2 HOUR ACTIVITY

WHAT'S IN WASHING PRODUCTS?

Children explore a range of real washing products and examine the packaging to see how they contain different mixtures, created to do the same job. Using the Post-it Planning Template or Interactive Planning Tool, groups of children will work together to develop their understanding of fair testing and controlling variables. They will also use this method to choose an aspect of the effectiveness of washing products, devise their own enquiry question and investigate the outcome.

TYPE OF ENQUIRY

Carrying out comparative and fair tests.

OBJECTIVES

- To investigate and compare different washing products (commercial mixtures)

To be able to:

- Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why

SCIENCE VOCABULARY

Mixture	Investigate	Compare
Variable	Change	Observe
Measure	Control	Fair Test

RESOURCES

Per group or 4 children:

- Samples of 4-6 washing products, eg. automatic powder and liquid, hand-washing powder and liquid, product specifically for colours and product specifically for stain removal. Where at all possible try to include examples of powders, liquids, tablets and liquid capsules.
- Washing adverts (eg magazine cuttings or Youtube)
- Source of cold and hot water (up to 50°)
- Thermometers
- Stop watch / timer
- Measuring jug
- Teaspoons
- 4-6 x 500 ml containers with lids
- 4-6 samples of stained fabric (plain cotton or polyester) – foods for providing stains, eg margarine, flour, mincemeat (don't use foods which stain severely such as tomato sauce)
- Disposable or rubber gloves
- Safety glasses (if available)
- Two colours of post-it notes
- Post-it Planning Template or Interactive Planning Tool
- Kitchen Chaos cartoon strip (optional)

Note: (i) Pre-prepared fabric samples can be the same size for fair testing, (ii) many additional resource requirements are dependent on the investigations planned by the children.

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 help to make some of the planning required for this.

ACTIVITY NOTES

At any time during the nine activities in this resource, the Kitchen Chaos cartoon strip can be shared with the class on-screen.

Examine the packaging of a range of real washing products to learn more about how they are all examples of mixtures made up from extensive lists of ingredients. Discuss how there are so many different types of washing products to choose from!

Focus class discussion around accompanying adverts for washing products, each of them boasting how their product's recipe is 'new and improved' or 'the most advanced formula yet" due to continuous research and development by company scientists. Explain how companies need to market their products effectively using persuasive language and enticing images in order to ensure high volume of sales. Ask, "How do we know which of these mixtures is the 'best' washing product?"

Discuss how scientists perform all kinds of different controlled tests on their products and use the outcomes of these tests for marketing purposes. Explain to children that, in the same way, they will be planning and carrying out their own choice of washing product investigation. Allocate Job Roles and responsibilities within each group and please refer to safety guidance for this activity.

Children might like to use the generic Post-it Planning Template or Interactive Planning Tool for support in the planning phase, outlined in detail as follows:

To plan a fair test investigation, groups begin by thinking about all the things that they could change during the washing process when attempting to remove a stain from fabric. These could include: the cause of stain, the size of stain, the type of material, the size of material, the type of washing product, the amount of washing product, the amount of water, the temperature of water, the number of rubs, the time that the fabric remains in the washing solution, the number of rinses to fabric after washing, etc. The list of independent variables is long and varied and children should be encouraged to generate as many possibilities as they can, adding each on a separate post-it note. Ensure that there are no right or wrong suggestions at this stage and all responses are valued.

Children should now use a different coloured set of post-it notes, to write down all the things that they could either observe or measure as a result of the washing process. These could include: size of the stain after washing, visibility of the stain after washing, time taken to remove the stain completely, volume of lather produced, etc. This list of dependent variables is often more difficult to generate and must not be confused with things that can be measured during the investigation such as the amount of washing product used or the temperature of the water. These variables can be measured in their own right but will not offer an appropriate outcome to this investigation.

Each group then discusses and agrees upon one variable from their "We will change" post-it notes and one variable from their "We will observe or measure" post-it notes to generate their enquiry question. Using the question frame:

When I change ☐ what will happen to ☐ ?

is a great way to help children devise a question they can investigate practically and one that they would truly like to find the answer to.

ACTIVITY NOTES...continued

Possibilities might include:

- When I change the type of washing product, what will happen to the time taken to remove the stain? – This could be measured using a timer to record how long it takes for the stain to disappear.
- When I change the temperature of the water, what will happen to the visibility of the stain? – This might be an observation based on a 'visibility scale' determined by the children.
- When I change the number of rubs, what will happen to the size of the stain? – This could be measured by children measuring the length of the stain with a ruler or placing a transparent cm2 grid on top of the fabric and calculating the area of stain remaining under each test condition.

Once groups have decided upon their enquiry question, they focus their attention on the post-it notes for 'variables they could change' and dispose of the post-it notes for 'variables they could observe or measure'. It is important at this stage that they understand that the remaining variables are all the things they must keep the same during their washing investigations, to keep their test fair. They can move these post-it notes down the planning template to the section: We will keep these the same.

Groups should spend some time making decisions about the equipment they will require, exactly how they will carry out their tests and make careful observations or measurements as well as the best way to record the test outcomes. The post-it note variables in their enquiry question can very easily be transferred to make headings in a table or axes on a graph, should this be required.

During the investigation, groups should keep referring to their post-it notes to ensure that they are carrying out a fair test for each trial. They might also 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. They could use the writing frame:

When we changed ☐ what happened to ☐ ?

To help them to offer a full explanation of the test outcomes. Please refer to Questions for thinking to aid and extend class discussion, including an evaluation of group investigations.

EXTENSION OR HOME-BASED ACTIVITIES

Children could design new packaging or adverts for the washing product that performed most favourably in their tests. This kind of creative thinking has excellent links with persuasive writing in the English curriculum as well as learning about how to make products appear innovative, functional and appealing in Design and Technology.

Children might also be interested in carrying out their own research by conducting a survey to find out what type of washing products families use at home such as tablets, powders, liquid capsules, liquids. There are plenty of interesting data handling opportunities to accompany the information gathered.

QUESTIONS FOR THINKING

- Why do you think there are so many different types of washing products available to buy?
- What do you think a really good washing product should be able to do?
- How well do you think your group controlled variables and carried out fair washing tests?
- If you were to do your washing tests again, what would you do differently and why?
- What other question would you like to investigate?

SAFETY GUIDANCE

Please use the following health and safety information to produce your own risk assessment for this activity:

- Prior to this activity, check for individuals who may be allergic to ingredients in any of the washing products or foods being used to stain fabrics. Disposable or rubber gloves should be worn to prevent any allergic reactions which children may have. As an additional precaution, children might wear safety glasses to prevent the rubbing of washing products into their eyes and also 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.

INDUSTRY LINKS AND AMBASSADORS

Links can be made with the washing powder and detergent industry via local companies and company websites. The STEM Directories is a great place to start looking at the **STEM Directories** and also manufacturer directories such as **www.europages.co.uk** or organisations such as the UK Cleaning Products Industry Association.

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 such as the rapid removal of fabric stains at lower temperatures and protection against colour fade.

Many manufacturing companies are also keen to improve how quickly their washing powders dissolve when added to water and there is great competition for them to produce powders, liquids, pods and capsules that outperform rival brands. 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 a video clip, **Marketing the Mixture**, on the Science of Healthy Skin website, and have a go at some marketing for themselves!

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 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.