

Hands On! Lab

Name: _____

Introduction

Hand-washing is an easy way to help prevent the spread of foodborne illness, flu, and the common cold. You will carry out an experiment to investigate hand-washing and hand sanitizer's affect on the presence of bacteria on your hands.

The Center for Disease Control recommends washing your hands:

- ▶ Before, during, and after preparing food
- ▶ Before eating food
- ▶ Before and after caring for someone who is sick
- ▶ After using the restroom, blowing your nose, coughing, or sneezing
- ▶ After touching animals, feed, waste, or garbage

To properly wash your hands:

1. Apply soap under clean, running water and lather up your hands including the back, front, between fingers, and under nails.
2. Continue washing hands for 20 seconds or for the time it takes you to sing the happy birthday song twice.
3. Rinse hands and dry with a clean towel or air dry. It is very important not to contaminate your clean hands by drying them on a dirty towel.

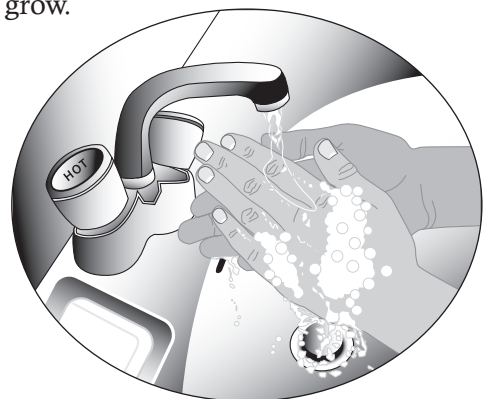
If soap and water isn't available:

- ▶ Use a hand sanitizer containing at least 60 percent alcohol.
- ▶ Apply hand sanitizer to palm and rub over surface of both hands until dry.

In this lab, you will use nutrient agar plates to investigate the presence of bacteria on your hands. Nutrient agar is a gelatin-like substance commonly used to grow bacterial cultures. The nutrient agar provides bacteria with the nutrients and moisture they need to survive. After inoculating the agar plates, you will put them in a warm place for several days to allow bacterial cultures to grow.

Group Materials

- ▶ 4 sterile nutrient agar plates
- ▶ Clear tape
- ▶ Resealable plastic bag
- ▶ Permanent marker
- ▶ Heat lamp or incubator (optional)
- ▶ Soap, water, and paper towels
- ▶ Hand sanitizer



Hands On! Lab *(continued)*

Lab Directions

Work in groups of three to four. Obtain the listed materials. Do not open the lid to the agar plates yet. Doing so can contaminate them with airborne particles. Lids should only be opened long enough to inoculate the plates with your finger as instructed below.

On the bottom of the agar plates use a permanent marker to label the plates:

- ▶ Control
- ▶ Unwashed
- ▶ Soap and water
- ▶ Sanitizer

1. One group member should not wash their hands prior to the experiment. Carefully open the agar plate labeled “Unwashed” and gently swipe the surface of the agar with the unwashed index finger. Do not poke a hole into the agar as it may break apart. Quickly replace the lid to the agar plate and set the plate aside.
2. One group member should carefully follow the hand-washing directions listed at the beginning of the lab. Do not touch anything after washing hands. Have another group member remove the lid off the agar plate labeled “Soap and Water.” The group member with the washed hands should then gently swipe the surface of the agar with a clean index finger. Do not poke a hole into the agar as it may break apart. Quickly replace the lid to the agar plate and set the plate aside.
3. One group member should carefully follow the hand sanitizer directions listed at the beginning of the lab. Do not touch anything after using hand sanitizer. Have another group member remove the lid off the agar plate labeled "Sanitizer." The group member with the sanitized hands should then gently swipe the surface of the agar with a sanitized index finger. Do not poke a hole into the agar as it may break apart. Quickly replace the lid to the agar plate and set the plate aside.
4. Do not open the lid to the agar plate labeled “Control.” This plate will not be inoculated.
5. Secure the lids to your agar plates with two pieces of tape.
6. Label a resealable plastic bag with your group name. Place each agar plate upside down in the plastic bag. This will keep any condensation from falling onto the agar surface.
7. Place the bag with the agar plates in a warm area. The ideal temperature is around 90 degrees Fahrenheit. If this is not possible, give the bacterial cultures a few more days to develop and observe over the course of five to seven days.

Lab Report

Purpose: What do you want to learn?

Hypothesis: What do you predict will happen?

Hands On! Lab *(continued)*

Nutrient Agar Plate Observations

Carefully note the appearance of bacterial colonies on your agar plates. Colonies are individual organisms of the same species living together. Bacterial colonies are visible as clusters. Note the *size, color, shape, and any other defining characteristics*.

Plate	Description		
	Day 1 after inoculation	Day 3 after inoculation	Day 5 after inoculation
Control			
Unwashed			
Soap and Water			
Hand Sanitizer			

Questions

1. What was the function of your control?
2. Which agar plate grew the most bacterial colonies? Why do you think it grew more bacteria than the other plates?

Hands On! Lab *(continued)*

3. Was your hypothesis proved or disproved?

4. Explain any differences in the bacterial cultures on the hand sanitizer and soap and water agar plates. Which is a better method for cleaning your hands?

5. From this experiment, what can you conclude about the effectiveness of hand-washing with soap and water and using hand sanitizer to reduce the bacteria present on your hands?

6. How would you do this experiment differently if you carried it out again?