

More resources



GloGerm Website
glogerm.com



Handwashing Facts
Centers for Disease Control
cdc.gov/clean-hands/data-research/facts-stats/



Clean: Wash Hands, Utensils, and Surfaces Often
FoodSafety.gov
foodsafety.gov/keep/basics/clean/index.html



Handwashing
University of Washington Medicine
healthlibrary.uwmedicine.org/Library/DiseasesConditions/Adult/85,P00628

Tacoma-Pierce County Health Department

(253) 649-1417
food@tpchd.org
tpchd.org

3629 S. D St., MS 1059
Tacoma, WA 98418

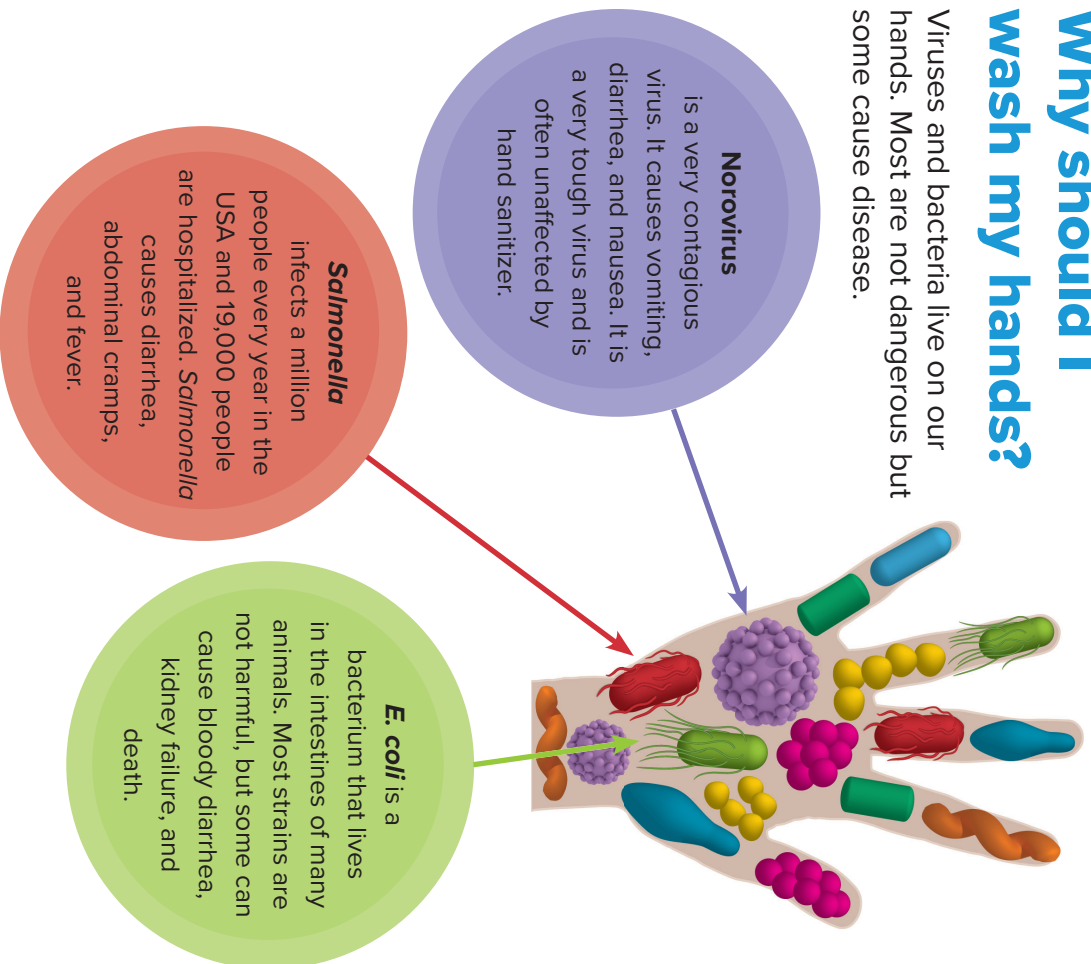


**These are germs from unwashed hands.
Dirty hands spread disease.
Gross.**

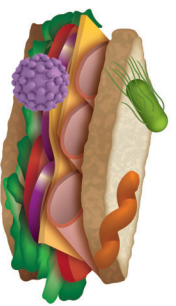
**Learn how to wash your
hands the right way.**

Why should I wash my hands?

Viruses and bacteria live on our hands. Most are not dangerous but some cause disease.



It is especially important to wash your hands when working with food, in a medical setting, or if you are sick.



5 Steps to proper handwashing.

Proper handwashing is key to removing germs that cause disease.

- 1.** Wet hands with warm water.
- 2.** Use soap.
- 3.** Lather for 20 seconds.
- 4.** Rinse with warm water.
- 5.** Dry your hands.

Lesson Plan: Why Should I Wash My Hands?

Background

Tacoma-Pierce County Health Department and the Science and Math Institute (SAMI) of Tacoma Public Schools collaborated to develop this lesson plan, originally designed for an AP Biology class.

Teachers can adjust the lesson plan to accommodate shorter timeframes and different academic levels. We included suggestions for how to adjust the lesson plan. Provided worksheets guide the lab for classes that need more guidance or have a short time frame.

The purpose of this lesson is two-fold:

- Tacoma-Pierce County Health Department is rebranding its hand washing campaign and developing curriculum any secondary school teacher can use to teach germ transfer.
- This open inquiry based lab allows students to explore the experimental design process, gather data and report their findings.

Standards

Modified from Next Generation Science Standard (NGSS) HS-ETS1-2:

- Design an explanation to a complex real-world problem by breaking it down into smaller, more manageable sections that can be expressed through scientific literacy.

Modified from Common Core State Standards (CCSS) ELA-Literacy.W.11-12.2

- Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings) and graphics (e.g., figures, tables) when useful to aiding comprehension.

Materials

- GloGerm (glogerm.com)—Available through Tacoma-Pierce County Health Department.
- UV Light—Available through Tacoma-Pierce County Health Department.
- Sink(s)
- Soap(s)
- Timer—Students can use their phones.

Lesson

Lesson background

Have the students listen to the podcast and review the materials before coming to class.

- **Radio Lab Podcast “Funky Hand Jive” (radiolab.org/story/funky-hand-jive)**
This Radio Lab podcast tries to answer the question of how many and how long germs (bacteria specifically) last on hands after contact with another person. This is great background information and sets up the lab well.
- **Tacoma-Pierce County Health Department “Wash Your Hands” handout.**
Handout for students to review before class, including the supplemental links, or during class time as an entry task.

Gathering information

Demonstrate GloGerm by applying it to the hand of 1 student and showing the class. Demonstrate transmission by having the student shake hands, high five or fist bump one another. Let them ask questions about the product only if they need clarification on what it does. Let them know they will use the GloGerm as a proxy for germs found on everyone's hands.

Group the students into groups of 2 or 3. Have them work together to summarize what they learned from the podcast and Health Department information (3–5 minutes for discussion). Some possible guiding questions:

- For open-ended classes—Summarize what you learned from the podcast and the Health Department handout.
- For classes that need more guidance—What are 3 interesting things you learned from the podcast and Health Department documents?

Make a master list on the board to have the students share their findings as a class. Once they create the list of things they know, send them back into groups (either the same groups or new ones) and have them brainstorm questions they are curious about (3–5 minutes). Require each group to have at least 3 questions they can explore. Bring them back together and have them share their questions and make a master class list on the board.

Example questions:

- Which type of transmission (high five, hand shake, fist bump) transfers the least amount of GloGerm?
- Does hot or cold water change the amount of GloGerm washed from hands?
- Does the presence or absence of soap change the amount of GloGerm washed from hands?
- Does the amount of time hands are washed affect the amount of GloGerm left on the hands?
- Next, hand out the “Lab Report Rubric.”

5–8 minutes: Assign each student one section to focus on while they read the entire rubric. You can have the students use their text outlining skills on the rubric to highlight important parts.

5–8 minutes: Have the students group together by their assigned sections and come up with an explanation of what the section asks the students to do. Have the groups present the explanation to the class.

Have the students listening to the presentations read along and take any notes they need. Ask the presenting groups any clarifying questions you think they need in order to be successful in writing the lab report later.

