

Year 4	Science	Medium Term Plan - Spring Term 2001	
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Main Learning Intentions	Ideas for Activities	Time / Wk	Resources / Notes
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Solids, liquids and how they can be separated		Unit 4D	
<p>Children should learn to:</p> <ul style="list-style-type: none"> ▪ identify solids & liquids ▪ that there are liquids other than water 	<p>Elicit children's existing knowledge of materials by presenting them with a collection of solids and asking them to group them according to their own criteria, recording reasons for their choices. Revise language for describing properties.</p> <p>Present children with additional items including liquids of differing viscosity and ask them to divide them into two groups only. Discuss groupings and introduce terms 'solid' & 'liquid'. See key questions on QCA doc & short term planning.</p>	1¼ hr	6
<ul style="list-style-type: none"> ▪ To make careful observations and measurements of volume recording them in tables and using them to draw conclusions. ▪ That liquids do not change in volume when they are poured into a different container. 	<p>Revise with children how volumes of liquids are measured. Ask children to find out and record in a table what happens to shape and volume when liquids are poured from one container into a different shaped container. Talk with children about what their results show and ask them to use them to make a generalised table.</p>	1¼ hr	↓
<p>That solids consisting of very small pieces behave like liquids in some ways.</p>	<p>Ask children to explore and describe how powders and solids consisting of many small pieces e.g. rice, salt, sand are different to liquids e.g. by tilting jars containing these, by trying to use sand to turn a water wheel, by sieving through gauze or fine mesh sieve.</p> <ul style="list-style-type: none"> ▪ Try emptying the same volume of water and a powdered solid using a tea-spoon. <p>How many spoonfuls of does it take to empty same volume? Why is there a difference?</p>	1¼ hr	7 ↓
		<p>Resources: A range of solids and liquids. Where actual object is not possible supplement with pictures.</p> <p>Links with NNP</p> <p>Measuring cylinders (volume) Variety of different shaped containers for liquids.</p> <p>A range of powders & solids consisting or small particles.</p> <p>Containers. Volume measures. Plastic tea-spoons.</p>	

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<ul style="list-style-type: none"> That the same material can exist both as a liquid and a solid That liquids can be changed to a solid by cooling and this is freezing or solidifying That a solid can be changed to a liquid by heating and that this is melting 	<ul style="list-style-type: none"> Ask children to suggest when they have seen water freezing, and what conditions are necessary for this to happen. Ask them to suggest how to make ice melt. Elicit other familiar examples of substances melting or solidifying e.g. wax running down the side of a candle, chocolate melting etc. Let them explore what happens to wax if it is held in the hand or put in a warm place (No naked flames) Ask children how to keep familiar materials e.g. ice, chocolate, butter from melting and help them to appreciate relative temperature. 	1¼ hr	<p style="text-align: center;">↓</p> <p style="text-align: center;">7</p>	<p>Possible materials: an ice-cream, candles, wax, ice, pre-melted and misshaped chocolate bar,</p> <p>thermometers – link with NNP ~ reading scales</p>	
<ul style="list-style-type: none"> Different solids melt at different temperatures That melting and solidifying or freezing are changes that can be reversed and are the reverse of each other 	<p>Use secondary sources e.g. video, CD-ROM pictures to illustrate molten metals or lava and emphasise that many materials have to be heated before they melt.</p> <p>Ask children to use secondary sources to find out more about melting metals and to record information about why this is important.</p>	2½hr	8	<p>Use secondary sources e.g. video, CD-ROM pictures</p> <p>Main Library and additional Schools' Library Service Project Loan.</p>	
<p>That solids can be mixed and it is often possible to get the original materials back</p> <p>To choose appropriate apparatus for separating a mixture of solids.</p>	<p>Demonstrate to children how solid particles of different sizes can be separated by sieving. (Link with earlier work on soils KS1)</p> <p>Challenge children to separate a mixture of e.g. sand, rice, dried peas and paper clips using their own techniques and to explain why these worked.</p>	1¼ hr	<p style="text-align: center;">9</p> <p style="text-align: center;">↓</p>	<p>A range of sieves in different sizes.</p> <p>A range of solid materials: rice, dried-peas, dry sand, marbles.</p>	

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<ul style="list-style-type: none"> that changes occur when some solids are added to water to make careful observations, recording results in tables and make comparisons 	<p>Ask children to explore what happens when a range of materials <i>e.g. salt, instant coffee, sugar, flour, powder paint, chalk, sand, glass beads or marbles, plaster of Paris</i>, are mixed with water and to group the solids according to what happens, recording their results in a table.</p>	1¼ hr	9	Range of powders (solids), teaspoons, beakers.
<ul style="list-style-type: none"> that when solids do not dissolve or react with the water they can be separated by filtering <p>to choose apparatus to separate an undissolved solid from a liquid</p>	<p>Ask children to suggest and try out how they could get marbles or sand back from the mixture with water. Discuss with the children why marbles can be separated from water by coarse sieves but sand cannot. Ask for suggestions of how to modify the apparatus to get sand back possibly illustrating ideas using tea bags or coffee filters. Children try out apparatus and materials <i>e.g. muslin, paper towels, gauze bandage, blotting paper, fabrics</i> they have suggested and describe and explain what they did.</p>	2½hr	10	
<ul style="list-style-type: none"> that some solids dissolve in water to form solutions and that although the solid cannot be seen it is still present to predict whether salt or sugar can be separated from a solution by filtering and to test the prediction to see if it was correct to decide what apparatus to use when it is safe to taste things to test them 	<p>Remind children that when salt and sugar are added to water clear solutions are obtained, and if necessary show them this again. Ask children to say what they think has happened to the salt and sugar, remind them <i>e.g. of adding sugar to tea or salt to cooking vegetables</i> and to suggest how they could find out <i>e.g. by tasting the solution</i>.</p> <p>Ask children to predict whether the salt or sugar could be separated by filtering.</p> <p>Discuss what they would need to do to find out whether their prediction is correct and help them to decide how to do this.</p> <p>Find out by testing whether their prediction is correct or not.</p>	2½hr	11	
<ul style="list-style-type: none"> Review..... 				

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	<p>Review work on solids, liquids and separating solids and liquids by presenting children with a series of cards showing everyday processes <i>e.g. using a tea bag, adding salt to cooking, warming fat in a pan for cooking vegetables, putting ice cubes in a drink, warming a frosted windscreen, getting lumps out of flour</i> and cards naming processes <i>e.g. filtering, dissolving, melting, sieving</i> and ask children to match the cards.</p> <p>Talk with children about how they knew how to match the cards.</p>	2½hr	12		
<ul style="list-style-type: none"> • Review..... • Assessment of terms work 	Format to be decided.		↓		