Lesson 1 - Algorithms

Activities

1. Firstly, we are going to review the coding vocabulary that the children learnt in year 1. Use the quiz as a class. It is set up so that you attempt all three questions and then click the submit button to check the answers. Click ‘OK’ to see which are correct and incorrect:

2. You can use the vocabulary cards to find the answers and display in the classroom.
3. Explain that today, the class will be working on a new word: algorithm. Have a look at the definition together using the vocabulary cards:

*An algorithm* is a precise step by step set of instructions used to solve a problem or achieve an objective.

4. Show the children your two models, without displaying the instructions. Ask them which is correct. Hopefully, they will say they are both correct; there is no such thing as correct when building creatively. They might prefer one over the other, but both are correct.

5. Now, show them the instructions and ask the question again. This time, the model made using the instructions is the correct one. The step-by-step instructions are the algorithm for building the bird.

6. Show children the Air Traffic Control lesson.

7. Work through challenges 1 and 2 with the children, reading through the blocks of code. Explain that we are following the instructions for what the code should do and then turning it into code.

8. When coding, we write algorithms for how the code should work then we turn the algorithms into computer code so that the computer can follow the algorithm. In the example, the algorithm is about making the planes move in different directions, so they look like they are taking off. Below is a diagram of the design with some numbered notes to show the algorithm.

**Task: To make an airport program where the planes take off.**

1) Click purple plane to make it take off.
2) Click yellow plane to make it take off.
3) Click green plane to make it take off.
4) If green plane crashes with yellow plane; make crashing sound.

9. We turn the algorithm into 2Code code that the computer can understand.

10. Next, review how to navigate to the 2Code page and find and open Free Code Chimp. Demonstrate how to go to Design Mode.
11. Drag in two turtle objects and change the image of one of them to a different coloured turtle (double-click on it).

12. See whether children can remember how to add a background picture: click on the icon and then the image property question mark in the properties table:

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>background</td>
</tr>
<tr>
<td>colour</td>
<td></td>
</tr>
<tr>
<td>image</td>
<td>?</td>
</tr>
<tr>
<td>Grid size</td>
<td>4</td>
</tr>
</tbody>
</table>

13. Remind children how to save their work and discuss why it is important to save their coding regularly so that they have a working version to go back to.

14. Go into Code Mode and show the children the actions that the turtle object can make by dragging one of the turtle code blocks into the coding window and looking at the pop-up action menu:

- forwards and backwards
- turn anticlockwise or clockwise by a set number of degrees
- Set pen colour, pen thickness, pen up and pen down
- hide, show and speak.

15. Children could work in pairs or individually. Children should create a design document similar to the plane example. They could use printed storyboard templates to show the sequence of the program (see resources section above). They should decide:
- What their objects are (the turtles),
- type of background (you might want to show the ready-made backgrounds) – NB designs should always be rough drawings e.g. stick people, not a picture that takes time to draw.
- The steps of their algorithm (What their program should do?): Children should create a program in which one turtle uses an algorithm with one step, and the other an algorithm with two steps.

16. Once children have their programs planned out, they should create it in Free Code Gibbon. They should save and test their code.

17. Show children how to save their work in their folders and print it out for their workbooks, if required.