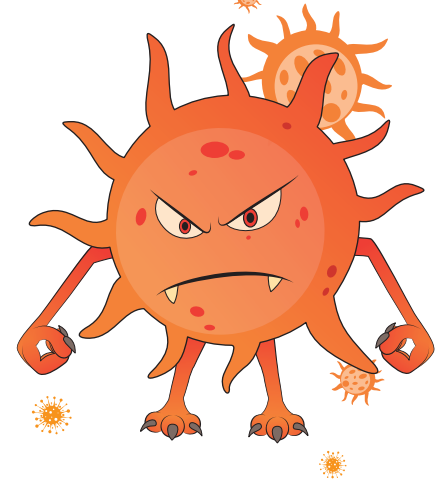


Educator Resource

Interactive Experiment: The Importance of Handwashing

Students come into contact with germs every day. They may not understand just how quickly germs can be transmitted by hands – and as a result, they may not wash and sanitize as often as they should. Try these interactive experiments to reinforce hand hygiene and encourage a lifetime of healthy habits.



Materials

- White paper
- Washable finger paint (darker colors are recommended)
- Blindfold
- Soap
- Running water
- Paper towels

Getting Ready

- **Before performing the experiment**, complete Worksheet 1 to discuss the concept of germs (good vs. bad, microscopic and can't see).
- **If performing the experiment in a classroom** setting, split students into 2 groups. Review Worksheet 2 with student group A to review how to properly wash hands. Do not review Worksheet 2 with student group B.

Procedure

1. Explain that paint will represent germs typically found on our hands.
 - **Note** – We're unable to see germs because they are so small (microscopic).
2. Dispense a dime-sized amount of paint on student's hands.
3. Have student rub paint on palm of hands only – from wrist to fingertips.
4. Blindfold student and ask them to wash hands with soap and water.
 - **Note** – For classroom experiment, group A should be instructed to wash per the WHO Handwashing Procedure. Allow group B to wash as they normally would.
5. Lightly pat palms of hands with paper towel one time.
6. Stamp hands onto white paper. Any area on the paper that has paint represents where germs were missed during hand wash. Areas without paint represent that germs have been removed.

Discussion Questions

1. Which area(s) on your hands did you wash poorly and they had a lot of visible paint? Which area(s) on your hands did you wash well and they had no visible paint?
2. For classroom experiment – did group A or group B wash their hands better and remove more germs?
3. Look around – what objects do you think have the most germs on them? Why?
4. What area of your hand do you think would have the most germs? Why?
5. What is a good way to clean your hands?
6. Why is it important to clean your hands?

Interactive Experiment: **The Importance of Handwashing** Worksheet 2

Washing your hands helps you stay healthy and keep bad germs off your hands. Always use soap and water, and wash your hands a lot, especially right before you eat. Follow the instructions below to learn the best way to wash your hands.



1 Wet hands under running water.



2 Add soap to hands.



3 Rub hands palm to palm.



4 Rub right palm over top of left hand with interlaced fingers. Repeat with left palm over top of right hand.



5 Rub palms together with fingers interlaced.



6 Rub backs of fingers to opposing palms with fingers interlocked.



7 Rub the soap into your left thumb with your right hand, then switch and rub soap into your right thumb with your left hand.



8 Rub your fingertips into your palms to clean under your fingernails. Repeat with each hand.



9 Rinse hands thoroughly with running water.



10 Dry with clean paper towels. Turn water off using towel.

Washing your hands properly takes about as long as singing "Happy Birthday" twice



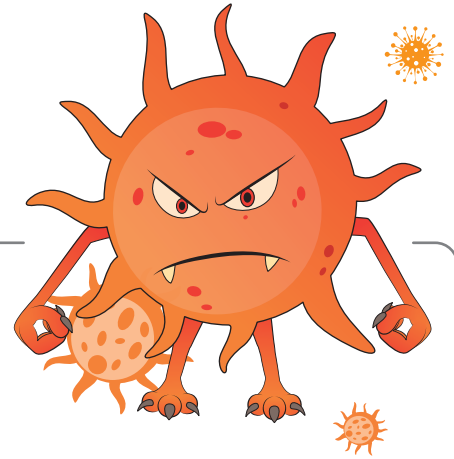
Interactive Experiment: **The Importance of Handwashing**

Worksheet 1

Did you know that germs are so small they're invisible? That's right! Even though you can't see them, germs are everywhere – and some of them are even good for us! When you wash your hands well, you get rid of the bad germs that can make you sick, so the good germs can help you stay healthy.

