

# SQUEAKY CLEAN

**Practical Project**  
For Teachers **p2&3**, for Students **p4**

## HEALTH AND SAFETY

Students should be encouraged to make their own risk assessment before they carry out any activity, including surveys. In all circumstances this must be checked by a competent person. Students using specialised equipment should be supervised at all times.

Students may want to set up unorthodox experiments and you may need to seek specialist advice.

Organisations such as CLEAPSS and the Royal Society of Chemistry are able to help. The MISAC (Microbiology in Schools Advisory Committee) can provide advice concerning microbiological investigations.

# SQUEAKY CLEAN:

## Bronze Practical Project - For Teachers



### Brand X or X-factor?

When the credit crunch began to bite in 2009, many people changed from expensive branded products, to the cheaper value for money lines. Is this a wise move? Are cheap cleaning products poor quality? Will the clothes of the nation become grey and shabby? Is it true that well known washing powders produce dazzling, good as new clothing?

### HAVE YOU EVER WONDERED?

...do cheap cleaning products work as well as more expensive ones?

You might like to imagine yourself in a situation such as...

You have been told that there will be less money for treats this year because the cost of the weekly shopping is going up and up. You think the bills could be reduced by buying cheaper products, so you decide to **undertake practical experiments** to:

- test products that can be used for a cleaning problem
- compare the performance of an inexpensive cleaning product with a more expensive alternative.

### POSSIBLE EQUIPMENT, MATERIALS AND RESOURCES

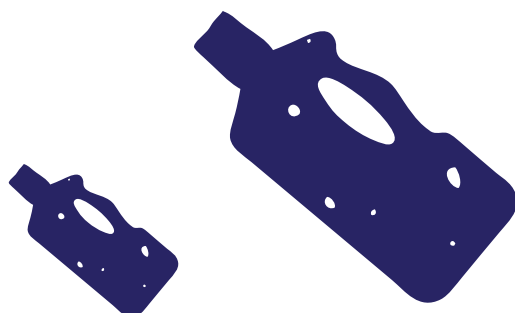
Equipment and materials for:

- bioassay using the safe culture and incubation of micro-organisms (e.g. culture of safe bacterium, culture medium such as nutrient broth or agar, sterile Petri dishes, incubator)
- comparison of the effectiveness of two cleaning agents (e.g. samples of different cleaning agents and squares of standardised soiled cloth).

## Prompts

The **Student Brief** gives some triggers to start students thinking. They should realise that each trigger implies several items to research and compare. Encourage students to identify these themselves. However, if necessary, prompts such as those below might be given, to point students in suitable directions.

- **The cleaning jobs there are around the home**
  - What things need cleaning?
  - How are they cleaned?
- **The different kinds of cleaning products available**
  - Do products have different ingredients?
  - Do products work in different ways?
  - How does stain removal differ from killing 'germs'?
- **How cleaning products work**
  - What are the 'active ingredients' found in cleaning products?
  - How do products 'lift stains' or 'kill germs'?
  - What is the difference between soap, detergent and surfactant?
  - Why is water alone not an effective cleaning agent?
- **The kind of cleaning problem that you want to focus on**
  - What factors must you take into account when you make your choice?
- **How you can test the effectiveness of cleaning products**
  - For example, how can you test how well a stain remover or a disinfectant works?
  - How might you use people as 'human measuring instruments'?
- **Do expensive brands work better than cheaper ones?**
  - How will you choose the products that you are going to compare?
  - How can you show that one product is better than another?
  - What tests could you carry out?
  - How can you make comparisons using a fair test?



## Suggestions for supporting students

Though primarily based on laboratory investigations, the Practical project will require some initial research into the nature and action of cleaning agents such as soaps and detergents.

Students may need some direction from you, both to identify the required information and to ensure that practical procedures are appropriate, feasible and safe. If students choose to culture micro-organisms, you will need to decide how much the students will be able to do themselves.

Although Bronze Award students are not expected to have an official Mentor for their project, access to expert advice makes students feel their work is important. Also, if the topic is not in your area of expertise, you may find a Mentor valuable. Your CREST Local Coordinator may be able to suggest suitable contacts.

Depending upon the nature of the project, someone with knowledge and/or experience of one or more of the following could be ideal:

- professional cleaning
- the work of an environmental health officer
- use of aseptic technique and/or bioassay
- enzyme technology applied to cleaning agents
- school cleaning problems

## Internet search

Combine 'cleaning' with terms such as: products, health, cheap, safe, hygiene, infection control, inexpensive, house, domestic, household; or try: soap, detergent or surfactant, or try:

- **Comparing light- and heavy-duty detergents, RSC (Royal Society of Chemistry)**  
[practicalchemistry.org/experiments/comparing-light-and-heavy-duty-detergents,299,EX.html](http://practicalchemistry.org/experiments/comparing-light-and-heavy-duty-detergents,299,EX.html)
- **How do disinfectants and antiseptics work?**  
[typesofbacteria.co.uk/how-do-disinfectants-antiseptics-work.html](http://typesofbacteria.co.uk/how-do-disinfectants-antiseptics-work.html)
- **Detergents, soaps and surface tension, RSC (Royal Society of Chemistry)**  
[practicalchemistry.org/experiments/detergents-soaps-and-surface-tension,301,EX.html](http://practicalchemistry.org/experiments/detergents-soaps-and-surface-tension,301,EX.html)
- **Enzymes for detergent**  
[mapsenzymes.com/Enzymes\\_Detergent.asp](http://mapsenzymes.com/Enzymes_Detergent.asp)
- **Green-cleaning/natural-cleaning, Which advice**  
[which.co.uk/advice/green-cleaning/natural-cleaning-products/index.jsp](http://which.co.uk/advice/green-cleaning/natural-cleaning-products/index.jsp)

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### Some things to think about...

- The cleaning jobs there are around the home
- The different kinds of cleaning products available
- How cleaning products work
- The kind of cleaning problem that you want to focus on
- How you can test the effectiveness of cleaning products
- Do expensive brands work better than cheaper ones?

### Health and Safety

Before you carry out any experiment:

- (a) find out if any of the substances, equipment or procedures are hazardous
- (b) assess the risks (think about what could go wrong and how serious it might be)
- (c) decide what you need to do to reduce any risks (such as wearing personal protective equipment, knowing how to deal with emergencies and so on)
- (d) make sure your teacher agrees with your plan and risk assessment

**NOTE:** Your teacher will check your risk assessment against that of your school. If no risk assessment exists for the activity, your teacher may need to obtain special advice. This may take some time.

- (e) if special tools or machines are needed, arrange to use them in a properly supervised D&T workshop.