Frimley Church of England School

Computing- Skills and Knowledge Progression

Intent

We aim to develop a culture where the use of ICT (information, communication and technology) becomes second nature to our pupils, thus ensuring they are ready and able to embrace the technological advances of the future.

Implementation

Staff and children have access a range of technologies. Lessons are enhanced through use of desktop and mobile devices, interactive whiteboards, digital cameras and numerous other technologies. Each year group has its own webpage on the school website, where they share information regularly. There is a key emphasis on learning skills for computing; these will include programming, debugging and exchanging information. Our children are taught how to access information, evaluate its suitability, store it, share it with others and tailor it to meet their own needs. Digital Literacy is a big part of the curriculum, with children learning how to use ICT safely – at regular points throughout the year children undertake online safety sessions on topics such as cyberbullying or keeping information safe.

Impact

Our children will confidently and independently use and apply information technology skills to support and extend their learning across all curriculum subjects, within and beyond the classroom walls.

National curriculum expectations:

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.

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;

What Frimley offers to it's pupils:

	Year 3	Year 4	Year 5	Year 6
Knowledge	**Computer science** • **To understand that algorithms are a set of instructions that complete a task** • **To understand that computers work by following a set of instructions called a program** • **To know programming is the process of designing an writing a set of simple instructions (a program) in language it understands** • **To understand terminology used when coding.** • **To understand basic scratch terminology such as sprite, stage, background, script.** • **To understand the sequencing blocks WHEN/THEN.** • **To understand the term 'debugging' and have the confidence to realise computing is about learning from our mistakes.** • **To understand the term decompose.** • **To remember how to move a sprite from their previous learning.**	**Computer science** • **to understand that a program is a sequence of statements written in computing language** • **To know logo is text based programming.** • **to understand the computer only knows this language so typos won't be recognised** • **to understand statements variables can be altered.** • Same objectives as logo but **executed using block coding** on **new programme**. • Learn how **to decompose in pairs.** • **To know the most effective starting point to make a game**. • **To understand what a forever loop is.**	**Computer science** • **I understand what a selection code is and when it is used.** • **To understand how the area is laid out as a X/Y grid.** • **To understand what 'broadcasting' in scratch means.** • **To understand what a variable is.** • **To realise why we don't wait until we've finished making the game to play it and debug it.**	**Computer science** • **To learn how to create a world in Kodu** • **To know kodu is a 3D gamed based coding program** • **To learn how to add a character and program it to move** • **To understand Kodu is moved by the keyboard arrows (user input)** • **To understand the conditional statement is conditional to the variable (score)** • **To understand all computer programs need to be designed.** • **To know what to think about when designing a computer program.**

	• **To understand how positive and negative numbers are used in scratch especially in the moving process.** • **To learn what the pen tools are and how we can use them effectively within a game** • **To understand coding blocks can go in any order but the computer reads the instructions and completes them in the order you give them.** • **To understand why games need instructions** • **To understand a sprite doesn't always have to be a character.** • **To learn how to make a sprite show and hide** **<u>Computer science (Theory)</u>** • **To understand our school computer system/server and the hardware we will be using.** • **To understand the AUP policy they signed; to not log on as anyone else and to realise we monitor their computer/internet use.**	**<u>Computer Science (Theory)</u>** • To understand **the internet is many commuters that care connected.** • To understand **some of the services available on the internet** • To understand **you can move around the internet using hyperlinks** • To **know the main features of web browsers** • To **understand how to find information using a search engine** • To **use search terms when looking for information using a search engine** • To **know the basic steps that can help distinguish safe and creditable websites**	**<u>Computer science (Theory)</u>** • **To understand many people remix content to work on the WWW** • **To know websites are written in HTML code** • **To know HTML gives a webpage structure** • **To understand the term hacking is where the content of something has been changed by someone else.**	**<u>Computer science (Theory)</u>** • **To understand** a **computer network is a group of computers that are connected** • **To know computer networks allows users to communicate and share** • To understand the internet is **many networks that are connected to each other** • **To know a router sends/receives information as packets of data** • **To know computers connected to the internet have their own IP address** • **To know the services involving webpages can be traced to a particular web server (where the website 'lives'** • To know that **webpages** are written in HTML.

