

KS3 Chemistry – Changing Materials

Subject curriculum intent:	<p>To develop in our students:</p> <ul style="list-style-type: none"> • An enjoyment of Science by providing relevant, interesting and challenging experiences and activities. • Observational skills, by looking for patterns and contrasts. • An inquiring mind and a logical approach to problem solving. • The ability to draw conclusions from simple experiments and, where appropriate, to devise suitable experiments for further investigations. • Communication skills in speaking and listening, written, diagrammatic and symbolic forms. • Co-operation and a respect for others by being able to work as part of a team – the development of appropriate social skills. • Confidence in their own abilities. • A respect for the environment and a careful use of resources. • An interest in the world about them and a greater understanding of it. 		
End of KS3 intent/outcome	End of KS4 intent/outcome	End of KS5 intent/outcome	
Students will build on their knowledge of science through the different areas – biology chemistry and physics. Students will ‘work scientifically’ to achieve the goals of each topic area they encounter.	Students will continue to develop their scientific knowledge through the different areas – biology, chemistry and physics. Students will ‘work scientifically’ to achieve the goals of each topic area they encounter. Students will be able to relate their scientific experiences to everyday life and have an understanding that science is all around them.	N/A	
Intent for this topic:	<p>Students will be able to explore changing materials by heating and cooling and observe the changes that have happened. They will be given opportunities to explore, identify and observe reversible and irreversible changes. Students will mix different materials together and identify if they are soluble or insoluble. They will also learn how materials that have been mixed together can be separated.</p> <p>Students will ‘work scientifically’ to achieve these goals, learning the key features of scientific enquiry; observing over time, pattern seeking, identifying, classifying, investigating (fair tests) and researching.</p>		
Core vocabulary needed for this subject/topic:	<p><u>Subject:</u> Biology, Chemistry, Physics Observe, pattern, identifying, classifying, investigating, fair test, researching</p> <p><u>Topic:</u> States of matter, solids, liquids, gas, particles, changing state.</p>		

Vocabulary pupils will have accessed in other topics or subject areas:	Materials, properties, solids, liquids, gas, particles			
Key vocabulary taught within this topic:	Heating, boiling, cooling, melting, freezing, particles, solution, reversible and irreversible changes, soluble, insoluble, mixing, separating			
Prior knowledge: what pupils may already have studied				
Key stage	Subject	Topic title	Term/year taught	Content/What might pupils already know?
KS3	Science	Properties of materials	Spring 1/Year 1	Children may be able to identify different materials. They may have described the properties of different materials as solids or liquids.
KS3	Science	Solids, Liquids and Gases	Spring 1/Year 2	Children will have been introduced to solids, liquids and gases. Children will have experienced changing the state of water between the different states of matter.
KS3	Cook-it	All	All years on a carousel	Children will have some understanding of how heating or cooling food can change the food's state. Children may have heard key words such as liquid, heating, cooling. Children will have changed the state of materials while cooking food.
KS3	Maths	Measurement: Capacity	Summer 1/All	Children may have experienced pouring liquids from one container to another.
Links to other subjects: Life Skills, Cook-it, Maths				

	<u>OU P Steps 5-6</u>	<u>OU P Steps 7-8</u>	<u>OU Step 1</u>	<u>OU Step 2</u>	<u>OU Step 3</u>
<u>Subject specific knowledge</u>	Knows that heating and cooling/freezing can change the state of food and drink.	Knows that food and drink can change state through heating/cooling/freezing.	Knows that food and drink can change state through heating/cooling/freezing.	Knows that food and drink can change state through heating/cooling/freezing.	Knows that food and drink can change state through heating/cooling/freezing.
	Knows when a change has been made to a material.	Knows how to change a solid to a liquid. Knows how to change a liquid to a solid.	Knows how to change a solid to a liquid. Knows how to change a liquid to a solid.	Knows how to change a solid to a liquid. Knows how to change a liquid to a solid.	Knows how to change a solid to a liquid. Knows how to change a liquid to a solid.

	<p>Knows that cooling things makes them go hard.</p> <p>Knows that heating things makes them go soft.</p> <p>Knows that materials can be mixed together.</p> <p>Knows that some materials change in water.</p> <p>Knows that materials can be separated.</p>	<p>Knows that some changes are temporary and some changes are permanent.</p> <p>Knows that cooking food is a permanent change.</p> <p>Knows that materials can be mixed together.</p> <p>Knows that some materials dissolve in water and some don't.</p> <p>Knows that materials can be separated.</p>	<p>Knows that some changes are reversible and some changes are irreversible.</p> <p>Knows that cooking food is a permanent change.</p> <p>Knows that materials can be mixed together.</p> <p>Knows that some materials dissolve in water and some don't.</p> <p>Knows that materials can be separated.</p> <p>Knows at least 1 way to separate materials.</p>	<p>Knows that some changes are reversible and some changes are irreversible.</p> <p>Knows that cooking food is a permanent change.</p> <p>Knows that burning is an irreversible change.</p> <p>Knows that materials can be mixed together.</p> <p>Knows that materials that are soluble dissolve in water.</p> <p>Knows that materials that are insoluble do not dissolve in water.</p> <p>Knows at least 2 ways how to separate materials.</p>	<p>Knows that some changes are reversible and some changes are irreversible.</p> <p>Knows that cooking food is a permanent change.</p> <p>Knows that burning is an irreversible change.</p> <p>Knows that burning materials can create energy.</p> <p>Knows that materials can be mixed together.</p> <p>Knows the meaning of soluble and insoluble.</p> <p>Knows different ways to separate materials.</p>
--	--	--	---	---	---

