

Curriculum statement	Explorify activities	Suggested use
Year 3 Rocks		
<ul style="list-style-type: none"> compare and group together different kinds of rocks on the basis of their appearance and simple physical properties Having explored the substances that make up Earth's surface, I can compare some of their characteristics and uses. SCN 2-17 New Welsh Progression step 3: I can recognise that our planet provides natural materials and can explain why they may have been processes to make them useful. NI Change over time KS2 How some materials change and decay whilst others do not such as fossil formation. 	<p>Big question why don't all rocks look the same?</p> <p>ZIZO Mysterious Material (Chalk)</p> <p>ZIZO Obscure orange (Sandstone)</p> <p>ZIZO Suprising Surface (Marble)</p> <p>ZIZO Glitter and Sparkle (Granite)</p> <p>ZIZO Kaleidoscope of colour (Basalt)</p> <p>LWCYH?Rock my world</p>	<p>Formative assessment tool?</p> <p>These could be great starters to first Rocks lesson or after watching https://www.bbc.co.uk/bitesize/topics/z9bbkqt/articles/zsgkdmn Which explains the 3 main types of rock. Children would not need to remember the names but knowing how rocks have formed helps explain their properties. You could ask, 'Do you think this rock has been made by squashing layers? Or has it melted inside the Earth?'</p> <p>https://www.geolsoc.org.uk/~media/shared/documents/education%20and%20careers/Resources/FactSheets/Rock%20cycle%20factsheet%20draft%20KS2%20v2/Rock%20cycle%20factsheet%20FINAL.pdf?la=en</p> <p>Followed by looking at a selection of rocks (e.g. Limestone, chalk, sandstone, slate, marble, Granite, Basalt) and fossils for children to sort into 3 groups based on their observations. Plan available if register here: https://edu.rsc.org/primary-science/found-in-the-ground/1655.article (Well worth registering - it is free)</p> <p>Plenary discussion about useful rocks and where we get them from and how.</p>
	<p>OOO Building with rocks</p> <p>Big Question Which rock would be best for a skate park?</p>	<p>Starter (discuss rocks humans use and human made bricks)</p> <p>Before...</p> <p>Activity where children test and compare properties of rocks e.g. absorbency, rub or scratch test. Then they use their results to decide which rock is most suitable and explain why. Could be used to assess how well children report on findings using this: TAPS focused practical task Y3 Rock Reports (Select Focused Assessment Plans tab: Year3: Rock Reports)</p>
<ul style="list-style-type: none"> describe in simple terms how fossils are formed when things 	<p>ZIZO Black stripes</p>	<p>Introduce the term 'fossil' then learn how simple cast fossils are made using: https://www.nhm.ac.uk/discover/how-are-fossils-formed.html</p>

<p>that have lived are trapped within rock</p> <ul style="list-style-type: none"> NI Change over time KS2 How some materials change and decay whilst others do not such as fossil formation. 	<p>OOO Frozen in Time</p> <p>Problem solvers If fossils could talk</p>	<p>Starter to extend understanding of types of fossils</p> <p>Practical, memorable activity once the cast fossil formation process has been taught.</p> <p>Might be good to follow with working out what fossils suggest about the animals and plants that left them, using this activity: https://www.stem.org.uk/resources/community/resource/5457/fossil-hunter</p>
	<p>OOO Making records What if Fossils didn't exist?</p> <p>OOO Scientists hall of fame</p>	<p>Starters for a lesson thinking about importance of fossils</p> <p>To introduce Mary Anning Then research using secondary sources (Scrap book science) To start you could use: https://www.bbc.co.uk/teach/class-clips-video/true-stories-mary-anning/zn7gd6f Can they use a website to add to their notes: https://www.bbc.co.uk/bitesize/topics/zd8fv9q/articles/zf6vb82</p>
<ul style="list-style-type: none"> recognise that soils are made from rocks and organic matter 	<p>Big Question Why don't all soils look the same?</p> <p>ZIZO Tiny bits and pieces</p> <p>ZIZO Glorious Grains</p> <p>Possibly WGO Sandcastle</p> <p>WGO Furry Fruits</p> <p>Problem solver Drainage dilemma</p>	<p>Both these could be part of a 'what is soil?' introduction along with this useful link: https://www.bbc.co.uk/bitesize/clips/z7rb4wx</p> <p>These show that sand is actually tiny bits of rock and so could help explain about weathering along with this: https://www.bbc.co.uk/bitesize/clips/zt3ykg7</p> <p>Great video to show what organic matter is.</p> <p>Practical comparison of properties of 2 soils. After watching: https://www.bbc.co.uk/bitesize/clips/z7rb4wx Try making soil 'balls' with samples</p> <p>British Science Week 2022 Glorious Mud activity useful to look at type of soils.</p>

