St Margaret Mary's Medium Term Planning

<table>
<tr><td colspan="2">Subject: Computing
Topic: Dancing Robot</td><td>Year group: 3
Term: Spring</td></tr>
<tr><td colspan="3">Prior learning: The children may have experience of Scratch Jr if used during KS1 or at home. The children will also have experience of sequences, particularly within maths with shape and number, which will support when programming blocks for the characters.</td></tr>
<tr><td colspan="3">Main focus of the unit:
This unit introduces children to visual coding with the Scratch Jr app. It was created for children and is extremely visual so it is simple to learn and use. Children simply snap together graphical programming blocks to make characters move, jump, dance and sing. Children can create their own characters in the paint editor, add their own voices and sounds, even insert photos of themselves -- then use the programming blocks to make their characters come to life. The children will be using some of Scratch Jr's more advanced coding blocks to create their own interactive dancing robot game. The children will learn the important skills of critical thinking, problem solving and debugging. They will also be documenting their coding by creating a journal in Google Docs.

End of unit task: Create an interactive dancing robot game through coding and sequencing.</td></tr>
<tr><td>Key Objectives</td><td>Vocabulary</td><td>Lesson sequence:</td></tr>
<tr><td>How do games and apps on your computer, tablet or phone work?
(IT) I can improve the quality and presentation of my work using editing and formatting techniques.</td><td>Font
Coding
Screenshot
Journal</td><td>Step 1: Watch the introduction video with children. This will give them an idea of what they are going to be covering during this computing activity. (Watch / Download). Ask "has anyone made a game before?" and "do you think it will be easy or difficult?".
Step 2: Open and read the teacher version of the digital learning journal, this is also available as a presentation. This will show you how each of the coding challenges work. If you use the Book Creator version (ePub) of the learning journal, these can only be opened in the Book Creator app. (Download)
Step 3: Distribute the children's digital learning journal template for the dancing robot activity. The journal must be opened with the Google Slides/ book creator if CLC. If you are not familiar with how to distribute digital work, please read through the Section 3: Tips for teachers. If you are using iPads/tablets you can quickly ask children to scan the QR Code in the teacher's book.
Step 4: Challenge 1, the children must design their own cover. You will need to model how to use Google Slides/Book Creator. Then discuss elements of design for a front cover. There's an age-old saying that we should never judge a book by its cover. However, stress the point that when you are designing a book cover you are visually representing the chapters, paragraphs, characters, events, settings and ideas, all in a single image. So the children need to remember this book is about computing and that should be reflected in the cover. As a class discuss the "Is this good design?" page in teacher handbook.
They will need to do the following independently: Tips:
Change the size of text The title should be large and easy to read
Change the colour of pages No white background, colours stand out better</td></tr>
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		Change the colour of text Make sure all text is readable Change the font Only use stylised fonts for titles Change alignment of text Paragraph text should be size 12 Add shapes, emojis and images Use a maximum of 4 emojis on the cover Step 5: Challenge 2. About me: what games do children play? In this task the children will get the opportunity to showcase how they use technology. What are their favourite technologies? Phones, tablets, consoles or TV? What are their favourite apps and games? They must explain why. The children will need to master a workflow, swapping between apps, saving images and resizing images in Google Slides/Book Creator. Once the children have created a technology mood board, they can either type their justification/choices or use the add sound to record their voice. Step 6: Challenge 3. Have you ever wondered how games and apps work? What did you come up with? Pair up the children and ask them to discuss the question. Children can either type their thoughts or use the add sound to record their voice. The key words to look for are code, coding or instructions. Step 7: Ask a couple of children to present their work to the class. Discuss their answers. Step 8: What is Coding? It's code that makes your technology work. When someone makes an app or game they can't use any of the languages that people normally use to speak to each other. For instance you can't just shout at a computer and expect it to do want you want. Instead you have to use a special language called a programming language. There are hundreds of these! So code can simple be thought of as instructions in a language that computers understand and coding as the act of writing those instructions. Step 9: Get children to complete the self-assessment and computing vocabulary pages in their journals.
How can decomposition be used to help with coding? What is an algorithm? (CS) I can create a simple flow diagram.	Code / Coding Decomposition Command Repeat Loop Algorithm Sequencing	Step 1: Restate the idea that coding is all about giving instructions. "When button A is pressed make the character jump". Step 2: Challenge 4. The children will be exploring the skill of decomposing computing/coding problems. Decomposition is one of the four cornerstones of Computer Science. It involves breaking down a complex problem or system into smaller parts that are more manageable and easier to understand. The smaller parts can then be examined and solved or designed individually, as they are simpler to work with. Ask the children to play a simple game for 15 minutes. We have chosen Mr Jump but this can easily be replaced with another. Have the children break the game up into smaller parts (decompose). Have them think about the instructions used e.g "when tap jump," "If Mr Jump collides with a spike the game ends" and "When game ends show the percentage completed." Thinking about decomposing how games are made will help later when the children make their own game. This task can be recorded quickly in their journal. However, if you wish to extend this activity, Popplet is a great app for mind mapping and decomposing problems. Watch Popplet video on how to use and for extension ideas. Step 3: Select a couple of children to share their answers on the board. Have the class discuss and give feedback, have they missed anything? Step 4: Explain to the class that coding is all about instructions but

