

# Long Term Plan Computing

## Year 6



### Aims

- 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.

### 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.

Term	Unit	Overview	Knowledge	Skills	Assessment
Autumn 1	Computing systems and networks - Communication	learners explore how data is transferred over the internet. Learners initially focus on addressing, before they move on to the makeup and structure of data packets. Learners then look at how the internet facilitates online communication and collaboration; they complete shared projects online and evaluate different methods of communication. Finally, they learn how to communicate responsibly by considering what should and should not be shared on the internet. Note: Some of	<p>To recognise that there are a number of search engines</p> <p>To explain why search engines exist</p> <p>To define the purpose of an index</p> <p>To explain why search engines create indexes, and that they are different for each search engine</p> <p>To explain how search results are selected</p> <p>To explain the role of web crawlers</p> <p>To explain that ranking narrows down the search results returned from the index, which makes it more useful</p> <p>To explain that search results are ordered, and this is known as ranking</p>	<p>To recall how to use a search engine</p> <p>To compare the results from different search engines</p> <p>To demonstrate that different search terms produce different results</p> <p>To explain that search terms need to be chosen carefully</p> <p>To evaluate the results of search terms</p> <p>To identify that results from search engines can include adverts, and that the adverts can be targeted</p>	<p>Can children recall how to use a search engine?</p> <p>Can children compare the results from different search engines?</p> <p>Can children demonstrate that different search terms produce different results?</p> <p>Can children explain that search terms need to be chosen carefully?</p> <p>Can children evaluate the results of search terms?</p> <p>Can children identify that results from search engines can include adverts, and that the adverts can be targeted?</p>

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		<p>the content in this unit was previously included in the Year 5 - 'Computer systems and networks' unit, so some learners may have already completed similar activities. Where this is the case, the context for the activity has been changed.</p>	<p>To explain how ranking is determined by rules, and that different search engines use different rules          To examine the role of the searcher, search engine, and content creator in the searching process          To explain why the order of results is important, and to whom          To identify some of the limitations of search engines          To explain how search engines make money by selling advertising space          To recognise that some information is not searchable          To define 'communication'          To discuss the opportunities that technology offers for communication</p>	<p>To identify different ways to communicate without technology          To list methods of communicating using the internet          To choose an appropriate method of internet communication for a given purpose          To evaluate different methods of online communication          To explain which types of media can be shared through the internet          To explain that communicating through the internet can be public or private          To decide what I should/should not share          To classify internet communication by messenger and recipient or audience</p>	<p>Can children identify different ways to communicate without technology?          Can children list methods of communicating using the internet?          Can children evaluate different methods of online communication?          Can children explain which types of media can be shared through the internet?          Can children explain that communicating through the internet can be public or private?          Can children decide what I should/should not share?</p>
		<p>Vocabulary          Communication Online safety Search          search engine, Google, Bing, Yahoo, Swisscows, DuckDuckGo, refine. index, crawler, bot, optimisation, links, web crawlers, content creator, ranking, communication, internet, public, private, one-way, two-way, one-to-one, one-to-many, SMS, email, WhatsApp, blog, YouTube, Twitter, BBC Newsround</p>			

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Autumn 2	Web page creation	<p>This unit introduces learners to the creation of websites for a chosen purpose. Learners identify what makes a good web page and use this information to design and evaluate their own website using Google Sites. Throughout the process learners pay specific attention to copyright and fair use of media, the aesthetics of the site, and navigation paths.</p>	<p>To recognise the relationship between HTML and visual display                  To recognise that web pages can contain different media types                  To recognise that web pages are written by people                  To recognise that a website is a set of hyperlinked web pages                  To recognise components of a web page layout                  To consider the ownership and use of images (copyright)                  To recognise the need to preview pages (different screens / devices)                  To recognise the need for a navigation path                  To recognise the implications of linking to content owned by others</p>	<p>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 embed media in a web page                  To add web pages to a website                  To preview a web page (different screen sizes)                  To insert hyperlinks between pages                  To insert hyperlinks to another site</p>	<p>Can children review an existing website (navigation bars, header)?                  Can children create a new blank web page?                  Can children add text to a web page?                  Can children set the style of text on a web page?                  Can children change the appearance of text?                  Can children embed media in a web page?                  Can children add web pages to a website?                  Can children preview a web page (different screen sizes)?                  Can children insert hyperlinks between pages?                  Can children insert hyperlinks to another site?</p>
		<p>Vocabulary                  web page, browser, media, Hypertext Markup Language (HTML), layout, header, media, purpose, copyright, fair use, evaluate, preview, device, breadcrumb, trail, navigation, hyperlink, subpage, implication, external link, embed</p>			

