

Hard water, soft water?



Water is water, right?

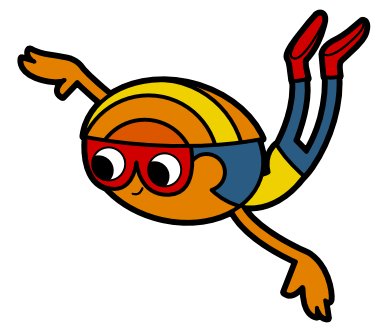
Make water hardness visible

The research question

Have you ever seen white spots form on bathroom or kitchen faucets? They come from minerals dissolved in tap water. We also talk about lime stains as well as calciferous or hard water. Water with little lime is called soft water. Water hardness also effects every washing process. **We investigate: How does it affect the foaming of dishwashing detergents and shampoos, for example?**

You will need

- Empty water bottles
- Waterproof felt-tip pen
- Tap water
- Distilled water*
- Still, calcium-containing water (medicinal water)*
- Dishwashing detergent or shampoo
- * from the supermarket



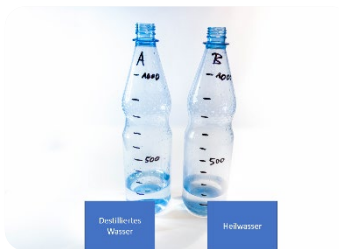
How to do it

Step by step



Preparation

1. Pour 100 ml of tap water into an empty 1 l plastic bottle.
2. Mark the liquid level (100 ml) with a marker.
3. Add another 100 ml of water and mark the liquid level (200 ml).
4. Repeat the steps until you have marked 1000 ml (= 1 l).
5. Prepare the second plastic bottle the same way.



Pour in water

1. Measure 200 ml of distilled water in a measuring cup and pour it into the first bottle.
2. Then measure 200 ml of the heating water and pour it into the second bottle.
3. Finally, add half a teaspoon of dishwashing detergent or shampoo to each bottle. Then firmly close both bottles.



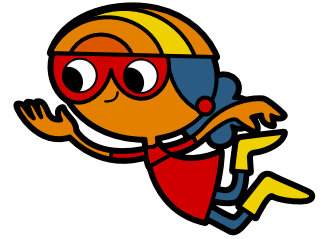
Shake and compare

1. Now shake both bottles vigorously for half a minute. When you are done, place them side by side and compare: Which one developed more foam?
2. What happens when you use tap water?



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Further information



Context

This experiment is one of a series of experiments dealing with the ecological footprint of detergents. Since they end up in wastewater, it is important to use only as much as is absolutely necessary. The amount depends on the hardness of the water. Depending on how hard the tap water is, for example, you need more or less detergent.

Water hardness

Water hardness is essentially determined by calcium and magnesium ions in the water. These minerals interfere with washing because they can bind the surfactants and soaps contained in detergents and cleaning agents. This is also shown by the fact that detergents, rinsing agents and shampoos foam less in hard water than in soft water.

As an extension, the experiment can be carried out with different types of mineral water and cleaning agents.

