National Teacher Training Institute

Lesson Plan

Soap Smart, Healthy Fun

Written by Cathy Hensel

Suggested Grade Level: 7

Time Allotment: Three 45-minute periods

Overview: Whenever we develop an infectious disease, there is a possibility that the disease may be spread to others. Infectious diseases are also called communicable diseases. The most common way to spread disease is through contact with an infected person. For example, when an infected person sneezes or coughs, droplets of disease-causing organisms, "germs," flow into the air or unto the hands of the infected person. If another person inhales the droplets or shakes the hand of the infected person, that individual has a high percentage of contracting the disease. Infections such as infectious diarrhea, colds, influenza, Hepatitis A, and many others are spread this way.

We must communicate to children (at a very early age) the necessity of cleanliness for the safety of their health and the health of others. An estimated 60 million days of school and 50 million days of work are lost annually because of the common cold. Every year Americans spend about $5 billion dollars on colds ($3 billion on doctor visits and $2 billion on treatments). Poor personal hygiene is the second leading cause of food-borne illnesses. In addition, some 5.5 million visits to the doctors' offices are due to bacteria ridden skin infections.

This lesson will take students through the scientific methods of testing the effectiveness of soap use against "germs" - to the history and chemistry of the substance that has aided humans in controlling and ridding themselves of "germs" (soap)- to the ever fascinating and fun byproduct of soap, bubbles.

Subject Matter: Life Science

Learning Objectives:

Students will be able to:

- Identify through experimentation that germs exist on our hands.
- Describe the correct hand washing procedure.
- Differentiate between good hygiene and poor hygiene.
- Explain the historical development of soap.
- Articulate why the use of a detergent makes it more efficient than soap as a germ buster.
- Create soap bubble art for fun.

Science Standards:

Content Standard 1: Students design, conduct, evaluate and communicate scientific investigations.

Content Standard 5: Students understand how scientific knowledge and technological developments affect society.

Content Standard 6: Students understand historical developments in science and in technology.

Media Components

Websites:

Cleaning 101
www.cleaning101.com
This website is the home page of the soap manufacturing industry. It is a very comprehensive and "fun" site to visit for cross-curricular information and materials. It has a "kids" site, SDA Kids Corner, that is very informative.

Soap Bubbles exploratorium.edu/ronh/bubbles/bubbles.html
A Web site for bubble exploration.

Materials

For each student group (working in pairs):

- Two pieces of white bread

- One small bar/chunk of soap or a small paper cup of liquid detergent.
- A running warm water source.
- Three paper towels
- Two pieces of white construction paper
- Science journals
- Colored Pencils
- Timer/Clock
- Two pairs of unwashed "dirty" hands.
- White or light colored construction paper
- Bubble wand (Can be made from a coat hanger) or drinking straw
- Shallow tray
- Drinking straws

Ingredients for bubble solution:

- Tempera or poster paint in three colors
- 3 or 4 containers to hold the bubble mixture (Each container must be able to hold one cup of mixture)
- Two cups of water
- 1/2 cup of hand dishwashing detergent (Dawn dishwashing detergent is environmentally friendly)

Prep for Teachers:

1. Prior to teaching this lesson, bookmark the websites in the lesson on each computer in your classroom. When using media, provide students with a FOCUS FOR MEDIA INTERACTION, a specific task to complete and/or information to identify during or after the viewing of video segments, web sites, or other multimedia elements.

2. Prepare the hands-on elements of the lesson by:

Setting at each student lab site the following:

- two pieces of white bread
- one small bar/chunk of soap or a small paper cup of liquid detergent
- three paper towels
- two pieces of white construction paper

Introductory Activity

Teacher: Divide students into groups of two. Designate Student A and Student B. Indicate to the students that the number one rule in lab safety is to listen to their teacher for directions. First, they are not to touch the pieces of bread. You will give oral and prepared board-written instructions according to the following steps:

Step 1: Have Student A pick up one piece of bread and rub his/her hands gently across the top of the bread. Student A should then put the bread on a white piece of paper and set it in a (teacher-designated) warm and moist area (away from light).

