purple mash

Computing
Scheme of Work

Unit 1.5 – Maze Explorers

Year Group: 1
Number of Lessons: 4

From 2simple

Contents

Introduction

For the following four sessions, you will need 2Go, which can be found on Purple Mash in the Creative Tools section.

A user guide to this tool can be found in the Guides and Resources area of Purple Mash.

These lesson plans make use of the facility within Purple Mash to set activities for pupils which they can then complete and hand in online (2Dos). This enables you to assess their work easily as well as distribute resources to all pupils. If children have not opened 2Dos before, they will need more detailed instructions for how to do this. If your pupils do not have individual logins for Purple Mash, we can help you with this. Contact your school Purple Mash administrator or email us at support@2simple.com.

A teacher's guide to 2Dos can be found in the Teacher section: 2Dos Guide.

To force links within this document to open in a new tab, right-click on the link and then select 'Open link in new tab'.

Medium-term Plan

Lesson	Aims	Success Criteria
1	To understand the functionality of the basic direction keys in Challenges 1 and 2. To be able to use the direction keys to complete the challenges successfully.	• Children know how to use the direction keys in 2Go to move forwards, backwards, left and right. • Children know how to add a unit of measurement to the direction in 2Go Challenge 2. • Children know how to undo their last move. • Children know how to move their character back to the starting point.
2	To understand the functionality of the basic direction keys in Challenges 3 and 4. To understand how to create and debug a set of instructions (algorithm).	• Children can use diagonal direction keys to move the characters in the right direction. • Children know how to create a simple algorithm. • Children know how to debug their algorithm.
3	To use the additional direction keys as part of their algorithm. To understand how to change and extend the algorithm list. To create a longer algorithm for an activity.	• Children can use the additional direction keys to create a new algorithm. • Children can challenge themselves by using the longer algorithm to complete challenges.
4	To provide an opportunity for the children to set challenges for each other. To provide an opportunity for the teacher to set these new challenges as 2Dos for all the class to try.	• Children can change the background images in their chosen challenge and save their new challenge. • Children have tried each other's challenges as 2Dos.

Lesson 1 – Challenges 1 and 2

Aims

- To understand the functionality of the basic direction keys in Challenges 1 and 2.
- To be able to use the direction keys to complete the challenges successfully.

Success criteria

- Children know how to use the direction keys in 2Go to move forwards, backwards, left and right.
- Children know how to add a unit of measurement to the direction in 2Go Challenge 2.
- Children know how to undo their last move.
- Children know how to move their character back to the starting point.

Resources

- Additional extension activities for the 2Go challenges can be found at:
  https://www.purplemash.com/#app/purplemash/2GoChallenges
- To make the most of this unit, it would be helpful if the children had had the opportunity to work with simple programmable toys to help develop directional language before engaging with this unit of work.
- 2Go works well if you create your own challenges for the children. Having created the challenge, you can then set the activity for the children as a 2Do. Help with setting 2Do lists can be found at 2Dos Guide.

Activities

1. Find 2Go in the Tools section on Purple Mash.
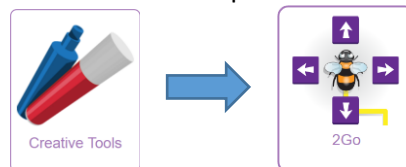
2. Tell the children that they are going to use 2Go and learn how to move things around on the computer just like they did on the floor.

3. If you want to use 2Go, you should learn how

   - 2watch carefully
   - 2listen carefully
   - and 2think brilliantly!

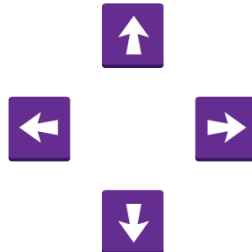   Then you can really make things happen!

