Declarative and Procedural Knowledge

Year 5

Contents

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 5.1 – 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**:
• Code can be simplified to complete the same process with less lines of code. Simplified code runs faster and uses less processing memory, it is said to be more efficient. Computer generated variables in 2Code are tags given to objects and these can be used to control object types meaning less lines of code are needed.	• Review a program that uses several objects of the same type and requires all of them to do the same thing such as having the speed set to 5. • Identify that common tags known as computer generated variables can used in the program to control all the objects. • Create a simplified code structure that functions exactly the same as the original code by using the common tags objects share. • Check both versions of the code work exactly the same way.

• A simulation is a model that represents a real or imaginary situation. Plans of an algorithm that represents a real or imaginary situation can be created and then used to program a simulation in 2Code.	• Explain what a simulation is and provide examples of physical systems that could be made into a simulation. Plan an algorithm • of a physical system such as traffic light sequences. • Consider in the algorithm plan essential details such as the sequence of traffic lights and when each light colour will display and for how long. • Convert the algorithm plan into a program within 2Code. • Test the program and how it compares to real-life. • Make adaptations to the program to consider variations in real-life situations. For example, adapting a simple traffic light sequence that needs adjusting because too much traffic is building up.
• The **timer every** command can be used to make code repeat forever.	• Recognise when the **timer every** command could be used in a suitable scenario to make code repeat forever. • Incorporate the **timer every** command into a program such as a traffic light sequence.
• Decomposition is a method of breaking down a task into manageable components. This makes coding easier as the components can then be coded separately and then brought back together in the program.	• Use planning to create a program. • During planning, use decomposition to break down the plan into the key parts that are required to get the program functioning. • Consider if there are any unnecessary details in the plan that aren't essential for the functioning of the intended program (abstraction).

• Abstraction is a way of de-cluttering and removing unnecessary details to get a program functioning.	• Recognise what abstraction is and why it is important. When • planning a program, use abstraction to remove any unnecessary complications. • Realise in examples such as creating a traffic light sequence in 2Code, we can follow a process of abstraction to remove unnecessary details that aren't crucial to getting the program to function. For example, not including moving traffic, pavements or pedestrians.
• A function is a block or sequence of code that can be accessed when it is needed. This means code doesn't have to be rewritten every time it is needed. Instead, the function can be called each time it is needed.	• Recognise the **create function** command as part of the create and change variable group of blocks. • Insert a **create function** command into a program and name it. • Include code to a newly created function such as setting the position of an object. • Insert the **call function** command and assign the function created. • Include the **call function** command as part of an event, such as when the ball hits a wall, the function is called to reset its position back to the start.
• Strings are text or a combination of text characters and numbers within programs. An example could be a program that has a string type variable that is used to keep a player informed of their progress in a game.	• Recognise what a string is in a program and all instances of a string including how it is used. • Create a **string variable** and initialise it (give it a value). Create • code that changes the value of the string such as setting the string variable to a random word every 1 second. • Use the **print to screen** command to show how the string variable value is changing every 1 second.

• Concatenation is the name given to the action of linking things together in a series. For example, in programs we might want to link words together to form random phrases that are seen by a user of a program.	• Recognise where concatenation can be useful in programs. • Use the **print to screen** command in combination with random words that are joined together to demonstrate concatenation. • Demonstrate concatenation in other programs created such as linking a variable (score) with text (well done) for a game.

Unit –

5.2 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**:
• The SMART rules are designed to keep children safe online.	• Watch a video about the SMART rules. • Know the 5 different SMART rules and how these can keep users safe when online. • Create a piece of work to show understanding of these rules.
• Passwords need to be kept secure.	• Recover forgotten emails normally using email. • Keep password safe and secure and never share them. • Create a good password involving letters, numbers and characters.
• Care needs to be given when sharing content online.	• Consider what information should be shared online. • Use an avatar as a virtual representation of themselves rather than a photograph.
• Sources should be referenced in work.	• Define what is mean by plagiarism. • Reference sources that they may have used in their work. • Apply this to written sources and images.

• Different forms of communication are best used for specific purposes.	• Write down various forms of communication. • Write about in which scenario a method may be most suited.

Unit –

	• Look at the advantages of online and face to face communication. • Think about when online communication has made them feel uncomfortable.

5.3 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**:
• A formula can be written in a sheet to convert units of length and distance.	• Explain what is meant by metric. • Know the short cuts for copy, paste and cut. • Write a simple formula for converting cm to m and m to cm using cell references, • Copy and paste a formula from one cell to another using appropriate shortcuts. • Drag a formula from one cell to adjoining cells. • Complete similar task for metres to km.
• A spreadsheet tool can be used to investigate if a hypothesis is true.	• Find the How Many tool in 2Calculate. • Define what is meant by a variable. • Open a sheet in advanced mode. • Make the sheet bigger by adding in more cells. • Use the How Many tool to count the number of vowels in a text. • Answer the hypothesis that the letter 'e' is the most popular letter in English. • Solve another problem using the How Many tool.