Ask students in their groups to think about the questions on the board and pick 2 they could design into a lab. Have the groups create a basic investigative plan (see rubric) based on one of the questions. The rubric allows students to answer questions or to create a hypothesis or both. You determine the level of guidance you want to give.

Have each group come to you for approval of their plan and have them talk through their plan with you. As you listen to what they plan to do, ask questions and have them clarify anything that does not make sense. Questions should guide students to create a plan that is reliable, repeatable and valid. For example, if they have only one trial, ask them how they will know one trial is not a fluke. If they want to test everyone in the school, ask them how they are going to do that within the confines of the classroom. Use the rubric as a guide to help the students think about designing an experiment. Have them create a complete materials and methods section as a group. Check for completion, and let them begin work.

Let the class work for 2 class periods. Check in with each group to discuss progress, see what data they are collecting. Continually refer to the rubric as a guide.

Assessment

Require a written lab report due 1 week from the end of the last lab day. Each student must complete their own lab report; no copying allowed, including in the materials and methods section. Require students to complete outside research to tie what they did in the GloGerm lab to other studies. The Health Department handout provides a list of resources. These are a good starting point. Encourage students to look for other reliable resources to cite in the works cited section.

Rubric: Why Should I Wash My Hands?

Name: _____ Date: _____ Period: _____

Category	Exceeding	Meeting	Approaching	Beginning
Modified NGSS HS ETS1-2	Everything in "Meeting" and real-world connections to experimental results.	Design an explanation to a complex real-world problem by breaking it down into smaller, more manageable sections that can be expressed through scientific literacy.	The explanation is poor at addressing the complex real-world issue and/or semi broken down into manageable sections and/or is poorly expressed through scientific literacy.	The explanation is not addressing the complex real-world issue and/or not broken down into manageable sections and/or is not expressed through scientific literacy.
Modified CCSSELA-Literacy.W.11-12.2		Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings) and graphics (e.g., figures, tables) when useful to aid comprehension.	The introduced topic is incorrect, and/or the ideas are not well organized, and/or is poorly built on previous sections. Figures and tables are used tangentially and/or not useful for aiding in comprehension.	The topic is not introduced, is not organized into complex ideas and concepts, or does not build on previous sections. Figures and tables are used incorrectly for their stated purpose. The paper is off topic.

Scientific Paper Sections	Section Requirements
Introduction and Prediction	- Includes past research (cited) and provides background for why the study is interesting/relevant. - The purpose/experimental questions are clearly stated. - The question is connected to previous knowledge, testable and adds to the scientific body of knowledge. - A predicted outcome is clear.
Methods, Procedure, Investigative Plan	Concise paragraphs (not a list) describe data collection methods. These methods must: - Be in order, logical, concise, able to be repeated by another person, and include labeled drawings or diagrams as needed. - State what is going to be observed, measured, and recorded, what will change and what will stay the same. - Includes what data is gathered, tools/materials to use, what measurements to record and how accurately to do so, the number of trials to conduct, and how to reduce sources of error.
Data and Observations	- Data is described through qualitative observations and/or quantitative observations as needed. - The observations are listed and labeled. - Opinions and prior knowledge are excluded. - The data are recorded in an organized way.
Data Analysis (figures, diagrams, and explanation)	Appropriate analysis of the data is completed. Data is organized in a meaningful way. - Data is summarized, interpreted, and represented. - Figures, tables, and/or diagrams are used when appropriate. - Paragraph(s) explaining the data analysis are accompanying the data as needed.
Explanation	The explanation: - Makes a claim that answers the investigative question. - Provides selected data to support the claim. - Has reasoning that links the claim and evidence, justifies why the evidence supports the claim, makes a strong argument, and considers alternative explanations.
Mechanics	- Each of the sections is titled, bolded and in the correct order. - Report has a title and author. - Paper is written in third person voice. - APA format OR MLA format is followed consistently. - All works are cited correctly.

Corrected By: _____ Date: _____ Period: _____

Lab: Why Should I Wash My Hands?

Name: _____ Date: _____ Period: _____

Question

Does hot water remove more GloGerm than cold water?

