**Computing Curriculum**
**Year 5 and 6 – Cycle B**

**Purpose of study**

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

**Aims**

The national curriculum for computing aims to ensure that all pupils:

♣ can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation

♣ can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems

♣ can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems

♣ are responsible, competent, confident and creative users of information and communication technology.

**Intent**

At Caythorpe, we use Teach Computing, provided by the NCCE, as the basis of our sequence of learning.

All learning outcomes can be described through a high-level taxonomy of ten strands, ordered alphabetically as follows:

- Algorithms — Be able to comprehend, design, create, and evaluate algorithms
- Computer networks — Understand how networks can be used to retrieve and share information, and how they come with associated risks
- Computer systems — Understand what a computer is, and how its constituent parts function together as a whole
- Creating media — Select and create a range of media including text, images, sounds, and video
- Data and information — Understand how data is stored, organised, and used to represent real-world artefacts and scenarios
- Design and development — Understand the activities involved in planning, creating, and evaluating computing artefacts
- Effective use of tools — Use software tools to support computing work
- Impact of technology — Understand how individuals, systems, and society as a whole interact with computer systems
- Programming — Create software to allow computers to solve problems
- Safety and security — Understand risks when using technology, and how to protect individuals and systems

The taxonomy provides categories and an organised view of content to encapsulate the discipline of computing. Whilst all strands are present at all phases, they are not always taught explicitly.

Due to our mixed year groups, we have adapted the structure of the Teach Computing scheme. The 'Computing Systems and Networks' unit is combined for Year 1/2, Year 3/4, and Year 5/6. This is then repeated in each cycle; it is expected that children will be completely secure in their knowledge by the end of each phase. This approach allows all children in the class to learn the key knowledge which underpins all the other units. Some of the units have been reordered to ensure that prior knowledge that the children need is taught before moving onto more complex learning. Our use of flashbacks allows children to revisit knowledge regularly so that they can remember key knowledge more effectively and do not forget.

Our pedagogical approach allows children to work collaboratively towards a project-based goal. The sequence of learning is taught through key concepts and vocabulary. In the first instance, children are encouraged to unplug from technology and explore ideas in other familiar real-life contexts before applying this to the new technological context. Children are continually encouraged to work with physical computing to enhance learning. As well as this, they apply knowledge from the arts alongside computing to achieve a goal. In programming our sequence allows children to explore, read and comprehend block based and text base code; leading them to successfully being able to write code.

**EYFS**

There are no statutory requirements to use and learn about technology in EYFS. However, at Caythorpe we believe technology can play a role in supporting early communication, language and literacy. It can offer new learning opportunities through ebooks, digital cameras, programmable toys, apps, computers with appropriate software, iPads and video calling. Thus, by the end of the year the pupils at Caythorpe have a range of technologies available to them within the nursery's continuous provision which they can choose to use whenever they wish to for their own purposes. Whilst children are developing their understanding of these technologies, practitioners should be drawing their attention to the technology that's being used in the world around them, from mobile phones to pedestrian crossings. Practitioners should also provide a positive role model by showing children that adults use technology for their own purposes and by talking to the children about the value they place on this use. In this way children will see technology used for real purposes and will develop the understanding that technologies are tools to be used when they're needed and that they're not used just for the sake of it. They will develop a positive disposition towards technology and a motivation to use it both now and in the future.

