

# KS3 Chemistry – Metals – Learning Objectives

	Beginning	Developing	Secure	Embedding	Extending	Excelling
Metals, Alloys, Others	Identify the common physical properties of metals and non-metals, and explain how their uses relate to these properties.		Define the term 'alloy', referring to the elements it is made from, and explain why alloys are useful. Give some examples of alloys: in each case, state the elements that are present, the properties of the alloy (linking to specific advantages) and ways in which the alloy is used.		Describe the properties and advantages of other specialist materials, such as polymers, ceramics and composites. Explain the value of developing new smart materials with specific properties.	
Recycling Metals	-	Explain the importance and value of recycling metals.	Describe the processes that are necessary for recycling metals, from collecting the old product to manufacturing the new product. Apply knowledge of the environmental and economic impact of extracting metals from their ores.		Answer questions relating to the environmental impact of extracting and recycling metals, including data handling.	-
Reactions Of Metals	-	-	Name the products of reactions between metals and oxygen (burning in air), metals and water, and metals and acids; construct word (and simple symbol) equations for these reactions. Recognise that there are differences in the reactivity of the metals, based on the rate at which the products are formed.		Construct balanced symbol equations for the reactions of metals with oxygen, water and acids.	
Reactivity Series	Recall that some metals are more reactive than others, and that the metals are listed in order of reactivity in the reactivity series.	List the most common metals in order of their reactivity. Recall that displacement occurs when a more-reactive metal reacts with a compound of a less-reactive metal.	Use the reactivity series to predict whether or not a displacement reaction will occur, and name the products formed; construct word (and simple symbol) equations for these reactions. Use an analogy to describe the concept of metal displacement. Describe some real-world examples of displacement reactions.		Construct balanced symbol equations for metal displacement reactions.	
Corrosion	Describe the conditions necessary to cause iron or steel to rust. Recall that only iron rusts; other metals may corrode to form other products.	Describe an experiment that can be used to show the conditions necessary for rusting to occur.	Write a word (and symbol) equation for the formation of rust. Describe some methods used to prevent the corrosion of metals (physical barriers, sacrificial protection, galvanising), and explain how they work.		Explain, in terms of reactivity, why some metals corrode faster than others.	-
Extracting Metals	Recall that very few metals are found in their native state; they are usually extracted from ores – a rock containing a worthwhile amount of the mineral (metal compound).	Explain how metals may be extracted from their ores either by heating the ore in a blast furnace, or by electrolysis of the molten ore. Explain how the reactivity series can be used to determine the most suitable extraction method, and why carbon (a non-metal) is sometimes featured in the series.		Describe the conditions required in the blast furnace, and why limestone is added. Evaluate the environmental and economic advantages and disadvantages of each method of metal extraction.		

*\* Objectives covering more than one grade are assessed based on the level of scientific detail and language used by the learner.*