4. Let the children open 2Go and select the Challenges button.
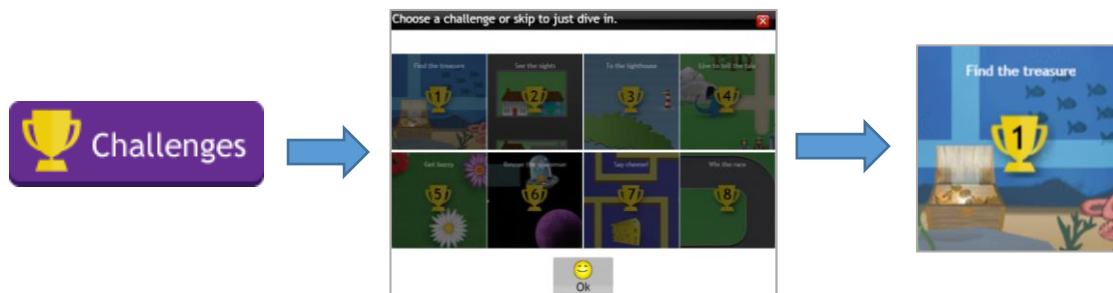
Challenge 1

5.   Select Challenge 1 and talk to the children about the first challenge.

6.   Using the simple direction keys show the children how to guide the fish around the screen.

7.   Explain how the direction keys work.

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8.   Remind them of the activity they are being asked to do. Use the suggestions below to guide the children on the whiteboard before letting them try the activity for themselves.

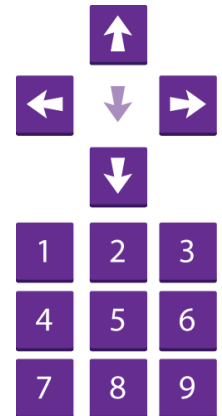> **Questions to support and guide the children**
>
> - Which way are we going to follow the path to the treasure?
> - Do you think there is a shortcut? Let's draw the path with our finger first.
> - Which way do we need to make the fish go first?
> - Which command shall we press to make it go that way?
> - 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

9.   Click on the 'New Page' icon to go back to all the challenges and select Challenge 2.

10. This challenge screen looks different. Talk to the children about how Challenge 2 looks different from Challenge 2.

11. Look at the direction keys; how are they different?

12. The squares used in the grid are smaller than in the first activity.

13. There is the addition of a number pad as well as the commands. You can now give a direction, e.g. forward 3.

14. 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.

15. There are now two targets to meet: first to go to the bank and then to go to the hospital.

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?

16. Now let the children explore some of the other scenes and make up their own ideas.

17. Click on the New icon.

18. At the following screen, let the children use the big, white arrow keys to scroll through all the different backgrounds.

19. Let the children choose a background to move their character around and practise using the direction keys.
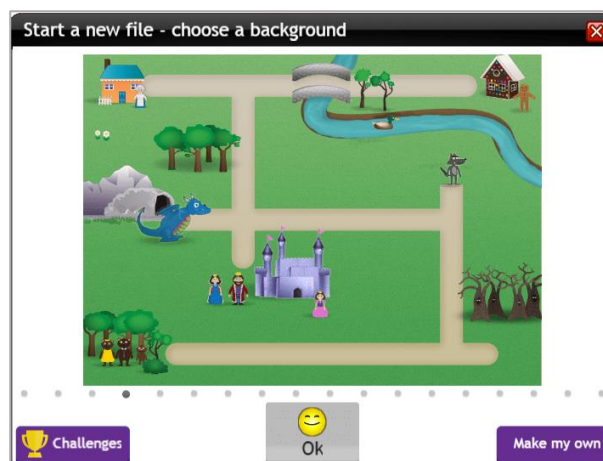
Additional activities

There are two additional 2Go files to support this lesson, which could be set as additional 2Do activities.

Lesson 1 Level 1 uses the direction keys in Challenge 1.

Lesson 1 Level 2 uses the direction keys in Challenge 2.

You will need to add instructions for the children when you set the activity as a 2do. For example, 'Lead Little Red Riding Hood to the Gingerbread house and then to Granny's cottage'.

Lesson 2 – Challenges 3 and 4

Aims

- To understand the functionality of the basic direction keys in Challenges 3 and 4.
- To understand how to create and debug a set of instructions (algorithm).