Hypothesis

If: _____

Then: _____

Because: _____

Variables

Manipulated variable:	Control variable:
Responding variable:	Control variable:

Materials

- GloGerm
- Sink
- Timer
- UV light
- Soap
- Transparent grid paper

Procedure

- 1. Apply GloGerm to your hands. Check that you have 100% coverage with the UV light.
- 2. Wash your hands for 20 seconds using hot water. Dry your hands by blotting them on a paper towel. **Be careful not to rub your hands on the towel.**
- 3. Place the grid sheet over your hand and turn on the UV light.
- 4. Count the number of squares that have GloGerm on them and record the numbers on the data table. Be sure to count both sides of the hands.
- 5. Repeat steps 1–4 using hot water.
- 6. Repeat steps 1–4 using cold water two times.

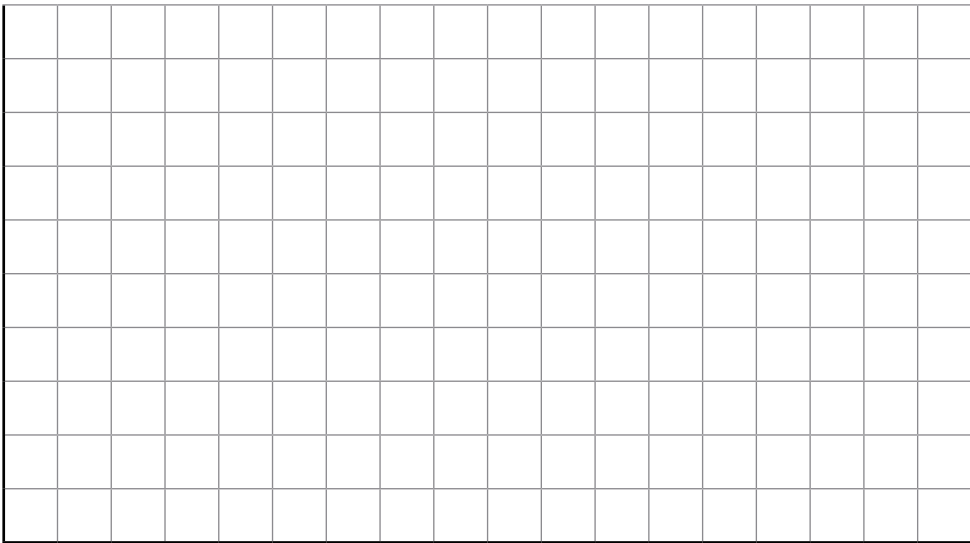
Data table

Title: _____

Trial	Palm right hand	Palm left hand	Back of right hand	Back of left hand
Hot water				
Hot water				
Cold water				
Cold water				

Data graph

Title: _____



Conclusion:

[illegible]

Lab: Why Should I Wash My Hands?

Name: _____ Date: _____ Period: _____

Question

Does using soap remove more GloGerm than using only water?

Hypothesis

If: _____

Then: _____

Because: _____

Variables

Manipulated variable:	Control variable:
Responding variable:	Control variable:

Materials

- GloGerm
- Sink
- Timer
- UV light
- Soap
- Transparent grid paper

Procedure

- 1. Apply GloGerm to your hands. Check that you have 100% coverage with the UV light.
- 2. Wash your hands for 20 seconds using soap and water. Dry your hands by blotting them on a paper towel. **Be careful not to rub your hands on the towel.**
- 3. Place the grid sheet over your hand and turn on the UV light.
- 4. Count the number of squares that have GloGerm on them and record the numbers on the data table. Be sure to count both sides of the hands.
- 5. Repeat steps 1–4 using soap.
- 6. Repeat steps 1–4 without soap two times.

