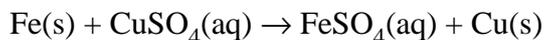


Displacement reactions

Aims

If you dip an iron nail into copper sulphate solution, it comes out copper plated.

The equations for this reaction are: iron + copper sulphate → iron sulphate + copper



The iron **displaces** some of the copper out of its compound.

Iron acts like this because it is **more reactive than** copper.

You can use this idea to put metals in order in the reactivity series.

You will be given some samples of different metals, and solutions of their salts.



Eye protection
must be worn

Apparatus

Goggles

Bench mat

Spotting tile

Teat pipettes

Metals: copper

iron

lead

magnesium

zinc

Solutions:

copper sulphate

iron sulphate

lead nitrate

magnesium sulphate

zinc sulphate

Methods

1. Draw up a table in your book with these columns. You need space for five solutions.

Metal Solution	copper	iron	lead	magnesium	zinc	metal score

2. Collect small samples of the five metals. Put them onto labelled pieces of paper.
3. Collect a spotting tile and pick **one** solution. Put three drops of it into each of five wells.
4. Put a small piece of copper into the solution in the first well.
Put a small piece of iron into the second well, and so on for all five metals.
5. Look carefully at the solution and metal in each well. If you can see any change in the appearance of the metal or the solution, then displacement is happening.
6. Write the solution in the table. Put a **tick** in the column for metals that have given a displacement reaction, and a **cross** in the column for metals that have not reacted.
7. Repeat steps 3–6 for as many other solutions as you have time for.
8. Fill in your table for all the solutions by pooling the results from the class (if necessary).

Conclusions

1. Add up the ticks for each metal column. The more ticks there are, the more reactive the metal is. Write out these five metals in order of reactivity, starting with the most reactive.
2. Write word equations (and symbol equations if you can) for each displacement reaction.