| Vocabulary: By the end of EYFS they will be able to *use the words…* | | Outcomes for the end of EYFS:<br>*Children will be able to:* |
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| Tablet<br>Phone<br>Computer<br>Keyboard<br>Keys<br>Touch screen<br>Code/ coding<br>A range of vocabulary linked to appliances such as tills, calculators, etc.<br>Switch<br>Safe<br>Safety<br>Online<br>Internet<br>Danger | Kind<br>Respect<br>Permission<br>Personal information<br>Swipe<br>Technology<br>App<br>games | ▪ Children will use and access a range of technology equipment in the learning environment.<br>▪ For pieces of equipment that the children are expected to use with regularity such as CD player or tablet, children need to be taught how to turn it on and use it as it is intended.<br>▪ Children will know how to take care of electronic equipment – away from water, not left on the floor et.<br>▪ Children will know that technology is used throughout the whole of our world and should discuss in class time instances of use such as tills, medical equipment, computers.<br>▪ Children will be able to verbalise and remember technology that is in their homes and familiar environments.<br>▪ Role play planning needs to enable pupils to use technology in play activities and observations should assess where they use them and the language and skills they reflect during their self-initiated activities -consider the 'Domestic Role-play' area to have an office, telephone, iPad.<br>▪ Children will know specific uses for computers.<br>▪ Children will know how to swipe on a screen and access an app that they a) self -elect b) are directed to select.<br>▪ Children will know how to access and use independently a range of appropriate apps that support learning in the class.<br>▪ Children will know that there are some very positive uses of computers however sometimes there are scary things that happen when you are on games or on the internet.<br>▪ Children will know that you are responsible for being kind to each other when online.<br>▪ Children will have watched an adult modelling the use of Scratch to do simple coding exercise.<br>▪ Children will have had experience of directing each other to create a sequence of instructions.<br>▪ Adults will have taught children to undertake a simple coding procedure on Scratch to do a simple action.<br>▪ Children need to learn a simple coding sequence and to explain how they completed it |

**Attainment targets**

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study. Schools are not required by law to teach the example content in [square brackets].

**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.

**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.

| | Autumn | | Spring | | Summer | |
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| **Topic** | Computer systems and networks – Systems, searching, communication and collaboratio | Creating media – Introduction to vector graphics | Programming B – Selection in | Creating media – Web page creation | Programming B – Sensing Movement | Creating media – 3D modelling |
| **Progression** | This combines the year 5 and year 6 units for 'computer systems and networks' from Teach Computing and the same pieces of procedural and declarative knowledge are taught in both cycles due to the importance of the knowledge: underpinning the rest of the computing curriculum. It is expected that by the end of year 6 all children will know and remember the key knowledge outlined. | 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. | 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'. | This unit progresses students' knowledge and understanding of the following: digital writing, digital painting, desktop publishing, digital photography, photo editing, and vector drawing. | This unit presumes that learners are already confident in their understanding of sequence, repetition and selection independently within programming. | 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. |
