

# Electric Circuits

Cambridge

BrainBox

# Experimental Kits

***Making Science Fun***



Issue 10B

**Ideal for Home or School**

Electric Circuits for Key Stages 1 - 4  
Designed for National Curriculum  
Safe experiments  
Fun Learning  
Simple Assembly

**100's**  
of safe, fun  
experiments

[www.cambridgebrainbox.com](http://www.cambridgebrainbox.com)

Cambridge

BrainBox

# Cambridge BrainBox®

Cambridge BrainBox is part of the Akhter group of companies. Akhter is a British company that has been supplying computer services and networks to the education and defence sectors since 1979 and is heavily committed to research and development. The company is continually seeking ways to provide innovative products that make life easier and more productive.

## The Developer

All of the products in the Cambridge BrainBox range have been specified by



George Warner, an ex-Science and IT teacher. His teaching career spanned 30 years and included posts in maintained and independent schools. George has a passion for education, for making learning fun and for creating educational tools that are more accessible to teachers. With this in

mind, each Cambridge BrainBox Electronic kit has been designed to provide maximum educational value in line with the requirements of the National Curriculum.

## The Future

New ideas for developing the Cambridge BrainBox range are being pursued all the time. To keep up to date with the latest information and details of where to buy, visit our website; [www.cambridgebrainbox.co.uk](http://www.cambridgebrainbox.co.uk)



## Electronic Kits.

### Great for Schools

Until now, kits for teaching electronics were expensive (one per class) and used wires and crocodile clips that often broke or went missing and were expensive to replace. Wires needed to be cut, stripped, or soldered and changing from one experiment to another took time.

By contrast, two students can share an inexpensive Primary Kit for a more 'hands on' learning experience. Parts are robust, easily replaced if lost and circuits are simple to assemble. Because of this simple assembly, experiments can be changed quickly so maintaining interest.

### Great for Home

You don't need a teacher to enjoy Cambridge BrainBox! The kits make ideal gifts and will provide hours of enjoyment as children discover for themselves what electricity can do. They will learn quickly how to build circuits and to adjust them to perform the things they want. Because the kits are designed to follow the National Curriculum, parents can be assured that their child's learning is focussed in the right areas.

## The Kits.

### Colour Coded Parts

All parts are numbered and colour coded for easy identification and cross reference with the instructions and diagrams in the user manual.

### Conveniently Packaged

Each part has a special pre-assigned slot in the box for easy location when required. This helps you to see that everything is present when packed away.

### User Guides

A comprehensive, easy to follow user guide is included with every kit. It shows each circuit in detail with notes on how the circuit works. Notes for Teachers/Parents are also included

### Electrically Safe

Experiments built from Cambridge BrainBox kits use 3V or 6V and fused battery holders so they are electrically safe.

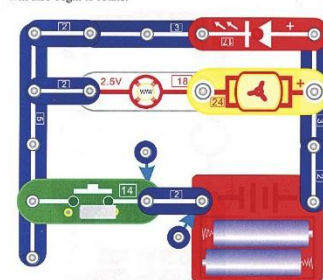
### Suitable For All Ages

The BrainBox method of making the electrical connections is so simple that children with a very wide range of abilities can build the circuits.

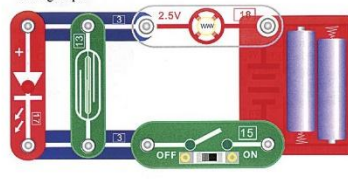
**20. An LED, lamp and electric motor connected in parallel.**  
Close the switch [15], the LED [17] and the lamp [18] will be lit up and at the same time, the motor [19] will rotate.  
LEDs are often used as visual indicators to show that a circuit is switched on.



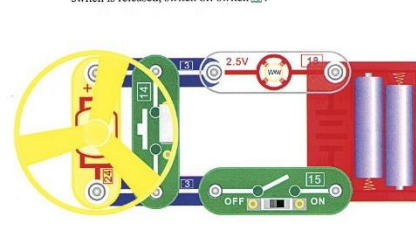
**21. Series-parallel connection of LED, lamp and electric motor.**  
Press the switch [15], the LED [17] and lamp [18] will be lit up, the motor [19] will also begin to rotate.



