Rayner Stephens

HIGH SCHOOL

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.

Computing Learning Journey

Rayner Stephens High School

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.

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

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

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

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.

mputing @ ASFC
ameside College
mputer Science A level
Digital Games
roduction Diploma

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

YEAR 9

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

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

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

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

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

YEAR 8

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

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.

YEAR 7

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

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

Year 9 – 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 deepen knowledge of the key concepts of Computing and develop software skills to become workplace ready. The units of work develop programming skills using both block based and text based languages to strengthen understanding of key concepts sequence, selection and iteration. The introduction of Business Studies both provides an insight into learning at KS4 but enhances Microsoft Office skills to develop and consolidate workplace skills. Digital world concepts are studied and presented using Photoshop, this is an exciting insight into graphic design.				
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	Edublocks - Block based & Python programming (E-Safety introduction) Students will further develop programming skills using Edublocks block based programming and Python. The main programming concepts covered in this unit are creating subroutines, develop understanding of decomposition, learning how to create and use lists, and build problem-solving skills.	Business & Real World: Introduction to KS4 Business Studies key concepts. Project focusing on marketing & advertising in a real life Business environment. Allows students to explore the impact of market research, combined with learning about business finance.	Creative Project & Cyber Security This unit develops editing skills in Photoshop whilst consolidating key digital world to prepare students for the workplace and real life. This unit links to cybersafety and cybercrime through creation of graphics and animation. Completing a digital project featuring a specially designed logo, rewriting and formatting a text to create a digital artefact.	Physical computing & Python Programming This unit applies and enhances the students' programming skills in a new engaging context: physical computing, using the BBC micro:bit. This unit introduces students to text-based programming with Python. The lessons form a journey that starts with simple programs involving input and output, and gradually moves on through arithmetic operations, randomness, selection, and iteration.	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

	Key digital literacy skills in Microsoft Powerpoint			Key digital literacy skills in PowerPoint.	
Skills	Key Software Skills: Programming, Presentation	Key Software Skills: Presentation, Word, Spreadsheets	Key Software Skills: Editing images, Literacy to edit text for an audience	Key Software Skills: Programming, Presentation	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 9 Computing Autumn Term Knowledge Organiser Business & Real World

Key Vocabulary:		
1	**Marketing**	Marketing is finding the needs of customers and demonstrating how a business fulfils those needs to increase sales
2	**Market Research**	The collection of data to help business decisions
3	**Primary Research**	Primary research is research you complete yourself (Questionnaire, focus group, interview)
4	**Secondary Research**	Secondary research is research that has already been completed by another person (using the internet to read a report, reading a newspaper, books.
5	**Market Segmentation**	Splitting the market into different groups.

Primary	**Pros**	**Cons**
Questionnaire	Cheaper than interviews Easily target certain people	Difficult to predict how many will be completed People may not understand the questions
Interviews	Questions can be explained Customers can easily be targeted	Expensive Customers may feel uncomfortable
Trial	Save money before making products widely available.	Costly to set up
Focus Group	Data is accurate to the target market	Only small groups that take part so expensive
Secondary Research	**Pros**	**Cons**
	Cheap and already available to use	Not exactly what you need Could be out of date Could be unreliable

Key Calculations	
Revenue	Selling Price X Number Sold
Total Cost	Fixed Costs + (Variable Cost for 1 X Number Sold
Profit or Loss	Revenue – Total Cost (It's a loss if the answer is negative)
Break Even	$\frac{\text{Fixed Costs}}{\text{Selling Price – Variable Cost per Unit}}$ (Answer in units not pounds)

Year 9 Computing Autumn Term Knowledge Organiser Graphics & Cyber Security

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.

KEY VOCABULARY		
8	**ADWARE**	adverts for products a user may be interested in, based on internet history
9	**AUTHENTICATION**	verifying the identity of a user or process
10	**AUTO UPDATE**	updating software to remove vulnerabilities automatically
11	**BIOMETRICS**	'password' created from the user fingerprint, iris, retina, facial, voice
12	**BLAGGING**	inventing a scenario to obtaining personal information
13	**MALWARE**	a variety of forms of hostile or intrusive software
14	**PENETRATION TESTING**	testing a network/program for vulnerabilities
15	**PHARMING**	redirecting web traffic to fake websites designed to gain personal information
16	**PHISHING**	messages designed to steal personal details/money/identity
17	**RANSOMWARE**	virus which locks a computer and encrypts files until a "ransom" is paid

Data Protection Act 2018:
All organisations and people using and storing personal data must abide by the DPA principles . It states how data should be stored/accessed and what rights a data subject has for the protection of their data.

KEY VOCABULARY		
18	**CAPTCHA**	Completely Automated Public Turing Test To Tell Computers and Humans Apart
19	**DOS/DDOS**	Denial of Service attack/Distributed Denial of Service
20	**ENCRYPTION**	mathematically converts data into a form that is unreadable without a key
21	**FIREWALL**	checks incoming and outgoing network traffic for threats
22	**HACKING**	gaining **unauthorised** access to or control of a computer system'
23	**SCRIPT KIDDIES**	hackers with no technical hacking knowledge using downloaded software
24	**SHOULDERING**	directly observing someone enter personal details e.g. PIN number, password.

