

PUZZLING CARTOON

- THE RINGS -



AMAZINGMATHS

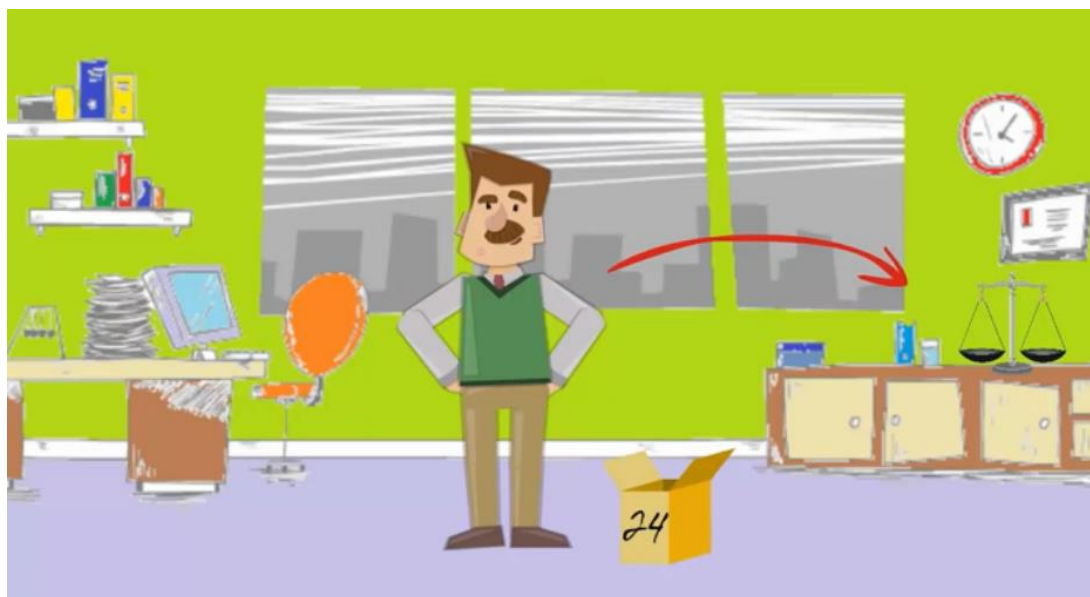
Materials:

- Video of the puzzle
- Sheets of paper
- Pencils

The puzzle

Mr. Bolzano is a jeweller and a mathematician. He just received a batch of 24 gold rings and suspects one of them is rather made of bronze.

Mr. Bolzano owns a pair of scales. He can weigh things. (A weighing consists of putting rings on each pan. The scale will tilt on the heaviest side or will remain balanced if both weights are equal.)



We know that the bronze ring is LIGHTER than the others. After thinking about it, he says: "I'm sure I can find it in 3 weighings".

How can Mr. Bolzano find the bronze ring in three weighings?

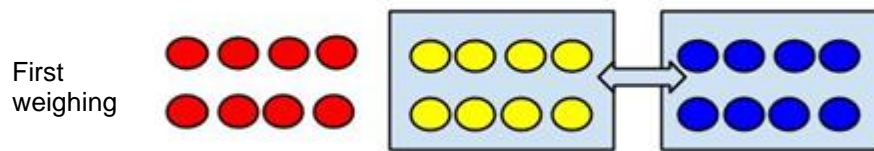


PUZZLE SOLUTION



The answer:

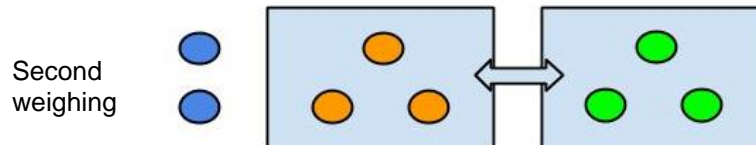
First of all, we divide our 24 rings into three piles of 8 rings and we compare two of these piles.



If the **1st weighing** is balanced, the bronze ring is among the 8 that were not weighed. We are now certain that the other 16 rings are really made of gold; we eliminate them.

Otherwise, it is among the 8 rings of the lightest pan. We are now certain that the other 16 rings, meaning the ones on the other pan and the ones that stayed on the table, are not bronze.

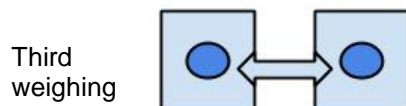
Let's use the same technique again, but this time separating our rings into two piles of three and one pile of two.



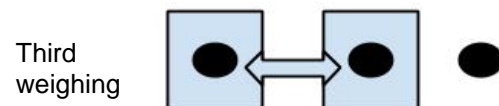
If the **2nd weighing** is balanced, the bronze ring is among the 2 that were not weighed. We are now certain that the other 6 rings are not made of bronze: we eliminate them.

Otherwise, it is among the 3 rings of the lightest pan. We are now certain that the other 5 rings are not bronze.

We then have two possibilities.



For the **3rd weighing**, *if there are two rings left*, we compare the last two rings and the lightest one is the bronze ring. **We found the bronze ring.**



For the **3rd weighing**, *if there are three rings left*, we compare two of the rings. If it is balanced, the ring that was not weighed is the bronze ring. **We found the bronze ring.**

If it is not balanced, the bronze ring is the lightest one. **We found the bronze ring.**

