

Bee-Bots 1,2,3 Activity

An introduction to programming
with Bee-Bots

Duration: **30 minutes per group**
+ 15 introduction & plenary

Concepts and approaches covered



Programming



Debugging



Algorithms



Persevering

Overview

Pupils create sequences of instructions (an algorithm) to draw the shape of a numeral e.g. 3. An algorithm is a sequence of instructions, or a set of rules, for performing a specific task. In this activity, programming involves taking the algorithm and using it to program a Bee-Bot to navigate a route, tracing the shape of the numeral.

Pupil objectives

- I can write an algorithm
- I can program and debug a Bee-Bot to follow my algorithm

Resources

- Pupils' small whiteboards / exercise books and pens
- Bee-Bots
- Bee-Bot A4 numeral cards
- Print some fakebots (a printed image of a Bee-Bot or other programmable toy)
- Optional – Bee-Bot command cards
- Teacher's IWB or paper flipchart (adapt to your needs)

Introduction **5 minutes**

Be 'bossy' and instruct a child to do something e.g. stand up, go to door, open it, come back to carpet place and sit down.

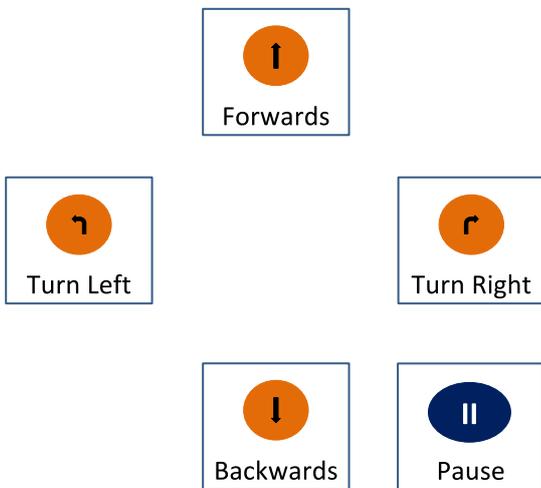
Say that sequences of instructions are important as they help us to know what to do and how to make things happen.

Explain that the lesson is about programming and how algorithms help us write in a language that computers can understand: code. Remind pupils that algorithms are steps to make something happen and are for people to understand but that programs are for computers.

Show pupils a Bee-Bot. Ask pupils how they think we might program it.

Ask pupils to record on whiteboards or in their books any Bee-Bot command symbols that they can remember from when they tinkered with the Bee-Bots (if they have completed this activity).

- What programming commands can we use?
- What do they do?
- How can we record them on our whiteboards?



Bee-Bot group explanation 5 minutes

Sit your group in a circle and ask them how we could get the Bee-Bot to write the numeral 1. Write the numeral 1 on a whiteboard to show them. They may suggest forward, forward. Some might start at the top of the number, others at the bottom.

Encourage pupils to think about how to write the number 1 (starting at the top) reinforcing number formation.

Ask pupils how they could record their plan. Ask them what they call this plan. Hopefully they remember from earlier work on algorithms that this is an algorithm. At this point let all the pupils have a go at drawing their algorithms on their whiteboards.

Show them the A4 numeral card	Show how you can jot your algorithm down on your whiteboard. You could include a jotting of the numeral and where you are going to start (top or bottom).	Some children might find using command cards helps (optional)	Try the algorithm by using a fakebot to walk the algorithm through.
			

Steps to create and then debug the algorithm

Explain it is often a good idea to walk through an algorithm before we program it. Stand up and walk through the algorithm and/or use the FakeBot to test the algorithm.

Choose a child to be your partner – your ‘coder’.

