

Spring Term Curriculum Development February Twilight Support Resources



RATIONALE

As part of our Term of Curriculum development, our twilight session on **Thursday 27th February** will be used as an opportunity to bring together and further co-ordinate our efforts towards a coherent, knowledge-rich curriculum for Colton Hills, with September 2020 as our ultimate aim. By this time, we will have a well-sequenced, engaging curriculum for all of our subject areas, a range of resources that support knowledge-rich teaching, and range of agreed and embedded teaching approaches which allow all students to make progress and succeed in our curriculum, regardless of starting points.

STRUCTURE OF THE TWILIGHT

The session itself will consist of two main parts, each consisting of an hour. These are:

3.30pm-4.30pm – Curriculum Sequencing: Why do we teach it in this order?

In the first hour, departments will map out their curriculum sequence for all of the Key Stages relevant to their students. They will seek to explain, as fully as possible, why one thing comes before and after another in their curriculum, and what links one topic to another. This may be simply mapping things out together that have already been agreed in some departments; in others, there is more work to do and this will be a chance to lay out the structure for 2020-21 in a way that significantly improves the student experience. By the end, all teachers should be able to articulate the curriculum sequence and the reasons behind it, bringing this into lessons.

4.30pm-5.30pm – Curriculum Enhancing: How we can we make our curriculum more powerful?

The second hour will begin with some input from Laura Jude, Advisory Teacher for Disadvantaged Pupils with the Wolverhampton LA, on cultural capital and the theory of 'Building the Field'. Once Laura has spoken, departments will critically evaluate their curriculum sequence, and look for opportunities to further enhance the curriculum and the resources we use to present it to students. In particular, this will be a chance to look at where cultural capital knowledge is taught, where students have chances at extended reading and writing, whether students can formally present their work to develop their speaking skills, and where the subject can make links to other subjects and whole-school curriculum focuses, and where students can access off-site trips and visits.

PREPARATION FOR THE TWILIGHT

Departments are at different points in their curriculum development, so below is a self-assessment tool to help to support preparations for the session. There is not anything to necessarily do before the session itself, but this could lead to interesting discussions in departments, and it would be well worth presenting the current curriculum picture to members of the department before the half-term holiday so that they feel prepared to engage in the session and bring their ideas and questions to the session. It will be optimum for everyone to feel fully involved in the session, and empowered to feel that they have contributed to curriculum discussions.

The self-assessment tool on the next page outlines the different stages in curriculum development, and is designed to support Curriculum Leaders in knowing what the next stages in their Curriculum Development are likely to be. It should be filled in prior to the session, and should therefore allow you to come to the session with a clear idea of how the session can be maximised for your department. Other than Laura's presentation, the time will mostly be given over to the departments to use ~~the time~~ as best as the Curriculum Leader sees fit, and this will be best achieved if there has been an honest consideration of the curriculum prior to the session.

OUTCOME OF THE TWILIGHT

At the end of the twilight session^s, Curriculum Leaders will complete some brief feedback on where the department has got to, and again use the self-assessment tool to assess the next, ongoing actions.

Ultimately, all Curriculum Leaders will submit a finalised return of the Curriculum Plan (template as Appendix A) to SBL by the end of the Spring Term, to present their finalised 2020 Vision Curriculum for whole-school evaluation. This will enable the Summer Term to be spent producing/improving the resources that support the curriculum, empowered to deliver our best ever, most knowledge-rich curriculum in academic year 2020-21.

CURRICULUM SELF-ASSESSMENT TOOL

The tool below is designed to get Curriculum Leaders to think about the current position of their curriculum, and the next steps are. The extent to which these questions can be answered by all members of the department is a measure of how strong the curriculum is, and how effectively this vision has been communicated to all teachers.

As experts in their subjects, and as school leaders, it is expected that Curriculum Leaders will engage in a positive and ambitious way, being self-critical of their curriculum and open-minded about how it can improve.

Stage	Key Questions	Agreed by all?
Foundation Stage: Curriculum Purpose and Intent		
1 Importance	<ul style="list-style-type: none"> - Why does your subject exist? - Why does your subject deserve its place in the curriculum? - Why should your subject be given more curriculum time? - What would students lose if your subject wasn't there? - Why is your subject important in the development of the world? 	
2 Moral Purpose	<ul style="list-style-type: none"> - What are the values that underpin your subject? - How does your subject contribute to students' personal development? - What are the vital spiritual, moral, cultural aspects of your subject? - How can your subject affect students' worldviews in a positive way? - How can your subject improve students' lives beyond their school career? 	
3 Skill Development	<ul style="list-style-type: none"> - What are the most important skills that students develop in your subject? - How do these skills develop over time and what does this look like? - What does it look like when someone masters your subject? - Which skills are the most challenging for students to master? - How will students know that their skills are improving as they move on? 	
Intermediate Stage: Curriculum Structure and Sequence		
4 Content Coverage	<ul style="list-style-type: none"> - How does your subject take into account the National Curriculum at KS3? - How do you prioritise elements of the KS4/5 specifications? - How do you ensure that content is covered to allow revision time? - How is your curriculum a broad experience that engages students fully? - How do you ensure that core concepts are regularly revisited? 	
5 Knowledge Progression	<ul style="list-style-type: none"> - What is the most challenging knowledge that is learned in your subject? - How does the knowledge in your subject get harder from year to year? - How does Year 8 build on Year 7 (and all other years in sequence)? - What knowledge will you ensure that students regularly come back to? - What knowledge elements do students find the most difficult? 	
6 Transition Points	<ul style="list-style-type: none"> - How does the switch between KS3-4 and KS4-5 increase the challenge? - How are raised expectations communicated clearly to students? 	

	<ul style="list-style-type: none"> - What do students find most challenging about these transitions? - How are students supported to move between Key Stages effectively? - What do you do to support students if they first arrive in KS4 or KS5? 	
Advanced Stage: Curriculum Enrichment and Enhancement		
7 Cultural Capital	<ul style="list-style-type: none"> - What opportunities could exist to engage with cultural capital ideas? - To what extent are these opportunities genuinely maximised? - Where are there historical, social, political and ethical ideas that could be used to bring extra interest and engagement to your subject? - What do students not understand, and how can you 'build the field'? 	
8 Compelling Experiences	<ul style="list-style-type: none"> - What are the experiences in your subject that students never forget? - Do you have enough of these experiences? Where can you create more? - What visits and opportunities could further enhance your curriculum? - What opportunities exist for students to present in front of audiences? - How can students present their work in ways that excite and inspire them? 	
9 Whole-school Curriculum	<ul style="list-style-type: none"> - Which of the whole-school curriculum priorities are most relevant to you? - Where do natural links exist into other subjects that we teach? - How do you ensure that you dovetail with the work of other subjects? - Can you find opportunities to work with other departments to deliver? - Are there any whole-school curriculum ideas you could engage with more? 	

CURRICULUM PLAN

The table below is designed to be a brief, concise and meaningful Curriculum Plan which summarises the department's thinking for our fully-developed, knowledge-rich curriculum. As well as a ready reference for Curriculum Leaders as part of their 'deep dive' department reviews, this should be a document shared with all members of the department, and regularly discussed as part of department meetings. It will be particularly useful when discussing how to move from one topic to the next, and will enable all teachers to coherently explain the curricular journey to students better in the classroom. Finally, new members of departments will be able to use it to get a better handle on the principles and practices of the department, allowing them to better transition into the department.

Please delete any years not relevant to you before submitting the final version to SBL.

Department: **ICT/CS**

Vision Statement: [No more than 50 words on what the department stands for]

With this pandemic in full flow, what has it taught us about technology?

That it's a fantastic way of bridging the gap and keeping the world connected and industries moving. However, with all the knowledge of how these technologies work it isn't enough reading a datasheet without knowing how to use it in a practical way.

This is why both ICT and Computer Science are needed to work hand in hand.

Strapline: [No more than 6 words. Make it catchy, memorable – alliteration always helps!]

Conceive, conceptualize, construct – bringing the virtual to reality

Curriculum Story: [No more than 50 words on the story of the curriculum sequence]

Since the introduction of Computer Science in to the curriculum it has taken a precedence over ICT in headlines, as is the way when something new is introduced. What many have failed to comprehend is that to get outstanding Computer Scientists we need proficient ICT users. For this reason, both need to be given equal precedence.

ICT will give the transferrable skills needed to provide students for life after school whilst Computer Science will equip those who wish to see the evolvement of technology for the good of mankind.

Skills developed: [No more than 50 words on what students get from your curriculum]

Analytical skills, problem solving, creativity, critical thinking skills and above all else resilience.

As a curriculum we will encourage students to try new things and help them realise that they won't get the answer first time and when they do get a solution it doesn't necessary need to be the same as someone else's.
It's not the end goal that determines the reward but the journey.

Below when 50 words just aren't enough.....

The aim of my curriculum is to develop confident digital citizens who understand the power of their digital world. It uses accessible, challenging and engaging projects that empower students and promotes the productive use of ICT.

I want students to feel able to 'tinker' with technology, to understand how it works and how to make it work for them; they should feel in control.

All students should have the opportunity to write their own programs, produce their own

Apps or create professional quality digital products.

Students should feel safe when using technology and the web. They must learn what their rights and responsibilities are, as well as how legislation such as The Computer Misuse Act and Data Protection Act can affect them.

Finally, our young people must understand how to utilise the power of the cloud. Understand what services are available and that the cloud can be a powerful collaborative tool.

Strands - KS3

DIGITAL LITERACY

Our students should learn:

- What the cloud is and how to utilise cloud services
- To be proficient in using a range of digital online/offline applications
- How to transfer skills from one application to another
- How to use search engines effectively
- How to identify accurate information in the digital world
- To use blogs, social networks and other online digital tools

DIGITAL CITIZENSHIP

Our students should learn:

- To be responsible when using social networks, technology and other online tools
- To understand the possible dangers they can face online
- To learn how to deal with situation they may encounter online
- To understand the impact ICT has on the world around them
- The positive and negative effects of ICT on their lives
- To learn how to use privacy setting on social networks

DIGITAL CREATIVITY

Our students should learn:

- The importance of evaluating existing digital content
- To consider audience and purpose when designing and creating digital products
- How to effectively combine text and images to produce effective digital products
- To learn how to effectively edit, repurpose and combine digital elements.
- The importance of self and peer evaluation
- To be effective when working independently as well as when collaborating with team

COMPUTING

Our students should learn:

- To be able to create interactive games by using a visual programming language
- To learn a textual programming language and related computational terminology
- To learn about the hardware components inside a computer/tablet/smartphone

Year 7: How do I become an effective IT user?						
With any new game, first thing to do is to meet the NPC guide who will give the rules on surviving the levels of the digital game.						
Topics	Why we teach this	Links to last topic	Links to future topics	Key skills developed	Cultural capital opportunities	Links to whole school curriculum
Autumn 1 Introduction to School network & Acceptable User Policy (AUP)						
Introduction to school network & Acceptable User Policy School rules/AUP Logins/password Resources Files and folders Idea.org.uk - Bronze	No two devices are the same, all students are to be brought to a level playing field and understand what are the limitations and where to find support.		Deeper understanding of networks	Critical thinking skills Email communication MS Office		All subjects with use of Teams.
Autumn 2 E-Safety and how to stay safe online						
Social Media Digital footprint Sexting Cyberbullying Prevention	For a generation who have grown up with the internet and got a false sense of security it's time to pull down the veil and show them the truth of how their actions are unwittingly putting them at risk.	Now that students have officially been given the reins to use the school computing resources it is the time on be shown how to stay safe online.	E-safety and cybersecurity	Critical thinking skills Social Media MS Office		Life skills
Spring 1 PC Basics – getting to grips with computers						
Inputs/outputs Binary/denary Hardware Software	Everything is great until it stops working! Unit helps you gain knowledge on how the basics of a PC fit together and troubleshooting.	Let's start seeing what is happening inside this digital device that is taking up so	Computer architecture	Analytical skills Problem solving Hardware		Maths

Commented [JJ1]: Breakdown of key skills of MS Word and school network to be included in SOW for each topic.

