

Computing Long Term and Medium Term Plans – Year Six

	Reception	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Autumn	Awesome Autumn	Programming MGL*	CM Digital Photography PE – Self-Image		CSN The Internet PE – Online Rep'		D & I Spreadsheets PE – Online Info
	Winter Warmers	D & I Grouping Data PE – Priv & Sec'	Programming MGL*	CM Desktop Publishing PE – Copyright		CSN Sharing Info' PE – Online Rel'	
Spring	Spring Time		D & I Pictograms PE – Priv & Sec'	Programming MGL*	CM Photo Editing PE – Copyright Self-Image		CSN Communication PE – Online Rep'
		CSN Technology Around Us PE – Well-Being		D & I Branching Databases PE – Online Info'	Programming MGL*	CM Vector Drawing PE – Copyright	
Summer	Summer Fun		CSN IT Around Us PE – Well-Being		D & I Data Logging PE – Online Info'	Programming MGL*	CM Web Page Creation PE – Copyright Online Rel'
		CM Digital Writing PE – Self-Image		CSN Connecting Computers PE – Priv & Sec'		D & I Flat-file Databases PE – Online Info'	Programming MGL*
Ongoing Skills		Project Evolve – Safer Internet Day Software & Keyboard/Tablet Skills					

Autumn 1: Year 6 – Data & Information - Introduction to spreadsheets

Unit introduction

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 graphs and charts, and evaluate their results in comparison to questions asked.

Overview of lessons

Lesson	Brief overview	Learning objectives
What is a spreadsheet?	During this lesson learners will understand that a spreadsheet is a computer application which allows users to organise, analyse, and store data in a table. They will begin to realise the importance of data headings. Learners will answer questions about a spreadsheet, and then create their own questions that can be answered using a given set of data.	To identify questions which can be answered using data • I can explain the relevance of data headings • I can answer questions from an existing data set • I can ask simple relevant questions which can be answered using data

Modifying spreadsheets	During this lesson learners will be taught that objects can be described using data. They will build a data set (a collection of related data that can be manipulated using a computer) within a spreadsheet application, and apply appropriate number formats to cells.	To explain that objects can be described using data • I can explain what an item of data is • I can apply an appropriate number format to a cell • I can build a data set in a spreadsheet application
What's the formula?	During this lesson learners will begin to use formulas to produce calculated data. They will understand that the type of data in a cell is important (e.g. numbers can be used in calculations whereas words cannot). Learners will create formulas to use in their spreadsheet using cell references and identify that changing inputs will change the output of the calculation.	To explain that formulas can be used to produce calculated data • I can explain the relevance of a cell's data type • I can construct a formula in a spreadsheet • I can identify that changing inputs changes outputs
Calculate and duplicate	During this lesson learners will recognise that data can be calculated using different operations: multiplication, subtraction, division, and addition. They will use these operations to create formulas in a spreadsheet. Learners will then begin to understand the importance of creating formulas that include a range of cells and the advantage of duplicating in order to apply formulas to multiple cells.	To apply formulas to data, including duplicating • I can recognise that data can be calculated using different operations

		• I can create a formula which includes a range of cells • I can apply a formula to multiple cells by duplicating it
Event planning	During this lesson learners will plan and calculate the cost of an event using a spreadsheet. They will use a predefined list to choose what they would like to include in their event, and use their spreadsheet to answer questions on the data they have selected. Learners will be reminded of the importance of organising data and will then create a spreadsheet using formulas to work out costs for their event.	To create a spreadsheet to plan an event • I can use a spreadsheet to answer questions • I can explain why data should be organised • I can apply a formula to calculate the data I need to answer questions
Presenting data	During this lesson learners will acquire the skills to create charts in Google Sheets. They will evaluate results based on questions asked using the chart that they have created. Finally, learners will outline their understanding that there are different software tools available within spreadsheet applications to present data.	To choose suitable ways to present data • I can produce a graph • I can use a graph to show the answer to questions • I can suggest when to use a table or graph

Progression

This unit progresses students' knowledge and understanding of data, and teaches them how to organise and modify data within spreadsheets.

