



St Winefride's Catholic Voluntary Academy

Curriculum Plan for Science

Year Group: 5

Title of Unit: Reversible and Irreversible Changes

National Curriculum Requirement:

- Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- Demonstrate that dissolving, mixing and changes of state are reversible changes

Key Knowledge and Skills:

- Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets
- Know and explain how a material dissolves to form a solution
- Know and show how to recover a substance from a solution
- Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating)
- Know and demonstrate that some changes are reversible and some are not
- Know how some changes result in the formation of a new material and that this is usually irreversible

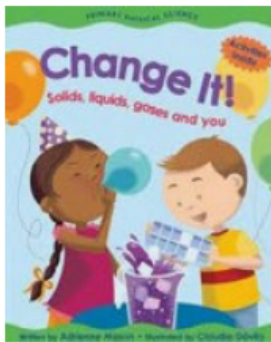



Key Knowledge and Skills Expectation

	Casey	Henry	David	Freya	Ralph	Fergus	Coco	Owen	Mabel	Kaydan	Oscar	Jniu	Evie	Joshua	Nancie	Lucas	Evan	Hannah	Eric	Clara	Isaac	Lerell	Daisy	Yami	ELEMENT	
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Year 5: Reversible and Irreversible Changes Knowledge Mat

Subject Specific Vocabulary		Interesting Books	Sticky Knowledge about Reversible and Irreversible changes		
solubility	Solubility is a chemical property referring to the ability for a given substance, the solute, to dissolve in a solvent.	 	<ul style="list-style-type: none"> Irreversible changes, like burning, cannot be undone. Reversible changes, like melting and dissolving, can be changed back again. 		
conductivity	Conductivity defines a material's ability to conduct electricity.				
transparency	In general, transparency is the quality of being easily seen through.	<p>Important facts to know by the end of the reversible and irreversible changes topic:</p> <ul style="list-style-type: none"> Know what a reversible change is and means. Know what an irreversible change is and means. Give examples of reversible and irreversible changes. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. 	<ul style="list-style-type: none"> Mixtures can be separated out by methods like filtering and evaporating. A change is called irreversible if it cannot be changed back again. 		
thermal evaporation	Something that is thermal is hot, retains heat, or has a warming effect. Evaporation is the process of a substance in a liquid state changing to a gaseous state due to an increase in temperature and/or pressure.				
dissolve	To dissolve is defined as to become broken up or absorbed by something or to disappear into something else.				
bicarbonate of soda	A white water-soluble powder, used chiefly as an antacid, a fire extinguisher, and a leavening agent in baking.				
thermal	Something that is thermal is hot, retains heat, or has a warming effect.				
filtering	To filter a substance means to pass it through a device which is designed to remove certain particles contained within.				
melting	Melting is a physical process that results in the transition of a substance from a solid to a liquid.				
separate	Separate, part, and divide mean to break into parts or to keep apart.				
					<ul style="list-style-type: none"> Examples of reversible changes: Melting is when a solid converts into a liquid after heating. An example of melting is turning ice into water. Freezing is when a liquid converts into a solid.
					<ul style="list-style-type: none"> A cooked egg cannot be changed back to a raw egg again. Mixing substances can cause an irreversible change. For example, when vinegar and bicarbonate of soda are mixed, the mixture changes and lots of bubbles of carbon dioxide are made. Burning is an example of an irreversible change.



Science unit: Year 5 Properties and changes to materials

Why will toast never be bread again?

Issues related to long-term memory and metacognition

Focus on children's learning links

- Children should consider the learning links they have to different materials. They should think of the materials that they come across every day. They should think of the learning links they have to previous learning such as change of states in Year 4. They should think of learning from Key Stage in relation to uses of different materials.

Think of the important learning

- Link to the key knowledge and skills statements about reversible and irreversible changes. At the end of the learning, we want pupils to know which materials can be changed back to their original state and which cannot.
- They may have time to explore the work of famous scientists. Can they explore the work of famous chemists: Lavoisier, Priestley, Spencer Silver or Ruth Benerito.

What inferences can pupils make?

- Throughout the unit, pupils will be encouraged to come up with their own questions, especially in relation to how materials change, for example rust on metals.
- Activities will be deliberately set that require pupils to ask their own questions based on the learning they have received, creating questions for others about reversible and irreversible changes.

