Year 2 Programming 2 Exploring my topic with a floor robot (Choice)

Timing 3 sessions of approx 45 minutes (The final treasure hunt activity may need to be organised alongside other class activities if you want each group to do this separately.)	**Children will** • Use Probot / Bee-Bot or other floor robot to collect information about animals • Self-assess confidence to 'write a program' to meet a challenge • Program floor robot to complete a treasure hunt • Guess the animal Probot is thinking about – look at the program that will draw a shape, predict the letter • Program a floor robot to draw a letter • Program a floor robot to draw a flight of stairs
e-safety links I can talk about why it is important to be kind and polite online and in real life.	**Objectives** **Programming** • I can tell you the order I need to do things to make something happen and talk about this as an algorithm. • I can program a robot to do particular tasks. • I can watch a program execute and spot where it goes wrong so that I can debug it. • I can look at my friend's program and tell you what will happen.
Links to other learning **Computing:** **Handling Data 1 and Technology in our Lives** (research online) **Mathematics:** direction, turn and number **Science:** Identify that most living things live in habitats to which they are suited. Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.	
Resources Probot/Roamer/other floor robot with number input Blue-Bot or Bee-Bot could be used (Blue-Bot will allow children to write program on a tablet or laptop with blue tooth) KS1 Self-assessment Poster	**Preparation** • Print photos of animals for session 1. • Create animal treasure hunt with three or four answers. This will need to be in a large space with at least six pictures of animals – only four will have clues on the back. The first clue is the program they will need to input to go to the first animal. Stick the second clue to the back of the first animal (also put number 1 on the back so that they know they have correctly reached the first animal). This will be the program to take them to the next animal etc. The last animal will need a 'You've finished' message together with 'Can you write down what you think each animal will eat message? • Use I Am a Computer Programmer document to support you in developing the language of programming. • Display KS1 Self-assessment poster • Create a large 'floor mat' for session 2 which may require some taping together of large sheets of paper. • Be ready to pre-program floor robot to draw the first letter of the name of an animal in session 2.

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	Expectations	Activity	Success Criteria
1	**Programming** I can program a robot to do a particular task *using the correct vocabulary.* I can tell you the order I need to do things to make something happen and talk about this as an algorithm.	**Increasing challenge with a floor robot** • Allow the children exploration time (10 minutes) reminding themselves of how to make Bee-Bot / Blue-Bot move around a space. Can they remember what they learnt in reception and year 1? • For those with other floor robots which require children to add quantity values for instructions: Probot (tips here) introduce this for the children to explore. What is the same as the Bee-Bot? What is different? Draw attention to key difference of needing to enter a number for an instruction. Children will also see the screen on the Probot which lets them see what has been programmed into the device. As they begin to use the Probot draw attention to the way the screen allows them to see where they have gone wrong – it will help them to debug the program. Make sure children discover how to clear the memory of the floor robot they are using. • (**Where you have only one or two floor robots** children will need to work in small groups away from the rest of the class. They will need a supervising adult who is clear about the vocabulary children will be practising. This activity will then take place over an extended period of time). Emphasis the need to work together, being kind to their friends (link with ***e-Safety***). • If you are using Bee-Bot you will need to emphasis the number of forward / turn they are doing. Ask them to record the instructions they are programming as the arrow and the number of times it is pressed. **Collect the Game Cards Challenge:** (As the children do this challenge, encourage them to use the correct vocabulary of **algorithm, program, execute, debug.)** • Linking to Science topic about animals their habitat and food, set out animal photos in baskets around a large space. Ideally use a 25cm square grid for the Probot to move around (15cm square for Bee-Bot) but the grid is not essential. • Challenge the children to visit each basket to collect the animal photos.	Gold: Can I understand the different vocabulary and use it to be successful? Silver: Can I begin to use specific vocabulary when making the floor robot move? Bronze: Can I successfully input a program for the floor robot to move?

