

# Kellogg's head starters



## What's maths got to do with nature?

Have you ever studied a honeycomb? Or gazed at the head of a giant sunflower? Or really looked closely at a pinecone?

They all have really amazing patterns and structures that get more amazing the more you study them.

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If you study the eye of a dragonfly, what you thought was just one big eye at first glance is actually 12,000 tiny eyes (called 'ommatidia') all working together!

The shape of each eye has six sides, so they're hexagonal. And the honeycomb in a beehive is the same.

Why? Because nature is brilliant at creating things that fit together perfectly, and that are incredibly strong for their size.

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When the architects were wondering how to design the Eden Project biomes they turned to nature. As we've seen, busy bees build honeycombs of hexagons, flies' eyes are made of hexagons... and this made the architects' eyes light up! The answer was interconnecting spheres made up of hexagons - otherwise known as geodesic domes.

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Snow kidding, most snowflakes are hexagons too!

Snowflakes are made of snow crystals, which form around tiny specks of dust that get carried up into the atmosphere by the wind. Scientists think that there are four kinds of snow crystal - one long and thin like a needle, and the rest...you guessed it... all based on six sided hexagonal shapes. When snow crystals fall from the sky and lump together they form snowflakes.

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Ever heard of a man named Fibonacci?

He was brilliant at maths. One day he devised an amazing formula that we now know as the Fibonacci sequence.

Here's the start of Fibonacci's sequence:

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89...

Weird, huh? Looks like any old set of numbers! But see how each number is the sum of the previous two? 0 plus 1 is 1, then 1 plus 1 is 2, then 1 plus 2 is 3...and so on. The amazing thing is, this pattern of numbers keeps showing up in the patterns of nature.



Petals form from lumps, called primordia, on the centre of tips of flower shoots. Can you see how they grow in spiral patterns? Spirals are generated because primordia in more central rings align themselves with gaps in the ring just outside. It's a simple way of using the available space to best advantage. They generally form in Fibonacci numbers.



The core building at the Eden Project was built around Fibonacci principles. Why not take a visit and see for yourself? You can go on a brilliant nature trail through the domes to discover more of nature's wonderful patterns.

And don't forget to enter our competition to win Eden Project entry tickets!



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