Step 2: Have Student B wash his/her hands according to the following guidelines:

- Wet hands with warm running water.
- Add soap, the rub hands together to make lather. Do this away from running water, so that the lather is not washed away. Wash the front and the back of hands, between fingers, and under the nails.
- Continue washing for 17 seconds.
- Rinse hands well under warm running water.
- Dry hands thoroughly with a clean paper towel.

Step 3: Have Student B pick up the other piece of bread and gently rub his/her hands across the top of the bread. Student B should then set his/her piece of bread on the other piece of white paper, and set his/her piece of paper next to his/her partner's in the designated warm and moist environment.

Step 4: Have both Student A and Student B wash their hands following Step 3 guidelines.

Step 5: Allow for 3-4 days of growth on the pieces of bread.

Step 6: After the 3-4 days have students gather their pieces of bread by carefully carrying their papers with the bread atop back to their lab areas.

Step 7: Have students visually observe their piece of bread and their partner's piece of bread.

Step 8: Have students draw (two pictures-one of Student A's bread and one of Student B's bread) with colored pencils and, in their science journals, write what they observe about the bread pieces. *(They will see mold-more on Student A's bread).*

Step 9: Tell students what they see is bread mold, BUT what they do not see are the disease-causing agents, "germs," that are living on the bread with the mold.

Step 10: Discuss with the students what disease-causing agents they know are living mutualistically with the mold, and list their answers on the board. *(Answers will vary.)*

Step 11: Have students tell you what the difference is between the growth of mold on Student A's and Student B's bread. *(More germs)*

Step 11: Teach the students the ditty, "Germs on their fingers. Germs one can't see. Those germs that linger, that won't let us be."

Step 12: Tell students that it is those germs growing on the bread that cause many of the illnesses that they and their family and friends get every year.

Step 13: Discuss with the class the illnesses that they and their family members have had in the past year, and list the illnesses on the board. *(Answers will vary.)*

Step 14: Ask the students why they think one person in the group was asked to wash his/her hands with soap and warm water. Discuss and list the answers on the board. *(There are more germs on the unwashed hands.)*

Step 15: Repeat the ditty, "Germs on their fingers. Germs one can't see. Those germs that linger, that won't let us be."

Step 16: Tell the students that hand washing with soap and warm running water is considered by the Center for Disease Control and Prevention (CDC), as one of the most important means of preventing germs from spreading and making people sick. Explain to the students that the CDC is a government agency (Atlanta, Georgia) that researches ways to keep Americans healthy and prevent diseases from entering into the U.S.A.

Step 17: Discuss with the students various ways that their hands can spread disease. *(Coughing, sneezing, poor restroom hygiene, food to hand contamination, shaking hands, etc).* List answers on the board.

Step 18: Ask students to discuss substances that they use to rid their hands of disease-causing agents. *(Detergents, "soaps" anti-bacterial lotions and soaps, rubbing alcohol)*.

Step 19: Ask students to log on to www.cleaning101.com (click on Health and Safety, and then Cleaning for Health). Provide your students with a FOCUS FOR MEDIA INTERACTION, asking them to go to the site and find an answer to the following questions (written on the board or on a prepared overhead):

1. How much money do Americans spend on treating colds each year? *(5 billion dollars)*
2. How can germs enter our bodies? *(Through the mouth, nose, eyes, and breaks in our skin.)*
3. How many days of school are missed annually because of the common cold?
4. What bacterial disease can survive freezing and can survive on dry surfaces for at least 24 hours? *(Salmonella)*
5. How many living germs can a kitchen tablecloth contain? (4 billion)

Step 20: Have the students write the answers to the questions in their journals.

Step 21: Discuss with the class the question, How can we stop this unhealthy lifestyle among humans?

