Candidate 4 evidence

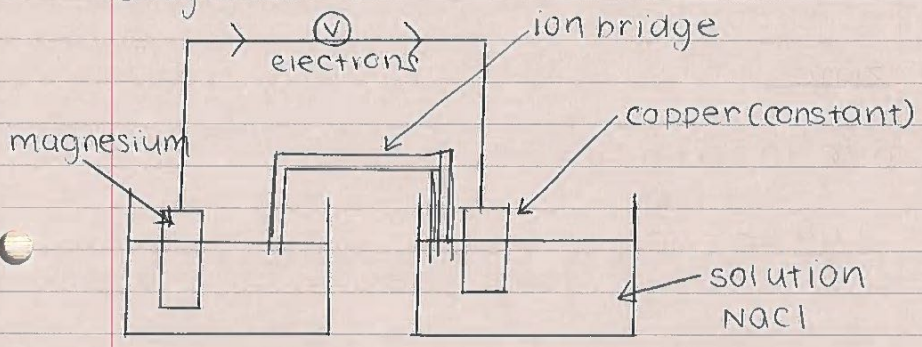
The voltage of metals in the electrochemical series.

Aim: To investigate the voltage released by different metals in the electrochemical series.

underlying chemistry:

- The electrochemical series is a list of metals ordered from high to low in how easily they loose electrons. Metals that loose electrons easily are placed at the top of the table such as magnesium and calcium, however metals who are reluctant to give away electrons such as Gold and mercury are placed at the bottom of the series
- metals give away electrons. when metals give away electrons they release a force called voltage.
- ions flow through an ion bridge that has been put into a salt solution.
- Electrons flow through the wires used from the metal higher in the series to the metal lower.

diagram.



method

- used 100cm³ of 1mol NaCl solution
- used four metals, copper, magnesium, zinc and iron
- used copper as constant metal and measured the voltage given with each metal paired with copper.

Data collecting and handling

experimental data

metal paired with copper	voltage (v)			average (v)
	1	2	3	
magnesium	1.53	1.53	1.53	1.53
copper	0.02	0.02	0.02	0.02
zinc	0.36	0.34	0.34	0.346
iron	0.16	0.14	0.15	0.15

averages calculation (iron)

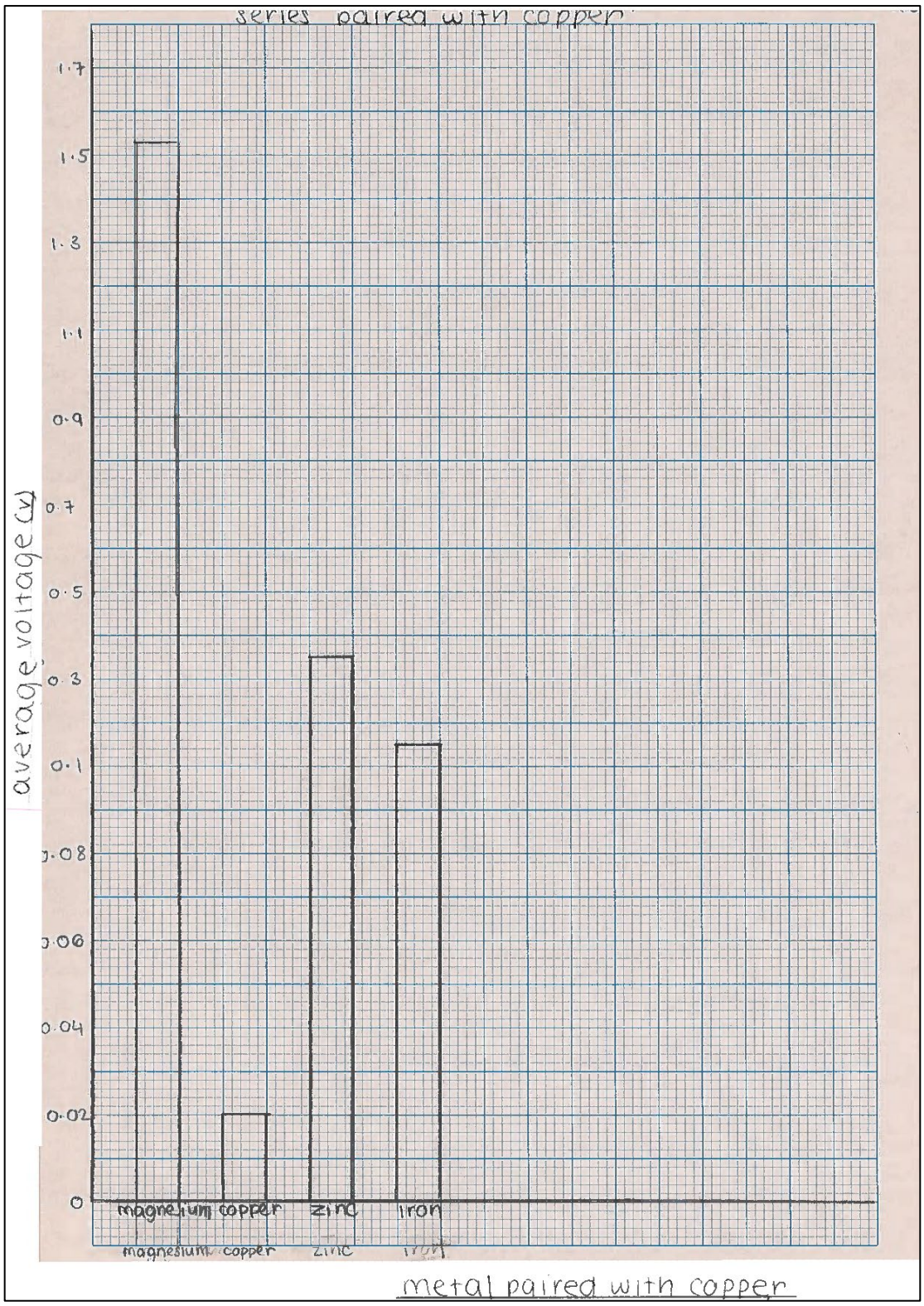
$0.16 + 0.14 + 0.15 = 0.45$

$\frac{0.45}{3} = 0.15$

zinc

$0.36 + 0.34 + 0.34 = 1.04$

$\frac{1.04}{3} = 0.346$


series paired with copper
average voltage (v)
1.7
1.5
1.3
1.1
0.9
0.7
0.5
0.3
0.1
0.08
0.06
0.04
0.02
0
magnesium copper zinc iron
magnesium copper zinc iron
metal paired with copper

internet sources

Magnesium -2.37	Zinc -0.76	Copper +0.34	
Magnesium	0.00 V	1.61 V	+2.71
Zinc	-1.61 V	0.00 V	+1.10 V
Copper	2.71 V	-1.10 V	0.00 V

bbc.co.uk/bitesize/guides/z2396yc/revision/1

Analysis

- compared to my data the ~~experim~~ internet data has a similar result however in my experiment i found that magnesium had a much higher voltage than copper which the internet source does not reflect.

conclusion

In conclusion different metals in the electrochemical series release different amounts of voltage and the closer the metals are to each other in the series, the smaller the voltage they produce.

Evaluation.

If i re-did my experiment i could use more combinations of metals to get a wider range of results.

~~to also~~

I could also use a different solution instead of just sodium chloride to see if it made a difference