

WALK THROUGH PAPER

Fit your entire body through a piece of paper

What you'll need:

- One letter size sheet of paper
- Scissors
- Template below (optional)

Activity setup:

1. Print out the template below and cut along the lines, or follow the steps below to draw and cut your own template.
2. Fold the paper in half lengthwise.
3. Keeping the paper folded, measure 1.5 cm from the top of the paper and draw a line across it (perpendicular to the fold). On the line you've just drawn, measure 1.5 cm in from the open end of the paper and make a clear mark.
4. Draw another line 1.5 cm beneath the first one. This time, measure 1.5 cm in from the folded end of the paper. Make another clear mark.
5. Repeat this process, alternating sides each time, until you've worked your way down the entire page.

Activity setup continued:

6. Now that you have your template ready, it's time to cut! The first line you drew will be a **Cut A**. Start from the folded end and cut across the line until you reach the mark you made 1.5 cm from the open end.
7. The second line will be a **Cut B**. Cut in from the open end until you reach the mark you made 1.5 cm from the folded end.
8. Repeat this process until you have cut every line.
9. Carefully unfold the paper. Cut along the folded creases in the middle of the page (perpendicular to the Cut As). Do **not** cut the creases between the Cut As at the top or bottom edges of the paper.
10. Expand the paper into a large loop and place it around your body!

Try this!

Once you've tried this trick once, why not mix up your materials or method to see what happens? Try this activity with a larger piece of paper, like a newspaper, or a smaller one, like an index card. See what happens if you use a less flexible material, such as cardboard. What will happen if you cut more lines spaced closely together? What about fewer lines? Can you cut the paper to fit around two or more people? What is the largest hole you can make? There's no limit to the experimenting you can do!

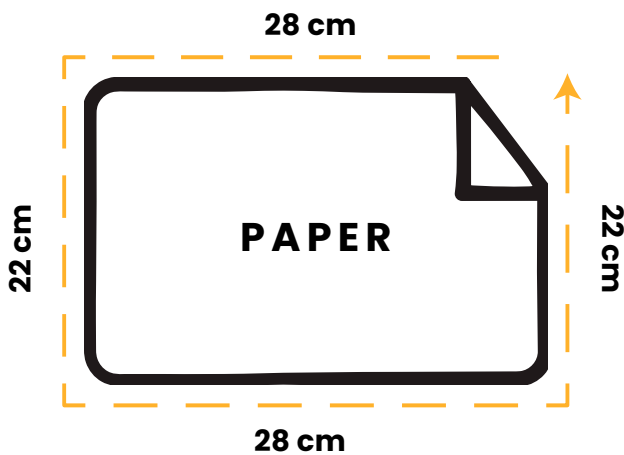


WALK THROUGH PAPER



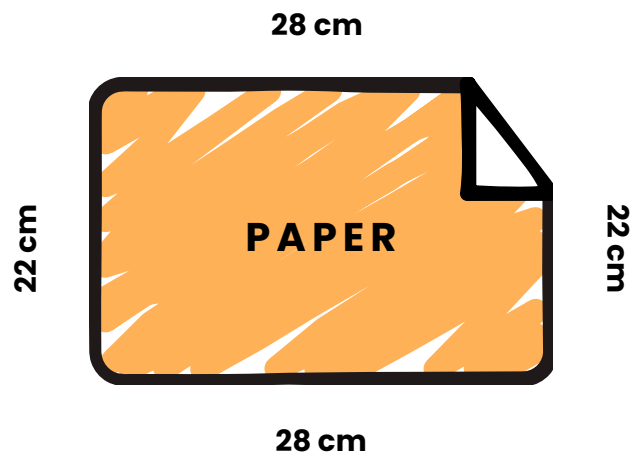
How does it work?

To understand this trick, we need to look at **perimeter** and **surface** area. The perimeter of a shape is the line that surrounds the shape. To calculate the perimeter of a rectangle, such as a piece of paper measuring 22 x 28 cm, add all four sides of the rectangle:



$$22 + 22 + 28 + 28 = 100 \text{ cm}$$

The surface area of the rectangle is the entire area contained inside the perimeter. To calculate this, multiply the length of the rectangle by its width:



$$22 \times 28 = 616 \text{ cm}$$

By cutting the paper, you increased the perimeter. This allowed the hole in the middle of the paper to increase in size as you expanded the paper outwards. The surface area of the physical paper remained the same, though it was distributed differently than it was in the original rectangle.





WALK THROUGH PAPER

