

## Second Grade Lesson Plan Bacterial Growth

### Health SOL 2.3c

The student will describe the influences and factors that impact health and well-being. Key concepts/skills include: germs and diseases

### Interdisciplinary SOLs:

#### Oral Language

2.2c. The student will continue to expand listening and speaking vocabularies by following oral 3-4 step directions

2.3c. The student will use oral communication skills by participating as a leader or contributor in a group (in this case, the groups are small groups as well as the whole class)

#### Science

2.1 The student will conduct investigations in which

- a) observation is differentiated from personal interpretation, and conclusions are drawn based on observations;
- d) conditions that influence a change are defined;

**Rationale:** Students should understand the influences and factors that impact health and well-being, including germs and diseases. By manipulating the growth of bacteria by washing their hands, they can cognitively connect hand washing to personal cleanliness, and cleanliness to health (an absence of germs). They will also develop healthy hand hygiene practices that they will carry with them for life.

**Goal:** For students to connect hand hygiene with maintaining their health.

### **Objectives: The student will be able to...**

- Demonstrate proper hand washing technique
- Explain why more bacteria grew in the "before washing" plate
- Make observations about why some bacteria might have grown in the "after washing" plate

### **Materials:**

- Two disposable-type plastic plates per student (paper not recommended)
- Plastic wrap—enough to cover each plate completely and wrap around each one
- Culture medium. Recipe below.
- Access to a sink with running water
- Paper towels

- Soap, preferably anti-bacterial
- Pictures/representations of each step of the hand-washing sequence: Hand-drawn photos, commercial or computer-generated. Pictures should include:
  - a) Turn on water
  - b) Get soap
  - c) Wash hands, making bubbles
  - d) Rinse under water
  - e) Dry with paper towels
  - f) Turn off faucet with paper towel
- Chart paper
- Blank Paper folded in half, labeled "Before Washing" and "After Washing"

#### Culture Medium Recipe:

- 2 pkgs gelatin dessert- lemon (light colored so bacteria will be visible)
- 2 pkgs unflavored gelatin
- 2-4 cups chicken broth
- water

If you have a small group, you may be able to get away with only 1 pkg. of gelatin. Prepare gelatin as directed on the box, except instead of using boiling water to dissolve the gelatin, substitute boiling chicken broth and add the unflavored gelatin to the mix. When the gelatin begins to thicken, pour a small amount into each plastic plate. Refrigerate the plates until ready to use.

Before beginning the lesson, have the plates with culture medium all ready to go. Label 2 plates for each child with their name, and a "before washing" and "after washing" label. Put 3 tablespoons of culture medium on each plate. They should remain covered until you are ready to have the students place their hands on them.

**Time: 1 hour per lesson, 3 day lesson**

#### **Day One**

##### **Advance Organizer/Set:**

1. ( 10 minutes) Remind students of proper hand-washing technique for the students, and have them mimic your proper hand washing techniques.

2. Have an aide or peer tutor show the picture of each step to the students. Place the pictures in order on a sequence board or chalk board as you complete them.
3. Explain to the students that germs are tiny living things that can make them sick. Tell the students that even though we can't see germs with our eyes, they grow until we feel ourselves getting sick
4. Tell the class that one of the ways we can keep from getting sick is by washing our hands to kill the germs that might get on them.
5. Tell the students that they will be growing some germs from their unwashed hands.

**Procedure:**

1. (45 minutes) Call each individual student to the sink and have them place an unwashed hand firmly in the middle of a plate of culture medium. Cover the plate completely and tightly with plastic wrap. Tell the student that some of his/her germs are now in the plate.
2. After this procedure, each student is assisted to complete the hand-washing procedure, using the picture cards and sequence board as a guide.
3. Praise the students for good listening, behavior, cooperation, and good efforts at each step. Keep the attention of the other students waiting for their turns by having them join in sequencing that comes next in the procedure.
4. Immediately after completing hand washing, have the student place his/her hand firmly in the center of the second plate of culture medium. They may wash their hands again after putting their hands in the second plate of culture medium.
5. When all the students have completed the hand-washing activity, tell them that the plates will be left at school for a few days, and then we will be looking at them to see whether the germs have grown on any of them. Praise attention and cooperation.
6. (5 minutes) Put the plates in a warm place and check them daily for growth. Expect growth within 3-4 days (will vary according to temperature) in the "unwashed hands" plates.

**Questions:**

1. Ask students to name some times that it is especially important to wash your hands (before eating, after using the rest room, after wiping your nose...)
2. Ask them what they think will happen to the plates that they put their hands in before they were washed. Record their answers on chart paper.
3. Ask them what they think will happen to the plates that they put their hands in after they were washed. Record answers.

## **Day Two**

### **Advance Organizer/Set**

**(After significant bacterial growth has occurred: 2-3 days) 20 minutes**

1. Pass the plates back out to the students.
2. Have them draw a picture of each plate in the designated half of their paper with the "Before" and "After" labels.

### **Procedure- 20 minutes**

1. Put children in groups, and have them answer the following questions as a group. One person in the group should be the recorder.
  - a) Ask the students if there is a difference between the two groups of plates. Did washing their hands thoroughly make the difference?
  - b) There may also be significant differences between the cultures in the "after washing" group. Ask students why that could be (some people did a better job of washing than others)?
  - c) Have students make observations about ways to make sure their hands are clean (use enough soap, wash them long enough it takes for them to sing "Twinkle, Twinkle, Little Star" twice, use proper techniques to wash hands to ensure total cleanliness, make sure they dry them completely)

### **Closure**

Address the class as a whole group and restate the questions from the Procedure section. Ask each group to contribute an answer.

Caution: Make sure to keep the plates covered, and after the lesson, dispose of them in a closed plastic bag in an outdoor garbage can. Thoroughly disinfect the area where the culture medium was kept.

### **Extension**

Optional Follow-up Activity:

Take a few photos of the most prolific culture dishes and display them over the sink with a sign: "Kill those germs! Wash Your Hands!" You may also opt to post a sign with the sequenced steps for proper hand washing.

**Homework**

Assign a homework assignment for students to choose one of their culture plates and draw a picture of the bacterial growth, and write an accompanying sentence that describes what happened to their culture and why. (Example: "My plate grew a lot of bacteria because I had germs on my hands.")

**Assessment:**

Assessment should occur in the following areas:

- 1) Observe the students washing their hands. Check to see if they used enough soap, washed for a sufficient period (at least 20 seconds), scrubbed thoroughly, rinsed completely, and dried their hands completely.
- 2) Assess their verbal responses to questions about the bacterial growth on the cultures. They should be able to correctly assess the causes of growth in the "before washing" plate, as well as give reasoning for why some bacteria might have grown in the "after washing" plate.
- 3) Were students more apt to wash their hands after this activity? Observe the classroom for 1-2 weeks and evaluate the effectiveness of the activity based on whether it changed children's attitudes towards hand hygiene.