

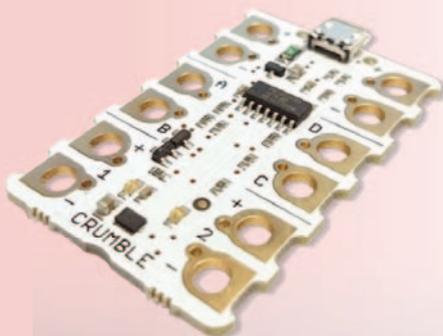
# Let's get ready

Coding can be an excellent context for collaborative learning experiences. In many schools coding is done on a PC and the outputs appear on the same screen that the code has been written on. There is a desire from many teachers that learners are able to 'see' a controller being driven by their code to produce an output on a device. Crumble controllers provide a low cost solution for schools to deliver a hands on experience of coding. Allowing learners to develop other skills associated with literacy, numeracy and construction.

The Crumble controller is cheap, easy-to-use and an ideal way to introduce electronic control and circuits to BGE classes. After starting out with a Crumble Controller, all you require is the addition of a

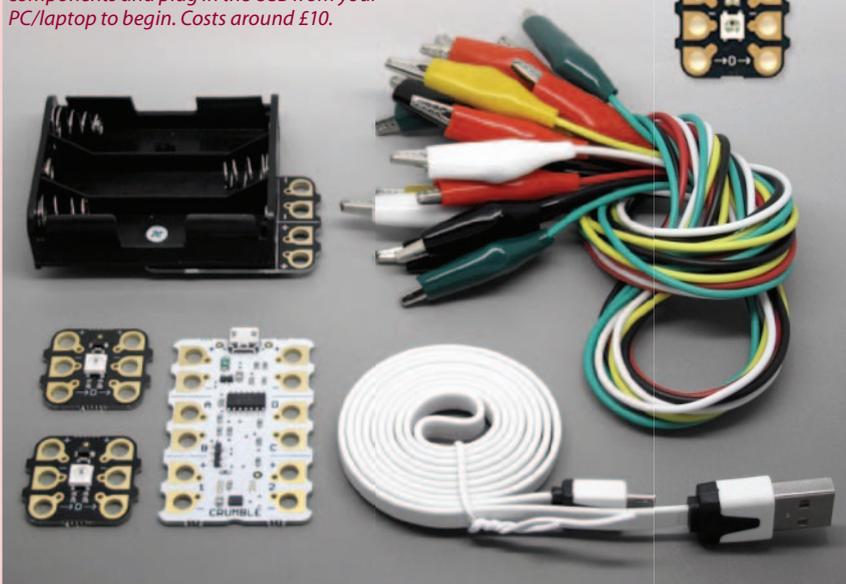
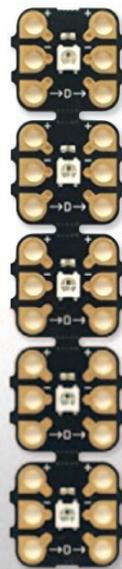
battery power source, a micro USB cable from the PC, a number of croc leads and sparkle LEDs and you are ready to begin.

Crumble control software is free and available from the Redfern Electronics website [1]. The basic control options are shown below in Figure 4, and they allow a 'drag and drop' programme to be put together as a flow chart on your PC.

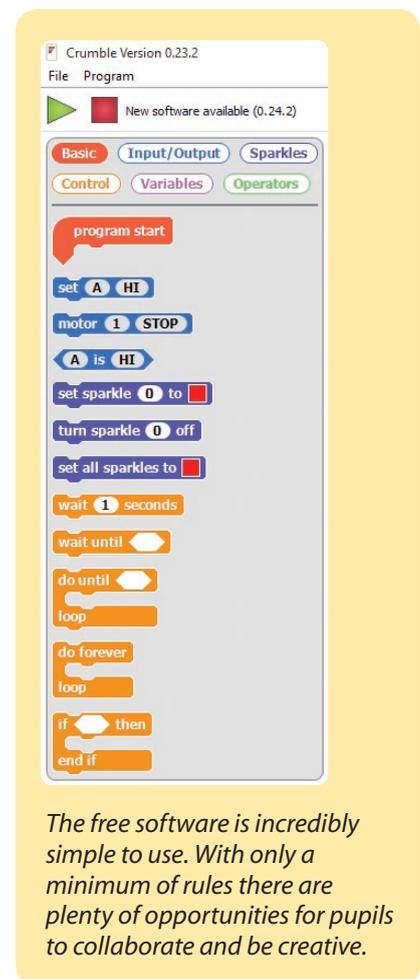


**Figure 1** - Crumble Controller is well laid out and easy to use. Simply connect to the additional components and plug in the USB from your PC/laptop to begin. Costs around £10.

