

## What would a world without mathematics be like?

Mathematics is the science of numbers, forms, amounts, and their relationships.<sup>1</sup> This discipline evolved from the basis of counting, measuring, and describing shapes which has developed our understanding of nature and has enabled mankind to create new technologies. This practise has been used since ancient times by civilisations such as the Ancient Greeks, Egyptians, Babylonians, and many others who used mathematics to develop their understanding of nature but also in other fields such as engineering and astronomy.<sup>2</sup>

The word ‘world’ in the question title corresponds to Earth, therefore what first needs to be considered is the question, what would human society be like without mathematics? Firstly, we wouldn’t be able to measure anything, so there would be no money, roads, houses etc.<sup>3</sup> Everything people use daily would no longer exist. However, this leads to another question, does this mean human beings wouldn’t be an intelligent species? In recent studies some animals such as chimpanzees have shown basic numerical abilities<sup>4</sup>, therefore any intelligent species wouldn’t exist in a world without mathematics.

Is mathematics an invention by the human brain or a discovery of the language of nature? This topic has been questioned for as long as human beings have been using mathematics and even today there is

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<sup>1</sup> “Mathematics”, *Cambridge Dictionary* (2021). <https://dictionary.cambridge.org/dictionary/english/mathematics> (accessed 29th August 2021)

<sup>2</sup> “History of Mathematics”, *Wikipedia* (2021). [https://en.wikipedia.org/wiki/History\\_of\\_mathematics](https://en.wikipedia.org/wiki/History_of_mathematics) (accessed 1st September 2021)

<sup>3</sup> “A world without mathematics”, *Engineering and Physical Sciences Research Council* (2018). <https://epsrc.ukri.org/newsevents/multimedia/aworldwithoutmathematics/> (accessed 29th August 2021)

<sup>4</sup> E. Nelson, “Animals that can do math understand more language than we think”, *The Conversation* (2020). <https://theconversation.com/animals-that-can-do-math-understand-more-language-than-we-think-133736> (accessed 1st September 2021)

no definite answer. An aspect of the answer depends on the individual's view - a Platonist (believes maths is innate) or a non-Platonist (believes maths is a human construct).<sup>5</sup>

Fibonacci discovered a consistent pattern in nature. This pattern is named the Fibonacci sequence and this sequence of numbers corresponds to the number of spirals in a seashell, the number of petals on a flower, the branching of bronchi in the lungs and many other natural phenomena. Furthermore, other patterns have been seen in nature such as fractals in the leaves of ferns, hexagon shapes of beehives, concentric circles in the ripples of ponds. Maths is also seen in outer space, for example the shape of our galaxy is a Fibonacci spiral.<sup>6</sup> In conclusion there are mathematical patterns present in nature.

Therefore, if mathematics didn't exist would nature be able to survive without having the ability to construct patterns?

Mathematics is a discipline used by mathematicians, physicists, computer scientists, and economists and without it our society would look very different to what it is today. To describe a world without mathematics is a difficult task, because people are still in debate whether maths is invented or discovered. To conclude, however, a world without human knowledge of mathematics would mean either humans wouldn't have the mental capacity for abstract reasoning or humans wouldn't exist. "If there's a number of trees in a forest and no-one is there to count them, does that number exist?"<sup>7</sup>

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<sup>5</sup> D. Abbott, "Is Mathematics Invented or Discovered?", (2013).

<sup>6</sup> "Math in Nature: 5 stunning examples of maths in our world", *Math Geek Mama* (2019). <https://mathgeekmama.com/math-in-nature/> (accessed 29<sup>th</sup> August 2021)

<sup>7</sup> J. Dekofsky, "Is math discovered or invented", *TEDEd* (2014). <https://ed.ted.com/lessons/is-math-discovered-or-invented-jeff-dekofsky#review> (accessed 1<sup>st</sup> September 2021)

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