Barefoot Computing at School

In collaboration with BT

Recommended for **ages 5-7**

Crazy Character Algorithms

An introduction to sequences of instructions

Duration: **30 minutes**

Concepts and approaches covered

Algorithms

Decomposition

Logic

Debugging

Overview

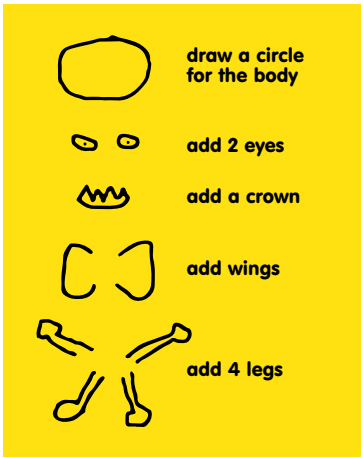
An algorithm is a precisely defined sequence of instructions or a set of rules for performing a specific task. By teaching this short unplugged activity, your pupils will create a set of instructions on how to draw a crazy character and so start to understand what algorithms are.

Pupil objectives

- I know what an algorithm is
- I can write an algorithm
- I can use an algorithm
- I can debug my algorithm

Before you start

Make up the crazy character algorithm example you are going to model



Draw a secret crazy character algorithm. The little pictures are to help you remember what to say.

You might like to think of an algorithm chant and character for your class, or use one of these. This is just to help you make this a memorable word - with actions to help pupils remember

'Alligator algorithm, step, step, step, she's very, very bossy but she gets things done, how to draw a character, how to open the door, Alligator algorithm think of some more?'

Resources

- Crazy character algorithm example (see 'teaching notes')
- Pupils' small whiteboards and pens
- Teacher's interactive whiteboard and activity presentation downloaded from the webpage or paper flip chart (to model how to create algorithms)
- Crazy character worksheet downloaded from the webpage

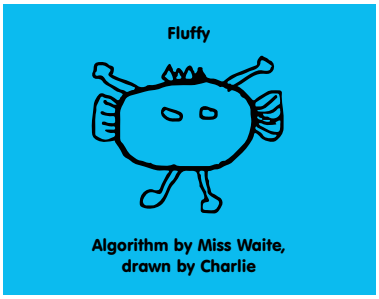
Introduction 10 minutes

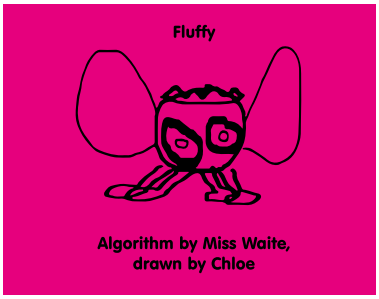
Explain you are going to teach pupils a new word - can they listen out for it?
The lesson is going to be about instructions, and that they are going to follow some instructions to draw a crazy character.

Say you have created an algorithm to help them draw it. Slip the word in and see if anyone spots it. What might this word mean?

- Share the learning intentions on slide 2.
- Say you are going to use the algorithm now.
- Read out your steps giving them time to draw each stage.
- Don't give them extra detail at this stage!

Ask pupils to show you what they have drawn. Model saying if it is or is not what you expected. e.g. 'oh I didn't expect that they are all different. I wanted the legs all around like...'





Ask pupils how you could change your algorithm so that it is what you wanted. Pupils should start to realise the need for precision in algorithms.

Model adding extra words in e.g. tiny, at the top etc.

Ask what was the algorithm. Explain that an algorithm is a sequence of instructions or a set of rules to get something done.

Main activity 20 minutes

Shared creation of algorithm

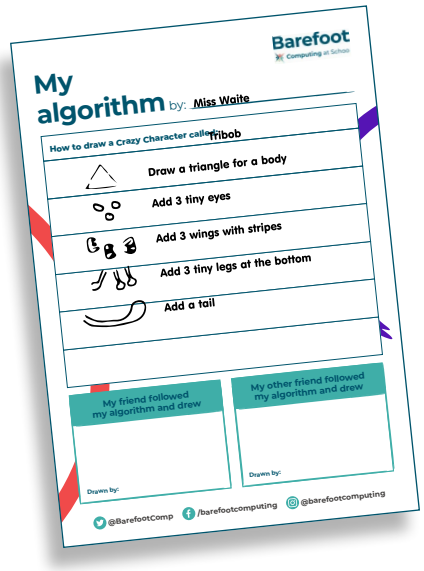
Tell pupils we are going to create instructions on how to draw a class crazy character.

