

4. SUSTAINABLE METHODS OF CLEANING: WHICH WASHING PRODUCT?

2-3 HOURS

Children think about the amount of clothing that they own and discuss different types of clothing for different purposes. They reflect upon how frequently clothing is washed and the impact this might have on the environment. Groups of children plan and carry out their own fair test to investigate how effective different commercial washing products are at removing stains from fabric. They complete the activity by considering how one company has developed an ingredient for a new washing product which washes clothes more effectively than ever so that we do not have to wash or replace them more than we need to.

The original activity and comprehensive background information can be found in the 'What's in washing products?' activity at http://www.ciec.org.uk/kitchen_concoctions/.

TYPE OF ENQUIRY

Carrying out comparative and fair tests.

OBJECTIVES

Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials including metals, wood and plastic (Year 5 Properties and changes of materials)

Demonstrate that dissolving, mixing and changes of state are reversible changes (Year 5 Properties and changes of materials)

Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (UKS2 Working Scientifically)

SCIENCE VOCABULARY

fabric, landfill, variable, fair test, greenhouse gases, carbon footprint, global warming

RESOURCES

per group of 4, unless otherwise stated

- Samples of clothing / different types of fabric (common washable fabrics include cotton, denim, linen, nylon, polyester and lycra),
- 1 teaspoon
- 1 thermometer
- 1 measuring jug
- 4-6 stained samples of white polyester or cotton
- **Activity Sheet 4:** grid photocopied onto clear acetate sheet
- Small samples of three different brands of commercial washing product (powder and liquid and an eco-friendly product),
- Source of warm water (up to 40°C),
- 1 timer
- 1 large bowl
- 4 pairs of disposable non-latex gloves and 4 safety glasses
- Interactive planning tool <http://www.ciec.org.uk/resources/interactive-planning-tool.html> or **Activity Sheet 6:** Post-it planning template
- Two colours of post-it notes
- Industry sustainability story: **Presentation**

Note: pre-prepared fabric samples could be the same size for fair testing. Stain the samples in advance with the same amount of food – do not use foods that stain severely such as tomato sauce. Good examples to include are margarine or mincemeat.

PRIOR KNOWLEDGE / EXPERIENCE

Children should have opportunities to set up simple practical enquiries, comparative and fair tests. They should be able to recognise when a fair test is necessary and contribute to some of the planning for this.

ACTIVITY NOTES

Introduction: Ask children to think about the amount of clothing that they own and the different types of clothing for different purposes. Children might have a uniform and PE kit for school, clothes for casual wear, special occasions, hobbies, seasonal clothes as well as warm coats, anoraks, jackets, body warmers, not to mention different types of shoes! Allow children time to explore and discuss a range of different types of fabric and which are used for different types of clothing. They might also like to look at labels on the clothing that they are wearing to identify fabric type.

Discuss how often clothing needs to be washed. For some children this might be every time an item has been worn or just when the clothing becomes dirty. Think about how most homes now have automatic washing machines and that modern detergents are considered essential for cleaning clothes. Explain that washing powders, liquids and capsules help break up dirt and stains so that we can wear our clothes repeatedly, rather than throwing them into the rubbish bin and ending up in landfill.

MAIN ACTIVITY

Discuss how washing products need to wash our clothes more effectively than ever so that we do not have to rewash or replace our clothes more than we need to. Also by washing clothes at much lower temperatures, we can use less energy. Explain to children that they will be planning and carrying out their own fair test investigation to find out how effective different commercial washing products are at removing stains from fabric.

Each group will be given samples of stained fabric and three different types of washing product (powder, liquid and eco-friendly). Children need to think about how they will test each washing product to observe or measure how well it removes the stain.

Children might like to use the generic **Post-It Planning Template (activity sheet 6)** or **Interactive Planning Tool <http://www.ciec.org.uk/resources/interactive-planning-tool.html>** for support in the planning phase by generating a list of variables that they could change and observe/measure. In the case of this investigation, they will be changing the 'washing product' to see how this affects the visibility / size of the stain OR the time taken to remove the stain.

Children should be aware that variables they control could include; the cause of stain, size of stain, type of fabric, size of fabric, amount of washing product, amount of water, temperature of water, number of rubs, time that the fabric remains in the washing solution, number of rinses to fabric after washing, etc.

