

Mobius Strip

Take Home Experiment!

You will need tape, something to write with, and scissors (with an adult's help if necessary).

Directions:

First, we'll make just a paper loop.

1. Cut along the right-most dotted line to get ONE of the two strips along the edge of this paper.
2. Make a loop with the paper by lining up the two short ends (C above A and D above B, all facing up).
3. Secure the ends together with tape. (Scotch tape works best.)



Now, we'll make a mobius strip.

4. Repeat steps 1 & 2
5. While holding the two short ends of the paper, twist once so that one set of letters is facing down. (C will be on B and D will be on A now.)
6. Secure the ends together with tape. (Scotch tape works best.)



You have your own mobius strip!

Time for the experiments!

Activity 1:

- **What do you think is going to happen if you draw a line around the loop? What about if you draw one around the mobius strip?**

1. Now, draw a line along the middle of the loop without picking up your pencil. Continue all the way around.
2. Repeat the previous step with the mobius strip (You may need to twist the strip as you go along.)

- **Where did you end up in each case? Is there any portion of the paper that you did not draw a line on?**

You end up back where you started for both the loop and the mobius strip. With the loop, your line never reached the inside of the loop. With the mobius strip, you never had to turn the paper over to the back, but your line follows all the way around the paper.

Mobius strips only have *one* side, unlike the loop that has *two*!

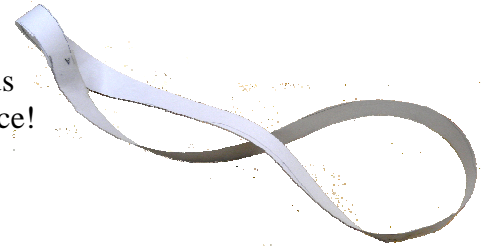
A B A B

C D C D

Activity 2:

- **What do you think is going to happen if you cut along your line around the loop? What about if you do the same with the mobius strip?**
- **Do you think you will have one loop or two in each case?**
 1. Now, cut along your line around the middle of the loop. (You may need an adult's help to get started.) Continue all the way around.
 2. Repeat the previous step with the mobius strip. (You may need to twist the strip as you go along.)

The loop becomes two loops, but the mobius strip just becomes a single long twisted piece!



- **Do you think this long twisted piece is still a mobius strip?**

Let's find out!

3. Draw a line along the middle of the new loop without picking up your pencil. (You might want to use a different color than before!) Continue all the way around the strip (You may need to twist the strip as you go along.)

The line does not continue to both sides of the paper, so this is just a long twisted loop now.

- **What do you think will happen if you cut around the middle of the new long twisted loop?**
 4. Cut around the middle of **new long twisted loop**. (You may need an adult's help to get started.) Continue all the way around.

Now it splits into two interconnected strips!



- **Do you think the new pieces are mobius strips?**

Let's find out!

5. Draw a line along the middle of the new loops without picking up your pencil. Continue all the way around.

The two strips are twisted, but they are just loops. The line around the center does not continue onto both sides of the paper.

The study of objects like the mobius strip in mathematics is called Topology.