Computational thinking for digital technologies: Exemplar 3

PROGRESS OUTCOME 2

Getting to the hive

Annotation

Harry responds to the task by breaking down the problem into a series of steps and creating an algorithm (a set of instructions). He then puts these instructions into a programming environment. In doing this, he shows he can:

- decompose a task into a set of instructions
- create a program that includes sequence and outputs
- test his program and use a simple debugging strategy to find and fix his mistakes.

Background

The class is studying bees as part of a school-wide science inquiry about insects. They have been investigating the way in which bees collect pollen from different plants and take it back to their hive.

Task

The students each get a grid showing a bee, flowers and a hive. Their task is to create a set of instructions for the bee to follow in order to collect pollen from each flower and take it to the hive. As a group, they compile a list of "direction" words that they can refer to. They decide to use "up", "down", "left" and "right".

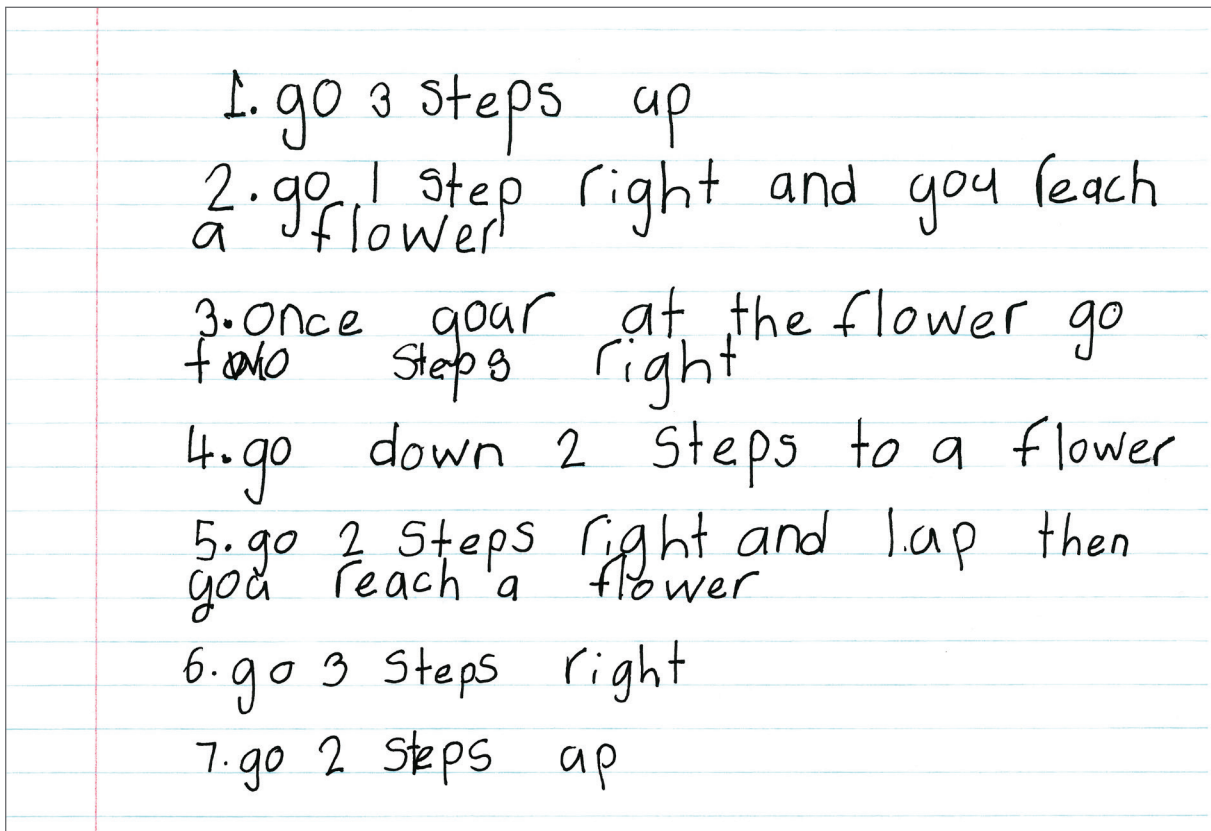Get the honey bee to its hive. Collect pollen from the flowers as you go.

