 Vine Tree Primary Long-Term Plan for Computing 

Computing at Vine Tree aims to provide a high-quality computing education focusing on the three key strands of the national curriculum: Computer Science, Digital Literacy and Information Technology.

At Vine Tree, we learn vital computing skills and knowledge as well as ensuring technology is embedded throughout the curriculum so that children are READY to become global citizens in today’s world, are taught to always be RESPECTFUL in their use of digital media, and how to keep themselves and others SAFE using technology including the internet.

Computing has deep links with mathematics, science, and design and technology and a high-quality computing education, which encourages creativity, will enable our pupils to understand and change the world around them.

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| Key Concepts / Skills |
| Be able to comprehend, design, create, and evaluate algorithms | Understand how networks can be used to retrieve and share information, and how they come with associated risks | Understand what a computer is, and how its constituent parts function together as a whole (systems) | Select and create a range of media including text, images, sounds, | Understand how data is stored, organised, and used to represent real world artefacts and scenarios | Understand the activities involved in planning, creating, and evaluating computing artefacts | Use software tools to support computing work | Understand how individuals, systems, and society as a whole interact with computer systems | Create software to allow computers to solve problems (Programming) | Understand risks when using technology, and how to protect individuals and systems (Safety) |
| **EYFS** | Although there is no statutory requirement to teach computing in Early Years the children are naturally surrounded by technology both at home and at school. During the EYFS children are able to use the interactive whiteboard and IPads to interact with age-appropriate games and use technology to create pictures. The children are able to begin to begin to explore programming through the use of Beebots. |
| **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 |
| **Year 1** | **E-Safety** Pupils can keep themselves safe while using digital technology. Pupils can understand that they need to keep safe when using digital technology. E.g. They should know to use filtered Safe Search  when looking for images on the web and that they should close the lid of a laptop (or similar action) if they find inappropriate images. Pupils can understand that information on the internet can be seen by others. Pupils should be aware that information stored on the web or transmitted via the internet is available to other people. E.g. They should know that the images they find online can be found by others too, and that the queries they type in can be seen by those who run the search engine.  Pupils can understand what to do if they see disturbing content online at home or at school. Pupils should know to close the laptop lid or turn the tablet over if they find content, such as inappropriate images, which might disturb them or other children. They should know to tell their teacher or their parents if this happens. | **Computers** Pupils can show an awareness of how IT is used for communication beyond school. Pupils can mention some of the ways in which IT is used to communicate beyond school. E.g. They might know that some people use social media such as Facebook, email, video calls or online greetings to say happy birthday to their friends.  | **Creating media** – **Digital painting** Pupils use a painting software describe what different freehand tools do, use the shape tool and the line tools, to make careful choices when painting a digital picture. Can the children explain why they chose the tools they used to paint a picture. Compare painting a picture on a computer and on paper. **Key concept/Skill:**Creating Media - Digital painting Know how to:  Use a paint program to create and save images. **Key questions:** Can I use digital media to create and save an image. Can I select appropriate tools for creating a digital image? Can I compare a digital image with an image created on paper. Key vocabulary:    Paint, drawing tool, save, gallery | **Creating media – Digital writing** Pupils will be able to use a computer to write, add and remove text on a digital device. They will be able to identify that the look of text can be changed, to make careful choices when changing text. **Key concept/Skill:**Creating Media - Digital writing Know how to:  Use a program to create and edit text.**Key questions:** Can I use digital media to text? Can I select appropriate tools for editing text? Key vocabulary:    Text, font, edit | **Programming A – Moving a robot** Children will be able to explain what a given command will do and combine commands in a sequence to move a robot forward and backwards in a sequence. Children will plan a simple program and identify and fix errors (bugs) in the program. **Key concept/Skill:**   Programming A – Moving a robotKnow how to:  Use simple commands to control a robot **Key questions:** Can I design a simple program to get a robot to follow a command? Can I identify errors in the program and select the best method to fix (debug)n the code) Key vocabulary:    Text, font, edit | **Programming B – Introduction to animation** Children will create a simple animation using coding blocks. Children will design, create and debug the program and evaluate it’s effectiveness. **Key concept/Skill:**Programming B – Introduction to animation Know how to:  Use a program to design and create an animation. **Key questions:**Can I use coding blocks to design and create a simple animation? Can I identify errors in the code? Can I debug the code to correct the errors? Key vocabulary:    Code, algorithms, debug, program. |
