III IYNT 2015

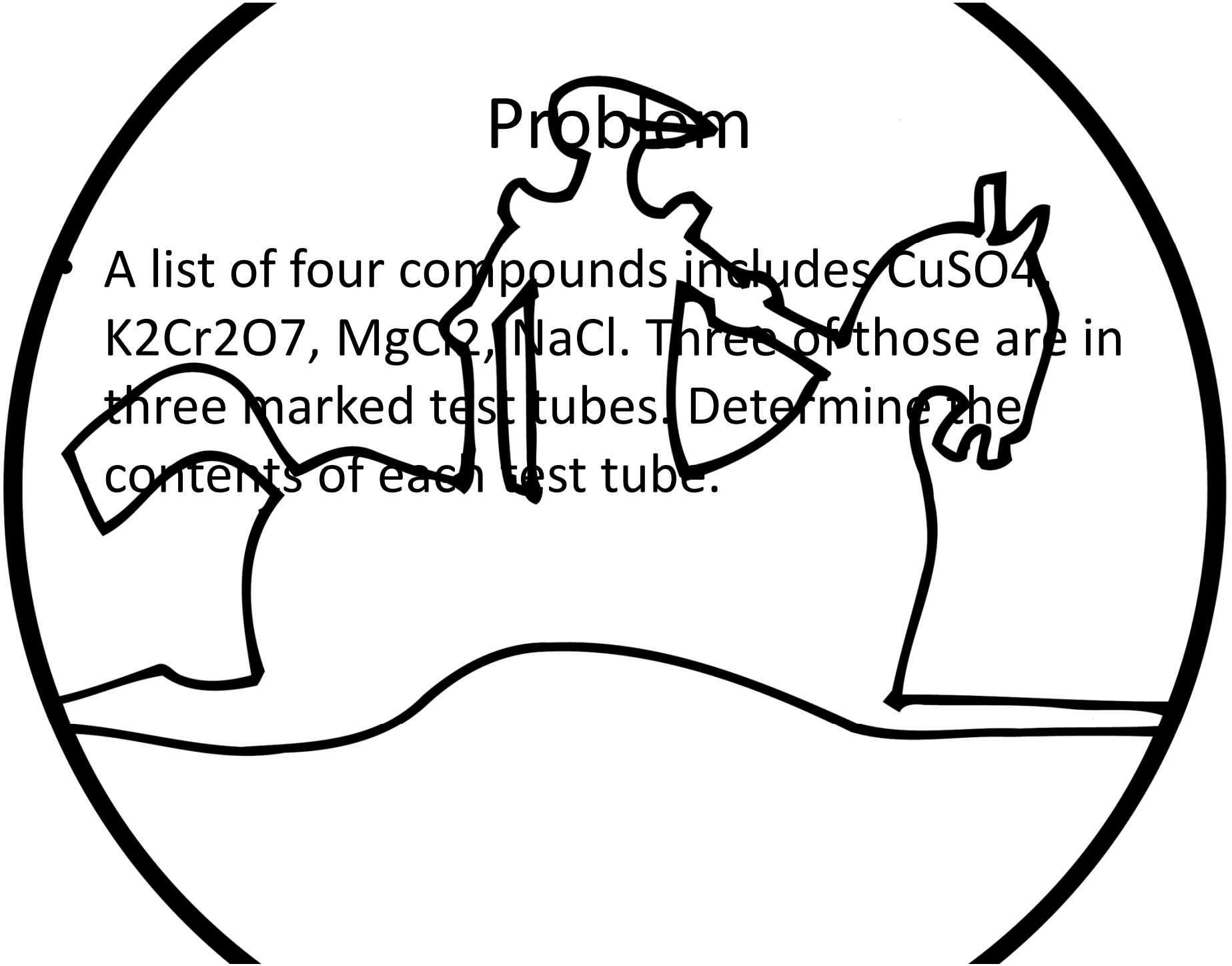
Additional Problem No.24

Team China

Taking the stage: ZENG Xiangjian

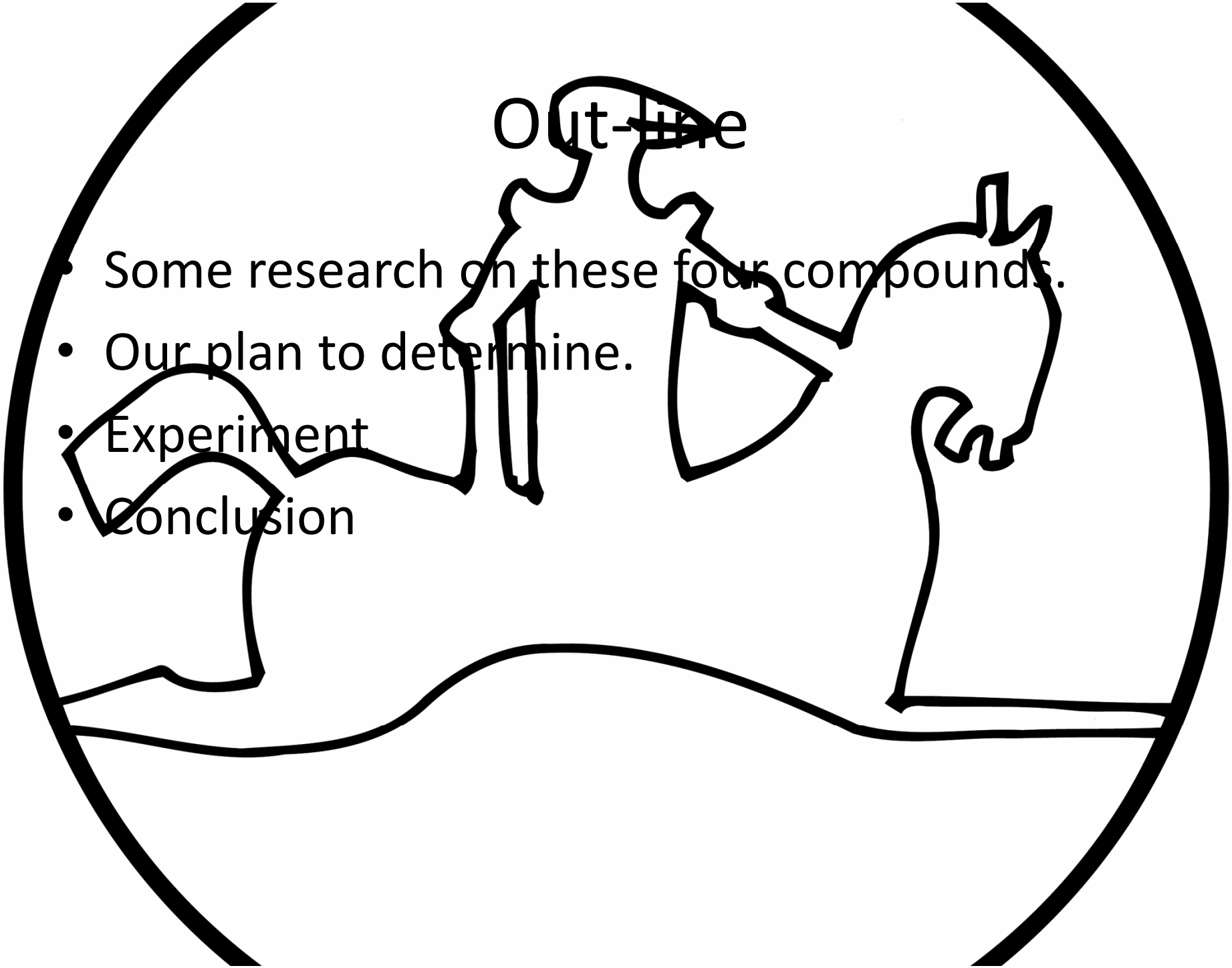
Problem

