









Computing Long Term Plan Hadrian Y6





Y6 Computing				
National Curriculum Objectives KS2		Key Links		
<p>By the end of KS2 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. 		<p style="text-align: center;"> https://teachcomputing.org/curriculum Education for a Connected World links https://www.knowsleyclcs.org.uk/2018-online-safety-sow/ PW: check emails </p>		
Topics	N.C Objectives	Key skills	Key Vocab	
Autumn 1	Computing	<ul style="list-style-type: none"> • Design, write and debug programs 	<ul style="list-style-type: none"> • To recall how to use a search engine 	
			Information	

	<h2 style="text-align: center;">Systems and Networks - Communication</h2>	<p>that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</p> <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • To compare the results from different search engines • To demonstrate that different search terms produce different results • To explain that search terms need to be chosen carefully • To evaluate the results of search terms • To identify that results from search engines can include adverts, and that the adverts can be targeted • To identify different ways to communicate without technology 	<p>movement Connecting devices Different audiences Research strategies Search result rankings Acknowledge resources</p>
<p>Progression</p> 	<p>This unit progresses students' knowledge and understanding of computing systems and online collaborative working.</p>			
<p>Teacher Subject Knowledge</p>	<p>Enhance your subject knowledge to teach this unit through the following training opportunities:</p> <p style="text-align: center;">Online training courses</p>			

	<ul style="list-style-type: none"> • Raspberry Pi Foundation online training courses <p>Face-to-face courses</p> <ul style="list-style-type: none"> • National Centre for Computing Education face-to-face training courses 			
<p>Cross Curricular Links</p> 	<p>Education for a Connected World links</p> <ul style="list-style-type: none"> • can describe and assess the benefits and the potential risks of sharing information online. • can use various additional tools to refine my searches (e.g. search filters: size, type, usage rights etc.). • can explain how to use search effectively and use examples from my own practice to illustrate this. • can explain how search engine rankings are returned and can explain how they can be influenced (e.g. commerce, sponsored results). 			
<p>Autumn 2</p>	<p>Programming A - Variables (Scratch)</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 • 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 	<ul style="list-style-type: none"> • To identify a variable in an existing program • To experiment with the value of an existing variable • To choose a name that identifies the role of a variable to make it more usable (to humans) • To decide where in a program to set a variable • To update a variable with a user input • To use an event in a program to update a variable • To use a variable in a conditional statement to control the flow of a program • To use the same variable in more than one location in a program 	<p>Predicting outputs Plan, program, test & review a program Program writing Control mimics +devices Sensors Measure input Create variables Link errors</p>
<p>Progression</p> 	<p>This unit assumes that pupils will have some prior experience of programming in Scratch. Specifically, they should be familiar with the programming constructs of sequence, repetition, and selection. These constructs are covered in the Year 3, 4, and 5 National Centre for Computing Education programming units respectively. Each year group includes at least one unit that focuses on Scratch.</p>			

<p>Teacher Subject Knowledge</p> 	<p>This unit focuses on developing pupils' understanding of variables in a new programming language. It highlights where variables can be used and how they can be set and changed through the running of a program. This unit also develops pupils' understanding of design in programming, using the approach outlined below.</p> <p>When programming, there are four levels that can help describe a project (known as 'levels of abstraction'). Research suggests that this structure can support pupils in understanding how to create a program and how it works:</p> <ul style="list-style-type: none"> • Task — what is needed • Design — what it should do • Code — how it is done • Running the code — what it does <p>Spending time at the 'task' and 'design' levels before engaging in writing code can aid pupils in assessing the 'do-ability' of their programs. It also reduces the cognitive load for pupils during programming.</p> <p>Pupils will move between the different levels throughout the unit, and this is highlighted within each lesson plan.</p> <p>During this unit, pupils are required to save their work in Scratch. We recommend the use of teacher and pupil accounts to manage this process. You can find detailed guidance on setting up and managing accounts in Scratch on the Scratch website (scratch.mit.edu/educators/faq)</p>			
<p>Cross Curricular Links</p> 	<p>DT Maths Science</p>			
<p>Spring 1</p>	<p>Creating Media - 3D Modelling @ The Word</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • To create 3D graphical objects on a computer screen • To alter the view of the 3D space • To place a 3D object in a 3D space • To select an object • To duplicate an object • To delete an object • To modify an object • To select multiple objects 	<p>Appropriate online tools Audience Atmosphere Structure Copyright Information</p>