Please see the learning graph for this unit for more information about progression.

Curriculum links

[National curriculum links](#)

- 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

[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

Assessment

Summative assessment

Please see the assessment question and answer documents for this unit.

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.

Enhance your subject knowledge to teach this unit through the following training opportunities:

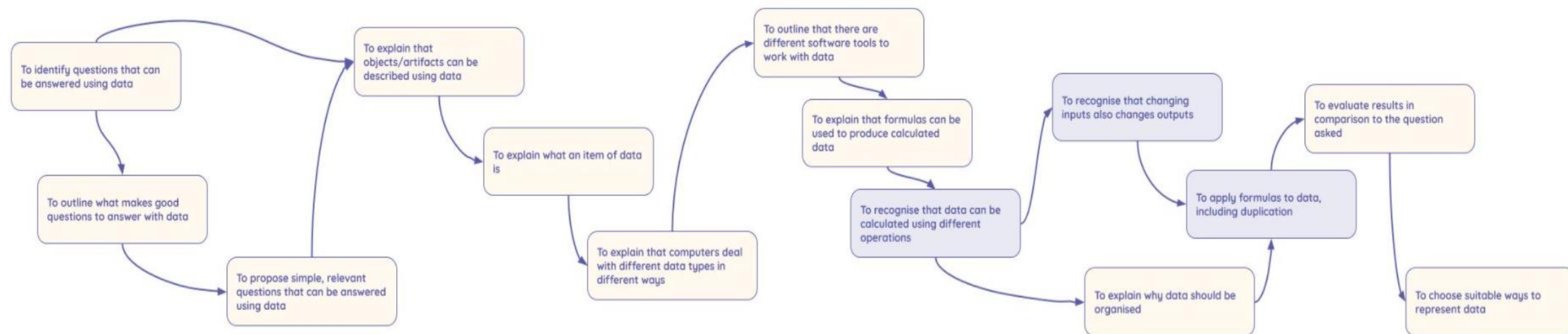
Online training courses

- [Raspberry Pi Foundation online training courses](#)

Face-to-face courses

- [National Centre for Computing Education face-to-face training courses](#)

Learning graph Year 6 - Introduction to spreadsheets



Spring 1: Year 6 – CSN - Communication

Unit introduction

In this unit, the class will learn about the World Wide Web as a communication tool. First, they will learn how we find information on the World Wide Web, through learning how search engines work (including how they select and rank results) and what influences searching, and through comparing different search engines. They will then investigate different methods of communication, before focusing on internet-based communication. Finally, they will evaluate which methods of internet communication to use for particular purposes.

Overview of lessons

Lesson	Brief overview	Learning objectives
1 Searching the web ncce.io/csn6-1-p	In this lesson, learners will be introduced to a range of search engines. They will be given the opportunity to explain how we search, then they will write and test instructions. Next, they will learn that searches do not always return the results that we are looking for, and will refine their searches accordingly. Finally, they will be introduced to the two most common methods of searching: using a search engine and the address bar.	To identify how to use a search engine • I can complete a web search to find specific information • I can refine my search • I can compare results from different search engines
2 Selecting search results	In this lesson, learners will gain an understanding of why search engines are necessary to help us find things on the World Wide Web. They will conduct their own searches and break down, in detail, the	To describe how search engines select results • I can explain why we need tools to find things online

ncce.io/csn6-2-p	steps needed to find things on the web. They will then emulate web crawlers to create an index of their own classroom. Finally, they will consider why some searches return more results than others.	• I can recognise the role of web crawlers in creating an index • I can relate a search term to the search engine's index
3 How search results are ranked ncce.io/csn6-3-p	This lesson includes an unplugged activity in which the class will learn about some of the main factors that influence how a search engine ranks a web page. Learners will create paper-based 'web pages' in groups, on a topic that they are currently studying. They will then discover how their web pages would rank when searching for keywords relating to their content.	To explain how search results are ranked • I can explain that search results are ordered • I can explain that a search engine follows rules to rank relevant pages • I can suggest some of the criteria that a search engine checks to decide on the order of results
4 How are searches influenced? ncce.io/csn6-4-p	In this lesson, learners will explore how the person performing a web search can influence the results that are returned, and how content creators can optimise their sites for searching. Learners will also explore some of the limitations of searching, then discuss what cannot be searched.	To recognise why the order of results is important, and to whom • I can describe some of the ways that search results can be influenced • I can recognise some of the limitations of search engines • I can explain how search engines make money
5 How we communicate ncce.io/csn6-5-p	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.	To recognise how we communicate using technology • I can explain the different ways in which people communicate • I can identify that there are a variety of ways of communicating over the internet