Write, draw, or discuss the answers and fill in the blanks to learn why it's important to wash your hands.

1. Some germs help you, but others can make you _____.
2. Germs are very tiny. You can only see them with a _____.
3. Always wash your hands with _____ and water.
4. Make sure you wash your hands after using the _____.
5. Wash your hands a lot, especially before you _____.



Stamp Hands Below

A large, empty rectangular box with rounded corners, intended for students to stamp or draw their hands.

Interactive Experiment: **The Importance of Handwashing**

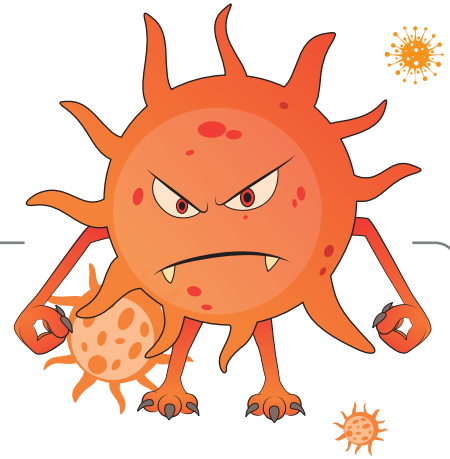
Worksheet 1 – Answer Sheet

Did you know that germs are so small they're invisible? That's right! Even though you can't see them, germs are everywhere – and some of them are even good for us! When you wash your hands well, you get rid of the bad germs that can make you sick, so the good germs can help you stay healthy.

Write, draw, or discuss the answers and fill in the blanks to learn why it's important to wash your hands.

1. Some germs help you, but others can make you sick.
2. Germs are very tiny. You can only see them with a microscope.
3. Always wash your hands with soap and water.
4. Make sure you wash your hands after using the restroom.
5. Wash your hands a lot, especially before you eat.

Stamp Hands Below



Interactive Experiment: Understanding Germ Transfer

Showing students how easily germs can move from hands to common objects – and back – is a great way to illustrate how washing your hands can help prevent the spread of germs. Seeing how quickly germs can spread around the classroom helps reinforce good hand hygiene and can encourage students to pay more attention to when and how well they're washing and sanitizing their hands.



Materials

- Glo Germ lotion
- Glo Germ powder
- Spray bottle
- Water
- Black light
- Black poster board
- Olive oil

Getting Ready

- **Before performing the aerosol experiment**, mix two tablespoons of Glo Germ powder* thoroughly with two cups of olive oil. Let mixture settle overnight and decant as much of the oil out as possible. Get the remaining oil out by putting the mixture into cloth and wring out any additional oil. Mix the oil-coated powder into a pint of water. Shake well and transfer into a spray bottle.
- **Complete Worksheet 1** to discuss the concept of germs and germ transfer.
- **Worksheet 2** should also be completed if the *Aerosol* experiment is being performed (Etiquette and how to cover a cough or sneeze).

Glo Germ Experiment

Procedure

1. Dispense a nickel-size amount of Glo Germ lotion on each student's hands.
2. Instruct the students to rub the lotion on the palms of their hands only — from wrist to fingertips — and before dry, touch items in the room. These items can be what they believe to be "high-traffic" areas in the classroom, the first 5 objects they see, etc.
3. Have students return to their seats once they've finished touching objects and their lotion is dry.
4. Once all students are back in their seats, turn off the lights and remove any additional light sources within the room.
5. Turn on the black light and move around the room to see what areas in the classroom were touched using the Glo Germ kit.

