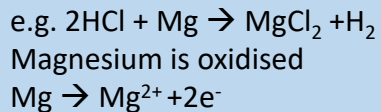


The reactions of metals

Section 1: Key Terms	
Metal oxide	Metals react with oxides to produce metal oxides. This is an oxidation reaction.
Displacement reaction	A more reactive metal can displace a less reactive metal from a compound .
Oxidation	Two definitions: Chemicals are oxidised if they gain oxygen in a reaction. Chemicals are oxidised if they lose electrons in a reaction. (HT)
Reduction	Two definitions: Chemicals are oxidised if they lose oxygen in a reaction. Chemicals are oxidised if they gain electrons in a reaction. (HT)
Acid	A chemical that dissolves in water to produce H⁺ ions .



HT: OILRIG



A **metal ore** is a rock that contains enough of a metal compound to make it economically worth while to extract it.

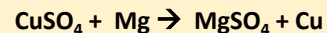
A **Low grade ores** contain low percentages of the metal. If the metal is expensive or rare they are worth extracting.

Section 2: Reactivity		
Element	Reaction	Reactivity
Potassium	When potassium is added to water , the metal melts and floats. It moves around very quickly. The metal is also set on fire , with sparks and a lilac flame .	↑
Sodium	When sodium is added to water , it melts to form a ball that moves around on the surface. It fizzes rapidly .	
Lithium	When lithium is added to water , it floats. It fizzes steadily and becomes smaller.	
Calcium	Fizzes quickly with dilute acid .	
Magnesium	Fizzes quickly with dilute acid .	
(Carbon)		
Zinc	Bubbles slowly with dilute acid .	
Iron	Very slow reaction with dilute acid .	
(Hydrogen)		
Copper	No reaction with dilute acid .	

Displacement reactions and metal extraction



A more reactive metal will displace a less reactive metal from its compounds. Reactivity depends on the tendency of a metal to lose electrons



HT Phytomining & bioleaching
These are ways to extract copper from low grade ores.

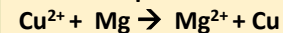
HT Phytomining

Plants are grown on soils containing copper compounds. The plants absorb the copper ions. The plants are burnt and sulfuric acid is added to make copper sulfate. Scrap steel is then added to displace the copper metal.
In bioleaching bacteria are used to absorb the copper ions from the water.

HT OILRIG

Oxidation is the loss of electrons
Reduction is where electrons are gained

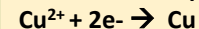
HT ionic equation



HT oxidation half equation



HT reduction equation



Section 3: Extracting Metals

Very unreactive metals	Found naturally as elements in the ground. Don't need extracting .
Metals less reactive than carbon	Extracted by reduction with carbon .
Metals more reactive than carbon	Extracted by electrolysis .