Ravens Wood School

KS3 Curriculum Plan

Subject: Computer Science

Overarching Topic 1: Cryptography			
Why is this topic being studied at this time? How does it fit into the wider subject curriculum?	Is your data secure? Cryptography dates back to ancient times, where our ancestors needed to send secret messages, like Caesar did to expand his Roman Empire. In modern times, we honour Alan Turing as the forefather of cryptography, as we pay homage to him breaking the famous Enigma code during WW2 at Bletchley Park. Mathematics and Computer Science collide beautifully when cryptography is studied and students will enjoy making links between these two subjects as well as honing their investigative and problem solving skills in cracking codes. In modern times, cryptography and encryption is the new buzzword, as GCHQ are actively recruiting for the next generation of cyber security experts who know how to use code to create the strongest ciphers Mankind has known, using the immense power of our supercomputers. Living in the digital age means that we need cryptography more than ever to combat security vulnerabilities online and at home. Students will be well versed in the currency of the future when they study about this exciting part of Computer Science that is only going to grow as we proceed into unchartered territory with computers.		
	Critical	**Core**	**Pinnacle**
The Big Questions (What questions will students be able to answer upon mastery of the topic?)	What does cryptography mean? Where does cryptography originate from? (Caeser Cipher)	How did the introduction of technology change the way we encrypt messages? What are the types of encryption used in today's technology world? How does encryption protect us?	How can encryption work alongside other types of security? Should companies/organisations do more to protect their customers?
The Key Skills/ Techniques	**The sophistication and application of skills will become more advanced as students' progress through the critical, core and pinnacle knowledge.**		
	Skill/Technique	**How will this skill be developed?**	
	Understand encryption and decryption	This skill will be developed through initial use of key vocabulary and enhanced by students encrypting and decrypting a range of messages.	
	Encrypting and Decrypting using a Caesar cipher.	Students will be initially shown the process of a Caesar cipher through historical context and then basic shift messages, to the point of being able to translate specific words knowing the shift key. Students will then be shown heuristic methods for deciphering longer messages to look for key syntax correlations with the English languages within the encrypted text.	

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<tr><td colspan="4">Overarching Topic 2: Python – The Next Steps. Can you build</td></tr>
<tr><td>Why is this topic being studied at this time?

How does it fit into the wider subject curriculum?</td><td colspan="3">Hello World! Building upon the skills learned in Year 7, students will now face the prospect of using their programs to solve their practical problems. Moving from the critical knowledge gained in Year 7, your son will be taken through a journey towards an advanced level programmer.

This fits into our wider curriculum for Mathematics, Geography and the Sciences. In that students will be able to utilise Python for what it is used most for worldwide, data analysis and Mathematical calculations.</td></tr>
<tr><td></td><td>Critical</td><td>Core</td><td>Pinnacle</td></tr>
<tr><td>The Big Questions
(What questions will students be able to answer upon mastery of the topic?)</td><td>What are the key data types used within programming?
What do we mean by a sequence?
What does selection mean?
What does iteration mean?</td><td>How do you link sequences together to complete a task?
How do I control the flow of programs?
Why do sections of programs need to repeat?
How do we create lists in python?
What are procedures and functions?</td><td>How are algorithms linked to procedures and functions?
How can you utilise the tools at your disposal into your wider curriculum?</td></tr>
<tr><td rowspan="4">The Key Skills/ Techniques</td><td colspan="3">The sophistication and application of skills will become more advanced as students’ progress through the critical, core and pinnacle knowledge.</td></tr>
<tr><td>Skill/Technique</td><td colspan="2">How will this skill be developed?</td></tr>
<tr><td>Use of selection</td><td colspan="2">This skill will be developed first in the theoretical space, in that we will allow our students to investigate how a system that only understands True or False can answer the most complex questions. Then students will be taken through the process of translating their pseudocode questions into the correct syntax for Python.</td></tr>
<tr><td>Use of iteration</td><td colspan="2">Similar to selection we will demonstrate to students how the theoretical can be translated into the practical syntax of Python. They will be shown how remedial tasks that involve repetitions are completed better by a program than a human being, and how they can use iteration to make given scenarios more efficient to solve.</td></tr>
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Overarching Topic 3: How do we communicate?			
Why is this topic being studied at this time? How does it fit into the wider subject curriculum?	Following on from their study of the use of technology in Year 7, your son will move onto to look at a variety of communication technologies from the invention of the telephone to Internet based communication. Students need to understand more about the digital world in which they reside but also appreciate how communication has developed to what they know today. Students gain a historic base to build upon to take them into the future world of work.		
	Critical	**Core**	**Pinnacle**
The Big Questions (What questions will students be able to answer upon mastery of the topic?)	How do non-Internet based communications work? What makes a good e-mail?	Can I send a professional e-mail? How does an e-mail travel across a network? How do mobile phones work to send calls and data?	What potential developments are there for communication techniques?
The Key Skills/ Techniques	**The sophistication and application of skills will become more advanced as students' progress through the critical, core and pinnacle knowledge.**		
	Skill/Technique	**How will this skill be developed?**	
	Understanding the modern world	Students will be shown a variety of modern communication tools such as e-mail, SMS and Multi-media messages and use their prior skills of decomposition and logical thinking to understand how these work.	
	Digital skills for the future	Tasks will provide students with the opportunity to recall and enhance the digital skills learnt in Year 7 by producing professional e-mails, understanding the content of text messaging and investigate the future of communications.	

