Declarative and Procedural Knowledge

Year 4

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Introduction

It is important to note that for simplicity and to demonstrate strand coverage, units have been put into their 'best fit' strand as per the Scheme of Work Overview document.

Key Stage 1

- In many units, children will be furthering online understanding and concepts of technology (DL) through making digital content (IT and CS)

Key Stage 2

- Children will be understanding of the capabilities of the World Wide web (CS) while searching online (IT).
- They will be developing their understanding of appropriate behaviour online (DL) skills while learning about searching the Internet (IT).

Both Key Stages • At all times children will be learning about using technology safely and respectfully (DL).

- In most units for all strands, children will be developing their general information technology skills (IT).
- This overlap, repetition and reinforcement helps to give children a deeper understanding of the knowledge and skills across all strands and of their integrated nature in the real-world.

*For more detailed information to assess pupils, see the assessment statements at the end of each unit and repeated in the Assessment document for each year group.

Unit 4.1 – Coding

NATIONAL CURRICULUM LINKS	**Dominant strand for this unit: Computer Science** • 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. **There will be elements from the other two strands due to the nature of the computing curriculum.**

Declarative - By the end of the unit the students **will know that**:	**Procedural** – By the end of the unit the students **will know how to**:
• There are objects in 2Code and that there are different types and these have attributes (properties) that can be changed.	• Enter design mode and locate the game elements tab. • Distinguish between the object types. • Click on an object and identify the attributes (properties) that can be changed. • Change attributes such as image, name, allow off screen, angle and movement. • Drag and position objects around the design mode screen. • Include objects of choice within the design screen.
• Backgrounds can be changed and manipulated.	• Enter design mode and locate the background icon. • Select a background of choice by clicking on the image attribute. • Include background of choice within a program they are creating.

• Selection is a term used in computer programming. That it is a decision command that will be run dependent on whether a condition is met.	• • Recognise flowcharts and what each node means. • Use a flowchart to help them visualise a simple program. Interpret flowcharts depicting selection and explain what happens if a condition is or isn't met within it.
• **If** statements are used to create selection in 2Code and that they are bits of code that will run only if a condition is true.	• Identify **if** Statement control blocks. • Recognise how an **if** Statement in 2Code is being used to create selection within a simple program. • Create selection within 2Code using **if** statement blocks within own program.
• Coordinates are used in computer programming to determine the position of a point, shape or object and that these change according to where they are positioned on the screen.	• • Open design view. • Click on object(s) to expose attributes. • Identify where coordinates x and y can be changed. Change the coordinates in the attributes of objects.
• **Repeat until** is a control block and that blocks of code will repeat until a condition is met.	• Identify r**epeat until** within the control blocks of block code view. • Look at code with r**epeat until** and know how to change code within it to meet an expected outcome. • Insert **repeat until** into own programs. • Successfully create code within 'Repeat until' block and make it run until a condition is met.
• **If/else** statements are a conditional command that tests a statement. If a condition is true, commands inside the **if** block will run. If a condition is false, commands inside the **else** block will run.	• Identify the **if/else** block within the control blocks of block code view. • Insert the **if/else** command within a program. • Create an **if** statement using blocks of code. • Create an **else** statement using blocks of code. • Execute the code checking the **if/else** code runs as expected.

• Variables are a virtual container (A place in computer memory) that contain a value that can change. The value is normally in the format of a number or letter. Variables are used in programming to keep track of things that can change such as the score in a computer game. There are 3 main types that be created using 2Code.	• Identify the **create variable** command from the variables blocks within code view. • Drag a **create variable** block into coding area. • Set a variable type to number. • Name a variable. Set the value of a variable. • Execute code with a variable within it. • Use the variable watch to monitor how a variable changes as the program executes code.

