

## Consumer Challenge

### Purpose

Students test the effects of antibacterial soap, regular soap, and tap water on bacteria. Students then evaluate which cleaning liquid promotes the best hygiene.

### Time Required

Two to three 45-minute class periods

### Lab Ratings



TEACHER PREP

STUDENT SET-UP

CONCEPT LEVEL

CLEAN UP

### Advance Preparation

Obtain agar from a scientific supply house. Prepare the agar mixture according to the manufacturer's instructions. To prevent contamination, do not open the Petri dishes until the agar medium is prepared, and then open them as briefly as possible. Pour the agar into the Petri dishes to a depth of 3–5 mm. Replace the lids immediately. Designate a dark, warm (37° C) place in the classroom to incubate the bacteria; bacterial growth at room temperature is slower and less dramatic. Relabel the bottles of antibacterial soap so that they read "Sudsy Bubbles Antibacterial Soap."

### Safety Information

While most bacteria are harmless, some can cause infections and illness. Students should thoroughly wash their hands after each phase of the activity.

### Teaching Strategies

This activity works best when students work in pairs. Before the activity, ask stu-

dents if they have ever been disappointed by an advertised product's performance. Emphasize the importance of being a discriminating shopper, and mention that there are different ways to investigate advertising claims. One way is to read product reliability reports. *Consumer Reports* and a number of other publications offer such reports based on product testing and data collected from consumers. Students can also conduct their own experiments to verify advertising claims.

Ask students to list things in the classroom that are frequently touched or handled. Talk about how bacteria can be transferred from people and animals to objects and then to other people. People's hands come into contact with a lot of bacteria during the day. Most bacteria are relatively harmless, and some are even helpful, such as the bacteria used to make yogurt or penicillin. Unfortunately, a few types of bacteria can make people very sick. Remind students that washing their hands frequently is a good way to avoid bacterial infection.

Although all soaps kill some bacteria, antibacterial soap breaks the surface tension between your skin and bacteria. Breaking the surface tension makes it possible for water to get between bacteria and your skin, allowing the bacteria to be washed away.

### Evaluation Strategies

For help evaluating this lab, see the Rubric for Experiments in the *Assessment Checklists & Rubrics*. This rubric is also available in the *Classroom Management CD-ROM*.



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## Consumer Challenge

The Sudsy Bubbles liquid-soap company has developed an antibacterial soap that contains the active ingredient Triclosan. They claim that this new soap kills bacteria more effectively than non-Triclosan soaps on the market.

Company President Phil Kleen plans to use an aggressive ad campaign to target households and schools where kids “get especially dirty.” His company touts the new antibacterial soap as a child’s first and last defense against germs.

The new antibacterial soap is more expensive than conventional soap, but Kleen believes that parents and schools will sacrifice the extra pennies for the health of the children.

As consumers, it is your right and responsibility to investigate the company’s claims, so lather up and take the Sudsy Bubbles consumer challenge!

### MATERIALS

- Petri dish with agar nutrient
- regular liquid soap
- antibacterial soap
- masking tape
- wax pencil or crayon
- water



### Ask a Question

How do water, regular soap, and antibacterial soap compare in effectiveness against bacteria?

### Make a Prediction

1. Which of the following do you predict will be most effective against bacteria: water, regular soap, or antibacterial soap? Explain your answer.

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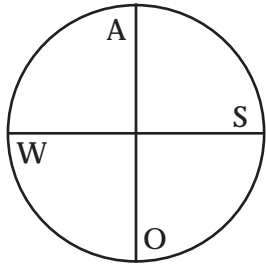
### Conduct an Experiment

2. Every day, you come into contact with a lot of bacteria simply by touching and picking up objects. With your partner, select one object in the room that is handled frequently. This object will be the bacterial source. What is the object?

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3. Label the cover of the Petri dish with the object’s name.

Consumer Challenge, continued



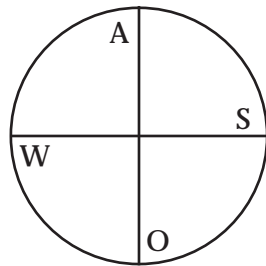
A = Antibacterial  
 S = Soap (regular)  
 W = Water  
 O = Control Group

4. Place two thin strips of masking tape perpendicular to each other on the outside bottom of the Petri dish to divide the dish into four quadrants. Label your dish with the wax pencil as shown at left.
5. To evenly distribute the bacteria on your hands, rinse your hands with tap water and shake off the excess water. Do not dry your hands.
6. Follow the steps below to produce a skin culture for the control group and for each cleaning method in the experiment. Remember to use a different finger for each step. When you have finished, wash your hands.

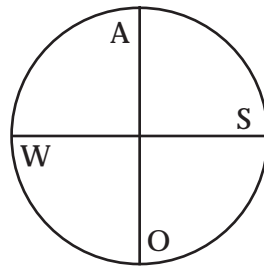
**Bacterial Culture Preparation**

|                           | What to do  | Cleaning agent   | Petri dish  |
|---------------------------|---|--|---|
| <b>Control group</b>      | Touch the object with your <b>index finger</b> .  | Do NOT rinse or wash your index finger.                              | Touch the finger to the agar medium in the quadrant marked "O"  |
| <b>Water</b>              | Touch the object with your <b>middle finger</b> . | Rinse your middle finger with tap water. Shake off the excess water. | Touch the finger to the agar medium in the quadrant marked "W." |
| <b>Regular soap</b>       | Touch the object with your <b>ring finger</b> .   | Wash your ring finger with regular soap and water.                   | Touch the finger to the agar medium in the quadrant marked "S." |
| <b>Antibacterial soap</b> | Touch the object with your <b>pinkie</b> .        | Wash your pinkie with antibacterial soap and water.                  | Touch the finger to the agar medium in the quadrant marked "A." |

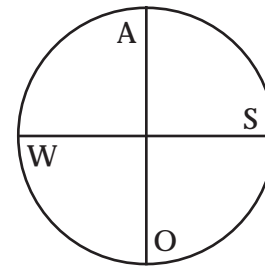
7. Cover the Petri dish, and place it in an area designated by your teacher. Observe the contents of the dish every day for three days. With a pencil, shade in the diagrams below to record the bacterial growth you see each day.



Day 1



Day 2



Day 3

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Consumer Challenge, continued

**Analyze the Results**

8. Was the prediction you listed in step 1 correct? Why or why not?

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9. Why was it important to have a control group?

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10. Which quadrant of the Petri dish contained the least amount of growth? Explain why you think that was the case.

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**Draw Conclusions**

11. Based on your results, do you feel that antibacterial soap is worth the extra money? Explain your answer.

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