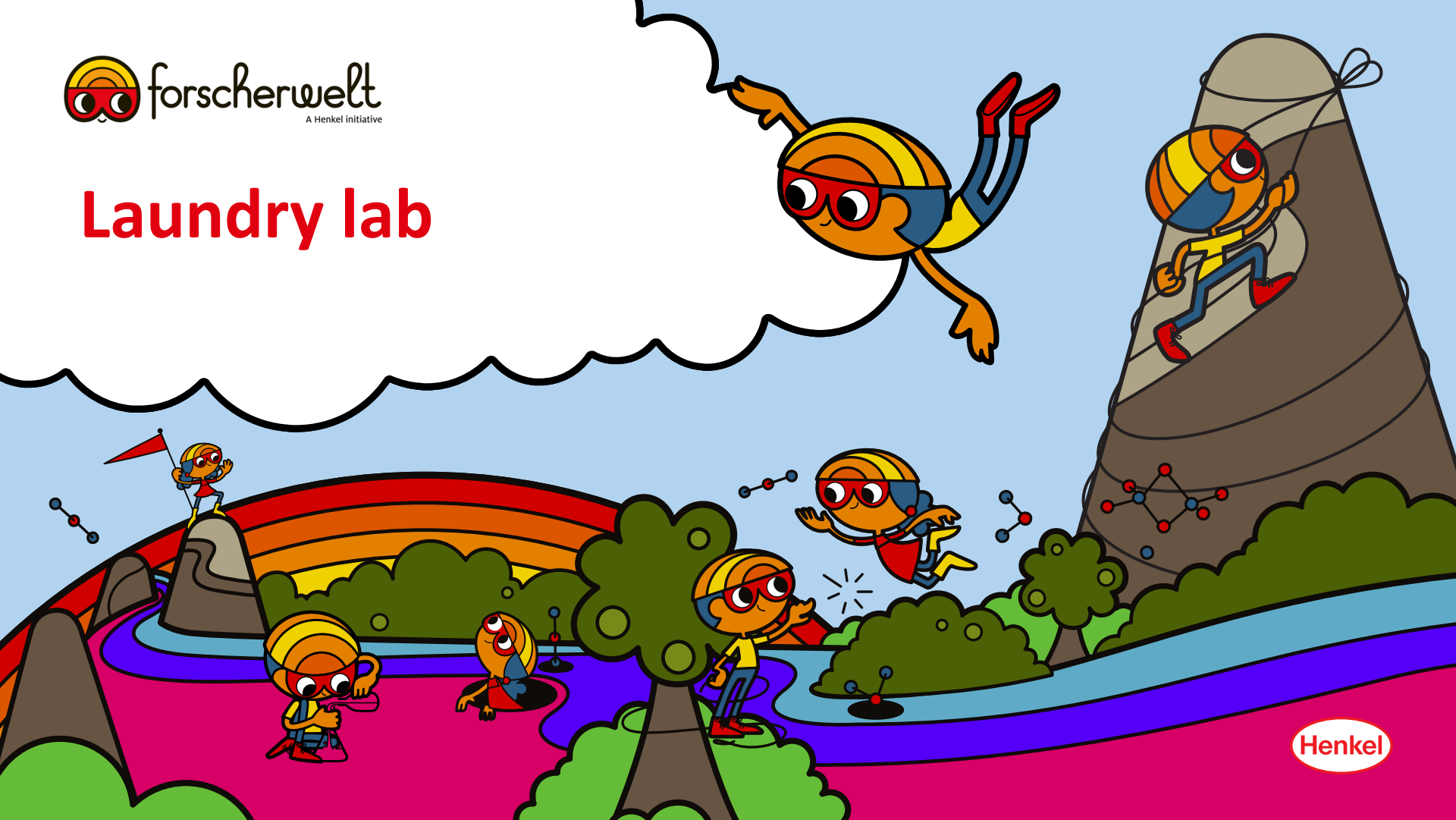
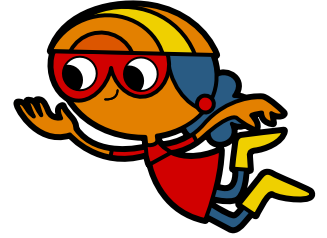


Laundry lab



Laundry lab

How experts systematically test detergents



Research question

How can I make comparisons between detergents and find out which conditions are best for removing the stains? The

answer is, before I wash, I first need to make multiple pieces of fabric dirty. The experts call this "staining". In this experiment, we want to show you the principle of how the professionals do it, so we won't use real detergent. Instead, you can use a little dishwashing detergent.

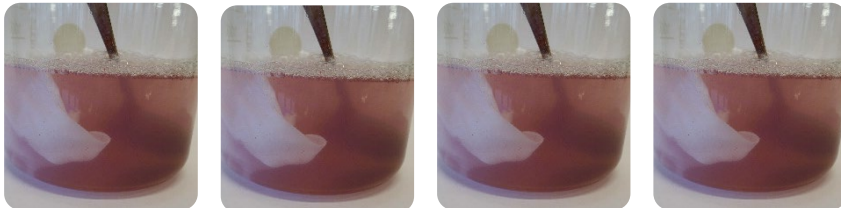
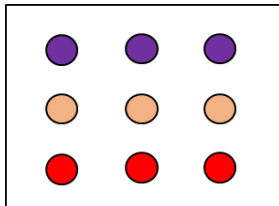
You will need

- 4 pieces of cotton fabric of the same size (approx. 30x30 cm) e.g. from old T-shirts)
- 3 types of stains (e.g. cocoa, beet juice, ketchup)
- "model detergent" - we use washing-up liquid instead of detergent
- plastic bowl or other container with approx. 2 L capacity)
- Measuring cup
- Cold and warm water
- Stopwatch
- Spoon for stirring



How to do it

Step by step



Staining

Apply each stain like this:

1. 3 times approx. $\frac{1}{2}$ teaspoon beet juice
2. 3 times approx. $\frac{1}{2}$ teaspoon cocoa
3. 3 times approx. a spatula tip of ketchup

4 tests with different parameters

1. Fill 700 ml of cold water from the tap into the washing vessel.
2. Add the first piece of cloth.
3. Stir for 5 minutes at 30 revolutions per minute. Then take out the piece of cloth and wring it out well.
4. Repeat the experiment three times, changing only one of the parameters at a time.:
 - 700 ml, cold water, 10 minutes, 30 r.p.m.
 - 700 ml, cold water, $\frac{1}{2}$ teaspoon detergent, 5 minutes, 30 rpm
 - Warm water if possible, 5 minutes, 30 rev/min

Evaluation

Place all the pieces of fabric next to each other and compare the results:
Which test produced the best result?

Which test produced the worst result?

How could the experiments be improved?



The four most important factors in washing

For parents and teachers



Context

This experiment is part of a series of lessons on sustainability. The aim is to find out how to wash in the most energy and environmentally friendly way possible by choosing the washing parameters. The parameters are: Amount of detergent, washing temperature, duration and washing program (mechanical load on textiles).

Sinner's Circle

Sinner's circle describes the factors that are central to a cleaning process: Chemistry, Temperature, Time and Mechanics. A circle diagram is used for representation:

You can achieve an equally good washing result in different ways by varying the parameters accordingly. There must be a balance: If you reduce one parameter, for example by lowering the temperature, another parameter such as the washing time must be increased to compensate. This is the reason why energy-saving eco-wash programs take a particularly long time. These interrelationships can be readily demonstrated in systematic washing trials.