| **Resources** | Laptops, access to internet, iPads, search engines | Laptops, internet access, iPads, GoogleDrawings, Microsoft Publisher/PowerPoint, lesson slides, | Laptops, internet access, iPads, lesson slides, visit the Scratch website (scratch.mit.edu/educators/faq). | Laptops, access to internet, iPads, | Laptops, access to internet, iPads, makecode.microbit.org, micro:bit will need the following peripherals:<br>A micro USB to USB lead<br>A battery pack<br>2 x AAA batteries per micro:bit (if you are using your own micro:bits, rather than those provided in the NCCE hub kits, check the battery size — some are AA) | Laptops, access to internet, iPads, (https://www.tinkercad.com). Learners will need accounts to save their work and access the resources. We recommend signing up for a teacher account at https://www.tinkercad.com/join, enables learner accounts to be created and the website accessed with a Class Code: https://tinkercad.zendesk.com/hc/en-us/articles/360026236693-Tinkercad-Classrooms. Please ensure your school's online safety policy (or similar) is closely adhered to and avoid using learners' full names when creating accounts. |
| **Vocabulary** | Search engine, world wide web, select, rank, address bar, web crawlers, Input, output, processes, | Vector, resize, reshape, zoom | Algorithms, if, then, else, binary question, code, infinite loops | HTML, code, hyperlinks, | Microbit, input, output, variables, >, <, =, operand, if, then, else, algorithm, | 2D and 3D graphics, resize, rotate, |
| **Flashback** | **Computers are made up of input devices, digital devices and output devices.**<br><br>**A computer network is made of multiple devices that pass information between each other.**<br><br>**Information can be shared through mobile networks, wifi (via wireless access points), a network switch and wired connections.** | ***Y6 additional flashback***<br><br>**Databases are used to organise information.** | **DTP's can be structured with placeholders.**<br><br>**How to add and remove text and images from place holders.**<br><br>**How to resize and rotate images, as well as changing fonts and applying effects to text.** | ***Y6 additional flashback***<br><br>**When searching a database, you are able to refine results by filtering records down to particular fields.** | **Children will know:**<br><br>**A loop can be programmed to stop after a specific number of times – this is called a count-controlled loop. (Scratch)**<br><br>**How to plan a program that includes appropriate loops to produce a given outcome.**<br><br>**Instructions need to be in certain order when creating a count controlled or infinite loop.** | ***Y6 additional flashback***<br><br>**'And' and 'Or' can be used to specify the criteria required in a search.** | **How to draw, modify and reposition objects.**<br><br>**How to move objects between layers of the drawing.**<br><br>**How to combine objects to achieve a desired effect.** | ***Y6 additional flashback***<br><br>**Cells can be formatted in different depending on the data that needs to be put into them.** | **That a condition can only be true or false.**<br><br>**How to create a condition-controlled loop.**<br><br>**How to create a computer programme that uses 'if' 'when' and 'else' selectors to direct the flow of the programme** | ***Y6 additional flashback***<br><br>**How to create a formula for different operations and duplicate this over multiple cells.** | **If you change the value of a variable, you cannot access the previous value (cannot undo)**<br><br>**If you read a variable, the value remains, and their can only be one variable at any one time.**<br><br>**Variables may need to be sued in more than one location. The name must be unique but the function can be the same.** | ***Y6 additional flashback***<br><br>**How to apply formula in order to answer a range of questions.** |