Unit –

• A spreadsheet can be used to model a real-life problem, in this case the area and perimeter of shapes.	• Explain what is meant by 'modelling'. Open up • the formula toolbar. • Create a simple formula to work out area. • Create a simple formula to work out perimeter. • Input information into a table. • Use the formulas to solve a problem.
• A spreadsheet can be used to convert days into weeks or years and vice versa.	• Recap key knowledge about minutes, hours, days, weeks and years. • Open the advanced mode in 2Calculate. • Create a simple table layout. • Write formulas to convert units of time. • Use the totalling tool.
• Spreadsheets can be created to support the organisation of real life events such as a school cake sale.	• Explain what is meant by the terms budget and profit. Create a • sheet which calculates the ingredients needed for a number of cakes produced. • Expand the sheet to work out the costs and make sure they change as the ingredient's change. • Use the sheet to work out the profit that will be made.

5.4 Databases

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**:
• A database can be used to search for information.	• Open an existing database in 2Investigate. • Click on a record and see how the information is entered. • Enter data using words and numbers as well as drop down menus. • Use drop down menus to make the data entry more efficient. • Sort, group and arrange information in a database. • Search for information in a database. • Display information in tabular format and chart form. • Answer questions involving the interrogation of a database.
• Users can contribute to a collaborative database.	• Create an avatar for use in the database and pick out key information they could record in it. • Enter their data into the database. • Look at the collaborative and completed database. • Ask three questions to encourage their peers to interrogate the database.

• Databases can be created to cover a range of topics or themes. .	• Choose a suitable topic for a database. • Set up the database with appropriate fields. • Ass at least 8 records to the database. • Write five questions using their database for their peers to answer. • Use databases created by their peers to answer questions.

Unit –

5.5 Game Creator

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 important to plan out a game before commencing on making it.	• Evaluate other games against criteria prior to beginning the creative process highlighting what works well and what could be improved. . • Use a design document to set the scene of the game. • Research what would make appropriate textures for aspects of the game and save these to the design document.
• A game design program has specific functions for the designer to use.	• Use the key functions of the game creator tool. • Remember the importance of saving regularly. • Design and add appropriate graphical elements to their game including floor, walls and ceiling. • Consider the appropriate places to locate game hazards which make the game more interesting and add to playability. • Add in game music to support the game theme. • Commence on making their game.
• The design of characters and quest items is a key aspect of game creation.	• Design the quest item and add in movement, sound effects and actions.

	• Consider where to place the quest items so it is possible to finish the game, and everything is collectible. • Place the enemies in the game in such a way as to provide challenge but not make it impossible to play. • Use their knowledge to create at least three levels.
• A finished game must be playable and possible for the player to complete.	• Finish making the game. • Write clear instructions that set a scene and provide gameplay instructions for the user. • Share the game online so other people can play it.
• Evaluation is important so a game can be improved and made more playable and exciting.	• Evaluate games made by their peers using given criteria. Read • evaluation of their game from other. • Make appropriate improvements to their game.

5.6 3D Modelling

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**:

Unit –

• 3D modelling can be done via a computer program.	• Define what a 3D model is. • Select a design template in the 3D modelling program. • Select a viewpoint – Net, Points, 3D – depending upon what part of the design process they are carrying out. • Rotate a 3D model to see what the model looks like from a variety of angles. • Used the fill tool to add texture to their design. • Deigned a house of their dreams using the 3D program.
• Moving points changes the appearance of a 3D model.	• Select a vehicle design template from the program. • Change the location of the points to alter the appearance of the model. • Add textures to the model using the painting tools. • Use the design slider to alter the width of the model. • Design a vehicle to meet a design brief.

• A 3D design program can be used to meet a design brief.	• Add and remove points on a model. • Use a regular polygon and then add points to the model to change its appearance. • Design a model to meet a design brief – a piece of packaging for holding something.
• Models need refining before they are printed out using a standard printer or 3D printer.	• Refining a model is important prior to the final printing process. • Know what a STL file is. • Print their model onto paper/card or via a 3D printer. • Construct their 3D model if appropriate.

5.7 Concept Maps

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 is a need for visual representation when generating and discussing complex ideas. This can be represented in the form of a concept map.	• Define a concept as an idea in the form of a question. • Begin to think about concept maps as a tool for organising and representing knowledge in a web. • Take part in an activity to make a physical concept map. • Develop a checklist of rules for creating a concept map.
• A computer program can be used to create a concept map.	• Set up a concept map using a blank template. • Add nodes to the map understanding they represent concepts or ideas. • Connect nodes together using a connection line and that arrows can be used to organise the date on the concept map. • Create a concept map linked to a specific topic. • Evaluate what worked well in the concept map and how it could be improved.
• A concept map can be used to retell information and stories.	• Open the story mode in the concept map program that allows the nodes to be used as a basis for their writing. • Create a piece of text using nodes as a basis for their writing.

