The Möbius Zip

(Ireland)

Background:

Many teachers and mathematicians will be familiar with the Möbius Strip that can be made from a narrow piece of paper. This is variation can be used over and over again without any waste or harm to the environment. It is said that it was discovered independently by the German mathematicians August Ferdinand Möbius and Johann Benedict Listing in 1858.

A Möbius strip can be created by taking a strip of paper, giving it a number of half-twists, then taping the ends back together to form a loop. If you take a pen and draw a line along the centre of the strip, you'll see that the line apparently runs along both surfaces of the loop.

By cutting along this line you will produce one large loop or (depending on the number of half twists), a number of interlocking loops.

You will need:

✓ A large zip that can be separated into two halves
✓ Four sticky Velcro hooks and loops pads

Follow these steps:

1. Stick the a Velcro pad on each side and end of the closed zip
2. Join the ends of the zip firstly with no twists
3. Fully open the zip- note you now have two separate loops.
4. Repeat with one half twist when you open the zip you will end up with one long loop.
5. Repeat with one full twist this time the result will be two interlocking loops
6. Investigate what happens with more twists?
7. Is there a relationship between the number of half twists and loops resulting?

What next?

• This simple activity can be used to introduce students to the mathematical topic of topology
• Students can research real world applications for the Möbius Strip such as large convey belts that use this design. The entire surface area of the belt gets the same amount of wear and so they last longer