Commented [AM2R1]: This will depend on the breakdown of how the staff member who creates the individual lessons, at this stage looking at strategic planning of what to teach

		much of our time and attention. How do I know which is better?				
Spring 2 - Multimedia project - design						
Multimedia project: (possible ideas – Podcast? personal blog? Magazine company? Social influencer?) -Research - Target audience -Design principles -Mood board - Creating a house style - Image collection - Content creation - Video - Sound	Time to open the imaginations of the students. Now starts the journey of overcoming obstacles and falling forward. Another fantastic way of starting your own business and making money with zero to minimal expenditure. Over the year's new jobs have emerged with use of social media. The successful influencers ensure their content stands out and is memorable.	Links to Y8: Web design & Development	Application design Application development	Analytical skills Problem solving Creativity Critical thinking skills Resilience Video/Photo editing MS Office	How to be a social media influencer	Art Business
Summer 1 Computational thinking						
What is programming Decomposition Abstraction Terminology Minecraft syntax debugging	Now you know what the hardware is capable of doing now it's time to issue it some commands and have it under your control.	Programming	Analytical skills Problem solving Creativity Critical thinking skills Resilience Programming			Maths

Commented [JJ3]: Incomplete?
So a scenario set at the beginning similar to the BTEC assignments?

Commented [AM4R3]: Was thinking creating an online brand/business and planning what items/service to sell and how branding will look, audience they will target etc

Summer 2 – programming hardware

<p>Application of computational thinking using programmable hardware.</p>	<p>Time to open the imaginations of the students. Now starts the journey of overcoming obstacles and failing forward. Another fantastic way of applying the key principles of computational thinking to a programmable device.</p> <p>Over the year's new jobs have emerged with use of social media. The successful influencers ensure their content stands out and is memorable,</p>	<p>Links to Y8: Web design & Development</p>	<p>Application design Application development</p>	<p>Analytical skills Problem solving Creativity Critical thinking skills Resilience Video/Photo editing MS Office</p>	<p>How to be a social media influencer</p>	<p>Business</p>
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Year 8: working online						
Time to find the loopholes to work your way out of the mainframe						
<u>Topics</u>	<u>Why we teach this</u>	<u>Links to last topic</u>	<u>Links to future topics</u>	<u>Key skills developed</u>	<u>Cultural capital opportunities</u>	<u>Links to whole school curriculum</u>
Autumn 1 Working online						
A reminder of the school network and the importance of using folders to remain organised. The unit delves into the concepts of cloud computing. Students have the opportunity to explore the benefits of cloud computing and some of the implications it can bring.	In recent times the development of technology has made it more obvious the need for technology. Work life patterns have changed with a significant job roles now require people to work from home. Modern technologies have paid a great part in this. Brining people together, sharing and collaborating. With the development of technology comes responsibility and awareness of the laws/regulations that govern how we interact with technology. This unit explores not just cloud technology but the legislations that impact individual users and organisations.	Year 7 school network and e-safety	What makes up a computer system Network architecture in year 9	Using cloud storage to save and share files Sharing and collaborating using cloud applications	Working effectively in any modern team	An effective skill that can be applied across the curriculum.
Autumn 2 What makes up a computer system?						
This unit begins with a reminder of hardware and software and how the hardware supports the software in order	It is important to know what makes up a computer system but also the ever changing threats to technology.	Working online	Network architecture Interface design	Research internet threats.	Sociological impact	Understanding principles of the data protection act.

for a computer system to work effectively. This provides the foundation to explore the dangers associated with computer systems and how they can be prevented. Finally linking the computer systems to organisations and how they use technology to support people with different accessibility needs	Technology is not just social or gaming tool but is a vital tool in any organisation. The users of technology are diverse and so the technology should be adapted to support the different users.					
Spring 1 Web development						
Understand the purpose of websites. Explore the common trends of websites. Learn the methods to create effective websites using HTML/CSS Review websites Story boarding Resource gathering Resource editing – Photoshop, correct files for internet	Websites offer many purposes. Many organisations benefit from websites for advertising, communication and information sharing. Therefore, making it vital to understand not just the vast purpose of websites but also the design principles of websites and how they are created.	Effective multimedia presentation designs in year 7	Game design App design	Research Designing a wireframe HTML/CSS programming	To develop a website for an existing organisation.	Literacy Graphic design Logical thinking – mathematics
Spring 2 – Web development continued						
Introduction to HTML: Basic Tags -Heading -Horizontal Rule -Paragraphs -Fonts	Time to get the creative juices flowing, no one likes a dull website. Another fantastic way of starting your own business and making	Time to create my designs and gain an audience that is far reaching	Multimedia project Programming	Analytical skills Problem solving Creativity Critical thinking skills Resilience HTML	Developing a website for an existing organisation	Business Life skills Problem solving - mathematics

-Body (and its properties) -Images -Hyperlinks Peer evaluation Improvements	money with zero to minimal expenditure.			Photo editing		
Summer 1 Spreadsheet development						
Layout of a spreadsheet. Formatting Basic (sum,+,*,/,-) formulae (Count, IF, Pivot, creating a dashboard, H/V lookups) Creating graphs Printing a spreadsheet Renaming tabs	Big data is everywhere and recent times have made it more apparent than ever the impact data is having in our daily lives. Covid rates have been analysed on a weekly basis for the government to make decisions effecting the whole nation.	Before data can be analysed effectively it is important to know how to use the software appropriately. this unit explores the anatomy of spreadsheets and how to format spreadsheets.	Computational thinking Programming Game development	Formatting a spreadsheet Creating formulae Creating graphs	Provide various real life contexts to the topic: Fast food restaurant Bank account Retail store	Business Mathematics Life skills Data manipulation in science
Summer 2 Game Development						
Use scratch/Kodu to make your animations/games Computational thinking and algorithmic thinking Decomposition	A fun and engaging way to further develop the skills of computational thinking taught in year 7. This unit revisits the core skills in computational thinking and now re-engaged in a game development unit.	Computational thinking programming	Programming and computational thinking in year 9	programming Decomposition Abstraction Terminology Syntax and commands needed in scratch or Kodu	YSD or Minecraft competition to create a game for a national competition	Logical reasoning – mathematics Graphic design

Year 9: Matrix: Red pill or blue pill						
Time to decide to be an innovator of ICT or pioneer of Computer Science						
<u>Topics</u>	<u>Why we teach this</u>	<u>Links to last topic</u>	<u>Links to future topics</u>	<u>Key skills developed</u>	<u>Cultural capital opportunities</u>	<u>Links to whole school curriculum</u>
Autumn 1 – network architecture and ethics						
Recall on the school network. Reminder of the school network dtives; where to save documents and where documents can be shared. Moving onto understanding networks and why they are needed.	Did you know the biggest network is the internet? A development of key knowledge built from year 7 to 8 on networks. This unit develops on the knowledge of networks. This time on the physical aspect of networks and the different forms of networks. Starting with what the students know that the school network is a LAN and the internet is a WAN.	The online word The school network	System architecture Networks system security	To distinguish the layout of different network types	A visit to the school's server room to see the actual hardware needed to run a LAN.	Literacy – understand the laws that govern networks.
Autumn 2 Modern technologies						
Cyber security in the wider world The need for. Attacks, concepts, and techniques. Protecting your data and privacy Protecting the organisation.	For a generation who have grown up with the internet and got a false sense of security it's time to pull down the veil and show them the truth of how their actions are unwittingly putting them at risk. "The best way to trick a fool is to let him think they are tricking you." – How many of the students just copy and paste of the first website they get <u>without</u> understanding what they have read. Time to make them digest and understand and realise consequences and look in to ethical hacking.	Links to Y8: E-Safety and Cybersecurity	GCSE Computer Science or BTEC ICT Modern technologies and cyber attacks in BTEC	Analytical skills Problem solving Critical thinking skills MS Office		Lifeskills Business

Commented [JJ5]: Is this also looking at the old National Curriculum? Spook websites?

Commented [AM6R5]: As we are 1 of 3 Cisco academies in Wolverhampton, make sense to utilise some of these resources possibly and offer meaningful industry standard content, linked in with Matrix challenge.

Spring 1 – user interface design						
What is an interface? Types of interfaces Design principles	Interfaces are every changing and the purpose of interfaces must be understood before designing/creating the most suitable interface. This unit explores the range of interfaces and the emerging technologies that impact interface designs. Design principles of interfaces are understood before the next stage of design and creation of an interface.	Web development Multimedia presentation design	App development spring 2 Python programming Systems software in GCSE CS Interface design BTEC L2	Analytical skills Research Report writing	Explore interface designs in various locations such as menu interface at Mc Donalds compared with GUI and CMD designs on computers	Graphic design
Spring 2 – Design and create an app (Young Designer Award)						
Interfaces, Gameplay (and progression) and Algorithms -Code Development, Alpha Testing and Debugging -End-User Testing and Evaluations	After using other peoples off the shelf app and not getting exactly what you wanted, how about you make your own and have it bespoke to your needs? Another great business opportunity with minimal cost. Make your own app and have it published to app stores	Links to Y8: Programming – App builder Multimedia project	GCSE Computer Science or BTEC ICT	Analytical skills Problem solving Creativity Critical thinking skills Resilience Video/Photo editing MS Office Programming	To be applied to an existing organisation such as Molineux stadium	DT Art
Summer 1 – how does a computer think?						
What is programming Decomposition Abstraction Terminology Understanding flowcharts and pseudo code	Progression from the previous 2 years of the concepts of computational thinking. This unit now explores further into pseudo code and the syntax of pseudo to breakdown a problem into logical steps using the pseudo code syntax.	Computational thinking from year 7 to year 8. Programming hardware Game development	Programming with Python Component 2 GCSE CS – computational thinking	Problem solving Analytical skills Using syntax correctly.	Real life programming problems to be solved using design concepts such as pseudo code	Logical reasoning – mathematics Literacy – understanding key words such as abstraction, decomposition when

Commented [JJ7]: Young Bafta Awards? Game or App design? Is there an alternative to Scratch? There were a few on the website link I shared with you last week.