Discussion Questions

1. What areas did you think would be most touched? Did this turn out to be true?
 2. Were you surprised by any areas that had been touched with Glo Germ?
 3. How can germs be transferred from surfaces?
 4. Why is good hand hygiene important to stop the spread of germs?
 5. Why is it important to regularly clean and disinfect high-touch surfaces?
-

Aerosol Experiment

Procedure

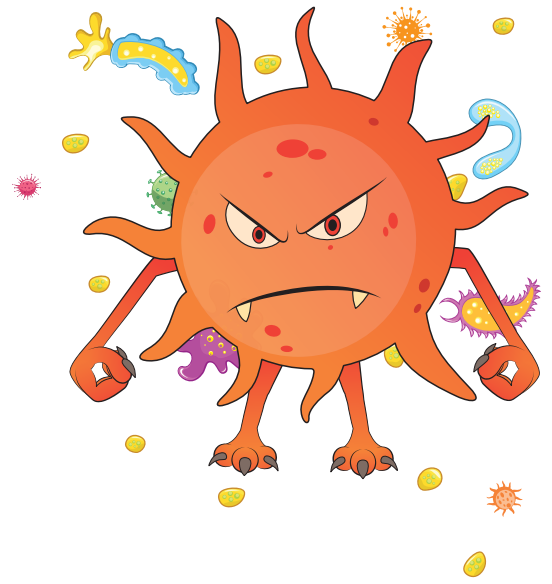
1. A student representative or the classroom teacher can take the prepared spray bottle and solution.
2. Dispense one spray of the solution onto a poster board that is posted approximately 3 feet away.
3. Repeat procedure with a poster board that is 6 feet away.
4. Turn off the lights and eliminate any additional light sources within the room.
5. Use the blacklight to visualize the aerosolized particles on the poster board.

Discussion Questions

1. Which surface had more visible droplets (the one closer to the spray source or further away)?
2. Was the spray pattern bigger or smaller than you expected?
3. If the spray was a sneeze, how would physical distancing reduce the risk of germ transfer?
4. If the spray was a sneeze, what could have interrupted the path in which the sneeze traveled?



Interactive Experiment: Understanding Germ Transfer



Worksheet 2

Germs can spread very fast if you don't cover your mouth when you cough or sneeze. Covering your mouth with your hand is a good way to help prevent germs from spreading, but using a tissue or the inside of your elbow helps keep germs off of your hands and face.

How to Cover Your Mouth Properly:



covering mouth with hands



covering mouth with tissue

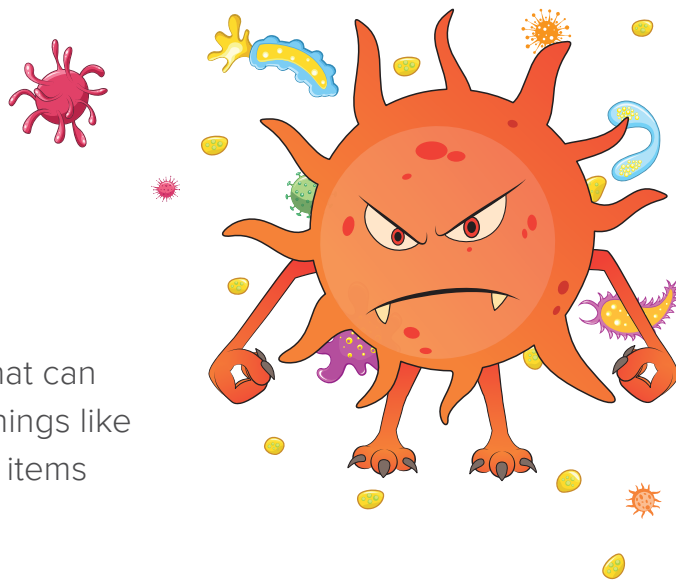


covering mouth with elbow

REMEMBER! Always wash your hands after you cough, sneeze, or blow your nose so you don't spread germs!