		there are different types of instructions. A "command" tells a computer to do one thing. Computers can only make simple yes/no or true/false "decisions." Sometimes you want the computer to do something more than once. This is called a "repeat" or "loop". A set of instructions for a task is known as an "algorithm". An algorithm is a bit like a recipe. You may wish to act out the different types of instructions to help children understand their meanings (See Mr Jump cards). Step 5: Challenge 5. The children must sequence a set of instructions in their journals. The instruction boxes can easily be moved and placed in the correct order. Model this on the board but deliberately get it wrong, then ask what would happen? Step 6: Challenge 6. We have already started looking at flow charts, so the children should have an idea of what the different boxes/shapes mean. A flowchart is a visual representation of the sequence of steps and decisions needed to perform a process. Each step in the sequence is noted within a diagram shape. Steps are linked by connecting lines and directional arrows. Get the children to create a simple flow chart by copying and fixing the one from the teacher handbook. Step 7: Have a couple of children present their work to the class. Discuss their answers. Step 8: Get children to complete the self-assessment and computing vocabulary pages in their journals.
What is sequencing? What is debugging? (CS) I can identify bugs (errors) in code and predict outcomes.	Debugging Sequencing App Bugs Tablet	Step 1: Restate the idea - "a computer program is a sequence of instructions executed by a computer". Step 2: Challenge 7 & 8. Have the children complete these two sequencing challenges in their journals. Have a few children present their answers. See who can complete the challenges in the fewest possible moves. Step 3: Model playing Lightbot to the children. If you are unsure how to use Lightbot, please watch the teacher video in handbook. Give them 15-20 minutes to see how far they can get. Demonstrate the following in Lightbot: Instructions need to be in the correct sequence. How to fix (debug) the instructions if they are in the wrong sequence. How to remove any unnecessary instructions. How to test the instructions. How to screenshot the iPad screen while playing Lightbot. (This can be done by pressing the "home button" and "power button" at the same time. Do not hold down or you will turn off the iPad.) Step 4: Have the children complete Challenge 9 & 10. If the children want they can add their own screenshots to their journal. The aim is to ensure the children can adequately explain the importance of sequencing instructions and debugging. This is done by using the add sound and record feature. Step 5: Challenge 11 is an unplugged activity. You will need to print out the instruction cards, holder pages and robot mask. The children will be creating a computer program to make a robot dance. Start by getting the children into pairs. One child will be the robot and only follow the instruction given. The other child will be the programmer and will create a choreographed dance sequence for the robot by using the instruction cards. In this activity there are three elements the children should understand:

