

SUBJECT: Science

UNIT: Year 9 Fundamentals: Reaction



While you were away.

Lesson one: Metal oxides

1. What is oxidation?
2. What is reduction?

Lesson Two and Three: Reactivity series

1. What does the reactivity series show?
2. Recall the order of the reactivity series

Lesson Four: Test for hydrogen

1. What is the test for hydrogen?
2. What does a positive result look like?

Lesson Five: Test for oxygen

1. What is the test for oxygen?
2. What does a positive result look like?

Lesson Six: Test for carbon dioxide

1. What is the test for carbon dioxide?
2. What does a positive result look like?

Lesson Seven: Test for chlorine

1. What is the test for hydrogen?
2. What does a positive result look like?

Lesson Eight: Electrolysis Introduction

1. What is electrolysis?
2. When can electrolysis occur?
3. When can electrolysis not occur?

Lesson Nine: Electrolysis of molten compounds

1. What happens to the positively charged ions in electrolysis?
2. What happens to the negatively charged ions in electrolysis?
3. What is an anode and cathode?

Lesson Ten: Using Electrolysis to extract metals

1. Why are electrodes made from graphite?
2. Why do we use molten cryolite when extracting aluminium oxide?

Lesson Eleven: Energy transfers

1. What is an exothermic reaction?
2. What is an endothermic reaction?

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Reactivity series

The reactivity series is a league table for metals. The more reactive metals are near the top of the table with the least reactive near the bottom. In chemical reactions, a more reactive metal will displace a less reactive metal.

Ambitious Vocabulary

Acid, base, electrolysis

	potassium
	sodium
	calcium
	magnesium
	aluminium
carbon →	zinc
	iron
	tin
	lead
Hydrogen →	copper
	silver
	gold
	platinum

Metal Oxides

Metals react with oxygen to produce metal oxides. The reactions are oxidation reactions because the metals gain oxygen.

Testing for chlorine gas

Inset blue litmus paper into the chlorine gas. The paper will change to pink and then white if the chlorine is present.

Testing for carbon dioxide

Make carbon dioxide using a metal carbonate and acid reacted together. The gas is collected in limewater using a delivery tube. If the limewater goes cloudy then carbon dioxide is present. If the limewater does not go cloudy then carbon

Exothermic Reactions

When a chemical reaction takes place, energy is involved. Energy is transferred when chemical bonds are broken and when new bonds are made. Exothermic reactions are those which involve the transfer of energy from the reacting chemicals to the surroundings. During a practical investigation an exothermic reaction would show an increase in temperature as the reaction takes place. Exothermic reactions include combustion respiration and neutralisation reactions.

Testing for oxygen

Light a splint and blow it out so it is glowing. Place splint into the gas. The splint will relight if oxygen is present.

Testing for hydrogen gas

Place a lit splint above the gas. If hydrogen is present a squeaky pop will be heard.

The process of electrolysis

Electrolysis is the splitting up of an ionic substance using electricity. Two electrodes are required to be placed in the electrolyte. The electrodes are conducting rods. One of the rods is connected to the positive terminal and the other to the negative terminal. The electrodes are inert (this means they do not react in the reaction) and are often made from graphite or platinum.

During the process of electrolysis, opposites attract. The positively charged ions will be attracted toward the negative electrodes, the charges are lost and they become elements. The positive electrode is called the anode. The negative electrode is called the cathode.

Using electrolysis to extract metals

Metals are extracted by electrolysis if the metal in question reacts with carbon or if it is too reactive to be extracted by reduction with carbon. Aluminium is manufactured by the process of electrolysis. Aluminium oxide has a high melting point and melting it requires a large amount of energy (increasing the cost) Therefore molten cryolite is added to aluminium oxide to lower the melting point and thus reduce the cost.

Endothermic Reactions

Endothermic reactions are those which involve the transfer of energy from the surroundings to the reacting chemicals. During a practical investigation, an endothermic reaction would show a decrease in temperature as the reaction takes place. Endothermic reactions include thermal decomposition and photosynthesis.