

# Germs are Everywhere: Health

## PreK-2

### Health

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### Objectives

Students will simulate how germs spread on surfaces and from person to person through interactive group and individual activities. Students will learn more about handwashing through songs and raps.

### Vocabulary

**bacteria**—very small living things that often cause disease

**fungus**—a group of living things (such as molds, mushrooms, or yeasts) that often look like plants but have no flowers and that live on dead or decaying things

**germ**— a very small living thing that causes disease

**virus**—an extremely small particle that causes a disease and that spreads from one person or animal to another

### Background

Germs live everywhere. You can find germs (microbes) in the air; on food, plants, and animals; in soil and water — and on just about every other surface, including your body.

Most germs won't harm you. Your immune system protects you against most germs. However, some germs are difficult to fight off because they constantly mutate to breach your immune system's defenses. Viruses, like colds and the flu, are examples of germs that mutate. We need a new flu shot every year because the virus changes and the antibodies from previous years do not recognize the new strain. Knowing how germs work can increase your chances of staying healthy.

### WHAT IS A GERM?

The term “**germ**” refers to a very small living thing that causes disease. Germs can be **viruses**, **bacteria**, or **fungi**.

Viruses are very small particles that cause a disease. We have all seen illustrations of the COVID-19 virus and heard reports of changes in the number and type of protein spikes as the virus mutates. Not all viruses are spheres, but most viruses have spikes to help them attach to healthy cells in the host organism. Viruses spread from one person or animal to another. Viruses are so simple they are often not considered alive. Viruses are not able to grow or reproduce on their own. Instead, they must take over a host cell to reproduce.

Bacteria are much larger in size and can live anywhere. Bacteria can be spherical, rod-like, or curved. There are bacteria in the soil and at the depths of the ocean. They can also be on the surfaces of teeth and in the digestive tracts of humans and animals. Most bacteria do not cause disease. In fact, many bacteria are very helpful to us. There are bacteria that break down trash or clean up oil spills. Bacteria can even be used to make medicines.

## Germs are Everywhere (continued)

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Fungi are larger, plant-like organisms without chlorophyll. Chlorophyll is what makes plants green and changes sunlight into energy. Since fungi do not have chlorophyll, they cannot make food. They have to absorb food from whatever they are growing on. Fungi can be very helpful. Fungi can make bread rise or break down trash. Penicillin is derived from a naturally occurring mold (fungi) found growing in a petri dish with a bacterial culture. Over time, the mold killed the bacteria in the petri dish. Fungi be harmful if they steal nutrients from another living thing or damage tissue.

Animals carry many germs. Being bitten or scratched by a sick animal can make people sick. People might also become infected by scooping cat's litter box. Humans even get sick by cleaning mouse droppings in houses or garages. The best way to keep this from happening is for people to wash their hands often.

Disease-causing organisms can also be passed along by indirect contact. Many germs stay on surfaces, such as a tables, doorknob, or faucet handle. When people touch the same doorknob as someone who is sick, they pick up the germs the other person left behind. If someone then touches their eyes, mouth, or nose before washing their hands, they may become sick.

When someone coughs or sneezes, they send droplets into the air around them. When the person is sick these droplets have the germs that made them sick.. Crowded, indoor rooms may increase the chance of droplets being spread. Some germs travel through the air in particles much smaller than droplets. These tiny particles remain in the air for long periods of time. They can travel in the air. If a person breathes in an airborne virus, bacteria, or other germ, they may become sick. They will then show signs and symptoms of the disease. The flu, SarS, and COVID-19 are contagious diseases often spread through the air.

Another way disease-causing germs can infect people is through food and water. E. coli is a bacteria which is in some foods, such as hamburger that is not cooked enough. It can also be in unwashed fruits or vegetables due to exposure to waste. When someone eats food that has E. coli, they could get an illness, often called food poisoning.

To keep from spreading germs, the CDC says people should:

1. Wash hands often with soap and water for at least 20 seconds especially after using the restroom, being in a public place, blowing their nose, coughing, or sneezing, or handling animals.
2. Avoid close contact with people who are sick. If possible, keep 6 feet of space between the person who is sick. If outside, keep 6 feet between people.
3. Always cover the mouth and nose with a tissue when coughing or sneezing, or plan to use the inside of the elbow and do not spit.
4. Clean and disinfect surfaces that are touched daily.

# Germs are Everywhere (continued)

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## Additional Reading

### Children's Books

Ben-Barak, Idan, *Do Not Lick This Book*, Roaring Brook Press, 2018.