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| **Lesson 1** | **WALT:** explain how computer systems are connected to form systems and the roles these systems play in our lives.<br><br>**Activities:** Learners will develop their understanding of components working together to make a whole. They will outline how digital systems might work and the physical and electronic connections that exist. Learners will consider how devices and processes are connected. They will also reflect on how computer systems can help us.<br><br>**Children will know:**<br>that a computer system features inputs, processes, and outputs.<br><br>computer systems communicate with other devices<br><br>the tasks that are managed by computer systems<br><br>the human elements of a computer system | **WALT:** know that drawing tools can be used to produce different outcomes<br><br>**Activities:** In this lesson learners will be introduced to vector drawings and begin to have an understanding that they are made up of simple shapes and lines. Learners will use the main drawing tools within a software package. This unit is written assuming the use of Google Drawings (docs.google.com/drawings/) but other packages such as Microsoft Publisher, or Microsoft PowerPoint can be used if preferred. Learners will discuss how vector drawings differ from paper-based drawings.<br><br>**Children will know:**<br>that vector drawings are made using shapes<br><br>the main drawing tools<br><br>how a vector drawing is different from paper-based drawings | **WALT:** know how selection is used in computer programs<br><br>**Activities:** In this lesson, learners revisit previous learning on 'selection' and identify how 'conditions' are used to control the flow of actions in a program. They are introduced to the blocks for using conditions in programs using the Scratch programming environment. They modify the conditions in an existing program and identify the impact this has.<br><br>**Children will know:**<br>how conditions are used in selection<br><br>some conditions in a program<br><br>how to modify a condition in a program | **WALT:** review an existing website and consider its structure<br><br>**Activities:** In this lesson learners will explore and review existing websites and evaluate their content. They will have some understanding that websites are created using HTML code.<br><br>**Children will know:**<br>how to explore a website<br><br>the different types of media used on websites<br><br>websites are written in HTML | **WALT:** create a program to run on a controllable device<br><br>**Activities:** In this lesson, learners will be introduced to the microbit as an input, process, output device that can be programmed. Learners will familiarise themselves with the device itself and the programming environment, before creating their own programs. They will then flash their programs to the device.<br><br>**Children will know:**<br>how to apply their knowledge of programming to a new environment<br><br>how to test their program on an emulator<br><br>how to transfer their program to a controllable device. | **WALT:** use a computer to create and manipulate three-dimensional (3D) digital objects<br><br>**Activities:** This lesson introduces learners to the concept of 3D modelling by creating a range of 3D shapes that they select and move. They also examine the shapes from a variety of views within the 3D space.<br><br>**Children will know:**<br>the similarities and differences between 2D and 3D shapes<br><br>why we might represent 3D objects on a computer<br><br>how to select, move, and delete a digital 3D shape. |
| **Lesson 2** | **WALT:** know how to use search engines and describe how the results have been selected.<br><br>**Activities:** They are given the opportunity to explain how to search. Next, they learn that searches do not always return the results that someone is looking for; refine their searches accordingly. Then learners are introduced to the two most common methods of searching: using a search engine and using the address bar. Learners gain an understanding of why search engines are necessary to help them find things on the World Wide Web. They conduct their own searches and break down, in detail, the steps needed to find things on the web. Learners then emulate web crawlers to create an index of their own classroom. Finally, they consider why some searches return more results than others.<br><br>**Children will know:** | **WALT:** create a vector drawing by combining shapes<br><br>**Activities:** During this lesson learners will begin to identify the shapes that are used to make vector drawings. They will be able to explain that each element of a vector drawing is called an **object**. Learners will create their own vector drawing by moving, resizing, rotating, and changing the colours of a selection of objects. They will also learn how to duplicate the objects to save time.<br><br>**Children will know:**<br>the shapes used to make a vector drawing<br><br>that each element added to a vector drawing is an object | **WALT:** know that a conditional statement connects a condition to an outcome<br><br>**Activities:** In this lesson, learners will develop their understanding of selection by using the 'if… then… else...' structure in algorithms and programs. They will revisit the need to use repetition in selection to ensure that conditions are repeatedly checked. They identify the two outcomes in given programs and how the condition informs which outcome will be selected. Learners use this knowledge to write their own programs that use selection with two outcomes.<br><br>**Children will know:**<br>how to use selection in an infinite loop to check a condition<br><br>how to identify the condition and outcomes in an 'if… then… else…' statement<br><br>how to create a program with different outcomes using selection | **WALT:** plan the features of a web page<br><br>**Activities:** Learners will look at the different layout features available in Google Sites and plan their own web page on paper.<br><br>**Children will know:**<br>the common features of a web page<br><br>media to include on their page<br><br>how to design a web page layout that suits a purpose | **WALT:** know that selection can control the flow of a program<br><br>**Activities:** In this lesson, learners will explore how if, then, else statements are used to direct the flow of a program. They will initially relate if, then, else statements to real-world situations, before creating programs in MakeCode. They will apply their knowledge of if, then, else statements to create a program that features selection influenced by a random number to create a micro:bit fortune teller project.<br><br>**Children will know:**<br>examples of conditions in the real world | **WALT:** compare working digitally with 2D and 3D graphics<br><br>**Activities:** This lesson examines the similarities and differences between working digitally with 2D and 3D graphics. Learners initially discuss the similarities and differences they have identified so far, then move on to combine 3D shapes, including lifting the 3D object, to produce a house. Learners then colour their 3D shapes, followed by adding further shapes and undertaking further reflection on the similarities and differences between working digitally with 2D and 3D graphics.<br><br>**Children will know:** |

