Sustainability Ambassadors | Literacy | Healthy Citizens | Cultural Explorers | Designers | Mathematics | Careers Pathfinders | Scientific Investigators | Digital Learners | Global Enquirers | Engineers

Subject: Computing **Unit:** Programming

Year Group: 5 **Term:** Summer Term

Medium Term Plan:

How can decomposition help me to solve problems?

Essential Vocabulary

program
command
decomposition
debug
logic
precise
repeat
sequence

Big Concepts

Problems can be broken down into smaller sections which make it easier to solve. Decomposition can be applied across curriculum areas, outside of school and is an essential concept to prepare for secondary school.

Curriculum Coverage

Flag any content that might not have been covered during school closure

Year 4 coding unit was not delivered due to school closure. Pupils have used 2Code previously in Year 3

Retrieve Essential knowledge to support learning of big unit concepts

Pupils to be reminded of experience of using 2Code and that programming/coding requires clear precise instructions. Link to instructions that they have recently been writing in English on the Mummification process.

Subsequent National Curriculum Coverage

To be able to design, write and debug more complex programs

Sequence of Teaching and Learning

Consideration has been given to the reduced time available for foundation subjects and a focus on key concepts that are priority for the remainder of this year. Teachers are able to either use the ICT suite or chromebooks as the Purple Mash 2Code will be used in the lessons.

Notes: **Year 4 programming unit was not covered due to school closure and therefore this Year 5 unit will include key elements of the Year 4 unit that needs to be covered.**
In this unit of work, pupils will be using text based programming rather than 'drag and drop' command blocks to write code. Although this textual programming language is in a basic format, they will be need to develop decomposition skills to break larger task into smaller sections. The activities require them to write code to complete a challenge, however; if they attempt to write the full code in one attempt, they will find this extremely difficult. Pupils should therefore break the task down into smaller chunks and write smaller sections of code.

1	**N.C: Decompose programs into smaller parts** **L.I.** Review previous knowledge and understanding and explore a new program. (During this lesson, without mentioning decomposition, pupils will already be doing this when they are thinking about what they want to create. The skill to develop in future lessons is that they recognise that they are doing this and can develop it even further by really considering what they want to achieve and identifying each step – using a whiteboard to write down the steps required before typing into the program.	Introduction to Logo (Purple Mash) staff guidance video in folder on drive. Use AB tutor to demonstrate Logo - Discuss layout and tools with pupils, show how to apply grid, change turtle and reset position of turtle. Demonstrate how to write a program to make the turtle draw a square. (e.g. fd 5 rt 90 fd 5 rt 90 fd 5 rt 90 fd 5) – **Pupils are then to explore what then to independently explore the program. Teacher to monitor use of angles or if pupils are just using fd & bk** **Stop class – Teacher input -** Logo uses left and right to change the position of the turtle but it must know what angle it has to turn Pupils are to create squares, rectangles and try to write their own initial. It would be beneficial for pupils to have whiteboard, pen and eraser so that they can draft out what they think they need to use before starting. **Model use of repeat (please see 2Logo user guide for guidance).**

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2	**N.C. Decompose programs into smaller parts** **Use logical reasoning to detect and correct errors in algorithms** L.I. Using decomposition, program the turtle to complete a task	*Memory recall – write down the instructions that you can use in Logo (forward, back, left, right) What instruction would need to be used if you wanted to turn the turtle a quarter turn to the right?* Share learning intentions with class – Children should write their Logo in the text area at the bottom. It is essential that they build up their Logo code progressively so that their solution displays the full answer rather than typing one step, deleting it and then typing the next. This means that they will not have to start from the beginning every time they make a mistake. **First challenge - Maze** – teacher to model maze activity – discuss importance of decomposition.(Lesson resources included in drive folder). Class to begin independent work – teacher to support where needed. During lesson teacher to demonstrate changing pen colour on Logo, pupils will be working to complete challenges so it is expected that pupils may be at different stages by the end of this lesson. During lesson teacher will need to decide whether there is scope to demonstrate **Challenge 2** – this requires pupils to use different angles to negotiate the river. Recommend that pupils use small steps to navigate rather than trying to write the code in one long section. Thus demonstrating decomposition and being able to identify any errors (debugging) in each section.

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Notes: **As pupils progress through the challenges they should develop their understanding and application of decomposition. They will be using logical thinking to identify what code is required and check for errors where the outcome is not correct. Pupils will be using sequencing in their coding and will also be applying selection by choosing angles and direction.**

3	**N.C. Decompose programs into smaller parts** **Use logical reasoning to detect and correct errors in algorithms** L.I. Using decomposition, program the turtle to complete a task	*Memory recall – could set an angle question similar to last week, or how penup is used or link to real world situations i.e. where might this type of program be used – to design patterns on wallpaper, signs etc. Used in engineering to draw repeated designs.* Share learning intention Challenge 3 – Teacher should use AB tutor to demonstrate how to change pen colour and use pen up pen down. Challenge 4 (pupils expected to complete in lesson) Pupils to continue with challenges – encourage use of whiteboards as evidence of decomposition, questioning : what do you think will happen if you use that code? How could you make the turtle move in this direction? Why is it not working? What is it in the program that is stopping the turtle from moving in the right direction?
4	**N.C. Decompose programs into smaller parts** **Use logical reasoning to detect and correct errors in algorithms** L.I. Using decomposition, program the turtle to complete a task	*Memory recall – give examples of how you could use decomposition in Maths, Science and English.* Share learning intention Pupils to continue with challenges – independently – again teachers should observe and note evidence of use of logical thinking and decomposition. Differentiation is evident in the challenges that pupils are able to attempt, higher ability pupils will be able to work towards Challenge 9 or even further. **Some pupils may complete these challenges at home. If this is the case then you could use them as digital leaders supporting other pupils within the class. However; ensure that they are explaining how the program works and not simply doing the work for the pupil.**

Skills for Life

Resilience | Communication | Being Safe | Team-working | Problem Solving | Self-motivation

Real World Links including pupil experiences:

Decomposition is an essential skill, not only throughout our time in education but as a life long skill.

Skills for Life/ Core Values:

Safe
Resilience
Problem solving
Communication
Self-motivation

Influential Figures:

Plan for deliberate Reading opportunities: