



St John's Church of England Primary School

Progression in
Computing

Sharing Joy and Hope in the Community

National Curriculum Purpose of study

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

Aims

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 National Curriculum Expectations | Key Stage 2 National Curriculum Expectations |
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| <p>Pupils should be taught to:</p> <ul style="list-style-type: none">• 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. | <p>Pupils should be taught to:</p> <ul style="list-style-type: none">• 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. |

| SKILLS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| Computing Systems and Networks | <p>Identify technology.</p> <p>Identify a computer and its main parts.</p> <p>Use a mouse in different ways.</p> <p>Use a keyboard to type on a computer.</p> <p>Use a keyboard to edit text.</p> <p>Create rules for using technology responsibly.</p> | <p>Recognise the uses and features of IT.</p> <p>Identify the uses of IT in the school.</p> <p>Identify IT beyond school.</p> <p>Explain how IT helps us.</p> <p>Explain how to use IT safely.</p> <p>Recognise that choices are made when using IT.</p> | <p>Explain how digital devices function.</p> <p>Identify input and output devices.</p> <p>Recognise how digital devices can change the way we work.</p> <p>Explain how a computer network can be used to share information.</p> <p>Explore how digital devices can be connected.</p> <p>Recognise the physical components of a network.</p> | <p>Describe how networks physically connect to other networks.</p> <p>Recognise how networked devices make up the internet.</p> <p>Outline how websites can be shared via the World Wide Web.</p> <p>To describe how content can be added and access in the WWW.</p> <p>Recognise how the content of the WWW is created by people.</p> <p>Evaluate the consequences of unreliable content.</p> | <p>Explain that computers can be connected together to form systems.</p> <p>Recognise that role of computer systems in our lives.</p> <p>Recognise how information is transferred over the internet.</p> <p>Explain how sharing information online lets people in different places work together.</p> <p>Contribute to a shared project online.</p> <p>Evaluate different ways of working together online.</p> | <p>Identify how to use a search engine.</p> <p>Describe how search engines select results.</p> <p>Explain how search results are ranked.</p> <p>Recognise why the order of results is important, and to whom.</p> <p>Recognise how we communicate using technology.</p> <p>Evaluate different methods of online communication.</p> |