**22. Switched Lamp and LED.**  
Close the switch [15], only the LED [17] will light up, put a magnet near to dry reed relay [13], the LED [17] will go out and the lamp [18] will light up.



**23. Switched lamp and motor.**  
Close the switch [15], the lamp [18] will light up and the motor [19] will begin to rotate. Press the switch [14], the motor will stop and the brightness of the lamp [18] will increase. Note, if the motor fails to restart when the switch is released, switch off switch [15].



Suitable for ages 8-12

The Primary 2 Kit is designed to teach children the basic principles of electricity and electronics in a fun way. The Primary Kit is suitable for use in the classroom or the home.

It covers the requirements of the Science National Curriculum at Key Stages 1 & 2 with links to Design and Technology and adds many extra exciting experiments for good measure!

Due to the ease of construction, students are quickly rewarded and if the circuit does not work first time, it is easy to rebuild it.

For young children, the brightly coloured parts makes it very easy to identify what goes where.

The manual uses both block diagrams and circuit symbols, so students soon learn how to understand and interpret circuit diagrams.

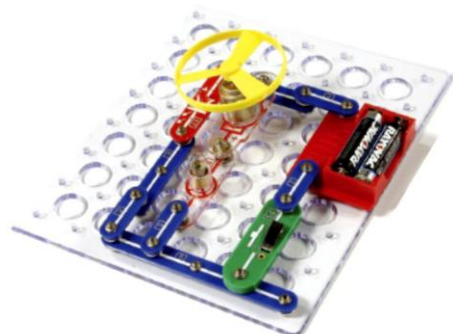


**With this kit you can:**  
**Build a flying fan**  
**Build a stop/go traffic light**  
**Learn about circuits**  
 plus over 100 other projects

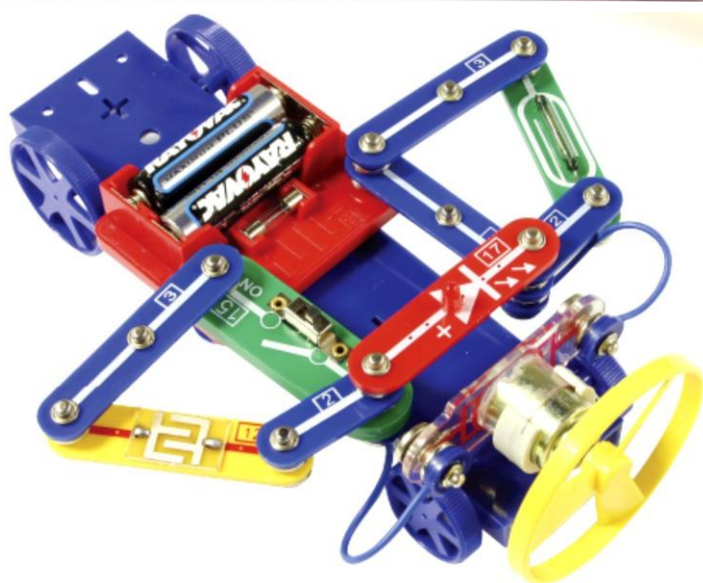
- Covers National Curriculum Science Key Stages 1 & 2
- Worksheets and notes for teachers and parents included
- Robust, brightly coloured and number coded parts aid construction
- Over 100 experiments to build understanding
- Learn about and design Electric circuits
- Find out how to control the brightness of lamps
- Learn about and use different types of switches
- Experiment with an electric motor
- Experiment with conductors and insulators
- Find out how to use light emitting diodes
- Learn about series and parallel circuits
- Find out about AND and OR gates
- Build a flying fan
- Produce electronic sirens

Requires 4 AA batteries (not supplied)  
 This product uses batteries, therefore adult supervision  
 is required for children under 8 years old

Adult supervision and guidance is essential for safety reasons



Suitable for ages 8-12



Adult supervision and guidance is essential for safety reasons

The kit is designed to be used in the classroom or the home and will provide many happy hours of experimentation and enhanced learning. The area covered is Year 6 Design and Technology, Unit 6D 'Controllable Vehicles' together with basic 'Electric Circuits' and a section on 'Alarms & Sensors'.

