



FRAMEWORK FOR LEARNING



CREATIVE

An education where imagination, curiosity and resilience enable us to ignite our learning.

HAPPY

A shared belief that optimism, empathy and responsibility are the foundations for a respectful, safe and inclusive community.

SUCCESSFUL

Individuals who are ready to learn, practise being reflective, and are motivated to become champions.

SUBJECT

COMPUTER SCIENCE

INTENT

Studying Computer Science will help develop problem-solving, critical thinking and analytical skills. Computer Science is found in nearly all jobs and careers. Studying Computing will provide students with a versatile foundation for many different careers and allows students to develop interchangeable and transferable skills inside and outside of IT. Our students are now living in a digital age where more of their lives become intertwined with digital technologies. It is important that students understand this technology and are able to use it effectively. In Computer Science, students will develop knowledge and understanding of key computing topics that will prepare them for their future studies in Computing. They will:

Key Stage 3:

1. Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems.
2. Understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem.
3. Use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables, or arrays]; design and develop modular programs that use procedures or functions.
4. Understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal].
5. Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems.



6. Understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits.
7. Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users.
8. Create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design, and usability.
9. Understand a range of ways to use technology safely, respectfully, responsibly, and securely, including protecting their online identity and privacy; recognise inappropriate content, contact, and conduct, and know how to report concerns.



YEAR GROUP

YEAR 8

RATIONAL / NARRATIVE

In year 8 students will continue to build upon their learning in Year 7. Again, a wide range of topics will be covered in Computer Science, Information Technology and Digital Literacy. Programming continues to be developed in Year 8 building on the skills and knowledge students learnt in Year 7. This year continues to cover a wide range of strands of the national curriculum. The strands that are covered in year 8 are listed below and the corresponding unit of student has been highlighted in brackets.

- Create, reuse, revise, and repurpose digital artefacts for a given audience, with attention to trustworthiness, design, and usability. *(8.1, 8.3, 8.6)*
- Understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits *(8.4)*
- Design, use, and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems *(8.6)*
- Use two or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables, or arrays]; design and develop modular programs that use procedures or functions *(8.5, 8.6)*
- Understand several key algorithms that reflect computational thinking; use logical reasoning to compare the utility of alternative algorithms for the same problem *(8.5, 8.6)*
- Understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming *(8.2)*
- Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems *(8.2)*
- Understand how instructions are stored and executed within a computer system *(8.2 8.5)*
- Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users *(8.1)*
- Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems *(8.5)*

TERM KNOWLEDGE

AUTUMN 1

AUTUMN 2

SPRING 1

SPRING 2

SUMMER 1

SUMMER 2

8.1 - Media – Vector Graphics

- Creating shapes
- Manipulating shapes
- Path operations
- Manipulating groups of objects
- Convert objects to paths.
- Draws paths.
- Edit path nodes.

8.2 - Computer Systems

- Computer System
- Purpose-built machinery
- Programs - Software
- Components of a computer systems
- Input and output devices
- Communication components
- Operating system

8.3 - Data Representation – From clay to silicon

- Examples of representations
- Encoding and Decoding messages
- Binary digits
- Numbers in binary
- Storage units

8.4 - Developing the Web

- HTML
- Displaying Images
- CSS
- Searching the web
- Tightening the web
- Navigating the web

8.5 - Python Programming

- Algorithms
- Python
- Print and input function.
- Variables
- Syntax errors
- Semantic of assignment statements

8.6 - Mobile App development

- Graphic User Interface
- Event driven programming
- Identifying and fixing coding errors
- User input
- Block-based programming language



