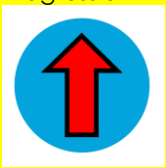
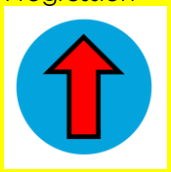
Computing Long Term Plan Hadrian Y5

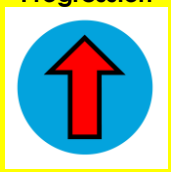
Y5 Computing	
National Curriculum Objectives KS2	Key Links
By the end of KS2 Pupils should be taught to: • design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts • use sequence, selection, 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.	**https://teachcomputing.org/curriculum** **Education for a Connected World links** https://www.knowsleyclcs.org.uk/2018-online-safety-sow/ PW: check emails

Topics		N.C Objectives	Key skills	Key Vocab
Autumn 1	Sharing	• Design, write and debug programs	• Type using fingers on both hands.	Computing

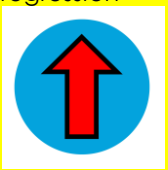
	Information	that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts • Use sequence, selection, and repetition in programs; work with variables and various forms of input and output • Understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration • 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	• Use common keyboard shortcuts, e.g. ctrl C (copy), ctrl V (paste). • Explain what makes a strong password. • Use folders to organise files. • Know how to mute and unmute audio on a computer or tablet. • Recognise that there is more than one search engine, and they may produce different results. • Use a search engine effectively to find information and images. • Know how to search for an application on a computer/tablet.	devices Internet parts Collaboration Responsibility Searching strategies Webpages
Progression 	This unit progresses learners' knowledge and understanding of computing systems and online collaborative working.			
Teacher Subject Knowledge 	Enhance your subject knowledge to teach this unit through the following training opportunities: **Online training courses** • Raspberry Pi Foundation online training courses			

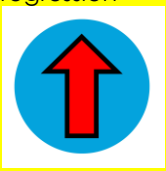
	Face-to-face courses • National Centre for Computing Education face-to-face training courses			
Cross Curricular Links 	Education for a Connected World links • I can assess and justify when it is acceptable to use the work of others • I can give examples of content that is permitted to be reused			
Autumn 2	Programming A - Selection in Physical Computing	• 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 • 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	• To create a condition-controlled loop • To use a condition in an 'if...then…' statement to start an action • To use selection to switch the program flow in one of two ways • To use a condition in an 'if...then...else…' statement to produce given outcomes	Explore procedures Refine procedures Variable Hardware + software control Change inputs Different outputs Articulate solutions Commands
Progression 	This unit assumes that learners will have prior experience of programming using a block-based language (eg Scratch) and understand the concepts of sequence and repetition. The National Centre for Computing Education key stage 1 units focus on floor robots and ScratchJr, however, experience of other languages or environments may also be useful.			

Teacher Subject Knowledge 	This unit focuses on physical computing, which allows learners to control real-life projects through the construction of programs. When learners undertake physical computing, they write programs that control real-world objects, like LEDs and motors, using a computer. The tangible effect of seeing the commands that they entered into a computer being carried out on a physical item, rather than on screen, can be highly motivational for learners. Physical computing also offers the opportunity to take a more project-based approach to learning, and allows learners to make choices about the purpose, design, and program of their product. Throughout this unit, there are opportunities to demonstrate a concept within the Crumble programming software or show a screencast animation on a slide. Pedagogically, it is more beneficial to demonstrate the concepts to learners, as it allows for easier questioning and understanding. We recommend that you use the animations to see what to demonstrate, then show learners with a live demonstration, however, animations are provided on the slides if you wish to use them instead. For this unit, you will need experience of constructing programs using the Crumble programming software (see the 'Resources' section at the end of this document). It uses the same drag-and-drop style as Scratch. You will need to write programs that turn LEDs (Sparkles) on and off, change LED colours, spin motors, use push switches as inputs, and combine a number of these components. Additionally, you will connect the Crumble controller to battery packs, Sparkles, motors, and push switches. For further support on using Crumbles, see the Crumble 'Getting Started' guide at redfernelectronics.co.uk/crumble-getting-started.
Cross Curricular Links 	**Science – Electricity (Year 4)** • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches, and buzzers **Design and Technology (Key stage 2)** Design • Generate, develop, model, and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces, and computer-aided design Make • Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining, and finishing], accurately • Select from and use a wider range of materials and components, including construction materials, textiles, and ingredients, according to their functional properties and aesthetic qualities