Commented [AM8R7]: Appshed apps would be decent as can get used to the one package and then utilise other products from the company which could help with other areas in the curriculum such Game maker/IOT builder

			Component 3 BTEC DIT notations			breaking down a problem
Summer 2- Command line programming - Python						
Outputs -Inputs and Variable Storage -IF Statements Advancing Knowledge: -FOR Loops -WHILE Loops Problem Solving (Abstraction and Decomposition) Tasks	Command line programming languages are industry standard and used by all major companies for their systems. For working with any app development one must understand key syntax and rules for programming.	Links to Y8: Programming – App builder Multimedia project Programming hardware	Component 2 GCSE CS computational thinking	Problem solving De- bugging Running commands on Python	Real life programming problems to be solved using Python.	Logical reasoning – mathematics Literacy – being able to recall syntax within Python to effectively run a Python program.

BTEC IT QUALIFICATION SUITE

Year 10: [BTEC DIT]						
[Brief summary of the overall focus here – no more than one line]						
Topics	Why we teach this	Links to last topic	Links to future topics	Key skills developed	Cultural capital opportunities	Links to whole school curriculum
Autumn 1 Component 1 – interface design						
Learners will develop their understanding of what makes an effective user interface and how to effectively manage a project. They will use this understanding to plan, design and create a user interface.	As digital technologies and organisations continue to evolve, each new development offers new and exciting ways of completing tasks and interacting with our hardware devices. Each new development opens up a new project with a new set of user requirements that needs to be solved. In this component, you will learn different project planning techniques that can be used to both plan and deliver a project that meets a set of user requirements. User interfaces allow individuals and individuals in organisations to interact with digital technologies. The design of the user interface is crucial in ensuring that users are able to interact positively with their hardware devices. In this component, you will learn the different design principles that can be used to design effective user interfaces and apply appropriate project planning techniques to create a user interface that meets user requirements. This component	Multimedia presentation design App development Game development	Social media and business L3 Web development L3	Interface design Interface development	Explore interface design in a variety of different locations. To create an interface for a local organisation.	Computer Science – system software Graphic design

	<p>will build on Key Stage 3 where you have learned about computer systems and software applications. You will learn how effective design and planning has a major impact on the user experience. This component will help you to progress to further vocational or academic qualifications. It will also enable you to develop transferable project planning skills that can be used across all areas of study and employment.</p>					
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Autumn 2 [Component 1 – interface design

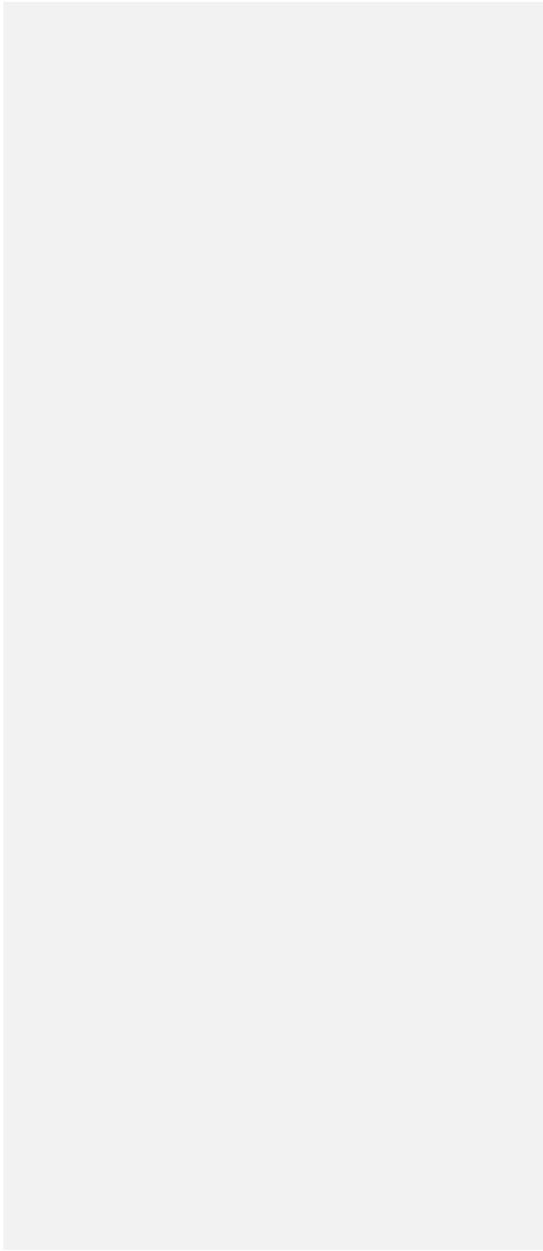
<p>Learners will develop their understanding of what makes an effective user interface and how to effectively manage a project. They will use this understanding to plan, design and create a user interface.</p>	<p>As digital technologies and organisations continue to evolve, each new development offers new and exciting ways of completing tasks and interacting with our hardware devices. Each new development opens up a new project with a new set of user requirements that needs to be solved. In this component, you will learn different project planning techniques that can be used to both plan and deliver a project that meets a set of user requirements. User interfaces allow individuals and individuals in organisations to interact with digital technologies. The design of the user interface is crucial in ensuring that users are able to interact positively with their hardware devices. In this component, you will learn the</p>	<p>Multimedia presentation design App development Game development</p>	<p>Social media and business L3 Web development L3</p>	<p>Interface design Interface development</p>	<p>Explore interface design in a variety of different locations. To create an interface for a local organisation.</p>	<p>Computer Science – system software Graphic design</p>
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	<p>different design principles that can be used to design effective user interfaces and apply appropriate project planning techniques to create a user interface that meets user requirements. This component will build on Key Stage 3 where you have learned about computer systems and software applications. You will learn how effective design and planning has a major impact on the user experience. This component will help you to progress to further vocational or academic qualifications. It will also enable you to develop transferable project planning skills that can be used across all areas of study and employment.</p>					
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Spring 1 component 2 collecting and presenting data

<p>Learners will understand the characteristics of data and information and how they help organisations in decision making. They will use data manipulation methods to create a dashboard to present and draw</p>	<p>In order to make decisions, organisations collect vast amounts of data from a range of different sources. They need to use appropriate data-collection methods to ensure that the data is of sufficient quality to enable decision making. Data must then be converted into information to allow it to become useful. In this component, you will learn the different data manipulation tools that can be used to change the way that data is presented. You will provide clear summaries of the data and present them in a</p>	<p>Computational thinking Spreadsheet design</p>	<p>Component 3 – data notations Computational thinking – GCSE CS</p>	<p>Analytical skills Problem solving Formatting spreadsheets Formulae Pivot tables Macros Charts</p>	<p>To analyse data for a real scenario – football scores, holiday and transport data</p>	<p>Computer science Mathematics Life skills Business Data manipulation in science</p>
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conclusions from information.	<p>dashboard that will allow organisations to make effective decisions. Even when data has been converted into information, it will not provide any conclusions on its own. It is up to the data user to be able to look at the information and draw conclusions, so how the information is presented is key to ensuring that effective and accurate decisions are made. In this component, you will learn the different presentation features that can be used to ensure that information is understood clearly in an objective way so that it is not misinterpreted. This component will build on Key Stage 3, where you have learned about how to create programs. This component will help to develop your understanding of how to represent information in different ways to give it more meaning. The component will help you to progress to further vocational or academic qualifications. It will enable you to develop transferable data manipulation tools that you can use to make effective decisions in all areas of study and employment. It will also help you to focus on your chosen specialism in more detail, for example managing big data, business analytics.</p>					
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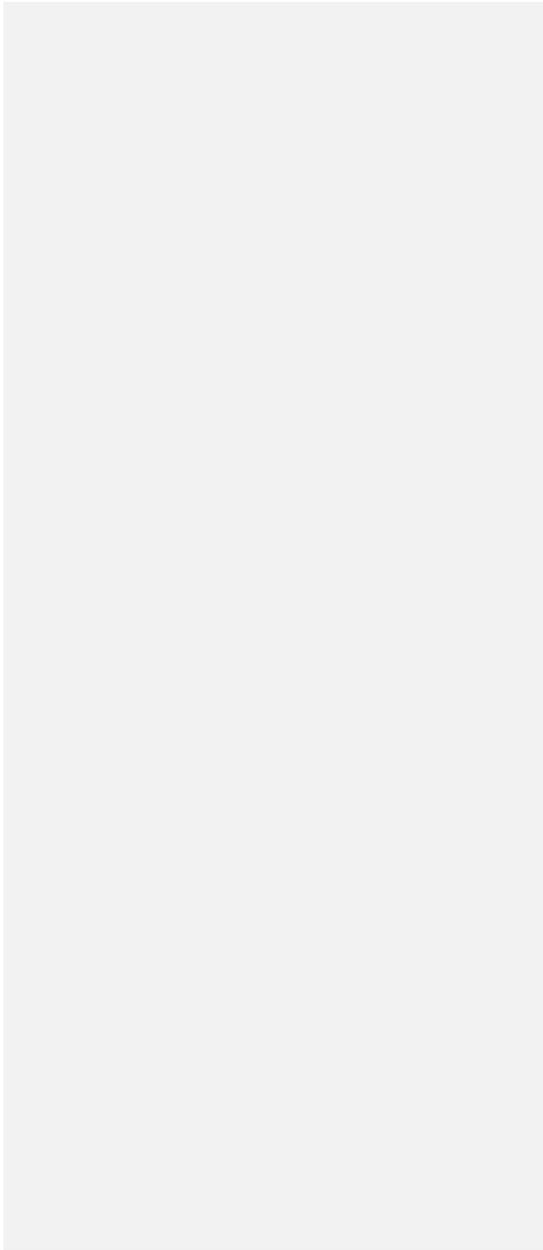
Spring 2 component 2 collecting and presenting data						
Learners will understand the characteristics of data and information and how they help organisations in decision making. They will use data manipulation methods to create a dashboard to present and draw conclusions	In order to make decisions, organisations collect vast amounts of data from a range of different sources. They need to use appropriate data-collection methods to ensure that the data is of sufficient quality to enable decision making. Data must then be converted into information to allow it to become useful. In this component, you will learn the different data manipulation tools that can be used to change the way that data is presented. You will provide clear summaries of the data and present them in a dashboard that will allow organisations to make effective decisions. Even when data has been converted into information, it will not provide any conclusions on its own. It is up to the data user to be able to look at the information and draw conclusions, so how the information is presented is key to ensuring that effective and accurate decisions are made. In this component, you will learn the different presentation features that can be used to ensure that information is understood clearly in an objective way so that it is not misinterpreted. This component will build on Key Stage 3, where you have learned about how to	Computational thinking Spreadsheet design	Component 3 – data notations Computational thinking – GCSE CS	_Analytical skills Problem solving Formatting spreadsheets Formulae Pivot tables Macros Charts	To analyse data for a real scenario – football scores, holiday and transport data	Computer science Mathematics Life skills Business Data manipulation in science

