Year 6 Computing Curriculum

Unit Autumn 1	3D Modelling
Summary	Planning, developing and evaluation of 3D computer models of physical objects.
NC Objectives	• 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 •
Teacher Subject Knowledge Required	Teachers will need to be familiar with the main concepts associated with 3D modelling. During the unit the following skills and concepts are introduced: • Working with and viewing shapes in three dimensions • Adding, resizing, and moving (including lifting and lowering) 3D shapes • Rotating 3D shapes • Combining 3D shapes • Grouping and ungrouping objects
Hardware/Software required	Tinkercad (https://www.tinkercad.com),
Key Vocabulary	TinkerCad, 2D, 3D, shapes, select, move, perspective, view, handles, resize, lift, lower, recolour, rotate, duplicate, group, cylinder, cube, cuboid, sphere, cone, prism, pyramid, placeholder, hollow, choose, combine, construct, evaluate, modify
Progression	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.
Adaptations	

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Unit Autumn 2	Communication and Collaboration
Summary	Exploring how data is transferred by working collaboratively online.
NC Objectives	• Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts • 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
Teacher Subject Knowledge Required	In this unit, you will need to have an understanding of the way data is sent over the internet. Some key terms you will need to be familiar with are Internet Protocol (IP) addresses; Domain Name Server (DNS); and data packets, including the main parts of a packet (header and data payload). The terms are discussed in more detail within the lesson plans. Part of this unit focuses on collaboration over the internet. These activities assume the use of Google Slides, a free web-based app, which is part of Google Workspace for Education. You will need a school Google account to access this.
Hardware/Software required	Google Workspace Scratch
Key Vocabulary	Communication, protocol, data, address, Internet, Protocol (IP), Domain Name Server (DNS), packet, header, data payload, chat, explore, slide deck, reuse, remix, collaboration, internet, public, private, one-way, two-way, one-to-one, one-to-many
Progression	This unit progresses learners' knowledge and understanding of computing systems and online collaborative working.
Adaptations	

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Unit Spring 1	**Webpage Creation**
Summary	Designing and creating webpages, giving consideration to copyright, aesthetics and navigation.
NC Objectives	• 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.
Teacher Subject Knowledge Required	You will need to ensure that you and learners have access to Google Sites. Experience with using Google Sites would support you in delivering this unit, but the unit will also deliver support within the slides. Familiarity with the implications of linking to other people's work online is needed, and an understanding of the terms 'fair use' and 'copyright' is important. You should be aware of your school's procedures related to children searching for images and how to report any issues. You will need to be able to access websites and have some understanding of HTML and the differences between browsers, websites, and web pages. You should also have an understanding of the terms 'breadcrumb trail' and 'navigation', and how websites are generally structured.
Hardware/Software required	Google Sites
Key Vocabulary	Website, web page, browser, media, Hypertext Markup Language (HTML), logo, layout, header, media, purpose, copyright, fair use, home page, preview, evaluate, device, Google Sites, breadcrumb trail, navigation, hyperlink, subpage, evaluate, implication, external link, embed
Progression	This unit progresses students' knowledge and understanding of the following: digital writing, digital painting, desktop publishing, digital photography, photo editing, and vector drawing.
Adaptations	

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Unit Spring 2	**Introduction to Spreadsheets**
Summary	Answering questions by using spreadsheets to organise and calculate data.
NC Objectives	• 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
Teacher Subject Knowledge Required	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.
Hardware/Software required	Google Slides Excel spreadsheets
Key Vocabulary	Data, collecting, table, structure, spreadsheet, cell, cell reference, data item, format, formula, calculation, spreadsheet, input, output, operation, range, duplicate, sigma, propose, question, data swet, organised, chart, evaluate, results, sum, comparison, software, tools
Progression	This unit progresses students' knowledge and understanding of data, and teaches them how to organise and modify data within spreadsheets. Specifically, learners will have experienced data in tables and charts in the Y4 data logging and Y5 branching database units.
Adaptations	

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Unit Summer 1	**Programming A - Variables in Games**
Summary	Exploring variables when designing and coding a game.
NC Objectives	• 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 • Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.
Teacher Subject Knowledge Required	When programming, there are four levels that 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 — what is needed • Design — what it should do • Code — how it is done • Running the code — what it does Spending time at the 'task' and 'design' levels before engaging in writing code can aid learners in assessing the 'do-ability' of their programs. It also reduces the cognitive load for learners during programming.
Hardware/Software required	Scratch
Key Vocabulary	Variable, change, name, value, set, design, event, algorithm, code, task, artwork, program, project, test, debug, improve, evaluate, share, assign, declare
Progression	This unit assumes that learners have some prior experience of programming in Scratch. Specifically, they should be familiar with the programming constructs of sequence, repetition, and selection.
Adaptations	

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Unit Summer 2	**Programming B – Sensing Movement**
Summary	Designing and coding a project that captures inputs from physical devices.
NC Objectives	• 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
Teacher Subject Knowledge Required	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. 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: • Task — what is needed • Design — what it should do • Code — how it is done • Running the code — what it does 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. Pupils will move between the different levels throughout the unit, and this is highlighted within each lesson plan: • 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
Hardware/Software required	The micro:bit will need the following peripherals: • A micro USB to USB lead • A battery pack • 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) makecode.microbit.org

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Key Vocabulary	Micro:bit, MakeCode, input, process, output, flashing, USB, trace, selection, condition, if then else, variable, random, sensing, accelerometer, value, compass, direction, navigation, design, task, algorithm, step counter, plan, create, code, test, debug
Progression	This unit presumes that pupils are already confident in their understanding of sequence, repetition and selection independently within programming. If pupils are not yet ready for this, you may wish to revisit earlier programming units where these constructs are introduced.
Adaptations	