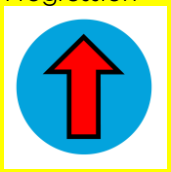
	Evaluate • Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work Technical knowledge • Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers, and motors] • Apply their understanding of computing to program, monitor, and control their products			
Spring 1	**Creating Media - Vector Drawing @ The Word**	• 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.	• To create graphical objects on a computer screen • To add or remove objects • To duplicate an object • To select an object • To delete an object • To modify an object • To select multiple objects • To combine objects	Online sharing Multimedia effects Multimedia modification Transitions Hyperlinks Editing tools Refining Online
Progression 	This unit progresses students' knowledge and understanding of digital painting and has some links to desktop publishing in which learners used digital images. They are now creating the images that they could use in desktop publishing documents.			
Teacher Subject Knowledge 	Lesson 1: Teachers will need an understanding of the tools available in the chosen software such as shape and line drawing tools: undo, redo, select, fill, and delete. Lesson 2: Teachers would benefit from knowing that vector drawings are created using shapes and that each shape used is called an object. It would be helpful to know how to move, resize, rotate, duplicate, and change the colour of objects within Google Drawings. Lesson 3: Teachers would benefit from an understanding of the tools within Google Drawings, including the ability to add colour effects to shapes and lines. Sharing Google Drawing files with the learners will be required for this lesson.			

	Lesson 4: Teachers need to understand that each added object creates a new layer in the drawing. It would help to know how to move shapes to a different layer using 'bring to front' or 'send to back'. Lesson 5: Teachers would benefit from understanding that objects can be grouped. Knowing how to group objects and copy/paste or duplicate them using keyboard commands would be an advantage. Lesson 6: Teachers would benefit from an understanding of how digital images can be made, either using shapes or pixels. It would be an advantage for teachers to have an understanding of the drawing tools available in Google Drawings to support learners in showcasing their skills in this lesson.			
Cross Curricular Links 	**Education for a Connected World links** **Copyright and ownership** • I can explain why copying someone else's work from the internet without permission can cause problems.			
Spring 1. 2	Creating media - video editing	• 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	• To review existing video content • To plan a video production • To review captured video • To use a recording device and a computer to make a video • To capture the video • To play back the video • To edit the video • To save and export a video file	Online sharing Multimedia effects Multimedia modification Transitions Hyperlinks Editing tools Refining Online

Progression 	This unit progresses learners' knowledge and understanding of creating media by guiding them systematically through the process involved in creating a video. The unit builds on the Year 4 unit 'Photo editing' where composition is introduced and the Year 3 unit 'Stop-frame animation' where learners explored some of the features of video production. By the end of this unit, learners will have developed the skills required to plan, record, edit, and share a video.			
Teacher Subject Knowledge 	This unit focuses on the skills associated with planning, recording, editing, and creating a video. You will need to be able to explain that video is the recording, reproducing, or broadcasting of moving visual images. You will also need to be familiar with a number of shot types and filming techniques, which are introduced in Lessons 2 and 3. A storyboard is used as a planning tool. It will be useful if you are familiar with the format of the storyboard. Once learners begin filming, you will need to be familiar with the device they are using, including how to start and stop recording, how to zoom in and out, and how to download content from the device to a computer for editing. It is important that you are familiar with the devices and apps or programs that you will use to import and edit video content. Windows 10 Video Editor is demonstrated in this unit, but there are many other free and paid-for apps available that can be used, either on a computer or on a device. Another option with limited function is to use the Microsoft Photos app. You need to know where to locate the video files and where to save them for easy retrieval. Once recording has been completed, learners will need to import their video files to the video editing software, so you will need to be familiar with this process, including where videos will be stored. You will need to have a clear understanding of how to edit and complete the video creation process, deleting or reordering clips. Finally, you should be able to demonstrate how to export the video project into an *.mp4 format for viewing.			
Cross Curricular Links 	**Internet safety** • **Use technology safely, respectfully, and responsibly; recognise acceptable/unacceptable behaviour.**			
Spring 2	Data and	• use search technologies effectively, appreciate how results are selected and	• To navigate a flat-file database • To design a structure for a flat-file	Spreadsheets