	<p>create programs. This component will help to develop your understanding of how to represent information in different ways to give it more meaning. The component will help you to progress to further vocational or academic qualifications. It will enable you to develop transferable data manipulation tools that you can use to make effective decisions in all areas of study and employment. It will also help you to focus on your chosen specialism in more detail, for example managing big data, business analytics.</p>					
Summer 1 Component 3 Effective Digital Working Practices						
<p>Learners will explore how organisations use digital systems and the wider implications associated with their use.</p>	<p>Modern organisations are increasingly reliant on the use of digital systems to complete every day, business-critical tasks. The development of these systems has presented organisations with many opportunities to work in new, inventive and flexible ways to achieve their aims. The systems have also brought new challenges and a range of responsibilities. This component will give you an opportunity to explore how the developments in technology over recent years have enabled modern organisations to communicate and collaborate more effectively than ever before. The component is designed to allow you to</p>	<p>Computational thinking Spreadsheet design</p>	<p>Cyber security L3 System software GCSE Networking GCSE CS</p>	<p>Notations Cloud computing Tethering and hot spotting Research and creating reports Exam techniques</p>	<p>Share collaborative resources similar to a modern organisations – understand the impact on a business. Cyber-attacks – case studies understanding the impact of the cyber attacks</p>	<p>Computer Science – networking and security Life skills Data manipulation in science</p>

	<p>explore the digital systems available to organisations and how their features have an impact on the way organisations operate. You will explore how developments in technology have led to more inclusive and flexible working environments, and how regulation and ethical and security concerns influence the way in which organisations operate. You will analyse information in a range of vocational contexts so that you develop a greater understanding of the use of digital systems by organisations and so that you are able to make reasoned judgements on the systems. This component builds on Key Stage 3 where you will have learned how to use technology responsibly. In this component, you will learn about how organisations can use technology safely and about the cyber security issues when working in a digital organisation. The knowledge and skills you develop in this unit will give you a basis for further study in a range of subject areas, including computing, IT, engineering, creative and scientific, or you may go on to an apprenticeship or entry-level employment where your understanding of technology will be relevant.</p>					
<p>Summer 2 Component 3 Effective Digital Working Practices</p>						

<p>Learners will explore how organisations use digital systems and the wider implications associated with their use.</p>	<p>Modern organisations are increasingly reliant on the use of digital systems to complete every day, business-critical tasks. The development of these systems has presented organisations with many opportunities to work in new, inventive and flexible ways to achieve their aims. The systems have also brought new challenges and a range of responsibilities. This component will give you an opportunity to explore how the developments in technology over recent years have enabled modern organisations to communicate and collaborate more effectively than ever before. The component is designed to allow you to explore the digital systems available to organisations and how their features have an impact on the way organisations operate. You will explore how developments in technology have led to more inclusive and flexible working environments, and how regulation and ethical and security concerns influence the way in which organisations operate. You will analyse information in a range of vocational contexts so that you develop a greater understanding of the use of digital systems by organisations and so that you are able to make reasoned</p>	<p>Online world Modern technologies</p>	<p>Cyber security L3 System software GCSE Networking GCSE CS</p>	<p>Notations Cloud computing Tethering and hot spotting Research and creating reports Exam techniques</p>	<p>Share collaborative resources similar to a modern organisations – understand the impact on a business. Cyber-attacks – case studies understanding the impact of the cyber attacks</p>	<p>Computer Science – networking and security Life skills</p>
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	<p>judgements on the systems. This component builds on Key Stage 3 where you will have learned how to use technology responsibly. In this component, you will learn about how organisations can use technology safely and about the cyber security issues when working in a digital organisation. The knowledge and skills you develop in this unit will give you a basis for further study in a range of subject areas, including computing, IT, engineering, creative and scientific, or you may go on to an apprenticeship or entry-level employment where your understanding of technology will be relevant.</p>					
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Year 11: BTEC DIT

[Brief summary of the overall focus here – no more than one line]

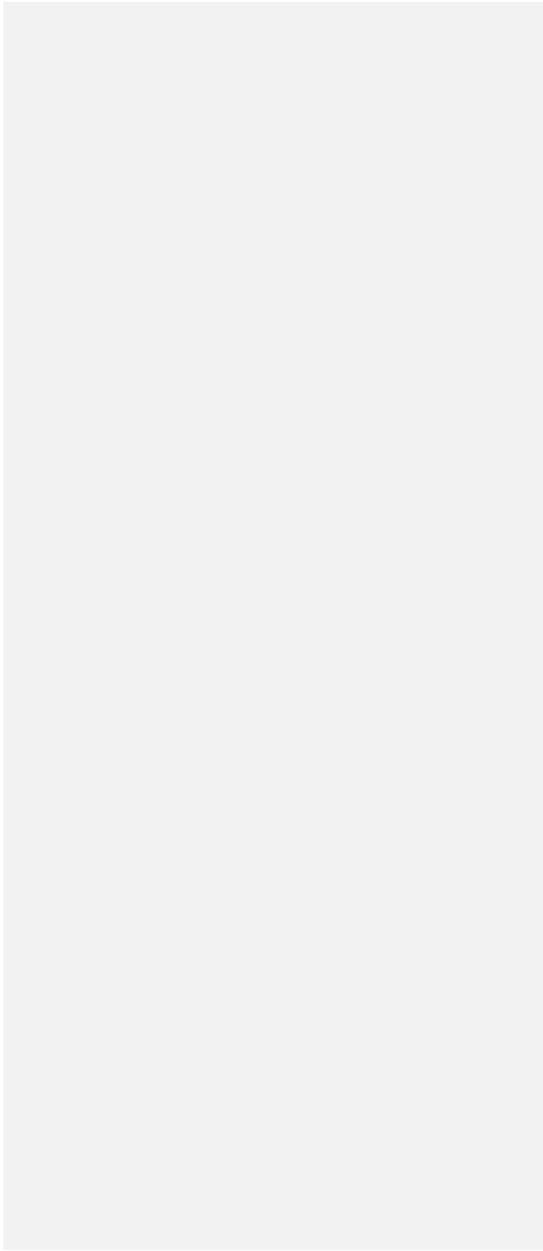
Topics	Why we teach this	Links to last topic	Links to future topics	Key skills developed	Cultural capital opportunities	Links to whole school curriculum
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Autumn 1 Component 3 Effective Digital Working Practices

Learners will explore how organisations use digital systems and the wider implications associated with their use.	Modern organisations are increasingly reliant on the use of digital systems to complete every day, business-critical tasks. The development of these systems has presented organisations with many opportunities to work in new, inventive and flexible ways to achieve their aims. The systems have also brought new challenges and a range of responsibilities. This component will give you an opportunity to explore how the developments in technology over recent years have enabled modern organisations to communicate and collaborate more effectively than ever before. The component is designed to allow you to explore the digital systems available to organisations and how their features have an impact on the way organisations operate. You will explore how developments in technology have led to more inclusive and flexible working environments, and how regulation and ethical and security concerns influence the way in which organisations operate. You will analyse	Online world Modern technologies	Cyber security L3 System software GCSE Networking GCSE CS	Notations Cloud computing Tethering and hot spotting Research and creating reports Exam techniques	Share collaborative resources similar to a modern organisations – understand the impact on a business. Cyber-attacks – case studies understanding the impact of the cyber attacks	Computer Science – networking and security Life skills
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	<p>information in a range of vocational contexts so that you develop a greater understanding of the use of digital systems by organisations and so that you are able to make reasoned judgements on the systems. This component builds on Key Stage 3 where you will have learned how to use technology responsibly. In this component, you will learn about how organisations can use technology safely and about the cyber security issues when working in a digital organisation. The knowledge and skills you develop in this unit will give you a basis for further study in a range of subject areas, including computing, IT, engineering, creative and scientific, or you may go on to an apprenticeship or entry-level employment where your understanding of technology will be relevant.</p>					
Autumn 2 Component 3 Effective Digital Working Practices						
<p>Learners will explore how organisations use digital systems and the wider implications associated with their use.</p>	<p>Modern organisations are increasingly reliant on the use of digital systems to complete every day, business-critical tasks. The development of these systems has presented organisations with many opportunities to work in new, inventive and flexible ways to achieve their aims. The systems have also brought new challenges and a range of responsibilities. This component</p>	<p>Online world Modern technologies</p>	<p>Cyber security L3 System software GCSE Networking GCSE CS</p>	<p>Notations Cloud computing Tethering and hot spotting Research and creating reports Exam techniques</p>	<p>Share collaborative resources similar to a modern organisations – understand the impact on a business. Cyber-attacks – case studies understanding the impact of the cyber attacks</p>	<p>Computer Science – networking and security Life skills</p>

<p>will give you an opportunity to explore how the developments in technology over recent years have enabled modern organisations to communicate and collaborate more effectively than ever before. The component is designed to allow you to explore the digital systems available to organisations and how their features have an impact on the way organisations operate. You will explore how developments in technology have led to more inclusive and flexible working environments, and how regulation and ethical and security concerns influence the way in which organisations operate. You will analyse information in a range of vocational contexts so that you develop a greater understanding of the use of digital systems by organisations and so that you are able to make reasoned judgements on the systems. This component builds on Key Stage 3 where you will have learned how to use technology responsibly. In this component, you will learn about how organisations can use technology safely and about the cyber security issues when working in a digital organisation. The knowledge and skills you develop in this unit will give you a basis for further study in a range</p>					
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	of subject areas, including computing, IT, engineering, creative and scientific, or you may go on to an apprenticeship or entry-level employment where your understanding of technology will be relevant.					
Spring 1 [Insert focus of the term here – no more than one line]						
	Resit exam revision and complete any outstanding internal assessments					
Spring 2 [Insert focus of the term here – no more than one line]						
	Resit exam revision and complete any outstanding internal assessments					
Summer 1 [Insert focus of the term here – no more than one line]						
	Resit exam revision and complete any outstanding internal assessments					
Summer 2 [Insert focus of the term here – no more than one line]						

Year 12: BTEC IT L3 Extended Certificate/ Diploma

[Brief summary of the overall focus here – no more than one line]