Year 4 States of Matter

<ul style="list-style-type: none"> compare and group materials together, according to whether they are solids, liquids or gases NI Place KS1 - the range of materials used in my area New Welsh Progression step2: I can explore and describe the properties of materials and justify their uses. 	<p>WGO Pottery</p> <p>OOO Gas</p> <p>WGO Dancing raisins</p> <p>WGO Expanding balloon</p> <p>WGO Fire Fighting</p> <p>OOO Excuse me!</p> <p>TBQ How do smells travel?</p> <p>Problem solvers Water carriers</p>	<p>Introductory activity. Lesson could go on to group and compare solids and liquids. Then the properties of solids and liquids could be identified by children trying: cutting (solids), shaping clay- holding shape (solids), pouring e.g. Wood chips, sand, sugar, salt as well as liquids (identify grains and why they are still solids) Looking at liquids of different densities & range of different containers to pour liquid into.</p> <p>These OOO and videos introduce gases. Follow up with a circus of activities could include: Sponge in water, balloon weight with and without air, paper scrunched in bottom of a cup & inverted into water – stays dry, lemonade/fizzy water and raisins (after watching video?), comparative test of weight of fizzy then flat drinks.</p> <p>Demonstrate who can smell perfume opened & track across the classroom. Showing gases spreading out to fill the space.</p> <p>To introduce a making challenge/ teamwork using idea that liquids take shape of their containers.</p> <p>You might want to link the properties to what the particles are doing (no requirement but can help explain the properties). You could use this excellent Particle model demonstration: https://www.primaryschoolscience.co.uk/Matter-Lab/materials-interactive-2.html</p> <p>Then this Interactive (Possible assessment tool?): https://www.primaryschoolscience.co.uk/Matter-Lab/materials-interactive-1.html</p> <p>Guidance for particle model drama (Possible assessment tool?): https://www.stem.org.uk/resources/elibrary/resource/25825/drama-solids-liquids-and-gases</p> <p>All substances can be a gas, liquid or solids it just depends on temperature. This is a good assessment tool for taking accurate measurements with a range of equipment including thermometers/ data loggers: TAPs focused practical task- Y4 measuring temperature (Select Focused Assessment Plans tab: Year4: Measuring Temperature)</p>
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<ul style="list-style-type: none"> observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) NI Changes over time KS1: the effect of heating and cooling some everyday objects NI Change over time KS2 Changes that occur to everyday substances, for example, when dissolved in water or heated or cooled By investigating how water can change from one form to another, I can relate my findings to everyday experiences. SCN 0-05a / SCN 1-05a I can apply my knowledge of how water changes state to help me understand the processes involved in the water cycle in nature over time. SCN 2-05a New Welsh Progression step 3: I can recognise that changes in materials affect their properties and uses under different conditions. 	<p>Heating Melting ZIZO White crystals Problem solver Ice-block skyscraper (do quickly)</p> <p>Problem solver Ice race</p> <p>What if... water couldn't freeze? WGO Frozen in motion</p>	<p>Lesson starters before investigating...</p> <p>Investigate ice melting in different places around school? (fridge, inside in cool cupboard, inside near radiator and outside) Use of thermometers/ data loggers OR excellent Brian Cox/ Royal Society resources At what temperature does chocolate melt?</p> <p>Fair testing of effects of salt on melting point</p> <p>Plenary discussion after investigating ice melting</p>
	<p>Water boiling/ evaporating LWCYH? Terrific transformations</p> <p>NEW- Coming soon OOO Sensing Evaporation</p> <p>NEW- Coming soon TBQ How can we slow down evaporation to make sure that wildlife can drink?</p>	<p>Good lesson starter</p> <p>This OOO is trying to help children understand evaporation and the behaviour of gases by using their senses. Try putting it into action: Ask the children to rub hand gel over their hands and hold them spread out in front of them. What can they feel? How long does it take to dry? Pour some strong-smelling liquid (perfume or vinegar) into a bowl and place in a warm place. Who smells it first? How long does it take for the smell to diffuse through the air to the back of the classroom?</p> <p>Children plan their own investigation –then do it if they can. Further guidance here: What is the best dish for a bird water bowl?</p> <p>OR TAPs focused practical task- drying washing</p> <p>OR Demonstrate heating water in a pan and use a data logger to measure the temperature of the water. Observe boiling point and plateau in graph.</p>