**Figure 2** - Sparkles can be detached and used in any combination. The LEDs can display various colours and each sparkle requires its own programme sequence. Costs around £6 for 5.



**Figure 3** - Crumble starter kit (batteries/laptop not included). Costs around £17 per starter kit.



**Figure 4** - Control options.

The free software is incredibly simple to use. With only a minimum of rules there are plenty of opportunities for pupils to collaborate and be creative.

# to Crumble

A simple click and drag system to be used when building a programme/sequence. Try this example:

**program start** Always begin with the PROGRAM START option.

**program start**  
**set sparkle 0 to** █  
 The first sparkle is always 0, then 1, then 2 etc. To select the colour click on the red box and choose from the wide selection.

**program start**  
**set sparkle 0 to** █  
**wait 1 seconds**  
 Tell Sparkle 0 to stay red for 1 second.

**program start**  
**set sparkle 0 to** █  
**wait 1 seconds**  
**turn sparkle 0 off**  
 Turn Sparkle 0 off again and the red will disappear.

**program start**  
**set sparkle 0 to** █  
**wait 1 seconds**  
**turn sparkle 0 off**  
**wait 1 seconds**  
 Keep the Sparkle 0 switched off for 1 second.

**program start**  
**do forever**  
**set sparkle 0 to** █  
**wait 1 seconds**  
**turn sparkle 0 off**  
**wait 1 seconds**  
**loop**  
 Finally select the DO FOREVER LOOP and the sequence will continue to flash red for 1 second then off for 1 second until told to do something different!

Crumble Version 0.23.2  
 File Program  
 New software available (0.24.2)  
 Select the green play button to begin (and then the red square button to stop).

## Connecting the controller to the first sparkle

The code created on the PC is transferred to the controller through the micro USB cable

The micro USB is inserted from the PC into the controller dock here.

Red croc lead to battery +  
 Black croc lead to battery -

The first sparkle is always programmed as Sparkle 0.

## Connecting multiple sparkles

Remember to keep the croc leads in sequence (+ connects to +, - connects to - etc.)

Up to 32 sparkles can be connected in sequence. Additional battery power may be required with high numbers of sparkles though.

### Classroom challenges

After covering the basics of the Crumble format you can set a series of challenges to pupils who may work individually, in pairs or larger groups. These challenges encourage investigation, trial and error.

#### Task 1

Switch on one sparkle to the colour of your choice.

#### Task 2

Make one sparkle flash ON for 1 second then OFF for 1 second continuously.

#### Task 3

Make one sparkle flash RED for 1 second then BLUE for 1 second continuously like a police car.

#### Task 4

Use multiple sparkles and programme a sequence where only one is lit at any one time. Sparkle 0, then 1, then 2 etc. Set the timing to 0.5 seconds each and watch the lights 'chase' each other along the sequence.

#### Task 5

Information from the Northern Lighthouse Board website shows that the Ailsa Craig lighthouse flashes WHITE every 4 seconds. Create a sparkle to replicate this time setting.

#### Task 6

Use three sparkles to simulate a traffic light sequence!

#### Task 7

Create a sparkle sequence with as many lights as possible like a Christmas Tree (remember there's a control maximum of 32 though!). ◀

#### Reference

[1] <http://redfernelectronics.co.uk/crumble/>.

## Kath Crawford awarded an MBE

**We are delighted to let you know that Kath was awarded an MBE for 'Services to Education' in the 2015 New year's Honours list.**

Prior to joining SSERC in 1998 Kath held a variety of posts including time as a Research Associate at the universities of Cambridge and Kent, teaching biology at North Kelvinside and Queens Park secondary schools in Glasgow, and lecturing at both Stevenson and Telford Colleges in Edinburgh.

During her time with SSERC Kath has worked in a variety of capacities including several years when she spent about half of her time working as a Research and Development Teacher with the Science and Plants for Schools (SAPS) project. Kath has had a lead, and pivotal, role in the development and delivery of SSERC's CPD programmes culminating in her leadership of the on-going Primary Cluster Programme in Science and Technology.

**To Kath we offer our warmest congratulations!** ◀