		<p>acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact</p>	<ul style="list-style-type: none"> • To recognise that blank objects must be used as placeholders to create holes • To recognise the role of scale in design • To combine objects 	<p>collection HTML code Storing 3D Modelling</p>
<p>Progression</p> 	<p>This unit progresses students' knowledge and understanding of creating 3D graphics using a computer. Prior to undertaking this unit, learners should have worked with 2D graphics applications.</p>			
<p>Teacher Subject Knowledge</p> 	<p>Lesson 1: You will need to be familiar with creating, selecting, and moving 3D objects in Tinkercad, including how to view them from different angles. Tinkercad's Start Learning 3D tutorials provide a good starting point (https://www.tinkercad.com/learn/designs).</p> <p>Lesson 2: You will need to be familiar with resizing, lifting, and altering the colour of 3D objects in Tinkercad. Tinkercad's Start Learning 3D tutorials provide a good starting point (https://www.tinkercad.com/learn/designs).</p> <p>Lesson 3: You will need to be familiar with rotating and positioning 3D objects in Tinkercad.. Tinkercad's Rotate it tutorial provides a good starting point (https://www.tinkercad.com/learn/designs) along with the Promo Ambition's Tinkercad Tutorial 2 (https://promoambitions.com/tinkercad). In order to deliver the extension task in Activity 3, the Changing workplanes teacher guidance provides further information, along with Promo Ambition's Tinkercad Tutorial 4 (https://promoambitions.com/tinkercad).</p> <p>Lesson 4: You will need to be familiar with resizing 3D objects to specific dimensions in Tinkercad. Tinkercad's Size it up! tutorial provides a good starting point (https://www.tinkercad.com/learn/designs). In order to use other objects as placeholders to create holes within 3D objects, 3D shapes need to be grouped. The Group it! tutorial provides further information (https://www.tinkercad.com/learn/designs).</p> <p>Lesson 5: You may wish to revisit resizing and grouping 3D objects from Lesson 4.</p> <p>Lesson 6: You may wish to revisit the skills developed during the previous lessons.</p>			
<p>Cross Curricular Links</p>	<p>Art and design – KS2</p> <ul style="list-style-type: none"> • To improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials 			



Design and technology – KS2

- Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

Mathematics – KS2 (Y6)

- Recognise, describe and build simple 3D shapes, including making nets

Education for a Connected World links

Strand

- Lesson 1 and Lesson 3 – Privacy and Security (Y4) – I can describe strategies for keeping my personal information private, depending on context

Spring 1. 2

Webpage creation

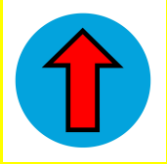
- Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- Select, use, and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems, and content that accomplish given goals, including collecting, analysing, evaluating, and presenting data and information.
- use technology safely, respectfully, and responsibly; recognise acceptable/unacceptable behaviour

- To review an existing website (navigation bars, header)
- To create a new blank web page
- To add text to a web page
- To set the style of text on a web page
- To change the appearance of text
- To add web pages to a website
- To embed media in a web page
- To insert hyperlinks between pages
- To preview a web page (different screen sizes)
- To insert hyperlinks to another site

Appropriate online tools
Audience
Atmosphere
Structure
Copyright
Information collection
HTML code
Storing

Progression

This unit progresses students' knowledge and understanding of the following: digital writing, digital painting, desktop



publishing, digital photography, photo editing, and vector drawing

Teacher Subject Knowledge



This unit focuses on the design and creation of web pages and websites using Google Sites.

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



English links

Writing composition: Identifying the audience for and purpose of the writing, selecting the appropriate form, and using other similar writing as models for their own


Education for a Connected World links

Online relationships

- I can use the internet with adult support to communicate with people I know. (EY-7)

Managing information online

- I can navigate online content, websites, or social media feeds using more sophisticated tools to get to the information I want (e.g. menus, sitemaps, breadcrumb-trails, site search functions). (11-14)

	<p>Copyright and ownership</p> <ul style="list-style-type: none"> • I can explain why copying someone else’s work from the internet without permission can cause problems. • I can give examples of what those problems might be. • When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it. • I can give some simple examples. • 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. • I can demonstrate the use of search tools to find and access online content which can be reused by others. • I can demonstrate how to make references to and acknowledge sources I have used from the internet. • I can explain the principles of fair use and apply this to case studies. (11-14) 			
Spring 2	<p>Data and information spreadsheets</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • To recognise that data can be calculated using different operations • To recognise that changing inputs also changes outputs • To apply formulas to data, including duplication 	<p>Generate Process Interpret Store Present information Plausibility Appropriate data tool Interrogate Investigations</p>
<p>Progression</p> 	<p>This unit progresses students' knowledge and understanding of data, and teaches them how to organise and modify data within spreadsheets.</p>			

Teacher Subject Knowledge



It would be beneficial for teachers to have an understanding of a spreadsheet application e.g. 'Google Sheets' or alternative software such as 'Microsoft Excel' or 'Purple Mash – 2Calculate'.

