Brough Primary School – Curriculum Intention Plan 2022 - 2023

Subject: Computing **Year Group:** Year 1/2		**Area of learning:** We are astronauts! RS 2.1
Links to previous work/Remember when	Paint or other art/drawing apps, Scratch	
Term	**Year**	**Key Skills to be taught**
Summer 1 ***(Cycle A)*** **2022/23** What the children should know at the end of this series of lessons	Y1/2	This unit will enable the children to: have a clear understanding of algorithms as sequences of instructions convert simple algorithms to programs predict what a simple program will do spot and fix (debug) errors in their programs. https://scratch.mit.edu/projects/15631475/ Link needed for Scratch project

Vocabulary:

Space, Earth, planets (Mars), moon, spaceship, background, sprite, instructions, programmer, algorithm, robot, multi-step, blocks, predict, debug

Sequence of learning	Objectives and suggested details provided by the subject leader.
1	**Lesson 1 - Being playground astronauts** Take the pupils into a big open space (such as the hall, playground or field). Designate one place as planet Earth. Use hoops to mark out the Moon and some planets, including Mars. Ask pupils to think carefully about what instructions would take a spaceship from 'Earth' to the 'Moon'. Explain that they can use move (so many) steps and turn instructions. Can they plan out the whole of the trip? Taking it in turns to act the role of the spaceship, the pupils should try out their planned instructions. Can they make improvements to someone else's algorithm (set of instructions) so that it works? Explain that the steps to follow are an algorithm, and that on a real computer these would be implemented as a program. Explain that usually the hardest part of solving the problem is finding the right algorithm. Set the pupils the harder challenge of working out the instructions to get from 'Earth' to 'Mars' via the 'Moon'. Ask pupils to plan a complete set of instructions in advance. They can again take turns as the spaceship and programmer. Ask other pupils to predict where they think the spaceship will end up after the instructions are followed. They could

	stand in the place they think it will arrive, with the child closest taking on the role of programmer for the next attempt.
2	**Lesson 2 - Using turtles in space** Ask the pupils to recall what they can from working with programmable toys in Year 1 (and perhaps the Foundation Stage). Provide them with access to one or more robots so they can demonstrate how to use these to their classmates. Correct any misconceptions. Emphasise the move and turn buttons as a way of programming the turtle. Set out a large area in your classroom (or perhaps the school hall). Mark out planet Earth, the Moon and one or more planets. Place the floor turtle on 'Earth' and ask pupils to work out the instructions to get from 'Earth' to the 'Moon'. The pupils should share their ideas with one another, providing feedback to each other on their algorithms. Encourage them to work out a complete set of instructions to solve the problem. You could ask the pupils to jot down ideas for their algorithms on paper or small whiteboards. The pupils should take turns to implement their algorithms as programs for the floor turtle. The rest of the class can make predictions for where the robot will end up when the program is run, perhaps putting down markers. The pupil who came closest can have the next attempt at programming the turtle. Set a more complex challenge, similar to that in Step 1, asking pupils to work out the steps needed for the robot to travel from 'Earth' to the 'Moon' and then on to 'Mars'. You could use the idea of refuelling as some justification for this. The pupils should again work out their algorithms in full, perhaps recording these on paper or small whiteboards. The pupils should again take turns to program the robot to follow the steps in their algorithms, while other pupils make predictions about where the robot will end up.
3	**Lesson 3 - Creating sprites and backgrounds** Introduce pupils to Scratch. Show how they can access this from any web browser by going to http://scratch.mit.edu and then clicking on Create. Explain the stage, backdrops and the sprites (characters). Explain that the backdrop and sprites can be changed to be anything the pupils want. If the pupils are going to work with a partner, put them into pairs now. Show how the pupils can edit the backdrop. Give them some time to explore the backdrop editor themselves. Remind the pupils of their work using painting programs in Year 1. Provide time for them to share their discoveries. Correct any misconceptions and ensure all pupils will be able to create their own backdrop, with support if needed. The pupils should create their own space backdrop in Scratch (the simplest approach is to fill with black and then add a few small white dots for stars). Ask the pupils to add a small circle to represent Earth, and to colour this in. Ask them what Earth looks like. Give pupils the opportunity to review one another's backdrops. Show the pupils how they can delete the cat sprite (right click, Delete). Show how they can create a new sprite of their own. Explain that Scratch expects all sprites to be moving to the right, so their spaceships will need to point that way. Ask pupils to design their own spaceship using the Scratch image editor (click on the paintbrush icon in the Sprites area of the screen). You might like to show some real and fictional examples of spaceships. Provide time for pupils to review one another's sprites. The pupils should download their work and save it on their computer, unless they have Scratch accounts (requires parental permission). Demonstrate that the sprites can be moved independently of the backdrop image, contrasting this with earlier work using Paint.

