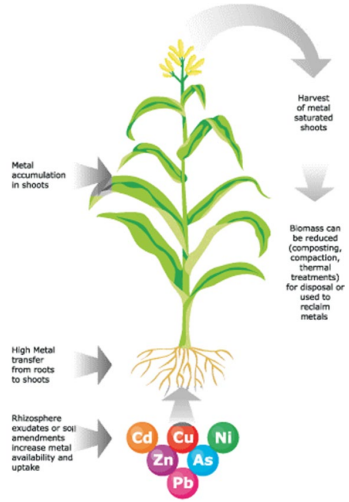
KNOWLEDGE ORGANISER
BIG IDEA: EARTH
TOPIC: EARTH'S RESOURCES

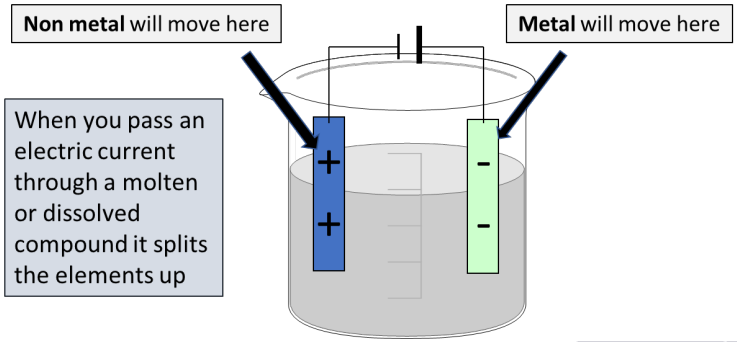
Key Word	Definition
metal	Type of substance. Usually hard, shiny, malleable, good conductors.
compound	Two or more elements chemically bonded
reduction	Removing oxygen from a compound e.g. $PbO_2 + C \rightarrow Pb + CO_2$
oxidation	Adding oxygen to a substance eg: $2\ Mg + O_2 \rightarrow 2\ MgO$
electrolysis	Splitting a compound into its elements using electricity
extraction	Separating a metal from its ore
reactivity	How easily a substance will take part in a reaction e.g. potassium is very reactive, gold is not.
recycling	Converting waste resources into a form in which they can be used again
native metal	A native metal is found in its pure form in nature (not in an ore)
ore	A rock or mineral from which metals can be extracted

Extraction
The **extraction** method used depends upon how reactive the metal is. Any metal could be extracted from its compounds using **electrolysis**. However, large amounts of **electrical energy** are needed to do this, so electrolysis is expensive.

If a metal is less **reactive** than carbon, it can be extracted from its compounds by heating with carbon. Copper is an example of this. **Molten** copper can be produced from copper oxide by heating with carbon:
Copper oxide + carbon → copper + carbon dioxide
$2CuO(s) + C(s) \rightarrow 2Cu(l) + CO_2(g)$

This is an example of reduction, because oxygen is removed from the compound. It works because carbon can displace the copper, because carbon is more reactive than copper.



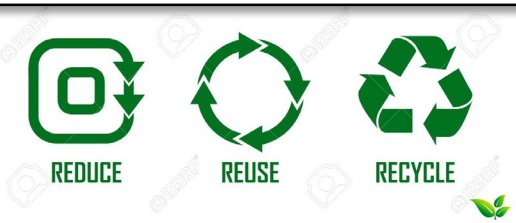


Extracting Copper
Low grade copper ores are extracted using **phytomining** and **bioleaching.**
Phytomining uses plants to absorb copper compounds. The plants are the burned to get the copper metal.
Bioleaching uses bacteria to absorb copper compounds. Acid is added.
Copper is purified using **electrolysis**.

Resources and recycling
Earth's resources are limited, and metals can take a lot of energy to extract.

Recycling is an important way to help us achieve sustainable development.

It takes less energy to melt and remould metals than it does to extract new metals from their ores. Aluminium is a valuable metal that melts at a relatively low temperature, so it is particularly important to recycle.



Metal	Method	Reactivity
Potassium	Electrolysis of molten compounds	Most reactive
Sodium		
Lithium		
Calcium		
Magnesium		
Aluminium		
(Carbon)		
Zinc	Heating with carbon	
Iron		
Copper		
Gold	Various chemical reactions	Least reactive