

Paper Magic: Secret Messages

Write secret messages to your friends

What you need:

- Astrobrights® “Galaxy Gold” paper from Wausau Papers (see note below).
- Lemon juice or vinegar
- Windex® or other ammonia-based glass cleaner
- Small paintbrush

What to do:

1. Use the paintbrush and lemon juice or vinegar to write a message on the paper. Exchange your secret message with a friend. (Don't let it dry out completely before your friend can read it.)

2. To read a secret message with a friend, lightly spray the paper with Windex. **CAUTION!** Do not spray in eyes or inhale the fumes.

How does it work?

When you spray Windex on the yellow paper, it turns deep red—except for the places that you had previously put lemon juice or vinegar on. Why?

The yellow dye that is in this paper acts as something chemists call a pH indicator. That means it changes colours to indicate the pH level, or acidity, of substances it comes into contact with. Chemists determine if a substance is acidic by comparing it against the pH scale, which goes from 1 to 14. Pure water is neutral, with a pH level of 7. Substances with a pH level less than 7 are acidic. At the opposite end of the scale, substances with a pH level greater than 7 are called *basic*, or *alkaline*.

When you touch the paper with something acidic, like lemon juice or vinegar, the dye stays its normal yellow colour. But when you touch it with something that is basic, it turns deep red. The ammonia in the Windex is basic, so the paper turns red when you spray Windex on it. The acidic lemon juice in your message counteracts the ammonia, though, so that part stays yellow. And if you paint over the red Windex parts with lemon juice, the paper will turn yellow again.

Note: Wausau Papers' “Galaxy Gold” is the only paper that will work. Look for it at Staples stores, or contact the Canadian distributor, Cascade Resources (<http://www.cascades.com/>), to find a printer in your area that carries it.

Paper Magic: Walk Through a Postcard

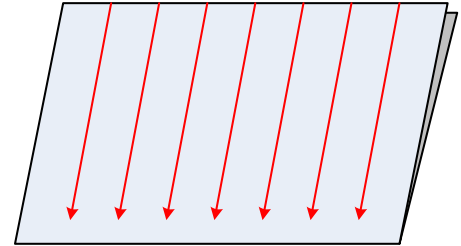
Cut a postcard in a special way that lets you step right through it.

What you need:

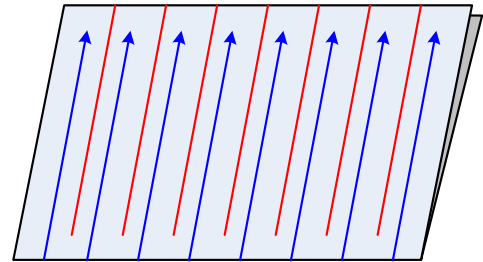
- Postcard or cardstock, approximately 17 x 22 cm (6.5" x 8.5")
- Scissors

What to do:

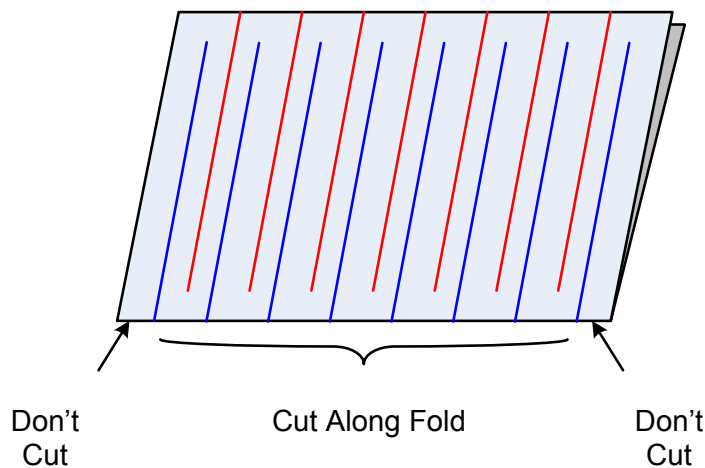
- 1.** Fold the card in half cross-wise. Starting at the open edge, make cuts about 1 cm apart, through both layers, across the card nearly to the fold. **CAUTION:** Don't cut right to the fold.



- 2.** Starting at the folded edge, make cuts between the previous cuts, nearly to the open edge. **CAUTION:** Don't cut right to the open edge.



- 3.** Cut along the folded edge, **EXCEPT** for the two outside segments. Leave the outer segment on either end intact, as shown in the diagram.



- 4.** Open up the card, and step through it.

Paper Magic: Moebius Loop

August Moebius was a 19th-century mathematician, physicist, and astronomer. This interesting little loop came out of his important work in geometry.

What you need:

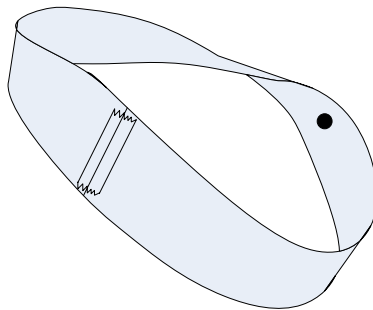
- Paper strip from the bottom of this page
- Tape
- Pen
- Scissors

What to do:

1. Cut a strip off of the bottom of this page, and draw a dot in the centre of it.



2. Give one end of the paper strip a half-twist, and tape the ends together to make a loop.



3. Starting from the dot you drew in Step 1, draw a line down the centre of the paper loop. Go all the way around until you get back to the dot. Look carefully at the line you just drew. You ended up at the same place you started, as you might expect when you draw a continuous line along a loop. But you've drawn a line on *both* sides of the paper!

4. Carefully cut along the line you just drew. What happens?