Topics	Why we teach this	Links to last topic	Links to future topics	Key skills developed	Cultural capital opportunities	Links to whole school curriculum
Autumn 1 Unit 2 Creating Systems to manage information						
Learners study the design, creation, testing and evaluation of a relational database system to manage information	In order to produce information to support many business processes as well as our social lives, relational databases are widely used to manage and process data. From the smallest in-house systems to stock control systems for large online retailers, databases are repositories of information that are a significant part of organisational operating requirements. You will examine the structure of data and its origins, and how an efficient data design follows through to an effective and useful database. You will examine a given scenario and develop an effective design solution to produce a database system. You will then test your solution to ensure that it works correctly. Finally, you will evaluate each stage of the development process and the effectiveness of your database solution. To complete the assessment tasks within this unit, you will need to draw on your learning from across your programme. The skills you gain in this unit support progression to IT-related higher education	Spreadsheet development Programming techniques SQL in GCSE CS	Programming	Normalisation Logical and problem solving skills	Databases are found in so many areas – Google backend is supported by a database, gallery on your phone, to the traditional paper based phone book. This units lends it self to so many every day examples of databases.	Literacy Life skills Business Computer Science Mathematics

	courses and to employment in a role that requires computing-related expertise					
Autumn 2 Unit 2 Creating Systems to manage information						
Learners study the design, creation, testing and evaluation of a relational database system to manage information	In order to produce information to support many business processes as well as our social lives, relational databases are widely used to manage and process data. From the smallest in-house systems to stock control systems for large online retailers, databases are repositories of information that are a significant part of organisational operating requirements. You will examine the structure of data and its origins, and how an efficient data design follows through to an effective and useful database. You will examine a given scenario and develop an effective design solution to produce a database system. You will then test your solution to ensure that it works correctly. Finally, you will evaluate each stage of the development process and the effectiveness of your database solution. To complete the assessment tasks within this unit, you will need to draw on your learning from across your programme. The skills you gain in this unit support progression to IT-related higher education	Spreadsheet development Programming techniques SQL in GCSE CS Component 3 Data manipulation	Programming	Normalisation Logical and problem solving skills	Databases are found in so many areas – Google backend is supported by a database, gallery on your phone, to the traditional paper based phone book. This units lends it self to so many every day examples of databases.	Literacy Life skills Business Computer Science Mathematics
Spring 1 Social media in business						

<p>Learners explore how businesses use social media to promote their products and services. Learners also implement social media activities in a business to meet requirements</p>	<p>Social media websites are a popular way for people to communicate and share information with friends and family. People spend a lot of time on social media websites and they give businesses opportunities to interact with people, for example to promote their business, to encourage people to visit their e-commerce site and buy, to provide customer service. You may be familiar with social media for personal use and in this unit you will discover how it can be used in a business context. You will explore different social media websites, the ways in which they can be used and the potential pitfalls when using them for business purposes. You will develop a plan to use social media strategies for business purposes to achieve specific aims and objectives. You will then implement the plan, developing and posting content and interacting with others. Finally, you will collect data on the business use of social media and review the effectiveness of your efforts. Understanding how to use social media for business purposes is useful for employment in information technology and in a variety of business sectors. Also, social media skills are closely linked</p>	<p>Component 1 User interface design App development Website development</p>	<p>Web development L3</p>	<p>Purpose of social media posts How to create social media posts to increase followers Analyse social media posts Manipulate social media data to give meaningful information</p>	<p>A unit of work that relates well to the school social media policy and drive to engage followers to our social media in a positive way.</p>	<p>Literacy Business</p>
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	with web and mobile applications development. This unit gives you a starting point for progression to roles such as social media specialist, content developer and web developer					
Spring 2 social media in business						
Learners explore how businesses use social media to promote their products and services. Learners also implement social media activities in a business to meet requirements	Social media websites are a popular way for people to communicate and share information with friends and family. People spend a lot of time on social media websites and they give businesses opportunities to interact with people, for example to promote their business, to encourage people to visit their e-commerce site and buy, to provide customer service. You may be familiar with social media for personal use and in this unit you will discover how it can be used in a business context. You will explore different social media websites, the ways in which they can be used and the potential pitfalls when using them for business purposes. You will develop a plan to use social media strategies for business purposes to achieve specific aims and objectives. You will then implement the plan, developing and posting content and interacting with others. Finally, you will collect data on the business use of social media and review the effectiveness of your	Component 1 User interface design App development Website development	Web development L3	Purpose of social media posts How to create social media posts to increase followers Analyse social media posts Manipulate social media data to give meaningful information	A unit of work that relates well to the school social media policy and drive to engage followers to our social media in a positive way.	Interpreting data Creating appropriate social media posts

	efforts. Understanding how to use social media for business purposes is useful for employment in information technology and in a variety of business sectors. Also, social media skills are closely linked with web and mobile applications development. This unit gives you a starting point for progression to roles such as social media specialist, content developer and web developer					
Summer 1 unit 1 information technology systems						
Learners study the role of computer systems and the implications of their use in personal and professional situations	Information technology (IT) systems have a significant role in the world around us and play a part in almost everything we do. Having a sound understanding of how to effectively select and use appropriate IT systems will benefit you personally and professionally. You will explore the relationships between the hardware and software that form an IT system, and the way that systems work individually and together, as well as the relationship between the user and the system. You will examine issues related to the use of IT systems and the impact that they have on organisations and individuals. To complete the assessment task within this unit, you will need to draw on your learning from across your programme. This unit will give	Creating systems to manage information Social media in business	Web development Cyber security	Exam techniques Synoptic units covers all units across the BTEC L3 course	This unit encompasses aspects covered in the course. It covers IT cyber security, transmission types, VPN, how organisations use IT and its impact on users. Students are provided a range of case studies related to the topic.	Literacy Life skills Business Computer Science Mathematics

	you a fundamental and synoptic understanding of all areas of IT, supporting your progression to an IT-related higher education course.					
Summer 2 unit 1 information technology systems						
Learners study the role of computer systems and the implications of their use in personal and professional situations	Information technology (IT) systems have a significant role in the world around us and play a part in almost everything we do. Having a sound understanding of how to effectively select and use appropriate IT systems will benefit you personally and professionally. You will explore the relationships between the hardware and software that form an IT system, and the way that systems work individually and together, as well as the relationship between the user and the system. You will examine issues related to the use of IT systems and the impact that they have on organisations and individuals. To complete the assessment task within this unit, you will need to draw on your learning from across your programme. This unit will give you a fundamental and synoptic understanding of all areas of IT, supporting your progression to an IT-related higher education course.	Creating systems to manage information Social media in business	Web development Cyber security	Exam techniques Synoptic units covers all units across the BTEC L3 course	This unit encompasses aspects covered in the course. It covers IT cyber security, transmission types, VPN, how organisations use IT and its impact on users. Students are provided a range of case studies related to the topic.	Literacy Life skills Business Computer Science Mathematics

Year 13: unit 1 information technology systems						
[Brief summary of the overall focus here – no more than one line]						
Topics	Why we teach this	Links to last topic	Links to future topics	Key skills developed	Cultural capital opportunities	Links to whole school curriculum
Autumn 1 unit 1 information technology systems						
Learners study the role of computer systems and the implications of their use in personal and professional situations	Information technology (IT) systems have a significant role in the world around us and play a part in almost everything we do. Having a sound understanding of how to effectively select and use appropriate IT systems will benefit you personally and professionally. You will explore the relationships between the hardware and software that form an IT system, and the way that systems work individually and together, as well as the relationship between the user and the system. You will examine issues related to the use of IT systems and the impact that they have on organisations and individuals. To complete the assessment task within this unit, you will need to draw on your learning from across your programme. This unit will give you a fundamental and synoptic understanding of all areas of IT, supporting your progression to an IT-related higher education course.	Creating systems to manage information Social media in business	Web development Cyber security	Exam techniques Synoptic units covers all units across the BTEC L3 course	This unit encompasses aspects covered in the course. It covers IT cyber security, transmission types, VPN, how organisations use IT and its impact on users. Students are provided a range of case studies related to the topic.	Literacy Life skills Business Computer Science Mathematics
Autumn 2 unit 1 information technology systems						

Learners study the role of computer systems and the implications of their use in personal and professional situations	Information technology (IT) systems have a significant role in the world around us and play a part in almost everything we do. Having a sound understanding of how to effectively select and use appropriate IT systems will benefit you personally and professionally. You will explore the relationships between the hardware and software that form an IT system, and the way that systems work individually and together, as well as the relationship between the user and the system. You will examine issues related to the use of IT systems and the impact that they have on organisations and individuals. To complete the assessment task within this unit, you will need to draw on your learning from across your programme. This unit will give you a fundamental and synoptic understanding of all areas of IT, supporting your progression to an IT-related higher education course.	Creating systems to manage information Social media in business	Web development Cyber security	Exam techniques Synoptic units covers all units across the BTEC L3 course	This unit encompasses aspects covered in the course. It covers IT cyber security, transmission types, VPN, how organisations use IT and its impact on users. Students are provided a range of case studies related to the topic.	Literacy Life skills Business Computer Science Mathematics
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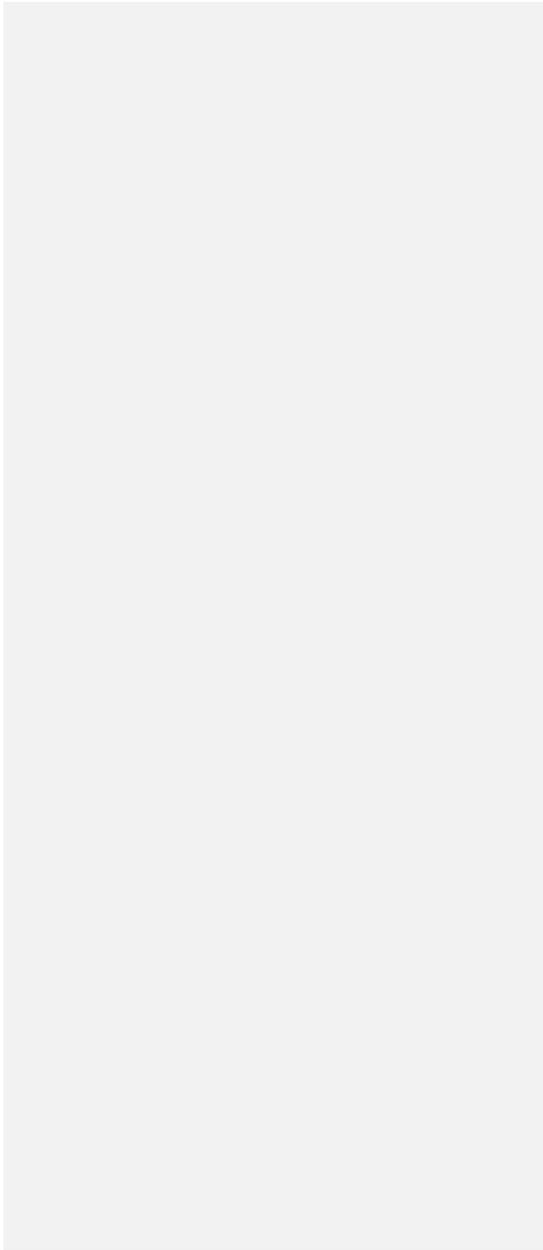
Spring 1 Unit 6 Website Development

