

# Hexagon Structures

Brought to you by the Kohl's Design It! Lab

## Introduction

Hexagons can be found in nature in the patterning of rocks, insect eyes, and much more. Build your own structure and discover what makes hexagons nature's perfect shape.

## Think About This

Why do bees use hexagons to store their honey?

## Materials

- Marker
- Ruler
- 1 Paper towel roll or 2-3 toilet paper rolls
- Scissors
- Tape
  - Staples or paperclips can work too!

## Directions

Hexagons are considered "nature's perfect shape" and are seen frequently. Design your own hexagon structure and test its strength!

- 1 Lay the paper towel roll on its side and press down to fold it flat.
- 2 Use a ruler to create a grid on the paper towel roll that will be used as a cutting and folding template.
  - a. Start lengthwise on the roll. Draw marks on the roll that are 2 cm apart. Repeat all the way down the length of the roll.
  - b. Turn the ruler to measure across the short side of the roll. Draw marks that are 2 cm apart. Repeat all around the width of the roll.
  - c. Draw lines to connect all of the marks to create a grid pattern.



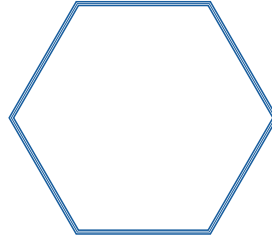
3 Cut the paper towel roll down each **width** line. This will provide many oval shaped rings.

4 Make tight folds on each ring along the grid lines to create a "Z" shape. Press and crease on the gridlines firmly.



## Hexagon Structures Continued

- 5 Open the ring and the creases to form a hexagon, a 6-sided shape.
- 6 Line up the edges of two hexagons. Put a small piece of tape over the edges to connect the hexagon rings.
- 7 Repeat Step 6 to create your own unique hexagon structure.



### Take it Further

- 1 Test the strength of your structure by stacking books on top of it. How many books can you stack? What do you notice?
- 2 Test the strength of your structure by standing carefully on it. The strong walls where the hexagons connect might be able to balance out your weight!

### What's Happening?

Hexagons have many benefits and can be seen frequently in nature. When pushed up against each other, the hexagon shape can fit together perfectly, or tessellate. When hexagons tessellate, they create a connection point of three shapes coming together at 120 degrees. This is one of the most structurally stable connections.

Bees use hexagons to build their honeycombs. Hexagons are good at filling in space efficiently and also have a large internal surface area. This means that a lot of honey can be stored inside and more storage areas can fit next to each other. When bees build honeycombs, they actually make a circular shape that gets pulled by tension as the walls attach, eliminating gaps and creating perfect hexagons.

The shape of the hexagon is also seen in the patterning of animal scales, tortoise shells, and insect eyes; it's in cooled volcanic rock, groups of bubbles, and even the structure of some molecules. Humans borrow this genius design for creating strong, lightweight products - car grills, jungle gyms, soccer balls, and the bottoms of some sneakers all might have hexagons!

Hexagons are also popular in the design of buildings. The Mitchell Park Domes are known for their beehive-shaped glass domes. If you look closely, you can see how the triangular elements work together to form hexagons all over! Where can you find hexagons in your neighborhood?

Show us what you've created and where you've seen hexagons!  
 Submit your photos to  
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 for a chance to have your design featured by Discovery World!