Success criteria

- Children can use diagonal direction keys to move the characters in the right direction.
- Children know how to create a simple algorithm.
- Children know how to debug their algorithm.

Resources

- Additional extension activities for the 2Go challenges can be found at:
 https://www.purplemash.com/#app/purplemash/2GoChallenges

Activities

1. Find 2Go from the Tools section. Can the children remember the challenges that they tried last time?

2. Can they remember how they controlled their character on the screen?

3. You could use the 2Dos created for Lesson 1 as revision at the start of this lesson if the children need some additional support.

4. Go back to the challenges. [Challenges]. This time select Challenge 3.

Challenge 3

5. Challenge 3 has a set of new direction keys.

6. Which direction keys have been added to the previous keys?

7. What do the children think these direction keys will do?

8. Which way will they make their character move?
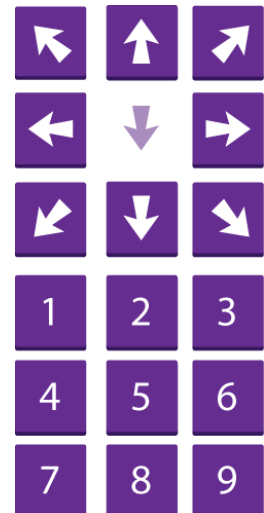
Questions to support and guide the children

- 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.

Challenge 4

9. Having completed Challenge 3, let the children go back to the New icon and select the next challenge: Challenge 4.

10. The directional tools in this activity will look very different from the previous challenges.

11. 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.**
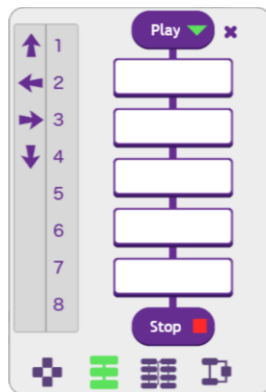
12. This is just like writing a list of instructions to send your programmable toy around a circuit in your classroom, only this time, we are making the list on the computer.

13. 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.

14. 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.

15. Show the children how to create one instruction by dragging a direction followed by a number into the first box on the list.

16. Which way does Little Red Riding Hood need to go first?

17. How many units forward does she need to go?

18. To test your first instruction, click on the big Play button and watch what happens to your character.

19. If your 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.

20. Click on the Rewind button to send Red Riding Hood back to the start again and try a new instruction.

21. The children will need to keep trying and testing each of their instructions as they write them.

22. 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.

23. 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.

24. Your completed set of instructions should finally look like this:
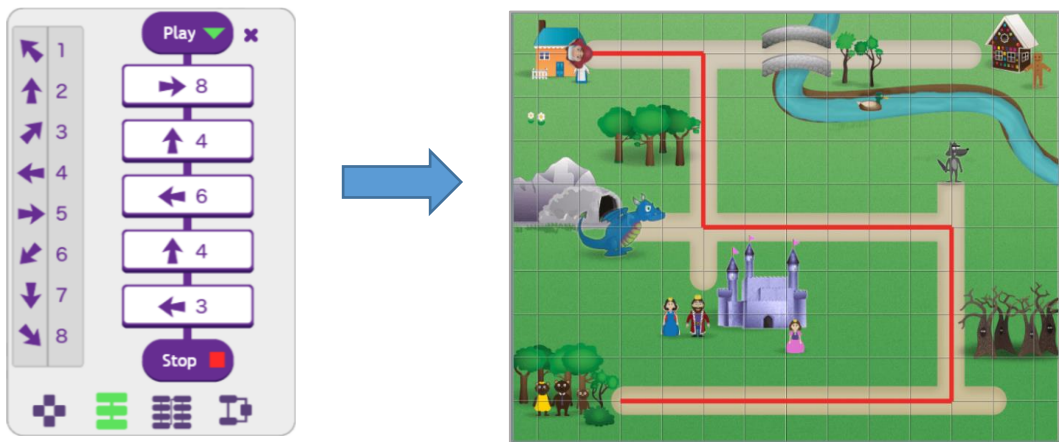
25. Read the instructions out with the children and go through the route before you press Play.