| **Year 2** | **Computing systems and networks –** **IT around us** **Key concept/Skill:** To know what information technology (IT) is. **Know how to:**Identify examples of IT. Use IT to improve our world and why it is important. Use IT responsibly and safely. **Key questions:** Can I recognise the uses and features of information technology? Can I identify information technology in school?technology? Can I identify information technology beyond school? Can I explain how information technology helps us? Can I explain how to use information technology safely? Can I recognise that choices are made when using information technology? **Key vocabulary:** Information technology, computer, devices, benefits, safely, responsibly | **Creating media – digital photography.****Key concept/Skill:** To capture, edit and improve photographs. **Know how to:** Capture a good photograph. Edit and improve a photograph Notice if a photograph has been edited. **Key questions:** Can I use a digital device to take a photograph? Can I make choices when taking a photograph? Can I describe what makes a good photograph? Can I decide how photographs can be improved? Can I use tools to change an image? Can I recognise that photos can be changed? **Key vocabulary:** Photographs, capture, edit, landscape, portrait, tools, improve | **Creating media – making music** **Key concept/Skill:** Creating music using a computer. **Know how to:** Compare creating music digitally and non-digitally. Identify patterns.Purposefully create music. **Key questions:** Can I identify how music makes me feel? Can I identify that there are patterns in music? Can I describe how music can be used in different ways? Can I show how music is made from a series of notes? Can I create music for a purpose? Can I review and refine my music creation? **Key vocabulary:** Patterns, music, notes, digitally, sequence, pitch duration, rhythm | **Data and information - Pictograms** **Key concept/Skill:** Data collection **Know how to:**Organise data. Present data on pictograms. Answer questions from their collected data. **Key questions**: Can I recognise that we can count and compare objects using tally charts? Can I recognise that objects can be represented as pictures? Can I create a pictogram? Can I select objects by attribute and make comparisons? Can I recognise that people can be described by attributes? Can I present information using a computer? **Key vocabulary:** Compare, tally charts, represented, pictogram | **Programming A – Robot algorithms** **Key concept/Skill:** Algorithms **Know how to:** Use logical reasoning to predict outcomes. Investigate how the order affects the outcome, Design in programming. Design algorithms. Test algorithms and debug them. **Key questions:** Can I describe a series of instructions as a sequence? Can I explain what happens when we change the order of instructions? Can I use logical reasoning to predict the outcome of a program? Can I explain that programming projects can have code and artwork? Can I design an algorithm? Can I create and debug a program that I have written? **Key vocabulary:** Algorithm, instructions, sequence, order, outcome, programming, debug | **Programming B – An introduction to quizzes** **Key concept/Skill:** Programming **Know how to:** Sequence commands. Make predictions. Modify designs to create their own quizzes.Evaluate their work and make improvements. **Key questions:** Can I explain that a sequence of commands has a start? Can I explain that a sequence of commands has an outcome? Can I create a program using a given design? Can I change a given design? Can I create a program using my own design? Can I decide how my project can be improved? **Key vocabulary:** Sequence, commands, outcome, program, features, debug, algorithm |
| **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 |
| **Year 3** | **Key concept/Skill: E-Safety / Information Technology** **Know how to**: Use technology safely**Key questions:** Can I explain technology as something that helps us? Can I explain how these technology examples help us? Can I identify rules to keep us safe and healthy when we are using technology in and beyond the home? Can I give examples of some of these rules? Can I discuss how we benefit from these rules? **Key vocabulary:** technology, e-safety | **Key concept/Skill: Computing Systems and Networks – Connecting Computers** **Know how to:** Connect computers using networks**Key questions:** Can I explain how digital devices function? Can I identify input and output devices? Can I recognise how digital devices can change the way we work? Can I explain how a computer network can be used to share information? Can I explore how digital devices can be connected? Can I recognise the physical components of a network? **Key vocabulary:** digital device, input, output network | **Key concept/Skill: Computing Systems and Networks –** **Connecting Computers** **Know how to:** Connect computers **Key questions:** Can I explain how digital devices function? Can I identify input and output devices? Can I recognise how digital devices can change the way we work? Can I explain how a computer network can be used to share information? Can I explore how digital devices can be connected? Can I recognise the physical components of a network? **Key vocabulary:** digital device, input, output network | **Key concept/Skill: Creating Media – Animation** **Know how to:** Create media animation **Key questions:** Can I explain that animation is a sequence of drawings or photographs? Can I relate animated movement with a sequence of images? Can I plan an animation? Can I identify the need to work consistently and carefully? Can I review and