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Overarching Topic 4: Website Design			
Why is this topic being studied at this time? How does it fit into the wider subject curriculum?	How many times do you access a website and cannot locate what you actually need? Are advertisements annoying or relevant? What makes you want to use that company's website again and again? A website should be able to accomplish one thing: to provide the basic information to the user, with what they want and when they want it. Your son will understand how websites can be created to achieve just that, whilst understanding the impacts of website design on both individuals and organisations. This links to the wider curriculum of Art, Graphic Design and Business Studies providing a range of opportunities to employ knowledge to other subjects.		
	Critical	**Core**	**Pinnacle**
The Big Questions (What questions will students be able to answer upon mastery of the topic?)	Can you recall how websites work? What are CSS and HTML?	How do websites communicate between the three types of code? How can CSS and HTML be used within a website? How can I create my own website? (Website design project.)	What are the benefits to companies of using websites? What makes a good website design?
The Key Skills/ Techniques	**The sophistication and application of skills will become more advanced as students' progress through the critical, core and pinnacle knowledge.**		
	Skill/Technique	**How will this skill be developed?**	
	Understand how CSS and HTML affect websites	Students will understand how various components are incorporated into websites can be combined to achieve challenging goals, including meeting the needs of known users.	
	Effective website design	Students will evaluate existing websites for effective design based upon the key fundamentals of good practice. They will then use this, along with their knowledge of HTML and CSS, to create a template to design their own multi-page website with a consistent look and feel.	

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<tr><td colspan="4">Overarching Topic 5: Cyber Crime and Security</td></tr>
<tr><td>Why is this topic being studied at this time?

How does it fit into the wider subject curriculum?</td><td colspan="3">Ransomware, beware! Cyber crime continues to rise in scale and complexity, affecting essential services, businesses and private individuals alike. Cyber crime costs the UK billions of pounds, causes untold damage, and threatens national security. That isn’t us stating this, the National Crime Agency take this matter as one of their top priorities.
Your son is now; with their smartphone, laptop, console or other electronic devices, going to be exposed to these every increasing threats. We will, through this unit, get them to better understand the threats from Cyber crime and how they can prevent/counter them.
Throughout your sons time at RWS they will be using the digital world to access the information they need to grow intellectually. They need to understand that our digital devices need to be respected and in doing so create a safe learning environment.</td></tr>
<tr><td></td><td>Critical</td><td>Core</td><td>Pinnacle</td></tr>
<tr><td>The Big Questions
(What questions will students be able to answer upon mastery of the topic?)</td><td>What does a typical scam email look like?
What does hacking actually mean?
How can I protect myself from electronic scams?</td><td>Why do people try to attack systems?

What does the law say about illegal activity and protecting data?</td><td>What are the ethical considerations of people involved in cybercrime?</td></tr>
<tr><td rowspan="3">The Key Skills/ Techniques</td><td colspan="3">The sophistication and application of skills will become more advanced as students’ progress through the critical, core and pinnacle knowledge.</td></tr>
<tr><td>Skill/Technique</td><td colspan="2">How will this skill be developed?</td></tr>
<tr><td>Recognising Email Scams</td><td colspan="2">Breaking down typical email hacking types into several key areas, showing why they are used and what the reason was for their use. Then showing exemplars of emails with obvious identifiers for the scam and slowly removing the obvious nature of the identifiers and allowing students to decipher real email scams.</td></tr>
<tr><td></td><td>Able to distinguish between different types of hacking</td><td colspan="2">Students will be taken through the de facto legislation that defines what hacking is. They will be encouraged to share the thoughts on their views and undertake a variety of activities to make informed decisions.</td></tr>
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