A feature of all Cambridge BrainBox kits is ease of assembly, all the parts just clip together with press-studs. Mistakes can be corrected in seconds so maintaining a high level of interest. All the parts are colour and number coded so making the selection of parts very easy. Each part has its own slot within the box so it is easy to see if any part is missing.

Included in the manual are worksheets for Unit 6D (Controllable Vehicles) of the Design & Technology National Curriculum along with 50 other experiments designed to revise and enhance the knowledge of electricity and electronics.

- Learn about electric circuits
- Experiment with sensors
- Find out how to control the speed and direction of an electric motor
- Find out about different types of switches
- Build a gear driven car and a fan propelled car
- Make a fan propelled boat
- Construct a propeller driven boat

**With this kit you can:**  
**Build an electric powered boat or car**  
**Make a touch sensor**  
**Learn about circuits**

Requires 2 AA batteries (not supplied)  
 This product uses batteries, therefore adult supervision is required for children under 8 years old

# Primary Plus 2 Kit

Suitable for ages 8-13



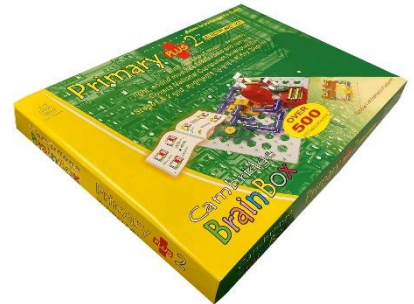
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## Three kits in one!

The Primary Plus 2 kit now includes all the parts from the original Primary Plus kit with the addition of the parts from the Primary 2 kit and the Sensors and Alarms kit. As such, it offers excellent value for money.

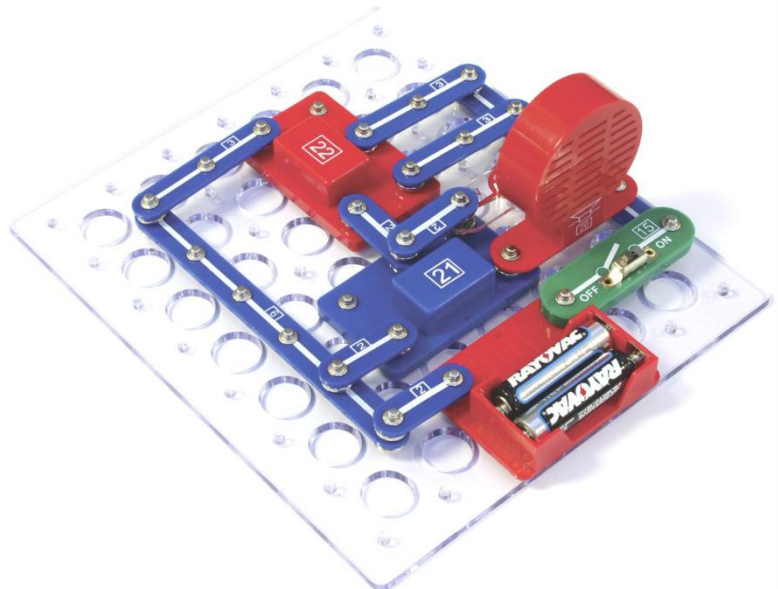
Ideal for the School as topics go beyond the requirements of the National Curriculum and are very suitable for use in after school clubs as well as in the classroom.

For the home user the extended range of experiments offer a greater insight into the world of electronics and gives the kit more interest and appeal.