		I can choose methods of communication to suit particular purposes
6 Communicating responsibly ncce.io/csn6-6-p	In this lesson, 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 in the previous lesson. During these activities, they will explore issues around privacy and information security.	To evaluate different methods of online communication - I can compare different methods of communicating on the internet - I can decide when I should and should not share - I can explain that communication on the internet may not be private

Progression

This unit progresses students' knowledge and understanding of computing systems and online collaborative working.

[Learning graph](#) (ncce.io/csn6-lg)

Curriculum links

[National curriculum links](#)

- 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

- **Use technology safely, respectfully and responsibly;** recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact

Education for a Connected World links

- I can describe and assess the benefits and the potential risks of sharing information online.
- I can use various additional tools to refine my searches (e.g. search filters: size, type, usage rights etc.).
- I can explain how to use search effectively and use examples from my own practice to illustrate this.
- I can explain how search engine rankings are returned and can explain how they can be influenced (e.g. commerce, sponsored results).

Assessment

Summative assessment

- [Summative assessment questions](https://ncce.io/csn6-saq) (ncce.io/csn6-saq)
- [Summative assessment answers](https://ncce.io/csn6-saa) (ncce.io/csn6-saa)

Subject knowledge

Enhance your subject knowledge to teach this unit through the following training opportunities:

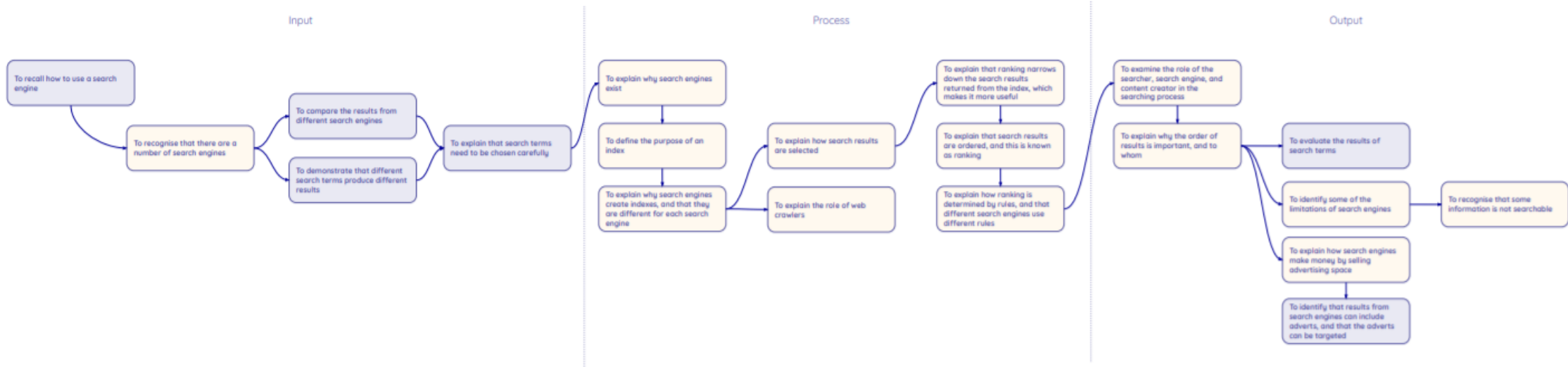
Online training courses

- [Raspberry Pi Foundation online training courses](#)