Learners investigate website development principles. They will design and develop a website using	Increasingly, organisations rely on websites to serve customers and, in some cases, to generate revenue. With millions of web pages being created daily, the need for websites to be engaging, innovative and desirable is important. As a website	Information technology systems Database systems Website development (KS3)	Preparation for future apprenticeships in IT, higher or further education	HTML CSS JavaScript Wireframe designs Flowcharts Evaluating – critique of designs and website	Students will create a website for a local organisation that requires a website. The website will be officially used by the local charitable organisation	Art Business Graphic design Computer Science
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scripting languages.	<p>developer, you must use sophisticated techniques to capture user interest and to ensure that customers are served. The scripting involved in the development of websites has become crucial: website developers need to understand and acquire the necessary skills to find solutions to a variety of scenarios and problems. In this unit, you will review existing websites – commenting on their overall design and effectiveness. You will use scripting languages such as Hypertext Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript® and a simple text editor, or rapid application development tools. Finally, you will reflect on the website design and functionality using a testing and review process. Many software developers, database experts and systems managers need web-client development skills as an integral part of their overall portfolio of expertise. This unit will prepare you for employment as a website developer or as a website development apprenticeship. The unit will benefit you if you want to go on to higher education to develop your studies</p>	<p>App development (KS3) Interface design (KS4) Programming</p>				
Spring 2 Unit 6 Website Development						

<p>Learners investigate website development principles. They will design and develop a website using scripting languages.</p>	<p>Increasingly, organisations rely on websites to serve customers and, in some cases, to generate revenue. With millions of web pages being created daily, the need for websites to be engaging, innovative and desirable is important. As a website developer, you must use sophisticated techniques to capture user interest and to ensure that customers are served. The scripting involved in the development of websites has become crucial: website developers need to understand and acquire the necessary skills to find solutions to a variety of scenarios and problems. In this unit, you will review existing websites – commenting on their overall design and effectiveness. You will use scripting languages such as Hypertext Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript® and a simple text editor, or rapid application development tools. Finally, you will reflect on the website design and functionality using a testing and review process. Many software developers, database experts and systems managers need web-client development skills as an integral part of their overall portfolio of expertise. This unit will prepare you for employment</p>	<p>Information technology systems Database systems Website development (KS3) App development (KS3) Interface design (KS4) Programming</p>	<p>Preparation for future apprenticeships in IT, higher or further education</p>	<p>HTML CSS JavaScript Wireframe designs Flowcharts Evaluating – critique of designs and website</p>	<p>Students will create a website for a local organisation that requires a website. The website will be officially used by the local charitable organisation</p>	<p>Art Business Graphic design Computer Science</p>
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	as a website developer or as a website development apprenticeship. The unit will benefit you if you want to go on to higher education to develop your studie					
Summer 1 [Insert focus of the term here – no more than one line]						
	Resit exam revision and complete any outstanding internal assessments					
Summer 2 [Insert focus of the term here – no more than one line]						



Computer Science qualification GCSE and A-Level

Year 10: GCSE Computer Science

[Brief summary of the overall focus here – no more than one line]

<u>Topics</u>	<u>Why we teach this</u>	<u>Links to last topic</u>	<u>Links to future topics</u>	<u>Key skills developed</u>	<u>Cultural capital opportunities</u>	<u>Links to whole school curriculum</u>
Autumn 1 systems architecture / Memory and storage						
1.1 Systems architecture 1.2 Memory and storage 1.3 Computer networks, connections and protocols 1.4 Network security 1.5 Systems software 1.6 Ethical, legal, cultural and environmental impacts of digital technology Memory/storage The need for primary storage " The difference between RAM and ROM " The purpose of ROM in a computer system " The purpose of RAM in a computer system " Virtual memory	The fundamentals of hardware components and how they communicate with one another. This is now getting into the depth of hardware components such as the vital CPU and who was Von-Neumann and what was his link to the modern computer. Memory/storage The need for primary storage " The difference between RAM and ROM " The purpose of ROM in a computer system " The purpose of RAM in a computer system " Virtual memory	What is inside a computer? Understanding computers	Structure and function of a processor (A-Level)	Research Understanding processes of a CPU Analyse and evaluate	The link to Von-Neuman and his impact on the modern day computer system Further reading on the subject area.	Design Technology Mathematics
Autumn 2 1.2.3 Units – data storage , characters						
The units of data storage: Bit Nibble (4 bits) o Byte (8 bits) o Kilobyte (1,000 bytes or 1 KB) o Megabyte	Why data must be stored in binary format	What is inside a computer? Understanding computers	Components of a computer and their uses Exchanging data	Problem solving Analytical skills Mathematical conversion of base numbers		Mathematics Data conversion – physics

<p>(1,000 KB) Gigabyte (1,000 MB) Terabyte (1,000 GB) Petabyte (1,000 TB) " How data needs to be converted into a binary format to be processed by a computer " Data capacity and calculation of data capacity requirements</p>	<ul style="list-style-type: none"> ✓ Familiarity with data units and moving between each ✓ Calculate capacity of devices ✓ Calculate required capacity for a given set of files ✓ Calculate file sizes of sound, images and text files <ul style="list-style-type: none"> ▪ sound file size = sample rate x duration (s) x bit depth ▪ image file size = colour depth x image height (px) x image width (px) ▪ text file size = bits per character x number of characters <p>Alternatives</p> <ul style="list-style-type: none"> • Use of 1,024 for conversions and calculations would b 					
Spring 1 Compression						
<p>The need for compression</p> <p><input type="checkbox"/> Types of compression:</p> <ul style="list-style-type: none"> ○ Lossy ○ Lossless 	<p>Common scenarios where compression may be needed</p> <ul style="list-style-type: none"> ✓ Advantages and disadvantages of each type of compression ✓ Effects on the file for each type of compression <p>Not required</p>	<p>Network architecture and ethics</p> <p>How does a computer work?</p>	<p>Components of a computer and their uses</p> <p>Exchanging data</p>	<p>Analytical skills</p> <p>Problem solving</p> <p>Formatting spreadsheets</p> <p>Formulae</p> <p>Pivot tables</p> <p>Macros</p> <p>Charts</p>	<p>To analyse data for a real scenario – football scores, holiday and transport data</p>	<p>Computer science</p> <p>Mathematics</p> <p>Life skills</p> <p>Business</p> <p>Data manipulation in science</p>

	<ul style="list-style-type: none"> ✘ Ability to carry out specific compression algorithms 					
Spring 2 1.3.1 Networks and topologies						
<p>Types of network:</p> <ul style="list-style-type: none"> ○ LAN (Local Area Network) ○ WAN (Wide Area Network) □ Factors that affect the performance of networks □ The different roles of computers in a client-server and a peer-to-peer network □ The hardware needed to connect stand-alone computers into a Local Area Network: ○ Wireless access points ○ Routers ○ Switches ○ NIC (Network Interface Controller/Card) ○ Transmission media □ The Internet as a worldwide collection of computer networks: ○ DNS (Domain Name Server) ○ Hosting ○ The Cloud ○ Web servers and clients □ Star and Mesh network topologies 	<p>The characteristics of LANs and WANs including common examples of each</p> <ul style="list-style-type: none"> ✓ Understanding of different factors that can affect the performance of a network, e.g.: <ul style="list-style-type: none"> ▪ Number of devices connected ▪ Bandwidth ✓ The tasks performed by each piece of hardware ✓ The concept of the Internet as a network of computer networks ✓ A DNS's role in the conversion of a URL to an IP address ✓ Concept of servers providing services (e.g. Web server " Web pages, File server " file storage/retrieval) ✓ Concept of clients requesting/using services from a server ✓ The Cloud: remote service 	<p>How do I become an effective IT user?</p> <ul style="list-style-type: none"> Working online Network architecture Modern technologies 	<p>Software and software development</p>	<p>_Analytical skills</p> <ul style="list-style-type: none"> Problem solving Formatting spreadsheets Formulae Pivot tables Macros Charts 	<p>To analyse data for a real scenario – football scores, holiday and transport data</p>	<p>Computer science</p> <p>Mathematics</p> <p>Data manipulation in science</p>

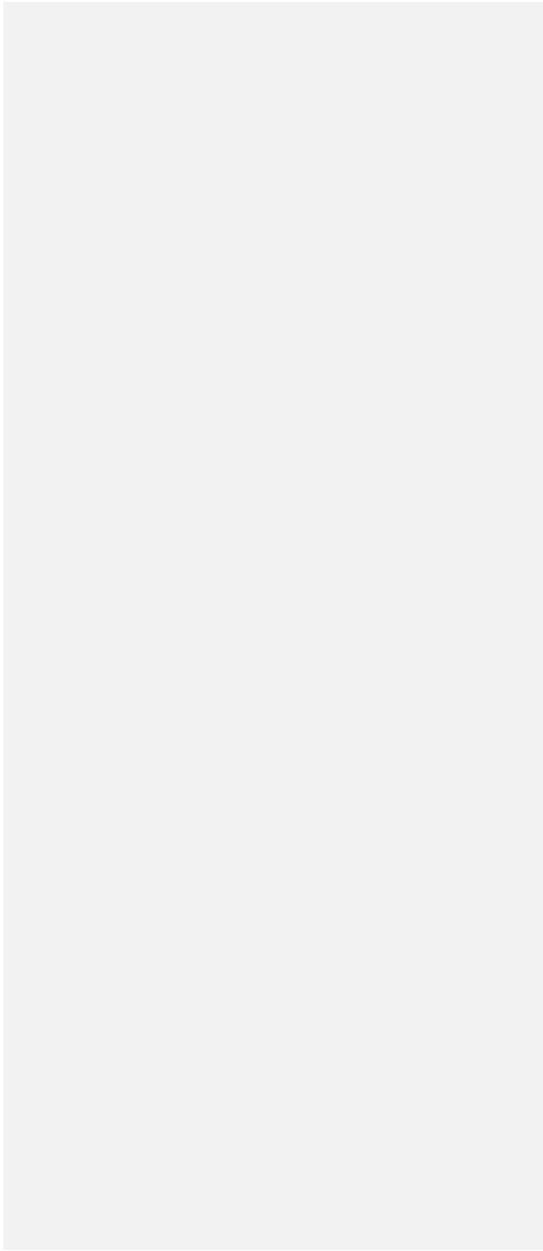
	provision (e.g. storage, software, processing) ✓ Advantages and disadvantages of the Cloud ✓ Advantages and disadvantages of the Star and Mesh topologies ✓ Apply understanding of networks to a given scenario					
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Summer 1 1.4 – Network security