Berger, Melvin, *Germs Make Me Sick!*, Harper Collins, 2015.

Cline-Ransome, Lesa, *Germs: Fact and Fiction, Friends and Foes*, Henry Holt and Co. 2017.

Dragon, Didi, *Germs vs. Soap*, AHA! Press, 2020.

MacDonald, Alan, *Germs! (Dirty Bertie)*, Capstone Press, 2012.

Marsh, Carole, *A Kid's Official Guide to Germs (Here and Now)*, Gallopade, 2002.

Mould, Steve, *The Bacteria Book: The Big World of Really Tiny Microbes*, DK Children, 2018.

Rooke, Thom, *A Germ's Journey (Follow It)*, Picture Window Books, 2011.

Verdick, Elizabeth, *Germs Are Not for Sharing*, Free Spirit Publishing, 2006.

## Websites

<https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/talking-with-children.html>

[https://www.ok.gov/health/County\\_Health\\_Departments/Comanche\\_County\\_Health\\_Department/Services/Communicable\\_Disease/index.html](https://www.ok.gov/health/County_Health_Departments/Comanche_County_Health_Department/Services/Communicable_Disease/index.html)

<https://kidshealth.org/>

<https://www.aphis.usda.gov/aphis/ourfocus/animalhealth>

<https://www.ncbi.nlm.nih.gov/books/NBK143061/>.

<https://www.mayoclinic.org/diseases-conditions/infectious-diseases/in-depth/germs/art-20045289#dialog-d45096456>

# Germs Are Everywhere

## Activity 1

## Grades PreK-2 Teacher Resources and Standards

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### Activity 1: Germs and Vaccinations, (Health)

1 50 minute class period

Students will learn how germs can spread from person to person and identify ways to prevent the spread of germs.

### Oklahoma Academic Standards

#### Activity 1: Germs and Vaccinations (Health)

- 1.2.3. Describe ways to prevent communicable diseases.
- 5.2.1 Identify situations when a health-related decision is needed (e.g., dealing with interpersonal conflict, managing anger, nutrition, safety, hygiene).
- 7.2.1 Demonstrate healthy practices and behaviors to maintain or improve personal health.
- 7.2.2 Demonstrate behaviors that avoid or reduce health risks.

#### Materials:

- Activity 1 Worksheet 1a “**Sharing Germs**”
- Activity 1 Worksheet 1a “**Sharing Germs**”
- Activity 1 Reading Page 1: “**Clean Hands Stop Germs**”
- Activity 1 Worksheet 2 “**Wash Your Hands**”
- Activity 1 Interactive Page 1 “**Handwashing Song**”
- Activity 1 Interactive Page 2 “**Handwashing Rap**”
- Activity 1 Worksheet 3 “**Handwashing Steps**”

# Germs Are Everywhere

## Activity 1

## Grades PreK-2 Teacher Resources and Standards

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### Materials and Instructions

- measuring cups and spoons
  - red cabbage solution\*
  - distilled water (tap water has minerals that can impact color change)
  - saturated baking soda solution\*\*
  - citric Acid solution\*\*\*
  - clear plastic 12-ounce cups
  - eye dropper or medicine syringe
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- \*To make the cabbage solution: Cover 2 cups of finely chopped red (purple) cabbage with boiling distilled water and let stand in a glass or stainless steel container for 10 minutes or more to leach color from the cabbage. Or process cabbage with distilled water in a blender until it forms a pulp. Strain residue using a strainer or funnel lined with a coffee filter. Do not use tap water as it will affect the pH of the solution and the results of the activity. Solution can be prepared ahead of time and refrigerated in a sealed container for 2-3 days or frozen for several months. (Note: if you only need a small amount, juice from frozen blueberries or blackberries contains the same pigment and may be a more cost effective alternative)
  - \*\*baking soda dissolved in water until no more can dissolve (about 1 tablespoon of baking soda dissolved in 1 cup of distilled water) Allow solution to “settle” until clear and pour off clear liquid for use in activity. Rinse solids down the drain with cool water.
  - \*\*\*2 tablespoons citric acid crystals dissolved in 2 cups distilled water (this solution has the same pH as vinegar, but without the odor)