	Information technology • **To understand out school computer system/server and the hardware we will be using.** • **To know how to log on and understand our logging on system.** • **To understand the AUP policy they signed; to not log on as anyone else and to realise we monitor their computer/internet use** • **To understand what book creator app is and reasons it can be used.** • **To know that Safari is a web browser and what a web browser is.** • **To know how to take a 'good' photo; have a steady camera, the subject needs to be seen, a focused screen and to review the photo after taking**	• **To understand copyright is an author's right of ownership and it is illegal to steal other people's material.** **Information technology** • **To understand the similarities and differences between their previous learning of animation on the computer to animating using ipads/stop frame.** • **To understand the success criteria of stop frame; small movements, keep the ipad still (use a stand) and not get in the shot.** • **To understand what green screen is and how/when it's used in films, weather reports etc.** • **To understand the purpose of Power Point** • **To understand that an overload of transitions in animations can overload the presentation and take away the focus.** • **I understand to make my word effective my font and colours need to be clear to read.**	**Information technology** • Be able to **remember** animation is made by creating frames. • Learn to **use animation tools in PowerPoint to design and create a programme with a given goal**. E.g. grouping objects together or within a set timer. • **To understand what the terms 'data' and 'spreadsheets' mean and when they might be used in life.** • **To understand that excel is a program that uses spread sheets.** • **To know what cells are and how each cell is names by its corresponding letter and number.** • **To know a formula has to start with a = sign**.	• **To recognise and use basic HTML syntax** • **To know HTML stands for Hypertext Markup Language** • **To know HTML stands for Hypertext Markup Language** • To know that webpages are written in HTML • **To know CSS stands for Cascading style sheets.** • **To know that CSS describes how HTML elements are to be displayed on screen.** **Information technology** • **To know what pixels and pixel art is.** • **To understand why pixels are used in computing.** • **To understand how images are layered.**

	• To understand what an animation is and the different animation that are used or have been used in film making. • To understand the term 'frame' and how a sequence of frames can appear to animate • To understand animations can be created using digital tools • To understand the importance of needing to plan before they start. **Digital Literacy+ online safety** • To understand the risks when using technology online. • To know not everything we read online is true. • To fully understand we do not communicate with stranger online and especially NEVER give out personal details or arrange to meet. • To know whatever happens they can always tell a trusted adult so we can help them. • To know what we mean by a trusted adult. • To know how to ask for help and to know we will support them and not lecture them. • To know I need to ask permission before taking someone's photos and before putting it on social media.	• To understand how information is collected and stored. • To know a database is a tool that allows us to store and then sort information. • To understand what a 'field' is in a data base. • To understand how a data base can sort, organise and group data and to practice this skill. • To know graphs can be produced to show the data in a variety of ways. **Digital Literacy+ Online safety** • To know why we have passwords and when I might need a password. • To know I can share my password with a trusted adult but no one else. • To know what makes a strong, secure password. • To understand weak passwords can be hacked easily. • To know not to **meet** strangers. • To know online shopping and other online activities can cause addictions. • To know what we can do to show respect online • To understand what the term 'online' means.	• To know how to sue the +, -, / and x symbols to create a calculation. • To understand people can use spreadsheets to solve mathematical problems. • To understand different ways presentation can be made using technology. • To know that we can uses recoded voice overs to support our presentations. **Digital Literacy + Online safety** • To understand this risks of using photographic images online • To know that I could be accidentally giving away personal information each time I upload a photo online/to social media. • To know to check the backgrounds of ALL images before they are posted/sent. • To know photos can store locations of where they were taken and we need to check our camera/phone settings for this. • To know what scams and what phishing scams are. • To understand how people get scammed and what scammers aim to do. • To understand how to spot scams and to know not all	**Digital Literacy+ Online safety** • To know what a vlog is. • To know how to keep themselves and others safe while making a vlog. • To know it's easier to record smaller sections of a vlog and edit them together in a video editing app.

	• **To understand how little we know about those we communicate with online so the safest option is to NOT communicate with strangers online**		**scams are easy to spot (use your gut feeling).** • **To know scams aren't only through email but from social media, message apps, phone calls and letters** • **To know what to do if they receive a scam** • **To realise if something is too good to be true then it probably is.** • **To know I can change the figure in one cell and it will recalculate the answer .** • **To understand how the =sum formula works and how it's easier to add multiple cells this way.** • **To know when people may use this formula on spreadsheets in real life.**	
Skills	**<u>Computer science</u>** • **To write a program that achieves a basic goal.** • **To use terminology when coding or in scratch.** • **To correctly use the sequencing blocks WHEN/THEN.** • **to add and copy a sprite** • **to use the 'fill' tool to customise the sprites** • **to use the mouse input to change the clothing colour.** • **To add and change backgrounds**	**<u>Computer science</u>** • To be able to type their own programming language. • **To program a turtle to execute a sequence of statements focusing on 90 degree angles.** • **To amend an algorithm/variable to change the size of a shape.** • To use repetition in programs • **Model how to use the art tools to create a slug as presentation is important in games – circle tool, straight line, paint brush.** • Begin to add the backgrounds **using the art tools to continue**	**<u>Computer science</u>** • **To change words and pictures on a website to create fake news using HTML.** • To decompose a game **independently**. • **To animate a sprite.** • To use the repeat/forever block **to make the sprite always move.** • To use angles to make a sprite turn. • **To use the drawing tools to create a maze background.** • **To use our decomposed game sheet to support our colour choices (mazes are same**	**<u>Computer science</u>** • To use conditional statements (when/do). • **To program objects to move towards each other by sequencing statements.** • **To program Kodu to 'express' something using the when/do conditions.** • **To add paths in a computer game.** • **To control characters using the repetition code (always tile).** • **To program characters to follow paths.** • **To add a variable/score**

