Metal Reactivity

Identifying unknown metals using their reactions with known metal compounds.

Background

As metals higher in the reactivity series will displace metals lower in the series from their compounds, it should be possible to determine unknown metals by their reaction with known metal compounds. Metals higher in the series (e.g. magnesium) will react with more of the metal compounds, while metals lower in the series (e.g. copper) will react less.

The Experiment

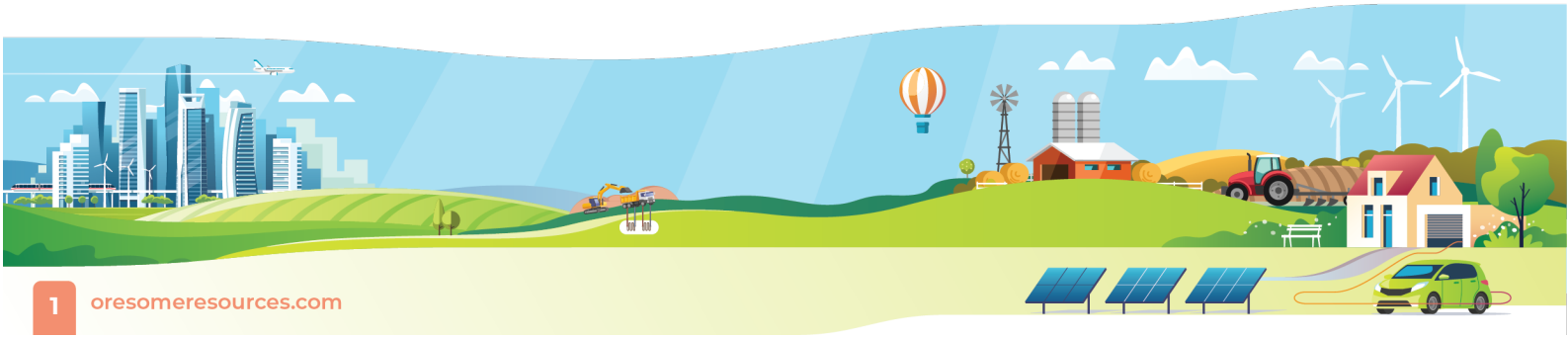
Aim: to identify unknown metals by observing their reactions with known metal compounds.

Equipment & chemicals

- 2 X Spotting trays
- 5 pieces of each sample of the unknown metals
- (Cu, Al, Zn, Pb, Fe, Mg)
- Solutions of metal compounds (Copper sulphate, zinc sulphate, aluminium sulphate, magnesium sulphate, iron sulphate)
- Steel wool
- Safety glasses
- Gloves

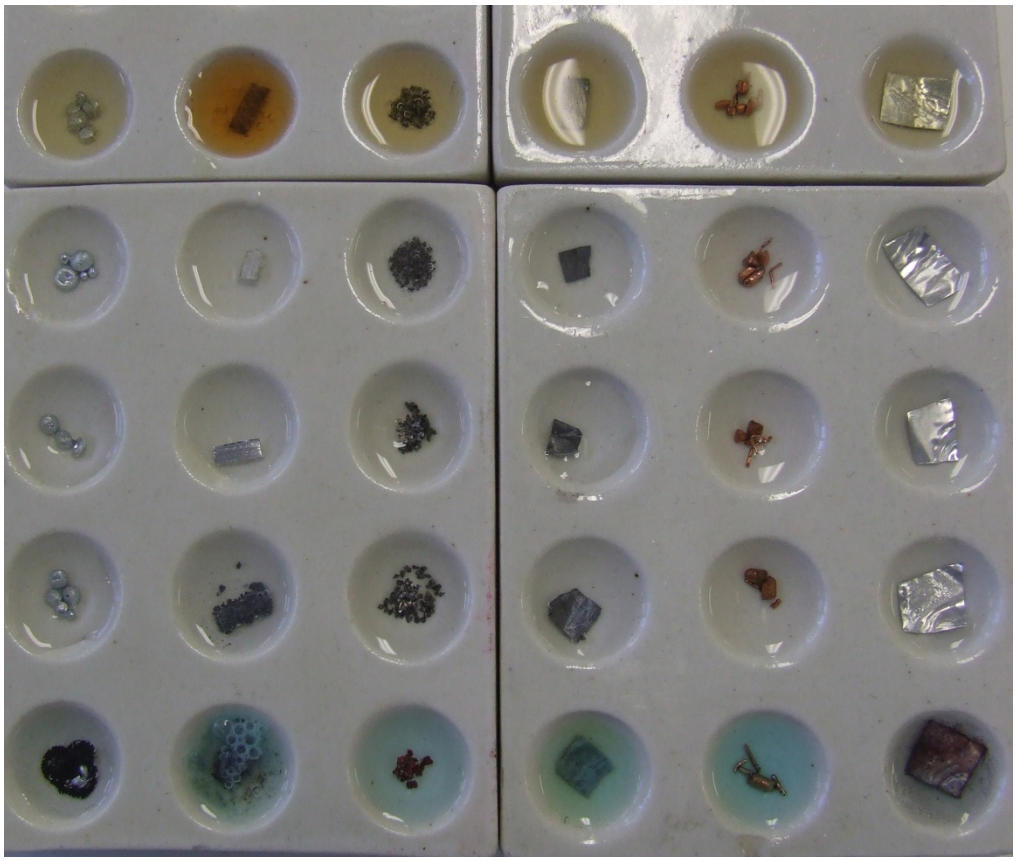
Procedure:

- Clean each sample of unknown metal with steel wool.
- Place samples in divots of spotting tray
- Add different solutions to each metal and observe for reaction
- Record results in table



Results:

	Unknown Metal					
Known metal compound	A	B	C	D	E	F
$FeSO_4$						
$Al_2(SO_4)_3$						
$MgSO_4$						
$ZnSO_4$						
$CuSO_4$						



Discussion:
Use the reactions to identify the metals as copper, magnesium, aluminium, iron, lead and zinc.

Discuss the reactions that allowed identification of each of the metals, and write balanced equations for these reactions. Draw upon your understanding of the reactivity series in justifying your identification of the metals.

Conclusion:
Provide a summary of your findings in this experiment.

For Teachers

In relation to safety procedures and preparation, please check guidelines and processes with your school.