<u>Subject specific skills</u>	Is able to change the state of food or drink by heating.	Is able to observe changes of state.	Is able to observe changes of state.	Is able to observe changes of state.	Is able to observe changes of state.
	Is able to change the state of food or drink by cooling.	Is able to change the state of food by heating.	Is able to change the state of food by heating.	Is able to change the state of food by heating and cooling.	Is able to change the state of food by heating and cooling.
	Is able to identify when a change happens.	Is able to change the state of food by cooling.	Is able to change the state of food by cooling.	Is able to explain the change that has happened.	Is able to explain the change that has happened giving a reason why.
	Is able to identify what has caused the change e.g. heating or cooling.	Is able to describe the change that has happened.	Is able to explain the change that has happened.	Is able to classify changes of materials into irreversible and reversible.	Is able to mix and separate materials.
	Is able to mix materials together.	Is able to explain what has happened during a change using heating and cooling.	Is able to identify	Is able to mix materials together.	Is able to name different ways to separate materials.
	Is able to separate materials.	Is able to mix materials together.	Is able to classify changes of materials into irreversible and reversible.	Is able to separate materials.	Is able to explain why a material is soluble of insoluble.
	Follow a set of demonstrations to carry out a simple investigation.	Is able to separate materials.	Is able to mix materials together.	Is able to identify if a material is soluble or insoluble.	Is able to suggest how to separate 2 materials.
		Is able to identify if a material has dissolved.	Is able to separate materials.	Is able to name 2 ways to separate materials.	Is able to draw conclusions from observations.
		Follows a picture method to carry out a simple investigation.	Is able to identify if a material has dissolved.	Follows a written set of instructions to carry out a simple investigation.	Is able to classify changes of materials into irreversible and reversible.
			Is able to name 1 way to separate a material.		

		<p>Is able to make a prediction from a choice of 3 using symbols.</p>	<p>Is able to make a prediction from a choice of 3.</p> <p>Follows a word and picture method to carry out a simple investigation.</p>	<p>Is able to make predictions.</p> <p>Records results in a suitable table.</p>	<p>Follows a written set of instructions to carry out a simple investigation.</p> <p>Is able to make predictions.</p> <p>Records results in a suitable table and is able to draw conclusions from their results.</p>
<p><u>Suggested Activities</u></p>	<ul style="list-style-type: none"> • Explore reversible changes with food e.g. melting and cooling chocolate, ice lollies. • Explore reversible changes with objects e.g. a candle and cooling the wax to return to solid. • Explore irreversible changes with food e.g. cooking an egg, bread to toast • Explore irreversible changes with objects e.g. burning wood • Explore how burning materials can create energy e.g. wood, gas, coal, oil • Sort materials into those that have reversible and irreversible changes. • Explain the changes that have been made. • Record observations. • Link changes to solids, liquids and gases. • Mix materials together and discuss how they have changed. • Explore if materials are soluble and insoluble e.g. sugar, sand, coffee, rice, flour, salt, gravy • Explore how to separate materials using filtration, sieving, magnetic attraction and evaporation. 				
<p><u>Possible Investigations</u></p>	<ul style="list-style-type: none"> • Change the state of different foods. • Explore heating and cooling • Investigate irreversible changes. • Investigate reversible changes. • Explore soluble and insoluble materials. • Explore how to separate materials. <p>Record observations of changes.</p> <p>Classify different foods/materials into how they change e.g. reversible, irreversible</p>				

<p><u>Personal development</u></p>	<p><u>Problem solving</u> Investigations and matching exercises</p> <p><u>Communication skills</u> Working as pairs in investigations, asking and answering questions</p> <p><u>Self-belief</u> Learning new skills, practising them and demonstrating them.</p> <p><u>Self-management</u> Working with new equipment</p> <p><u>Teamwork</u> Working as groups to solve problems or find out new information</p>
<p><u>Online resources</u> Twinkl (good investigation for soluble and insoluble & separating materials in year 5 science changing materials) CLEAPPS for risk assessments BBC bitesize for video resources. YouTube – videos and songs linked to topic.</p>	
<p><u>Evidencing Work</u> All work / evidence sheets need to be printed off (where appropriate levelled in accordance with the rubric), students need to self-assess and work needs to be put in student folders.</p>	

RRS Articles:

This unit of work is linked to Articles of the UN Convention on the Rights of the Child.