Additional activities

26. There are two additional 2Go files to support this lesson which could be set as additional 2Do activities.

27. Lesson 2 Level 1 uses the direction keys in Challenge 3.

28. Lesson 2 Level 2 uses the direction keys in Challenge 4.

29. You will need to add instructions for the children when you set the activity as a 2do. For example, 'Lead Little Red Riding Hood to the Gingerbread house and then to Granny's cottage'.

Lesson 3 – Challenges 5 and 6

Aims

- To use the additional direction keys as part of their algorithm.
- To understand how to change and extend the algorithm list.
- To create a longer algorithm for an activity.

Success criteria

- Children can use the additional direction keys to create a new algorithm.
- Children can challenge themselves by using the longer algorithm to complete challenges.

Resources

- Additional extension activities for the 2Go challenges can be found at:
  https://www.purplemash.com/#app/purplemash/2GoChallenges

Activities

1. The direction keys in Challenge 5 include those used in Challenge 3. They are used to create an algorithm (set of instructions).
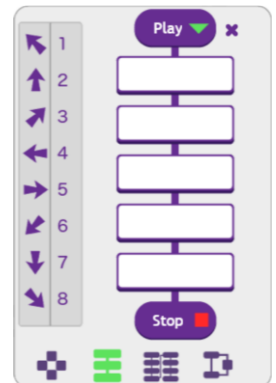
Challenge 5

2. Set the children the challenge of using the new set of direction keys to make a simple program to guide the bee to the poppies in whichever order they choose to visit them.

3. Remind the children to keep testing their algorithm (set of instructions) and to change (debug) their instructions if they need to.

4. Show the children how they can make their algorithm longer by selecting the icon for the longer algorithm at the bottom of the program list.

5. This new program list will give the children the opportunity to create a longer program and may help them with the next activities.

> **Questions to support and guide the children**
> - After visiting the two poppies, can you choose the longer program and visit the two blue flowers?
> - Can you make the bee fly from the blue flower (starting point) to the purple flower and back again?
>   **A real test!**
> - Can you make a triangle by making the bee fly to the white flower first, then going diagonally towards the purple flower, then coming back through the purple flower and finishing back at the blue starting flower?
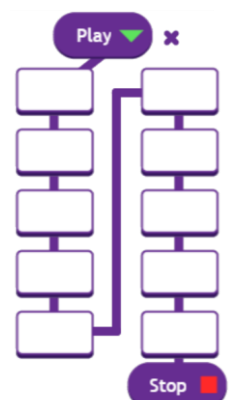
Challenge 6

6. Now let the children try Challenge 6 with the new, longer algorithm.

7. You may want to do part of this activity with the whole class first.

8. Remind them how to keep testing their instructions and what to do if they need to change (debug) any of their instructions.

9. It might also be an opportunity for the children to work together in pairs.

10. Tell the children to start by setting a point to journey to.map the journey out with your finger, e.g. travel to the purple planet first, then to the blue planet and finally to the spaceman.

11. Keep testing your instructions along the way.

12. Finally, press start to see the whole journey take place.

13. Did your algorithm work?
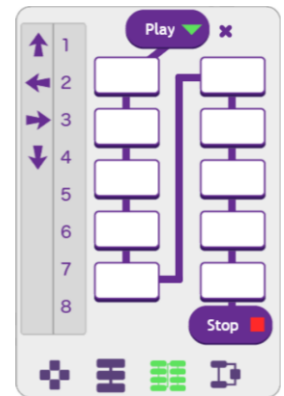
> **Questions to support and guide the children**
> - How many times do you think the rocket is going to change its direction?
> - Can you guess at each point by how many squares you think the rocket is going to move?
>
>   E.g. from the green planet to the purple planet? (Have a go at doing this in stages.)
>
> - How many times do you think the rocket would have to change direction to get to the alien or the space lab?
> - Take the rocket to the purple planet first. Which commands do you need to give it to get there?
> - Now go to the blue planet; did you use the same commands?
> - Now go from the blue planet to the spaceman; what commands do you think you are going to use?
> - Look at the commands you have used; can you see any numbers that are the same? For which

