Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.

Date	Objective (s)	Task/activity	Resources	Key Vocabulary	Learning Outcome
Lesson 1	NC objective: To understand what algorithms are. Lesson objectives: I can follow a set of instructions	Main Teaching Talk to children about the instructions for a Lego model. Show the two models and discuss what could have happened to the one built incorrectly (instructions not followed) Choose a volunteer to sit with their back to you beside one of the selections of Lego. You are going to give them some instructions for what to do with the Lego while you also follow your own instructions. Ensure that the rest of the class can see both of you, but that you cannot see each other's model. Give some simple instructions.. Compare models and discuss whether the instructions were clear enough or if anything went wrong. Repeat this, and then get children to volunteer to give the instructions. Differentiated Activities 6. Now, children could pair off (or play in small groups, depending on the quantity of bricks that you have) and	Two small Lego models and some Lego instructions A selection of Lego	Instruction – Information about how something should be done. Algorithm – A precise, step-by-step set of instructions used to solve a problem or achieve an objective. Computer – an electronic device for storing and processing data.	To emphasise the importance of following instructions

Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.

		play this game together to get used to the need for precise instructions. Discuss whether the children are getting better at giving precise instructions as they continue to play the game. Challenges <u>Plenary</u> Bring the class back together and display the word 'Algorithm' on the whiteboard. Read it and practise saying it together. Explain the meaning of the word: The children have been giving each other the algorithms to build models with the bricks. Can the children give examples of any algorithms that they use during their lives? One example is getting ready for school in the morning: usually, they will follow a correct order for doing things, but what would happen if they put their trousers on before their pants, for example? What about making breakfast; if they poured out the cereal before getting a bowl? An 'algorithm' is a precise, step-by-step set of instructions used to solve a problem or achieve an objective.		Program – To provide (a computer or other machine) with coded instructions. Debug – To find and remove errors from computer hardware or software.	

Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.

Lesson 2	NC objective: To understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions Lesson objectives: I can follow and make sets of simple instructions using the computer	Main Teaching Revise the meaning of the word 'algorithm' Show the children how to open one of the 2Dos that you set for them of the outline picture (not the bird). They should all open the same one. They will need to log on and look for the bell at the top of their screen next to their picture: Explain that they should colour in the picture using the paint colours. Once they have had adequate time to finish this, show them how to: save their work, exit and then 'Hand in' their work. Open the handed-in 2Dos (via your own Notifications icon) on the whiteboard. The class will be able to see all their pictures as little thumbnail images. You can double-click on them for a closer look. Emphasise how each picture is unique because you didn't give them any specific instructions about how to do it. Explain that they are going to repeat this exercise, but this time you are going to give them an algorithm for colouring in the animal. Open the bird algorithm on the whiteboard. Emphasise how important it is to number the order of the steps because an algorithm	Paint projects containing outlines for colouring set as 2dos Bird activity set as a 2Do. Paint by Numbers Instructions. Paper and coloured pens or pencils.	algorithm, programme, code, coder	To follow and create simple instructions on the computer..

Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.

		is a set of instructions completed in an ordered way. Talk though the algorithm: **Algorithm** Step 1) Paint the beak yellow Step 2) Paint the head red Step 3) Paint the tummy dark green Step 4) Paint the wing dark blue Step 5) Paint the tail orange Step 6) Paint the legs yellow <u>Differentiated Activities</u> Give children time to complete this on their own computers and then 'Save', 'Exit' and 'Hand in' their finished piece. <u>Challenges</u> play a 'coders and robot' game where they first write the 'program code' on paper for colouring the last 2Do outline using a colour key, e.g. 1) tail = , 2) neck = , etc. 14. Then they give the program to a robot (another child) and take on the role of a robot following someone else's program. Can the coders write good programs for the robots to follow? <u>Plenary</u>			

Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.