Face-to-face courses

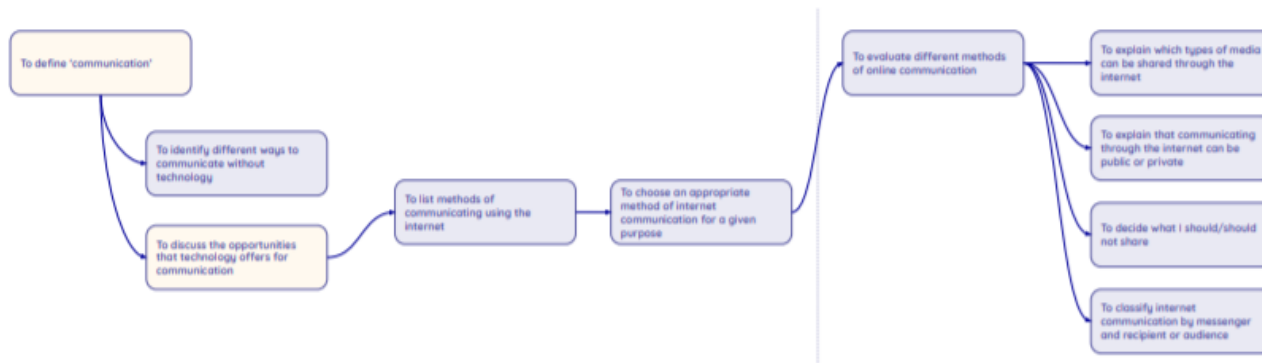
[National Centre for Computing Education face-to-face training courses](#)

Learning graph Year 6 – Communication



Lesson

Lesson



Summer 1: Year 6 – Creating Media - Web page creation

Unit introduction

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.

Overview of lessons

Lesson	Brief overview	Learning objectives
What makes a good website?	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.	To review an existing website and consider its structure • I can explore a website • I can discuss the different types of media used on websites • I know that websites are written in HTML
How would you lay out your web page?	Learners will look at the different layout features available in Google Sites and plan their own web page on paper.	To plan the features of a web page • I can recognise the common features of a web page • I can suggest media to include on my page • I can draw a web page layout that suits my purpose

	Homework: Learners will look at two of their favourite websites and sketch them on the worksheet provided, detailing the similarities and differences. Note: For the homework activity, teachers could provide printed 'home page' images for anyone who doesn't have internet access at home.	
Copyright or copyWRONG?	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. Homework: Learners answer a series of questions based on copyright and fair use.	To consider the ownership and use of images (copyright) • I can say why I should use copyright-free images • I can find copyright-free images • I can describe what is meant by the term 'fair use'
How does it look?	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.	To recognise the need to preview pages • I can add content to my own web page • I can preview what my web page looks like • I can evaluate what my web page looks like on different devices and suggest/make edits.
Follow the breadcrumbs	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.	To outline the need for a navigation path • I can explain what a navigation path is • I can describe why navigation paths are useful • I can make multiple web pages and link them using hyperlinks

Think before you link!	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.	To recognise the implications of linking to content owned by other people • I can explain the implication of linking to content owned by others • I can create hyperlinks to link to other people's work • I can evaluate the user experience of a website
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Progression

This unit progresses students' knowledge and understanding of the following: digital writing, digital painting, desktop publishing, digital photography, photo editing, and vector drawing.

Please see the learning graph for this unit for more information about progression.

Curriculum links

National curriculum links

- 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.

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)

Copyright and ownership

- 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)

Assessment

Summative assessment

- Please see the assessment rubric document for this unit.