Unit 4.2 Online Safety

NATIONAL CURRICULUM LINKS.	**Dominant strand for this unit: Digital Literacy** • Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact. **There will be elements from the other two strands due to the nature of the computing curriculum.**

Declarative - By the end of the unit the students **will know that**:	**Procedural** – By the end of the unit the students **will know how to**:
• Safe protocols can be developed to protect people when using email.	• Identify emails that may be phishing emails and another name for these emails is spam emails. • Ignore these emails and not reply to them. • Understand that spam emails may be too good to be true or offer prizes to the recipient. • Look at the sender's email address as a clue if the email is spam. • Use the padlock on the web address bar which indicates the site will be safe.
• Everything put online leaves a trail known as a digital footprint.	• Recognise that everything they post online remains there. • Use the terminology Digital Footprint for this personal digital content. • Be aware that a digital footprint can be positive or negative depending upon what they posted.

• There are risks and benefits of installing software including apps.	• Download apps and programs in the safest possible way but that even reputable stores can have invasive software on there. • Define the word malware as a type of software designed to cause viruses on your device or leave it unusable. • Avoid clicking on ads on screen can be dangerous. • Define a computer virus.
• Copying the work of others and presenting it as their own is called 'plagiarism'.	• Identify plagiarism in text and talk about what plagiarism means. • Correctly reference someone else's work when they are using it for their writing.
• There are positive and negative influences of technology on health and the environment.	• Think about how much time they spend on screen during the day. • Keep a record over the week of screen time. • Contribute to a class database about screen time. • Think about the positive and negative influences of too much screen time.

Unit 4.3 Spreadsheets

NATIONAL CURRICULUM LINKS.	**Dominant strand for this unit: Information Technology** • 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. **There will be elements from the other two strands due to the nature of the computing curriculum.**

Declarative - By the end of the unit the students **will know that**:	**Procedural** – By the end of the unit the students **will know how to**:
• It is possible to input numbers into a spreadsheet in different formats including the use of a decimal point.	• Highlight a cell where numbers be inputted. • Find the format cell box in 2Calculate. • Select the formatting option they want to use. • Enter the appropriate data into the cell.
• Formulas can be added to a spreadsheet to speed up calculations when data is changed.	• Understand what a formula is in a spreadsheet. • Find the formula wizard box in 2Calculate. • Click on cells or type cell numbers in. • Choose the appropriate number operation. • Start using the more advanced features of the wizard/
• There is specific functionality of some of the tools within 2Calculate.	• Locate the 2Calculate tools on the main screen. • Use the random number tool. • Use the spin number tool. • Use the timer tool. • Apply this knowledge to a specific task.

• A spreadsheet can create a range of graphs and charts and these can be interrogated. .	• Recall what a line graph is from previous learning in other subjects. • Enter appropriate data in tabular format in a spreadsheet that can be used to form graphs. • Locate and click on the graphing button. • Create a line graph from the selection on offer. • Label the graph correctly. • Interpret the data contained within the graph including estimating values between given data sets.
• Spreadsheets can be used to model a real-life situation and improve the efficiency of day to day tasks.	• Recall what is meant by a budget and why budgeting is important. • Analyse the information in a budget setting spreadsheet. • Create their own budget template on 2Calculate. • Use the TOTAL functionality within the spreadsheet program. • Make amendments to a budget spreadsheet and see what impact that has on the totals.
• A value can be added to images in 2Calculate to make a resource to teach place value.	• Explain what is meant by place value using learning from mathematics. • Look at how a picture can have a value assigned to it in 2Calculate. • Allocate a value to images they have chosen. • Import the image onto the spreadsheet. • Make a place value activity using the values images.

Unit 4.4 Writing for different audiences

NATIONAL CURRICULUM LINKS.	**Dominant strand for this unit: Information Technology** • 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. **There will be elements from the other two strands due to the nature of the computing curriculum.**

Declarative - By the end of the unit the students **will know that**:	**Procedural** – By the end of the unit the students **will know how to**:
• Formatting including the style of font can affect the impact of a text.	• Look at the different fonts used in a range of texts. • Look at the way a font has been used for effect. • Look at examples of unformatted text and how difficult it is for the reader to understand.
• Editing the formatting of the text makes a document fit for purpose.	• Look at the formatting options available to users on the formatting toolbar. • Change the style of font. • Change the font alignment. • Change the colour of the font.
• Producing documents to meet a brief involves using appropriate formatting.	• Make notes about the event. • Type up the event as a newspaper report using appropriate formatting choices. • Produce a persuasive document using appropriate formatting choices.