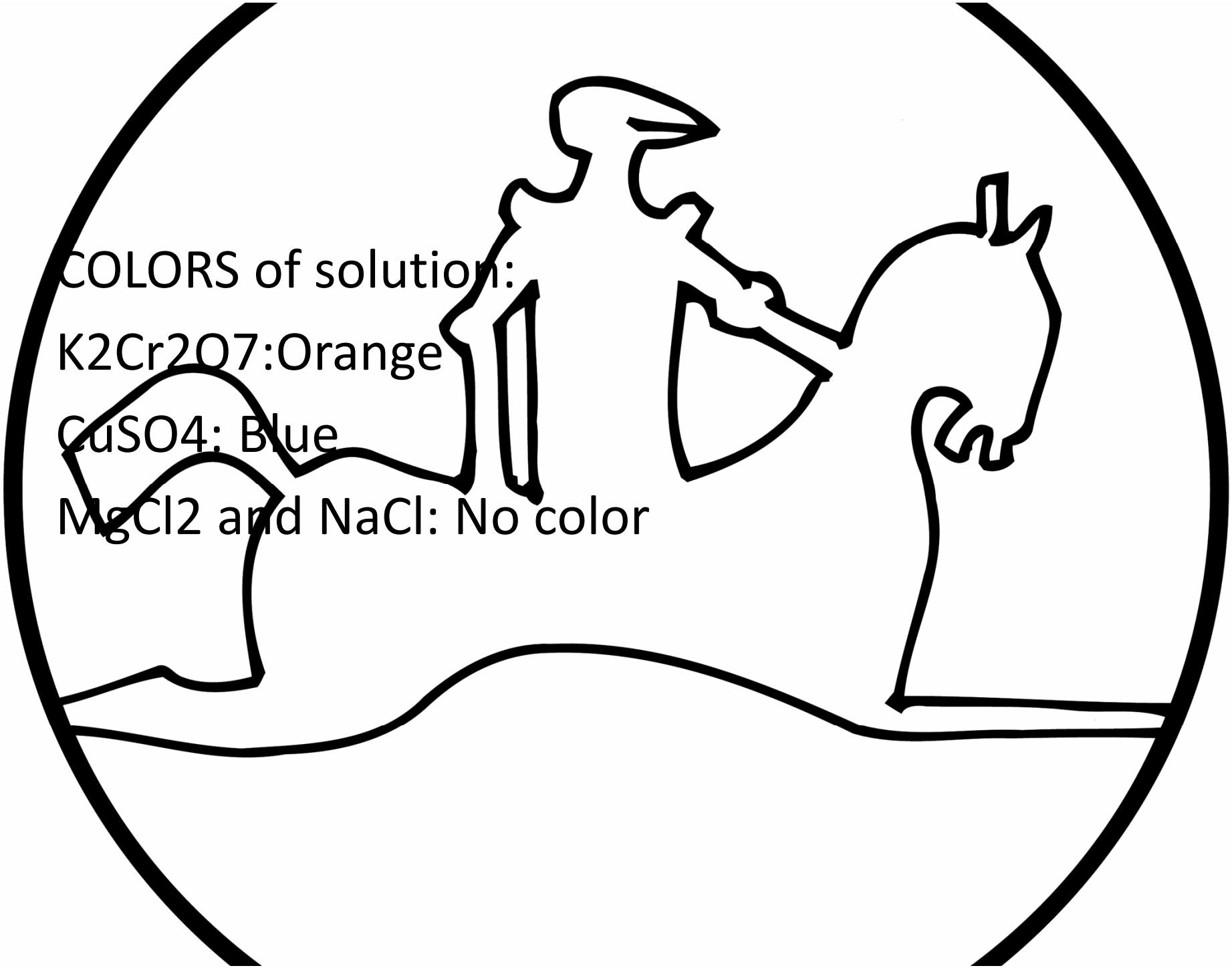
- A list of four compounds includes $CuSO_4$, $K_2Cr_2O_7$, $MgCl_2$, NaCl. Three of those are in three marked test tubes. Determine the contents of each test tube.



