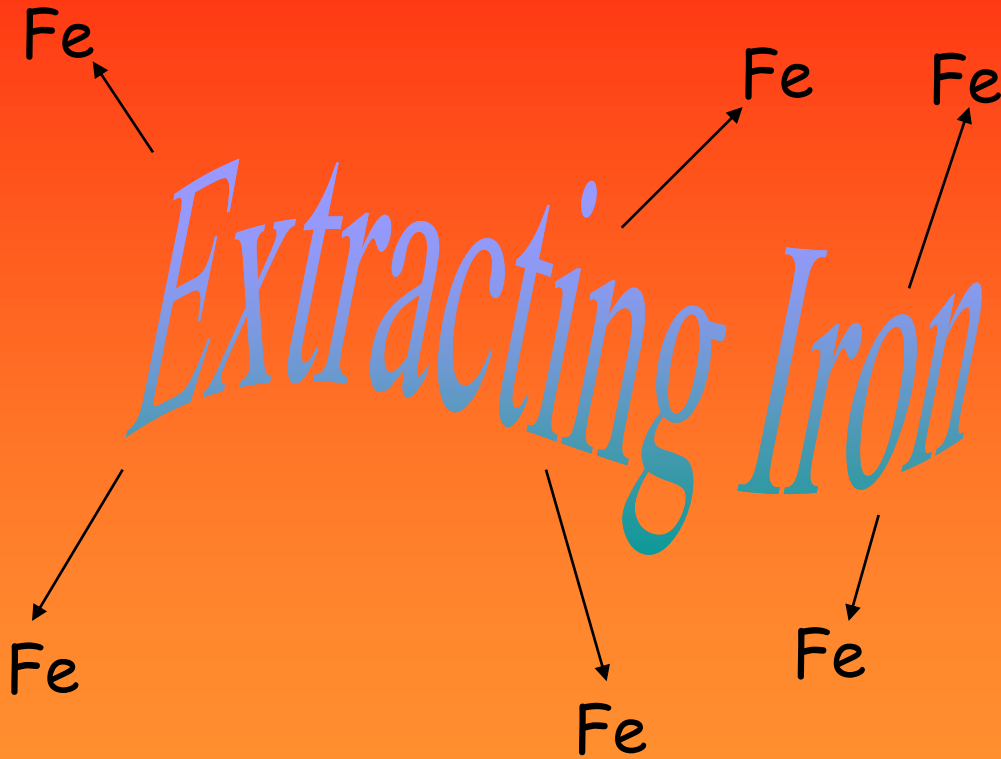


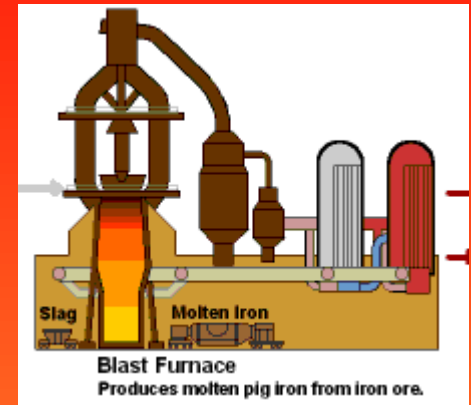
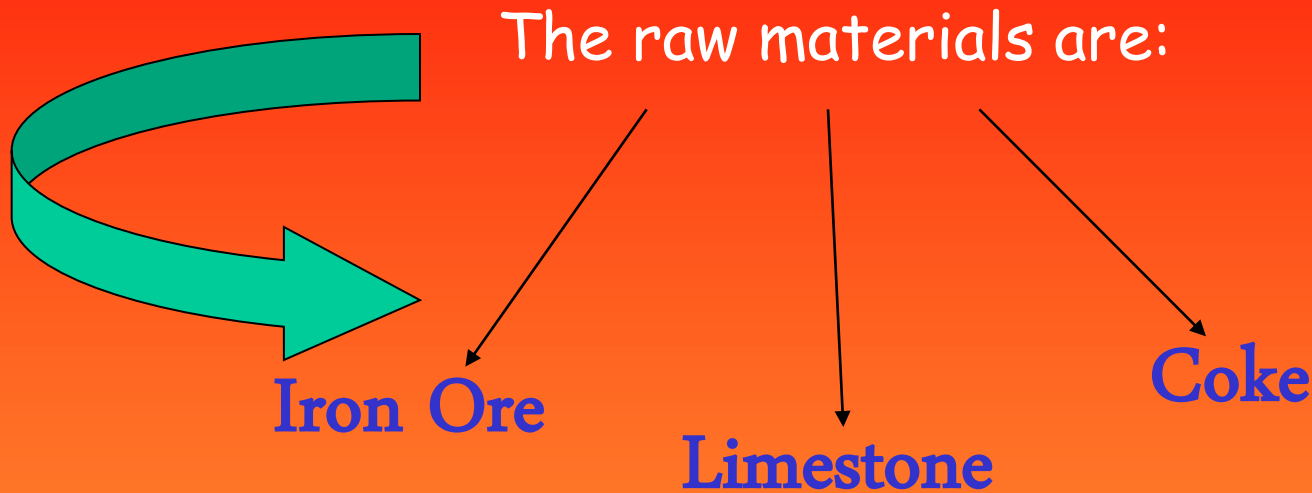
The Blast Furnace



Introduction

- Iron is a very common element in the Earth's crust, but good iron ores are only found in a few select places around the world, such as Australia, Canada and Millom.
- Iron is extracted from haematite, Fe_2O_3 , by reduction (i.e. removal of oxygen) in a blast furnace

What are the raw materials??