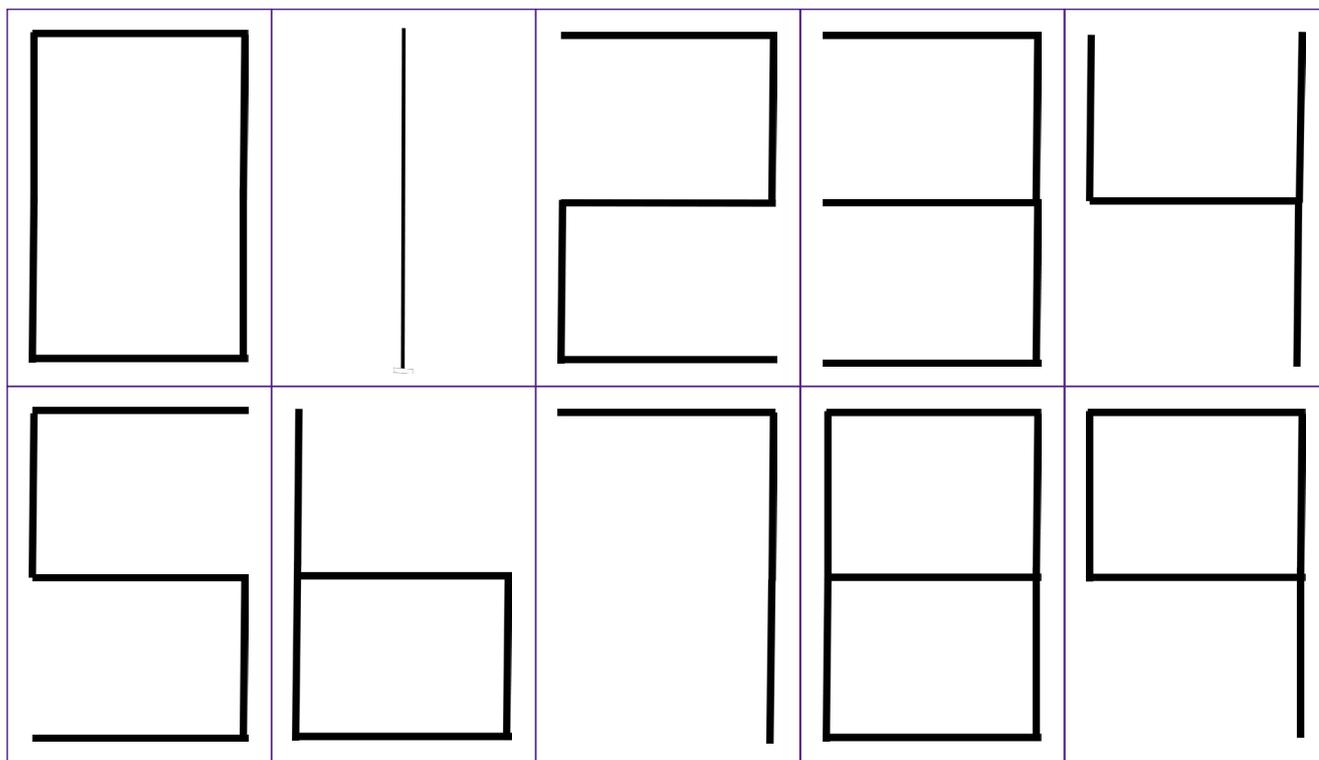
Give the coder your algorithm and ask them to use it to type in the commands on the Bee-Bot.

Ask the pupils what went well? (e.g. they remembered to press clear, the Bee-Bot went forward) and what could be improved?

Main Activity 20 minutes

In each pair/group, pupils will take it in turns (and swap over roles) to:

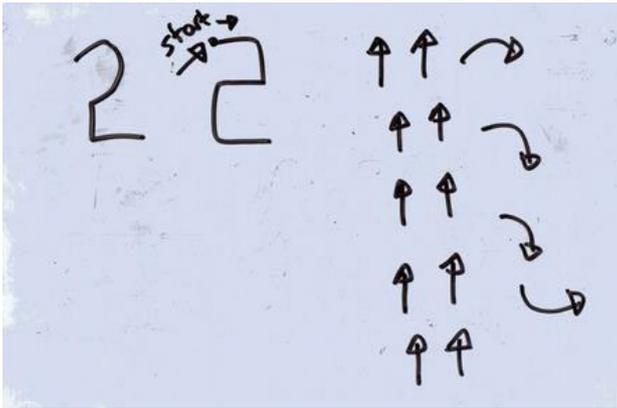
- Write the algorithm to solve the challenge on a pupil’s whiteboard
- Together they will review their success and try to fix any problems
- Show pupils the numeral cards to help them understand how the shapes of numbers need to change for a Bee-Bot to trace them



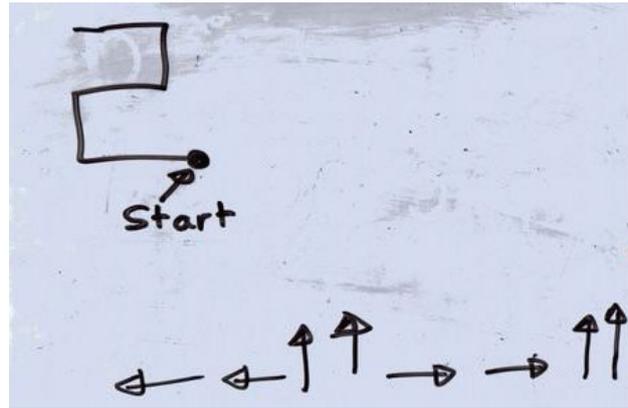
Numeral Cards



Examples of algorithms you might see:



This first algorithm for the numeral 2 may not do what the child thinks



This may be closer for the numeral 2, but do we need to start at the top of the commands or the bottom when coding this algorithm?

How they record their algorithm is less important than whether they can explain it and use it to program the Bee-Bot.

Give pupils command cards if they are finding it tricky to work out the sequence of steps. Encourage the pupils to try just 2 or 3 commands before they test it so they work on small bite-size chunks. This is always a useful approach to programming.

Plenary 5 minutes

Ask pairs to share one of their programs with each other explaining what was easy and what was hard about creating the algorithm and programming the Bee-Bot to follow it.

As a whole class, talk about successes, challenges and surprises from the activity.

Differentiation

Support

Pupils may need supportive pairings or adult support, particularly when creating their algorithm. Pupils who find drawing the algorithm pictures difficult can use the Bee-Bot command cards to sequence their steps.

Stretch & Challenge

Encourage more able pupils to be very precise when creating their algorithms. Encourage pupils to tackle it as a multi-step problem with distinct parts (decomposing). Encourage pupils to debug as they go along, checking their algorithm.

Assessment opportunities

- Informal teacher assessment of pupils during main task and plenary. Focus on how pupils write their algorithms for the numerals and then program their Bee-Bot to follow this, debugging if required
- Assessment of pupils' algorithms photocopied from whiteboards

Teaching notes

Concepts and approaches



Programming

Pupils implement their algorithms as programs for the Bee-Bot using the inputs on the Bee-Bot



Debugging

Pupils debug their algorithm or program if there is an error in it



Algorithms

Pupils write an algorithm that traces out the shape of each numeral
Pupils collaborate together to design the algorithm and create the code for their program
Pupils use decomposition to break down the numerals into sections, making it easier to write the algorithm



Persevering

Pupils persevere as they encounter bugs in their work and work through how to fix these

Curriculum links

Please refer to the resource overview page on the website, to understand how the learning objectives covered in this lesson relate to the curriculum in your country.

Taking this further

There is a wealth of resources to use with Bee-Bots online:

<http://www.tes.co.uk/teaching-resources/primary-40069/ks1-ict-41488/controlling-and-modelling-41489/>

If you are using pro bots:

BBC KS1 How do you program a robot: <http://www.bbc.co.uk/guides/zqnc4wx>

Related activities

[KS1 Bee-Bots Tinkering activity](#)

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