

The national curriculum for computing aims to ensure that all pupils:

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology.

Key Stage 1

Pupils should be taught to:

- Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
- Create and debug simple programs
- Use logical reasoning to predict the behaviour of simple programs
- Use technology purposefully to create, organise, store, manipulate and retrieve digital content
- Recognise common uses of information technology beyond school
- Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

Key Stage 2

Pupils should be taught to:

- Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- Use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- Understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
- Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

	<i>Year 3 Computer User</i>	<i>Year 4 Computer User</i>	<i>Year 5 Computer User</i>	<i>Year 6 Computer User</i>
	Algorithms and programming/ Computer Science Coding Unit 3.1 • Flowcharts are a type of diagram that use specifically shaped labelled boxes and arrows to represent an algorithm as a diagram. • Timers are used in coding to help control when a block of commands are run. Timer commands can be run after a timed delay or at regular intervals. In 2Code there are two timer options, timer every or timer after. These can be altered by changing the number of seconds/quarter seconds. • Repeat is a control block and blocks of commands can be set to repeat a specified number of times using the repeat control block. • Testing, debugging and fixing are an important part of the process of making computer programs. Understanding what nesting is and the effect it has on a program can help when trying to debug a program.	Algorithms and programming/ Computer Science Coding Unit 4.1 • There are objects in 2Code and that there are different types and these have attributes (properties) that can be changed. • Backgrounds can be changed and manipulated • Selection is a term used in computer programming. That it is a decision command that will be run dependent on whether a condition is met. • If statements are used to create selection in 2Code and that they are bits of code that will run only if a condition is true. • Coordinates are used in computer programming to determine the position of a point, shape or object and that these change according to where they are positioned on the screen. • Repeat until is a control block and that blocks of code will repeat until a condition is met.	Algorithms and programming/ Computer Science Coding Units 5.1 and 5.5 • Code can be simplified to complete the same process with less lines of code. Simplified code runs faster and uses less processing memory, it is said to be more efficient. Computer generated variables in 2Code are tags given to objects and these can be used to control object types meaning less lines of code are needed. • A simulation is a model that represents a real or imaginary situation. Plans of an algorithm that represents a real or imaginary situation can be created and then used to program a simulation in 2Code. • The timer every command can be used to make code repeat forever.	Algorithms and programming/ Computer Science Coding 6.1 • Number elements combined with a number variable and an if/else statement can be used to create an onscreen countdown timer. Selection can be achieved through the use of if/else statements. • The coordinates of objects can be used in code such as moving the position of them. The position of an object on the screen in 2Code is referenced using x and y coordinates. • The launch command can be used within 2Code to open another Purple Mash file or an external website when it is called in a program. • 2Code contains tabs in the coding view. Tabs can be used to help organise code.

Micro:bit Unit 3.10

- A micro:bit is a tiny computer which needs instructions in code to make it work.
- A micro:bit can produce outputs.
- A micro:bit can receive inputs.
- Code from the coding environment can be transferred onto a micro:bit.
- The order (sequence) of instructions is important when coding.

Information technology

Branching Database Unit 3.6

- A database is a collection of data organised in a way that it can be searched, and information found easily.
- Objects can be sorted using yes/no questions and relate this to how computer binary databases work.
- Branching databases can be created using programs such as 2Question.
- It is important to test and debug if needed when creating branching databases so that they work as intended.
- Computer programs such as 2Graph can be used to present data in more meaningful ways.
- It's important to use the most appropriate graph type according to the information entered into it.
- Graphing programs can be used to help solve questions.

Presenting Google Slides: 3.9

- Presentation software is a way of creating and displaying information to an audience that is clear and engaging
- Simple presentations can be made quickly by using features such as textboxes, word art and images.
- Presentations can include additional slides, video and audio.
- Designs of slides can be changed.
- Animations can be incorporated within a Google Slides presentation
- Transitions can be applied between slides.
- Timings can be added to transitions and animations.

- If/else statements are a conditional command that tests a statement. If a condition is true, commands inside the if block will run. If a condition is false, commands inside the else block will run. C
- Variables are a virtual container (A place in computer memory) that contain a value that can change. The value is normally in the format of a number or letter. Variables are used in programming to keep track of things that can change such as the score in a computer game. There are 3 main types that be created using 2Code.

