Mobius Strip Magic

Adapted by Megan Schollenberg and Mike Wong

Grade Range	Content Area	Materials
Grades 1-5	● Geometry ● Shape and Space	● Strips of paper (about 30cm in length and 2-3cm wide) ● Scissors ● Tape

Activity

Activity 1 - (Is it Possible to Turn Two Circles into One Square?)

1. **Procedure**
- Form one strip into a circle. Tape.
- Loop the second strip through the circle in the manner of a paper chain. Tape.
- Securely tape the two circles together. Important: tape loops together on *both* sides.
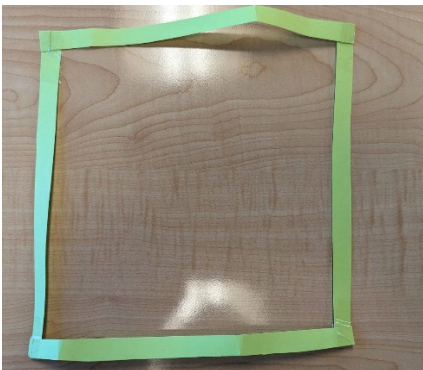
- Carefully cut one circle in half lengthwise. Now you have two loops connected by one long strip.
- Cut the remaining strip down the middle.

2. **Questions to wonder**
- Is it possible to transform something round into something straight?
- What shape did you get when you cut this out?
- How do you know it is a square?
- Do you think it is possible to make a rectangle?
- What sides came from what loops? How could we show this?

Activity 2 - (Mobius Strips)

1. **Procedure**
- Mark an X on both ends of the same side of the paper strip.
- Half-twist the paper so the Xs touch.
- Tape together.
- Now you have a Möbius strip.
- Feel free to make another one!

2. **Questions to wonder**
- What is a mobius strip?
- How many "sides" or surfaces does it have?
- How can a 3-D shape only have 1 surface?
- How could we show this?

What happens if I cut it in "½"

3. **Procedure**
- With your pencil, draw a line down the middle of the strip, making a continuous line until you reach the starting point.
- Take your scissors and cut down this line.
- When you reach the end, do not let go immediately!
- Instead, think: What is going to happen when I pull these apart?

4. **Questions to wonder**
- What do you notice about the loop? (How many twists does it have now?)
- Why didn't we get two pieces?
- What do you think would happen if we cut the loop in half again?

What happens if I cut it in "1/3"

5. **Procedure**
- This time, instead of drawing a line down the middle, make your starting point one third of the way from the edge of the Möbius strip.
- Continue the line until you reach the starting point. You will see (*what looks like*) two parallel lines on the surface. Cut the strip.
- Once again, before making the final snip, predict what will happen.

6. **Questions to wonder**
- Is there a way to cut it into two pieces by cutting along the length?
- If we started with a thicker(wider) paper, what would happen if we kept cutting the loops?

Resources
Alagappan, S. (n.d.). *The Timeless Journey of the Möbius Strip*. Scientific American. Retrieved February 13, 2023, from https://www.scientificamerican.com/article/the-timeless-journey-of-the-moebius-strip/ Erica. (2015, June 16). Geometry Magic: Turn 2 Circles into 1 Square. *What Do We Do All Day*. https://www.whatdowedoallday.com/geometry-magic/ Erica. (2014, July 8). Math Art with a Möbius Strip. *What Do We Do All Day*. https://www.whatdowedoallday.com/math-art-mobius-strip/ Gunderman, David and Gunderman, Richard. (September 25, 2018). *The Mathematical Madness of Möbius Strips and Other One-Sided Objects	Science| Smithsonian Magazine*. (n.d.). Retrieved February 13, 2023, from https://www.smithsonianmag.com/science-nature/mathematical-madness-mobius-strips-and-other-one-sided-objects-180970394/