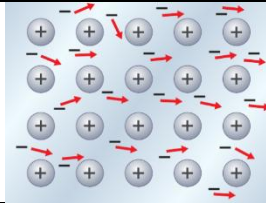


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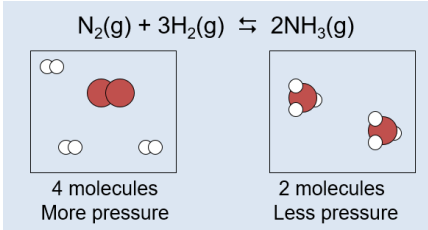
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Extracting metals		
1.	Name the more reactive metals.	Metals that end in "ium". Potassium, sodium, magnesium, calcium, aluminium
2.	Name the least reactive metals	Silver, gold, platinum
3.	What does native mean?	Not combined with other elements, found on its own
4.	What happens in a displacement reaction?	A more reactive metal takes the place of a less reactive metal in its compound.
5.	What is an ore?	A rock that contains a metal compound
6.	Why are some metals extracted by heating with carbon?	Metals that are less reactive than carbon can be displaced by carbon. e.g: carbon + copper oxide → copper + carbon dioxide
7.	Why are more reactive metals extracted by electrolysis?	Carbon is not reactive enough to displace the metal from its compound so a more powerful reduction reaction is needed.
8.	What is oxidation?	Gain of oxygen
9.	What is reduction?	Loss of oxygen
10.	What is the disadvantage of using electrolysis for extracting metals?	Uses a lot of energy so it is expensive
Biological methods of extraction (HT)		
1	What biological substance is needed in bioleaching?	Bacteria
2	Describe how bioleaching extracts metals from low-grade ores.	Bacteria breaks away the bonds between Cu-S and forms a liquid called a leachate. The leachate must then go through electrolysis to obtain pure metal.
3	What biological substance is needed in phytomining?	Plants
4	Describe how phytomining extracts metals from low-grade ores.	Plants are grown on low grade ores and absorbs copper ions from the ores. The plant is then burned, and the copper compound is reacted with acid to form copper metal.
Metallic bonding and properties of metals		
1	What kind of bonds are present between metallic elements?	Metallic bonds
2	Describe how metals form metallic bonds.	Metals lose the electrons in its outer shell to form a positive metal ion (cation) The electrons are delocalised throughout the structure and holds the positive ions together.

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3	Explain why metals are malleable	The layers of ions can slide over each other. The sea of delocalised (free) electrons holds the ions together so the metal can change shape instead of breaking
4	Why are metals good conductors of electricity?	Electrons are free to move around and carry the current
Equilibria		
1	Explain what is meant by a reversible reaction	A reaction that can go in both directions so the products of a reaction can react together to form the reactants.
2	Describe what is meant by 'dynamic equilibrium'	Dynamic equilibrium is when a forward and backward reaction occurs at the same speed and time.
3	What is the process of producing ammonia called?	Haber process
4	Which two gases are required to form ammonia and where are they obtained?	Nitrogen (from the air) and hydrogen (from natural gas)
5	What is the optimum temperature for producing ammonia?	450 °C
6	What is the optimum pressure for producing ammonia?	200 atmospheres
7	What catalyst is added in the Haber process?	Iron catalyst
Equilibria (HT)		
1	Describe Le Chatelier's principle.	The position of equilibrium will shift to oppose the change introduced.
2	If you increase the temperature of a reaction what will happen to the position of equilibrium.	Equilibrium moves to cool it
3	If you decrease the pressure of a reaction what will happen to the position of equilibrium	Equilibrium moves to raise it
4	Predict which way the position of equilibrium will move if you increase the concentration of C: <div data-bbox="268 1859 769 1948" data-label="Chemical-Block"> $\text{A (aq)} + \text{B (aq)} \xrightleftharpoons[\text{ENDOTHERMIC}]{\text{EXOTHERMIC}} \text{C (aq)} + \text{D (aq)}$ </div>	To the left (backward reaction)
5	Predict which way the position of equilibrium	To the left (backward reaction)

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	will move if you decrease the concentration of A:	
	$\text{A (aq)} + \text{B (aq)} \xrightleftharpoons[\text{ENDOTHERMIC}]{\text{EXOTHERMIC}} \text{C (aq)} + \text{D (aq)}$	
6	Predict which way the position of equilibrium will move if you decrease the temperature:	To the right (forward reaction)
	$\text{A (aq)} + \text{B (aq)} \xrightleftharpoons[\text{ENDOTHERMIC}]{\text{EXOTHERMIC}} \text{C (aq)} + \text{D (aq)}$	
7	Predict which way the position of equilibrium will move if you decrease the pressure :	To the left (backward reaction)
	<p>$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$</p>  <p>4 molecules More pressure</p> <p>2 molecules Less pressure</p>	

Electrolysis		
1	Define electrolysis.	A substance is decomposed (broken down) using electricity.
2	Why can electrolysis only occur if an ionic substance is molten or aqueous?	The ions are free to move.
3	What is the name of the negative and positive electrode?	Negative: Cathode Positive: Anode
4	Which ions are attracted to the anode and which to the cathode?	<ul style="list-style-type: none"> Anode = negative Cathode = positive
5	Define electrolyte.	Ions in a solution that are free to move and can conduct electricity.
6	What happens when ions get to an electrode?	Gain or lose electrons becoming neutral atoms again.
7	What happens at the anode?	Electrons transferred from the ion to the anode and the non-metal forms.
8	What happens at the cathode?	Electrons transferred from the cathode to the ion and a metal is formed.
9	When is hydrogen formed from an aqueous solution?	If the metal is MORE reactive than hydrogen.
10	When is a metal (not hydrogen) formed from an aqueous solution?	If the metal is LESS reactive than hydrogen.

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11	State one use of electrolysis.	Extracting a reactive metal from its ore.
12	Which useful product could be removed from the solution left after electrolysis of dilute sodium chloride solution?	Sodium hydroxide (bleach)
13	What would be formed at the anode in electrolysis of dilute sodium chloride solution?	Chlorine gas
14	What would be formed at the cathode in electrolysis of dilute sodium chloride solution?	Hydrogen
15	When will oxygen be produced at the anode?	When the solution does NOT contain HALIDE ions. Otherwise the halogen is produced.
Electrolysis and half equations (HT only)		
1	Write an ionic half equation for the reaction of the cathode in electrolysis of dilute sodium chloride solution (HT only)	$2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2$
2	Write an ionic half equation for the reaction of the anode in electrolysis of dilute sodium chloride solution (HT only)	$2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$
3	What would be produced at the anode in electrolysis of molten aluminium oxide? (HT only)	Oxygen
4	What would be produced at the cathode in electrolysis of molten aluminium oxide? (HT only)	Aluminium
5	Write an ionic half equation for the reaction at the anode in electrolysis of molten aluminium oxide (HT only)	$2\text{O}^{2-} \rightarrow \text{O}_2 + 4\text{e}^-$
6	Write an ionic half equation for the reaction at the cathode in electrolysis of molten aluminium oxide (HT only)	$\text{Al}^{3+} + 3\text{e}^- \rightarrow \text{Al}$