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| | how to make use of a web search to find specific information<br><br>how to refine a web search<br><br>the role of web crawlers in creating an index<br><br>how a search term is related to the search engine's index (Y6) | how to move, resize, and rotate objects I have duplicated | | | how to use a variable in an if, then, else statement to select the flow of a program<br><br>how to determine the flow of a program using selection | how graphical objects can be modified<br><br>how to resize a 3D object<br><br>how to change the colour of a 3D object |
| **Lesson 3** | **WALT:** explain how search results are ranked and why the order is important<br><br>**Activities:** Learners take part in an unplugged activity to find out about how a webpage's content can influence where it is ranked in search results. In groups, learners create paper-based webpages on a topic that they are familiar with. They then discover how their webpages would rank when searching for keywords relating to their content.<br><br>**Activities:** Learners take part in an unplugged activity to find out about how a webpage's content can influence where it is ranked in search results. In groups, learners create paper-based webpages on a topic that they are familiar with. They then discover how their webpages would rank when searching for keywords relating to their content. Learners explore how someone performing a web search can influence the results that are returned, and how content creators can optimise their sites for searching. They also explore some of the limitations of searching and discuss what cannot be searched.<br><br>**Children will know:**<br><br>that a search engine uses criteria to rank results<br><br>some of the ways that search results can be influenced, including how they make money<br><br>the limitations of search engines | **WALT:** use tools to achieve a desired effect<br><br>**Activities:** During this lesson learners will continue to increase the complexity of their vector drawings by using the zoom tool to help them add detail. They will begin to understand how grids and resize handles can be used to improve consistency in their drawings and use tools to modify objects, creating different effects.<br><br>**Children will know:**<br>how to use the zoom tool to help me add detail to my drawings<br><br>how alignment grids and resize handles can be used to improve consistency<br><br>how to modify objects to create different effects | **WALT:** know how selection directs the flow of a program<br>**Activities:** In this lesson, learners consider how the 'if… then... else…' structure can be used to identify two responses to a binary question (one with a 'yes or no' answer). They identify that the answer to the question is the 'condition', and use algorithms with a branching structure to represent the actions that will be carried out if the condition is true or false. They learn how questions can be asked in Scratch, and how the answer, supplied by the user, is used in the condition to control the outcomes. They use an algorithm to design a program that uses selection to direct the flow of the program based on the answer provided. They implement their algorithm as a program and test whether both outcomes can be achieved.<br><br>**Children will know:**<br>that program flow can branch according to a condition<br><br>how to design the flow of a program which contains 'if… then… else…'<br><br>that a condition can direct | **WALT:** consider the ownership and use of images (copyright)<br><br>**Activities:** During this lesson learners will become familiar with the terms 'fair use' and 'copyright'. They will gain an understanding of why they should only use copyright-free images and will find appropriate images to use in their work from suggested sources.<br><br>**Children will know:**<br>why they should use copyright-free images<br><br>how to find copyright-free images<br><br>what is meant by the term 'fair use' | **WALT:** update a variable with a user input<br><br>**Activities:** In this lesson, learners will initially use the buttons to change the value of a variable using selection. They will then develop their programs to update the variable by moving their micro:bit using the accelerometer to sense motion. Finally, they will learn that a variable can be displayed after it is updated or in response to an input.<br><br>**Children will know:**<br>how to use a condition to change a variable<br><br>how to experiment with different physical inputs<br><br>that if you read a variable, the value remains | **WALT:** construct a digital 3D model of a physical object<br><br>**Activities:** During this lesson, learners will produce a 3D model of a physical object, which will contain a number of different 3D objects. 3D objects will need to be rotated and placed into position in relation to other 3D objects.<br><br>**Children will know:**<br>how to rotate a 3D object<br><br>how to position 3D objects in relation to each other<br><br>how to select and duplicate multiple 3D objects |