<p style="text-align: center;">SKILLS</p> <p style="text-align: center;">ASSESSMENT</p> <p style="text-align: center;">HOME LEARNING</p>	<ul style="list-style-type: none"> Tools and techniques to create vector graphics. Investigate vector graphics 	<ul style="list-style-type: none"> Logic gates Artificial intelligence and machine learning Sharing program code 			<ul style="list-style-type: none"> Arithmetic expression statements Relational operators Logical expressions Generate and use integers. Selection statements Iteration Boolean variables 	<ul style="list-style-type: none"> Variables Sequence and Selection
	<p>Students will develop skills in:</p> <ul style="list-style-type: none"> Drawing Manipulation Grouping Align and Distribute Union Difference Evaluation 	<p>Students will develop skills in:</p> <ul style="list-style-type: none"> Researching Problem solving Thinking Investigate Evaluation Breaking down information Explore 	<p>Students will develop skills in:</p> <ul style="list-style-type: none"> Investigate Encoding and decoding Converting binary and decimals Measuring data Problem solving Thinking Evaluation 	<p>Students will develop skills in:</p> <ul style="list-style-type: none"> Searching the web Web design Building web pages HTML Tags CSS Navigating the web Evaluation 	<p>Students will develop skills in:</p> <ul style="list-style-type: none"> Sequencing Variables Selection Operators Iteration Evaluation skills Identifying and selecting information 	<p>Students will develop skills in:</p> <ul style="list-style-type: none"> Analysis Decomposition Design Correcting code Block based programming. App development User input Evaluation
	<p>Marking Point: Students final graphics will be assessed via an assessment rubric.</p>	<p>Marking Point: Written activity for students to demonstrate their understanding of key computer components. (Extended Writing)</p> <p>Marking Point: End of topic assessment set Microsoft Teams based on Computer Systems. (Self-Marking)</p>	<p>Marking Point: Binary and Denary conversion activity.</p> <p style="text-align: center;">Spring Progress Test (Week 2/3)</p>	<p>Marking Point: Students' final webpages will be assessed via an assessment rubric.</p>	<p>Marking Point: Practical Programming activity.</p>	<p>Marking Point: Students final app will be assessed via an assessment rubric.</p> <p style="text-align: center;">Summer Progress Test (Week 3/4)</p>
	<p>Graphics – students will examine a range of key terms and match them to their definitions.</p>	<p>Computer Systems – Students to complete a range of comprehension tasks.</p>	<p>Number to bits – Students will complete a range of conversions between binary and denary.</p>	<p>HTML – students to examine the code and complete the code to ensure it effectively works.</p>	<p>Python Programming – Students to examine the python code and answer a range of comprehension questions.</p>	<p>Screen designs – Students will design at least 2 screen designs for their app.</p>



READING, WRITING, TALK, NUMERACY

Reading: Students will read subject specific documents linked to the topic of study. They will focus on developing breaking down information and learning new vocabulary.

Writing: During this half term students will focus on deepening their skills of summarising. They will also develop their reflective writing skills. As they progress through this topic, they will reflect on each lesson about what they have learnt and what they need to develop further in the next lesson.

Oracy: Students will focus on two elements of oracy. Linguistics ensuring that they use appropriate vocabulary. They will also focus on Physical skills of voice and body language as students will showcase their final graphics in the last lesson.

Numeracy: Students will create a number of shapes using appropriate software. They will need to consider the measurements of the shapes as well as other angles.

- Analyse
- Create
- Define
- Describe

Reading: Students will read subject specific text documents including online resources. The main skill students will focus on during this half term will be visualize and learning new vocabulary.

Writing: Student will continue to develop expository writing and will record key information about the different components of a computer systems. Students will be required to describe what the components do and their role in a computer.

Oracy: Students will continue developing their social and emotional oracy skills. They will focus on developing their listening and responding further as well as their confidence in speaking.

Numeracy: Students will examine computer speeds and the impact of different components. They will also examine logical operators.

- Create
- Define
- Describe
- Discuss

Reading: Students will read texts linked to this topic. They will continue to develop their previous skills but will focus on deepening their skill of relating to their own experience.

Writing: Students will continue to develop their reflective and summarising skills. They will need to be able to record key information and sequences required for data conversions.

Oracy: Students will continue to develop their social and emotional skills with a focus on listening and responding. They will also develop their cognitive skills focusing on self-regulation.

Numeracy: Students will learn to convert binary and decimals numbers. They will also examine how different data units are used to store different data.

- Analyse
- Calculate
- Compare
- Consider

Reading: Students will read a range of texts linked to this topic. They will focus on deepening their skills of breaking down information and learning new vocabulary.

Writing: Students will continue to develop their expository writing skills. They will summarise key information and present relevant information in their webpages.

Oracy: During this half term students will focus on their cognitive skill of clarifying and summarising. They will also develop their social and emotional skills with a focus on confidence in speaking.

Numeracy: Students will use a range of number skills when creating their HTML tags to ensure that their webpage is formatted appropriately.

