



A Möbius strip with an intrinsic twist

Skill and Experience ● ● ● ● ●

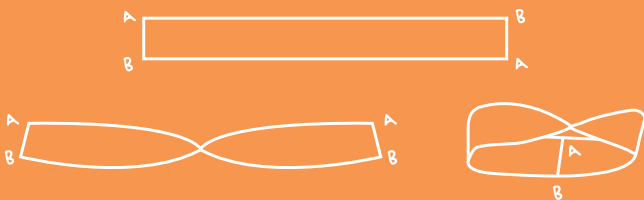
A very easy project for someone who can crochet and a slightly more challenging one for someone who can knit and has access to two circular needles. There is a video to called “[Knitting a Mobius Strip](#)” to help you.

How it relates to maths

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A Möbius strip or Möbius band is a two-dimensional surface with only one side. It is named after the German mathematician August Möbius, but there are pictures of them from well before his time. There is a Roman mosaic from Sentium where the god Aion stands inside a Möbius strip with signs of the zodiac on it.

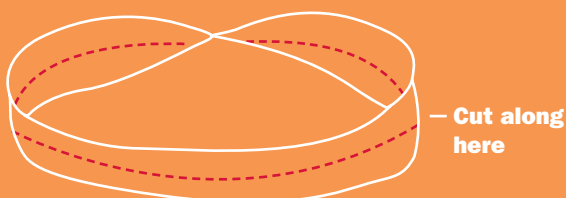
If you haven't played with a Möbius strip, do so now. Cut a strip of paper, twist it half the way round and join the ends with sticky tape.



Start writing E E E ... all around the strip until you get back to where you started. You should notice that by the time you get back to where you started, all the band is covered in letters. There isn't an inside and an outside. If you hold the paper up to the light and you have used a dark enough pen you will see that, looking through the paper, all the Es will look like 3s.

Now try colouring in one edge. You should find you come back to where you started. There is only one edge.

Now try making a pencil line halfway up the strip all the way round and then cut along the line.



What happens? Does it just fall into two pieces?

Now make a new Möbius strip and make a pencil mark about a third of the way from the edge. Cut along this line and what happens?

It is very easy to make a Möbius strip out of material by cutting out a rectangle and sewing it together just as you stick the paper ones together. You can make a yarn Möbius strip by knitting a long rectangle and sewing the ends together, but there is no satisfaction in doing that. The challenge is to make a Möbius strip where there is no visible seam, starting from the middle and working out with an intrinsic twist. – Simple to crochet, but a bit more challenging to knit. I tried my first knitted Möbius strip following instructions on [Sarah-Marie Belcastro's wonderful website The Home of Mathematical Knitting](#). One easier way to start a knitted Möbius strip is the “Möbius cast on” which is described by lots of people on YouTube for making infinity scarves. My preferred way uses a variation of Judy Becker's Magic cast-on created by the Sockmatician, as shown in his YouTube video [Judy Becker's Magic Cast On - A Sockmatician Tutorial - YouTube](#). It is actually a way of casting on to make a sock without a seam in the toe, but it's great for starting a Möbius strip.

There is a video to show how to make the knitted Möbius strip if you find the written instructions confusing.



Knitted Möbius Strip

There is a video
to help you called
"Knitting a mobius strip"

What you'll need



First set of 4mm circular needles (any length) for the cast on



Second set of 4mm circular needles of 60cm length for the knitting



A small ball of double knitting yarn



About 4cm of a different coloured yarn



A crochet hook size 4mm or smaller



A tapestry, darning or wool needle



Scissors

Step-by-Step Instructions

- 1 Pull out a tail of yarn about 1 metre long.
- 2 Cast 101 stitches onto one of the first set of circular needles, using the Sockmatically's variant of Judy Becker's magic cast on.
- 3 Twist the tail yarn and hold it against the work in your left hand, as shown on the video, and pull the bottom needle out, leaving the stitches on the cord.
- 4 Pick up the second set of circular needles in your right hand. Knit, purl, knit, purl alternately from the top needle of the first set in your left hand to the needle of the second set in your right hand, until all the stitches have gone from the left-hand needle. If all is well there should be 51 stitches so that your last stitch is a knit.
- 5 Pull the stitches on the first circular needles to the needle you haven't used yet, and continue alternating purl, knit, purl from this needle onto the needle from the second set in your right hand. The first two stitches should be pulled very tight, as this is where the two sets of stitches try to pull away from each other.
- 6 After about five stitches, use the crochet hook and the short piece of contrasting yarn to tie the stitches from the first set and the second set together to stop them pulling and making a stretched loop in the final strip. Then continue alternating knit and purl to the end. There should be 50 stitches at this stage so the last stitch should be a knit.
- 7 Once all the stitches are on the second needles, the first needles can be put to one side. Keep the same needle in your right hand and bring the needle from the same set up in your left hand. The stitches should be very close to the needle in your left hand now. Remove the contrasting yarn which kept things from stretching and continue to work moss stitch around the needles. You should be starting purl, knit, purl. Again, as you complete the loop make the first two stitches tight to make sure there is no sag.
- 8 Continue to work moss stitch until your band is sufficiently wide. Make sure you stop in line with the original tail so that the band is the same width all the way round.
- 9 Cast off in the usual way and sew in the ends.

Quick Tips



These instructions are for a strip in moss stitch (alternating knit and purl) which is a stitch where both sides look the same. This helps to hide the starting line in the middle. If you start with an even number of stitches and alternate between knit and purl, it comes out as rib and you can see the half stitch translation clearly in the middle of the strip. If you start with any number of stitches but you knit all the time, the middle is very clear. One half looks like the front of stocking stitch and the other half looks like the back, but as you go around the strip there is never a point where one changes into the other.

These instructions are for a small Möbius strip about 8cm in diameter. For a snug neck warmer, cast on 200 stitches and work in rib (alternating knit and purl) and make it wide enough to cover your neck. The rib stretches so you can get it over your head and it snuggles smaller again around your neck. Use circular needles with a longer cord to make a big draping infinity scarf. An easy way to make it more lacy is to use thinner yarn and thicker needles.

You can cast off in a contrasting colour to make a very visual edge. This is a good idea for thicker Möbius strips where the shape can get lost to the eye from a distance.

Crocheted Möbius strip

What you'll need



A small ball of double knitting yarn, any left over bit will do



A tapestry, darning or wool needle



Scissors



A 4mm crochet hook

Step-by-Step Instructions

- 1 Make a slip knot and make a chain about 25cm long.
- 2 Work double crochet stitches (US single crochet) into the chain, starting from the slip knot end.
- 3 When you get back to the slip knot, instead of working the next row into the first row, continue the row into the original chain, but on the other side.
- 4 When you come back to the slip knot again continue working into the first row you made and just keep crocheting until the band is 2 to 3cm deep.

Quick Tips



It is best to finish in line with the slip knot so there is as much above the original chain as below.

This can be done in any weight of yarn with any size of hook. Experiment!