# Germes Are Everywhere

## Procedures:

1. Pour  $\frac{1}{2}$  cup of solution into a plastic cup, and label the bottom to distinguish it from other cups. This will be the teacher's cup.
2. Add  $\frac{1}{2}$  cup of citric acid solution to 2-3 of the cups. Record the numbers on these cups for use in the activity to follow. **These cups have been "vaccinated", and the color change and chemical reaction in these cups will represent the presence of antibodies.**
3. Set aside one cup each of the baking soda, citric acid and distilled water samples to test at the end of the activity.
4. Add  $\frac{1}{2}$  cup distilled water to the remaining cups
5. Hand each student a cup. **Instruct students to not drink from the cups.**
6. **Tell students an infected animal or person has entered the classroom. One person in the class will represent the infected animal or person. (This will be the teacher.)**
7. Students will spend the next 5-10 minutes mingling and sharing water by pouring small amounts of water into each others' cups, being careful not to overfill the cups. Instruct students to share their cup with at least 5 other students.
8. The teacher will use the cup of saturated baking soda solution prepared ahead of time to participate in the mingling without letting students know they are the infected person or animal. Try to avoid sharing with the students with the citric acid solution to avoid an obvious chemical reaction early in the activity.
9. After 5-10 minutes stop and ask these questions:
  - a. Did you "eat" or "drink" after each other? (cats, dogs and other animals often share a common food or water bowl. Students and family members sometimes share a drink or take a bite of someone else's food.)
  - b. Did you walk in the contaminated "droppings" of another animal? (Bird droppings are the most common droppings, but cleaning up after a dog or cleaning a cat's litter box or a rabbit's cage spreads germs as well. Students with farm or show animals clean pens regularly)
  - c. Were you in the same area as other animals (students)? (Are you sure your neighbors are healthy? Sometimes you are contagious before you feel bad.)
  - d. Do you think you shared any germs? (Did you wipe your nose with your hand, or cough/sneeze into your hand and then touch something or someone before washing your hands? Did you touch anything on the playground and then touch someone?)
10. Put 1 dropper full (or one-half teaspoon in a dosing syringe) of cabbage solution (or blueberry/blackberry juice) into each student's cup.
11. Students will observe what happens:

# Germs Are Everywhere

## Procedures, continued:

12. If the water turns blue or blue green, a germ (represented by the baking soda) was shared. The samples “vaccinated” with citric acid will turn purple or pink depending on the concentration of acid. Depending on the degree of “sharing”, some samples may be gray or brown. This indicates the presence of both the germ and the antibodies (from the vaccination)
13. Reveal to students that the teacher was the “host animal,” and explain that cabbage solution is an indicator and turns blue green when it comes into contact with a base (baking soda) and purple or pink when in contact with an acid.
14. Group cups by color (pink/purple, blue/green) on a table. Bring out the three reserved cups (baking soda solution, citric acid solution and distilled water) and put a dropper full of cabbage solution in each cup. Have students compare their cups to the “control” cups.
15. Have students complete Activity 1 Worksheet 1a “**Sharing Germs**”.
  - If the liquid is blue or blue-green, it has the germ, but no antibodies.
  - If the liquid is pink or purple and has bubbles, the germ was neutralized by the antibodies (citric acid). If the liquid does not have bubbles, that cup was not exposed to the germ
  - If the liquid is a “muddy” color, the antibodies slowed down the germ, but did not overpower it.
  - If the liquid is the same color as the cabbage juice, the cup was not vaccinated and was not exposed to the germ.
16. After discussing how germs spread, have students complete the bottom part of Activity 1 Worksheet 1b “**Sharing Germs**”. For students who are not yet reading ask the questions out loud and have students answer with a show of hands.
17. Use Activity 1 Reading Page 1 “**Clean Hands Stop Germs**” to discuss how and when to wash hands. Have students complete Activity 1 Worksheet 2 “**Wash Your Hands**”. Discuss each example and why washing your hands is important in each situation
18. Use either Activity 1 Interactive Page 1 “Handwashing Song” or Activity 1 Interactive Page 2 “Handwashing Rap” to help reinforce how long you should wash your hands. If you have a sink in your room, have student practice washing their hands while using the song or the rap.
19. Use Activity 1 Worksheet 3 “**Hand Washing Steps**” to have students color the pictures and put the steps in order. Alternate activity: Cut the pictures apart and have students put them in the correct order.

Adapted from: *Infectious Disease Spread Activity*, Partnership for Environmental Education and Rural Health at College of Veterinary Medicine & Biomedical Sciences, Texas A&M University

# Germs Are Everywhere

## Activity 1 Worksheet 1a: Sharing Germs page 1



Name: \_\_\_\_\_ Date: \_\_\_\_\_

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### Answer the questions after the activity.