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<p>Spring 1</p>	<p>Programming A - Variables in games</p>	<p>This unit explores the concept of variables in programming through games in Scratch. First, learners find out what variables are and relate them to real-world examples of values that can be set and changed. Then they use variables to create a simulation of a scoreboard. In Lessons 2, 3, and 5, which follow the Use-Modify-Create model, learners experiment with variables in an existing project, then modify them, before they create their own project. In Lesson 4, learners focus on design. Finally, in Lesson 6, learners apply their knowledge of variables and design to improve their games in Scratch.</p>	<p>To define a 'variable' as something that is changeable                  To identify examples of information that is variable, for example, a football score during a match                  To explain that a variable can be used in a program, eg 'score'                  To define a program variable as a placeholder in memory for a single value                  To explain that a variable has a name and a value                  To recognise that the value of a variable can be used by a program                  To recognise that the value of a variable can be updated                  To identify that variables can hold numbers (integers) or letters (strings)                  To define the way that a variable is changed                  To recognise that a variable can be set as a constant (fixed value)                  To explain the importance of setting up a variable at the start of a program (initialisation)                  To explain that there is only one value for a variable at any one time                  To explain that the name of a variable is meaningless to the computer                  To explain that if you read a variable, the value remains                  To explain that the name of a variable needs to be unique                  To explain that if you change the value of a variable, you cannot access the previous value (cannot undo)</p>	<p>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 easier for humans to understand it                  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>	<p>Can children identify a variable in an existing program?                  Can children experiment with the value of an existing variable?                  Can children choose a name that identifies the role of a variable to make it easier for humans to understand it?                  Can children decide where in a program to set a variable?                  Can children update a variable with a user input?                  Can children use an event in a program to update a variable?                  Can children use a variable in a conditional? statement to control the flow of a program?                  Can children use the same variable in more than one location in a program?</p>
<p>Vocabulary                  Variable, change, name, value, set, design, algorithm, code, task, artwork, program, project, code, test, debug, improve, evaluate, share</p>					

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<p>Spring 2</p>	<p>Introduction to spreadsheets</p>	<p>This unit introduces the learners to spreadsheets. They will be supported in organising data into columns and rows to create their own data set. Learners will be taught the importance of formatting data to support calculations, while also being introduced to formulas and will begin to understand how they can be used to produce calculated data. Learners will be taught how to apply formulas that include a range of cells, and apply formulas to multiple cells by duplicating them. Learners will use spreadsheets to plan an event and answer questions. Finally, learners will create charts, and evaluate their results in comparison to questions asked.</p>	<p>To identify questions that can be answered using spreadsheet data                  To explain what an item of data is in a spreadsheet                  To outline that there are different software tools to work with data                  To explain how the data type determines how a spreadsheet can process the data                  To explain that formulas can be used to produce calculated data                  To recognise cells can be linked                  To explain why data should be organised in a spreadsheet                  To recognise that a cell's value automatically updates when the value in a linked cell is changed                  To evaluate results in comparison to the question asked</p>	<p>To calculate data using a formula for each operation                  To use functions to create new data                  To use existing cells within a formula                  To choose suitable ways to present spreadsheet data</p>	<p>Can the children calculate data using a formula for each operation?                  Can the children use functions to create new data?                  Can the children use existing cells within a formula?                  Can the children choose suitable ways to present spreadsheet data?</p>
<p><b>Vocabulary</b>                  data, data heading, data set, cells, columns and rows, data item, format, common attribute, formula, calculation, cell reference, sigma, graph, evaluate, results, comparisons, questions, software, tools, data, propose</p>					