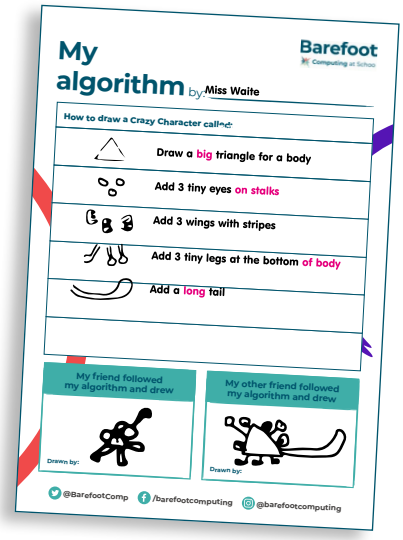
Model how to imagine/think of a character and create the step by step instructions (the algorithm).

Ask your TA or a pupil to follow the algorithm and draw the character in one of the bottom boxes.

Then ask, 'is that what I expected?' Model how to think through each step and about adding detail (precision). Think about how people will understand (interpret) the words we use e.g. add eyes on stalks.

Ask a pupil to use the improved algorithm to draw the character again – in the second box.

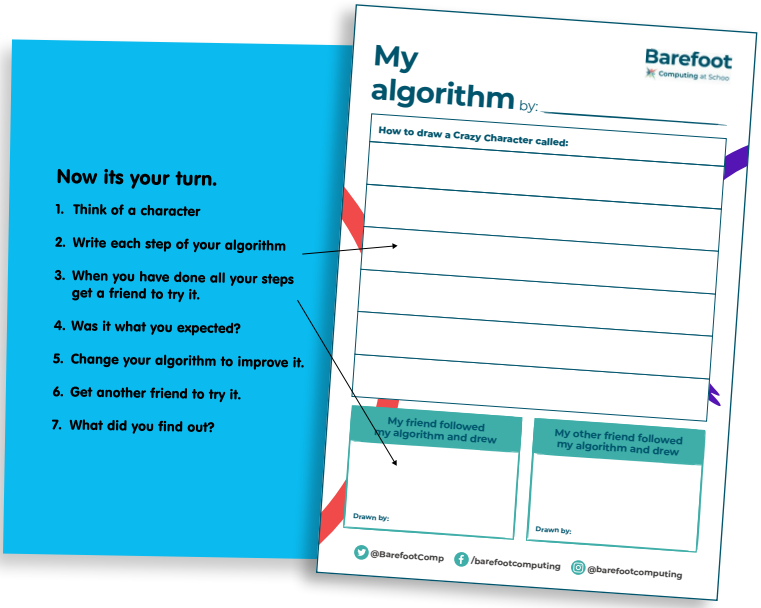




Example class crazy character algorithm *Example of a completed worksheet*

Pupils create algorithm

Ask pupils to think of a crazy character and explain it is their turn to write the instructions. Remind them to think of simple instructions that their partners will understand. When they have written their algorithm, they can ask a friend test it for them. Remind them to think, 'is this what I expected?' Then they can improve their steps and get another friend to test it. (This is the start of learning to debug).



Instructions on how to use the crazy characters worksheet (the instructions are an algorithm too!)

Pupils use worksheet each to create their own algorithms

Plenary

Ask pupils to tell partner how their algorithm changed and why.

Select a few pupils to share their discussions. What kinds of words were added (position, size, number etc?) How did these help? What happened that they did not expect? What did they do to change their algorithm? Did it work?

Ask pupils what an algorithm is. An algorithm is a sequence of instructions or a set of rules to get something done.

Can they remember your chant if you used one? (see teaching notes).

Differentiation

Support

Pupils who find following instructions or thinking about breaking a problem down into steps (decomposing) difficult may find it helpful to be paired with a pupil who is comfortable with this idea, or adult support might be useful

Stretch & Challenge

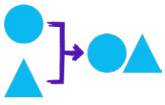
When breaking your problem down into steps (decomposing) encourage more able pupils to be very precise when they create their algorithm, to think which details are important and which are not

Assessment opportunities

- Pupils can say an algorithm is a set of detailed steps to make something happen or work something out
- Pupils can create an algorithm which is precise and in the correct order. Pupils can debug their algorithm, improving the precision in each step
- Pupils can follow an algorithm precisely

Teaching notes

Concepts and approaches



Algorithms
Pupils are writing algorithms for their crazy characters

Decomposition
Pupils decompose the process of drawing their crazy character

Logic
Pupils use logical reasoning to think through if their algorithm will produce the crazy character they are thinking

Debugging
Pupils are debugging their algorithm as they add more precision to it

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

The CS4fun website, Queen Mary, University of London has a range of related unplugged activities such as the 'Create a Face' activity.

Related activities

KS1 Sharing sweets activity
KS1 Spelling rules activity
KS2 2D shape algorithms

Barefoot

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