

# Which cleaning agent do we choose?

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**Subject:** Science

**Grade level:** 8-9

**Curriculum content:** pH, surface tension and the various conditions of bacterial growth

**Kind of activity:** Library search, work in a kitchen [bathroom], laboratory investigation, group discussion to make a justified socio-scientific decision

**Anticipated time:** 5 lessons

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**Objectives/competencies:** Students are expected to be able to:

- Seek and select appropriate information related to the study of cleaning agents, from books, computers networks and web pages.
- Explain the advantages and disadvantages of different types of cleaning agents.
- Explain pH, surface tension and bacterial growth density.
- Put forward a plan of how the pH, impact on surface tension and on bacterial growth of a cleaning agent can be determined.
- To cooperate with partners in the group in undertaking an experimental investigation.
- To design and carry out sampling in situ and experimental determinations in the laboratory.
- Decide, with reasons, which cleaning agent Mr. Clean should buy.

## Teacher guide

Cleaning in the kitchen or bathroom is taken for granted and we do not reflect upon the importance it has for our health and for the control of epidemics. An important part of this are appropriate cleaning agents. Here some questions are presenting themselves: if we are to prevent bacterial growth in kitchens and bathrooms, do we need cleaning agents with bacteriostatic or bactericidal properties? Or is it enough to remove the organic matter (proteins, fat etc.) on which bacteria thrive?

## Learning outcomes by lesson

### Lesson 1

At the end of this lesson, students are expected to be able to:

- Discuss the scenario and the problem
- Put forward suggestion of where to seek information

### Lesson 2

At the end of this lesson, students are expected to be able to:

- Put forward tests to perform in various localities, where cleaning is called for.
- Suggest advantages and disadvantages of different cleaning agents.

### Lesson 3: Work in the domestic science room (and/ or other locality)

At the end of this lesson , students are expected to be able to collect appropriate samples for observation and comparison of bacterial growth prior to and after cleaning

### Lesson 4

At the end of this lesson, students are expected to be able to:

- Carry out tests in the school laboratory
- Understand the connection between pH of the cleaning agent and its impact on surface tension and the efficiency of the cleaning agent.
- Obtain results of the tests and of the comparison of bacterial growth

**CAUTION: large amounts of otherwise harmless bacteria (that can be obtained in this procedure) may be harmful or even dangerous. DO NOT – AND DO NOT LET THE STUDENTS – OPEN THE PETRI DISHES! They must be destroyed by you or other suitable agent after the lesson.**

### Lesson 5

At the end of this lesson, students are expected to be able to:

- Discuss which cleaning agent is appropriate
- Make decision
- Write the report

## Teaching strategies

The teacher:

Pose the problem to the students given by the scenario

- Prepare students for the task injecting in the students a feeling of labour responsibility, activity for which we also have to prepare them.
- Introduce the group work through which students determine the source of information needed for their investigation, being critical as regards the texts/internet etc to be used, valuing them from the scientific point of view.
- Facilitate the reading and interpretation of the bibliography consulted, as well as the interchange of ideas among members of the same group and others. Orient and collaborate with getting and preparing the work material for the field visit and for the lab analysis.
- Coordinate the work in the domestic science room, school kitchen or other locality.
- Guide the experimental work in the laboratory; and also guide the students making the comparatives tables and charts.
- Direct the plenary debate, encouraging the questions and analysis of findings, which each groups got, with the aim to get a general conclusion.
- Suggest the criteria to taking account to elaborate the final report to be given to Mr. Cecil Clean.

## Scope of the objectives

Objective	Achieved by means of
1. Seek and collect information relate to the study of cleaning agents, from the books, computers networks and web pages.	<ul style="list-style-type: none"> <li>• Seek, presentation and analysis of information, from the collected material.</li> </ul>
2. Explain the advantages and disadvantages of different types of cleaning agent.	<ul style="list-style-type: none"> <li>• Confection of comparatives tables and charts, with the information gotten from different sources.</li> </ul>
3. Explain how the pH and the impact on surface tension of the cleaning agent can be determined.	<ul style="list-style-type: none"> <li>• Seek in sources of information and election of the techniques to be used.</li> </ul>
4. Explain how the pH and the impact on surface tension of the cleaning agent may affect its efficiency.	
5. Explain what the conditions of bacterial growth are.	
6. To cooperate with partners in the group in undertaking an experimental investigation.	<ul style="list-style-type: none"> <li>• Group work about: investigation, organisation of the work in situ and work in the lab.</li> </ul>
7. To design and carry out experimental determinations, IN SITU, and at the lab.	<ul style="list-style-type: none"> <li>• Preparation and taking of sample in situ and analysis in the lab.</li> </ul>
8. Decide, with reasons, which field Mr Clean should buy.	<ul style="list-style-type: none"> <li>• Discussion of the findings and writing the final report for Mr. Clean in which the reasons for the decision made is given.</li> </ul>