Diploma

Relational databases and structured query language:
Concepts of databases and relational databases, Structured Query Language (SQL) key commands

YEAR 11

POST 16

Cyber Security :
Purpose of cyber security, threats, social engineering, malicious code, methods to detect and prevent cyber threats

Algorithms:
Understanding what algorithms are, determining the purpose of algorithms in the format of both flowcharts and pseudocode

Computer Networks:
Defining a computer network and network protocols, describing types of networks and topologies, network security, describing the 4 layer TCP/IP model.

Computer Systems :
Hardware and software, Boolean logic, Software classification, classification of programming languages and translators, Systems architecture.

YEAR 10

Representation of Data :
Number bases, converting between number bases, units of information, binary arithmetic, character encoding, representing images, representing sound, data compression

Programming essentials in Scratch:
Create subroutines, develop understanding of decomposition, learn how to create and use lists, and build problem-solving skills.

Introduction to Python programming:
Applying the programming constructs of sequence, selection and iteration in Python

Physical computing:
Combine sequence, selection, iteration, and function/method calls to control the flow of program execution.

YEAR 9

Physical computing:
Write simple programs that use these components to interact with the physical world

Business & Real World:
Introduction to Business Studies: Market Research and finance

Logic & Binary:
Introduction to logic and binary using truth tables and logic gates

Graphics/Animation & Cyber Security:
Creating digital products in Photoshop about cyber safety & security.

YEAR 8

Vector Graphics:
Understand the processes involved in creating graphics and creating own in Photoshop

Programming essentials in Scratch:
Reviewing Scratch functionality. Focus: Variables, Logic, Loops and Conditional Statements.

Modelling data, spreadsheets:
Sorting and filtering data and using formulas and functions in spreadsheet software

YEAR 7

WELCOME TO COMPUTING AT RSHS

Impact of technology: collaborating online respectfully:
Introduction to the computer room and how to use the school network appropriately. Identifying how to use online collaboration tools respectfully

Programming essentials in Scratch:
Applying the programming constructs of sequence, selection and iteration in Scratch

History of Computing
Exploring the development of Computing through time. Including digital literacy key skills.

Year 8 – Computing 2022-23					
Curriculum intent	The aim of the curriculum is that through the delivery of the schemes of work, students are guided to becoming digital citizens, able to further develop understanding of the key concepts sequence, selection and iteration. There is the opportunity to further develop workplace skills using ICT based software Microsoft Office and the National Curriculum Computing key concepts are studied. of identified key concepts. Students will develop theoretical concepts through practice and programming. The sequence of lessons supports students developing deeper knowledge and builds on the foundations laid in Year 7.				
Term	**Topic 1 (Week 1-9)**	**Topic 2 (Week 10-18)**	**Topic 3 (Week 19-27)**	**Topic 4 (Week 26-35)**	**Topic 5 (Week 36-39)**
Knowledge	Block based programming (E-Safety introduction) Students will develop computer programming skills using Scratch block based language. The main programming concepts covered in this unit are Variables, Logic, Loops and Conditional Statements. Key digital literacy skills in Microsoft Word & PowerPoint	Computational Thinking - Logic/ Binary Student will explore what is meant by logic and binary. Study the key features of binary and denary number systems Identify NOT/AND/OR logic gates Key digital literacy skills in PowerPoint.	Graphics This unit combines learning editing skills in Photoshop whilst learning key digital world content preparing students for a life online. Vector graphics can be used to design anything from logos and icons to posters, board games, and complex illustrations. Through this unit, students will be able to better understand the processes involved in creating such graphics and will be provided with the knowledge and	Physical computing This unit applies and enhances the students' block based programming skills in a new engaging context: physical computing, using the BBC micro:bit. In the process, they will further develop programming skills and encounter a range of programming patterns that arise frequently in physical computing applications.	IDEA Award The Inspiring Digital Enterprise Award (IDEA) to develop digital, enterprise and employability skills for free. Online challenges, to achieve career-enhancing badges and consolidate learning across the topics and build on work place skills to create digital citizens

			tools to create their own.		
Skills	Key Software Skills: Programming, Microsft Word & Powerpoint	Key Software Skills: Microsft Word & Powerpoint	Key Software Skills: Editing in Photoshop Word processing	Key Skills: Programming, Microsoft PowerPoint	Key Software Skills: Word Processing, Creativity, Coding
Assessments	Teacher Q&A, Student oracy opportunities Teacher learning analysis mid-way through the completion of task and provide feedback the following lesson Peer assessment Self assessment End of unit Teacher assessment. Teacher learning analysis, provide feedback the following session.	Teacher Q&A, Student oracy opportunities Teacher learning analysis mid-way through the completion of task and provide feedback the following lesson Peer assessment Self assessment End of unit Teacher assessment. Teacher learning analysis, provide feedback the following session.	Teacher Q&A, Student oracy opportunities Teacher learning analysis mid-way through the completion of task and provide feedback the following lesson Peer assessment Self assessment End of unit Teacher assessment. Teacher learning analysis, provide feedback the following session.	Teacher Q&A, Student oracy opportunities Teacher learning analysis mid-way through the completion of task and provide feedback the following lesson Peer assessment Self assessment End of unit Teacher assessment. Teacher learning analysis, provide feedback the following session.	Teacher Q&A, Student oracy opportunities IDEA badges
Enrichment	Coding & Minecraft club IDEA Award	Coding & Minecraft club IDEA Award	Coding & Minecraft club IDEA Award	Coding & Minecraft club IDEA Award	Coding & Minecraft club IDEA Award