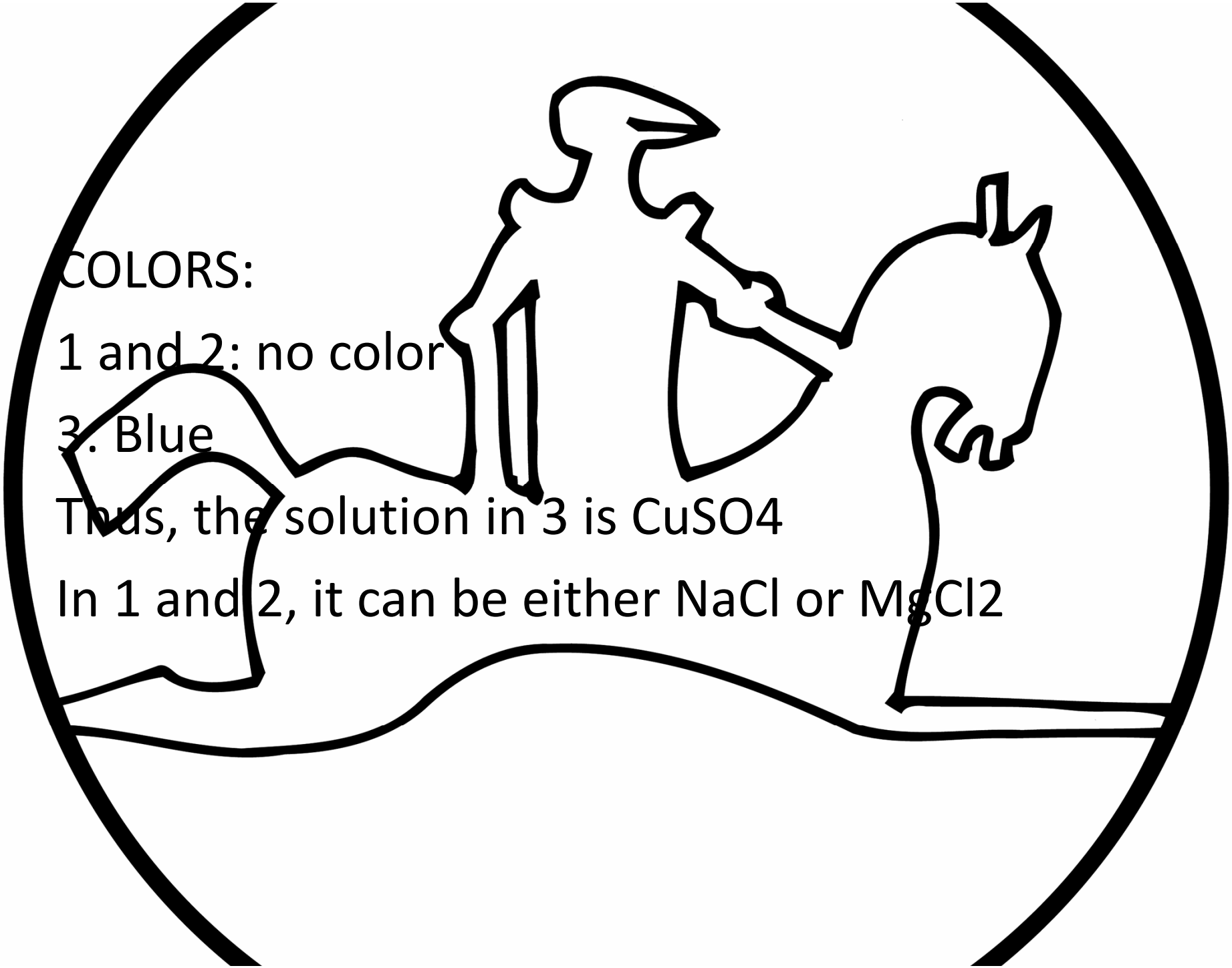
Out-line

- Some research on these four compounds.
- Our plan to determine.
- Experiment
- Conclusion




COLORS of solution:
K2Cr2O7:Orange
CuSO4: Blue
MgCl2 and NaCl: No color

1
2
3



COLORS:

1 and 2: no color

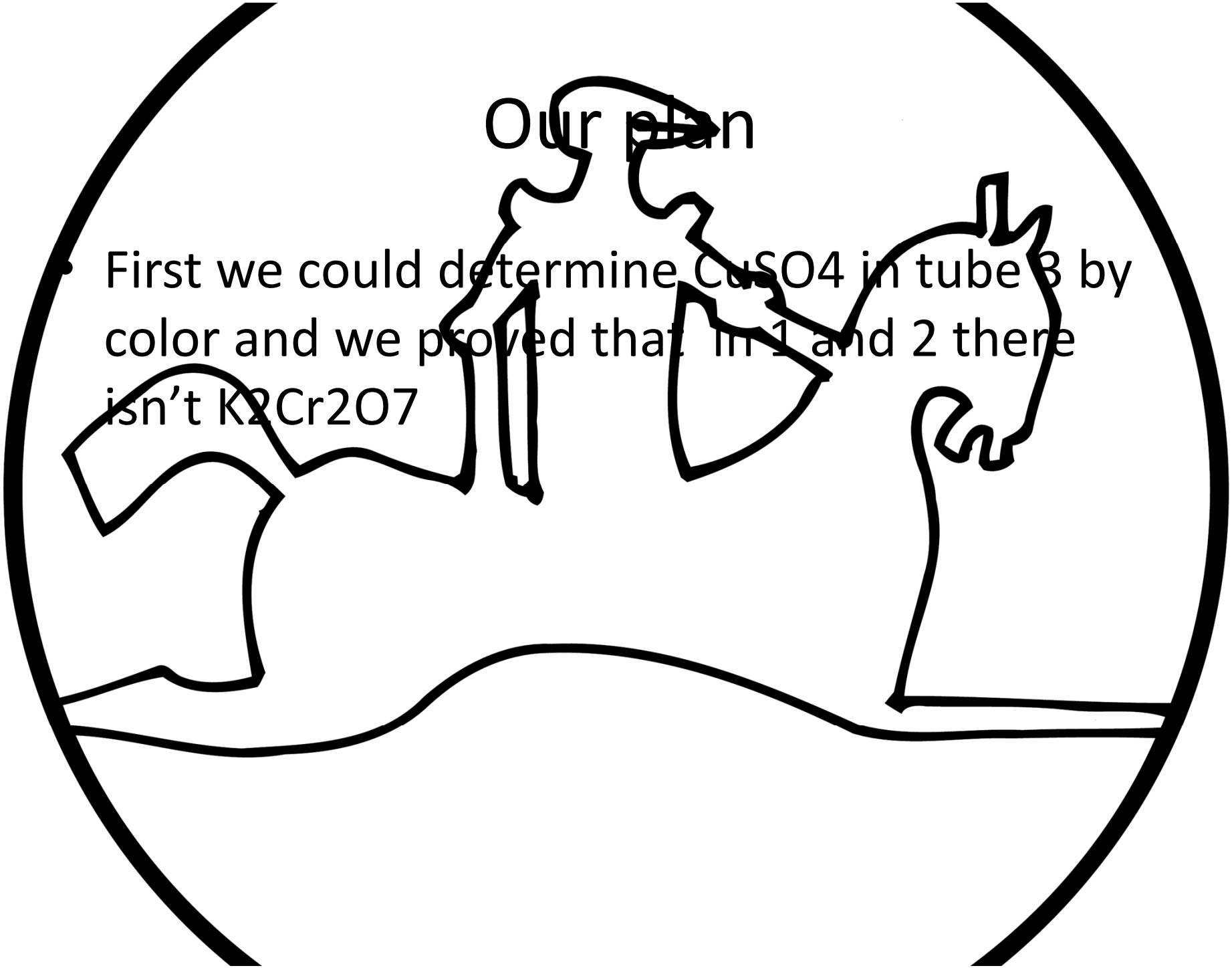
3: Blue

Thus, the solution in 3 is $CuSO_4$

In 1 and 2, it can be either NaCl or $MgCl_2$

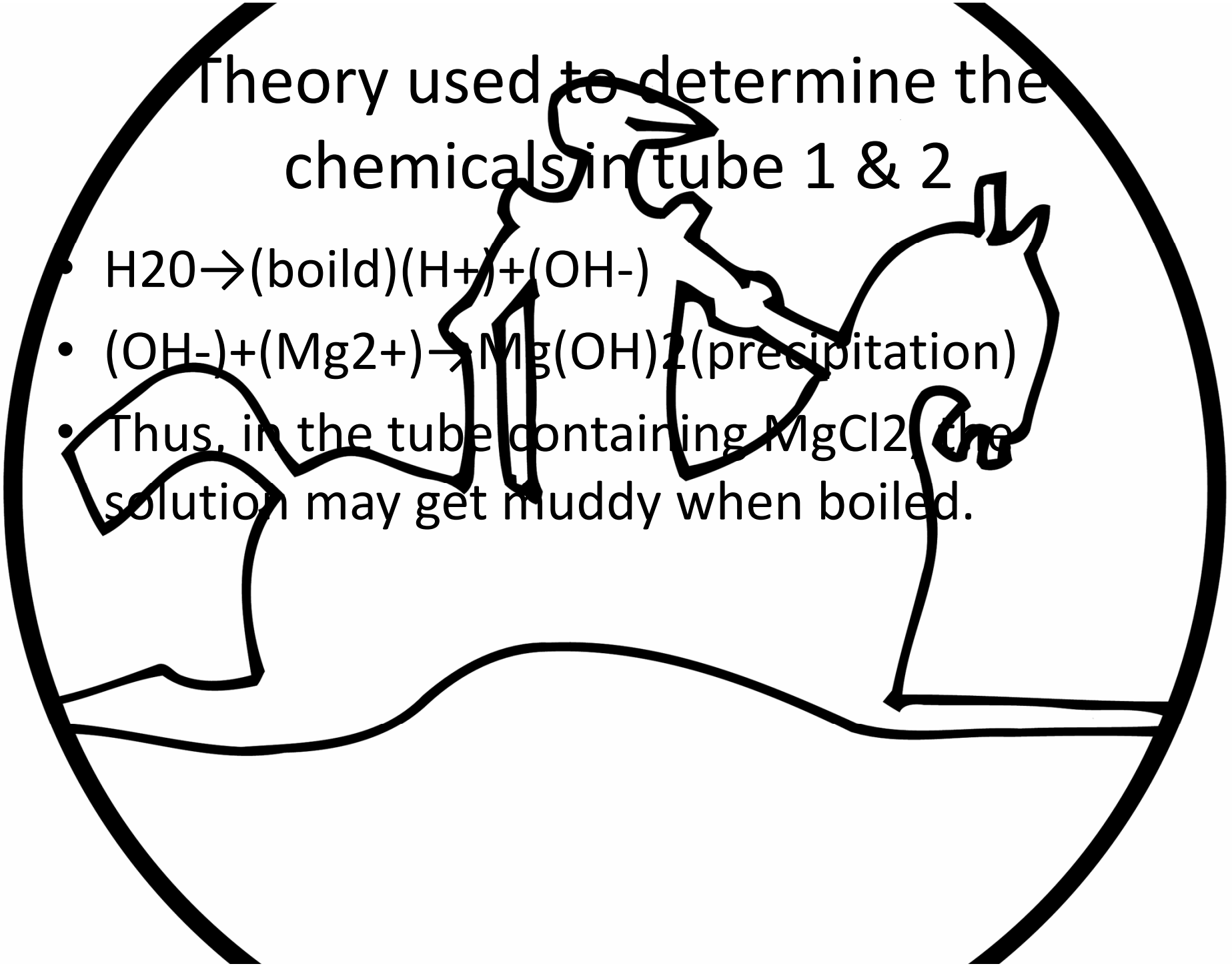
Our plan

- First we could determine $CuSO_4$ in tube 3 by color and we proved that in 1 and 2 there isn't $K_2Cr_2O_7$