- Learn about and design Electric circuits
- Suitable for all ability levels
- Find out how to control the brightness of lamps
- Learn about and use different types of switches
- Experiment with an electric motor
- Experiment with conductors and insulators
- Find out how to use light emitting diodes
- Learn about series and parallel circuits
- Construct an AM radio
- Find out about AND, OR, NAND and NOR gates
- Produce electronic music
- Build a vibration sensor
- Build a rain detector
- Investigate light operated circuits
- Experiment with resistance and capacitors
- Build your own burglar alarm circuits

With this kit you can:  
**Make an AM radio**  
**Learn about electric circuits**  
**Build a Burglar alarm**  
**Plus over 500 other projects**



Requires 4 AA batteries (not supplied)  
This product uses batteries, therefore adult supervision  
is required for children under 8 years old

Adult supervision and guidance is essential for safety reasons

# Secondary 2 Kit

Suitable for ages 11-14

Over  
500  
Experiments

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**Includes software to turn your computer into an oscilloscope so that you can view the wave forms produced by the circuits.**

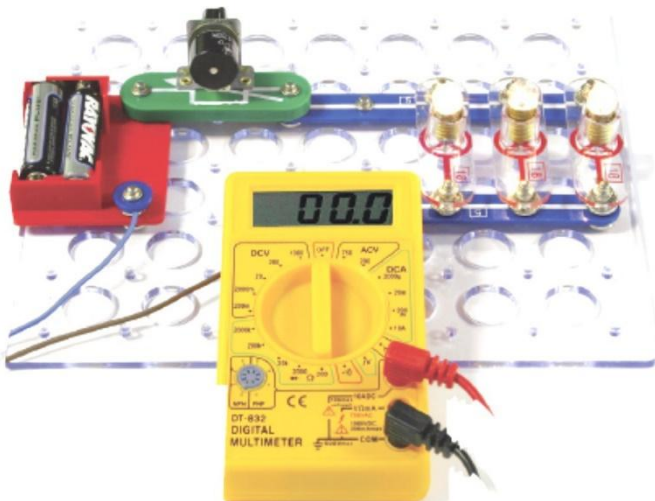
The Secondary 2 Kit covers Unit 7J (Electrical Circuits) of the Science National Curriculum at Key Stage 3 and will also be useful in supporting Design and Technology at Key Stage 3. The kit includes 4 bulbs and bulb holders so that the effect of several lamps in series or parallel can be seen. A variable resistor and a digital multi meter are also included.

The manual includes Science National Curriculum worksheets covering Unit 7J (Electrical Circuits) and provides details of over 500 exciting experiments.

Initially students start by revising what was covered at Key Stage 2 and then go on to explore circuits by using a multimeter to measure such things as resistance, voltage, current and the relationship between them. Students find out about the action of fuses and experiment by testing their own.

**With this kit you can:**  
Use a multimeter  
Make and test fuses  
Use an oscilloscope  
Learn about circuits

- Learn how to use a digital multimeter (provided) to measure current and voltage
- Find out about series and parallel circuits
- Build an AM radio
- Use sensors to switch on and off
- Build a rain sensor
- Make and test fuses
- Convert your computer into an oscilloscope



Requires 4 AA batteries (not supplied)  
This product uses batteries, therefore adult supervision is required for children under 8 years old

**Adult supervision and guidance is essential for safety reasons**

# Explorer 2 Kit

Suitable for ages 11-14

Over  
900  
Experiments

Cambridge  
BrainBox®

The Explorer 2 Electronics Kit now has software that converts your computer into a oscilloscope. Using this you can explore the wave forms produced buy the circuits and see the results of any changes you make to the circuit.

The Kit is designed to build upon the skills already learnt and to increase the student's knowledge of the principles of electronics. The kit could be used to enhance the understanding of Key Stage 3 and 4 electronics.

The kit has over 60 individual components including transistors, resistors and capacitors.