Year 8 Computing Autumn Term Knowledge Organiser Block Based Coding in Scratch

Key Vocabulary:

1	**Program**	A program is a set of instructions that tell a computer what to do.
2	**Algorithm**	A sequence of instructions that can be processed by a computer
3	**Sprite**	Characters that you can make move or say things.
4	**Stage**	The area of the screen where the action occurs in a Scratch program. Also the background of the project.
5	**Costume**	Pictures used to change how a Sprite looks, or to animate a Sprite.
6	**Script**	A series of connected blocks that perform a specific function.
7	**Loops**	*Loops* are a programming concept that can be used to repeat sets of instructions until a certain condition is met.
8	**X and Y coordinates**	This will help you remember… X is like a cross and Y in the sky!! X, Y – X always comes first, like in the alphabet XYZ
9	**Events**	an event is something that *happens*. It could be a key being pressed, or a mouse being clicked

Blocks in Scratch:

|		
Motion block		Control the sprite's movement around the Stage.
Looks block		Change what the user can see on the Stage.
Sound block		Control the sound that is output
Event block		Start instructions running.
Control block		Determine when other instructions run. For example, this could be by waiting before moving on to the next block, or running some blocks multiple times
Sensing block		Allow your programs to detect changes in your Scratch project, for example, if a sprite is touching another sprite, or how long a timer has run for.
Operator block		Used to manipulate letters, numbers, and symbols, and perform calculations or compare values. For example, you can use them for adding two numbers together, or searching for a letter in a word.
Variables block		Allow your programs to: define, set and change data stored in a variable and controls how you view the variable on the stage.
List blocks		Used to manage data that are stored in a list.

Year 8 Computing Autumn Term Knowledge Organiser Logic

Key Vocabulary:

1	**Hardware**	The parts of a computer that can be physically touched: EXAMPLE: Monitor, keyboard, CPU
2	**Software**	The programs and other operating information used by a computer. (Cannot be physically touched.) EXAMPLE: Microsoft Word, Google
3	**Peripheral**	A hardware device for a computer but NOT essential for the computer to run. EXAMPLE: printer, speaker
4	**Motherboard**	a printed circuit board containing the principal components of a computer or other device, with connectors for other circuit boards to be slotted into.
5	**CPU**	CPU is considered as the brain of the computer. It controls the operation of all parts of the computer.
6	**Hard Drive**	Where all the data is stored (even when computer turned off)
7	**RAM**	Computer's short-term memory
8	**Graphics Card**	Converts the binary code into the screen display – what we see!
9	**Boolean Logic**	Logic used by a computer to process information it can only have two results: • The result is **TRUE, ON, (1)** • Or the result is **FALSE, OFF, (0)**
10	**Binary**	Binary is a number system that only uses two digits: 1 and 0. The binary system is known as a 'base 2' system.
11	**Denary**	The decimal or "denary" number system uses the Base-of-10 numbering system – the digits 0-9 used by humans.
12	**Logic Gates**	A **logic gate** is a building block of a digital circuit.

Bit (b)	The smallest unit of data. 0 or 1.
Nibble (N)	4 bits
Byte (B)	8 bits (note the difference between b and B)
Kilobyte (KB)	1000 bytes. Note KB is different from Kb.
Megabyte (MB)	1000 KB
Gigabyte (GB)	1000 MB
Terabyte (TB)	1000 GB
Petabyte (PB)	1000 MB

Multipliers	128	64	32	16	8	4	2	1
Binary number	0	0	0	0	0	0	0	0

Logic Gate Operators

AND   OR   NOT
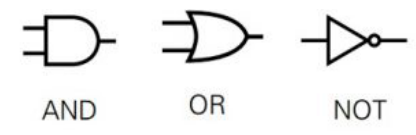
CONVERTING FROM BINARY TO DENARY

To convert from binary to decimal (also known as denary) multiply each binary digit with its multiplier, then add up the products to work out the decimal number.