2Do additional activities

14. Lesson 3 Level 1 uses the direction keys in Challenge 5.

15. Lesson 3 Level 2 uses the direction keys in Challenge 6.

Lesson 4 – Setting More Challenges

Aims

- To provide an opportunity for the children to set challenges for each other.
- To provide an opportunity for the teacher to set these new challenges as 2Dos for all the class to try.

Success criteria

- Children can change the background images in their chosen challenge and save their new challenge.
- Children have tried each other's challenges as 2Dos.

Resources

- None.

Activities

1. Talk to the children about what they have found out so far using 2Go.

2. Did the challenges get more difficult when they had a longer set of instructions to write?

3. Which was the most difficult challenge to do?

4. In this lesson, the children won't be continuing with any more challenges but will be creating challenges for their friends to try.

5. In 2Go, the children can change the background pictures in the challenges and therefore create a new challenge.

6. To begin, let the children choose which level of challenge they want to use, and select the challenge, e.g. I have selected Challenge 2 from the list of challenges.
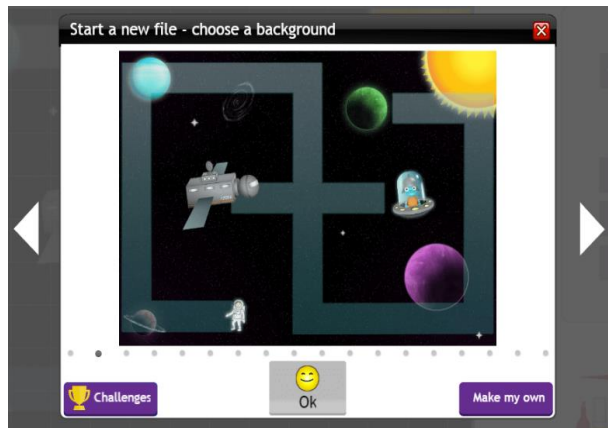

7. To change the background image but keep the same direction keys, click on the 'new' icon ⬜.

8. This will take you back to the first screen, where you can use the large white arrow keys to scroll through the background images until you find the one you want to use.

9. Click on the OK button and this will allow you to use the background picture with the same direction keys.
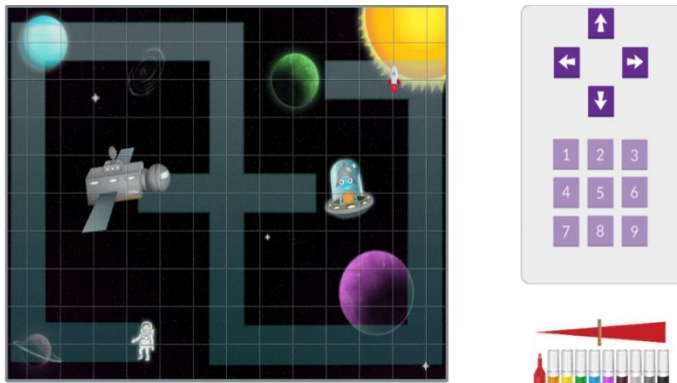
10. Let the children work in pairs, setting simple tasks for each other.

11. At this stage, the children will need to tell each other what their challenge is going to be.

12. Children could share their activities to a class displayboard so that they can try each other's activities. To do this see the Displayboards Guide.

Assessment Guidance

The unit overview for year 1 contains details of national curricula mapped to the Purple Mash Units. The following information is an exemplar of what a child at an expected level would be able to demonstrate when completing this unit with additional exemplars to demonstrate how this would vary for a child with emerging or exceeding achievements.