1. Did the water in your cup change color?

Yes

No

2. Do you think you shared any germs?

Yes

No

3. Write the number of cups in each color group:

Blue or blue-green

\_\_\_\_\_

Pink or purple

\_\_\_\_\_

Gray or brown

\_\_\_\_\_

No change

\_\_\_\_\_



# Germs Are Everywhere

## Activity 1 Worksheet 1b: Sharing Germs



Name: \_\_\_\_\_ Date: \_\_\_\_\_

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### **Circle the letter by the sentences if the sentence is true.**

- A. When you eat or drink after someone you share germs.
- B. You do not always know who is sick.
- C. It is fine to go to school if you are sick, but feel ok.
- D. You need to wash your hands after handling animals.
- E. You do not need to wash your hands before you eat.
- F. You can spread germs when you cough or sneeze.
- G. It is important to wash your hands after using the restroom.
- H. You can get germs from your cat's litter box.

# Germs Are Everywhere

## Activity 1 Worksheet 1: Sharing Germs

### ANSWER KEY



Name: \_\_\_\_\_ Date: \_\_\_\_\_

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### After the activity, answer the questions:

Did the water in your cup change color?                      Yes                      No

Do you think you shared any germs?                      Yes                      No

Write the number of cups in each color group:

Blue or blue-green \_\_\_\_\_

Pink or purple \_\_\_\_\_

Gray or brown \_\_\_\_\_

No change \_\_\_\_\_

### Circle the letter if the sentence is true.

- A. When you eat or drink after someone you share germs.
- B. You do not always know who is sick.
- C. It is fine to go to school if you are sick but feel ok.
- D. You need to wash your hands after handling animals.
- E. You do not need to wash your hands before you eat.
- F. You can spread germs when you cough or sneeze.
- G. It is important to wash your hands after using the restroom.
- H. You can get germs from your cat's litter box.

# Germs Are Everywhere

## Activity 1 Reading Page 1: Clean Hands Stop Germs



Name: \_\_\_\_\_ Date: \_\_\_\_\_

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You may not see germs.

Germs are always around.

Get rid of germs by washing your hands.

Use soap and warm water.

Wash hands for 20 seconds.

Wash between your fingers and under fingernails.

Hand sanitizer is ok if you do not have soap and water.

Washing with soap and water is always best.



# Germs Are Everywhere

## Activity 1 Worksheet 2: Wash Your Hands!



Name: \_\_\_\_\_ Date: \_\_\_\_\_

When you should wash your hands?  
Put an "X" in the box by the picture.

# Wash your hands!



1. Before eating



2. After using the rest room



3. After sneezing, coughing or blowing your nose



4. After playing outdoors



5. After jumping rope



6. After playing with animals

Source: Operation Risk Curriculum, Michigan State University Board of Trustees

For more lessons and resources, please visit [www.agclassroom.org/ok](http://www.agclassroom.org/ok)

# Germs Are Everywhere

## Activity 1 Interactive Page 1: Handwashing Song



Name: \_\_\_\_\_ Date: \_\_\_\_\_

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### **Wash, Wash, Wash Your Hands**

(To the tune of Row, Row, Row Your Boat)

Wash, Wash, Wash your hands. Wash them nice and clean.

Scrub them here (with hand motion scrubbing together)

Scrub them there (with hand motion scrubbing tops of hands)

And scrub them in between (with hand motion scrubbing between fingers).

Wash, wash, wash, your hands

Play our handy game

Rub and scrub, scrub and rub

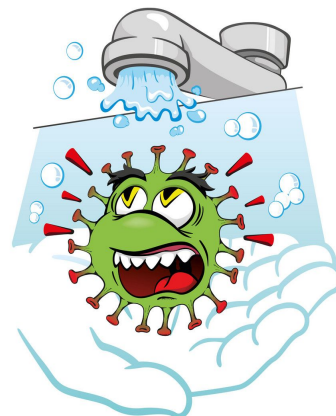
Germs go down the drain HEY!

Wash, wash, wash, your hands

Play our handy game

Rub and scrub, scrub and rub

Germs go down the drain HEY!