KEY VOCABULARY

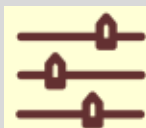| 1	**Bitmap**	Bitmap graphics are made up of pixels. Each pixel is stored on the computer as a series of 1s and 0s. When you take a photo with your smart phone it stores the digital image as a bitmap.	2	**Vector**	Vector graphics do not have any pixels. Instead they are made up of lines and shapes. When a vector is enlarged the lines and shapes are redrawn; making them great for resizing.

FILES TYPES

3	**JPG**	A system used to express numbers
4	**PNG**	Bitmap format that does not compress digital images (bigger file size than JPG). Supports transparent background.
5	**GIF**	Bitmap format that compresses digital images. Supports transparent background, animation and web safe colours
6	**TIFF**	Bitmap format that does not compress digital images (file sizes tend to be bigger). Great for printing good quality images.
7	**SVG**	Vector format; not widely supported. SWF files can be viewed using a web browser, such as Internet Explorer.

EDITING TOOLS

	ZOOM IN/OUT Allows you to enlarge an area of the graphic (zoom in) to see it more clearly. Zoom out to see the whole graphic.		**BRIGHTNESS/CONTRAST** Brightness will lighten/darken the image. Contrast makes the lights lighter and darks darker.
	CROP Allows you to chop off parts of an image you don't want to see. This will also change the dimensions of the image.		**ROTATE** Allows you to turn your Images clockwise/anticlockwise by a certain degrees.
	LAYERS Allows you to separate parts of a graphic into different layers, making it much easier to edit the graphic.		**DESATURATE** Desaturation turns colour photos black & white. Try 'colour splash' to enhance a desaturated photo.
	RESIZE Allows you to change the dimensions of an image. You can also resize parts of the image if layers are used. Brightness/Contrast		**FILTERS** You can apply different filters to your photo, such as Mosaic Tiles, Stained Glass and Chalk & Charcoal.

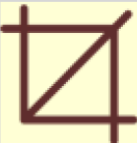# Year 8 Computing Summer Term Knowledge Organiser Logic
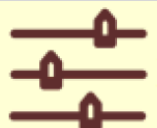
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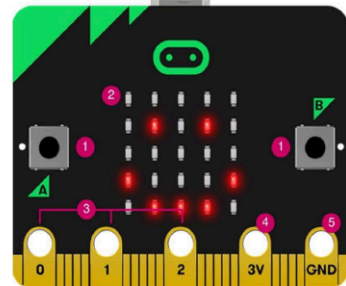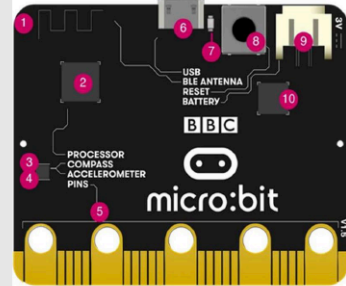
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8.4 Summer Knowledge Organiser Computing

	Key vocab	
1	MICRO:BIT	A small computer designed by the BBC for use in computer education in the UK.
2	PROCESSOR	Receives inputs from the computer and produces outputs.
3	USB	The form of power supply used by the Micro:bit – power is transmitted from the computer via a micro-USB cable.
4	BUTTONS	Input devices used within the Micro:bit to control or alter programs whilst running.
5	LED (LIGHT EMITTING DIODES)	(LEDs) –used on the Micro:bit as a screen in a 5x5 grid to display information.
6	ACCELEROMETER	An input device within the Micro:bit to control or alter programs by tilting or moving the device.
7	MICROSOFT BLOCK EDITOR	The visual programming language used to create
8	ALGORITHM	A set of instructions to be followed to complete a given task or solve a problem.
9	PROGRAM	A sequence of instructions used by a computer.
10	SEQUENCE	The order which the computer will run code in, one line at a time.
11	SELECTION	A decision made by a computer, choosing what code should be run only when certain conditions are met.
12	CONDITION	Checking to see whether a statement or sum is true or false.
13	ITERATION	When a section of code is repeated several times –also known as looping.
14	VARIABLE	Something which can be changed in a computer. Made up of a name and some data to be saved.

	https://makecode.microbit.org/
15	Key features of the micro:bit
16	On-board motion detector or "accelerometer" that can detect movement and tell other devices you're on the go. Featured actions include shake, tilt and freefall.
17	A built-in compass or "magnetometer" to sense which direction you're facing, your movement in degrees, and where you are.
18	Bluetooth Smart Technology to connect to the internet and interact with the world around you.
19	Five Input and Output (I/O) rings to connect the micro:bit to devices or sensors using crocodile clips or 4mm banana plugs.

20

1. Buttons
2. LED display & light sensor
3. Pins - GPIO
4. Pin - 3 volt power
5. Pin – Ground

21

1. Radio & Bluetooth antenna
2. Processor & temperature sensor
3. Compass
4. Accelerometer
5. Pins
6. Micro USB socket
7. Single LED
8. Reset button
9. Battery socket
10. USB interface chip