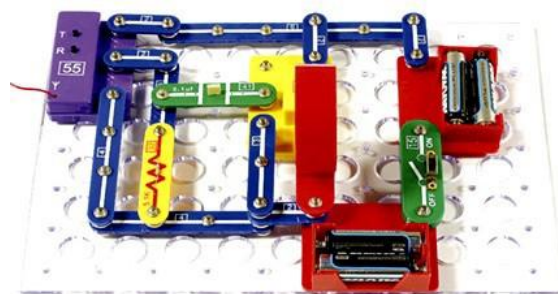
Circuits range from the basic, lighting a single bulb, and progresses through using pre-programmed sound modules to building an FM radio.

Students can experiment by designing their own circuits such as how to control events like switching on a bedroom light when the daylight fades or using a magnetic sensor to see if a window has been left open.



- Clear circuit diagrams to aid construction
- Over 900 exciting experiments
- Build your own FM and AM radio
- All Sensors and Alarms parts included
- Learn about and design Electric circuits
- Find out how to control lamps
- Learn about and use switches
- Experiment with an electric motor
- Experiment with conductors and insulators
- Find out how to use light emitting diodes
- Learn about series and parallel circuits
- Find out about AND, OR, NAND & NOR gates
- Build a flying fan
- Produce electronic music
- Produce 'space war' sounds
- Build a vibration sensor
- Build a rain detector
- Investigate light operated circuits
- Learn about switches
- Experiment with resistance and capacitors
- Build your own burglar alarm circuits
- Program a 7 segment display
- Learn about and use transistors
- Build a voice recorder

With this kit you can:  
**Make an FM radio**  
**Build a rain detector**  
**Use an oscilloscope**  
**Learn about circuits**

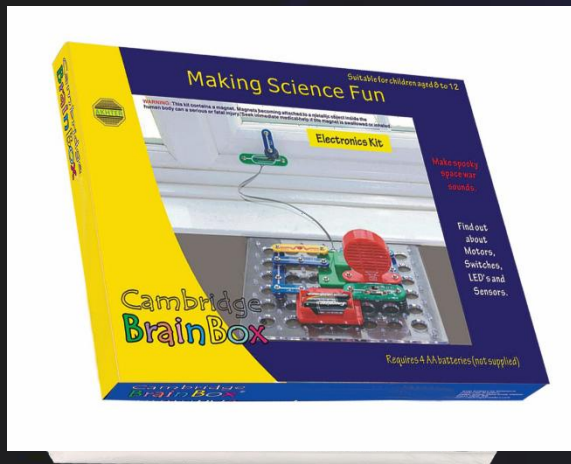


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# Making Science Fun

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This kit covers much of Key Stage 1 and 2 of the Science National Curriculum electric circuits.

Find out about Motors, Switches, LED's and Sensors.

- Make spooky space war sounds
- Colourful manual makes it easy to follow and understand the experiments
- All the parts are designed for simple and quick assembly
- Suitable for all ability levels as all the parts are numbered and colour coded

Adult supervision is essential for safety reasons

## Solar Racer Kit

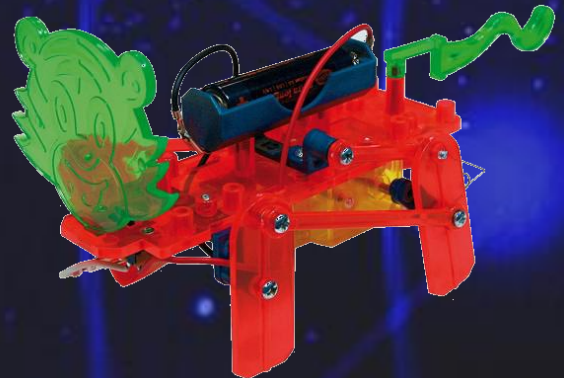
Product code CONS 10700



The Solar racer introduces the idea of how a solar panel can be used to power an electric vehicle. Adult help will be required.

## Walking Robot Kit

Product code CONS 10800



The Walking Robot shows how rotary motion is converted into linear motion. Adult help will be required.

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