Mr Cusack puts a template of the grid into an introductory programming environment (in this case, ScratchJr). He asks the students to put in their step-by-step instructions (algorithms) and then test them to ensure that the sequence is correct.

As well as asking the students to put in the sequence, Mr Cusack suggests they make their programs more interesting for the user.

The task builds on the work the students have been doing to develop their skills in giving and following oral and written instructions (literacy) and in creating simple maps to show position and direction (geometry strand in mathematics). (See Exemplar 1.)

Student response

1. go 3 steps up
2. go 1 step right and you reach a flower
3. Once goar at the flower go two steps right
4. go down 2 steps to a flower
5. go 2 steps right and l.ap then you reach a flower
6. go 3 steps right
7. go 2 steps up

Although he writes his instructions correctly, Harry incorrectly uses "left" instead of "right" at the second step when he puts it into ScratchJr. After Harry fixes this error, his program looks like this.
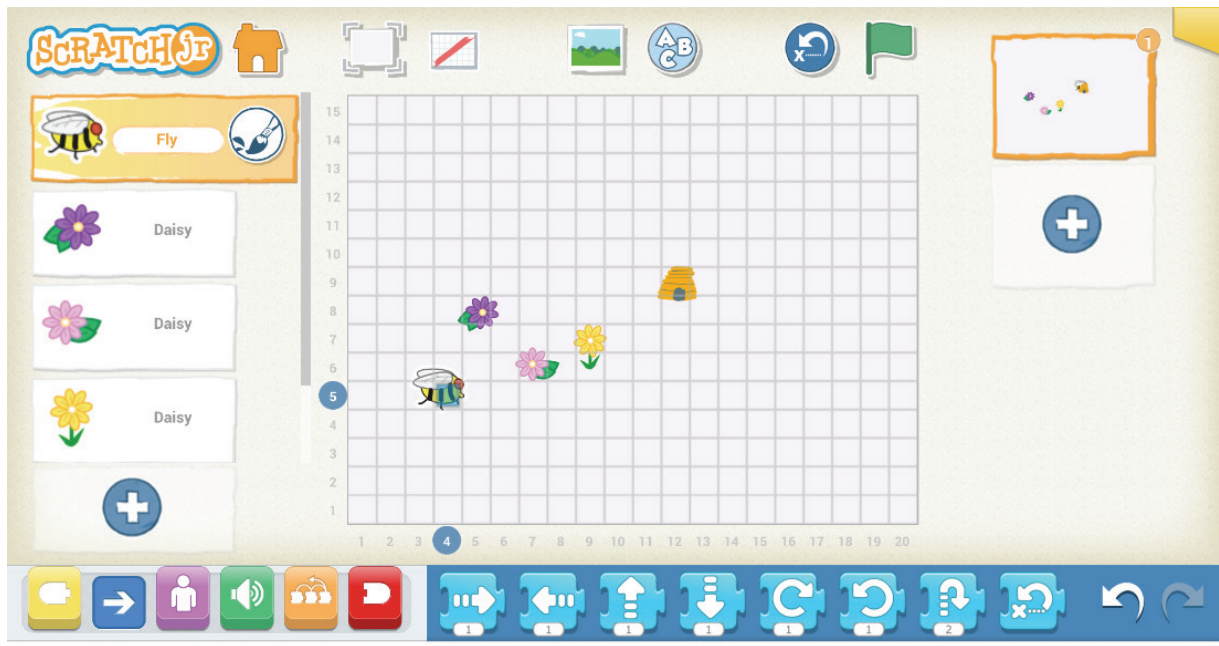
Mr Cusack:	What happened when you put your instructions into the program? Did your bee get to the hive?
Harry:	The first time I tried I didn't put it in properly, so it didn't work. I found a mistake and fixed it, and then my bee got to the hive.
Mr Cusack:	Well done. How about adding some output blocks to make your program more interesting?

Mr Cusack:	*What did you add to your program?*
Harry:	*You can tap the bee now to make it go, and it makes a noise when it gets to a flower.*
Mr Cusack:	*How did you know when to put the sounds in?*
Harry:	*I counted how many squares to a flower so it had to go there.*

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