Interactive Experiment: Understanding Germs

Worksheet 1



It's important to wash your hands to get rid of germs that can make you sick, but did you know that when you touch things like door handles, chairs, and handrails, the germs on those items can end up on your hands?

Which objects in the classroom do you think have the most germs?

1. _____
2. _____
3. _____

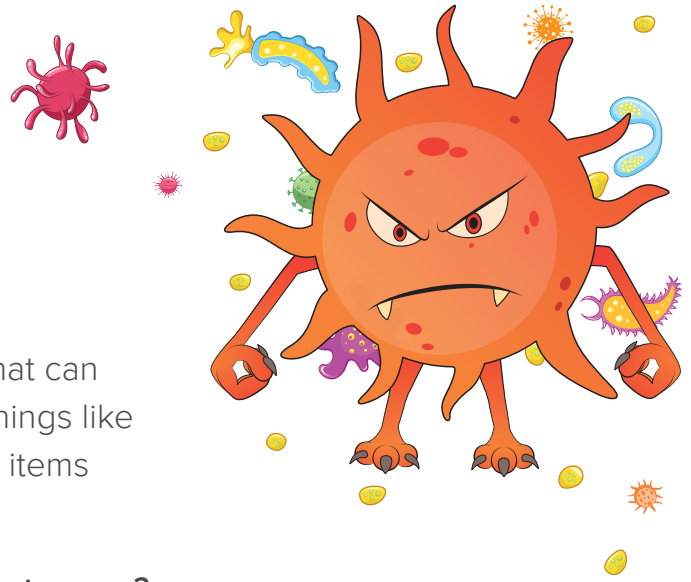
When you wash your hands you're washing away germs you may have picked up from touching things around the classroom and helping keep germs away.

Fill in the blanks and see why it's important to wash your hands.

1. When you touch an object, _____ can end up on your hands.
2. If you don't wash your hands thoroughly, germs can remain on your hands which can make you _____.
3. Always wash your hands with _____ and water.
4. Make sure you wash your hands after using the _____.
5. Wash your hands a lot, especially before you _____.
6. How long should you wash your hands? _____
7. Do all microorganisms make you sick? _____
8. Besides washing your hands, what other ways can you help keep germs away?

Interactive Experiment: Understanding Germs

Worksheet 1 – Answer Sheet



It's important to wash your hands to get rid of germs that can make you sick, but did you know that when you touch things like door handles, chairs, and handrails, the germs on those items can end up on your hands?

Which objects in the classroom do you think have the most germs?

The most germey objects are those that are touched by the most people and cleaned least often.

- Door handles
- Chairs
- Light switch
- Pencil sharpener
- Desks
- Shared keyboards/laptops

When you wash your hands you're washing away germs you may have picked up from touching things around the classroom and helping keep germs away.

Fill in the blanks and see why it's important to wash your hands.

1. When you touch an object, germs can end up on your hands.
2. If you don't wash your hands thoroughly, germs can remain on your hands which can make you sick.
3. Always wash your hands with soap and water.
4. Make sure you wash your hands after using the restroom.
5. Wash your hands a lot, especially before you eat.
6. How long should you wash your hands? (20 seconds)
7. Do all microorganisms make you sick? (No, some bacteria is found naturally on our hands and does not make you sick)
8. Besides washing your hands, what other ways can you help keep germs away?
(Covering sneezes and coughs properly, wearing a mask, practicing physical distancing, using hand sanitizer, cleaning up after yourself, not sharing food and drinks, etc)

Educator Resource

Interactive Experiment: The Effectiveness of Hand Hygiene Techniques

Older students can still benefit from learning the advantages of good hand hygiene too. Break out those microscopes and have students swab the same area before and after washing their hands and compare the number of germs from each swab. It's a great way to demonstrate the importance of hand hygiene and learn what common germs on hands look like in real life!