improve an animation? Can I evaluate the impact of adding other media to an animation? **Key vocabulary:** image, animation, sequence | **Key concept/Skill: Data and Information – Branching Databases****Know how to:** Use branching databases **Key questions:** Can I create questions with yes/no answers? Can I identify the object attributes needed to collect relevant data? Can I create a branching database? Can I explain why it is helpful for a database to be well structured? Can I identify objects using a branching database? Can I compare the information shown in a pictogram with a branching database? **Key vocabulary:** questions, information, database, branch | **Key concept/Skill: Programming A / B****Know how to:** Use code for programming **Key questions:** Can I explore a new programming environment? Can I identify that commands have an outcome? Can I explain that a program has a start? Can I recognise that a sequence of commands can have an order? Can I change the appearance of my project? Can I create a project from a task description? **Key vocabulary:** code, command, sequence, program |
| **Year 4** | **Key concept/ skills: Computing systems and networks – the internet** **Know how to:** To explore networks and the WWW **Key questions:** 1. Can I describe the internet as a network of networks? 2. Can I describe networked devices and how they connect? 3. Can I describe how to access website on the WWW? 4. Can I describe how content can be added on the WWW? 5. Can I recognise how the content on the WWW is created by people? 6. Can I evaluate the consequences of unreliable material? **Key vocabulary:** WWW Unreliable material Content Website Internet Network | **Key concept/ skills: Creating media: audio editing** **Know how to:** To digitally record and edit sounds. **Key questions:** 1. Can I identify how a sound can be digitally recorded? 2. Can I use a digital device to record sound? 3. Can I explain that a digital recording is stored as a file? 4. Can I explain that audio can be changed through editing? 5. Can I combine different types of audio? 6. Can I evaluate my editing choices? **Key vocabulary:**File Audio Editing Recording | **Key concept/ skills: Programming A – repetition in shapes** **Know how to:** To create and modify a program. To decompose a task. **Key questions:** 1. Can I identify that accuracy in programming is important?2. Can I create a program in a text-based language? 3. Can I explain what ‘repeat’ means? 4. Can I modify a countcontrolled loop? 5. Can I decompose a task? 6. Can I create a program that uses count-controlled loops?**Key vocabulary:** Count-controlled loop Repeat Text-based language Programming | **Key concept/ skills: Data and information: data logging** **Know how to:** To use a data collector, to collect data to answer questions. **Key questions:** 1. Can I explain that data can be used to answer questions? 2. Can I use a digital device to collect data automatically? 3. Can I explain that a data-logger collects ‘data points’? 4. Can I use data collected over a long time to find information? 5. Can I identify the data needed to answer questions? 6. Can I collect data to answer questions? **Key vocabulary:** Data, Data points Digital device | **Key concept/ skills: Creating media: photo editing** **Know how to:** To change the composition of a photo, to edit photographs, to understand that not all images are real. **Key questions:** 1. Can I explain that digital images can be changed? 2. Can I change the composition of an image? 3. Can I describe how images can be changed for different uses? 4. Can I make good choices when selecting different tools? 5. Can I recognise that not all images are real? 6. Can I evaluate that changes can improve an image. **Key vocabulary:** Composition Tools | **Key concept/ skills: Programming B: repetition in games****Know how to:** To use count controlled and infinite loops in programming games. To modify loops and design a program. **Key questions:** 1. Can I develop the use of count-controlled loops? 2. Can I find the difference between countcontrolled loops and infinite loops? 3. Can I develop a design that uses two or more loops? 4. Can I modify an infinite loop? 5. Can I design a project that includes repetition? 6. Can I create a project that includes repetition? **Key vocabulary**: Repetition Infinite loop Count-controlled loop |
| **Year 5** | **Programming A –** Selection in Physical Computing**Key concept/Skill:** Computing systems and networks – Sharing information **Know how to:** 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 To create a program that controls a physical computing project **Key questions:** Can I control a simple circuit connected to a computer? Can I explain the role of a loop in a program? Can I create a program that controls a physical computing object? **Key vocabulary:** Loops, program, input, output, components. **Cross curricular links:** Creating a working playground carousel. Links to Victorian fairgrounds. **Links to Prior Learning:** Science – Electricity (Year 4) | **Computing systems and networks –** Sharing information.**Key concept/Skill:** Computing systems and networks – Sharing information **Know how to:** Explain that computers can be connected together to form systems Recognise the role of computer systems in our lives Recognise how information is transferred over the internet Explain how sharing information online lets people in different places work together. Contribute to a shared project online. Evaluate different ways of working together online**Key questions:** Can I recognise and explain the role of computer systems in our lives? Can I recognise and explain how information is transferred over the internet? Can I contribute to a shared project online?