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| **Lesson 4** | **WALT**: know the importance of internet addresses and how data is transferred across the internet.<br><br>**Activities:** Explore different ways that addresses are written. Children to explore and find IP addresses looking at links between different IP addresses. Introduce the idea that parts of a computer system are not always in the same place or country. Instead, those parts of a system must transfer information using the internet. This lesson builds on the introduction to the internet in the Year 4 'What is the internet?' unit, adding awareness of IP addresses and the rules (protocols) that computers have for communicating with one another.<br><br>**Children will know:**<br><br>that a computer uses addresses to access websites on the internet.<br><br>data is transferred using agreed methods.<br><br>data is transferred over the internet and between networks in packets.<br><br>the main parts of a data packet (Y6) | **WALT:** recognise that vector drawings consist of layers<br><br>**Activities:** During this lesson learners will gain an understanding of layers and how they are used in vector drawings. They will learn that each object is built on a new layer and that these layers can be moved forward and backward to create effective vector drawings.<br><br>**Children will know:**<br>that each added object creates a new layer in the drawing<br><br>which objects are in the front layer or in the back layer of a drawing<br><br>how to change the order of layers in a vector drawing | **WALT:** design a program which uses selection<br><br>**Activities:** In this lesson, learners will be provided with a task: to use selection to control the outcomes in an interactive quiz. They will outline the requirements of the task and use an algorithm to show how they will use selection in the quiz to control the outcomes based on the answer given. Learners will complete their designs by using storyboards to identify the questions that will be asked, and the outcomes for both correct and incorrect answers. To demonstrate their understanding of how they are using selection to control the flow of the program, learners will identify which outcomes will be selected based on given responses.<br><br>**Children will know:**<br>how to outline a given task<br><br>how to use a design format to outline my project<br><br>the outcome of user input in an algorithm | **WALT:** recognise the need to preview pages<br><br>**Activities:** Today learners will revise how to create their own web page in Google Sites. Using their plan from previous lessons, learners will create their own web page/home page. They will preview their web page as it will appear on different devices and suggest or make edits to improve the user experience on each device.<br><br>**Children will know:**<br><br>how to add content to their own web page<br><br>how to preview what their web page looks like<br><br>how to evaluate what their web page looks like on different devices and suggest/make edits. | **WALT:** use a conditional statement to compare a variable to a value<br><br>**Activities:** In this lesson, learners will initially work at code level by applying their knowledge from the previous lesson to make their micro:bit perform the function of a compass. They will then design a program which will enable the micro:bit to be used as a navigational device. To code this, they will adapt the code they completed to make the compass.<br><br>**Children will know:**<br>the importance of the order of conditions in else, if statements<br><br>how to use an operand (e.g. <>=) in an if, then statement<br><br>how to modify a program to achieve a different outcome | **WALT:** identify that physical objects can be broken down into a collection of 3D shapes<br><br>**Activities:** During this lesson, learners will produce a 3D model of a pencil holder desk tidy. The 3D model will contain a number of 3D objects that are of specific dimensions and use other 3D objects as placeholders to create holes with them.<br><br>**Children will know:**<br>the 3D shapes needed to create a model of a real-world object<br><br>how to create digital 3D objects of an appropriate size<br><br>how to group a digital 3D shape and a placeholder to create a hole in an object |
| **Lesson 5** | **WALT:** how sharing information online can help people work together and evaluate different ways of doing this.<br><br>**Activities:** In this lesson, learners will consider how people can work together when they are not in the same location. They will discuss ways of working and start a collaborative online project. Learners will reflect on how they worked together and how their working together might be improved. Learners will work together on an unplugged activity and use that experience to develop their own ideas of good collective working practices.<br><br>**Children will know:**<br><br>how to access shared files of different media | **WALT:** group objects to make them easier to work with<br><br>**Activities:** During this lesson learners will be taught how to duplicate multiple objects. They will learn how to group objects to make them easier to work with, how to copy and paste these images, and then make simple alterations.<br><br>**Children will know:**<br>how to copy part of a drawing by duplicating several objects<br><br>how to group to create a single object | **WALT:** create a program which uses selection<br><br>**Activities:** In this lesson, learners will use the Scratch programming environment to implement the first section of their algorithm as a program. They will run the first section of their program to test whether they have correctly used selection to control the outcomes, and debug their program if required. They will then continue implementing their algorithm as a program. Once completed, they will consider the value of sharing their program with others so that they can receive feedback. Learners conclude the lesson by using another learner's quiz and providing feedback on it. | **WALT:** use navigation paths<br><br>**Activities:** During this lesson learners will begin to appreciate the need to plan the structure of a website carefully. They will plan their website, paying attention to the navigation paths (the way that pages are linked together). They will then create multiple web pages for their site and use hyperlinks to link them together as detailed in their planning.<br><br>**Children will know:**<br>what a navigation path is | **WALT:** design a project that uses inputs and outputs on a controllable device<br><br>**Activities:** In this lesson, learners will be working at the design level. They will pick out features of a step counter, a piece of technology with which they are likely to be familiar. They will then relate those features to the sensors on a micro:bit. Having seen a simulated example of a micro:bit step counter, learners will pick out features which they will be able to include in their design. In the main activity, learners will design the | **WALT:** design a digital model by combining 3D objects<br><br>**Activities:** During this lesson, learners will resize and enhance their 3D model of a pencil holder desk tidy. Learners will also plan their own 3D model of a photo frame, which will be developed during the next lesson.<br><br>**Children will know:**<br>how to plan a 3D model<br><br>which 3D objects I need to construct my model |