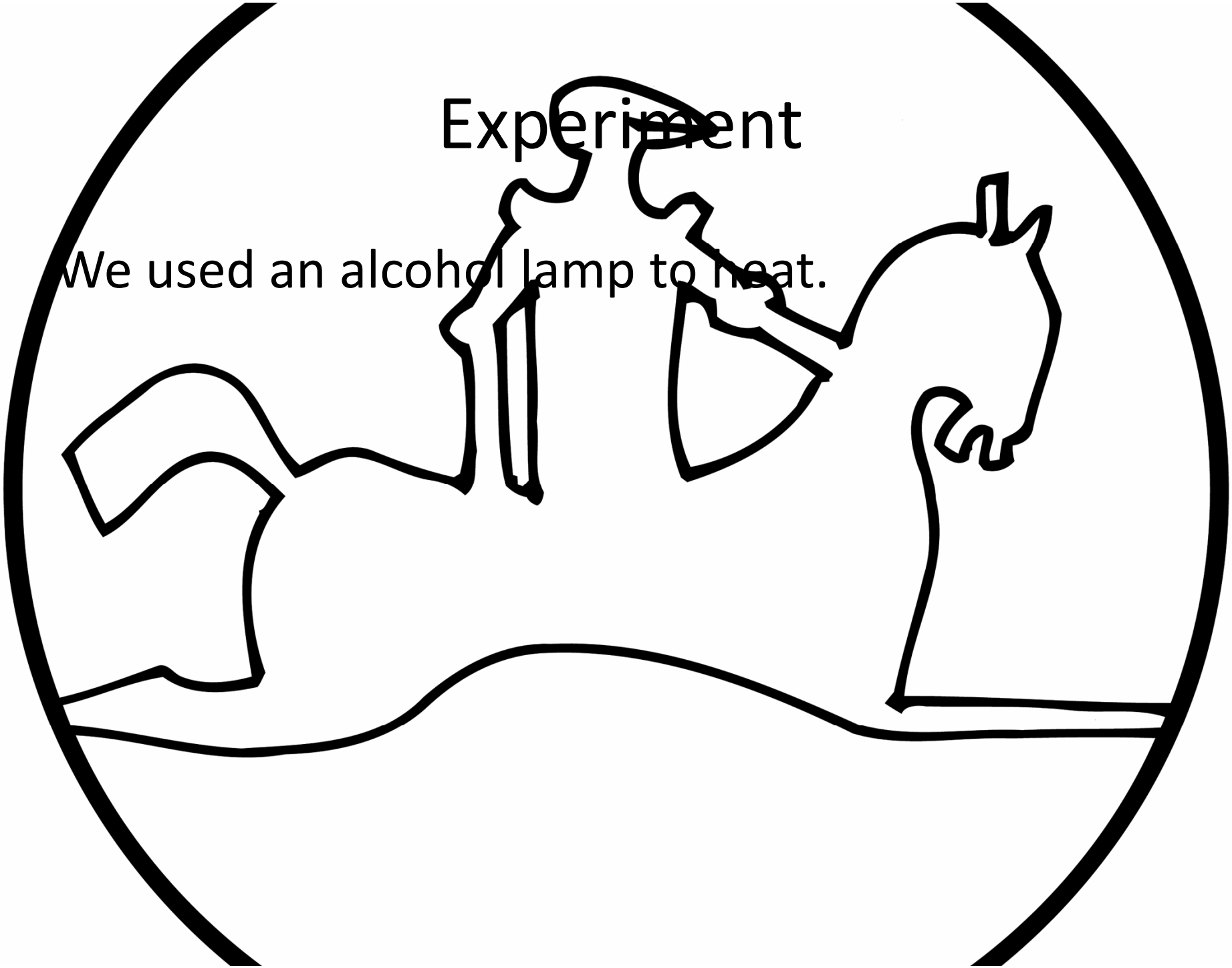
Theory used to determine the chemicals in tube 1 & 2

- H20→(boild)(H+)+(OH-)
- (OH-)+(Mg2+)→Mg(OH)2(precipitation)
- Thus, in the tube containing MgCl2, the solution may get muddy when boiled.

