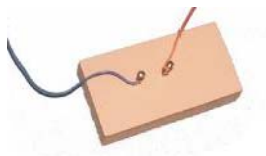


Sample activities – design briefs

Use these ideas in conjunction with the Instruction Manual which comes with the *BrainBox* kit.

Conductivity tester

There is a design for a conductivity tester on page 4 of the Instruction Manual. It can have extra parts added to make it easier to test larger items. The extra parts needed are easy to make (see photo).



It is simply a small block of wood with two steel nails hammered in about 2cm apart. Wires are wrapped around each nail and connected into circuit 9 on page 4. When a conductor is placed across the two nails the globe will glow.

This allows you to use longer connector wires to test things around the room.

Alarm circuits

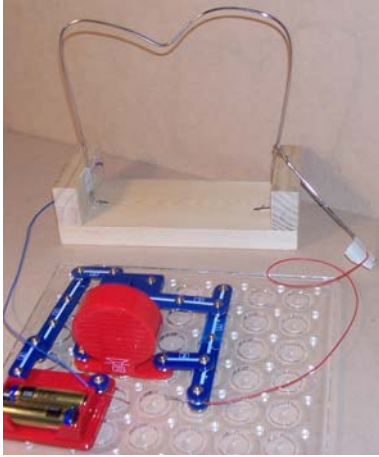
I used a sound module from the *BrainBox* kit, but you could use a light circuit if you want a silent indication of an intruder. The students have to design a switch that will trigger the alarm. These switches could be used with more sophisticated circuits rather than designing your own circuit.

- Pressure switches are easy to make using cardboard and foil with a small sandwich of foam to keep the two parts separate. Pressure switches (like those in the door of the fridge or car door) turn on when the pressure is released.
- Light activated switches can be made using the photo sensor from the kit and extra wires to put it where you need it.
- The reed switch and magnet can be remotely mounted so that when a door is opened the circuit is tripped.
- The buzzer is actually a transducer (meaning it acts a bit like a mini speaker) and responds to noise. It could also be used and triggered by a loud noise.
- A tilt switch or mercury switch could be added to trigger alarms if the object is moved.

Games and puzzle circuits

Maze Games, Quiz Games, Secret Code Challenge or even a Morse Code Trainer can be constructed using sections of *BrainBox* circuitry.

Steady hand puzzle



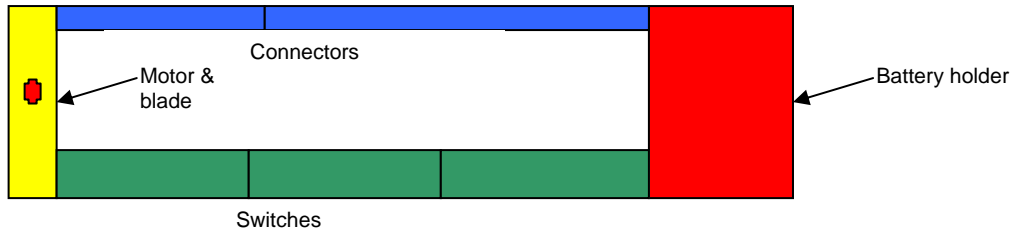
This circuit can be added into a *BrainBox* sound module or lighting circuit replacing the normal switch. The wire shape was made from a coat hanger and several pieces of wood. Wires are connected as in the photo and then snapped into the *BrainBox* circuit (I used the design on page 8 – be warned you get sick of ‘Happy Birthday’ after a while).

The wire loop is then adjusted to make it curlier and then the challenge begins.

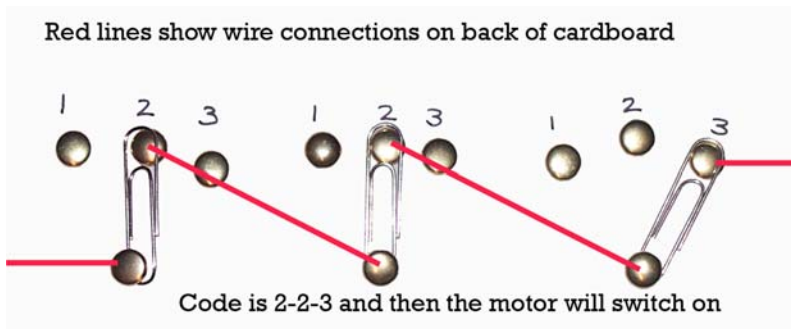
Can you get the small wire loop from one end of the large loop without making a noise?

Secret Code Challenge

Three switches in series can mimic the fail-safe mechanisms for rocket launch. A demonstration can be made using *BrainBox* parts – use number 15 Slide Switch + number 13 Reed Switch + number 14 Button Switch between the battery box and motor with blades. When all three switches are on (the Reed Switch needs the magnet) then the blades will take off.



Below is a home made code switch made from cardboard, paper clips and fasteners. The wires are on the under side and you have to try various combinations to try to get it to work. This was fitted between the battery box and motor (see circuits on page 3 or page 6 of manual). The code switch fits in instead of a Slide switch or Button switch).



Group activities

These activities are for groups of three or four students.

Intruder alarm

Your task: Construct a working model of an intruder alarm.

You may use a sound module or light circuit from the *BrainBox* as part of your alarm. The way the alarm is triggered is your challenge. Do you want it to be triggered when someone walks on the trigger? Perhaps it will be triggered by someone opening a door. This is for you to work out.

Your group needs to show your plans as well as have a working model to demonstrate to the rest of the class.

A full explanation of how it works (with labelled diagrams and digital photos) is also to be included in your final report for display on the notice board.

Game or puzzle

Many games or puzzles use electrical circuits to make them work and appear more interesting.

Your task: Design and build a game or puzzle that uses sound or lights to show when someone has solved the puzzle or won or lost the game.

An example of a commercial game is *Operation*. It has a metal area around each piece to be removed. If the wired tweezers touch the metal you complete the circuit, a buzzer sounds and you have 'lost'. Some ideas you may like to explore could include a maze or steady hand puzzle or perhaps a coded set of switches that only turn on a light or sound when set correctly.

You may use a sound module or light circuit from *BrainBox* as part of your puzzle or game.

Your group needs to show your plans as well as have a working model to demonstrate to the rest of the class. A full explanation of how it works (with labelled diagrams and digital photos) is also to be included in your final report for display on the notice board.