

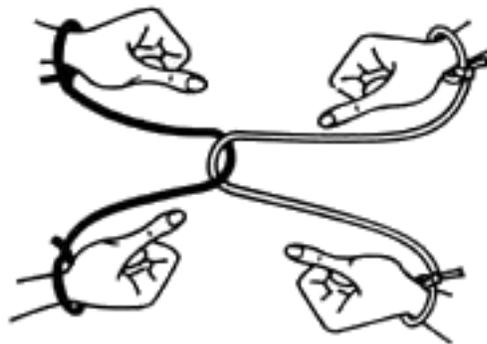
The Handcuff Puzzle

This is a classic puzzle that has been around for at least 250 years. It is challenging, but it gives you a chance to get students up and moving. The solution depends on lateral thinking and topology or the mathematics of distortion.

The Set-Up

For this puzzle you need two people. Each person will need a piece of rope with a loop tied in both ends, so it can be worn as handcuffs. The rope should be reasonably long, so that the person wearing it can easily step over it if they want.

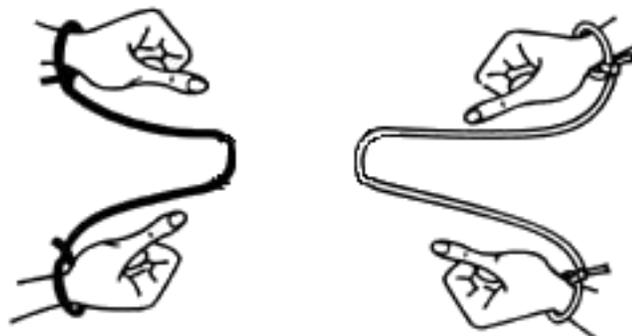
I tie the loops in each end of the rope in advance. I then help one student put the loops on their wrists and tighten the loop a bit, leaving some space between the rope and the wrists. Take the second rope loop it around the rope the first student is wearing and then put the loops on the second student's wrists and tighten the loop a bit. The handcuffs are looped around each other so the students are tied together.



The Task

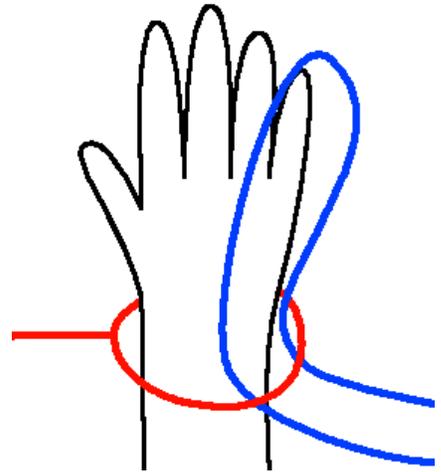
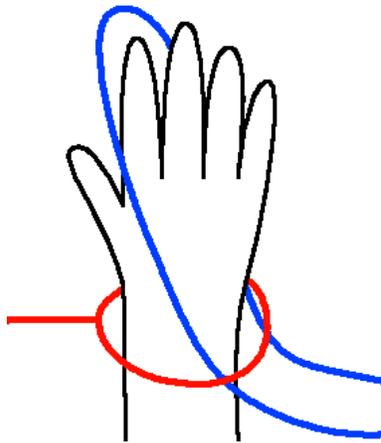
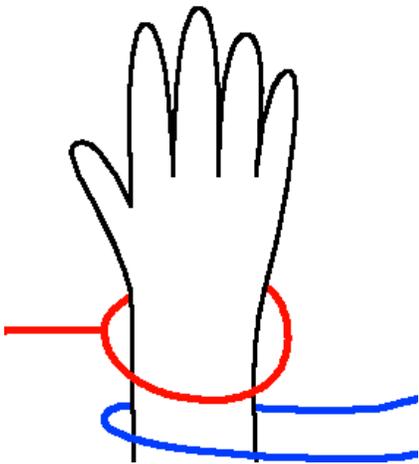
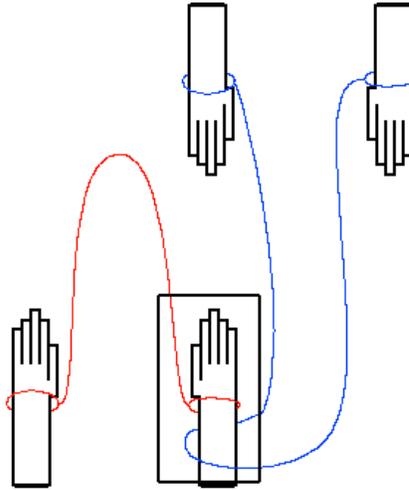
The student have to find a way to separate themselves from each other while following these rules: The handcuffs cannot be removed from the wrists. You cannot break, cut, bite through or in any other way damage the rope.

If you are doing this puzzle with a class, make certain you tell them they need to be able to show you their solution. Otherwise it won't be so enjoyable.



The Solution

Start by moving the other person's rope along yours until it is lying on your arm. Make sure that the other person's rope is not wrapped around your rope, it should only be touching your arm. Reach in through your handcuff with a thumb and finger; and grab the tip of the other person's rope. Now pull it through the opening between the loop and the wrist. Pull it over the hand and then pull it out of the loop. Now let it go back through the handcuff and you are separated.

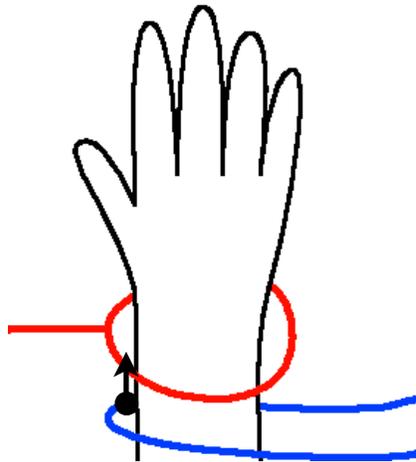


Tips

If you are showing this to a class, some students will say that the puzzle is easy and they know how to do it. The first thing they will do is either step over the other person's rope or duck under it. This will not work. People very rarely solve this one without assistance. Giving a hint may help. The basic concept of all disentanglement puzzles is to examine the assumption of what "inside" and "outside" means.

Consider being in a room with only a door. If the door is closed you are locked inside the room. If the door is open there is nothing blocking you from going out the opening to the outside. Disentanglement puzzles are best solved by looking at points that seem locked inside an area and finding a "door" that is open to pass through to the outside.

Have them visualize a point where the 2 ropes meet. Try to have them think of a way that point on one rope could escape through an open door to the outside. Look for an opening that the point could go through to be on the outside of the other rope. There is an opening between the wrist and the rope that would allow a point trapped inside to escape outside. Take that point and pass it through the opening and keep moving over the hand and out the other opening in the wrist.



Single Person Version

A single person version is to tie a knot in the rope, then put the handcuff on. They need to untie it, following the same rules.