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| <p>Describe what different freehand tools do. Use shape tools and line tools. Make careful choices when painting a digital picture. Explain why tools were chosen. Use a computer to independently paint a picture. Compare painting a picture on a computer and on paper. Use a computer to write. Add and remove text on a computer. Make careful choices when changing text. Compare typing on a computer to writing on paper.</p> | <p>Use a digital device to take a photograph. Make choices when taking a photograph. Describe what makes a good photograph. Decide how photographs can be improved. Use tools to change an image. Recognise that photos can be changed. Say how music can make us feel. Identify that there are patterns in music. Show how music is made from a series of notes. Create music for a purpose. Review and refine computer work.</p> | <p>Explain that animation is a sequence of drawings or photographs. Relate animated movement with a sequence of images. Plan an animation. Identify the need to work consistently and carefully. Review and improve an animation. Evaluate the impact of adding other media to an animation. Recognise how text and images convey information. Recognise that text and layout can be edited. Choose appropriate page settings. Add content to a desktop publishing publication. Consider how different layouts can suit different purposes. Consider the benefits of desktop publishing.</p> | <p>Identify that sound can be digitally recorded. Use a digital device to record sound. Explain that a digital recording is stored as a file. Explain that audio can be changed through editing. Show that different types of audio can be combined and played together. Evaluate editing choices made. Explain that digital images can be changed. Change the composition of an image. Describe how images can be used for different uses. Make good choices when selecting tools. Recognise that not all images are real. Evaluate how changes can improve an image.</p> | <p>Identify that drawing tools can be used to produce different outcomes. Create a vector drawing by combining shapes. Use tools to achieve a desired effect. Recognise that vector drawings consist of layers. Group objects to make them easier to work with. Evaluate my vector drawing. Explain what makes a video effective. Identify digital devices that can record video. Capture video using a range of techniques. Create a storyboard. Identify that video can be improved through reshooting and editing. Consider the impact of the choices made when making and sharing a video.</p> | <p>Use a computer to create and manipulate 3D digital objects. Compare working digitally with 2D and 3D graphics. Construct a digital 3D model of a physical object. Identify that physical objects can be broken down into a collection of 3D shapes. Design a digital model by combining 3D objects. Develop and improve a digital 3D model. Review an existing website and consider its structure. Plan the features of a webpage. Consider the ownership and use of images. Recognise the need to preview pages. Outline the need for a navigational path. Recognise the implications of linking to content owned by other people.</p> |
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| <p>Label objects. Identify that objects can be counted. Describe objects in different ways. Count objects with the same properties. Compare groups of objects. Answer questions about a group of objects.</p> | <p>Recognise that we can count and compare objects using a tally chart. Recognise that objects can be represented as pictures. Create a pictogram. Select objects by attribute and make comparisons. Recognise that people can be described by attributes. Explain that we can present information using a computer.</p> | <p>Create questions with yes/no answers. Identify the object attributes needed to collect relevant data. Create a branching database. Explain why it is helpful for a database to be well structured. Identify objects using a branching database. Compare the information shown in a pictogram with a branching database.</p> | <p>Explain that data gathered over time can be used to answer questions. Use a digital device to collect data automatically. Explain that a data logger collects 'data points' from sensors over time. Use data collected over a long duration to find information. Identify the data needed to answer questions. Use collected data to answer questions.</p> | <p>Use a form to record information. Compare paper and computer-based databases. Outline how grouping and then sorting data allows us to answer questions. Explain that tools can be used to select specific data. Explain that computer programs can be used to compare data visually. Apply knowledge of a database to ask and answer real-world questions.</p> | <p>Identify questions which can be answered using data. Explain that objects can be described using data. Explain that formulas can be used to produce calculated data. Apply formulas to data, including duplicating. Create a spreadsheet to plan an event. Choose suitable ways to present data.</p> |
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| <p>Explain what a given command will do. Act out a given word. Combine forwards and backwards commands to make a sequence. Combine four direction commands to make sequences. Plan a simple program. Find more than one solution to the problem Choose a command for a given purpose. Show that a series of commands can be joined together. Identify the effect of changing a value. Explain that each sprite has its own instructions. Design parts of the project. Use an algorithm to create a program.</p> | <p>Describe a series of instructions as a sequence. Explain what happens when we change the order of instructions. Use logical reasoning to predict the outcome of a program. Explain that programming projects can have code and artwork. Design an algorithm. Create and debug a program. Explain that a sequence of commands has a start and outcome. Create a program using a given design. Create a program using own design. Decide how a project can be improved.</p> | <p>Explore a new programming environment. Identify that commands have an outcome. Explain that a program has a start. Recognise that a sequence of commands can have an order. Change the appearance of a project. Create a project from a task description. Explain how a sprite moves in an existing project. Create a program to move a sprite in four directions. Adapt a program to a new context. Develop a program by adding features. Identify and fix bugs in a program. Design and create a maze-based challenge.</p> | <p>Identify that accuracy in programming is important. Create a program in a text-based language. Explain what 'repeat' means. Modify a count-controlled loop to produce a given outcome. Decompose a task into small steps. Create a program that uses count-controlled loops to produce a given outcome. Develop the use of count-controlled loops in a different programming environment. Explain that in programming there are infinite loops and count controlled loops. Develop a design that includes two or more loops which run at the same time. Modify an infinite loop in a given program. Design a project that includes repetition. Create a project that includes repetition.</p> | <p>Control a simple circuit connected to a computer. Write a program that includes count-controlled loops. Explain that a loop can stop when a condition is met. Explain that a loop can be used to repeatedly check whether a condition has been met. Design a physical project that includes selection. Create a program that controls a physical computing project. Explain how selection is used in computer programs. To relate that a conditional statement connects a condition to an outcome. Explain how selection directs the flow of a program. Design a program which uses selection. Create a program which uses selection. Evaluate a program.</p> | <p>Define a 'variable' as something that is changeable. Explain why a variable is used in a program. Choose how to improve a game by using variables. Design a project that builds on a given example. Use a design to create a project. Evaluate a project. Create a program to run on a controllable device. Explain that selection can control the flow of a program. Update a variable with a user input. Use a conditional statement to compare a variable to a value. Design a project that uses inputs and outputs on a controllable device.</p> |
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| <p>Learn the need to follow certain rules to remain safe online. Learn that directory sites with alphabetical listings offer one way to find things on the Internet. Discuss how to responsibly handle requests where websites ask for personal information. Having ownership over creative work. Practice putting name and date on something they produce. Explore how to use email to communicate with real people within their schools, families, and communities.</p> | <p>Understand how to stay safe online by choosing websites that are good to visit, and avoid sites that are not appropriate. Learn that information put online leaves a digital footprint or “trail.” This trail can be big or small, helpful or hurtful, depending on how it is managed. Explore what cyberbullying means and what to do when they encounter it. Learn how to select keywords to produce the best search results. Learn that all websites are not equally good sources of information.</p> | <p>Explore reasons why people use passwords, learn the benefits of using passwords, and discover strategies for creating and keeping strong, secure passwords. Understand how the ability for people to communicate online can unite a community. Examine product websites and understand that the purpose of the site is to encourage buying the product. Learn methods used to promote products on these sites. Explore the similarities and differences between in-person and online communications, and then learn how to write clear and respectful messages. Communicate effectively by email, taking into account the purpose and audience of a message, and the tone they want to convey.</p> | <p>Explore what it means to be responsible to and respectful in offline and online communities as a way to learn how to be good digital citizens. Think critically about the information shared online. Identify actions that will make them Upstanders in the face of cyberbullying. Learn strategies to increase the accuracy of their keyword searches and make inferences about the effectiveness of the strategies. Learn that copying the work of others and presenting it as one’s own is called plagiarism. Learn about when and how it’s ok to use the work of others.</p> | <p>Learn how to create secure passwords in order to protect private information and accounts online. Outline common expectations in order to build a strong digital citizenship community. Learn what spam is, the forms it takes, and identify strategies for dealing with it. Reflect on the importance of citing all sources when they do research. Learn how to write bibliographical citations for online sources. Learn how photos can be altered digitally. Consider the creative upsides of photo alteration, as well as its power to distort perceptions of beauty and health.</p> | <p>Learn that the Internet is a great place to develop rewarding relationships. But not to reveal private information to a person they know only online. Create comic strips to show a digital superhero who witnesses an act of poor digital citizenship, and then helps resolve it. Learn to identify secure sites by looking for privacy policies and privacy seals of approval. Explore how it feels to be cyberbullied, how cyberbullying is similar to or different than in-person bullying, and learn strategies for handling cyberbullying when it arises. Explore how the media can play a powerful role in shaping ideas about girls and boys.</p> |
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