Forms of attack: o Malware o Social engineering, e.g. phishing, people as the 'weak point' o Brute-force attacks o Denial of service attacks o Data interception and theft o The concept of SQL injection Common prevention methods: o Penetration testing o Anti-malware software o Firewalls o User access levels o Passwords o Encryption o Physical security	Threats posed to devices/systems ✓ Knowledge/principles of each form of attack including: ▪ How the attack is used ▪ The purpose of the attack Understanding of how to limit the threats posed in 1.4.1 ✓ Understanding of methods to remove vulnerabilities ✓ Knowledge/principles of each prevention method: ▪ What each prevention method may limit/prevent	Computational thinking Spreadsheet design	Cyber security L3 System software GCSE Networking GCSE CS	Exam techniques Network diagrams and manipulating structures	Share collaborative resources similar to a modern organisations – understand the impact on a business. Cyber-attacks – case studies understanding the impact of the cyber attacks	BTEC IT
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	<ul style="list-style-type: none"> ▪ How it limits the attack 					
Summer 2 1.5 – Systems software						
<p>The purpose and functionality of operating systems:</p> <ul style="list-style-type: none"> ○ User interface ○ Memory management and multitasking ○ Peripheral management and drivers ○ User management ○ File management <p>The purpose and functionality of utility software</p> <ul style="list-style-type: none"> □ Utility system software: <ul style="list-style-type: none"> ○ Encryption software ○ Defragmentation ○ Data compression 	<p>Technology introduces ethical, legal, cultural, environmental and privacy issues</p> <ul style="list-style-type: none"> ✓ Knowledge of a variety of examples of digital technology and how this impacts on society ✓ An ability to discuss the impact of technology based around the issues listed ✓ The purpose of each piece of legislation and the specific actions it allows or prohibits ✓ The need to license software and the purpose of a software licence ✓ Features of open source (providing access to the source code and the ability to change the software) ✓ Features of proprietary (no access to the source code, purchased 	<p>What makes a computer system? Modern technologies</p>	<p>Software and software development</p>	<p>Research Report writing Understanding and interpreting processes</p>	<p>Explore different interfaces in the real world and their purposes</p>	<p>BTEC IT</p>

	commonly as off-the-shelf) ✓ Recommend a type of licence for a given scenario including benefits and drawbacks					
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Year 11: GCSE Computer Science

[Brief summary of the overall focus here – no more than one line]

<u>Topics</u>	<u>Why we teach this</u>	<u>Links to last topic</u>	<u>Links to future topics</u>	<u>Key skills developed</u>	<u>Cultural capital opportunities</u>	<u>Links to whole school curriculum</u>
Autumn 1 Algorithms						
Principles of computational thinking: <ul style="list-style-type: none"> ○ Abstraction ○ Decomposition ○ Algorithmic thinking Identify the inputs, processes, and outputs for a problem <ul style="list-style-type: none"> <input type="checkbox"/> Structure diagrams <input type="checkbox"/> Create, interpret, correct, complete, and refine algorithms using: <ul style="list-style-type: none"> ○ Pseudocode ○ Flowcharts ○ Reference language/high-level programming language <input type="checkbox"/> Identify common errors <input type="checkbox"/> Trace tables 	Produce simple diagrams to show: <ul style="list-style-type: none"> ▪ The structure of a problem ▪ Subsections and their links to other subsections <ul style="list-style-type: none"> ✓ Complete, write or refine an algorithm using the techniques listed ✓ Identify syntax/logic errors in code and suggest fixes ✓ Create and use trace tables to follow an algorithm 	What is inside a computer? Understanding computers How do computers think?	Data types, data structures and algorithms	Logical reasoning Problem solving	tasks are based on real life computational problems	Design Technology Mathematics
Autumn 2 Searching and sorting algorithms						
Standard searching algorithms: <ul style="list-style-type: none"> ○ Binary search ○ Linear search <input type="checkbox"/> Standard sorting algorithms: <ul style="list-style-type: none"> ○ Bubble sort ○ Merge sort ○ Insertion sort 	Understand the main steps of each algorithm <ul style="list-style-type: none"> ✓ Understand any pre-requisites of an algorithm ✓ Apply the algorithm to a data set 	What is inside a computer? Understanding computers How does a computer think?	Data types, data structures and algorithms	Problem solving Analytical skills Mathematical conversion of base numbers		Mathematics Data conversion – physics

	✓ Identify an algorithm if given the code for it					
Spring 1 Programming fundamentals						
<p>The use of variables, constants, operators, inputs, outputs and assignments</p> <ul style="list-style-type: none"> <input type="checkbox"/> The use of the three basic programming constructs used to control the flow of a program: <ul style="list-style-type: none"> o Sequence o Selection o Iteration (count- and condition-controlled loops) <input type="checkbox"/> The common arithmetic operators <input type="checkbox"/> The common Boolean operators AND, OR and NOT <p>Additional programming techniques</p> <ul style="list-style-type: none"> <input type="checkbox"/> The use of basic string manipulation <input type="checkbox"/> The use of basic file handling operations: <ul style="list-style-type: none"> o Open o Read o Write o Close <input type="checkbox"/> The use of records to store data <input type="checkbox"/> The use of SQL to search for data 	<p>Practical use of the data types in a high-level language within the classroom</p> <ul style="list-style-type: none"> ✓ Ability to choose suitable data types for data in a given scenario ✓ Understand that data types may be temporarily changed through casting, and where this may be useful <p>Practical use of the additional programming techniques in a high-level language within the classroom</p> <ul style="list-style-type: none"> ✓ Ability to manipulate strings, including: <ul style="list-style-type: none"> ▪ Concatenation ▪ Slicing ✓ Arrays as fixed length static structures ✓ The use of functions ✓ The use of procedures 	<p>Network architecture and ethics</p> <p>How does a computer work?</p>	<p>Elements of computational thinking</p> <p>Problem solving and programming</p> <p>Analysis of the problem</p>	<p>Analytical skills</p> <p>Problem solving</p> <p>Logical reasoning</p>	<p>To construct a program for a given scenario that is based on a real life computational problem</p>	<p>Computer science</p> <p>Mathematics</p> <p>Life skills</p> <p>Data manipulation in science</p>

<input type="checkbox"/> The use of arrays (or equivalent) when solving problems, including both one-dimensional and two-dimensional arrays <input type="checkbox"/> How to use sub programs (functions and procedures) to produce structured code <input type="checkbox"/> Random number generation	<input checked="" type="checkbox"/> Where to use functions and procedures effectively <input checked="" type="checkbox"/> SQL commands: <ul style="list-style-type: none"> ▪ SELECT ▪ FROM ▪ WHERE 					
Spring 2 Boolean logic						
Simple logic diagrams using the operators AND, OR and NOT <input type="checkbox"/> Truth tables <input type="checkbox"/> Combining Boolean operators using AND, OR and NOT <input type="checkbox"/> Applying logical operators in truth tables to solve problems	Knowledge of the truth tables for each logic gate <input checked="" type="checkbox"/> Recognition of each gate symbol <input checked="" type="checkbox"/> Understanding of how to create, complete or edit logic diagrams and truth tables for given scenarios <input checked="" type="checkbox"/> Ability to work with more than one gate in a logic diagram	How do I become an effective IT user? Working online Network architecture Modern technologies	Analysis of the problem Algorithms	Analytical skills Problem solving Formatting		Computer science Mathematics Data manipulation in science
Summer 1						
Revision and retrieval of content						
Summer 2 FINAL EXAMINATIONS						

Year 12: A-Level Computer Science

<u>Topics</u>	<u>Why we teach this</u>	<u>Links to last topic</u>	<u>Links to future topics</u>	<u>Key skills developed</u>	<u>Cultural capital opportunities</u>	<u>Links to whole school curriculum</u>
Autumn 1 Components of a computer and their uses						
The Arithmetic and Logic Unit; ALU, Control Unit and Registers (Program Counter; PC, Accumulator; ACC, Memory Address Register; MAR, Memory Data Register; MDR, Current Instruction Register; CIR). Buses: data, address and control: how this relates to assembly language programs. (b) The Fetch-Decode-Execute Cycle; including its effects on registers. (c) The factors affecting the performance of the CPU: clock speed, number of cores, cache. (d) The use of pipelining in a processor to improve efficiency. (e) Von Neumann, Harvard and contemporary processor architecture	This component will introduce learners to the internal workings of the Central Processing Unit (CPU), the exchange of data and will also look at software development, data types and legal and ethical issues. It is expected that learners will draw on this underpinning content when studying computational thinking, developing programming techniques and devising their own programming approach in the Programming project component (03 or 04). Learners will be expected to apply the criteria below in different contexts including current and	Systems architecture	Further or higher education in IT or Computer science	Logical reasoning Problem solving Understanding and interpreting processes	Von Neuman Develop further concepts and processes related to the modern computer system	Design Technology Mathematics

	future uses of the technologies					
Autumn 2 Exchanging data						
Lossy vs Lossless compression. (b) Run length encoding and dictionary coding for lossless compression. (c) Symmetric and asymmetric encryption. (d) Different uses of hashing. Relational database, flat file, primary key, foreign key, secondary key, entity relationship modelling, normalisation and indexing. See appendix 5f. (b) Methods of capturing, selecting, managing and exchanging data. (c) Normalisation to 3NF. (d) SQL – Interpret and modify. See appendix 5d. (e) Referential integrity. (f) Transaction processing, ACID (Atomicity, Consistency, Isolation, Durability), record locking and redundancy	This component will introduce learners to the internal workings of the Central Processing Unit (CPU), the exchange of data and will also look at software development, data types and legal and ethical issues. It is expected that learners will draw on this underpinning content when studying computational thinking, developing programming techniques and devising their own programming approach in the Programming project component (03 or 04). Learners will be expected to apply the criteria below in different contexts including current and future uses of the technologies	Data		Problem solving Analytical skills Mathematical conversion of base numbers		Mathematics Data conversion – physics
Spring 1 Data types, data structures and algorithms						