This experiment is best suited for groups of 3 students

Materials

- PURELL® Advanced Hand Sanitizer
- Bottled water
- Plain, non-antimicrobial soap
- Probiotic capsules containing live cultures of Lactobacillus and Bifidobacterium
- Permanent marker
- 3-TSA petri dishes per group of 3 students
- Timer
- ¼ teaspoon measuring spoon
- Mixing bowls
- Paper towels
- Tape

Getting Ready

- **Before performing the experiment**, prepare the inoculum by emptying three capsules of probiotic powder into a clean bowl and mixing with $\frac{3}{4}$ teaspoon of room temperature bottled water.
- Label petri dishes:
 - Plate 1 — Baseline
 - Plate 2 — Hand Sanitizer
 - Plate 3 — Soap
- **Complete Worksheet 1** to discuss the concept of germs on hands and effective methods for removing germs.



Procedure

1. Baseline Sample – To demonstrate hand contamination

- Prior to beginning the experiment have all participating students wash and dry hands following CDC standards.
- To measure baseline, apply ¼ tsp. of inoculum mixture onto one palm of student 1. Instruct student to rub inoculum over both hands until dry.
- Have student 1 press fingertips (excluding thumb) gently onto the surface of the petri dish labeled “Baseline” for 5 seconds.
- Have student 1 wash hands with soap to decontaminate.

2. 2 Pumps of Hand Sanitizer – To demonstrate sanitizer effectiveness

- Apply ¼ tsp. of inoculum onto one palm of student 2 and instruct student to rub inoculum over both hands until dry.
- Apply two pumps of hand sanitizer onto student 2’s hands. Instruct student to rub sanitizer over hands until dry. Apply a second pump of sanitizer and have student rub until dry.
- Have student 2 place fingertips (excluding thumb) gently onto the surface of the petri dish labeled “Sanitizer” for 5 seconds.
- Have student 2 wash hands with soap to decontaminate.

3. 1 Pump of Soap – To demonstrate handwashing effectiveness

- Apply ¼ tsp. of inoculum onto one palm of student 3 and instruct student to rub inoculum over both hands until dry.
- Apply one pump of soap onto student 3’s hands. Allow student to rub the plain, soap for 20 seconds and rinse for 30 seconds. Instruct student to pat hands dry with paper towels.
- Have student 3 place fingertips (excluding thumb) gently into petri dish holding for 5 seconds.
- Have student 3 wash hands with soap to decontaminate.

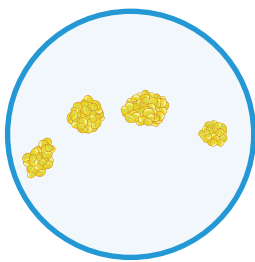
4. Tape petri dishes together and write group name on the tape.

5. Incubate plates with lids facing down in warm/dry place, such as a cabinet, for 48-72 hours.

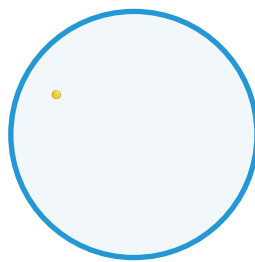
6. Following the incubation period observe plates for bacterial growth and discuss results.

7. Examples of plates are shown below.

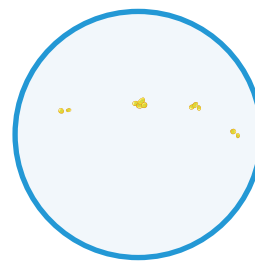
- Note: Bacteria from the probiotic inoculum will appear as small beige to yellowish colonies. Environmental contaminants, such as mold, should not be counted.



Baseline



Hand Sanitizer



Soap

Discussion Questions

- What product did you think would be most effective? Did this turn out to be true?
- Were you surprised by any of the results?
- Why are hand washing and hand sanitizing important in helping to eliminate germs from hands?
- When might you use hand sanitizer instead of soap and water?



Interactive Experiment: The Effectiveness of Hand Hygiene Techniques

Worksheet 1

Did you know that there are millions of germs on your hands at any given time? The more surfaces, objects, and people we contact, the more germs can end up on our hands. When those germs are passed on to new surfaces or objects, they can continue to live and potentially cause others to get sick.

Hand hygiene is important to help eliminate germs that can cause you to get sick.