	• **To animate a scratch using the repeat command** • **To program a sequence of instructions that create visual effects.** • **To create a sequence of code that allows their sprite to move forwards and backwards.** • **To decompose a game when in scratch as a class.** • **To evaluate the efficiency of other peoples games and identify improvements.** • **To make a series of frame using stick man animation** • **To understand the term 'frame.'** • **To make small movement for every frame.** • **To create a scene for an animation.** • **To draw a background, using their decomposition answers to support what their background needs to have.** • **To save their work** • **To open their work** • **To add coding that allows their backgrounds to change using WHEN/DO** • **To be able to use pen up/down/change and to change colour using the WHEN/DO blocks** • **To have the confidence to 'debug' their games and use given examples on the board to stop their mistakes** • **To evaluate their own and others work.**	**with the neat presentation and add a WHEN block to change the background.** • **To use a forever loop in code** to move sprite. • **To debug sequences with repetition and sequence with increased independence.** • **To complete unfinished algorithms with repetition.**	**colour, start is one colour, end is one colour).** • **To create a multileveled game by making the background mazes progressive.** • **To use a selection code (if) to make the game stop 'if' the sprite touches the walls.** • To debug **with independence, spotting where our coding has gone wrong and how we can correct it.** • To evaluate **and adapt our game so far, making the changes needed to improve it (crab size, moving, turning).** • **To create a spawn point to add a starting position for the sprite using x/y co-.** • **To use a broadcast within selection coding to make their background/level automatically change.** • **To create a variable to add a scoring system.** • **To make the variable change when the sprite touches the coin.** • **To make the coins hide and show** • **To change and debug the game throughout the lesson.**	• To make the screen change level **when a number of coins have been collected by using a conditional statement.** • To program a computer game **using variables, repeats and conditions.** • To identify mistakes in their own programs. • **To develop strategies (systematic approach) for debugging computer programs.** • **To make changes in their work when things do not execute as expected.**

	Computer science (Theory) • **To log on and understand our logging on system.** • **To use basic navigation skills to browse the WWW.** **Information technology** • **To use a paint program with control** • **To use publisher and the following tools with independence; insert online image, insert shape, change text size, font and colour, change the background.** • **To save work** • **To be able to google image search effectively for a given purpose.** • **To create a new book in book creator** • **To add pre-saved images** • **To add text** • **to change the text font, colour an size** • **To change the background** • **To record themselves telling the joke to add to their book**	**Computer science (Theory)** • To use basic navigation skills to browse the WWW • **To use search terms when looking for information using a search engine.** • **To create a quiz/cyber hunt** • **To add hyperlinks to link to a webpage which will reveal the answer.** • **To recall the basic steps that can help distinguish safe and creditable websites** **Information technology** • **To create a short film using stop frame animation.** • **To use lego to create step by step moments and small movements to create a short animation.** • **To evaluate their previous animation against last week's success criteria.** • **To use their evaluation to improve their work/animation.** • **To use their learning from last week to make a longer, more effective animation.** • **To edit videos as they go.** • **To add their animated film to a green screen app.** • **To select an appropriate image to use as a background** • **To import their background into the green screen app.**	**Computer science (Theory)** • **To change words and images using HTML on a given website to create their own website.** • **To use x ray goggles to change the HTML code both text <p> and images<img scr>.** **Information technology** • **To draw frames by using the individual slides in power point to produce a sequenced animation.** • **To use the shape and drawing tools in power point to produce my backgrounds and images.** • **To use copy and paste to copy my slides to add to a sequence.** • **To use the transition timer to make the animation play.** • To copy and paste objects • **To use ctrl and G to group objects together.** • **To use the animate tools to make objects fly in.** • **To use the animated motion paths and make objects move 'with' each other.** • **To format a background in Power Point.**	**Computer science (Theory)** • **To recognise and use basic HTML syntax.** • **To use tags to edit pre made websites or begin to create my own webpages.** • **To apply the print screen function my work and paste into a word document.** • **To use CSS tags to edit a webpage to make it my own.** **Information technology** • **To be able to create a picture to represent pixel art.** • **To be able to format the size of columns and rows in excel.** • **To be able to change the colour of cells in excel.** • **To create their own pixel art image and lettering.** • **To explain that animation can be produced in a variety of ways.** • **To use the rotoscope animation technique to create their own animations.** • **To record a 3 second video and understand why it needs to be simple.** • **To add the video to the Doink animation app.** • **To be able to draw on the top layer, over the video.** • **To move the video on to the next frame and draw over it,**