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4	**Lesson 4 - Programming the spaceship** Show pupils the example spacesim project on the Scratch website (see Resources), or your own version of this. Show how the forward, left and right purple blocks can be used to control the spaceship, by dragging these into the Code section of the Scratch screen and clicking them. Show how they can be snapped together to make more complex, multistep programs. Share the URL for this with the pupils through your learning platform or class blog. Provide time for pupils to experiment with snapping these instructions together. What can they make the spaceship do? Draw their attention to the similarity between this and the playground and robot instructions in previous steps. Show pupils the blue, move instruction blocks, and demonstrate how these can be snapped together in just the same way. What differences do the pupils notice? These instructions look more complicated, and many have a space for a number. This is called a parameter. Encourage the pupils to experiment with these instructions, snapping some of these together in the Code section on Scratch to make multi-step programs and exploring the effect of changing parameters. What sorts of things can they make the spaceship do using these instructions? The pupils should share their programs with one another, and provide feedback. Ask the pupils to open their space backdrops and sprites from the previous step by uploading them in the Scratch editor (this does not publish their projects to the web). Point out that the easy purple forward, left, right turn blocks aren't available for their own projects but they can still use the blue movement blocks. Ask pupils to experiment again with these, changing some parameters and snapping blocks together to make their spaceship move. They should share their programs with one another and provide some feedback.
5	**Lesson 5 - Moving from one planet to another** Ask pupils what they can remember about working in Scratch and correct any misconceptions. Use your learning platform or class blog to provide pupils with access to the spacesim project (see Resources), and show how they can swap to the Earth and Moon backdrop. Set pupils the challenge of using just the simple purple blocks to create a program to move the spaceship from Earth to the Moon. Encourage them to think through the algorithm for their program first. Provide time for them to try this, correcting (debugging) their programs as they go. Tell pupils that pressing the Space bar (on the keyboard) in this program will bring the spaceship straight back to Earth. Now ask the pupils if they can do the same thing using Scratch's blue movement blocks, remembering that they'll need to pick the numbers to go in the spaces (parameters) for these and experimenting to get these right. Explain that they can have the same algorithm as before, but they'll be using a different program to implement this. Provide time for the pupils to experiment and debug their own programs. Remind pupils how they can open their own space backdrops and spaceship sprites in Scratch. Ask them to edit their backdrop (or make a copy of their backdrop and edit that) to draw on the Moon wherever they want. Discuss what the Moon looks like. Ask pupils to write a Scratch program using the blue movement blocks, with their own choice of parameters, to move the spaceship from Earth to the Moon. They should debug their programs. Encourage pupils to show their work to one another. Has anyone found an unusual way to solve the problem? Whose programs work most quickly? The pupils should download their projects to their computers (unless they have Scratch accounts).
6	**Lesson 6 - Three planets** Show pupils the Scratch spacesim project with the Earth, Moon and Mars backdrop selected and the simple, purple blocks. Ask them to work out a single algorithm (or set of instructions) to take the spaceship sprite from Earth to the Moon and then on to Mars. Ask them to record their instructions on paper or small whiteboards, just as they did in the earlier steps. Ask one pupil to program Scratch, but before running their program, other pupils should use logical reasoning to predict what will happen. The pupils can debug the first script until they have one that works.

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	Share the URL for the project with pupils via your learning platform or class blog, and ask them this time to use the blue movement blocks to implement their algorithm for getting from Earth to the Moon and then on to Mars. The pupils should predict what will happen when the program is run, and then they should work together to debug their program. Pupils should compare their programs – who has the simplest solutions? Whose solutions are quickest? Remind pupils how to upload their own projects from Step 5 to the Scratch editor. Ask pupils to add Mars to their picture, wherever they want. The pupils should think through an algorithm to take their spaceship from Earth via the Moon to Mars. They should then program this using the blue movement blocks. Their partner should use logical reasoning to predict what will happen when they run the program. How close were they? Did the program work? The pupils should work together to debug their program. The pupils should share their programs with one another. Who had the most efficient programs? Did anyone find a very clever solution? Use a closing plenary for the pupils to reflect on the differences between acting out an algorithm in the playground, programming the robots, programming Scratch using the purple blocks and programming it using the blue blocks.

Learning Outcome/product
ALL CHILDREN SHOULD BE ABLE TO: Plan an algorithm to move a spaceship from Earth to the Moon Implement algorithms on floor turtles Implement algorithms as programs on a screen sprite using simple blocks without parameters Debug their programs Solve the Earth–Moon challenge on a variety of programmable devices

Assessment records	**List only those children who have not achieved the expected outcomes**

End of unit assessment question
What is a sprite? What is a block on Scratch? What is an algorithm? Give me an example of an algorithm? What was the purpose of your algorithm on Scratch for this project?

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