	<p>WGO? Top of the pops</p> <p>What if... Water didn't evaporate?</p>	<p>Repeat these using names of processes:</p> <ul style="list-style-type: none"> Particle model demonstration: https://www.primaryschoolscience.co.uk/Matter-Lab/materials-interactive-2.html Guidance for particle model drama: https://www.stem.org.uk/resources/elibrary/resource/25825/drama-solids-liquids-and-gases <p>Formative assessment- who can apply the idea of boiling in a different context?</p> <p>As a plenary to review the importance of evaporation.</p>
<ul style="list-style-type: none"> identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature I can apply my knowledge of how water changes state to help me understand the processes involved in the water cycle in nature over time. SCN 2-05a NI Change over time KS2 Changes of state in the water cycle New Welsh Progression step 3: I can recognise that changes in materials affect their properties and uses under different conditions. 	<p>OOO Cloud Watching Possibly: LWCYH? Like a flash</p> <p>WGO A sudden downpour To show rain soaking desert and evaporation</p> <p>New coming soon: OOO Where is the water? (For condensation)</p> <p>OOO Warming effects</p>	<p>Before a lesson explaining the water cycle. Where do clouds come from? https://www.youtube-nocookie.com/embed/zBnKgwnn7i4?playlist=zBnKgwnn7i4&autoplay=1&iv_load_policy=3&loop=1&modestbranding=1&start= And/ or https://learning.sciencemuseumgroup.org.uk/resources/whats-in-the-clouds/</p> <p>Water cycle in a bowl/bag activity. https://www.metlink.org/resource/water-cycle-lesson/ Video: https://www.stem.org.uk/resources/elibrary/resource/32074/evaporation-and-condensation-robinson-crusoe-makes-drinking-water</p> <p>Plenary discussion about weather changes associated with global warming</p>

