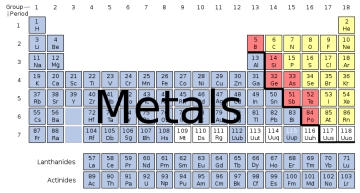
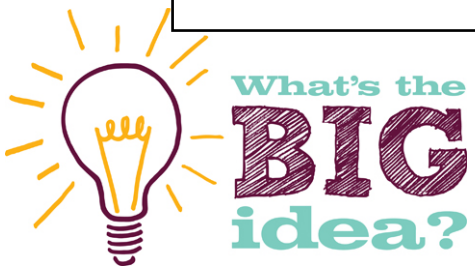
You need to know the content of this sheet. 100%

100% Sheet Metals





Chemical reactions
involve rearrangement of atoms in substances to form new substances.

The Reactivity Series

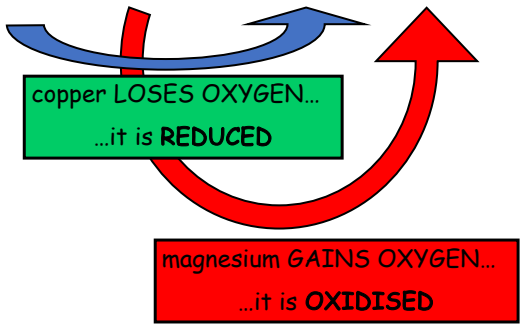
1. Sodium
2. Magnesium
3. Aluminium
4. Carbon
5. Zinc
6. Iron
7. Copper
8. Gold

Use the reactivity series (you will be given it in the exam) to predict reactivity and reactions of metals.
At the top the metals are very reactive and will react with air to make oxides and carbonate compounds found in rocks (Ores)
At the bottom they are not reactive and can be found as pure metals
Using carbon is a cheap way of displacing metals below it such as iron from iron oxide in a blast furnace

Use the reactivity series to predict DISPACEMENT reactions where 1 metal can replace another metal in a compound BUT only if the single metal is more reactive (higher in the list) than the metal in the compound
Sodium will replace Magnesium in magnesium oxide
$2Na + MgO \rightarrow Na_2O + Mg$
But Zinc cannot replace Magnesium in Magnesium oxide

RedOx can be defined as the loss or gain of oxygen in a reaction

$CuO(s) + Mg(s) \rightarrow Cu(s) + MgO(s)$



RedOx can also be defined in terms of the loss or gain of electrons – OIL RIG
Oxidation Is Loss (of electrons)
Reduction is Gain (of electrons)
HIGHER

$CuO(s) + Mg(s) \rightarrow Cu(s) + MgO(s)$

Look at ionic half equations (break the compounds into ions and look at each in turn) and ask if electrons have been lost (OiL) or gained (RiG)

$Cu^{2+} + 2e^- \rightarrow Cu$

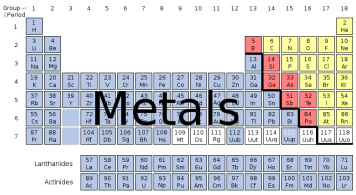
$Mg \rightarrow Mg^{2+} + 2e^-$

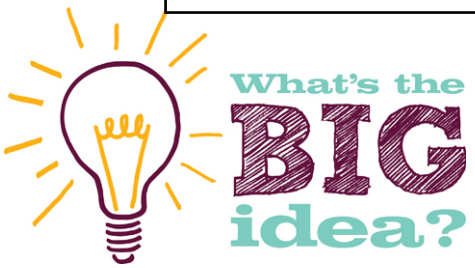
Cu2+ has gained electrons (RIG)
Mg has lost electrons (OIL)

Metal activity can be determined in the lab by reacting them with water or acid.
The most reactive will react most vigorously with water (Review group 1 alkali metal reactions with water) to make a metal hydroxide and hydrogen gas
Less reactive metals will react with acids to make a metal salt and hydrogen gas. The rate of reaction)and reactivity) can be monitored by fizzing or disappearance of the metal (the quicker, the more reactive)
Metal at the bottom of the list will not react at all.

You need to apply your knowledge

100% Sheet Metals





Chemical reactions
involve rearrangement of atoms in substances to form new substances.

Titanium is extracted from the titanium chloride by reacting it with sodium at 1000 °C in a reactor.
The only other substance in the reactor is argon gas.

$TiCl_4$ + 4Na → Ti + 4NaCl

What does this tell you about the reactivity of sodium compared with titanium?

Suggest why the reactor contains argon and **not** air

Many everyday items are made from iron. Haematite is an *ore* of iron. Haematite contains iron oxide, Fe_2O_3.

What is the meaning of the term *ore*?

Iron can be produced by reacting iron oxide with carbon in a blast furnace.

What type of reaction produces the iron?

Explain if the iron ore is oxidised or reduced

magnesium + zinc oxide → magnesium oxide + zin
Explain which is the most reactive metal, Mg or Zn?

Identify what has been oxidised and what has been reduced

Part of a reactivity series is

increasing reactivity ↑

sodium
calcium
magnesium
aluminium
zinc
iron
hydrogen
copper

Add an arrow to show the position of carbon
Explain the method used to extract Ca from its ore