Logo Unit 4:5

- 2Logo has its own language with specific instructions.
- Representations of shapes, letters and flowers can be created in 2Logo using the repeat command.
- The repeat command is a more efficient way to code in 2Logo.
- It is important to test and debug code in 2Logo as with other coding platforms to ensure it runs effectively.

Information technology

Spreadsheets 4:3

- It is possible to input numbers into a spreadsheet in different formats including the use of a decimal point.
- Formulas can be added to a spreadsheet to speed up calculations when data is changed.
- There is specific functionality of some of the tools within 2Calculate.
- A spreadsheet can create a range of graphs and charts and these can be interrogated.
- Spreadsheets can be used to model a real-life situation and improve the efficiency of day to day tasks.
- A value can be added to images in 2Calculate to make a resource to teach place value.

Making Music Unit 4:9

- There are some main elements to music including pulse, rhythm, tempo, pitch and texture.
- A piece of music can be altered by changing the rhythm and tempo.
- A melodic phrase can be created using music software.
- An electronic piece of music contains the key musical features.

- Decomposition is a method of breaking down a task into manageable components. This makes coding easier as the components can then be coded separately and then brought back together in the program.
- Abstraction is a way of de-cluttering and removing unnecessary details to get a program functioning.
- A function is a block or sequence of code that can be accessed when it is needed. This means code doesn't have to be rewritten every time it is needed. Instead, the function can be called each time it is needed.
- Strings are text or a combination of text characters and numbers within programs. An example could be a program that has a string type variable that is used to keep a player informed of their progress in a game.
- Concatenation is the name given to the action of linking things together in a series. For example, in programs we might want to link words together to form random phrases that are seen by a user of a program.

Though Lego CAD:

- External devices can be used to control a coded program.
- An external device can be used as a controller
- An external device can be used to model real life situations.
- A program can be written for the external device to meet a specific design brief.

Information technology

Word Processing Unit 5.8

- A word processing tool can be used to create a range of documents. WP
- Images can be added to a document. WP
- Images can be edited WP
- The look of text within a document can be changed. WP
- Various features within the program will enhance the documents look and usability. WP
- Google Docs can easily be shared with other people. WP
- Tables can be used to present information within a document. WP
- A template can be used to create a document. WP

- Using functions helps with making programs more efficient. Instead of writing the same sequence of code repeatedly when needed, a function can be created and called when required. Procedures are an independent piece of code. In 2Code, a procedure might be coded as a function.
- Flowcharts can represent procedures within a program. Flowcharts can be referenced when a program is executed to test whether a program is running as expected according to the flowchart.
- Input is defined by information going into a computer. Inputs could consist of pressing a key, swiping a screen, clicking an object on the screen with a mouse or typing using the keyboard. All of these can be used to increase user interaction within a program. Prompt for input and get input are both defined as user input.
- Text adventures are computer games that have been created using text instead of graphics. Players use text commands to control characters and influence the environment.

Binary Unit 6.8

- Binary is a number system using only 1 and 0 and is how data in a computer is saved and used.
- All denary numbers can be represented in binary. For example counting in binary from zero to 15, or writing a friend's age in binary
- It is possible to represent the state of an object in a game as active or inactive using the respective binary values of 1 or 0.

Networks Unit 6.6

- The difference between the World Wide Web and the Internet.
- LAN and WAN are different kinds of networks
- The Internet has changed our lives in many ways.

Information technology

Blogging Unit 6.4

- A blog is an online vehicle for displaying thoughts and ideas in an informal style.
- It is important to plan out the theme and content of a blog before writing it.
- People can contribute to blogs by adding their own posts.
- Blog posts written by others can be commented on.