- The **iron ore** contains the iron - **IMPORTANT!!**
- The coke is almost **pure carbon**. This is for reducing the iron oxide to iron metal
- The limestone takes away impurities in the form of slag

Reducing the Iron Ore

to Iron:

- Hot air is blasted into the furnace making the coke burn much faster than normal and the temperature rises to about 1500°C.
- The coke burns and produces carbon dioxide:



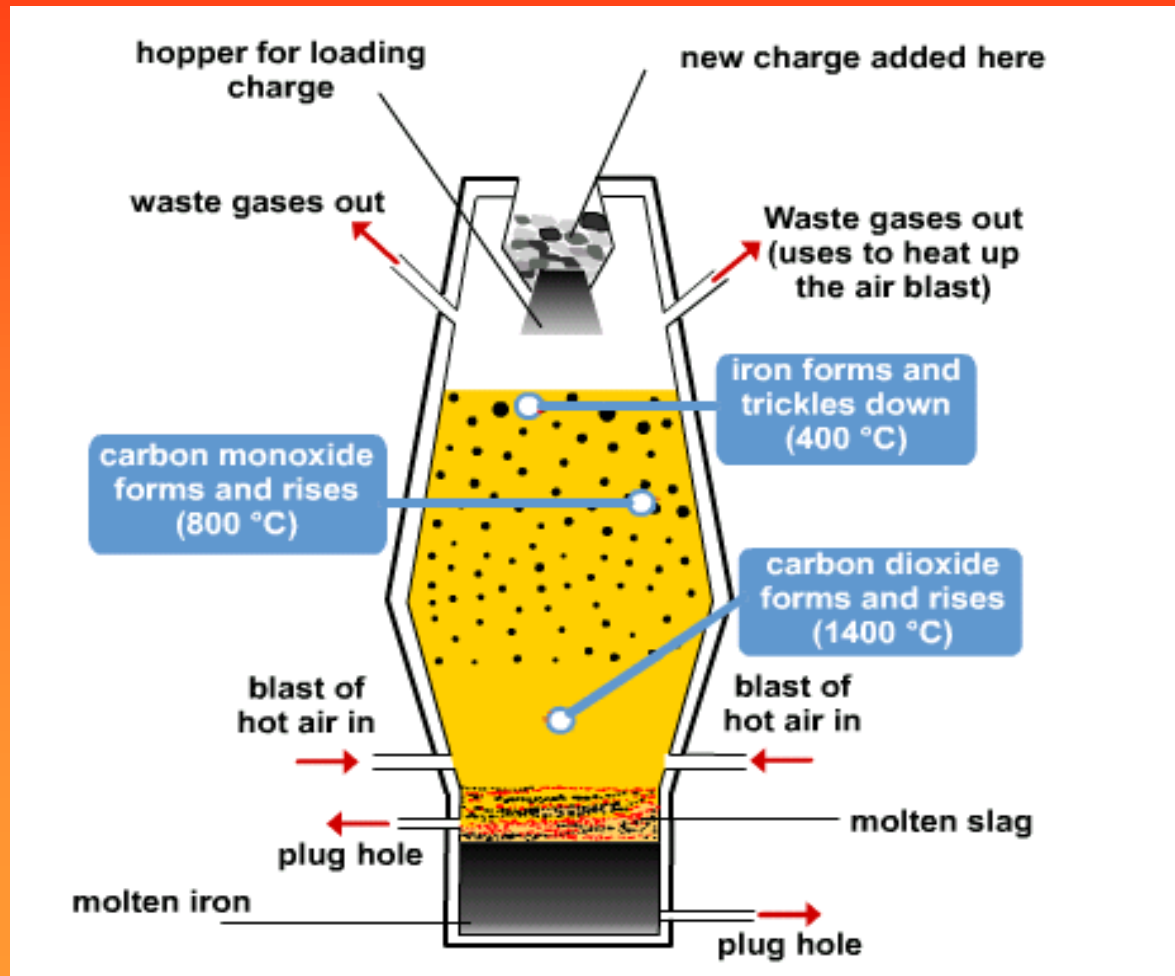
- The CO_2 then reacts with unburnt coke to form CO :



- The carbon monoxide then reduces the iron ore to iron:



- The **iron** is molten at this temperature and it's very dense, so it *runs to the bottom* of the furnace where it's tapped off..



Example: Port Talbot Steel Works (Blast Furnace)



Removing the Impurities:

- The main impurity is **sand** (silicon dioxide). This is still solid at 1500°C and would tend to *stay mixed in with the iron.*

Q... What removes the sand???

A... **Limestone** (CaCO_3)

Removing the Impurities:

- The limestone is decomposed by the heat into calcium oxide and CO_2 :



- The calcium oxide then reacts with the sand to form calcium silicate or slag which is molten and can be tapped off:



Uses of Slag.....

Road building