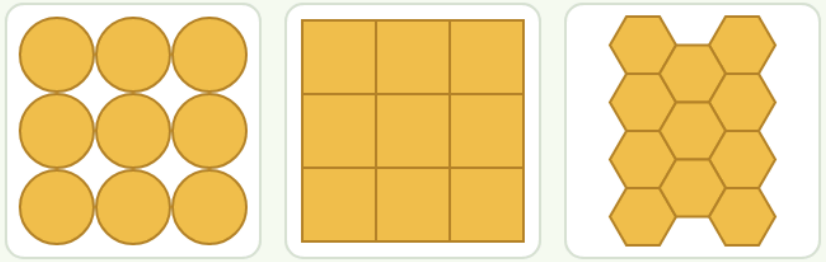
That is why

Why do bees build hexagons?

Hexagons fill space with no gaps using the least wall, and warm wax pulls round cells into that shape.

A Same space, different walls



Circles
gaps waste space

Squares
4.00 units of wall

Hexagons
3.72 units of wall

Wall needed around each cell of the same area (area = 1): square 4.00, hexagon 3.72. Circles leave gaps; hexagons tile with no gaps and the least wall of any shape. Proved by mathematician Thomas Hales in 1999.

Less wall means less wax for the same amount of stored honey.

B Wax is expensive



6 to 10 lb of honey

Bees eat this much honey to make each pound of wax.

Workers make wax in glands on the underside of the abdomen, as tiny flakes. Every wall costs honey, so the cheapest wall shape wins.

C From circles to hexagons

1 Built round

Bees first shape each cell as a circle around their own bodies.

2 Warmed to about 45 °C

"Heater" workers warm the wax until it flows slowly.

3 Pulled straight

Surface tension pulls the soft walls flat where three walls meet, making hexagons.

Like soap bubbles pressed together in a sink.

Least wax, most honey: the hexagon wins.

Free for learning thatiswhy.com

Free for learning, teaching and research. Please credit: That Is Why, thatiswhy.com

Diagram: https://thatiswhy.com/diagrams/why-honeycomb-cells-are-hexagons/ · Full guide: https://thatiswhy.com/why-bees-build-hexagons/