		Compare the pieces of work as before. This time the work should all look very similar. Explain that when they follow instructions they are behaving like a computer; it cannot think for itself, so we (humans) need to provide very precise instructions so that it can do anything. Introduce and define the word 'Program'. An algorithm that has been coded into something that can be run by a machine, e.g. a computer or a robot.			
Lesson 3	NC objective: To understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise	Main Teaching Talk about what a recipe is. What is included in a recipe? Why do we need them? Open the 'Wrong Sandwich' activity on the whiteboard. There is a gallery of photos accessed by clicking on the green crosses. The algorithm is not very good, so a robot making the sandwich would probably make some mistakes. Can children suggest which 'wrong' photos could occur? • Instruction 2 does not say to spread the butter on the bread; there is a photo of the butter spread on the plate. • Instruction 3 does not say to cut slices of cheese; there is a photo of the whole	The 'Wrong Sandwich' activity Category Instruction Writing. Children can find this in the English section of Purple Mash, or you could set	algorithm, programme, code, coder, debug	To consider how the order of instructions affects the result.

Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.

	and unambiguous instructions. To create and debug simple programs. <u>Lesson objectives:</u> I can order instructions so they make sense.	block of cheese on the bread. • Instruction 4 does not say to put the top piece of bread butter-side down; there is a photo with the butter-side up on top. • Instruction 5 does not say how to cut up the sandwich; there is a photo of a haphazardly cut-up sandwich. Now let's 'debug' the algorithm - When you debug a program, you look for any bugs (problems) in the code and try to fix them. Go through each step, in order, and correct it. Match the correct photos to end up with a much better algorithm. <u>Differentiated Activities</u> Direct the children to the recipe sequencing games' in the 'Instruction Writing' category. Children should spend some time working through some of these, <u>Challenges</u> <u>Plenary</u> come back together to discuss the correct order for the recipes. What could go wrong with each recipe if the algorithm is incorrect? Can the children make up an algorithm for how to make cereal that a robot could	some of the sequencing games as 2Dos for them		

Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.

		follow? Can others debug any errors?			
Lesson 4	NC objective: To understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions Lesson objectives: I understand what the direction keys on a keyboard do.	Main Teaching Children should have had the opportunity to use bee bots and use alongside these activities. Find 2Go in the Tools section on Purple Mash. Tell the children that they are going to use 2Go and learn how to move things around on the computer just like they did on the floor. If you want to use 2Go, you should learn how • 2watch carefully • 2listen carefully • and 2think brilliantly! Then you can really make things happen! Let the children open 2Go and select the Challenges button. Differentiated Activities Challenge 1 talk to the children about the first challenge Using the simple direction keys show the children how to guide the fish around the screen. Explain how the direction keys work. Questions to support and guide the children • Which way are we going to follow the path to the treasure? • Do you think there is a shortcut? Let's draw the path with our finger first. • Which way do we need to make the fish go	beebots	Direction – A course along which someone or something moves. Challenge – A task or situation that tests someone's abilities. Arrow – A mark or sign resembling an arrow, used to show direction or position. Undo – Cancel or reverse the instruction.	To understand the functionality of the basic direction keys To be able to use the direction keys to complete a challenge.

Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.

		first? • Which command shall we press to make it go that way? • How far did the fish move? • Where shall we make the fish move to next? • Let's count the squares; how many times do we need to press the command to make it move that way? • Use the Undo button (the blue circle) to undo the last instruction if you go wrong. • Take the fish right back to the starting position and start again. Use the Rewind button to do this. • Make a mistake and let the children see how easy it is to undo it or to send the fish back to the starting position and start again. Shall we try it again and see if we can remember the instructions that we used? Let's write the instructions down this time (draw the directions on a large piece of paper). Challenge 2 This challenge screen looks different. Talk to the children about how Challenge 2 looks different. Questions to support and guide the children • Which way are we going to follow the path to the treasure? • Do you think there is a shortcut? Let's draw the path with our finger first. • Which way do we need to make the fish go first? • Which command shall we press to make it go that		Rewind – Move back several steps or to the start. Forward – To move in the direction that one is facing or travelling. Backwards – To move in the opposite direction to which one is facing. Right turn – To move the object in a clockwise direction. Left turn – To	

Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.

