



# HANDWASHING LESSONS

## *For High School Students*

### Preparing for Handwashing with Adults

#### **Materials:**

- Rubber chicken
- Preservative-free bread
- Sandwich bags
- Apple (or other fruit)
- Sandwich
- Glo Germ
- UV light (black light)
- Sterile petri dishes
- Sterile swabs or Q-tips
- Distilled water
- Masking tape
- Permanent markers
- Access to water, soap and paper towels

### Part 1: Why is handwashing important?

- 229,000 germs per square inch on frequently used faucet handles
- 21,000 germs per square inch on work desks about 400 times more than the average toilet seat.
- More germs at the kitchen sink than at the toilet
- 1,500 germs on each square centimeter of hands
- Prevents spreading germs to food or to another person
- Hands are the most exposed part of the body to germs
- Washing hands regularly can keep a person healthy
- A large percentage of foodborne disease outbreaks are spread by contaminated hands. Handwashing can reduce the risk of foodborne illness and other infections.
- According to the CDC, handwashing can reduce the risk of respiratory illnesses, like colds, in the general population by 16–21%.

**Where are the most germs?** These are all items on the high germ list:

- |                     |                             |                   |
|---------------------|-----------------------------|-------------------|
| ▪ Work desk         | ▪ Bathroom doorknob         | ▪ Remote controls |
| ▪ Kitchen sink      | ▪ Keyboards                 | ▪ Light switches  |
| ▪ Dishcloth, sponge | ▪ Escalator handrails       | ▪ Bathroom cups   |
| ▪ Garbage can       | ▪ Shopping cart handles     | ▪ Pet cages       |
| ▪ Refrigerator      | ▪ Picnic tables             | ▪ Toys            |
| ▪ Phone             | ▪ Pens, pencils and crayons |                   |

## Part 2: Four handwashing experiments

### 1. Rubber Chicken and Black light

*Materials: Rubber chicken, other items to pass, Glo Germ product, black light, extension cord, telephone, an apple or other fruit and a sandwich*

**Note: You may do this experiment before the start of the presentation.**

#### **Procedure:**

1. Prior to arriving, apply Glo Germ to rubber chicken and other items including handouts. Pass items around the room for all to touch without telling them about the Glo Germ.
2. After all have touched the items, tell them that the items had fake germs on them that will glow under a black light.
3. Turn out lights and take ultraviolet light around the room or have participants come forward to observe their hands under the black light.

#### **Script:**

Before the presentation started, I applied a substance called Glo Germ around the room. Even though it is all over the room, the only way we can see it is by using an ultraviolet light. Microorganisms are a lot like this product. Microorganisms can be found everywhere, even though we can't see them without the use of a microscope.

Remember the rubber chicken? When you touch a real raw chicken, where do the germs go? How about picking up a sandwich after touching raw meat and not washing your hands – where do the germs go? (Using a real sandwich has a better effect.) What about cutting up a raw chicken on the counter (demonstrate with rubber chicken)? Now I put my sandwich on the counter (where the chicken was) when I go to answer the phone. And how about the chicken juice on the phone?

After using the toilet and toilet paper and then not washing hands, you may have microscopic bacteria on your hands. Then pick up a sandwich. Again, where do the germs go? You ingest them. That's what makes you sick – also touching your mouth, nose or eyes gives the germs a way to get inside your body.

#### **How do hands get germs on them?**

- Make sure everyone had a chance to touch the “contaminated” rubber chicken.
- If your hands were contaminated from the items you passed around, would you want to pick up an apple and eat it? (Demonstrate)
- If your hands had really touched objects covered in bacteria, not washed your hands and then ate an apple, you could have put bacteria in your mouth if you hadn't thoroughly washed your hands after touching the items.

## 2. Glowing Germs in Petri Dishes

**Materials:** Sterile petri dishes, sterile swabs or Q-tips, distilled water, masking tape and permanent markers

*Note: Petri dishes can be obtained from a local hospital or clinic. If they have reached an expiration date, the facility cannot use them for tests. They still will work for this experiment. Red gelatin made with less water can be used for this experiment as well. Small sample plastic cups from a local deli will work well to hold the gelatin.*

### **Script:**

Today we will each be selecting an object or surface to sample for microorganisms. We will be growing the microorganisms in containers called petri dishes. The red gelatin-like substance in the petri dishes is called agar. The agar provides nutrients or food to the microorganisms so that they can grow—they are used to test for strep throat. It will be interesting to see which objects or surfaces have the most microorganisms including our hands.

### **Procedure:**

1. Give each person the following items or two can share a dish.
2. Instruct the participants to select one surface or object that they would like to test for the presence of microorganisms.
3. Each person should test a different surface or object, rather than several testing the same area.
4. Mark the bottom of the petri dish in half with permanent marker and test two sites or touch one side with their fingers.
5. Instruct the participants to hold the swab at one end, and rub it over the surface or object to be tested. If the object or surface is dry, the participants should wet the swab with distilled water and then rub the swab over the object or surface.
6. If the object or surface is wet, the participants should use a dry swab to rub over the object or surface. The participants should then gently rub the swab on the agar and touch part of the plate with their fingers, close the lid, and tape the dish shut around the edge.
7. Dishes should be labeled with the names, class period, and the name of the surfaces or objects tested if used in a classroom.
8. Label one clean, unused petri dish as the control. The control is used to show that a petri dish that was not opened would not have any microorganisms growing on it. Any growth on the petri dishes is coming from the surface or objects that they tested.
9. Place the dishes in a warm spot (such as on top of a refrigeration unit, wrapped in plastic in a sunny window, or by a heater) for three days. Store them upside down so there is no chance of anything leaking out of the dishes.
10. Without opening the dishes, the students should examine the petri dishes daily.  
Safety Note: Never open the dishes any time after adding the contaminant. The dishes could contain harmful microorganisms, which could cause illness if people are exposed to them.  
A cross-curricular activity suggested is to have students look at their plates under a microscope.
11. At the end of exercise, collect dishes for proper disposal. Check with the custodian or janitor.

### 3. Dirty Hands on Bread Slice

**Materials:** *Preservative-free bread, sandwich bags, permanent markers and water*

**Procedure:**

1. Ask students to touch their desks, hair and faces to get their hands contaminated.
  2. Give each student a piece of bread or a half piece and instruct them to touch it all over, keeping it flat.
  3. Have students place bread slice in bag with two small drops of water. Seal shut.
  4. Label with name and date.
  5. Put all bread slices in a brown grocery bag and seal shut. Place in a warm spot.
  6. Have one piece of bread in a baggie that was untouched as a control.
- Note: Takes about five days for good mold growth.

### 4. Dirty Hands on Bread Slice

**Materials:** *Glo Germ, UV light, access to warm water, soap, paper towels and a 20-second timer*

**Procedure:**

1. Place one drop of Glo Germ in the palm of each student's hand; have them rub Glo Germ all over their hands and wrists as if they were applying hand lotion.
2. Students observe "contaminated" hands under UV light.
3. Instruct to wash hands without any hints as to the correct technique.
4. Have all students check their hands with UV light for any residual Glo Germ.
5. Point out areas commonly missed: cuticles, under nails, thumb and finger webs and wrists.
6. Use a 20-second timer to demonstrate how long 20 seconds is.
7. Instruct as to correct handwashing procedure:
  - Soap and warm running water.
  - Fingers pointing down.
  - Rub hands vigorously for 20 seconds.
  - Wash all surfaces including:
    - Backs of hands.
    - Wrists.
    - Between fingers.
    - Tips of fingers.
    - Thumbs.
    - Under fingernails (nailbrush is best).
  - Dry vigorously with paper or clean cloth towel.
  - Turn off faucet with towel.
  - Open door with towel.

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