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deSTEMber

SCIENCE ★ TECHNOLOGY ★ ENGINEERING ★ MATH

Index Card Engineering

According to an ancient Greek legend, there was a woman of royalty by the name of Princess Dido. When her brother, Pygmalion, murdered her husband, Dido, along with some loyal supporters, fled to the coast of North Africa. She asked the local king to sell her some land so that she could build a new city there. When the king refused, she persuaded him by asking him to sell her the amount of land that she could enclose with the hide of an ox. As soon as the king agreed, Princess Dido told her servants to tan an ox-hide and cut it up into long, narrow strips. Then she sewed all of the strips together to make one very long leather strip. With this strip, she claimed enough land to build a new city!

Thinking like Princess Dido, do you think you can cut an index card in such a way that you can fit through it?

TEKS:

6.4 Expressing relationships and making predictions.
6.4B Generate formulas (perimeter, area, volume) from data.

How To:

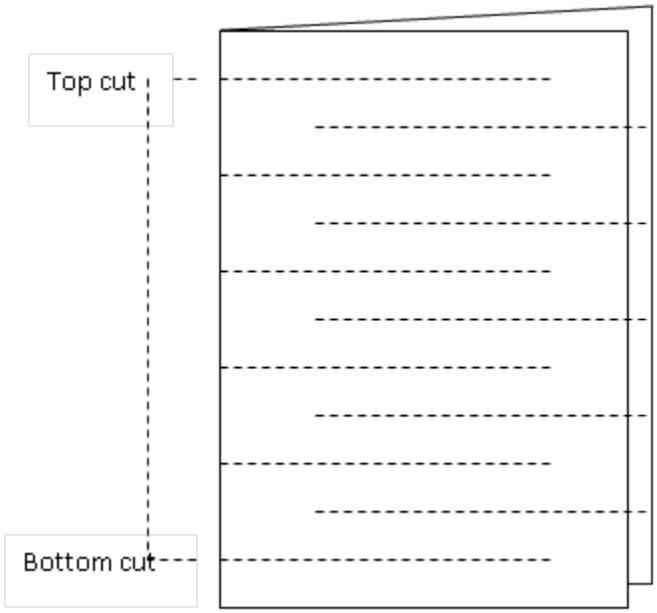
Materials:

- Index cards
- Scissors

1. Fold the index card in half so that the short edges meet.
2. Hold your card so that the fold is on your left. Start your first cut from the fold side about ¼ inch below the top of the card. (Use the image on the next page as a guide). Cut a straight line toward the non-fold side, making sure to leave about ¼ inch of the non-fold side uncut.
3. About ¼ inch below your first cut, start from the non-fold side and cut a straight line in toward the folded side. As before, leave about ¼ inch uncut.
4. Alternate your cuts on the folded and not folded sides until you have made cuts in the whole card. You should end up with an odd number of cuts (13 or 15 cuts works well). The closer together you make the cuts, the more cuts you'll have and the bigger your rectangle will be.
5. When you are finished making the cuts, cut along the fold between the top cut and the bottom cut without cutting the topmost and bottommost ¼ inch along the fold.
6. Unfold the card and… surprise! You've created a large rectangle big enough to squeeze your whole body through!

31 Days of STEM Fun!

How To (continued):



Note: If you use a sheet of 8½ ”x 11” paper, you will easily be able to fit a couple of people through the hole simultaneously. If you make the cuts closer together, you can make an even larger hole.

The STEM Explanation:

This activity demonstrates the difference between area and perimeter. The area of a flat object is the amount of space it takes up. The perimeter of a flat object is the distance around the edge of the object. When you made the cuts in the paper, you increased the perimeter of the paper, but the surface area remained unchanged.

Career Connection:

Applied mathematicians use theories and techniques, such as mathematical modeling, to solve practical problems. These mathematicians typically work with individuals in other occupations to solve problems. *Theoretical mathematicians* do research to identify and resolve unexplained issues in mathematics. They are primarily concerned with exploring new areas and relationships of mathematical theories to increase knowledge and understanding about the field.

Resource:

- http://www.bls.gov/ooh/math/mathematicians.htm#tab-2

