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CLIMATE CHANGE CHALLENGES

**SUSTAINABLE
SOLUTIONS**

2023-1-LV01-KA220-SCH-0001246777

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Title	Hard and soft water							
Objectives	Reduce the number of household appliances that are damaged by built-up limestone.							
Necessary resources	1M calcium nitrate solution, 1M sodium carbonate solution, 1M magnesium sulfate solution, 1M sodium phosphate solution, 3 test tubes, small funnel, filter paper, test tube rack, crushed laundry soap, spoon for measuring substances, sample of tap water, distilled water.							
Time	60 minutes							
Step by step instructions	<p>Experiment 1</p> <p>1. Pour about 2 ml of calcium nitrate solution into two test tubes!</p> <p>2. Add a little bit of ground household soap to one test tube, close the test tube with a stopper and shake vigorously! Then place the test tube in a stand!</p> <p>3. Add about 2 ml of sodium carbonate solution to the second test tube!</p> <p>4. Place an empty test tube in a stand! Place a funnel into it, in which a paper filter is placed, and pour the mixture obtained in step 3 into the filter!</p> <p>5. Add a little bit of ground household soap to the resulting filtrate, close the test tube with a stopper and shake vigorously!</p> <p>Experiment 2</p> <p>1. Pour about 2 ml of magnesium sulfate solution into two test tubes!</p> <p>2. Add a little bit of ground household soap to one test tube, close the test tube with a stopper and shake vigorously! Then place the test tube in a stand!</p> <p>3. Add about 2 ml of sodium phosphate solution to the second test tube!</p> <p>4. Place the empty test tube in a stand and insert a funnel into it, in which a paper filter is placed! Pour the mixture obtained in step 3 into the filter!</p> <p>5. Add a little bit of ground household soap to the resulting filtrate, close the test tube with a stopper and shake vigorously!</p> <p>Data recording table</p> <table><tr><td>Type of water</td><td>Water exposure with soap, foaming/non-foaming</td></tr><tr><td>Distilled water.</td><td></td></tr><tr><td>Hard water containing calcium nitrate.</td><td></td></tr></table>		Type of water	Water exposure with soap, foaming/non-foaming	Distilled water.		Hard water containing calcium nitrate.	
Type of water	Water exposure with soap, foaming/non-foaming							
Distilled water.								
Hard water containing calcium nitrate.								

	Hard water containing magnesium sulfate.	
	Water after adding soda and filtering.	
	Water after adding sodium phosphate and filtering	
Reflection	Compare the effects of distilled water and hard water on soap!	
	
	
	
	Explain the observations for the effect of hard water on soap!	
	
	
	
	Determine the type of chemical reaction!	
	
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