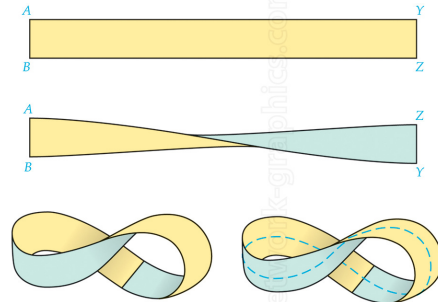
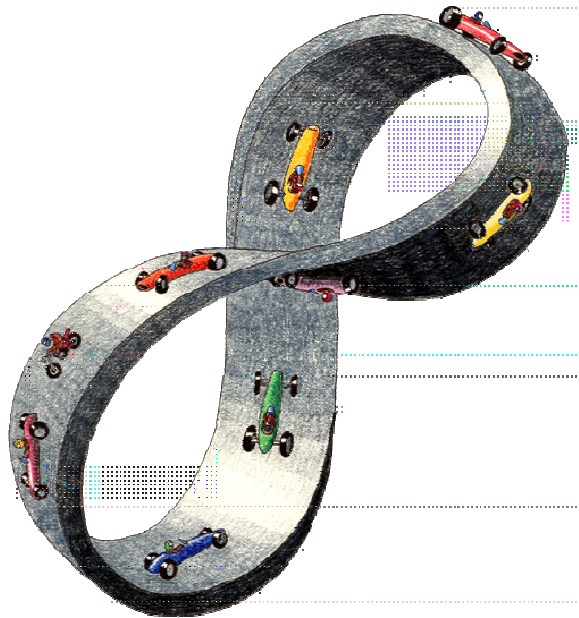


# The Möbius strip



( Source: [http://network-graphics.com/images/math/mobius\\_strips\\_m.jpg](http://network-graphics.com/images/math/mobius_strips_m.jpg))

The **Möbius strip** is formed from a rectangular strip by gluing the short ends together with a half twist. One unusual property of this surface is that it is **one – sided** and not two – sided like most of the familiar surfaces in 3 – dimensional space like the sphere. Two – sidedness means that one can define a continuous unit vector valued function on the surface which always points upward or outward, with the vectors in the opposite direction pointing downward or inward. For example, if we have a sphere of unit radius centered at the origin, then the unit vector is merely the vector from the origin to the point on the surface. In contrast, there is no way of defining a unit vector field on the Möbius strip which can be described as pointing upward or outward. The drawing below illustrates this fact; the racing cars on the surface can be viewed as an attempt to describe a continuous upward direction, but the picture shows that if one travels along the continuous path in the center of the strip, then after one lap the car will be upside down from its original position (look at the two red cars near the center of the picture).



( Source: [http://blogs.20minutos.es/mati-una-profesora-muy-particular/files/2012/10/Study\\_of\\_Mobius\\_Strip.png](http://blogs.20minutos.es/mati-una-profesora-muy-particular/files/2012/10/Study_of_Mobius_Strip.png))