SCIENCE MUSEUM GROUP

MATHS IN SCIENCE ACTIVITIES

Maths is the lens through which we view the world. We measure our years in months and weeks, our days in hours and minutes; our good and services are assigned a value, our journeys are mapped with miles or metres. In short, maths defines our world.

Maths also plays a vital role in science, technology and engineering. For example, measurement is crucial in performing experiments, and statistics help us to interpret the results. Logical reasoning is used in forming hypotheses (predictions or explanations that can be tested). Algebra is used to create mathematical statements that summarise scientific theories (Einstein's equation $E = mc^2$ is perhaps the best-known example). Geometry finds applications in anything that is designed, since function relies on shape.

Here are some examples of how maths can be explored using different Science Museum Group hands-on activities.

GEOMETRY

Everything has a shape, and often it is that shape for a reason. Changing the shape or design can change how something works, and investigating this helps us explore a range of science topics such as forces, sounds, materials and many more. Shape and design can be explored in the following activities:

Shape

- *Spaghetti Structures* explores what shapes work best for building the tallest and strongest structure
- *Build a Dome* investigates the science behind the strength of triangles
- *Bubble Fun* explores the shapes bubbles make and how shape and design can change performance
- Change the shape or design of a rocket in *Rocket Mice* to see how much higher it can fly
- Test different shapes for amplifying noise using *Tune Booster*
- Explore how changes in design affect how long an aircraft can stay in the air in *Make It Fly*

Angles

- Modify the angles and shapes in *Periscopes* to be able to see over walls or behind you

MEASUREMENT

A key part of scientific observation is measurement. Whether exploring change across time, or testing the effects of something, we need to measure and record results in some way to draw comparisons. Key skills in measuring include observation, estimation and accuracy. Different variables can be measured using these activities:

Height/ size

- Measure how high the rockets fly in *Rocket Mice*
- Compare the difference in volume of marshmallows under various pressures in *No Pressure*
- Explore the width and height of structures in *Build a Dome* and *Spaghetti Structures*

Distance

- See how far gliders can go in *Make It Fly*

Time/ speed

- Investigate how quickly rockets ascend and descend in *Rocket Mice*
- Find out how fast ice cream can freeze in *Instant Ice Cream*
- Record how slowly paper helicopters spin to the ground in *Make It Fly*

Other

- Observe how the volume and clarity of sound can change with different types of boosters in *Tune Booster*

STATISTICS

In many scientific experiments, data is collected and then statistics are used to analyse that data. This includes calculating averages, creating graphs or looking for patterns or statistical significance in experiment results. These are all statistical methods.

Data

Data collected can be recorded in lots of different and creative ways:

Record results in a table: For example, in *Make It Fly* note how long it takes the paper helicopter to fall to the ground.

	1	2	3	4	5
Trial 1 – no change					
Trial 2 – with extra weight					

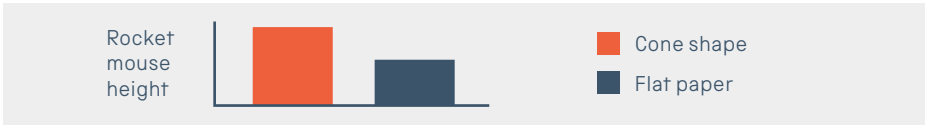
Record results using physical markers: For example, in *Make It Fly* use tape to mark how far each paper plane or glider travelled before landing.

Represent data visually: For example, in *Ear Gongs* draw different ear sizes or smaller and larger circles to show how loud the sound was.

Graphs

Graphs provide a great way of summarising and visualising results.

2D Bar Chart: Show the average results of the different trials. For example, in *Rocket Mice* show how different shapes of rocket affect how high it flies.



3D Bar Chart: Physically show results. For example, in *Make It Fly* make paper aeroplanes and line them up to show how far the average plane flew.

Sketch It: For example, in *No Pressure* sketch the average size of the marshmallow before, during and after the pressure decrease.

RESOURCES

For the hands-on activities mentioned above – and many more ideas – visit: **sciencemuseumgroup.org.uk/resources**