

Topic: Mechanisms	Year group	Term
Circuits, switches and bulbs (crumbles)	Year 4	Summer 1 6 sessions

Background knowledge

Children have built a level of understanding of levers, linkages and wheels, and will now build on this by adding knowledge of electronic programming. The crumble is an electronic board which you can attach up to two motors, lights, buzzers etc and attach lots of switches and sensors to control how they operate. It plugs into your pc via usb and you can program it via the free drag and drop crumble software. Motors and buzzers are powered by 4.5v-5v battery packs. The Crumble can digitally control full-colour LEDs, called Sparkles. Crumble projects could include traffic light systems, buggies, interactive displays or simple games.

What should I already know?

Parts can be connected in different ways to make linked parts move or react.

Parts can be connected in different ways

How to build a simple circuit (science)

Basics of programming (Computing-scratch/espresso/code)

National Curriculum Objectives / Key Skills	The Journey
Design: Use research and design criteria to inform the design of functional, appealing products that are fit for purpose, aimed at particular groups or individuals. - Generate, develop, model and communicate their ideas through discussion, annotated sketches, exploded diagrams - Select from and use a wider range of tools and equipment to perform practical tasks. - Select from and use a wider range of materials and components, including construction materials, according to their functional properties and aesthetic qualities Evaluate: Investigate a range of existing products - Evaluate their ideas and products against their own design criteria Technical knowledge: Understand and use mechanical systems in their products, (for example levers and linkages) - Understand and use electrical systems in their products, (for example series circuits incorporating switches, bulbs. - Apply their understanding of computing to their products. - I can explore and use existing products to help generate ideas about what my product needs. - I can suggest some design criteria to suit the purpose and audience of the product. - I can produce a plan and explain it, including exploded diagram/annotated sketch.	- WALT: Research products that use crumbles; choose a target audience and purpose to work towards, set design criteria as a class. - WALT: Investigate how crumbles work; children shown the software and given chance to experiment. - WALT: Design my final product; Create a labelled diagram and flow chart explaining how to make the product. - WALT: Make my final crumble product - WALT: Complete and finish my final product - WALT: Evaluate my product against the criteria

• I can make a product that uses simple electrical systems or computer programming to enhance it. • I can independently select from a wider range of tools and explain my reasons for these. • I can persevere and adapt the process to overcome problems • I can evaluate my design against the criteria and suggest improvements for my design to others.	
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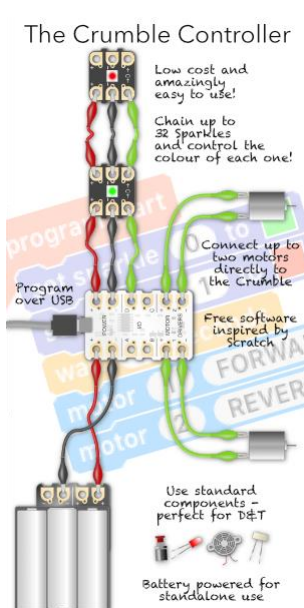
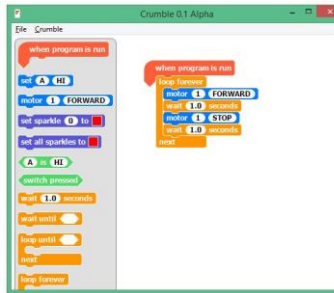
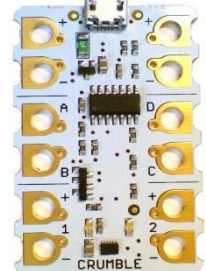
Outcomes

An overview of what children will know / can do

Working towards: With support can construct and program a simple crumble.

Expected: Can design and construct a crumble program with minimal support.

Exceeding: Can add detail to create an interesting and well thought out crumble.

Key Vocabulary	Timeline / Diagrams
Design- The way the product is planned to look or behave Program- set of instructions given to the product Construct- make Cell- battery Wire- Sparkle- Full colour LEDs Crumble- Control board that can control LEDs, motors, buzzers etc.	The Crumble Controller  Low cost and amazingly easy to use! Chain up to 32 Sparkles and control the colour of each one! Connect up to two motors directly to the Crumble Free software inspired by Scratch Use standard components - perfect for D&T Battery powered for standalone use  

Key people / places

Assessment questions / outcomes

What is a crumble?

What kind of products could use a crumble board?

Name some components used in crumble boards

How will your design meet the design criteria?

What problems did you overcome in programming your crumble?

How effective was your crumble?

How would you improve it next time?