Key points to learn

Reactivity series	The reactivity series lists metals in order of how vigorously they react. The most reactive metals are at the top.
Reaction of metals with dilute acid	Potassium, Sodium, Lithium: Explode. Products are metal salts and hydrogen. Calcium, Magnesium, Zinc, Iron, Lead: React, making bubbles. Products are metal salts and hydrogen. Copper, Silver, Gold: Do not react
Reaction of metals on heating in air	Potassium, Sodium, Lithium, Calcium, Magnesium, Zinc, Iron: Burn vigorously. Products are metal oxides. Lead, Copper: Do not burn. Form oxide layer on surface. Silver, Gold: Do not react
Reaction of metals with water	Potassium, Sodium, Lithium, Calcium: React vigorously. Products are metal hydroxide solution and hydrogen. Magnesium, Zinc, Iron, Lead: React with steam. Products are hydrogen and a metal oxide. Copper, Silver, Gold: Do not react

Key points to learn

Displacement	More reactive metals displace less reactive metals from compounds
Extracting metals using carbon	Zinc and metals below it in the reactivity series are extracted by heating their oxides with carbon
Ceramics	Ceramic materials include pottery and brick. They are hard and brittle, with high melting points.
Polymers	Polymers have long molecules. There are hundreds of polymers. Each has unique properties that make it suitable for particular purposes.

KS3: C2.3 Metals & Acids Knowledge Organiser

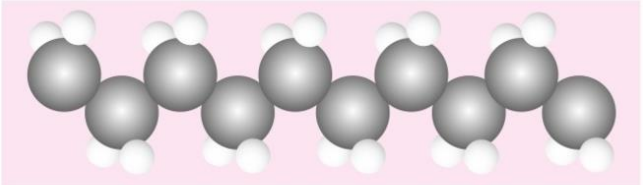
Big picture

- Chemistry
  - 1.1 Particles and their behaviour
  - 1.2 Elements, atoms and compounds
  - 1.3 Reactions
  - 1.4 Acids and alkalis
  - 2.1 The Periodic Table
  - 2.2 Separation techniques
  - **2.3 Metals and acids**
  - 2.4 The Earth

Fantastic fact!

The ceramic hafnium carbide has the highest melting point of all known ceramics, at about 3900 °C.

Additional Information



▲ This is part of a molecule of a polymer called poly(ethene). One molecule has hundreds of $-C_2H_4-$ units, joined in a long chain. The black spheres represent carbon atoms. The white spheres represent hydrogen atoms.

C2 Checklist
Chapter 3

Activate

Lesson	Developing	Secure	Extending
C2 3.1 Acids and metals	I can describe what happens when metals react with acids. ☐	I can compare the reactions of different metals with dilute acids. ☐	I can use formula equations to show what happens when metals react in different acids. ☐
	I can state that hydrogen gas makes a squeaky pop when lit. ☐	I can explain the test for hydrogen gas. ☐	I can use word and formula equations to explain the test for hydrogen gas. ☐
C2 3.2 Metals and oxygen	I can state the product of the reaction between metals and oxygen. ☐	I can compare the reactions of different metals with oxygen. ☐	I can explain the reactivity of metals according to how they react with oxygen. ☐
	I can identify state symbols from an equation. ☐	I can use state symbols in balanced formula equations. ☐	I can construct balanced equations that include state symbols. ☐
C2 3.3 Metals and water	I can state the products of the reaction between metals and water. ☐	I can compare the reactions of metals with water. ☐	I can link a metal's reaction with its place in the reactivity series. ☐
	I can state whether a metal is more or less reactive than another metal. ☐	I can use the reactivity series to predict reactions. ☐	I can explain predictions made about a metal's reactivity. ☐
C2 3.4 Metal displacement reactions	I can state which metal is more reactive in a pair of named metals. ☐	I can predict if a given pair of substances will undergo displacement. ☐	I can explain why displacement reactions are predicted to occur or not occur. ☐
	I can state where different metals are found in the reactivity series. ☐	I can use the reactivity series to explain displacement reactions. ☐	I can use particle models and diagrams to represent displacement reactions. ☐

Lesson	Developing	Secure	Extending
C2 3.5 Extracting metals	I can state where carbon is found in the reactivity series. ☐	I can use the reactivity series to decide which metals can be extracted from their ores by heating with carbon. ☐	I can explain why metals can be extracted using carbon, using the idea of displacement. ☐
	I can calculate the percentage of waste material in a metal ore. ☐	I can calculate the amounts of metals in ores. ☐	I can convert amounts of metals within ores from masses to percentages, or vice versa. ☐
C2 3.6 Ceramics	I can list the properties of ceramics. ☐	I can explain ceramic properties. ☐	I can distinguish between chemical and physical properties of ceramics. ☐
	I can list some uses of ceramics. ☐	I can explain why properties of ceramics make them suitable for their uses. ☐	I can justify why possible ceramics are identified from data about material properties. ☐
C2 3.7 Polymers	I can state the definition of a polymer. ☐	I can describe polymer properties. ☐	I can explain properties of different polymers. ☐
	I can state some uses of polymers. ☐	I can explain how polymer properties make them suitable for their uses. ☐	I can compare properties of different polymers. ☐
C2 3.8 Composites	I can state some properties of composite materials. ☐	I can describe composite properties. ☐	I can explain composite properties. ☐
	I can state some uses of composite materials. ☐	I can explain why composite properties make them suitable for their uses. ☐	I can suggest advantages and disadvantages of composite properties. ☐

Chapter 3 Glossary

Key word	Definition
carbon fibre	A material made of thin tubes of carbon.
ceramic	A compound such as a metal silicate or oxide that is hard, strong, and has a high melting point.
composite	A mixture of materials with properties that are a combination of those of the materials in it.
displace	A more reactive metal displaces – or pushes out – a less reactive metal from its compound.
displacement reaction	In a displacement reaction, a more reactive metal displaces – or pushes out – a less reactive metal from its compound.
metal	Elements on the left of the stepped line of the Periodic Table. Most elements are metals. They are good conductors of energy and electricity.
natural polymer	Polymers made by plants and animals, including wool, cotton, and rubber.
ore	A rock that you can extract a metal from.
polymer	A substance made up of very long molecules.
reactive	A substance is reactive if it reacts vigorously with substances such as dilute acids and water.
reactivity series	A list of metals in order of how vigorously they react.
state symbol	A state symbol gives the state of a substance in a chemical equation. (s) means solid, (l) means liquid, (g) means gas, and (aq) means dissolved in water.
synthetic polymer	A substance made up of very long molecules that does not occur naturally.
thermite reaction	Reaction of aluminium with iron oxide to make aluminium oxide and iron.