**Key vocabulary:** Input, output, system, network, packet, router, internet, network, IP address.**Cross curricular links:** Shared project to create a presentation based on Crewe the local history.**Links to Prior Learning:** Computer systems and network (year 4) | **Creating media –** Video editing **Key concept/Skill:** Video Editing Know how to: 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**Key questions:** Can I record a video? Can I create a storyboard? Can I edit and improve my video using editing software? **Key vocabulary:** Frame, Angles | **Creating media –** Vector drawing **Key concept/Skill:** Creating Vector Drawings **Know how to:** To identify that drawing tools can be used to produce different outcomes. Create a vector drawing by combining shapes, to use tools to achieve a desired effect, to recognise that vector drawings consist of layers. Group objects to make them easier to work with. Evaluate vector drawing.: **Key questions:** Can I create vector drawings by combining shapes? Can I recognise that vector drawings consist of layers? Can I group objects to make them easier? **Key vocabulary:** Vectors, layers, tools, | **Data and information –** Flat-file databases **Key concept/Skill:** FlatFile Databases**Know how to:** Use a form to record information. Compare paper and computerbased 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 my knowledge of a database to ask and answer real-world questions **Key questions:** Can I use a form to record information? Can I use tools within a database to select specific data? Can I use a database to answer questions? **Key vocabulary:** Fields, Records, Database, Sorting | **Programming B –** Selection in quizzes **Key concept/Skill:** Selection in Quizzes**Know how to:** Explain how selection is used in computer programs. 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 my program **Key questions:** Can I explain how selection is used in computer programs? Can I design a program which uses selection?**Key vocabulary:** Selection, algorithm, program, sequence, repetition **Links to programming in year ¾** |
| **Year 6** | **E-Safety and Computing systems and** **networks –**Communication **Key concept/Skill**: Use technology safely, respectfully and responsibly when learning about how to use the World Wide Web as a communication tool.**Know how to:** Recognise acceptable and unacceptable behaviour online and understand how to report my concerns. Understand computer networks and the opportunities they offer for communication and collaboration. **Key questions:** Do I know who to talk to about concerns and inappropriate behaviour at home or in school and how to report these concerns? Can I use search technologies effectively and appreciate how results are selected and ranked? Can I evaluate digital content from various websites? **Key vocabulary:** respectful, safe, responsible, acceptable, unacceptable, reporting, search engines, ranking, networks, communication, collaboration | **Creating media –** 3D Modelling **Key concept/Skill:** Use a computer to produce a 3D model.**Know how to:** Select, use and combine a variety of software on a range of digital devices to design and create a range of programs, systems and content that accomplish a given goal. **Key questions:** Can I learn to make accurate 3D models of physical objects? Can I examine the differences between working digitally with 2D and 3D graphics? Can I plan, develop and evaluate my own 3D model? **Key vocabulary:** media, 3D modelling, 3D spaces, graphics, plan, develop, evaluate. | **Creating media –** Web page creation **Key concept/Skill:** To create a website for a chosen purpose. **Know how to:** Collect, analyse, evaluate and present data and information.**Key questions:** Can I understand what makes a good web page and use this information to design and evaluate my own? Can I understand copyright and fair use of media? Can I create an aesthetically pleasing website with navigation paths? **Key vocabulary:** software, design, create, content, website, information, copyright, navigation. | **Data and information** – Spreadsheets **Key concept/Skill:** To organise data in columns and rows to create my own data set within a spreadsheet.**Know how to:** Format data to support calculations, apply formulas to a range of cells and to use spreadsheets to answer questions. **Key questions:** Can I use a spreadsheet to plan an event and answer questions? Can I create graphs and charts and evaluate their results? Can I use programs and systems to analyse, evaluate and present data and information?**Key vocabulary:** Excel, spreadsheet, formula, cell, data, information, graph, chart. | **Programming A –** Variables in games **Key concept/Skill:** To use variables to design and create my own game in Scratch**Know how to:** Design, write and debug programs that accomplish specific goals. **Key questions:** Can I use sequence, selection, and repetition in programs? Can I work with variables and various forms of input and output? Can I use logical reasoning to explain how some simple algorithms work and detect and correct errors in algorithms and programs? **Key vocabulary:** variables, design, create, debug, sequence, repetition, input, output, algorithms, Scratch. | **Programming B –** Sensing **Key concept/Skill:** To make a micro:bit based step counter.**Know how to:** Use sequence, selection and repetition to design, write and debug programs that accomplish specific goals. **Key questions:** Can I work with variables and various forms of input and output? Can I use logical reasoning to explain how some simple algorithms work and detect and correct errors in algorithms and programs? Can I control and simulate a physical system? **Key vocabulary:** micro:bit, sequence, selection, repetition, variables, input, output, algorithms. |