Source: Operation Risk Curriculum, Michigan State University Board of Trustees

# Germs Are Everywhere

## Activity 1 Interactive Page 2: Handwashing Rap

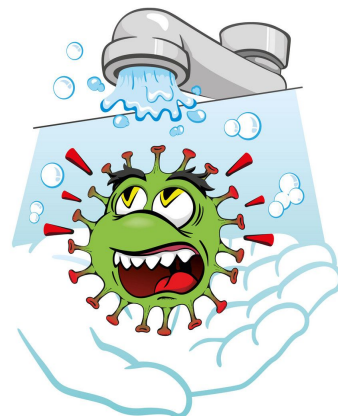


Name: \_\_\_\_\_ Date: \_\_\_\_\_

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### Handwashing Rap

You gotta' wash your hands, and you gotta' wash 'em  
right,  
Don't give into germs without a fight  
Use water that's warm  
And lots of soapy bubbles,  
These are the weapons For preventing germ troubles  
Don't cut your time short Your fingers — get between,  
It takes twenty seconds To make sure they're clean  
Gotta' wash...gotta' wash  
Gotta' — wash — your — hands,  
Gotta' wash...gotta' wash  
Gotta — wash — your — hands



Source: Operation Risk Curriculum, Michigan State University Board of Trustees

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# Germs Are Everywhere

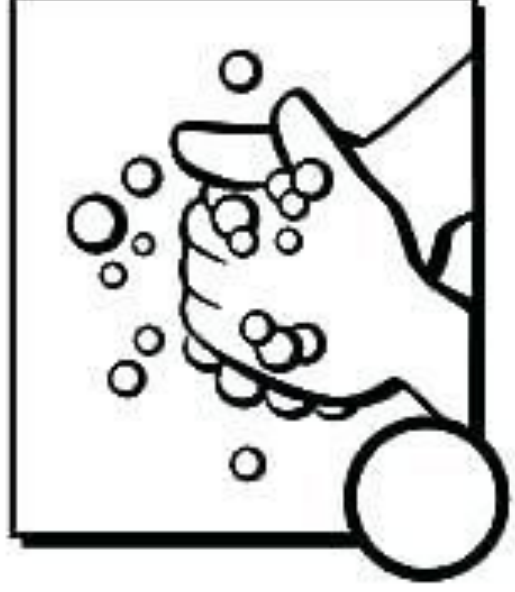
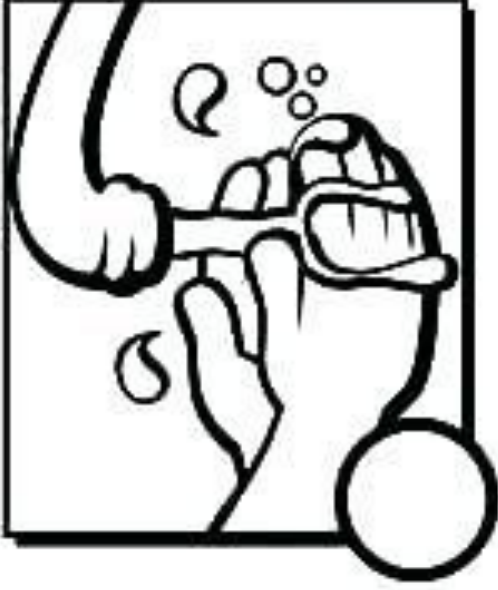
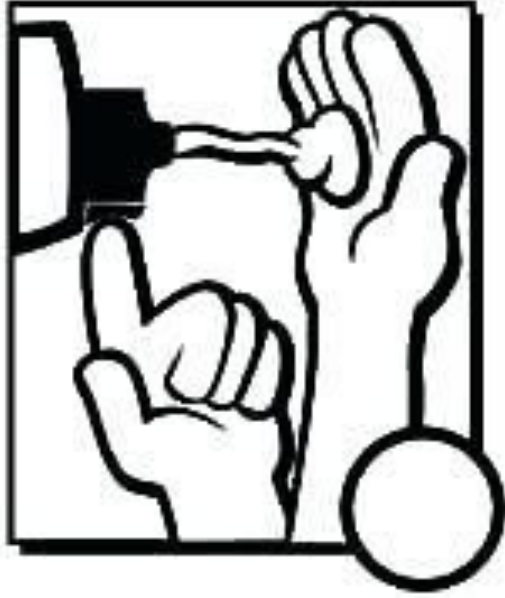
## Activity 1 Worksheet 3: Hand Washing Steps



Name: \_\_\_\_\_ Date: \_\_\_\_\_

Color each picture.

Number pictures 1, 2, 3, 4, and 5 to put them in order.