St James' CofE Juniors – Computing

	Year 3 Computer User	Year 4 Computer User	Year 5 Computer User	Year 6 Computer User
Progression and Assessment Criteria	Digital literacy e safety Online Safety • Passwords are private and should never be shared. • Blogs can help us to communicate our thoughts and ideas. • Not everything online is factually correct, and some websites can be referred to as spoof websites. • PEGI / BBFC ratings exist to keep young people safe and steps can be taken should students see inappropriate content. • It's important to use email systems safely and that there are things people can do to try to keep themselves safe. Digital Literacy – using it for a purpose Email Unit:3.5 • There are different methods of communication and they each have strengths and weaknesses. • Emails are electronic versions of letters, and they can be sent and received almost instantly to anyone with an email address. • Pictures, documents and other file types can be attached to emails. • Address books can be made in email clients which store known contacts' email addresses. When sending an email we can use an address and send to multiple people.	Digital literacy e safety Online Safety Unit: 4.2 • Safe protocols can be developed to protect people when using email. • Everything put online leaves a trail known as a digital footprint. • There are risks and benefits of installing software including apps. • Copying the work of others and presenting it as their own is called 'plagiarism'. • There are positive and negative influences of technology on health and the environment. Digital Literacy – using it for a purpose Effective Searching Unit 4:7 • Information can be located on a search engine page. • There are different skills needed to research effectively. • Web Pages need to be evaluated to see if the information contained is true and reliable.	Game Creator Unit 5.5 • It is important to plan out a game before commencing on making it. • A game design program has specific functions for the designer to use. • The design of characters and quest items is a key aspect of game creation. • A finished game must be playable and possible for the player to complete. • Evaluation is important so a game can be improved and made more playable and exciting. 3D Modelling 5.6 • 3D modelling can be done via a computer program. • Moving points changes the appearance of a 3D model. • A 3D design program can be used to meet a design brief. • Models need refining before they are printed out using a standard printer or 3D printer. Digital literacy e safety Online Safety Unit 5.2 • The SMART rules are designed to keep children safe online. • Passwords need to be kept secure. • Care needs to be given when sharing content online. Online Safety Unit 5.2 Digital Literacy – using it for a purpose • Sources should be referenced in work. • Different forms of communication are best used for specific purposes.	Unit 6.9 Spreadsheets • There are key features of a spreadsheet, and they can enter data into cells. • Formulae can be entered into a spreadsheet, and this can save time and make working more efficient. • A spreadsheet can be used to model a situation. • Sheets can make complex data clear by manipulating the way it is presented. • Formulae can be used for percentages, averages, max and min in spreadsheets. • A spreadsheet program can display a variety of graphs and charts. • They can use a spreadsheet to model a real-life situation. • Their spreadsheet skills can be used to solve problems. Online Safety Unit 6.2 Digital literacy e safety • A digital footprint leaves a trail online to show their behaviour and this can have a negative impact. • It is important to balance game and screen time with other parts of our lives Digital Literacy – using it for a purpose • A game can be created to encourage the player to think about online safety.

Computing Year Plan

Throughout the year it would be good to spend time touch typing and finding ways to integrate computing into other lessons.

Computing overview	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 3	Online safety Unit 3.2 Digital literacy and safe computer use Lessons on logging on, searching	Email Unit 3.5 Digital literacy and safe computer use	Branching Data base 3.6 Information technology	Presenting Google slides 3.9 Information Technology	Coding Unit 3.1 Computer science	Microbit Unit 3.10 Information Technology
Year 4	Online safety Unit 4.2 Digital literacy and safe computer use	Coding Unit 4.1 Computer science	Effective search Unit 4.7 Information technology	Making music Unit 4.9 Information Technology	Logo Unit 4.5 Computer science	Unit 4.3 Spreadsheets Information Technology
Year 5	Online safety Unit 5.2 Digital literacy and safe computer use	3D modelling Unit 5.6 Information technology	Word Processing Unit 5.8 Information technology (8 lessons may feed into spring 2)	Lego CAD Game Creator 5.5	Coding Unit 5.1 Computer science	Coding Unit 5.5 Computer science
Year 6	Online safety Unit 6.2 Digital literacy and safe computer use	Coding Unit 6.1 Computer science	Blogging 6.4 Information technology	Lego CAD And Spreadsheets 6.9	Networks Unit 6.6 And Spreadsheets 6.9	Understanding Binary Unit 6.8