Subject knowledge

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

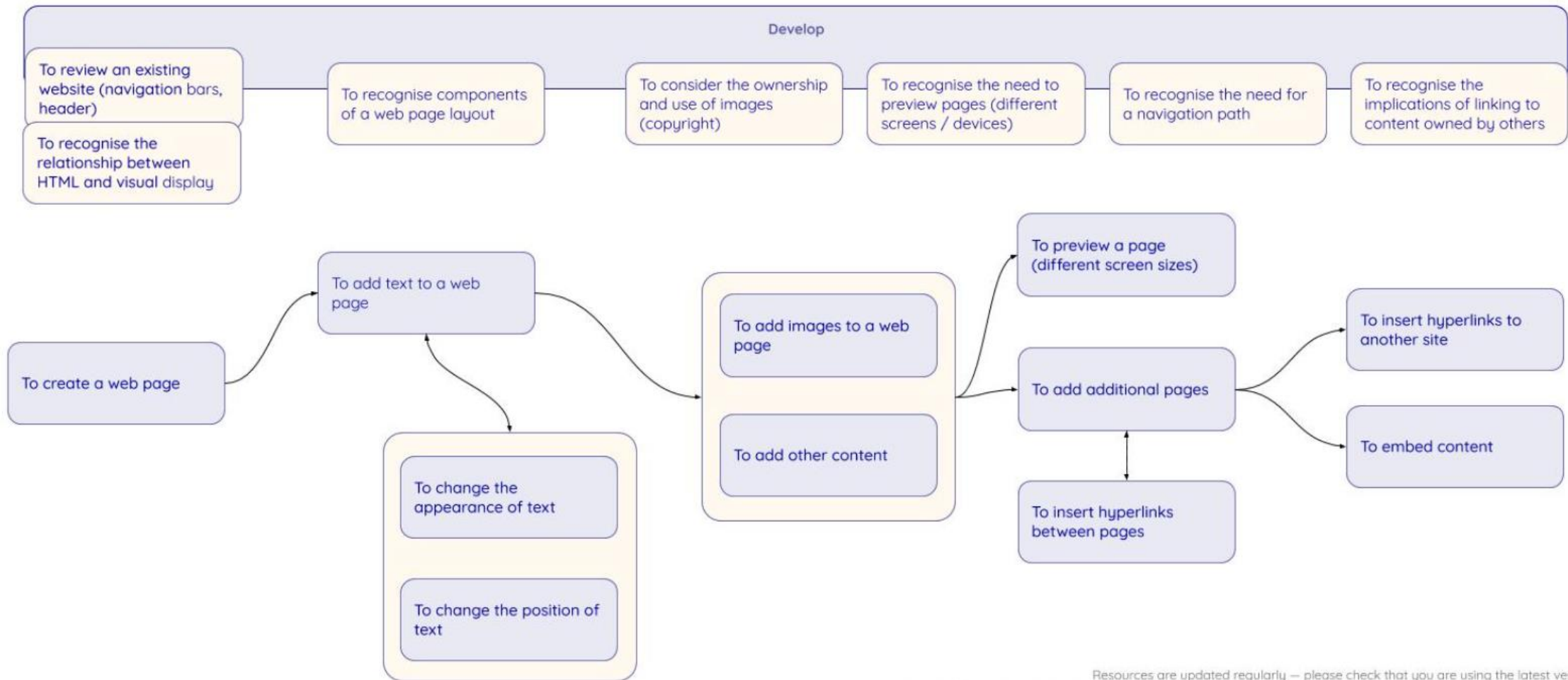
Enhance your subject knowledge to teach this unit through the following training opportunities:

Online training courses

- [Raspberry Pi Foundation online training courses](#)

Face-to-face courses

- [National Centre for Computing Education face-to-face training courses](#)



Web page creation assessment rubric

Team:		Teacher:		Date:	
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Aspect of web page creation	Emerging [1]	Meets expectations [2]	Exceeds expectations [3]	Score
Web page creation	Contains pictures and writing related to chosen topic	- Contains multiple sections - Relates to a relevant purpose/audience	Additional features have been used (editing, image carousels, maps)	
Copyright and fair use	Aware of the importance of checking ownership of multimedia	Contains copyright-free images	- Contains original work - References / acknowledgements are made (fair use)	
Website structure (paper-based plan)	- Aware that planning helps create a better outcome - Some parts of the layout have been planned	- Design is clear - Design is organised	Design closely reflects options available in the software	
Adding subpages and hyperlinks	- Recognise that multiple web pages can be added - Recognise that multiple web pages can be linked	- Subpages have been added - Hyperlinks have been added - External links are added	- Multiple pages are added, organised, and linked - Website is enhanced with embedded content	
Previewing sites	Aware of differences when viewing how the web page will look on different devices	Learners suggest some improvements	Learners justify and make changes	

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Teacher feedback	
Learner response to feedback	

Summer 2 - MGL UNIT: Year 6, Programming A – Variables in games

Unit introduction

This unit explores the concept of variables in programming through games in Scratch. First, pupils will learn what variables are, and relate them to real-world examples of values that can be set and changed. Pupils will then use variables to create a simulation of a scoreboard. In Lessons 2, 3, and 5, which follow the Use-Modify-Create model, pupils will experiment with variables in an existing project, then modify them, then they will create their own project. In Lesson 4, pupils will focus on design. Finally, in Lesson 6, pupils will apply their knowledge of variables and design to improve their game in Scratch.

