



MAKER ED

LEARNING IN THE MAKING:

Shapes in Nature

INTRODUCTION

Join the fun as we explore shapes in nature! What shapes do animals use to build their outdoor shelters? Where do they build their shelters? In this activity, you will design a shelter to keep your stuffed animal safe and cozy using newspaper dowels. Have fun creating and innovating with this engineering design challenge. Build, test, and try it again!

DESIGN CHALLENGE

Using newspaper dowels, you will design and build a cozy shelter for a toy or a stuffed animal using at least 3 different shapes.

EXPLORE SHAPES IN NATURE

Before you begin building, go on a walk and look closely at different shapes in nature. What do you notice? What do you wonder?

Some geometric shapes are stronger than others.

- Triangles are very strong shapes because they hold their shape and have a strong base. The triangle is common in all sorts of building supports and trusses.
- Hexagons are also very strong shapes. When bees make hexagons in their hives, the 6-sided shapes fit together perfectly. Hexagons can be divided into triangles.
- Cylinders are strong shapes as well. Think about the shapes of trees, telephone poles and your bones.



Reflect on what other shapes you see in nature as you design, build, and test a shelter for your own toy or animal!



Tools & Materials of Making

- **Newspaper** (other options: paper, magazines or catalogs)
- **Tape** (scotch or masking)
- **Drinking Straws** (other options: wooden dowels, round chopsticks, markers, pencils)
- **A stuffed animal or toy**
- **Optional:** scissors, pipe cleaners, craft materials



Subject

Science, Math, Engineering



Standards

Disciplinary Core

Ideas: ETS1.A:

Defining and Delimiting Engineering Problems

Science and Engineering

Practices: Defining Problems; Designing Solutions

Crosscutting

Concepts: Structure and Function; Cause and Effect



Grades

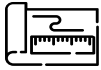
K-2nd
3-5th
6-8th



Key Terms

- Shelter
- Stability
- Structure
- Shapes

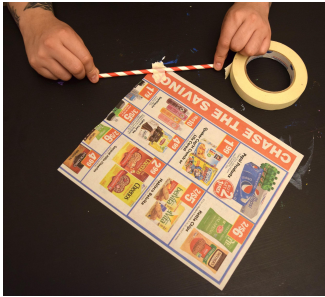




ACTIVITY INSTRUCTIONS

MAKE PAPER DOWELS

Make 7-10 paper dowels to start out with - you can always make more if you need to.



Step 1: Tape a piece of a straw down on one corner of the newspaper.



Step 2: Gradually roll the paper snugly around the straw.

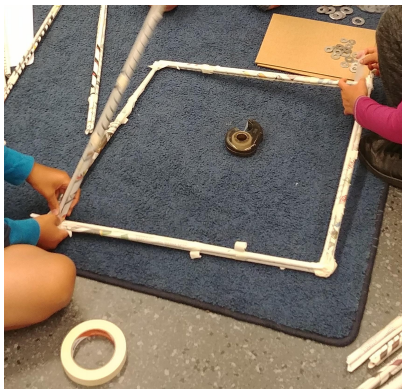


Step 3: Use a small piece of tape to tape the dowel closed. Repeat!

DESIGN IT!

Now it's time to think about the design and shapes you will use to build a shelter for your toy or stuffed animal

- Look at your toy or stuffed animal. How big/tall will the shelter need to be? How wide will the entrance need to be? What shapes will you use?



BUILD IT!

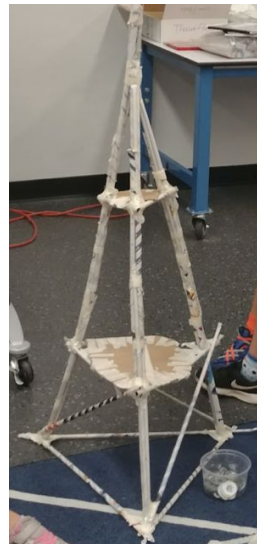
Once you have an idea of what you want to build, get started! Use tape to connect the dowels. Tape, bend or cut the dowels as you need in order to create your design. Test it out!

- Does your toy/animal fit inside it's shelter?
- How stable is it?
- What changes do you need to make?
- Redesign and Repeat.

EXTENSION IDEAS

Once you build your shelter, take your idea further:

- Add more rooms to your shelter
- Make your shelter mobile by adding wheels
- Build a 2-story shelter
- Write a story about your toy or animal's new home!



Reflect After you complete the challenge, reflect on your experience:



- What did you have to think about when designing your shelter?
- Which shapes were the most stable?
- What was a challenge you overcame in your building?



Helpful Tip: Larger pieces of newspaper can be harder for younger learners to manage by themselves. Cut your newspaper into smaller squares for smaller dowels.



Helpful Tip: The thicker the paper (construction paper, cardstock) the harder it is to roll the dowel.



Shelter: a place or structure that gives protection against weather or danger.



Structure: the way that something is built, arranged, or organized



Stability: the strength to stand



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