	• **To create a new book in book creator** • **To add pre-saved images** • **To add text** • **To change the text font, colour an size** • **To change the background** • **To record themselves telling the joke to add to their book** • **To be able to export their finished books to the school server** • **To evaluate their book and think about what they would change next time** • **To be able to insert text box and change the font, colour and size.** • **To change the background of their poster** • **To add images to enhance the meaning of their poster** • **To take photos from a range of perspectives and understand the perspectives from standing near or far the camera.** • **To use filters to enhance, correct or add impact to my photos** • **To make a series of frames using stick man animation on the program 'pivot'** • **To make a small movement for every frame to create a short film** • **To create a scene for an animation** • **To move 1 character in small steps to create frames to create their animation.**	• **To watch their films back, fully animated enhanced.** • **To change the font size, colour and type making sure it's clear and can be read.** • **To add images and text boxes which are animated.** • **To include transitions.** • To remember what makes a strong password and why we need them. • **I can make a word art, using all its features (font, colour, word positioning)** • **I can save my word art and import the image onto a publisher document.** • **To input data into their own database** • **To add data correctly into 'fields'** • **To sort and group their data to be able to answer questions.** • **To create their own data base** • **To create their own fields making sure they are relevant** • **To input data into their fields** • **To create their own data cards using their inputted data** • **To ask and answer questions using their sorted data to support them.**	• **To animate objects to grow and shrink.** • **To create a trigger points for objects to start their animation.** • **To group objects to make an animation more effective.** • **To understand how we set the timing can affect the overall effect of the animation.** • **To use the shape tool and layer the shapes to create images.** • **To add a background to our slide.** • **To use ctrl D to duplicate objects.** • **To use ctrl to select more than 1 item to change colours .** • **To duplicate slides and change features to create a repeating pattern animation.** • **To add borders to a cell.** • **To fill cells with colour to make it easier to read.** • **To use formula to create and solve various calculations.** • **To use the + and x calculations to solve a shopping investigation.** • **To create an investigation** • **To create a spreadsheet using the =sum formula to add multiple cells.** • **To turn data into a variety of graphs.** • **To plan their presentation.** • **To use safari to download images to their gallery (remembering SAFE SEARCHING and COPYRIGHTS).**	**creating the next frame of the animation.** • **To add colour to their drawn frames.** • **To finish their animations.** • **To watch their animations back and edit/improve if it doesn't flow.** • **To add a background to the animation.**

	• **To add characters and backgrounds** • **To move 2 or more characters and background objects in small steps to create frames to create their animation.** • **To evaluate their animations – 2 stars and a wish** **<u>Digital Literacy+ Online safety</u>** • **To be able to retell the safety message of not communicating with strangers online (and offline) and add this to a poster** • **To understand why we have ChildLine and to add their number to their posters** • **To be able to talk about the risks of going online and how we can keep ourselves safe when online.** • **To be able to ask for help and advise others on how to do so.** • **To recognise who our trusted adults are.**	**<u>Digital Literacy+ Online safety</u>** • **I can create my own strong, secure password using a mix of upper/lower case.** • **I can be a good digital citizen and show what being respectful online looks like through my school and home use of the internet.** • **I can tell others about the importance of being safe online via a poster.**	• **To add an image into iMovie.** • **To use the record tool to record their voice overs.** • **To edit their video by making the image and the recording the same length.** • **To add background music to their presentation to create a greater effect.** • **To export and save their video presentations.** • **To watch and evaluate their own and others video presentations.** **<u>Digital Literacy + Online safety</u>** • **To create an avatar to use instead of a photo.** • To share tips on how to be Image Safe online. • **To use the keynote app to add images and text to create a poster.** • **To make their own scam (not to send!) by using the 'how to spot a scam' tips.** • **To demonstrate how report unwanted content and scams online.** • **To use Pic collage to create a scam, including images for letter headings/company logos.**	**<u>Digital Literacy + Online safety</u>** • **To use book creator to make a book about vlogging.** • To recall all their internet safety learning so far. • **To make a vlog using the video function on the iPad .** • **To edit their vlog videos on iMovie adding extra features where necessary.** • **To put their 'stay safe while vlogging' tips into practise.** • **To evaluate their vlogs and suggest improvements for next time.**