

THE WINTERTON FEDERATION MEDIUM TERM PLAN SCIENCE Autumn YEAR 5

Material World	Learning Objective	Activity – Switched On Science	STEM Activities	Success Criteria
Session 1	<p>To identify the properties of a range of materials and explain their uses.</p> <p>To plan comparative or fair tests and then take accurate measurements and make accurate observations.</p>	<p>Look at things used to wash up (bowls, cloths, scourers, sponges) and talk about why each material has been used for the purpose Present a collection of everyday materials. Discuss and jot down what is known any similarities or differences. Draw out the following standard properties: strength (strong/weak) hardness (hard/soft) toughness (tough/brittle) elasticity (elastic/plastic) stiffness (stiff/flexible). Emphasise the difference between hard and tough, tough and strong. Now come up with some simple ways of testing those properties. Record their findings on ‘Why that material?’ (Activity resource book, page 12). Get into groups: Explain that they are going to develop their skills of investigating as they find out more about the properties of materials. Use as many of the investigations below as needed and then rank the materials. Use ‘Investigation planning board’ (Activity resource book, page 13). Which is the bounciest ball? Which is the hardest material? Which is the best moppper-upper? Which is the best packaging material? Which is the best elastic band or the stretchiest fabric? Choose one to investigate.</p>		<p>I can compare the properties of a range of materials. I can plan comparative and fair tests, collecting accurate results. I can draw on the results of my tests to explain why some materials are used.</p>
Session 2	<p>Know that some materials will dissolve in liquid to form a solution.</p>	<p>Drop polystyrene ‘peanuts’ (from packaging) into water and watch them disappear. Then try some other liquids and see if the same thing happens. Get into groups: After the quick challenges, discuss how they know if something has dissolved and challenge them if they say it has disappeared, for example by tasting the salt or sugar in solutions or asking why the</p>		<p>I can identify some factors that affect dissolving.</p>

		liquid is now coloured. Discuss and come up with some sort of model that they think could explain what is going on. Say this is one way scientists work: they often start with some creative thinking, then carry out tests to see if their ideas are correct. Let the children quickly find out which factors affect dissolving. Then apply what they've discovered in the practical investigation – dissolving different things in water. Draw their findings together and list factors on the board. Then ask the children if they think their model can explain what they have found out. Do they need to change them? Or do they need to amend their ideas? Now they are going to use what they've learned to find the fastest way to dissolve jelly. They will need to consider all the variables and decide which they will control in their plans. They should use the information from the findings above to decide on the appropriate values and ranges for those variables. As part of their evaluation of the investigation, the children could identify further tests to do.		
Session 3	To use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.	Show the children mixtures of icing sugar and coconut; sand and paper clips; and muesli. Ask them how they could separate the different bits out. Pour sandy water through a sieve and then filter paper, and ask the children to explain the difference. Show the film: 'Material World'. Ask for other examples of changes that take place through cooking and ask them to suggest whether these are reversible or irreversible. Explain that the holes in even fine sieves can be too big to separate some mixtures. Look at some other filters with magnifiers to see if they can spot any spaces. Try filtering some chalky water using each filter.		I can describe different ways to separate mixtures. I can use scientific language and ideas to explain dissolving and separation.
Session 4	To explain that some	Show children the YouTube clip of mercury		I can explore reversible and

	<p>changes result in the formation of new materials, and this kind of change is not usually reversible.</p> <p>To record data and results using a range of scientific equipment reporting and presenting findings, including conclusions, causal relationships.</p>	<p>(II) thiocyanate reacting when heated – it produces a long winding ‘snake’: https://www.youtube.com/watch?v=2pXyJ7P0B0k</p> <p>Give the children a range of materials to mix with water and ask them to observe the changes they see. Discuss with them if they think a new material has been made and why they think this. Explain that some changes are not permanent and we can get back what we started with. Remind the children how they separated materials earlier in this unit and link this to changes of state that they learn about in Year 4. Then explain that they are going to carry out some experiments that will help them know if a chemical/irreversible change has happened. Carry out experiments to show: sometimes gas is produced sometimes heat is given out or taken in a solid might be formed a colour change might happen a smell may be produced. They decide the best way to present their findings. Ensure the children are clear about the difference between reversible and irreversible changes. To make sure, ask them to identify which is which from some examples such as: making a cake making an ice lolly making popcorn rotting fruit sawing a piece of wood. Signs of Change investigations from Teacher Book.</p> <p>Demonstrate or show clips of things burning and ask the children what they see happening. Can they see ash, fumes and smoke? And how they would know if a gas had been made when they can’t see it? Finish off by discussing some everyday examples of burning.</p>		<p>irreversible changes.</p> <p>I can explain the difference between changes in materials.</p> <p>I can decide the best way to present my findings and evidence.</p>
<p>Session 5</p>	<p>Explain that some changes result in the formation of new materials, and this</p>	<p>Demonstration! All you need to do is add lots of Mentos to a bottle of Diet Coke using a dispenser. And remember – it’s best to do this outside.</p>		<p>I can explore reversible and irreversible changes.</p> <p>I can explain the difference between changes in materials.</p> <p>I can decide the best way to</p>

	<p>kind of change is not usually reversible</p>	<p>Ask children to construct a concept map about changing materials using terms like: dissolving, melting, evaporating, hot, cold, reversible, irreversible, burning and reaction. Explain that Potty Putty was invented in the 1950s by accident when scientists were trying to find a replacement for rubber. Play with it to really get to grips with its properties. (See page 37 for other 'modern accidental discoveries'.) Explain that the children are going to make a similar material to Potty Putty and find out about its properties. Give instructions about how to make flubber and find out about its properties (see page 35). Explain that the children are going to make another mystery material. All they need to do is follow these steps: 1. Each child gets a bowl of orange juice with calcium, some Gaviscon and a pipette. 2. Squeeze small amounts of Gaviscon into the juice to form 'worms'. 3. Vary the amount of time each 'worm' is left in the juice and see what difference it makes. 4. Put a couple of 'worms' – straight after forming – into strong salt solution and watch what happens. Group consolidation: Discuss what the children think the flubber or 'worms' could be like if they could see right inside it. They should present what they have found out as creatively as possible,</p>		<p>present my findings and evidence</p>
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