# Paperclip trick

Overview: Math isn't just about numbers or shapes… it's also about games and thinking about things in a new way. This problem is a great example of this. It's a neat logic question that also involves some spatial thinking, like geometry, to work yourself out of what seems like a paradox. Before you look at the solution on the next page, see if you can figure it out for yourself.

Materials

- 11 paper clips
- Three cups

Activity: For this puzzle, you'll use three cups and 11 objects. The first challenge is to put an odd number of objects in each cup. Is this pretty simple? How many different combinations can you come up with for the 11 objects?
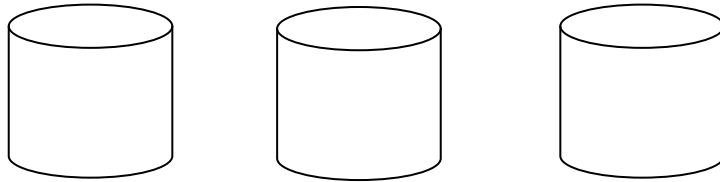
Now take one paperclip away and use ten instead. Is this puzzle more challenging?

Try to figure this out for yourself first before turning the page! Make notes here on things you tried that did and didn't work:

Need a hint? Can you figure out a way for one paperclip to be in two different cups at the same time?
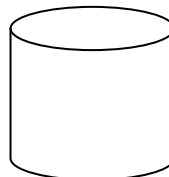
Solution time! For 11 paperclips, you'll find this is one solution to the problem:
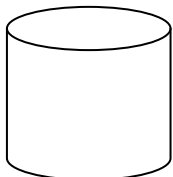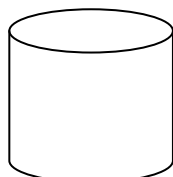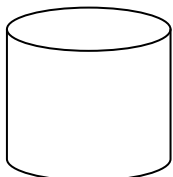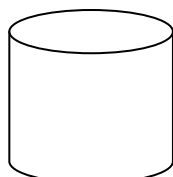
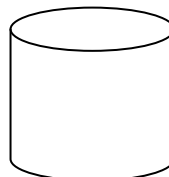1 clip   3 clips   7 clips

Another solution is here:

3 clip   5 clips   3 clips

Pretty cool, right? I hope you enjoyed this trick. Mathematics and paradoxes can really be a lot of fun!

Exercises

1. What is an even number?
2. What is an odd number?

If you have 8 paperclips and three cups, arrange the paperclips you that you have an odd number in each cup. Find three different solutions (arrangements) to solve this problem.

3. First arrangement
4. Second arrangement
5. Third arrangement

Now you have 11 paperclips and three cups. Find two *new* solutions (ones we haven't covered yet in this lesson) to having an odd number in each cup.

6. First arrangement
7. Second arrangement

Reduce your number to 10 paperclips. Find four *new* solutions (ones we haven't covered yet in this lesson) to having an odd number in each cup. (Is it easier this time?)

8. First arrangement
9. Second arrangement
10. Third arrangement
11. Fourth arrangement

Answers to Exercises: Paperclip trick

1. Is a number that can be divided by 2 completely without a remainder
2. Is a number that when divided by 2, the remainder is always 1
3. 3,(4(1))
4. 1,(4(3))
5. 5,(2(1))
6. 1,1,9
7. 1,5,5
8. 7,(2(1))
9. 5,(4(1))
10. 1,(4(5))