There are two Year 6 programming units:

- Programming A – Variables in games
- Programming B – Sensing

This is unit A, which should be delivered before unit B.

Overview of lessons

Lesson	Brief overview	Learning objectives
1 Introducing variables	In this lesson, pupils will be introduced to variables. Pupils will see examples of real-world variables (score and time in a football match), then they will explore them in a Scratch project. Pupils will then design and make their own project including variables. Finally, pupils will identify that variables are named and can be letters (strings) as well as numbers.	To define a 'variable' as something that is changeable • I can identify examples of information that is variable • I can explain that the way that a variable changes can be defined

		I can identify that variables can hold numbers or letters
2 Variables in programming	In this lesson, pupils will understand that variables are used in programs, and that they can hold a single value at a time. Pupils will complete an unplugged task that will demonstrate the process of changing variables. Next, they will explore why it is important to name variables, then they will apply their learning in a Scratch project in which they will make, name, and update variables.	To explain why a variable is used in a program - I can identify a program variable as a placeholder in memory for a single value - I can explain that a variable has a name and a value - I can recognise that the value of a variable can be changed
3 Improving a game	In this lesson, pupils will apply the concept of variables to enhance an existing game in Scratch. They will predict the outcome of changing the same change score block in different parts of a program, then they will test their predictions in Scratch. They will also experiment with using different values in variables, and with using a variable elsewhere in a program. Finally, they will add comments to their project, explaining how they have met the objectives of the lesson.	To choose how to improve a game by using variables - I can decide where in a program to change a variable - I can make use of an event in a program to set a variable - I can recognise that the value of a variable can be used by a program
4 Designing a game	This lesson focuses on the design elements of programming. For the majority of the tasks, pupils will be working at the algorithmic level of abstraction. Pupils will first design the sprites and backgrounds for their project, then they will design their algorithms to create their program flow.	To design a project that builds on a given example - I can choose the artwork for my project - I can explain my design choices

		I can create algorithms for my project
5 Design to code	In this lesson, pupils will implement the algorithms that they created in Lesson 4 as code. In doing this, they will identify variables in an unfamiliar project and learn the importance of naming variables. They will also have the opportunity to add another variable to enhance their project.	To use my design to create a project - I can create the artwork for my project - I can choose a name that identifies the role of a variable - I can test the code that I have written
6 Improving and sharing	This lesson gives pupils the opportunity to build on the project that they created in Lesson 5. As the lesson develops, the scaffolding is gradually removed, so that the last main activity is without constraints. Finally, pupils will evaluate each other's projects, identifying features that they like, and features that could be improved further.	To evaluate my project - I can identify ways that my game could be improved - I can extend my game further using more variables - I can share my game with others

Progression

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.

Please see the learning graph for this unit for more information about progression.

Curriculum links

National curriculum links

- 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

Assessment

Formative assessment

Assessment opportunities are detailed in each lesson plan. The learning objectives and success criteria are introduced in the slide deck at the beginning of each lesson, and then reviewed at the end. Pupils are invited to assess how well they feel they have met the learning objective using thumbs up, thumbs sideways, or thumbs down.

We recommend the use of teacher accounts in Scratch to help with assessment throughout this unit. For guidance on setting up teacher accounts, please [visit the Scratch website](https://scratch.mit.edu/educators/faq) (scratch.mit.edu/educators/faq).

Summative assessment

Please see the assessment question and answer documents for this unit.

Subject knowledge

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.

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.

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](https://scratch.mit.edu/educators/faq) (scratch.mit.edu/educators/faq).

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](#)