<p>Primitive data types, integer, real/floating point, character, string and Boolean. (b) Represent positive integers in binary. (c) Use of sign and magnitude and two's complement to represent negative numbers in binary. (d) Addition and subtraction of binary integers. (e) Represent positive integers in hexadecimal. (f) Convert positive integers between binary hexadecimal and denary. (g) Representation and normalisation of floating point numbers in binary. (h) Floating point arithmetic, positive and negative numbers, addition and subtraction. (i) Bitwise manipulation and masks: shifts, combining with AND, OR, and XOR. (j) How character sets (ASCII and UNICODE) are used to represent text Arrays (of up to 3 dimensions), records, lists, tuples. (b) The following structures to store data: linked-list, graph (directed and undirected), stack, queue, tree, binary search tree, hash table. (c) How to create, traverse, add data</p>	<p>This component will introduce learners to the internal workings of the Central Processing Unit (CPU), the exchange of data and will also look at software development, data types and legal and ethical issues. It is expected that learners will draw on this underpinning content when studying computational thinking, developing programming techniques and devising their own programming approach in the Programming project component (03 or 04). Learners will be expected to apply the criteria below in different contexts including current and future uses of the technologies</p>	<p>Data conversion Compression algorithms</p>	<p>Elements of computational thinking Problem solving and programming Analysis of the problem</p>	<p>Analytical skills Problem solving Logical reasoning</p>		<p>Computer science Mathematics Life skills Data manipulation in science</p>
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to and remove data from the data structures mentioned above. (NB this can be either using arrays and procedural programming or an object-oriented approach)						
Spring 2 Legal, moral, cultural and ethical issues						
The Data Protection Act 1998. (b) The Computer Misuse Act 1990. (c) The Copyright Design and Patents Act 1988. (d) The Regulation of Investigatory Powers Act 2000. The individual moral, social, ethical and cultural opportunities and risks of digital technology: • Computers in the workforce. • Automated decision making. • Artificial intelligence. • Environmental effects. • Censorship and the Internet. • Monitor behaviour. • Analyse personal information. • Piracy and offensive communications. • Layout, colour paradigms and character sets.	The individual moral, social, ethical and cultural opportunities and risks of digital technology. Legislation surrounding the use of computers and ethical issues that can or may in the future arise from the use of computers	Legal and ethical issues (GCSE) Modern technologies Network architecture Working online		_Forming an argument for or against Further reading around a subject	News articles on IT based topics and laws Further reading on case studies	Computer science Mathematics Data manipulation in science Literacy
Summer 1 Content of Algorithms and programming						
a) The nature of abstraction. (b) The need for	This component will incorporate and build on the knowledge and	KS3/GCSE Computational thinking Algorithms		Problem solving Logical reasoning Applying the 3 processes of	The aspects of algorithms to be applied to many everyday	Mathematics Life skills

<p>abstraction. (c) The differences between an abstraction and reality. (d) Devise an abstract model for a variety of situations.</p> <p>Identify the inputs and outputs for a given situation. (b) Determine the preconditions for devising a solution to a problem. (c) The nature, benefits and drawbacks of caching. (d) The need for reusable program components</p> <p>Identify the components of a problem. (b) Identify the components of a solution to a problem. (c) Determine the order of the steps needed to solve a problem. (d) Identify sub-procedures necessary to solve a problem.</p> <p>Identify the points in a solution where a decision</p>	<p>understanding gained in the Computer systems component (01). In addition, learners should: • understand what is meant by computational thinking • understand the benefits of applying computational thinking to solving a wide variety of problems understand the principles of solving problems by computational methods • be able to use algorithms to describe problems • be able to analyse a problem by identifying its component parts.</p>	<p>programming</p>		<p>computational thinking</p>	<p>occurrences that helps students form the link and understanding of algorithms</p>	
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<p>has to be taken. (b) Determine the logical conditions that affect the outcome of a decision. (c) Determine how decisions affect flow through a program.</p> <p>Determine the parts of a problem that can be tackled at the same time. (b) Outline the benefits and trade offs that might result from concurrent processing in a particular situation.</p>						
<p>Summer 2 revision and retrieval</p>						

Year 13: A-Level Computer Science

<u>Topics</u>	<u>Why we teach this</u>	<u>Links to last topic</u>	<u>Links to future topics</u>	<u>Key skills developed</u>	<u>Cultural capital opportunities</u>	<u>Links to whole school curriculum</u>
Autumn 1 Content of non exam assessment Programming project						
Describe and justify the features that make the problem solvable by computational methods. (b) Explain why the problem is amenable to a computational approach Identify and describe those who will have an interest in the solution explaining how the solution is appropriate to their needs (this may be named individuals, groups or persona that describes the target end user) Research the problem and solutions to similar problems to identify and justify suitable approaches to a solution. (b) Describe the essential features of a computational solution explaining these choices. (c) Explain the limitations of the proposed solution. Specify and justify the solution requirements including hardware and software configuration (if appropriate). (b) Identify	Learners will be expected to analyse, design, develop, test, evaluate and document a program written in a suitable programming language. The underlying approach to the project is to apply the principles of computational thinking to a practical coding problem. Learners are expected to apply appropriate principles from an agile development approach to the project development. While the project assessment criteria are organised into specific categories, it is anticipated the final report will document the agile development process and elements for each of the assessment categories	Algorithms GCSE programming Link to unit 4 programming BTEC L3	Further or higher education in IT or Computer science	Logical reasoning Problem solving Understanding and interpreting processes		Design Technology Mathematics

and justify measurable success criteria for the proposed solution	will appear throughout the report					
Autumn 2 Design of the solution						
Break down the problem into smaller parts suitable for computational solutions justifying any decisions made Explain and justify the structure of the solution. Describe the parts of the solution using algorithms justifying how these algorithms form a complete solution to the problem. (c) Describe usability features to be included in the solution. (d) Identify key variables / data structures / classes justifying choices and any necessary validation. Identify the test data to be used during the iterative development and post development phases and justify the choice of this test data	Learners will be expected to analyse, design, develop, test, evaluate and document a program written in a suitable programming language. The underlying approach to the project is to apply the principles of computational thinking to a practical coding problem. Learners are expected to apply appropriate principles from an agile development approach to the project development. While the project assessment criteria are organised into specific categories, it is anticipated the final report will document the agile development process and elements for each of the assessment categories will appear throughout the report	Algorithms GCSE programming Link to unit 4 programming BTEC L3	Further or higher education in IT or Computer science	Problem solving Analytical skills Mathematical conversion of base numbers		Mathematics Data conversion – physics
Spring 1 Developing the solution						

<p>Provide annotated evidence of each stage of the iterative development process justifying any decision made. (b) Provide annotated evidence of prototype solutions justifying any decision made.</p> <p>Provide annotated evidence for testing at each stage justifying the reason for the test. (b)</p> <p>Provide annotated evidence of any remedial actions taken justifying the decision made</p>	<p>Learners will be expected to analyse, design, develop, test, evaluate and document a program written in a suitable programming language. The underlying approach to the project is to apply the principles of computational thinking to a practical coding problem.</p> <p>Learners are expected to apply appropriate principles from an agile development approach to the project development. While the project assessment criteria are organised into specific categories, it is anticipated the final report will document the agile development process and elements for each of the assessment categories will appear throughout the report</p>	<p>Algorithms GCSE programming Link to unit 4 programming BTEC L3 Unit 9 project planning BTEC L3</p>	<p>Further or higher education in IT or Computer science</p>	<p>Analytical skills Problem solving Logical reasoning</p>		<p>Computer science Mathematics Life skills Data manipulation in science</p>
<p>Spring 2 Evaluation</p>						
<p>Provide annotated evidence of testing the solution of robustness at the end of the development process. (b)</p>	<p>Learners will be expected to analyse, design, develop, test, evaluate and document a program</p>	<p>Algorithms GCSE programming</p>	<p>Further or higher education in IT or Computer science</p>	<p>_Forming an argument for or against Further reading around a subject</p>		<p>Computer science Mathematics Data manipulation in science Literacy</p>

<p>Provide annotated evidence of usability testing (user feedback) Use the test evidence from the development and post development process to evaluate the solution against the success criteria from the analysis. Provide annotated evidence of the usability features from the design, commenting on their effectiveness Discuss the maintainability of the solution. (b) Discuss potential further development of the solution.</p>	<p>written in a suitable programming language. The underlying approach to the project is to apply the principles of computational thinking to a practical coding problem. Learners are expected to apply appropriate principles from an agile development approach to the project development. While the project assessment criteria are organised into specific categories, it is anticipated the final report will document the agile development process and elements for each of the assessment categories will appear throughout the report</p>	<p>Link to unit 4 programming BTEC L3 Unit 9 project planning BTEC L3</p>				
Summer 1		revision and retrieval				
Summer 2		revision and retrieval				

Appendix A: Whole-school Curriculum Vision

OUR CURRICULUM VISION

Colton Hills Community School is an inner-city school with a diverse cohort that draws from a wide range of cultures, nationalities and identities. A significant majority of our students come from working class backgrounds, and many from households where resources can be scarce and access to cultural capital is limited. Our school proudly holds the status of a School of Sanctuary, where students from across the local area – and across the globe, too – can come together to learn harmoniously regardless of their background and upbringing. We are aware of the challenges of our students' lives, but do not use them as an excuse.

Therefore, the intention of our curriculum is that we will offer our students the access to a broad and varied curriculum that seeks to equip them for modern life. We intend it to be knowledge-rich, deep in its explorations of topics, challenging in its delivery and with a distinctive, outward-looking, international feel. We recognised the importance of grounding our curriculum in its wider contexts to enable us to fill gaps in our students' knowledge that they may have when compared to students from more affluent backgrounds, and we are unapologetic in ensuring that our students have every opportunity to engage with as much powerful knowledge as those more fortunate than they are.

With these school contexts in mind, at Colton Hills we have built our curriculum around a series of thematically based Curricular Concepts that students will see in various subjects, enabling them to draw links and supporting them in making connections that might not always be apparent to them.

The intention of our curriculum at all stages is that we will teach all children at the school that:

1 – Humanity is on an optimistic, positive journey of developing tolerance, enfranchisement and rights for all peoples, and we must all play our part in this (SOCIAL JUSTICE)

2 – Diversity is a gift to be valued, one that enriches our school, and that the shared histories of all cultures are worthy of respect and understanding (**CULTURAL DIVERSITY**)

3 – Respect for the law, democracy and its institutions are vital, but that existing power structures should always be respectfully questioned (**CIVIC RESPONSIBILITY**)

4 – Technological development is full of great human achievement, but is not without its challenges and drawbacks of which we must always be aware (**TECHNOLOGICAL PROGRESS**)

5 – The natural world is a place of wonder, mystery and beauty that should be respected, revered and protected, particularly in the face of climate change (**PRECIOUS PLANET**)

6 – Our health – mentally, physically and spiritually – is of primary importance and must be preserved as it contributes immensely to a happy and ~~productive~~contented life (**HEALTHY LIVING**)

7 – Being enterprising and financially independent is crucial, but making money should always be weighed against the moral decisions about who it might affect (**ETHICAL ENTERPRISE**)

8 – An appreciation of the vast array of creative arts and their power to entertain and educate is vital in an enriched, meaningful and fulfilled life (**ARTISTIC CREATIVITY**)

Students who leave school with wider awareness of the world around them, with self-respect and with a personal morality will be best able to take advantage of all that life offers, and find their place in the world as a citizen of all of their communities.