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Unit 4.5 Logo

NATIONAL CURRICULUM LINKS	**Dominant strand for this unit: Computer Science** • Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. • Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs **There will be elements from the other two strands due to the nature of the computing curriculum.**

Declarative - By the end of the unit the students **will know that**:	**Procedural** – By the end of the unit the students **will know how to**:
• 2Logo has its own language with specific instructions.	• Input directional instructions into 2Logo and leave appropriate spaces. • Input the more abstract non directional code such as PU, PD and CS.
• Representations of shapes, letters and flowers can be created in 2Logo using the repeat command.	• Follow simple instructions to create simple shapes initially on paper and then on the screen. • Create their own shapes by typing all the instructions and then using the repeat command. • Follow instructions to create letter shapes and four-letter words. • Create 2Logo flowers.

• The repeat command is a more efficient way to code in 2Logo.	• Program repeating commands of code a line at a time. • Use the repeat command to replicate the same outcomes as repeated typing of commands. • Create regular shapes using the repeat command in preference of writing long code blocks.
• It is important to test and debug code in 2Logo as with other coding platforms to ensure it runs effectively.	• Look at the screen and isolate errors in the output. • Look at the code and identify why the errors have occurred.

Unit 4.6 Animation

NATIONAL CURRICULUM LINKS.	**Dominant strand for this unit: Information Technology** • 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. **There will be elements from the other two strands due to the nature of the computing curriculum.**

Declarative - By the end of the unit the students **will know that**:	**Procedural** – By the end of the unit the students **will know how to**:
• Some animations are created by hand and others with the help of technology.	• Talk about what is meant by hand made animation. • Make a simple flick animation book. • Open 2Animate on Purple Mash and discuss why animation using technology may be easier than using hand drawn images. • Create a simple moving object animation on Purple Mash using 2Animate.
• Onion skinning is a term used in animation and can make the animation process more efficient.	• Appreciate the purpose of onion skinning. • Use the onion skinning tool in 2Animate and they can talk about how it speeds the process up.
• Sound can be added to animation to enhance the finished product.	• Add sounds and background to their animations to improve them.
• The term stop frame animation refers to animation where the stopping and starting of a camera gives an object the impression of movement.	• Talk about stop frame animation they have watched, and the techniques used. • Create a simple stop frame animation. • Present their animation to an audience.

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Unit 4.7 Effective Searching

NATIONAL CURRICULUM LINKS	**Dominant strand for this unit: Digital Literacy** • Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content **There will be elements from the other two strands due to the nature of the computing curriculum.**

Declarative - By the end of the unit the students **will know that**:	**Procedural** – By the end of the unit the students **will know how to**:
• Information can be located on a search engine page.	• Load up a search engine onto their device and give the name of a well-known search engine. • Enter the search enquiry. • Research the different types of information one can get from a search engine. • Correctly interpret the information outputted.
• There are different skills needed to research effectively.	• Enter basic search enquiries. • Enter more advanced effective enquiries without the need for full sentences. • Answer a quiz using effective search.
• Web Pages need to be evaluated to see if the information contained is true and reliable.	• Analyse the contents of a web page for clues about the reliability of information. • Appreciate that the search engine will give results tailored to the interests of the searcher.

Unit 4.8 Hardware Investigators

NATIONAL CURRICULUM LINKS	**Dominant strand for this unit: Computer Science** • 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 **There will be elements from the other two strands due to the nature of the computing curriculum.**

Declarative - By the end of the unit the students **will know that**:	**Procedural** – By the end of the unit the students **will know how to**:
• Different parts make up a computer.	• Name the different parts of a computer such as Hard Drive, RAM, Network Card etc. • Define what is meant by hardware, components and peripherals. • Describe the function of these different parts. • Show this knowledge by answering a quiz.