		1. They are creating a computer program (sequence of instructions executed by a computer) to make a robot dance. 2. The child playing the part of the robot must only carry out the instructions given, in the order they are given. Computers need exact instructions. 3. Can the programmer predict what will happen? If the dance program doesn't work as they thought it would then it needs to be fixed (debugged). If you wish, the children could choose music to accompany the robot dance. YouTube is ideal for this. Step 6: Challenge 12. They must video their dance routine and discuss sequences and what happened. Step 7: Get children to complete the self-assessment and computing vocabulary pages in their journals.
What is visual coding? (CS) I understand that I must keep testing my program and I can recognise when I need to debug it.	Visual coding Flow Diagram Conditional Background Broadcast Screencasts	Step 1: Introduce the children to visual coding. Explain there are two types of coding, text-based (instructions are written out) and visual (blocks of code are drag and dropped to create programs). Step 2: Explain to the children that they are going to use an app called Scratch Jr and do some visual coding. Demonstrate the basics of using Scratch Jr, if you have never used it before watch the tutorial video. Then give the children 15 minutes using the app to experiment with visual coding. They are not allowed to add characters or backgrounds, this is about learning what the code blocks do! Get some of the children to showcase what they have made using the visual code blocks. Step 3: Challenge 13 is for the children to complete in their journals. Ask them to "name the different type of categories for the instruction blocks?" Step 4: Challenge 14 asks the children to turn written algorithms into programs. An example answer is in the teacher handbook. Get a couple of children to present their answers and discuss the blocks used. Ask "why would we use a loop instruction?". Step 5: Demonstrate to the children how to add a new sprite (character) in Scratch Jr. Challenge 15 asks the children to turn programs into written algorithms and is for the children to complete in their journals. Step 6: Watch the "how to guide for teachers" video in the teacher's handbook. Ask the children to start a new Scratch Jr project. Demonstrate how to delete the cat, add two new sprites (crab and fish) and then add a background. The challenge for the children is to now use code to get the two characters (sprites) to talk to each other. You may wish to have the children write a short script first. They will encounter problems like how does the second sprite know when the first sprite has finished talking? Have the children reflect on creating this program in their journal. Get them to focus on the fact they had to test the program and then fix or improve their code. Step 7: Have a couple of children present their work to the class. Discuss their answers. Step 8: Get children to complete the self-assessment and computing vocabulary pages in their journals.
What is a sprite? What is a repeat command? What is send & receive	Input Sprite Program	Step 1: Remind children about the computing term, "sprite" (means a character or graphic). Step 2: The children are going to use shapes to create their own robot sprite in Scratch Jr. So ask them to complete the "can you draw the shape" in their learning journal. Have a few children showcase and discuss their work.

(broadcast)? (IT) I can create my own sprite and background in Scratch. (CS) I can use repeat commands to improve my programs.		Step 3: Watch the video tutorial on how to draw a robot sprite in Scratch Jr and then demonstrate to the children. Ask them to complete challenge 17. Make sure they screenshot and record their work in their journal. Step 4: Ask the children to independently work through challenge 18. This consists of six projects that will teach the coding skills require to complete the final dancing robot program. In the teacher handbook there are additional tips to help. Make sure the children screenshot or screencast their work and include in their journal. Step 5: Ask a couple of children to present their work to the class. Discuss their answers. Step 6: Get children to complete the self-assessment and computing vocabulary pages in their journals.
How can I improve my game/coding? (IT) I can evaluate my work and improve its effectiveness. (CS) I can create a basic game using Hopscotch, Tynker or Scratch Jr/Scratch. (IT) I can create an eBook to retell a story. E.g. I can combine a mixture of text, graphics and sound to share my ideas and learning.	Graphics	Step 1: In this final lesson the children will use the coding knowledge they have learnt in the previous lessons to build the final Dancing Robot game. Teachers should watch the tutorial videos; this will show you how the full game is made. The children should complete challenge 19 by firstly watching the screencast of a completed dancing robot game. They will then need to decompose the game to work out how they can make their own version. Ask the children to write a list of instructions for the game. They will need to add the following sprites and graphics: Background Robot Title text At least one dance button Questions the children should think about when decomposing the coding and writing the dance program: How does the button work? How does the button send a message to the robot to start dancing? How does the robot receive the message to start dancing? How does my robot dance, what instructions are required? How can I use the repeat to improve the program? How can I add music and get it to play? Step 2: Make sure the children document their understanding, their code, any mistakes and how they fixed them in their learning journal. As the children are doing this, ask a couple of children to present their work to the class. Discuss their answers. Step 3: Ask the children to complete challenge 20 by creating a screencast video of their game. Watch the tutorial video and then demonstrate to the children. This video should then be inserted into their journal. Step 4: Get children to complete the self-assessment and the final computing retrieval activity page in their journals. Step 5: The final challenge (21) is to share their journal. Review the share options in the teacher handbook. If you are unsure of how you can share and celebrate digital work please review Section 3: Teacher's Tips - How? Why? & Try!