		way? • How far did the fish move? • Where shall we make the fish move to next? • Let's count the squares; how many times do we need to press the command to make it move that way? • Use the Undo button (the blue circle) to undo the last instruction if you go wrong. • Take the fish right back to the starting position and start again. Use the Rewind button to do this. • Make a mistake and let the children see how easy it is to undo it or to send the fish back to the starting position and start again. Shall we try it again and see if we can remember the instructions that we used? Let's write the instructions down this time (draw the directions on a large piece of paper. Look at the direction keys; how are they different? The squares used in the grid are smaller than in the first activity. There is the addition of a number pad as well as the commands. You can now give a direction, e.g. forward 3. Using the left and right commands followed by a number will move the car to the left or right by the number of squares you have chosen. There are now two targets to meet: first to go to the bank and then to go to the hospital.		move the object in an anti-clockwise direction. Debug – To find and remove errors from computer hardware or software. Instruction – Information about how something should be done. Algorithm – A precise, step-by-step set of instructions used to solve a	

Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.

		Questions to support and guide the children • Which route are you going to take to the bank first? • Map the route out with your finger. • The squares are much smaller on the grid. How many squares do you think the car should move to get to the bank? • Now you are at the bank, what command will you use to move towards the hospital? • Use the Undo button to try out your directions and delete them if they are wrong. Once you get to the hospital and you have completed the task, let the children set themselves tasks to complete, e.g. visit the pet shop, the temple and the church. Can you make the car go around the village and create a big square shape? Challenges Children to design their own maze on squared paper and write instructions – with adult support Plenary Look at some of the other scenes and come up with instructions.		problem or achieve an objective.	
Lesson 5	NC objective: To create and	Main Teaching Find 2Go from the Tools section. Can the children	2go challenges		

Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.

	debug simple programs. To understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions Lesson objectives: I can debug a simple algorithm.	remember the challenges that they tried last time? Can they remember how they controlled their character on the screen? Recap last weeks challenges and the direction keys. Differentiated Activities Challenge3 Challenge 3 has a set of new direction keys. Which direction keys have been added to the previous keys? What do the children think these direction keys will do? Which way will they make their character move? Questions to support and guide the children • Now you have the option of cutting across the water by using the diagonal direction keys. • Which is going to be the fastest way to get to the next island? • Do you need to go around the islands or can you cut across the water? • Does having more direction keys to choose from make it easier? • Find the shortest route to visit the three islands. Look at the route your friend has taken; is their route different to your route? How many commands did they use? • Show the children how to choose a different colour for the pen each time they visit a new island.	set as 2dos bee bots beebot mats		To understand how to create and debug a set of instructions (algorithm).

Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.

		Challenge 4 select Challenge 4. The directional tools in this activity will look very different from the previous challenges. In this challenge, the children will be able to create a list (set of instructions) of the directional tools as they start to use them. This list or set of instructions is referred to as an algorithm. This is just like writing a list of instructions to send your programmable toy around a circuit in your classroom, only this time, we are making the list on the computer. In this activity, the children need to take Little Red Riding Hood to Grandma using five sets of instructions. The instructions must be added to the list (algorithm) in the correct order. The key part of this activity is that the children keep trying and testing (debugging) their instructions until they finally make an algorithm which will work. Show the children how to create one instruction by dragging a direction followed by a number into the first box on the list. Which way does Little Red Riding Hood need to go first? How many units forward does she need to go? To test your first instruction, click on the big Play button and watch what happens to your character. If your			

Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.

		instruction is wrong, you need to change it by dragging the instruction (the number or the direction, or both!) back into the direction tool list. Click on the Rewind button to send Red Riding Hood back to the start again and try a new instruction. The children will need to keep trying and testing each of their instructions as they write them. Don't forget you must send Red Riding Hood home before you press Play as your instruction list will always play right from the start of the list, wherever Red Riding Hood is on the picture. The children will need lots of practice with this and it may be better to do this activity with all the class first to familiarise the children with the tools and how to use them. SEN – Beebots and beebot mats, can they find a route from one letter/building to another? <u>Challenges</u> Give children a set of instructions for the beebots that are incorrect. Children to debug so they work. <u>Plenary</u> Look at children's programmes, which bits work and which don't.			

Computing Medium Term Plan- Spring Term 1 Y1

Lego Builders

Maze Explorers

- To understand what an algorithm is and can create and debug simple programs.