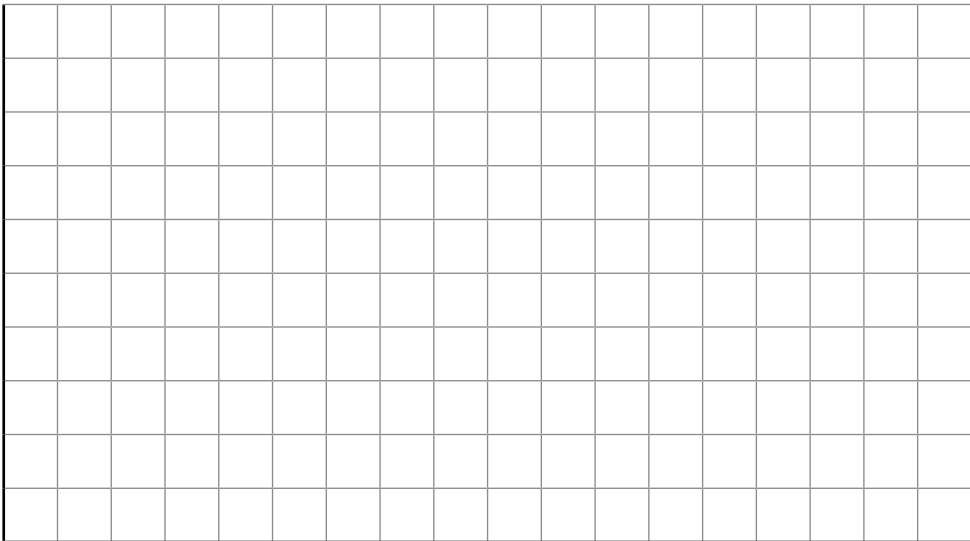
Data table

Title: _____

Trial	Palm right hand	Palm left hand	Back of right hand	Back of left hand
Soap				
Soap				
No soap				
No soap				

Data graph

Title: _____



Conclusion:

[illegible]

Lab: Why Should I Wash My Hands?

Name: _____ Date: _____ Period: _____

Question

Does washing hands for more time remove more GloGerm?

Hypothesis

If: _____

Then: _____

Because: _____

Variables

Manipulated variable:	Control variable:
Responding variable:	Control variable:

Materials

- GloGerm
- Sink
- Timer
- UV light
- Soap
- Transparent grid paper

Procedure

- 1. Apply GloGerm to your hands. Check that you have 100% coverage with the UV light.
- 2. Wash your hands for five seconds using soap and water. Dry your hands by blotting them on a paper towel. **Be careful not to rub your hands on the towel.**
- 3. Place the grid sheet over your hand and turn on the UV light.
- 4. Count the number of squares that have Glo Germ on them and record the numbers on the data table. Be sure to count both sides of the hands.
- 5. Repeat steps 1–4 with increasing times of 10, 15, and 20 seconds.

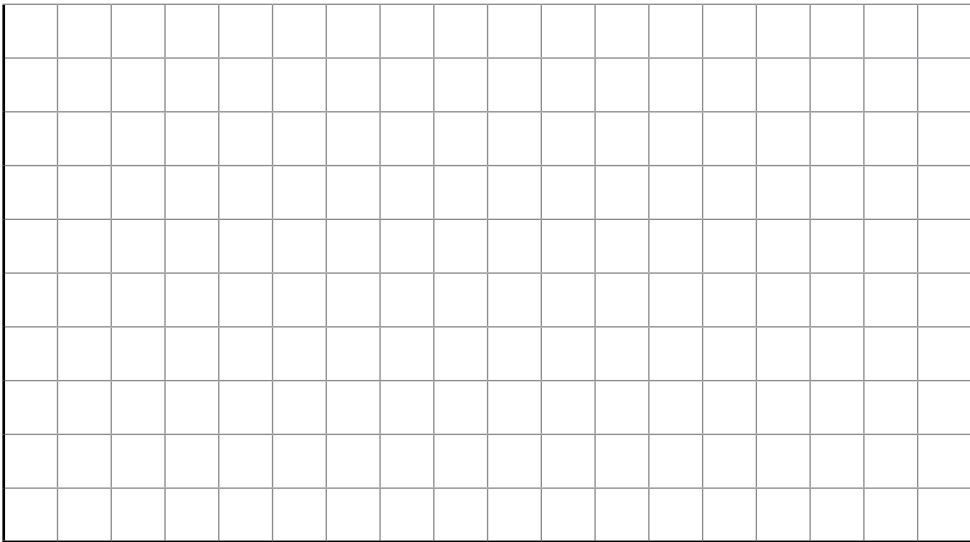
Data table

Title: _____

Trial	Palm right hand	Palm left hand	Back of right hand	Back of left hand
5 seconds				
10 seconds				
15 seconds				
20 seconds				

Data graph

Title: _____



Conclusion:

[illegible]