

# FREE RESOURCES

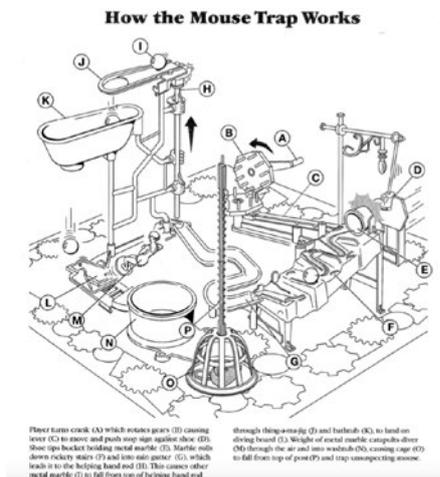
The Why and How Challenge

The 'Why and How' Challenge is intended to be something for the staffroom table that lots of teachers will try.

It is specifically designed to encourage the children to work scientifically to design and make something or to solve a problem.

This issue's Why and How Challenge is based on our **CHAIN REACTION** resource. You can download lots of supporting materials for this activity on the **PSTT website**. Could you run this as a **whole school competition**?

## Have you ever played Mousetrap®?



As the game is played, a contraption is built, piece by piece. Eventually, one player will turn a crank handle, which sets the next piece (a gear) into motion, which triggers the next lever and so on, until finally, the trap itself falls on the mice.

Look at and follow the diagram, from part A through to O. The only part that the player moves is the first piece – the crank handle (A). After this, the pieces are arranged so they either move the next piece, or they trigger another object, such as a ball, a small diver or the trap itself to move.

Each of the parts must be positioned carefully to be sure that every single movement triggers another.

Mousetrap® is, of course, a commercial product, with each piece carefully manufactured so that it will always (or almost always) work. The mouse is trapped at the end of a mechanical chain reaction – by this we simply mean that by setting off the first part of a device, a whole series of movements will occur, each leading to another until the device finally stops with the planned outcome.

Such devices are sometimes known as 'Heath Robinson' or 'Rube Goldberg' devices. William Heath Robinson and Reuben Garrett 'Rube' Goldberg were both cartoonists/illustrators who drew designs for incredibly complicated machines that performed very simple tasks. You might like to look at some of their ideas online!

Some of our favourite Rube Goldberg devices can be found here:

[coolmaterial.com/roundup/rube-goldberg-machines](http://coolmaterial.com/roundup/rube-goldberg-machines)

There are also lots of really great examples on the Internet, which you will find if you search 'Rube Goldberg machine ideas for schools'.



## WHAT TO DO

Design and build devices that create mechanical chain reactions. The device does not have to have a specific purpose, although you are more than welcome to set one. It certainly does not need to be as complicated as the amazing videos or pictures that you might find online, but feel free to develop your ideas in any way you wish!

You can use just about any ordinary, everyday objects that you choose, e.g. cardboard tubes, boxes, ramps, cups, toys such as marbles, balls, cars, dominoes etc. You could make parts from Lego® or K'nex® or use parts of larger toy sets such as marble runs or car tracks. Be creative!

Encourage children to work in small groups to create their devices in the classroom and provide plenty of time for everyone to watch them and describe the effects of the forces they see in action. Decide which device will represent the class or think about combining ideas.

### Here's how you could structure a whole school science challenge day:

#### Morning

Quick assembly to introduce the competition.

Children work in small groups to make a range of devices.

#### After break

Groups show their devices to the rest of the class and describe the effects of the forces.

Class decides on one device to represent the class.

#### Afternoon

Whole school to hall for the grand finale. Classes describe their device and demonstrate this to rest of school.

Panel of judges select winner based on own criteria e.g. most creative/ most effective machine.