Year 5 Properties and changes of materials

<ul style="list-style-type: none"> 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 Through exploring properties and sources of materials, I can choose appropriate materials to solve practical challenges. SCN 1-15a NI Place KS1 - the range of materials used in my area Welsh 3. a comparison of the features and properties of some natural and made materials. 4. the properties of materials relating to their uses New Welsh Progression step 3: I can recognise that changes in materials affect their properties and uses under different conditions. New Welsh Progression step2: I can explore and describe the properties of materials and justify their uses. 	<p>WGO melting ice cubes</p> <p>LWCYH? Bottle it up</p> <p>WGO Magnets</p> <p>Mystery bag attracting objects</p> <p>Mystery bag interesting insulators</p> <p>Mystery bag electrifying metals</p>	<p>Before lesson testing thermal conductivity. Then assess how to use test results to make predictions and set up further tests with: TAPS focused practical task Y5 insulation layers (Select Focused Assessment Plans tab: Year5: Insulation Layers)</p> <p>Revision of vocabulary: transparent, nonporous, strong, hard but brittle</p> <p>Revise which materials are magnetic. https://www.bbc.co.uk/bitesize/topics/zyttyrd/articles/zw889qt Should any other classroom resources go in the bag?</p> <p>Could have both bags (with a few materials purposely misplaced for each group) Revise terms electrical conductor and insulator then devise a test to check they are all in the right bag</p>
<ul style="list-style-type: none"> know that some materials will dissolve in liquid to form a solution, and describe how to 	<p>OOO Hot drinks for cold days</p> <p>Big Question Does hot chocolate have to be hot?</p>	<p>Before investigating dissolving. Then assess their understanding of variables planning a fair test with: TAPs focused practical task- Y5 dissolving (Select Focused Assessment Plans tab: Year5: Dissolving)</p>

<p>recover a substance from a solution</p> <ul style="list-style-type: none"> By investigating common conditions that increase the amount of substance that will dissolve or the speed of dissolving, I can relate my findings to the world around me. SCN 2-16b New Welsh Progression step 3: I can recognise that changes in materials affect their properties and uses under different conditions. 	<p>WGO Brilliantly bouncy eggs</p> <p>Recovery of solute- see clean the up beach</p>	<p>As a plenary/ homework exploring dissolving in unusual context</p> <p>https://saltassociation.co.uk/education/properties-of-salt/grow-salt-crystal/</p> <p>https://www.stem.org.uk/resources/elibrary/resource/31669/growing-crystals</p>
<ul style="list-style-type: none"> use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating I have participated in practical activities to separate simple mixtures of substances and can relate my findings to my everyday experiences 2-16a I have investigated different water samples from the environment and explored methods that can be used to clean and conserve water and I am aware of the properties and uses of water. SCN 2-18a New Welsh Progression step 3: I can recognise that changes in materials affect their properties and uses under different conditions. 	<p>ZIZO All mixed up</p> <p>ZIZO Stringy patterns</p> <p>What if an astronaut gets thirsty?</p> <p>Problem solvers clean up the beach</p> <p>Mystery bag Marvellous mixtures</p> <p>Mission survive Toxic spill</p>	<p>To introduce everyday examples of mixtures that could be separated by sorting/ sieving</p> <p>To introduce filters to separate solids and liquids</p> <p>These all provide context for a follow up separating activity e.g.</p> <p>Separate sand, salt, magnetic metal (paperclips) and large plastic beads using magnet, sieve, filter and then evaporation.</p>

<ul style="list-style-type: none"> • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • NI Place KS2: Why materials are chosen for their use • Welsh 3. a comparison of the features and properties of some natural and made materials. 4. the properties of materials relating to their uses • New Welsh Progression step2: I can explore and describe the properties of materials and justify their uses. 	<p>OOO Forks OOO It's in the bag!</p>	<p>Starters before they investigate the strongest type of carrier bag or TAPs focused practical task testing nappy absorbancy</p>
<ul style="list-style-type: none"> • demonstrate that dissolving, mixing and changes of state are reversible changes • By contributing to investigations into familiar changes in substances to produce other substances, I can describe how their characteristics have changed. SCN 2-15a • NI Change over time KS2 Changes that occur to everyday substances, for example, when dissolved in water or heated or cooled • New Welsh Progression step 2: I can observe and describe ways in which materials change when they are mixed together 	<p>WGO Snowflake</p> <p>ZIZO All mixed up</p> <p>ZIZO Stringy patterns</p> <p>What if an astronaut gets thirsty? Problem solvers clean up the beach Mystery bag Marvellous mixtures Mission survive Toxic spill</p>	<p>Revision that changes of state are reversible Particle model demonstration: https://www.primaryschoolscience.co.uk/Matter-Lab/materials-interactive-2.html Guidance for particle model drama: https://www.stem.org.uk/resources/elibrary/resource/25825/drama-solids-liquids-and-gases</p> <p>To introduce everyday examples of mixtures that could be separated by sorting/ sieving To introduce filters to separate solids and liquids</p> <p>Demonstrate mixing in all the items then children work to reverse the mixing... Separate sand, salt, magnetic metal (paperclips) and large plastic beads using magnet, sieve, filter and then evaporation. Different contexts</p>