**Computing Curriculum – 3 I’s**

**Intent**

It is our intention to enable children to find, explore, analyse, exchange and present information. We also focus on developing the skills necessary for children to be able to use information in a discriminating and effective way.

We want children to know more, remember more and understand more in computing so that they leave primary school computer literate.

Computing skills are a major factor in enabling children to be confident, creative and independent learners and it is our intention that children have every opportunity available to allow them to achieve this.

We intend to **build a computing curriculum that develops pupil’s learning and results in the acquisition of knowledge of the world around them that ensures**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.

We intend to **build a computing curriculum that prepares pupils to live safely in an increasingly digital British society where p**upils can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems.

**Implementation –**

* A clear and effective, bespoke cross curricular scheme of work that provides coverage in line with the National Curriculum. Teaching and learning should facilitate progression across all key stages within the strands of digital literacy, information technology and computer science
* Access to resources which aid in the acquisition of skills and knowledge.
* Children will have access to the hardware (computers, tablets, programmable equipment) and software that they need to develop knowledge and skills of digital systems and their applications
* A clear and effective scheme of work that provides coverage in line with the National Curriculum.
* Teaching and learning should facilitate progression across all key stages within the strands of digital literacy, information technology and computer science. Children will have the opportunity to explore and respond to key issues such as digital communication, cyber-bullying, online safety, security, plagiarism and social media.
* Wider Curriculum links and opportunities for the safe use of digital systems are considered in wider curriculum planning.
* The importance of online safety is shown through displays within the learning environment and computer suite.
* Parents are informed when issues relating to online safety arise and further information/support is provided if required.
* As well as opportunities underpinned within the scheme of work, children will also spend time further exploring the key issues associated with online safety.

**Impact –**

* Children **will be confident users of technology, able to use it to accomplish a wide variety of goals, both at home and in school.**
* Children will have a secure and comprehensive knowledge of the implications of technology and digital systems. This is important in a society where technologies and trends are rapidly evolving.
* Children will be able to apply the British values of democracy, tolerance, mutual respect, rule of law and liberty when using digital systems.