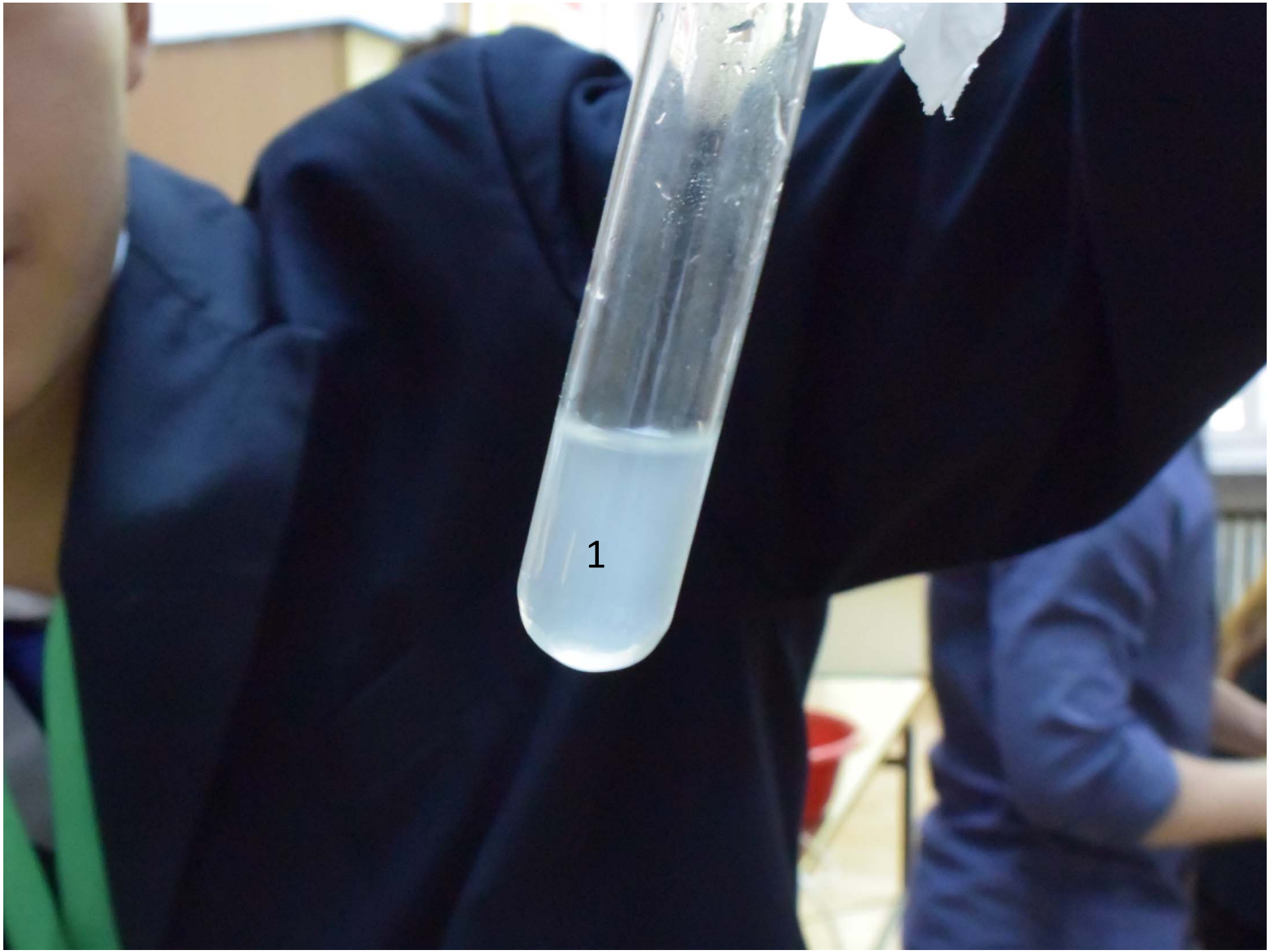


Experiment

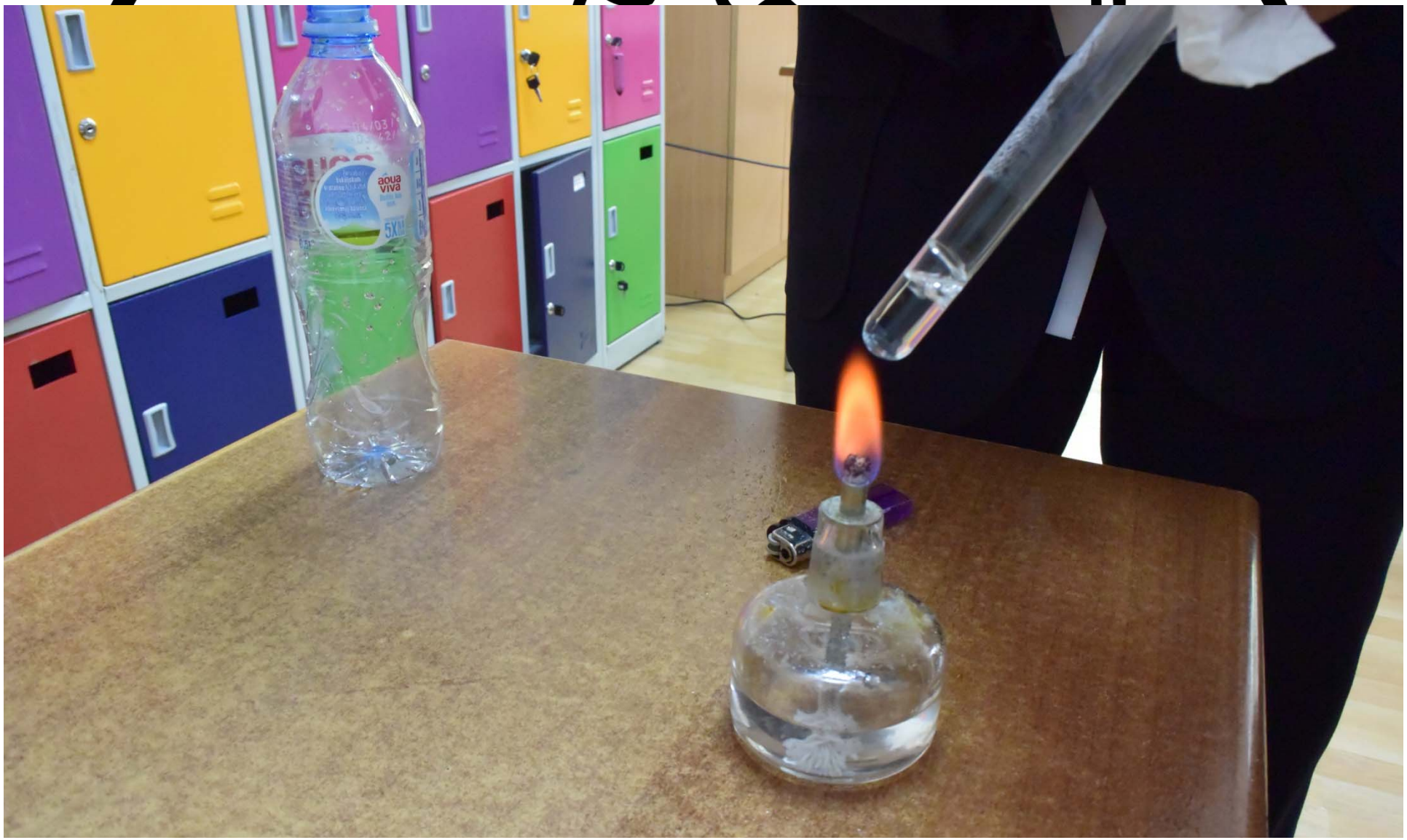
We used an alcohol lamp to heat.