Unit 4.9 Making Music

NATIONAL CURRICULUM LINKS.	**Dominant strand for this unit: Information Technology** • 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. **There will be elements from the other two strands due to the nature of the computing curriculum.**

Declarative - By the end of the unit the students **will know that**:	**Procedural** – By the end of the unit the students **will know how to**:
• There are some main elements to music including pulse, rhythm, tempo, pitch and texture.	• Define what the significant elements to music are. • Access Busy beats on Purple Mash. • Listen to some ready-made musical examples and identify some key elements.
• A piece of music can be altered by changing the rhythm and tempo.	• Recap what is meant by rhythm. • Identify and recall a simple rhythm. • Explain what tempo is and how changing it can change the mood of the music. • Create their own music using the program Busy Beats focussing on rhythm and tempo.
• A melodic phrase can be created using music software.	• Talk about and therefore show an understanding of melody. • Create a simple melodic pattern. • Experiment with pitch using a variety of notes. • Create their own music using the program Busy Beats focussing on melody and pitch.
• An electronic piece of music contains the key musical features.	• Create a piece of electronic music on busy beats combining their knowledge of pitch, rhythm and melody.

Unit 4.10 – Artificial Intelligence

NATIONAL CURRICULUM LINKS	**Dominant strand for this unit: Information Technology** • 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. **There will be elements from the other two strands due to the nature of the computing curriculum.**

Declarative - By the end of the unit the students **will know that**:	**Procedural** – By the end of the unit the students **will know how to**:
• Artificial intelligence is having an impact already in day-today life.	• Recall artificial intelligence in news stories and talk about positives and negatives. . • Define artificial intelligence in their own words. • Answer a quiz about artificial intelligence. • Give three examples of artificial intelligence in their lives.
• Artificial intelligence can assist and benefit us in our everyday life.	• Recap what artificial intelligence is. • Talk and write about real life applications of artificial intelligence. • Discuss how these applications are making life better for us.
• The potential of artificial intelligence is limitless.	• Critically think about the future of artificial intelligence. • Express their ideas in written and illustrated form about the future of artificial intelligence. • Consider if there are negatives associated with artificial intelligence.
• Artificial intelligence is already being used to create music and art.	• Decide if art and music are created by humans or artificial intelligence.

	• Use various artificial intelligence programs to create music and art to meet a description.

Unit 4.11 – Physical Devices: micro:bit

NATIONAL CURRICULUM LINKS	**Dominant strand for this unit: Computer Science** • 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. **There will be elements from the other two strands due to the nature of the computing curriculum.**

Declarative - By the end of the unit the students **will know that**:	**Procedural** – By the end of the unit the students **will know how to**:
• Sensor inputs from an accelerometer can be used to detect movement in conjunction with the use of variables.	• Explain that an accelerometer is one of several sensors that a micro:bit has. • Create a variable in Free code micro:bit. • Use events code blocks in conjunction with a variable. • Use output code blocks in conjunction with a variable. • Combine event, output and variable code blocks to produce code that makes a micro:bit change it's output based on environmental changes (**When gesture shake**).

• Inputs, outputs and computer code work together to make control systems.	• Explain that inputs, outputs and computer code work together to make simple systems such as a light level detector using a micro:bit. • Identify the control blocks of code: **repeat**, **if** and **else**. • Identify input code blocks. • Identify output code blocks.
	• Create a simple piece of code that makes up a control system.
• Logic is used to make different outputs happen depending on changes in data from a sensor.	• Explain that logic is used to make different outputs happen on a micro:bit according to changes from its sensors. This logic is created by coding in Free code micro:bit. • Identify that the **IF/Else** block of code is used to create a form of logic. • Use the **IF/Else** block of code within a program to create a control system. • Identify that the **repeat forever** command. • Use the repeat forever command in conjunction with **IF/Else** block to continually check on a sensors environmental conditions that will change outputs according to environmental changes.