Unit –

• Collaborative concept maps allow many users to contribute to the same map and therefore quickly and easily share ideas.	• Make a concept map collaborative and save the document in the correct folder. • Contribute to a collaborative concept map on a given theme.

5.8 Word Processing (WORD)

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**:
• A word processing tool can be used to create a range of documents.	• Open a blank document or a premade template. • Navigate around the toolbar at the top of the screen. • Expand the toolbar categories to give additional options. • Save a document into a specific folder. • Use the SHIFT or CAPS LOCK to write capital letters. • Select specific words to format. • Type sentences and then format them accordingly. • Format a document so it is easy to read.
• Images can be added to a document.	• Switch between portrait and landscape mode. • Use appropriate keyboard shortcuts for copy, paste and cut. • Search for images online. • Download images to a document. • Correctly reference the owner of the images.

Unit –

• Images can be edited in Word using Word Wrap.	• Edit an image using the image handles. • Crop and resize an image. • Wrap text around an image. • Alter the transparency of an image. • Use the style options to change the appearance of an image.
• The look of text within a document can be changed.	• The text formatting toolbar allows the text within the document to be changed. • Apply a style to the document. • Add in headings and subheadings to a document. • Use a range of bullet points including numbered lists.
• Various features within the program will enhance the documents look and usability.	• Add in drop capitals. • Insert text boxes and shapes to a document. • Layer objects within a document. • Add in hyperlinks to a document to link to an external website.
• Tables can be used to present information within a document.	• Add in WordArt to a document in a range of styles. Insert a table. • Merge and unmerge table cells. • Add in columns and rows to a table. • Distribute rows and columns in a table. • Choose table borders. • Change the background colour of a cell in a table.
• A template can be used to create a document.	• Look at the range of templates in the program. • Talk about the advantages of using a template over a blank document. • Create a document using a template. • Use the spelling and grammar check.

• Page layout can be improved by using headings and columns.	• Look at the layout features of a newspaper. Insert • columns into a blank document. • Use columns and learning from previous lessons to create a newspaper front page.

Unit 5.8 Word Processing (GOOGLE)

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**:
• A word processing tool can be used to create a range of documents and know how to navigate around them.	• Open a blank document or a premade template. • Navigate around the toolbar at the top of the screen. • Expand the toolbar categories to give additional options. • Save a document into a specific folder. • Use the SHIFT or CAPS LOCK to write capital letters. • Select specific words to format. • Use the REDO and UNDO functions. • Type sentences and then format them accordingly. • Format a document so it is easy to read.
• Images can be added to a document.	• Switch between portrait and landscape mode. • Search for images online. • Download images to a document. • Correctly reference the owner of the images.
• Images can be edited in.	• Edit an image using the image handles. • Crop and resize an image.

	• Wrap text around an image. • Alter the colour of an image. • Add a border to an image. • Use the style options to change the appearance of an image.
• The look of text within a document can be changed.	• The styles toolbar allows the text within the document to be changed. • Apply a style to the document. • Add in headings and subheadings to a document. • Use a range of bullet points including numbered lists.
• Various features within the program will enhance the documents look and usability.	• Insert text boxes and shapes to a document. Layer • objects within a document. • Add in hyperlinks to a document to link to an external website.
• Google Docs can easily be shared with other people.	• Use the SHARE button. • Enter the email address of people who they wish to share the document with.
• Tables can be used to present information within a document.	• • Insert a table. Merge and unmerge table cells. • Add in columns and rows to a table. • Distribute rows and columns in a table. • Change the background colour of a cell in a table.
• A template can be used to create a document.	• Look at the range of templates in the program. • Talk about the advantages of using a template over a blank document. • Create a document using a template. • Use the spelling and grammar check.

Unit 5.9 Using External Devices

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**:
• External devices can be used to control a coded program.	• Write if something is an output or an input. • Define what an external device is. • Start coding using the new external device code blocks. • Use the QR code to connect the external device or emulator. • Play their simple code.
• An external device can be used as a game controller.	• Talk about the features of a game controller. • Complete a partially made game. • Debug their code if it isn't working. • Share their game so others can play it.

• Text can be outputted to an external device.	• Find blocks relating to graphics. • Choose blocks to output text to the external device. • Write a program to code text to the device.

• An external device can be used to model real life situations.	• Know the external device can use sensors and these can be used in the code. • Find blocks relating to sensors in the external device namely shake, tilt and sound detected. • Plan and then code their program.
• A program can be written for the external device to meet a specific design brief.	• Plan out the program before they start to code. Start • coding their program. • Share the program with others. • Evaluate the program and make improvements where needed.