An understanding that data can be words, numbers, dates, images, sounds, etc. without context is important. Just as words need to be in a sentence to give them meaning, data items need to be part of a structure. For example, the number 6 isn't data unless it's part of a larger structure, such as included in a spreadsheet with data headings. Understanding that a data set is a collection of related data that can be modified using a computer is helpful, as learners will be creating their own data sets throughout the unit.

Knowledge of why data headings are important and an understanding of how data is organised in columns and rows would be beneficial. Organising data is an important aspect of data and information. It supports the use of calculations and provides the opportunity to use sorting and filtering, which enables ease of use and reduces human error.

This unit focuses on the learners applying number formats to alter cells. It is important to understand that this type of formatting changes how a spreadsheet interacts with the data and is different to applying style formatting (bold, italics, etc.), which only changes the appearance of data.

In Lesson 5 of this unit, learners have been provided with the mathematical calculations they need to complete the activities in the unit, the calculations can be found in the 'Data calculations' handout. It is important that learners are given the opportunity to demonstrate their ability to use the computational skills required, regardless of their mathematical ability.

Cross Curricular Links



National Curriculum maths links

Number – addition, subtraction, multiplication, and division:

- Solve problems involving addition, subtraction, multiplication, and division

Statistics:

- Interpret and construct pie charts and line graphs, and use these to solve problems
- Calculate and interpret the mean as an average

Education for a Connected World links

Managing information online

- I can describe how I can search for information within a wide group of technologies (e.g. social media, image sites, video sites)
- I can use different search technologies
- I can evaluate digital content and can explain how I make choices from search results



Summer 1


Programming B -


- Design, write, and debug programs

- To identify a variable in an existing

Predicting

	<p>Sensing (Robots)</p>	<p>that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</p> <ul style="list-style-type: none"> • 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 	<p>program</p> <ul style="list-style-type: none"> • To experiment with the value of an existing variable • To choose a name that identifies the role of a variable to make it more usable (to humans) • To decide where in a program to set a variable • To update a variable with a user input • To use an event in a program to update a variable • To use a variable in a conditional statement to control the flow of a program • To use the same variable in more than one location in a program 	<p>outputs</p> <p>Plan, program, test & review a program</p> <p>Program writing Control mimics +devices Sensors Measure input Create variables Link errors</p>
<p>Progression</p> 	<p>This unit presumes that learners are already confident in their understanding of sequence, repetition and selection independently within programming. If learners are not yet ready for this, you may wish to revisit earlier programming units where these constructs are introduced.</p>			
<p>Teacher Subject Knowledge</p> 	<p>This unit focuses on developing pupils' understanding of variables in a different programming environment and using a physical device. It also enables pupils to combine their knowledge and understanding of programming constructs introduced in previous years. This unit continues to advance pupils' understanding of design in programming, using the approach outlined below.</p> <p>When programming, there are four levels that can help describe a project (known as 'levels of abstraction'). Research suggests that this structure can support pupils in understanding how to create a program and how it works:</p> <ul style="list-style-type: none"> • Task — what is needed • Design — what it should do • Code — how it is done • Running the code — what it does <p>Spending time at the 'task' and 'design' levels before engaging in writing code can aid pupils in assessing the 'do-ability' of their</p>			

	<p>programs. It also reduces the cognitive load for pupils during programming.</p> <p>Pupils will move between the different levels throughout the unit, and this is highlighted within each lesson plan:</p> <ul style="list-style-type: none"> • Lesson 3 - pupils work at the 'code' and 'running the code' levels from a given design • Lesson 4 - pupils move from 'design' to 'code', to 'running the code' with some scaffolding • Lesson 5 - pupils work at the 'design' level with increasing independence • Lesson 6 - pupils work at the 'code' and 'running the code' levels, using their own design 			
<p>Cross Curricular Links</p> 	<p>Maths DT Science</p>			
<p>Education for a Connected World (Throughout the year)</p>	<p>My Online Life Y6</p> <p>How does the internet and media shape our views?</p> <p>How can you be a good Digital Citizen?</p> <p>What does the information online say about us?</p> <p>How would you deal with online bullying?</p> <p>How do you make informed decisions online? Can you trust everything you read online?</p> <p>Can technology impact on your health?</p> <p>How secure are you with</p>	<ul style="list-style-type: none"> • use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact. 	<ul style="list-style-type: none"> • Explain what makes a strong password and why this is important at school and in the wider world. • Explain how algorithms are used to track online activities with a view to targeting advertising and information. • Know that there are laws around the purchase of games; the production, sending and storage of images; what is written online; and around online gambling. 	<p>Reputation Online Bullying Copyright Self Image Identity Trust Risks Profile Password Private Empathy Responsible online communication Informed choices Virus threats Blogs Messaging</p>

	your online information and accounts? Who owns the information on the internet?			
Key texts 	<ul style="list-style-type: none">• Ada Lovelace• But it's Just a Game• Book Beneath The Screen			