Help pupils to make sensory links

- For this unit the sense of sight is very important. Pupils should have opportunities to talk about what they see happening to such things as bread turning in to toast and a mixture of sand and cement turning in to concrete.
- They need to understand why some changes can be reversed and others not.

Reflect on the learning that has taken place

- At the end of the unit of learning, an activity needs to be organised that helps pupils to recall the learning.
- This can be in different forms. It could be a power point presentation, a short video clip or even a display.
- The main focus is to present their learning to the class as a whole. This could include staff creating a presentation of the learning using photographs, etc.

Fixing misunderstandings

- It is important that pupils' misconceptions are picked up as quickly as possible, especially in relation to what happens to materials that are heated, burned or mixed.
- It is important that pupils know why their investigations have to be fair.
- Pupils must develop their understanding about what being a scientist means.



Element 1: Teaching Sequence

	Direct Teaching (including resources and links)	Pupil Tasks
Lesson 1	<p>Solids, liquids and gas</p> <ul style="list-style-type: none">•This is a retrieval lesson or element.•Talk to pupils about what they remember before asking them to complete the chart.	<ul style="list-style-type: none">•Use the chart appendix 5 to help pupils remember the classification of states of matter (from Year 4).
Lesson 2	<p>Comparing and grouping everyday materials</p> <ul style="list-style-type: none">•Talk to pupils about how to classify materials.•Use the following categories: hardness; solubility; transparency; and conductivity.	<ul style="list-style-type: none">•Pupils should use the chart outlined on appendix 4 to help them understand more about the qualities of different materials.
Lesson 3	<p>Explaining reversible and irreversible changes: Heating, burning or mixing</p> <ul style="list-style-type: none">•Pupils should be shown a piece of bread and an A4 piece of paper. Talk to them about how these could be changed. Put the piece of bread in a toaster and toast it. Burn the piece of paper until only the ashes remain.•Ask pupils about turning the paper and bread back to their original forms.	<ul style="list-style-type: none">•Pupils will use appendix 1a and 1b to outline their learning.



	<ul style="list-style-type: none">• Now, show pupils salt and water. Mix the two together and ask pupils if we could get back the original salt and water.• Use this as an introduction to the topic.• Show pupils the following internet: What are irreversible changes? -BBC Bitesize• Encourage them to watch the following internet link to support the task: Changes in the state of materials (clip compilation) -KS2 Science -BBC Bitesize	
Lesson 4	<p>Dissolving</p> <ul style="list-style-type: none">• Pupils should learn what solution, separation and dissolving means.• They should use the following internet clips to help them:<ul style="list-style-type: none">• What is dissolving? -BBC Bitesize• What is separation? -BBC Bitesize• Some substances dissolve when you mix them with water.• When a substance dissolves, it might look like it has disappeared, but in fact it has just mixed with the water to make a transparent (see-through) liquid called a solution.• Substances that dissolve in water are called soluble substances. When you mix sugar with water, the sugar dissolves to make a transparent solution. Salt is soluble in water too.• Substances that do not dissolve in water are called insoluble substances. When you mix sand or flour with water, they do not dissolve.	<ul style="list-style-type: none">• Pupils, working with a partner, should create 8 questions from the information they have learned so far. They should then challenge another pair who will have created 8 questions of their own (Use appendix 2 to complete the task).



Lesson 5	<p>Working scientifically: How can you separate materials? Separating, filtering and dissolving</p> <ul style="list-style-type: none">•Pupils, in groups of four, will be asked to separate the following solution: sand, salt and water.•Pupils must be made aware of the resources available to them, including filtering paper.•They must be supervised when heating water, otherwise they should be allowed to continue their work without support.•They should weigh carefully the separate items, i.e. salt, sand and water.•Decide when it the right time to share the following internet link with pupils: Separating mixtures of materials -KS2 Science -BBC Bitesize•Things that do not change.•We know our finger prints do not change. Today police use eye recognition and DNA to help them solve crimes.•	<ul style="list-style-type: none">•They should use the sheet on appendix 1a to provide appropriate prompts at different stages.•They should then use appendix 1b to write up their results. <p>Use appendix 2 to help you to become crime solvers.</p>
Lesson 6	<p>Famous scientists</p> <ul style="list-style-type: none">•Pupils should explore the work of one of the following famous chemists:•Antoine Lavoisier,•Joseph Priestley,•Spencer Silver•Ruth Benerito	<ul style="list-style-type: none">•They should use the proforma set out in appendix 3 to help them.

