

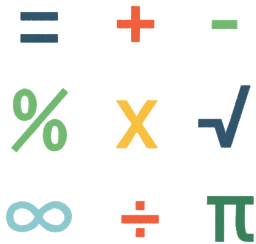
Mathematicians' passion, creativity and problem-solving skills have provided solutions to real-world problems throughout history. Whether it's space exploration, computing technology, medical discoveries, engineering feats and more, museums provide excellent opportunities to explore how maths has changed and enriched our lives.

Some museum objects, such as abacuses, compasses and measuring scales are most easily associated with

maths. But many more objects also have maths at their heart, from their design to their manufacture and distribution.

Here are some ideas to encourage mathematical thinking and talking, and how you can explore core maths topics throughout our museums and beyond.

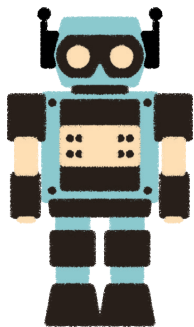
NUMBERS



Numbers are the language of quantity. The concept of 'amount' is essential to how we value, order and record our lives. Museums provide an opportunity to examine a large quantity of objects, to look closer at the number of different parts that make up objects, and to explore how numbers have impacted our lives in the past and present.

- Find numbers on the objects. Where are numbers used? How are they displayed? For example, as Roman numerals or Arabic numbers? Are they analogue or digital?
- How much of an object is made from each of its materials (percentage and/or fraction)? Which part do you think would be the most difficult to find/make?
- Count how many parts or pieces make up an object. What is the most common type of piece? (Screws? Buttons? Panels?) Is this an indication of how difficult the object may have been to make?
- How many of each object could have existed? How many people might have used them?
- Who do you think used the objects? Would they have needed to do calculations (for example, in determining the price, speed and/or size)?
- Where are numbers useful in our everyday life? Bus numbers, clock times, etc.

MEASUREMENT

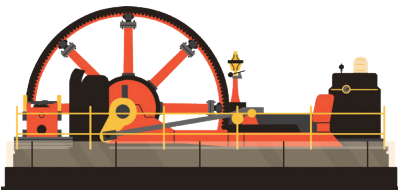


Measurement is how we define the world. Time, space and distance are constant factors in everybody's lives. Museums hold historical objects, each of which can be explored not only through its dimensions of length and width, but also through other measures such as weight and cost.

- Estimate the size, height or length of an object. Draw comparisons between known measurements, such as hand span, stride length, etc. What factors need to be considered in relation to its size? For example, did it need to fit people? Did it need lots of fuel? Did it need to be seen from a distance?
- Estimate the proportional dimensions of an object. For example, it is twice as tall as it is wide
- Consider how expensive an object would have been when it was new. How much would you pay for it now? Why?

- How heavy might an object be? Could a human lift it? How far could it be thrown? Would it work better if it were lighter or heavier?
- Estimate how long an object might have been in use (for example, decades, years or months)
- What measurements would be important in making an object?
- What skills would be needed to build or use an object?
- Explore scale models. Estimate how much bigger/smaller they are in reality
- How easy would it be to recreate a scale model of one of the objects back at school or at home? What information would you need to collect? Why not try it out?

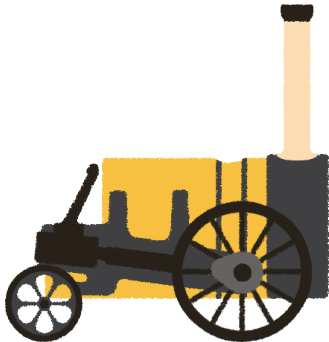
GEOMETRY



Everything has a shape, and often it's that shape for a reason. For example, there's a reason why wheels are round. Museums provide an opportunity to explore the shapes in objects and to compare how they have changed throughout time.

- What shapes are used in or on an object? Is the shape important for its function? If so, how?
- Find examples of 2D and 3D shapes throughout the museum
- What shapes/parts in the object provide strength and stability?
- Look out for different patterns on objects or around a gallery. Why would they be there?
- Look out for symmetrical objects. Find lines of symmetry on different objects
- Consider if the shape of an object has changed throughout time. Why would this have happened?
- Continue looking out for shapes and patterns beyond the museum, on the way back to school, in the classroom or at home

STATISTICS



Statistics is the collection and interpretation of information. Statistics allow us to make comparisons, are key to understanding connections and help us make informed decisions. Museums have examples of developments that have changed and improved our lives as a result of data collection and interpretation.

- Look for where data has been collected and/or represented
- What can an object tell us about what was average or the norm in the time when it was used?
- Collect data from objects (for example, their colours, materials, size). What does this tell us about those objects? How could that data be presented (e.g. creatively, clearly, convincingly)?
- Consider ways that objects in the museum or beyond (at home, school or local area) could be grouped
- Compare an object to something similar that is used today – is the modern version an improvement? How would you know? What data could be collected to measure change over time (e.g. speed, size, cost)?