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| | different ways that information can be sent over the internet.<br><br>different ways of working together online<br><br>working together on the internet could be public or private. | how to reuse a group of objects to further develop my vector drawing | **Children will know:**<br>• how to implement my algorithm to create the first section of my program<br>• how to test my program<br>how to share my program with others | why navigation paths are useful<br><br>make multiple web pages and link them using hyperlinks | algorithm for their step counter project. Finally, they will connect the battery pack to their micro:bit to set it up as a portable device.<br><br>**Children will know:**<br>• what variables to include in a project<br>• the algorithm for their project<br>• how to design the program flow for their project | how to modify multiple 3D objects |
| **Lesson 6** | **WALT:** recognise and evaluate different methods of online communication.<br><br>**Activities:** In this lesson, learners will deepen their understanding of the term 'communication'. They will explore different methods of communication, then they will consider internet-based communication in more detail. Finally, they will evaluate which methods of communication suit particular purposes. Learners will use information provided and their own prior knowledge to categorise different forms of internet communication. They will then choose which method they would use for the scenarios discussed. During these activities, they will explore issues around privacy and information security.<br><br>**Children will know:**<br><br>recognise and evaluate the most appropriate methods of communication for different purposes, including online methods.<br><br>which information should and should not be shared online.<br><br>communication on the internet may not be private. | **WALT:** evaluate my vector drawing<br><br>**Activities:** During this lesson learners will understand how digital images can be made from shapes or pixels. They will suggest and implement improvements to vector drawings and complete the unit by creating their own labels for the classroom using the skills they have learned.<br><br>**Children will know:**<br>how to create alternatives to vector drawings<br><br>how to suggest improvements to a vector drawing<br><br>how to explain what I have learned about vector drawings | **WALT:** evaluate my program<br><br>**Activities:** In this lesson, learners will return to their completed programs and identify ways in which the program can be improved. They will focus on issues where answers similar to those in the condition are given as inputs, and identify ways to avoid such problems. Learners will also consider how the outcomes may change the program for subsequent users, and identify how they can make use of setup to provide all users with the same experience. They will implement their identified improvements by returning to the Scratch programming environment and adding to their programs. They conclude the unit by identifying how they met the requirements of the given task, and identifying the aspects of the program that worked well, those they improved, and areas that could improve further.<br><br>**Children will know:**<br>ways the program could be improved<br><br>the setup code I need in my program<br><br>how to extend their program further | **WALT:** recognise the implications of linking to content owned by other people<br><br>**Activities:** Learners will consider the implications of linking to content owned by other people and create hyperlinks on their own websites that link to other people's work. They will then evaluate the user experience when using their own website and that of another learner.<br><br>**Children will know:**<br>the implication of linking to content owned by others<br><br>create hyperlinks to link to other people's work<br><br>how to evaluate the user experience of a website | **WALT:** develop a program to use inputs and outputs on a controllable device<br><br>**Activities:** In this lesson, learners will use the design that they have created in Lesson 5 to make a micro:bit-based step counter. First they will review their plans, followed by creating their code. Depending on their level of confidence, they can use a scaffolded or part-complete project, otherwise they can start a new project. Learners will test and debug their code, using the emulator and then the physical device. To successfully complete this project, learners will need to use all four programming constructs: sequence, repetition, selection, and variables.<br><br>**Children will know:**<br>how to create a program based on their design<br><br>how to test their program against their design<br><br>how to use a range of approaches to find and fix bugs | **WALT:** develop and improve a digital 3D model<br><br>**Activities:** 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.<br><br>**Children will know:**<br>how their model can be improved<br><br>how to modify their model to improve it<br><br>how to evaluate my model against a given criterion |
| **Key Knowledg** | **Children will know:**<br><br>**Search engines follow specific rules in order to rank search results by relevance.** | **Children will know:**<br><br>**How to draw, modify and reposition objects.** | **Children will know:**<br><br>**That a condition can only be true or false.** | **Children will know:**<br><br>**Websites are created using HTML code.** | **Children will know:** | **Children will know:**<br><br>**How to select, modify and rotate 3d objects using a CAD tool.** |

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| | Search engines can give higher priority to certain websites that pay them (advertising) this is how they make their money and can be a drawback of the sites<br><br>That a computer system is made up of inputs, processes and outputs. They can communicate between devices.<br><br>Data is transferred in packets over networks in which each device has a unique address (IP address)<br><br>We can access shared information online and we can use this to collaborate and communicate. | How to move objects between layers of the drawing.<br><br>How to combine objects to achieve a desired effect. | How to create a condition-controlled loop.<br><br>How to create a computer programme that uses 'if' 'when' and 'else' selectors to direct the flow of the programme | A navigation path is a link to another webpage within a website.<br><br>How to create and build a multipage website with clear navigation paths and hyperlinks. | If you change the value of a variable, you cannot access the previous value (cannot undo)<br><br>If you read a variable, the value remains, and their can only be one variable at any one time.<br><br>Variables may need to be sued in more than one location. The name must be unique but the function can be the same. | How to use place holders to create holes within 3D objects.<br><br>How to combine multiple objects to create a design. |