Groups should spend time making decisions about the equipment they will use, how they will carry out their tests and make careful observations or measurements, as well as the best way to record the test outcomes. Visibility of stain could be an observation based on a 'visibility scale' determined by the children. Size of stain could be obtained by measuring the length of the stain with a ruler or placing a transparent cm² grid on top of the fabric (**Activity Sheet 4**) and calculating the area of stain remaining under each test condition.

Children might decide to include a control sample of stained fabric to compare the outcomes of different tests with the original stained material. They can also take photos or make annotated drawings and notes to assist them in the recording process. Once the washing investigations are complete, give children time to discuss and make decisions about their results and, ultimately, formulate an answer to their original enquiry question: Which washing product is the most effective at removing stains from fabric?

EXTENSION OR HOME-BASED ACTIVITIES

Children will be interested to research the phrase 'fast fashion' and learn about the increasing demand on clothing companies to deliver frequent new collections inspired by catwalk looks or celebrity styles. They should consider how 'fast fashion' can lead to negative environmental impact, water pollution, the use of toxic chemicals and increasing amounts of fabric waste.

In attempt to combat the problem of 'fast fashion', children might be interested in finding out about commercial products that protect and prolong the lifespan of fabrics, such as Scotchgard™. They could investigate this by 'protecting' clean samples of cotton or polyester with suggested substances such as glue, hair spray or vegetable oil. They could then drip staining liquids such as a diluted food colouring or a flavoured fruit drink onto the fabric and observe how well the substances offered protection.

QUESTIONS FOR THINKING

- Why do you think there are so many different types of washing products available to buy?
- What do you think a good washing product should be able to do?
- How can washing our clothes have a negative effect on the environment?
- How well do you think your group controlled variables and carried out fair washing tests?
- If you were repeating the washing tests, what would you do differently and why?
- What other question would you like to investigate?

SAFETY GUIDANCE

Prior to this activity, check for individuals who may be allergic to ingredients in any of the washing products or foods used to stain fabrics. On the back of many packets for example washing powder, you will find the words 'Danger', 'Keep out of reach of children' or a hazard warning label. Giving the children only minimal quantities of a sample, will reduce risks to an acceptable level, and the products can be used by children safely. Disposable or rubber gloves (non-latex may be required by some children) should be worn to prevent any allergic reactions children may have. As an additional precaution, children might wear safety glasses to prevent the rubbing of washing products into their eyes and warned not to eat or taste any of the products provided. When performing washing tests, hot water from a kettle or water heater should be cooled before use to no more than 50°C and a thermometer used to test this. Care should be taken to avoid splashing water on the skin, even at this temperature, ensuring that any spills are cleaned up immediately and hot water dispensed carefully by an adult.

For more comprehensive safety guidance, provided by CLEAPSS, please log in and go to: <http://primary.cleapss.org.uk/Resource-File/P005-Investigating-soaps-and-detergents.pdf>

INDUSTRY LINKS AND AMBASSADORS

Links can be made with the washing powder and detergent industry via local companies and company websites. STEM Ambassadors are volunteers from a wide range of science, technology, engineering and mathematics related jobs across the UK. They offer their time and enthusiasm and can be found via the STEM Learning website at <https://www.stem.org.uk/stem-ambassadors>

Industrial leaders such as Unilever, Procter and Gamble, and Croda provide speciality ingredients for household products including laundry and fabric care. The scientists at these companies are continuously investigating new ways to improve cleaning performance. Each company will have a team of marketing experts whose job is to tell customers about the benefits of choosing their products over others. Children could watch the video clip, 'Marketing the Mixture', at <http://scienceofhealthyskin.org.uk/foam6.htm> and have a go at some marketing for themselves!

To enable children to explore one company's solution to the environmental impact of washing clothes, teachers and children follow the slides on the presentation **Sustainable methods of cleaning: which washing product?** and engage in discussion points and activities to develop a further understanding of industrial contexts.

CROSS CURRICULAR LINKS

English: pupils could draft, edit and produce scripts and poster advertisements for the washing product that performed most favourably in their tests. This kind of creative thinking has excellent links with the genre of persuasive writing in the English curriculum.

Mathematics: pupils will use a range of equipment to measure and compare volumes of water and washing products, temperature of water and time taken to remove stains. There is also an opportunity to measure and compare the area of the stains using grids.

Design and Technology: pupils could design new packaging for new and improved washing products. They will select from and use a wide range of materials as well as evaluate their functional properties and aesthetic qualities.

PSHE: pupils will learn what improves and harms their local, natural and built environments and develop strategies and skills needed to care for these (including conserving energy).