Year 9 Computing Autumn Term Knowledge Organiser EduBlaocks - Block Based & Python Coding

Key Vocabulary:

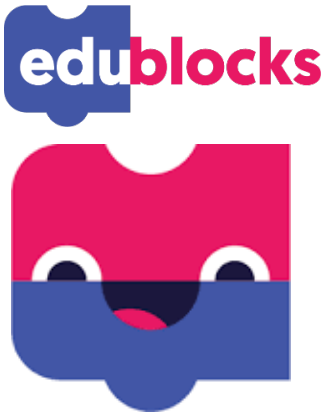
1	**EduBlocks**	A visual block based programming tool that helps to introduce text based programming languages.
2	**Python**	A text based programming language.
3	**Programming Code**	The process of writing computer programs. The instructions that you write to program a computer.
4	**Algorithm**	A set of rules / instructions.
5	**Sequence**	Parts of the code that run in order and the instructions for our code.
6	**Selection**	Using logical tests to change the flow of the sequence.
7	**Iteration**	Using loops to repeat sequences of code. Code is repeated (looped) while something is true or for a number of times.
9	**Variable**	A value that can be changed (speed, lives, score) Function Inbuilt code that performs a specific task.
10	**Data Type: String**	A sequence of characters that can include letters, numbers, symbols.
11	**Data Type: Integer**	Whole numbers, no decimal point.
12	**Data Type: Float**	Decimal Numbers. While Loop A "While" Loop is used

Key Vocabulary:

13	==	Equal to
14	!=	Not equal to
15	<	Less than
16	>=	Greater than or equal to
17	<=	Less than or equal to
18	>	Greater than
19	/ /	Integer division
20	%	Remainder
21	* *	Exponent

Drawing Patterns

Patterns are repeating sequences of code. Here we modify the triangle code to draw a repeating, rotating pattern. The while True loop will run forever, and the for loop will draw the triangle. Each time the loop iterates we move the Turtle 10 pixels.



Functions

Functions are powerful tools. They are subroutines, small sequences of code inside the main code.

We can call the function, and come out of the main code, do the function, then come back to the code.

They enable us to reuse sections of code. They keep our code tidy, and with fewer lines to write.

In our code we can draw any shape using one section of code.

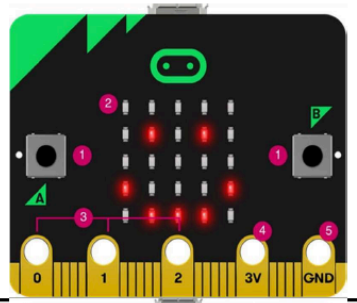
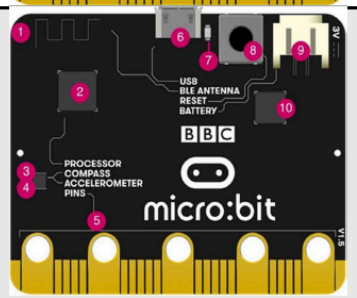
Year 9 Computing Summer Term Knowledge Organiser Graphics & Cyber Security

KEY VOCABULARY		
1	**ADWARE**	adverts for products a user may be interested in, based on internet history
2	**AUTHENTICATION**	verifying the identity of a user or process
3	**BIOMETRICS**	'password' created from the user fingerprint, iris, retina, facial, voice
4	**BLAGGING**	inventing a scenario to obtaining personal information
5	**MALWARE**	a variety of forms of hostile or intrusive software
6	**PHISHING**	messages designed to steal personal details/money/identity
7	**LIVE STREAMING**	a live transmission of an event over the internet.
8	**RANSOMWARE**	virus which locks a computer and encrypts files until a "ransom" is paid
9	**ENCRYPTION**	mathematically converts data into a form that is unreadable without a key
10	**FIREWALL**	checks incoming and outgoing network traffic for threats
11	**HACKING**	gaining **unauthorised** access to or control of a computer system'
12	**SHOULDERING**	directly observing someone enter personal details e.g. PIN number, password.

KEY VOCABULARY		
13	**COOKIES**	A cookie is a small data file created when you access a website.
14	**VIRUS**	A computer virus is a simple program made to harm a computer system
15	**PASSWORD**	A password is a secret word that only you know. It might have jumbled up numbers and letters, to make it hard for someone to guess
16	**DATA PHARMING**	Redirecting web traffic to fake websites to gain personal information
17	**PERSONAL DATA**	Personal data is private and should only be accessible by authorised people.
	Data Protection Act 2018:	
18	All organisations and people using and storing personal data must abide by the DPA principles . It states how data should be stored/accessed and what rights a data subject has for the protection of their data.	
	GDPR:	
19	The General Data Protection Regulation (GDPR), which came into effect on 25th May 2018, provides a legal framework for keeping everyone's personal data safe by requiring companies to have robust processes in place for handling and storing personal information.	

Year 9 Summer Term 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