	information – Flat-file databases	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	database • To choose different ways to view data • To choose which attribute to sort data by to answer a given question • To choose which attribute and value to search by to answer a given question (operands) • To ask questions that need more than one attribute to answer • To choose multiple criteria to search data to answer a given question (AND and OR) • To select an appropriate graph to visually compare data • To choose suitable ways to present information to other people	Complex searches (and/or:) Problem solving Present answers Analyse information Question data Interpret Data Flat-File
Progression 	This unit progresses pupils' knowledge and understanding of why and how information might be stored in a database, and looks at how tools within a database can help us to answer questions about our data. It moves on to demonstrate how a database can help us display data visually, and how real-life databases can be used to help us solve problems. Finally, the pupils create a presentation showing understanding and application of all the tools used within the unit.			
Teacher Subject Knowledge 	Teachers will need to know that a flat-file database is a collection of data organised in a single table. The term 'database' means 'a collection of organised data that is stored on a computer'. Databases allow people to search and sort large quantities of data to find information. Data can be letters, words, numbers, dates, images, sounds etc. In addition, teachers will need to be familiar with the basic structure of a database, and the concept of 'grouping' and 'sorting' data records based on different fields. For example, grouping objects by colour, or sorting into alphabetical order. A database is composed of 'records', which are sets of data on a particular object. Records are formed from one or more 'fields' of data. A field is one specific piece of data in a database record. For example, a record all about a country could have fields such as 'country name' and 'country population'. The value within the record is the 'answer' to each field, eg Mexico is the value in the 'country name' field and '126.2 million' is the value in the 'country population' field. Teachers will also need to be aware that all objects have attributes. An attribute includes its 'name' and a 'value'. For example, a ball will have a 'colour', which might be 'red'. 'Colour' is the attribute 'name', 'red' is the attribute 'value'. In a flat-file database the attribute names become the fields when the data about the object is stored as a record. The values of the attributes become the values that are			

	saved in the database fields. Teachers will need to be familiar with using j2data sample databases. Support with navigating the databases can be found at http://www.j2e.com/help/videos/datags4. Knowledge of how to carry out a flight search using https://www.expedia.co.uk/Flights, and the ability to screenshot flight details from a web browser, would also be beneficial.			
Cross Curricular Links 	Maths			
Summer 1	Programming B - Selection in quizzes	• 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	• To experiment with a repeat-until loop • To use a condition in an 'if... then…' statement to produce a given outcome • To show that a condition can switch program flow in one of two ways • To use a condition in an 'if... then... else...' statement to produce given outcomes	Explore procedures Refine procedures Variable Hardware + software control Change inputs Different outputs Articulate solutions Commands Repeat Loop

Progression 	This unit assumes that learners will have prior experience of programming using block-based construction (eg Scratch), understand the concepts of 'sequence' and 'repetition', and have some experience of using 'selection'. Ideally, learners will have completed 'Programming A – Selection in physical computing' before undertaking this unit, as this will provide them with the required knowledge of 'selection'.			
Teacher Subject Knowledge 	This unit focuses on developing learners' understanding of selection in an on-screen context. It highlights what 'conditions' are and how they are used as part of 'selection'. This unit also develops learners' understanding of design in programming, using the approach outlined below. **Levels of abstraction** When programming, there are four levels which can help describe a project (known as Levels of abstraction). Research suggests that this structure can support learners in understanding how to create a program and how it works: • Task - this is what is needed • Design - this is what it should do • Code - this is how it is done • Running the code - this is what it does			
Cross Curricular Links 	Maths DT Science			
Education for a Connected World (Throughout the year)	My Online Life Y5 What does your online life say about you? What's an online community?	• use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	• Know where to find copyright free images and audio, and why this is important. • Critically evaluate websites for reliability of information and authenticity. • Demonstrate responsible use of a	Responsible online communicatio n Informed choices Virus threats Blogs

	What judgements do you make about other peoples online life? How can you protect yourself from online bullies? How do you interpret online information? How reliable is the information you read online? Can technology impact on your sleep? How secure are you with your online information and accounts? Can you copy anything you find on the internet?		online services, and know a range of ways to report concerns.	Messaging Reputation Online Bullying Copyright Self Image Identity Trust Risks Profile Password Private
Key texts 	• Book Beneath the Screen • When Charlie McButton Lost Power • Sasha Savvy Loves to Code			