

BEES BUILDING A HONEYCOMB

In this video the speaker explains why bees choose to use a hexagon to build their honeycomb structure rather than a triangle or a square.

1 VIDEO. Watch this video and comment.

Behind the Beehive - The Code - Episode 2 - BBC Two

Audioscript

Behind the Beehive - The Code

A – *This almost looks man-made manufactured.*

B – *Yeah.*

A – *It doesn't look like something from the natural world.*

The precision, the fine straight lines that they've created...

B – *Right, right.*

A – *It's extraordinary.*

B – *Right, it's an engineering wonder for sure.*

A – *Because it's... it's perfect. Hexagons here.*

B – *Yeah, it is amazing and the hexagon is a very strong structure.*



SPEAKER - The bees have made an identical pattern to the columns on the Giant's Causeway. Each cell is exactly like the others: six walls meeting precisely at a hundred and twenty degrees and every honeybee, everywhere in the world, knows how to build these shapes. It's as if the hexagon is built into the bees' DNA.

A – *You can see the bees going down inside the cell. It's almost exactly the same size as their bodies.*

B – *Right.*

A – *And are they using their body like a ruler in some sense?*

B – *Yeah. I would say that's an accurate description. I know different races have a smaller body and the cell size and their comb is smaller.*

A – *And each of the hexagons, how do they actually make a hexagon rather than some irregular shape?*

B – *They have just done it for thousands and thousands of years. They were born to do it. They just instinctively know that this is the shape of their home.*

SPEAKER - But there's more to the bees' behaviour than raw instinct. There's another reason why they build in hexagons, and to reveal that reason we need to turn to the universal language of all nature: mathematics. The bees' primary need is to store as much honey as they can, while using as little precious wax as possible.

A – *The bees' honeycomb is an amazing piece of engineering but why have they evolved to produce this hexagonal pattern? Watching, they don't have too many choices. If you're trying to put pentagons together, for example, they just don't fit together nicely or circles leave lots of little gap. If they want to produce a network of regular shapes which fit together neatly, then you've really only got three options: you can do equilateral triangles or you could do squares or you can do the bees' hexagons. But why of those three does the bee choose hexagons? Well, it turns out that the triangles actually use much more wax than any of the other shapes. Squares are a little better but it's the hexagons which use the least amount of wax.*

It's a solution that was only mathematically proven a few years ago. The hexagonal array is the most efficient storage solution the bees could have chosen. Yet, with a little help from evolution they worked it out for themselves millions of years ago.