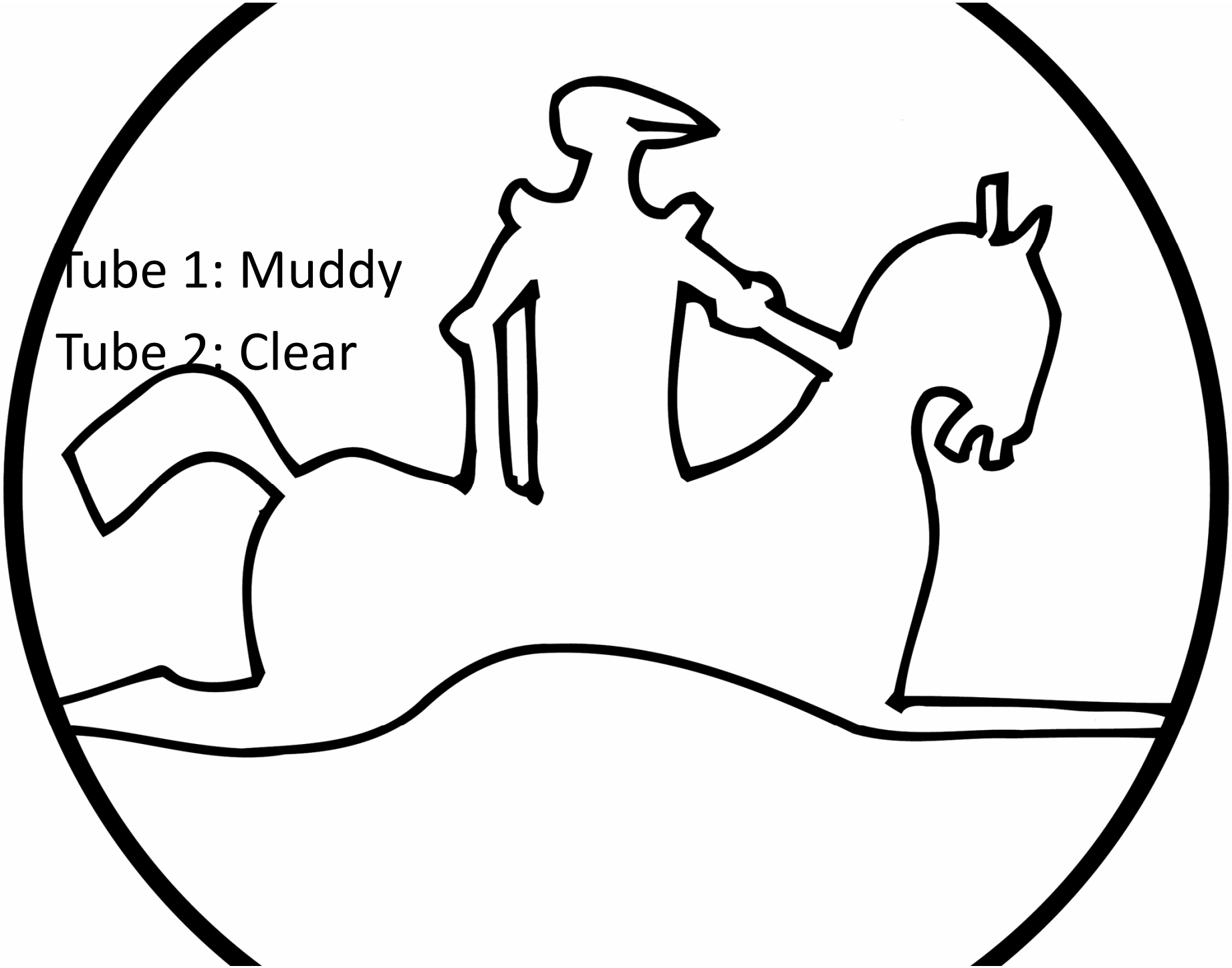


Experiment 1 (tube 1)

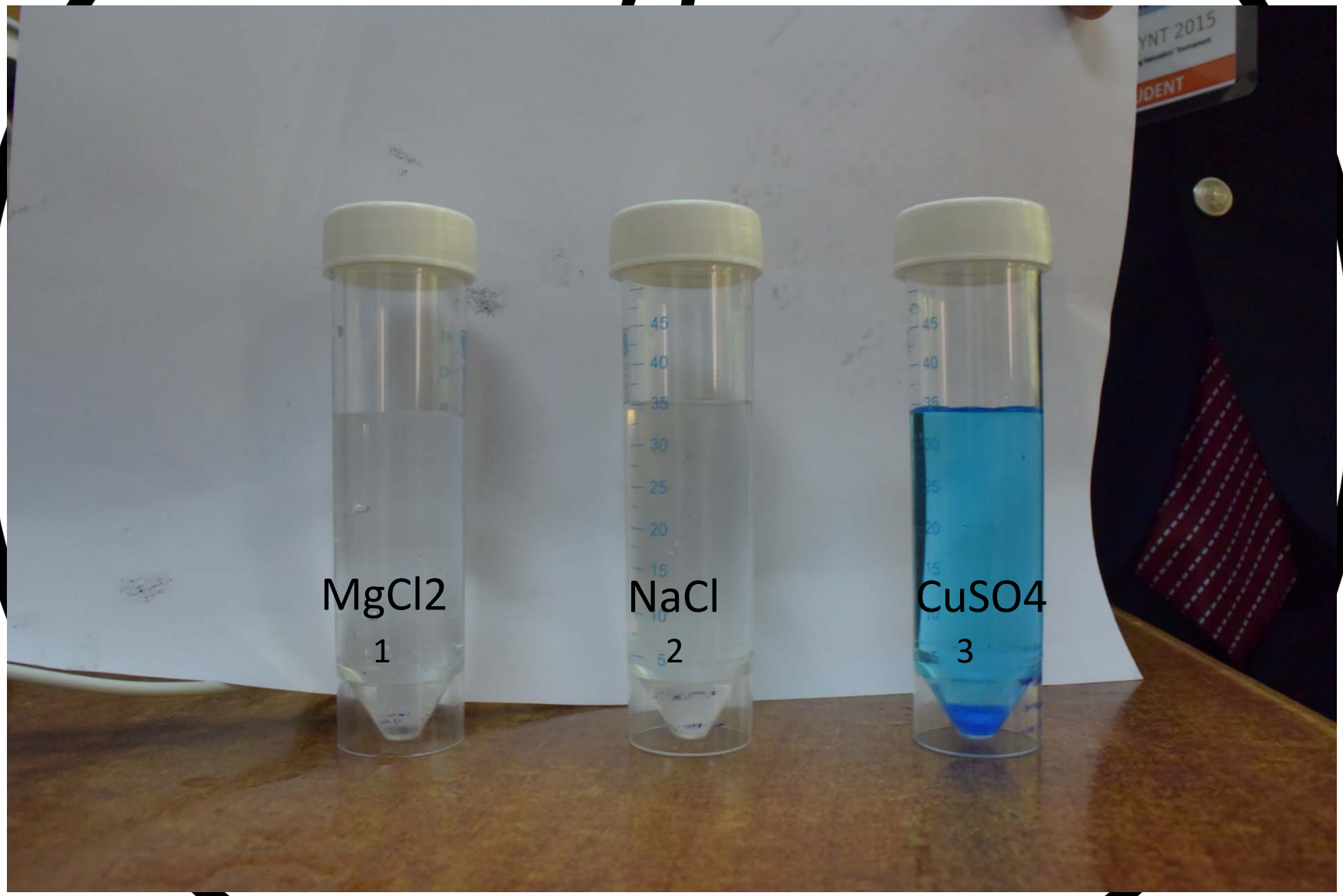

1

Experiment 2 (tube 2)




Tube 1: Muddy
Tube 2: Clear

Conclusion



THANK YOU FOR YOUR ATTENTION !