

How can a person walk through a sheet of paper?



Discover how it is possible for a person to walk through a piece of paper

Setting: Indoors / Outdoors

Time: < 30 minutes

Concepts: Surface area

Skills: problem solving, creative thinking

Subject(s):

- ✓ Physics
- ✓ Math

Ages:

- ✓ 9-11
- ✓ 12-14

Materials:

- 8 1/2 x 11 piece of paper
- Scissors
- Pen (not absolutely necessary)



Safety First!

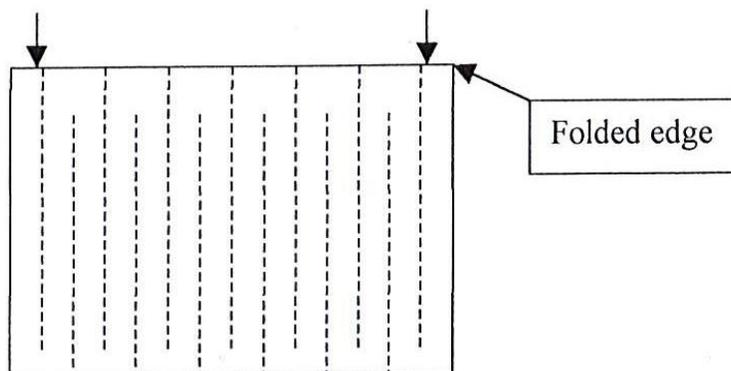
Use care when handling sharp scissors.

What to do:

Challenge: Using one piece of paper and a pair of scissors, can you make a hole in the paper that is large enough to walk through? Try to figure it out before reading the solution.

Solution: There may be other ways to complete this challenge, here is one solution:

1. Fold paper in half (width-wise is easiest)
2. Cut a slit in the paper, starting from the folded edge until you almost reach the other end
3. Alternate along your paper, cutting from the folded edge and then cutting from the unfolded edge
4. Make sure the end cut also starts from the folded edge



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5. Cut along the fold, in between where the two arrows in the above image are
6. Open it up. It should be one big circle!

What's happening?

By making all of these cuts, essentially you're making one rectangular piece of paper into a long narrow strip that is still connected at its two ends. Even though the area of your piece of paper has not changed, you've now increased the perimeter of the shape that you're trying to step through. This gives a person plenty of room to pass through.

Why does it matter?

Understanding the relationship between perimeter and area is important for many tasks. For instance, if you were putting trim in a room, a rectangular room might need a lot less trim than an irregularly shaped room of the same area.



Investigate further!

- Try to make as large of a perimeter as you can. How many people can you fit?
- Can you find another solution to the problem?