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<p>Summer 1</p>	<p>Creating media- 3D modelling</p>	<p>Learners will develop their knowledge and understanding of using a computer to produce 3D models. Learners will initially familiarise themselves with working in a 3D space, moving, resizing, and duplicating objects. They will then create hollow objects using placeholders and combine multiple objects to create a model of a desk tidy. Finally, learners will examine the benefits of grouping and ungrouping 3D objects, then go on to plan, develop, and evaluate their own 3D model of a building.</p>	<p>To recognise that 3D objects comprise length, width, and height (depth)                  To recognise the similarities and differences between real-life 3D and virtual 3D                  To recognise the differences when working in 3D compared with 2D                  To recognise that structures can be broken down into a collection of 3D objects</p>	<p>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 reposition objects in three dimensions                  To rotate objects in three dimensions                  To resize an object in three dimensions                  To recolour an object                  To use an object as a placeholder                  To recognise that blank objects must be used as placeholders to create holes                  To recognise the role of scale in design                  To select multiple objects                  To group objects                  To modify multiple objects</p>	<p>Can children create 3D graphical objects on a computer screen?                  Can children alter the view of the 3D space ?                  Can children place a 3D object in a 3D space ?                  Can children select an object ?                  Can children duplicate an object?                  Can children delete an object?                  Can children reposition objects in three dimensions?                  Can children rotate objects in three dimensions?                  Can children resize an object in three dimensions?                  Can children recolour an object?                  Can children use an object as a placeholder?                  Can children recognise that blank objects must be used as placeholders to create holes?                  Can children recognise the role of scale in design?                  Can children select multiple objects?                  Can children group objects?                  Can children modify multiple objects?</p>
		<p>Vocabulary                  2D, 3D, 3D object, space, view, resize, colour, lift, rotate, position, select, duplicate, dimensions, placeholder, hole, group, ungroup, modify, evaluate, improve.</p>			

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<p>Summer 2</p>	<p>Programming B - Selection in quizzes</p>	<p>pupils develop their knowledge of selection by revisiting how conditions can be used in programs and then learning how the If... Then... Else structure can be used to select different outcomes depending on whether a condition is true or false. They represent this understanding in algorithms and then by constructing programs using the Scratch programming environment. They use their knowledge of writing programs and using selection to control outcomes to design a quiz in response to a given task and implement it as a program</p>	<p>To define that conditional statements are used in computer programs                  To relate that a conditional statement connects a condition to an outcome                  To explain that instructions in a program will produce specific outcomes                  To outline that a condition is something that can either be true or false                  To relate that a count-controlled loop contains a condition                  To explain that a loop can stop when a condition is met, eg number of times                  To explain a sequence within a count-controlled or event-controlled loop                  To explain that a loop can stop when a condition is met, eg an event                  To modify a count-controlled or event-controlled loop                  To create a count-controlled or event-controlled loop                  To explain the importance of instruction order in 'if... then...' statements                  To conclude that a loop can be used to repeatedly check whether a condition has been met                  To explain the importance of instruction order in 'if... then... else...' statements</p>	<p>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 show that a condition can switch program flow in one of two ways</p>	<p>Can children experiment with a repeat-until loop?                  Can children use a condition in an 'if... then...' statement to produce a given outcome?                  Can children show that a condition can switch program flow in one of two ways?                  Can children show that a condition can switch program flow in one of two ways?</p>
		<p>Vocabulary                  MakeCode, input, process, output, flashing, USB, selection, condition, if... then... else, variable, random, navigation, design, task, step counter, plan, create, code, test, debug</p>			
<p>Enrichment                  Internet safety week                  Remote learning at home learning using the internet                  Anti-bullying week (keeping safe online opportunities)                  Using computing skills across the curriculum                  E-cadets sharing of key internet safety messages across school</p>					

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