- Analyse
- Create
- Define
- Describe

Reading: Student will read subject specific documents linked to programming. They will focus on deepening their skills in predict and learning new vocabulary.

Writing: Students will be continuing to develop their summarising skills. They will need to be able to keep a record of each of the different programming elements that they learn and what they do, to refer back to them in their next lesson.

Oracy: Students will focus on cognitive skills during this topic. They will continue to develop their clarifying and summarising skills as well as their self-regulation skills.

Numeracy: Students will use a range of numeracy skills in this lesson. They will have to effectively take numerical inputs, use arithmetic expressions, and use count control.

- Analyse
- Apply
- Choose
- Complete

Reading: Students will use a read a range of text documents linked to this topic. They will focus this term on further developing their skills in asking questions and well as developing previous skills.

Writing: Students will continue to develop and improve their summarising skills. They will also develop evaluating skills by reflecting on the work that they completed. They will ask to be reflective on their progress during lessons.

Oracy: Students will develop their Linguistic skills further with a focus on using appropriate vocabulary linked to app development. They will also develop their social and emotional skills with a focus on confidence in speaking.

Numeracy: Students will use a range of numeracy skills in their app. They will need to get the app to count in order to control the program.

- Analyse
- Apply
- Choose
- Complete

TIER 2 VOCABULARY



TIER 3 VOCABULARY

PSPSMC, BRITISH VALUES AND DIVERSITY

<ul style="list-style-type: none"> • Design • Develop • Explain • Select • Summarise 	<ul style="list-style-type: none"> • Examine • Explain • Identify • Justify • Process 	<ul style="list-style-type: none"> • Define • Describe • Examine • Explain • State 	<ul style="list-style-type: none"> • Design • Develop • Explain • Select • Summarise 	<ul style="list-style-type: none"> • Create • Define • Design • Develop • Examine • Select • Summarise 	<ul style="list-style-type: none"> • Create • Define • Design • Develop • Examine • Select • Summarise
<ul style="list-style-type: none"> • Vector Graphics • Path operations • Path nodes • Icons • Raster graphics • Scalability 	<ul style="list-style-type: none"> • Computer System • Hardware • Operating System • Logical operators • Artificial Intelligence • Machine Learning • Program code 	<ul style="list-style-type: none"> • Data Representation • Encoding/ Decoding • Binary • Denary • Data Units • Character – Coding scheme 	<ul style="list-style-type: none"> • Hypertext Markup Language • HTML Tags • CSS • Search Engine • Hyperlinks • Navigation 	<ul style="list-style-type: none"> • Algorithm • Variables • Arithmetic expressions • Relational operators • Selection • Multi branch selection 	<ul style="list-style-type: none"> • Decomposition • Event-driven programming • Variable • Decompose • Sequence • Selection
<p>Personal: Develop transferable design skills. Social: Learn how to communicate effectively with people. British value: Understanding that all students can contribute to the lesson and work together effectively. Moral: Understand and explore the use of AI in computers. Physical: Effects of too much time on the computer and the impact it can have on people. Cultural: Understand the cultural norms associated with digital issues. Diversity: Explore where different components of a computer come from and who was instrumental in the creation of them.</p>		<p>Personal: Develop skills in web design to effectively communicate information. Social: Consider the impact that information could have on people. Ensure it is effectively communicated. British value: Understand how people influence the design of websites and how people's beliefs are considered. Moral: Understand the impact that computers and apps can have on people. Be able to consider how this can be less damaging. Physical: Consider how computers can have an impact on people and consider how we can design apps to help overcome the impact on people. Cultural: Understand how computers can impact different people from different cultures. Consider how they may feel with advancement in technology. Diversity: Students will create a website that explores diversity in computing and the significance of people from diverse backgrounds within computing.</p>		<p>Personal: Develop transferable programming skills. Social: Opportunities for students to work together in the development of skills. British value: Understand the laws used to govern computer systems and the creation of computer programs. Moral: Understand how misinformation on the internet can be damaging. Physical: Physical and emotional wellbeing surrounding computers, time spent on computers and developments in technologies impact on people and society. Cultural: Understand the impact that different people have had on computer programming Which groups of people led the development of programming languages. Diversity: Students will explore how people from different backgrounds have shaped programming and app development.</p>	