Millbrook Primary School Unit Plan

Year 5 Materials MTP 2021-22 (Terms 4 and 5 – 11 weeks)

Enquiry type	Observing over time	Identifying and classifying	Research	Fair and Comparative testing	Pattern seeking	Exploring/ Problem Solving
Lesson	5, 9, 13	8, 12	4, 8	3, 4, 5, 11, 12	5, 9	1, 6, 7, 9, 10
Skills focus	Asking questions and planning enquiries	Setting up and doing enquiries	Observe and measure	Recording	Interpreting + communicating results	Evaluating
Lesson	1, 4, 6, 8, 11	3, 4, 5,6, 7, 8, 10, 11,	3, 4, 5, 9, 12	3, 4, 6, 11, 12	4, 12	4, 11

Big Six Vocabulary	
process	solution
reaction	dissolve
thermal	molecules

Lesson	Purpose of lesson (incl Key question)	Activity	Outcome
1	How can we separate materials? KL: Separating Materials (1 lesson)	Explorify Starter - https://explorify.uk/en/activities/zoom-in-zoom-out/all-mixed-up How would we separate this? Hook in – Letter from a builder, explaining that materials have been mixed up and we need to help get all of the different materials back. Bucket with sand, salt, strips of fabric, wood, plastic and metal. Children have sieves, tweezers and magnets to separate larger materials. Leave sand and salt until after dissolving. Plenary – look at molecular sieves.	Child Led Investigation Questioning and Reasoning Pictures of children separating (Floor book lesson)

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2	Context lesson What does our key vocabulary mean? KL: Exploring Scientific Vocabulary (1 lesson)	Explorify starter - https://explorify.uk/en/activities/zoom-in-zoom-out/all-ground-up Explore the 'Big Six' for the term. Create linear arrays – original word goes in rectangle on left, antonym on rectangle on right. 3 central ovals to be filled with words that get less similar as they reach the other side e.g. **microscopic** > tiny > small > bigger > **large** SEND to have visuals to support understanding. Ext: Add an illustration Explain and set up Million Dollar word Club on Working Wall – Big Six written. Every time a child uses one of those words in conversations in lessons, their initials go on the board. Prize at end of unit for person with most points.	Linear Arrays (exercise books) Million Dollar Word Club (working wall)
3	Which materials dissolve and how do we know they're still there? KL: Understanding Dissolving and Solutions (1 lesson)	Explorify Starter - https://explorify.uk/en/activities/odd-one-out/tiny-grains What does dissolve mean? Have various items to dissolve – sugar, salt, coffee, sand etc. In groups, children try dissolving each material in different beakers of water. Discuss variables – we keep the amounts or water and solid the same, as well as the temp, and change the solid. Check sheet – did it dissolve? How do we know? Look at each solid in turn. How can we test that the solid is still there? Taste test, sight or weigh. Plenary – Look at molecular make up of dissolved substance.	Pictures of the experiments Dissolving table checklists Explanations of how we know the substance is there (exercise and floor books) Ideas: sugar, salt, bicarb, oil, chocolate, coffees, dark vinegar, ready brek, crushed biscuits, flour, sand
4	What affects the rate of reaction? KL: Understanding Chemical Reactions (3 lessons – plan, do, evaluate)	Expolrify Starter - https://explorify.uk/en/activities/odd-one-out/hot-drinks-for-cold-days Hook in – email from Mr Rose/Mrs Youngman/Mrs Charlton explaining that they are too busy to wait for their sugar to dissolve in their tea and asking Y5 to investigate how to make it quicker. Discuss how we might explore this. Plan - CIEC | Interactive Planning Tool What will we change? What will we keep the same? Temperature, type of sugar, size of granules, stir, shake etc. Do – Children work in their teams of no more than 3 to explore their chosen variable, making notes and filling in results table. Think about how independent variable will be measured. Evaluate – Show results in a graph. Support children in choosing the correct graph for their results. Write a letter, including their graphs, to the head. (Assessment Opp) Plenary – Definition Match Game (Assessment Opp)	Child Led Investigation Plans of investigation Pictures of experiment Results table/graph Reports/Letters to head