<ul style="list-style-type: none"> • New Welsh Progression step 3: I can recognise that changes in materials affect their properties and uses under different conditions. 		
<ul style="list-style-type: none"> • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda • I have collaborated in activities which safely demonstrate simple chemical reactions using everyday chemicals. I can show an appreciation of a chemical reaction as being a change in which different materials are made. SCN 2-19a • NI Change over time KS2 Changes that occur to everyday substances, for example, when dissolve in water or heated or cooled • Welsh 5 how some materials are formed or produced 	<p>LWCYH? Feeling hot, hot, hot</p> <p>ZIZO Bright Spark ZIZO Melting away ZIZO Red and flaky</p> <p>WGO Balloon surprise and/or WGO 321 lift off</p>	<p>Starter for introducing irreversible changes- use their science capital who helps with cooking? Can you 'uncook'</p> <p>Formative assessment: 3 ZIZOs what is it? Is there a change going on? Is it reversible? Who can identify burning and rusting as examples of irreversible reactions?</p> <p>After Bright Spark, ask what do you know about burning from your observations: Match lights & burns- releases heat, changes colour to black and tiny bits of ash carried away with gas produced (CO₂) New substances made that cannot remake match.</p> <p>Melting- change of state from ice to water. Reversible.</p> <p>Observations any same as match? colour change iron and water to make rust- can't go back to iron and water</p> <p>Key points: Irreversible reactions:</p> <ul style="list-style-type: none"> • You can't get products back to the reactants. • New products have been formed e.g. iron oxide • New substance could be a gas so look for bubbles • New substance could be a different colour do look for a colour change • Chemical reactions can release energy so there could be a change in temperature <p>Use observations for something may not have seen before... New product is a gas, temperature drop (balloon), can't get back to sodium bicarbonate & white vinegar</p> <p>Show videos before investigating this reaction themselves/ after to show what would happen if you collected the gas/ contained the reaction</p>

	<p>WGO Secret writing</p> <p>ZIZO Craggy surfaces</p> <p>WGO Baking cookies</p>	<p>Observing over time- measuring skills</p> <p>Plenary- can they explain irreversible reactions in a different context?</p> <p>Before DT lesson baking (link to irreversible reactions)</p>
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Background reading to give you confidence when you are starting any new topic.

Teaching Support- Confidence with Science - Tackle the tricky bits of science:

<https://explorify.uk/teaching-support/teaching-science/states-of-matter-tackle-the-tricky-bits>

<https://explorify.uk/teaching-support/teaching-science/states-of-matter-explore-with-your-class>

<https://explorify.uk/teaching-support/teaching-science/materials-tackle-the-tricky-bits>

Other useful links:

<https://pstt.org.uk/what-we-do/explorify>

<https://explorify.uk/teaching-support/teaching-science/plan-good-practice-in-assessment-from-the-ase>

<https://explorify.uk/teaching-support/teaching-science/good-science-teaching-starts-with-assessment>

<https://primary.cleapss.org.uk/Resource-File/P002-Investigating-heating-and-melting.pdf>

Water no hotter than 50 °C:

<https://pstt.org.uk/resources/curriculum-materials/assessment>