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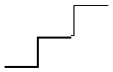
		Encourage the children to talk through what they will need to do (the **algorithm**) before they begin to **program** the robot. Can they record the **program** for moving from the grass to the chicken? etc. Use the vocabulary of '**execute** the program' when they push the Go button. Use the word '**debug**', if the floor robot goes in the wrong direction or moves too far, to work out the error in the program. • **Plenary:** (when all the groups have had a turn) Give groups of children different cards with the labels: algorithm, execute, program, debug. The children are to discuss and present a definition for what they recall/think that their words mean. Each group presents their word for the class to discuss. This is an opportunity to clear up any misconceptions that the children may reveal.	
2	**Programming** I can tell you the order I need to do things to make something happen and talk about this as an algorithm. I can look at my friend's program and tell you what will happen. I can watch a program execute and spot where it goes wrong so that I can debug it.	**Creating shapes** • An activity if you have Probot / Roamer of floor robot with a hole for a pen. This activity can link to activities in year 2 programming 3 where the programming is linked to 2d shapes in mathematics. For schools with only a Bee-Bot, an outline of a 2d shape could be drawn first and the children asked to program the Bee-Bot to move along the line. The children are to watch carefully to check it does not move off the line. • Have a large area of paper on the floor. This can be done as a whole class, sat round the edges of the piece of paper. However, working in small groups may be more effective to support active learning. • Can you program the floor Robot to draw a staircase? Show what this should look like:  What is the algorithm? Can the children describe what will need to happen? Move forward, turn, move forward, turn, move forward, turn. If children talk about moving sideways or moving up, talk through the movements the floor robot is allowed to do. Can the children act out the movement that will be required? • Do you know how to make this happen? Remind children of KS1 self-	Gold: Can I talk about the algorithm that describes what I need to do and write the program? Can I detect and correct any errors I make in the program? Silver: Can I detect and correct errors in a program? Bronze: Can I program the floor robot to draw a shape?

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		assessment poster. Identify children that may need additional support. Let the children decide on their program in pairs. Can they 'write down' the program? – using symbols and numbers. Let the children enter and execute their program on a floor robot. Are they happy with the shape? Do they need to do any debugging? • **Extension:** Is there a quicker way to create the stair case? If the children recognise a repeating pattern, introduce them to the repeat command. • **What animal is the robot thinking about?** (Pre-program the robot to draw the first letter of the name of an animal.) Ask all of the children to watch carefully. Ask one of the children to press Go. Can they guess the animal from the shape that has been drawn? Can they 'write down' (wipeable white boards are ideal) what they think the program looks like? Look at the programs. See if the children can recognise whether this will draw the shape. Can they spot any errors? Test and improve the programming as required. • Children can continue to do this activity in small groups or pairs. They can think of an animal and decide on the algorithm and then the program to draw the first letter of its name. Continue to use self-assessment to allow children to identify the progress they are making and for you to see those that may need a different activity to reinforce the learning. Some will continue to benefit from physically walking through the algorithm required first. • Can the children talk through the algorithm, write the program, enter and execute the program to create the first letter of the name of an animal? • What have they learnt from drawing the shapes? Try to draw out working together, sorting out mistakes, persevering – as well as things linked to the programming skills.	
3	**Programming** I can look at a program and tell you what will happen.	**Animal Treasure Hunt** Each treasure hunt group will need to have a staggered start or organise the class for one group at a time to do the treasure hunt. Children waiting for their turn could research the food eaten by each animal you have included in the hunt or, as children	Gold: Can I predict what will happen when I input a program and can I detect and correct any errors I make? Silver: Can I detect and correct errors

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	I can program a robot to do a particular task. I can watch a program execute and spot where it goes wrong so that I can debug it.	finish the treasure hunt, they could research the food eaten by each animal they visited. • In a large space set out pictures of at least 6 animals for a 4 clue treasure hunt. • Give the children a set of instructions they must program into the floor robot to get to the first animal. When they reach that point they will find an animal with number one on the back (to make sure they arrive at the correct animal) together with the next set of instructions for them to program in. They must note down what they think each animal eats (this links to Handling Data 1 activities). • Can they predict from the 'clue' which animal they are going to next? • Remind children to cancel their program before heading to a new destination, why? • If the floor robot did not end up at the required destination, why? • Were all the children able to get to each destination? What were the common errors the children had to debug?	in a program? Bronze: Can I program the floor robot to reach each target?

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