In this particular lab, an unknown solution was given to every individual, from which, each individual needed to identify the cations present in the unknown solution. Every individual was given 5 different potential cations from the start to learn their behavior and different possibilities of precipitates; then confirmatory tests to the actual solutions to decipher whether the potential cations were present or not. My potential ions were: Ag+, Ba2+, Cu2+, Mn2+, Fe2+. An schema/procedure, for the unknown solution, was constructed.

Firstly, a few amounts of drops of Sodium Chloride (NaCl(aq)) were added to the unknown solution to see whether it formed a white precipitate AgCl(s) or not. This is because: , and AgCl is insoluble in water, thus, forming a white precipitate. Thus, when this confirmatory test was conducted, a white precipitate formed and then the solution left was centrifuged and it was decanted off; isolating the AgCl (white precipitate).

Secondly, a few amounts of drops of Sodium Sulfate (Na2SO4(aq)) were added to the unknown solution (excluding the Ag+) to see whether it formed white Ba(SO4)(s) or not. This is because: , and BaSO4(s) is insoluble in water, being a white colour precipitate. Hence, when this confirmatory test was conducted, no precipitate was seen. In addition it was still a yellowish solution, with no precipitates formed. In order to be completely positive that there was no trace of Barium ions, the solution was centrifuged, although there was still no trace of a white precipitate. Concluding that there was not any trace of Barium ions in the unknown solution.

After testing for Barium ions, the following confirmatory test was for Cu2+. Hence, an excess amounts of drops 6.0 M Sodium Hydroxide (NaOH) were added to the unknown yellowish solution to see whether it formed a light yellow/brownish precipitate or not. This would be because: , and is insoluble in water and is a complex ion because of adding excess 6M NaOH, being a light yellowish/brownish precipitate. Although that wouldn’t be the only step in order to confirm it or get the precipitate because it was required to get the CuI2(s) as a precipitate not Copper(II) hydroxide. Therefore, the pH of the solution after the addition of excess NaOH had to be around 7. Hence, several drops of .5M HNO3(aq) was added in order to reach the optimum pH level. After, the confirmatory test was conducted by adding drops of KI solution, where tiny ions of Copper(II) could be seen, however, centrifuging and decanting was required in order to be completely positive of the presence of Copper(II) ions; then, a small amount of light yellow/brownish precipitate was formed, confirming the presence of Copper(II) ions.

At this part of the scheme, there were only 2 potential ions were left: Fe3+ and Mn2+ to test for their presence in the unknown solution (excluding Silver and Copper(II) ions) . In order to separate Manganese (actually Mn(OH)2) and Iron (III) (actually Fe(OH)3), the acid solution: HNO3(aq) was added till the solution reached a 5<pH<7. Then, Manganese (Mn(OH)2) would be a clear solution to which small trace amounts of NaBiO3(s) and then 2 drops of 6M HNO3(aq); centrifuge and decant which should show a light purple precipitate. While on the other hand, Iron (III) (Fe(OH)3), is supposed to be a precipitate and had to have a pH of 7 in order to perform the confirmatory test, which had to be reached through adding HNO3 or NH4OH. Once pH was reached to the right level, the confirmatory test was supposed to be conducted; which was adding few drops of aqueous KSCN to the solution. This confirmatory test should give a dark reddish precipitate. However, both of these confirmatory test failed, the Mn remained a clear solution with no precipitate, and the Iron(III) confirmatory test gave a dark brown precipitate; which could’ve had slight reddish colour in it, however, I couldn’t see it so I decided that that there wasn’t any Iron in it. Although, I’m still debating whether there was iron in the unknown solution or not, as it was a very close colour to dark red. Hence, there was neither Iron (III) (most likely) nor Manganese present in the unknown solution.

In conclusion, these confirmatory tests conducted to the unknown solution given in the lab, conclude that there were only Ag+ and Cu2+ cations present in the solution out of the 5 potential ions: Fe3+, Cu2+, Ba2+, Ag+, Mn2+.