Assessment Guidance	
Emerging	Children can use the buttons to move their character purposefully.
	They move one step at a time towards the goal rather than anticipating several steps.
	In (Unit 1.5 Lesson 2), they needed support with challenges 4 and 5 which require anticipating several steps.
	Children can tackle challenges 4-6 with support, though they might not complete all challenges.
	They are starting to be able to work out why their program doesn't work as they expect and know that it is due to the instructions which they are inputting rather than a fault with the computer understanding the instructions.
	With support, children can explain the possible ways to make their turtle move. When looking at a program they can 'read' the code one line at a time but might not be able to envision the bigger picture of the overall effect of the program. When presented with an example from challenges 4-6, they will struggle to work out where the turtle will end up at the end of the program but will know that it will move.
Expected	Children can use the buttons to move their character purposefully.
	They can plan their moves several steps at a time towards the goal rather than one step at a time.
	In (Unit 1.5 Lessons 2 & 3), they were able to complete challenges 4 and 5 which require anticipating several steps.
	In (Unit 1.5 Lessons 2 & 3), children can complete challenges 4 and 5 which require anticipating several steps to build a program.
	They know that any unexpected outcome is due to the code that they have created and make logical attempts to try to fix this code rather than attributing it to a fault with the computer understanding the instructions.
	Children can explain the possible ways to make their turtle move in the different levels of 2Go. When looking at a program they can 'read' the code one line at a time and make good attempts to envision the bigger picture of the overall effect of the program. When presented with an example from challenges 4-6, they can sometimes work out where the turtle will end up at the end of the program and when they are incorrect, they will make good attempts to work out why.
	Most children will be able to save their 2go maze files, using a memorable file name, to their own personal space on Purple Mash and understand that this can be retrieved later Unit 1.5 Lesson 4 Point 12.

Assessment Guidance

	Using 2Go, children can use simple direction keys in conjunction with a number pad (add a unit of measurement) to move an on-screen character to specific locations on a screen. They demonstrate that their sequence of buttons relates to their thinking of how to solve a problem of getting character from point A to point B (Unit 1.5. Lesson 1). As children move through this unit, they demonstrate an ability to successfully use diagonal direction keys combined with number pad to refine their solution for solving a problem (Unit 1.5. Lessons 2 to 3). Most children can make a screen character 'sprite' navigate to a specific place using 2Go. Using strategies such as drawing the route with their finger, counting squares with a grid and testing how many squares each command moves the character, the children have broken down a problem to solve a solution (Unit 1.5. Lesson 1). Children can use the 'list' feature in 2Go to generate an algorithm to solve a given problem. They test their instructions until they finally make an algorithm which works (Unit 1.5. Lesson 2 Points 4 to 8). Their skill of breaking down a problem to solve it is evident in their ability to create increasingly longer and more complex algorithms, including number of units moved and diagonal controls (Unit 1.5. Lessons 3 & 4). Most children can change an algorithm to create a different outcome when using 2Go. Their skill at debugging an algorithm and then changing it to perform an intended outcome is secure. Children use alternative algorithms to achieve the same outcomes, beginning to understand refinement of instruction (Unit 1.5. Lesson 3).
Exceeding	Children choose to plan their moves several steps at a time towards the goal even reaching the goal in one 'run' of the program rather than one step at a time. In (Unit 1.5 Lessons 2 & 3, they were able to complete challenges 4 - 6 which require anticipating several steps with ease. Children challenge themselves by creating their own complex challenges. Children choose to plan their moves several steps at a time towards the goal. In (Unit 1.5 Lessons 2 & 3), they can complete challenges 4 - 6 which require anticipating several steps with ease. Children challenge themselves by creating their own complex challenges. They intuitively debug their code knowing that any unexpected outcome is down to the code and not the computer's understanding. Children can explain the possible ways to make their turtle move in the different levels of 2Go. When looking at a program they can 'read' the code one line and envision the bigger picture of the overall effect of the program. When presented with an example from challenges 4-6, they can often work out where the turtle will end up at the end of the program and when they are incorrect, they are able to work out why.