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			(Exercise books)
5	How does the amount of solid affect the rate of reaction? <u>KL: Exploring Saturation Points</u> (1 lesson)	Explorify Starter - https://explorify.uk/en/activities/mystery-bag/marvellous-mixtures What does saturation mean? What is a saturation point? How can we test saturation points? Discuss results from previous investigation to figure out which conditions speed up dissolving and how we can use that in today's investigation. Independent variable – amount of sugar in teaspoon increments Dependent variables – temp and amount of water, rate at which we stir, type of sugar, type of container (HA why is this important – thermal conductors) Set up and carry out investigation in groups. Give each person in the group a role – recorder, stirrer, timer. Discuss results as a class. Create graph to present results. Plenary – Science reasoning problem.	Predictions Pictures of experiment Graphs of results Exercise books
6	How can we separate sand and salt? <u>KL: Reversable Reactions</u> (1 lesson)	Explorify starter - https://explorify.uk/en/activities/zoom-in-zoom-out/rock-star Recap change of state – ice, water, vapour, melting and freezing – from Y4 Look at the filter paper under magnifying glass – what do we notice? Link back to sieves from a previous lesson. How do you think the filter paper will work? What will you need to add to the sand and salt to separate them by filtration? Groups to have a scoop of sand/salt mixture. Add a small amount of water to dissolve the salt and then pass slowly through the filter paper. This is a slow process. While it is happening, children draw or write up the separation of materials so far, explaining each step.	Write ups and diagrams Separated mixtures
7	How can we separate salt and water? <u>KL: Exploring evaporation as a method of separation</u> (1 lesson)	Explorify Starter - https://explorify.uk/en/activities/zoom-in-zoom-out/bright-spark What might this have to do with today's KL/question? We are now left with the final part of the builder's mixture to sort – the salt. Currently it is in a salt water solution. Show children the equipment that will be used today – foil pie/cake tins and burners. How could we remove the water from the salt? What is this process called? Set out safety rules before setting the experiment up. Children to evaporate the water from the solution over a candle to remove the salt. Discuss how this is a reversable change (the water turns to vapour, which could be condensed and added back to salt) Plenary – How could we separate salt and water if our only heat source was the sun?	Pictures of investigation Discussions from plenary (floor books)

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8	Why can't we get materials back after we burn them? KL: Irreversible Reactions (2 lessons)	Explorify Starter - https://explorify.uk/en/activities/listen-what-can-you-hear/feeling-hot-hot-hot What would children like to burn? Create list and discuss any materials which it would be unsafe to burn in school and why. Talk children through how we would carry out this experiment and discuss potential risks. Pose question – how can we make this experiment safe for everyone? Show example risk assessments and have children create their own. Predict which of the materials will be flammable and which will not. Challenge HA to think about what the reaction will look like for different items on the list. Do – Set up tea lights and objects for burning on each table. Use tweezers/ tongs to hold materials into flames. Children observe. Plenary – What is the difference between melting and burning? Are both processes irreversible? Are new materials created?	Risk Assessments completed by children Predictions and plans Illustrations of changes to each material. (floor books)
9	What makes a reaction irreversible KL: Irreversible Changes (1 lesson)	Explorify starter - https://explorify.uk/en/activities/zoom-in-zoom-out/brown-and-spicy Demonstrate an irreversible change – Lighting a match or candle. Can children identify what is happening and what has been produced? Carousel of different experiments demonstrating different irreversible chemical reactions: Cooking egg white over a flame (could be done in small groups in rotation in cooking room – staff permitting. Include cooking toast if using cooking room) Mashing a banana/making a smoothie Bicarb and vinegar – self inflating balloons (vinegar in bottle, put balloon over, leave a gap to put in bicarb and seal) Plaster of Paris and water Mixing Jelly/Bath bombs in water Come back to look at science behind these changes. Plenary – set up an experiment to explore rust to observe over time – different types of metal in water.	Pictures of activities Explanations from children (floor books)

