PROJECT!

POWER PAPER!

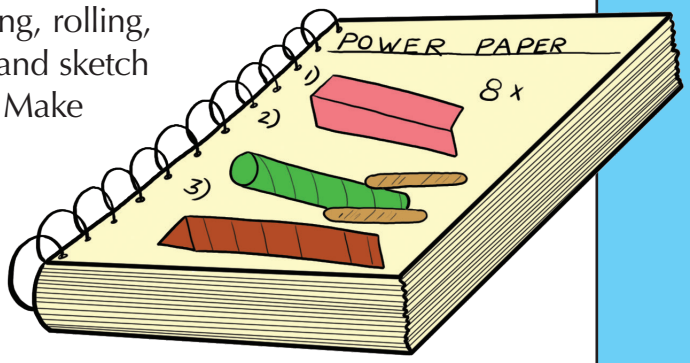
SUPPLIES

- engineering notebook and pencil
- paper
- tape
- heavy books

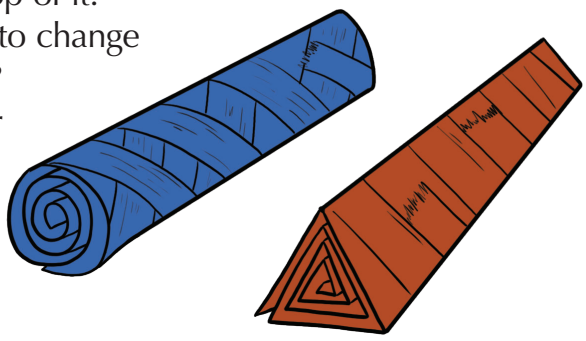
Think about some words you might associate with paper, such as *thin* or *rip*, and then think of the words you might associate with a textbook, such as *heavy*. Do you think that sheets of paper could support the weight of one of your textbooks? Why or why not?

1 Start an engineering design worksheet in your engineering notebook. Your first step is to state the problem: How can you shape the paper in a way to make it strong enough to hold up a heavy book?

2 Consider different ways of folding, rolling, and taping your paper. Brainstorm and sketch your ideas. Choose a design to try. Make your paper and tape it to keep it in the shape you made. This is your prototype!

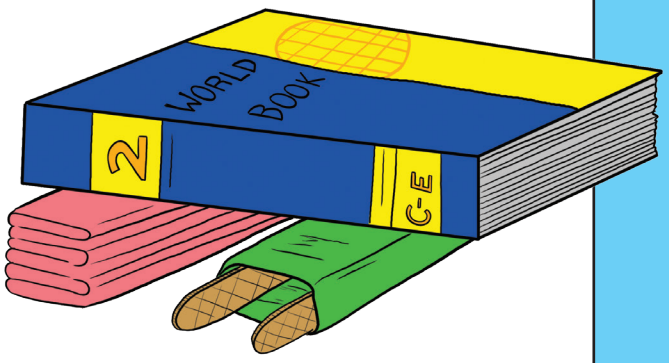


3 Test the strength of the shape by placing a heavy book on top of it. What happens? Do you need to change the way your paper is shaped? What can you do to the paper to make it stronger?



PROJECT!

4 Change your design to make your paper stronger. Evaluate your new prototype. What shape is strongest? How much weight can you get your paper to hold?



EXPLORE MORE: What can you add to your paper structures to make them stronger? How does adding straws, popsicle sticks, or other material to your paper structures keep them from crumpling under the weight of the books?

THE GRANDFATHER OF SKYSCRAPERS

In England, you can still find the first building to be built with an iron frame, which was later developed into the technique of using steel frames to make taller buildings possible! In 1797, engineer Charles Bage (1751–1822) designed the Ditherington Flax Mill with an iron frame to help prevent fire—flax dust was famous for going up in flames. The mill still stands. It is being renovated into offices and shops, while keeping the historic iron frame.

PS

You can watch a short documentary about the building here.

KEYWORD PROMPTS

Ditherington Flax Mill video