Step 22: List answers on the board. *(Soap, various detergents)*

Learning Activity:

Indicate to the students that they are to work in pairs on their computers to discover the agent that has saved many lives, great amounts of money and time, and has personally become the number one source of cleanliness. *(Soap)*

Step 1: Ask students to log on to www.cleaning101.com (Click into SDA Kids Corner (History) and into Soaps and Detergents (Chemistry). Provide your students with a FOCUS FOR MEDIA INTERACTION, asking them to go to the site and find an answer to the following questions (written on the board or a prepared overhead):

- When did soap making first begin? *(2800 B.C.)*
- Who were the first people to bathe regularly? *(Egyptians)*
- What were the first ingredients of hair gel? *(Ashes and oil)*
- Where "theoretically" did soap get its name? *(Roman legend, Mount Sapo-where animals were sacrificed)*

- Who first discovered the substance soap? *(Germans and Gauls)*
- The lack of personal cleanliness and unsanitary living conditions contributed to which deadly plague in Europe during the Middle Ages? *(Black Death)*
- What were the first soap manufacturing countries? *(Italy, Spain, and France)*
- In 1622, how much money did King James grant a soap maker a year to make soap? *($100,000)*
- In the mid-1800's what ordinary table ingredient was added to the soap mixture as an ingredient? *(Table salt)*
- What year was soap manufacturing one of the fastest growing industry in the Americas? *(1850)*
- Household detergents did not become popular in the U.S. until after what war? *(WWII)*
- What are five achievements in the soap/detergent industry from the 1950's through the 1990's. *(Answers will vary)*
- What are the agents that are used in soap-making that would help water kill germs. *(surfactants)*
- What kind of water does the poorest job of cleaning your hands? *(hard)*

Materials for two students:

Bubble Recipe:

- Four 1/2 cups of water
- 1/2 cup of hand dishwashing detergent (Dawn dishwashing detergent is environmentally friendly)
- Tempera or poster paint in three colors
- White or light colored construction paper
- Bubble wand (can be made from a coat hanger) or drinking straw
- 3 or 4 containers to hold the bubble mixture (Must be able to hold one cup of mixture)
- One teaspoon
- One cup

Culminating Activity 1:

This hands-on art activity can prove that getting your hands wet and lathering up can be both healthy and fun.

Step 1: Spread newspaper around the area and wear an old T-shirt.

Step 2: Pour about one cup of the bubble solution in each container.

Step 3: Add one teaspoon of paint to each container.

Step 4: Stir until well mixed.

Step 5: One student is to put wand or drinking straw into the mixture and blow a bubble while the other student "catches" them on the piece of white paper. Alternate colors. (Give students a period of time for blowing their bubbles-no more than 3 minutes).

Step 6: Alternate students and repeat Step 5.

Step 7: Allow the bubble art creations to dry-they are beautiful.

While the students have the bubble mixture available, allow them to have a bubble sculpture contest.

Materials Needed:

- Bubble Solutions
- Shallow tray
- Drinking straws

Culminating Activity 2:

Step 1: Fill the bottom of the shallow tray with 1/4 inch of one of the colored bubble solutions.

Step 2: Dip one end of the straw in to the solution. Hold the straw slightly above the surface and gently blow a bubble.

To blow a bubble within a bubble.

Step 1: Wet the straw.

Step 2: Gently insert it in to the top of another bubble so that it enters at a 45-degree angle.

Step 3: Blow gently to form another bubble.

Step 4: Repeat the steps to form more bubbles in bubbles.

Remind students that following the following bubble rules will help them to succeed:

- Blow bubbles on cool days.
- Keep surfaces wet.

If students would like to independently find more bubble activities for their "at home fascination" have them reference: www.cleaning.com (SDA Kids Corner-Bubbles).

Cross-Curricular Extensions

Science:

Students could examine these various health related links, and formulate research papers based on the various agencies that have objectives of keeping societies healthy.

http://www.hhs.gov/phs: This is the website for the Public Health Service.

http://www.cdc.gov: This is the website for the Center for Disease Control and Prevention.

http://www.who.int: This is the site of the World Health Organization.

Students could examine the history of disease causing agents, and explore the havoc that they have played with mankind.

Art:

Students could Have a Bubble Art Show and invite the community to their art show.

Students could make health safety posters to remind people to wash their hands.

Community Connections:

Bubble Art Show

Community Awareness Project. Students could ask to put their safety posters in community businesses.