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10	How can irreversible changes create new products? KL: Creating products from Irreversible reactions (1 - 2 lessons)	Explorify starter - https://explorify.uk/en/activities/zoom-in-zoom-out/red-and-flaky Discuss the difference between reversable and irreversible changes and physical vs chemical reactions. Explain that scientists us these reactions to create new products – Spencer Silver, Arthur Fry and Alan Amron (sticky note), Ruth Benerito (wrinkle free cotton) Explore irreversible reactions to make a product by: Making Bath Bombs - https://www.youtube.com/watch?v=wieE0wSVXOQ&list=PLLnAFJxOjzZu0QhykI_sCKp05sDaa00kT&index=11 Or Making Lava Lamps - https://www.youtube.com/watch?v=v5a408V1BB4 Or Growing Crystals – Obs over time Ext: Venn diagram – Reversable and irreversible reactions.	Discussions Photographs of the products Venn Diagrams (floor books)
11	Which material would make the best teaspoon? KL: Exploring Thermal Conductors (2 lessons)	Explorify Starter - https://explorify.uk/en/activities/whats-going-on/tea-for-lift-off What are teaspoons used for? What properties do they need to have to make them successful in stirring hot drinks? Discuss conduction and insulation (link to Y4 Electricity unit). Explain that materials can also be thermal conductors or insulators. What could this mean? Plan – Children plan how they are going to test materials with what they have been given. Do – Children set up and carry out experiments. Evaluate – Write up their findings.	Plans and evaluations (Exercise books)
12	How can I keep my tea hotter for longer? KL: Exploring Thermal Insulators (1-2 lessons)	Explorify starter - https://explorify.uk/en/activities/zoom-in-zoom-out/beans-anyone Another email from one of the heads explaining that now they've perfected their sugar dissolving, they need our help again. They are making cups of tea but finding the go cold too easily. Can we find out how to keep the tea hot for them? Have cups made from different materials and some tea. Children measure the control temperature of the tea and record before pouring (carefully!) into the cups and covering. Measure temperature of each cup every 5 minutes and record. While waiting, children can be writing predictions and sketching experiments. Stop after 30 minutes (6 recordings) and discuss with another group. Create graphs and present information to heads of school. Ext: What if we wrapped these cups in another material? How would that affect the rate of cooling? Plenary – sort insulators and conductors.	Sketches of experiment Predictions Graphs (Exercise books)

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13	How can we group and compare materials? (2 lessons)	Explorify Starter - https://explorify.uk/en/activities/zoom-in-zoom-out/red-and-flaky What are properties of materials? How can we define them? List of properties for children to define. Matching game for LA. Tell the children that they will be testing the properties of several different materials. Explain that they will test each material for magnetism, hardness transparency, flexibility and permeability. https://www.bbc.co.uk/bitesize/clips/zxkc87h In groups, children decide which property to test and how. Ask the HA children to share their ideas on the possible uses for the materials they tested, based on their properties. Ask for feedback on their ideas from the rest of the class Children design and create a game based on material, their properties and their uses.	Property definitions Pictures of investigation Class discussion Properties and purposes game CIEC | Interactive Planning Tool
14	What are the conditions needed to produce rust on a metal? KL: Observing chemical changes over time and recording results (1 lesson)	Explorify starter https://explorify.uk/en/activities/whats-going-on/baking-cookies Recap reversable vs irreversible. Look at the metals in the liquids under magnifying glasses. What can we see? What can we conclude from this? Children draw each metal and write brief conclusion for each one. Scenario – I want to make a bicycle that doesn't rust. Which of the metals should I choose? We will need to think about all of the other properties of each material and choose something appropriate. Design the bicycle.	Drawings Discussions Bicycle designs (exercise books)

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Separating technique	Difference in property required
Filtration and sieving	A solid that does not dissolve in a liquid. Different sized solid bits
Magnets	Some materials magnetic others not
Evaporation	A solid dissolved in water and the solid has a high boiling temperature
Floating	Some materials float and other sink