### Hand Washing Steps

1. Wet hands.
2. Apply soap.
3. Wash 20 seconds.
4. Rinse hands.
5. Dry hands

# Germs Are Everywhere

## Activity 1 Worksheet 3: Hand Washing Steps

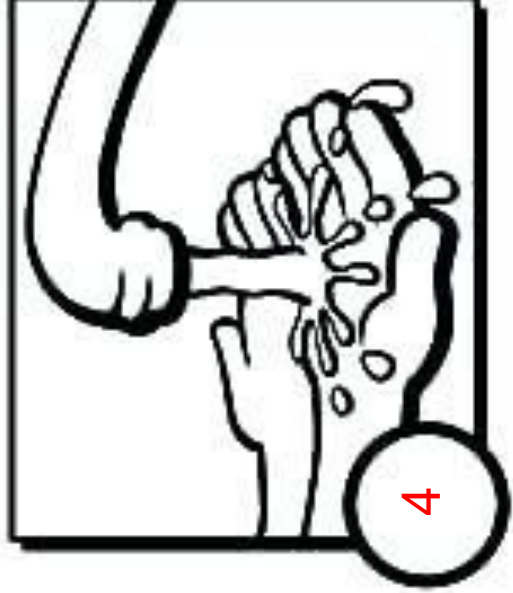
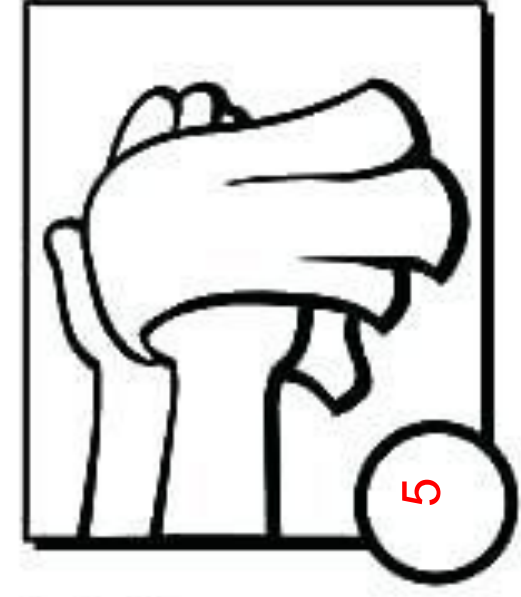
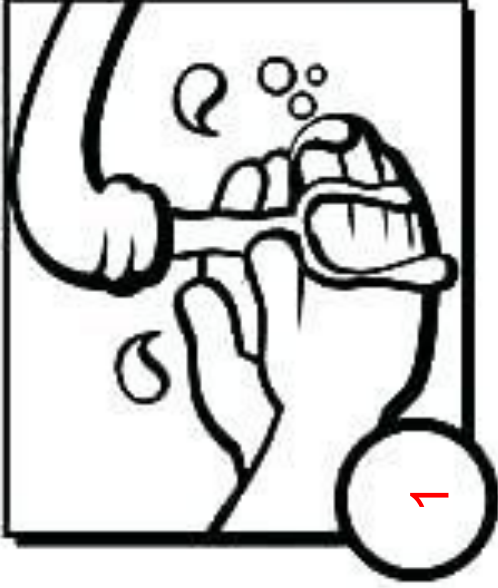
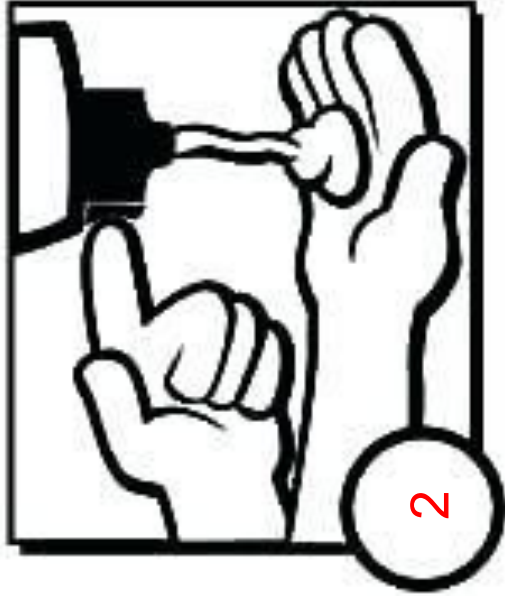
**ANSWER KEY**

Name: \_\_\_\_\_ Date: \_\_\_\_\_



Color each picture.

Number pictures 1, 2, 3, 4, and 5 to put them in order.



## Hand Washing Steps

1. Wet hands.
2. Apply soap.
3. Wash 20 seconds.
4. Rinse hands.
5. Dry hands

