December 2, 2023

Make a Möbius Strip and A Sweaty Plant Adaptation

**Student Comprehension Worksheet: Make a Möbius strip**

**Directions:** Read the online *Science News* article “[An enduring Möbius strip mystery has finally been](https://www.sciencenews.org/article/mobius-strip-mystery-solved-math) [solved](https://www.sciencenews.org/article/mobius-strip-mystery-solved-math)” and answer the following questions as directed by your teacher.

# Before Reading Activity

1. With scissors, cut three long strips from a sheet of paper. Make sure every strip has the same width and the same length. Using a ruler, measure the length and the width of each strip in centimeters.
2. Take one strip and make a loop by taping one end of the paper strip to the other. Take the second strip and twist the paper halfway around once before taping the two ends. If you need a visual, check out [this](https://www.youtube.com/watch?v=1WRgFKyALto) [video.](https://www.youtube.com/watch?v=1WRgFKyALto) The normal loop has two surfaces, an inside and outside. How many surfaces does the half-twist loop have? You can figure this out by running your finger along the loop until you arrive back at the point you started.
3. Take the third strip and create another loop with a twist. Before taping, try to make the loop as small as you possibly can. What happens to the loop if you make it too small?

# During Reading

1. How does the number of surfaces differ between a strip of paper curled into a loop vs. a Möbius strip?
2. What problem occurs if you attempt to make a Möbius strip from too short of a strip of paper?
3. Explain the meaning of the following symbol: √3
4. In 1977, what did mathematicians hypothesize regarding the limitations of the Möbius strip?
5. In 1977, mathematicians showed that a Möbius strip’s ratio of length and width must exceed a

particular value. What is that value?

1. What assumption did Schwartz make regarding the shape of a sliced opened and flattened Möbius strip? What did he discover the shape to be?
2. What did Schwartz prove after correcting his previous mistake?

# After Reading

1. What does this story tell us about the value of trying multiple approaches in addressing challenging problems?
2. What was the proportion of your Möbius strip’s length to width? Did it fall within the proportion

proved by Schwartz? Explain.

1. Come up with one other potential real-world application for a Möbius strip and describe it in one sentence. What is it about the Möbius strip that makes it so useful in this application? Feel free to be creative!