Germs are Everywhere: Math PreK - 2





Objectives

Students will simulate how germs spread on surfaces and from person to person through interactive group and individual activities. Students measure how germs spread with tally marks and pictographs.

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 and examples of germs that mutate. We need a new flu shot every year because the virus changes and the antibodies from previous years don't 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 that 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)

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 the mold killed the bacteria. 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 you sick. You might also become infected by scooping your cat's litter box. You can even get sick by cleaning mouse droppings in your house or garage. The best way to keep this from happening is to wash your hands often.

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

When you cough or sneeze, you send droplets into the air around you. When you're sick these droplets have the germs that made you 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 you breathe in an airborne virus, bacteria, or other germ, you may become sick. You 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 you is through food and water. E. coli is a bacteria that can be in some foods, such as hamburger that is not cooked enough. It can also be in unwashed fruits or vegetables due to waste. When you eat foods that have E. coli, you could get an illness, often called food poisoning.

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

- 1. Wash your hands often with soap and water for at least 20 seconds especially after you have used the restroom, been in a public place, blown your nose, coughed, or sneezed or handled animals.
- 2. Avoid close contact with people who are sick. If possible, keep 6 feet of space between the person who is sick and yourself. If outside your home, keep 6 feet between you and others.
- 3. Always cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow and do not spit.
- 4. Clean and disinfect surfaces that are touched daily.

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/Service s/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#dialogl d45096456

Activity 1

Grades PreK-2 Teacher Resources and Standards

Activity 1: Lots of Germs (Math)

1 50 minute class period

Students will use tally marks and pictographs to express data from a group activity. Students will count and add germs and complete a pattern using germs.

Oklahoma Academic Standards

Activity 1: Lots of Germs (Math)

- PK.N.2.4 Count up to 5 items in a scattered configuration; not in a row or column.
 PK.A.1.2 Recognize, duplicate, and extend repeating patterns involving manipulatives, sound, movement, and other contexts.
 K.N.1.2 Recognize that a number can be used to represent how many objects are in a set up to 10.
- K.D.1.1 Collect and sort information about objects and events in the environment.
- 1.N.2.1 Represent and solve real-world and mathematical problems using addition and subtraction up to ten.
- 1.A.1.1 Identify, create, complete, and extend repeating, growing, and shrinking patterns with quantity, numbers, or shapes in a variety of real-world and mathematical contexts.
- 1.D.1.1 Collect, sort, and organize data in up to three categories using representations (e.g., tally marks, tables, Venn diagrams).
- 2.N.2.5 Solve real-world and mathematical addition and subtraction problems involving whole numbers up to 2 digits.
- 2.D.1.2 Organize a collection of data with up to four categories using pictographs and bar graphs with intervals of 1s, 2s, 5s or 10s.

Materials:

- Hand sanitizer
- Clear disposable gloves
- Fine glitter (assign three colors to represent bacteria, fungi and virus)
- Activity 1 Worksheet 1 "How Many Germs?"
- Activity 1 Worksheet 2 "Germ Pictograph" (2 pages)
- Activity 1 Worksheet 3 "Count the Germs"
- Activity 1 Worksheet 4 "Complete the Pattern"
- Scissors
- Glue stick

Activity 1- Continued

Procedures:

- 1. To demonstrate how germs spread:
 - Teacher, "We are going to do an experiment to see how fast germs spread."
 - Select 2-3 students to be "sick" and squirt a good amount of hand sanitizer on their gloved hands and have them rub around (not rub it in)
 - Sprinkle with fine glitter (each student needs a different color to represent bacteria, fungi and virus). One color might be a cold, one strep throat and one ringworm.
- 2. Have all other students put gloves on and hold both hands up in the air.
- 3. Give "infected" students one minute to walk around and high five as many people in the group as they can.
- 4. To help keep order in the classroom the students who are not infected will stand still with hands up.

—Once a student has been high fived, they can high five those beside them without moving their feet.

- 5. After one minute, check to see if anyone is still "healthy" (no glitter).
- 6. If someone has managed not to high five and is still "healthy" then ask, "Is it really possible to avoid all germs without living in a bubble? Usually everyone will have multiple colors of glitter on them.
- 7. Have students try to dust the glitter off, wipe it off glitter won't usually come off and if it does, it is still on their clothes, so students can see the "germs" and how quickly they spread.
- 8. Have students stand in a straight line. Ask students to step forward by the following groups and record the results on the board:
 - a. students with no germs (no glitter)
 - b. students with one type of germ (one color of glitter)
 - c. students with two types of germs (two colors of glitter)
 - d. students with three types of germs (three colors of glitter)
- 9. Have students dispose of gloves and wash hands if needed
- 10. Using the information on the board, have students use Activity 1 Worksheet 1 "**How Many Germs**" to put tally marks in each row to count the number of students with no germs, one type of germ, two types of germs or three types of germs.
- 11. Complete Activity 1 Worksheet 2 "**Germ Pictograph**". Students will cut out the "germs" on the following page and glue them on the correct lines. There are different germ pictures to represent one, two or three germs. There is also a green circle for no germs.

Activity 1- Continued

Procedures:

- 12. Activity 1 Worksheet 3 "**Counting Germs**" is a counting and addition activity. Have students place their hands on the worksheet to reinforce left and right hands. Students will count the germs on each hand and then add the total number of germs pictured.
- 13. Have students cut out the germ pictures at the bottom of Activity 1 Worksheet 4 "**Complete the Pattern**" and glue them in the correct squares to complete the pattern in each row.
- 14. Ask students the following questions:
 - a. "How does this activity show us that germs will spread?"
 - b. "What can we do to keep germs from spreading?"

Activity 1 Worksheet 1: How Many Germs?

Name:_____

Date:



Put tally marks in each row to count the number of germs shared.

Add the tally marks to get the total for each row.

1		6	_HHT I
2	11	7	JHH 11
3	Ш	8	J##111
4		9	J##*
5	_HHT	10	

Total

No germs	
lgerm	
2 germs	
3 germs	

Which row had the most tally marks?	

Which row had the least tally marks? _

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Activity 1 Worksheet 2: Germ Pictograph

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Vame:	Date:	1100 19910
Count the 1 Cut out the Glue the cc Write the t	tally marks on Worksheet 1. "germs" on page 8 . orrect number of germs on each line below. otal at the end of each line	Total
No germs		
l germ		
2 germs		
3 germs		



Cut out germs and paste in the pictograph rows.

No germs	l germ		2 germs		3 germs	
					X	
				in the second	X	

Activity 1 Worksheet 3: Count the Germs

Name: ____

_ Date: _



Count the germs on each hand. Write the numbers in the blanks below.

Left Hand

Right Hand_



For more lessons and resources, please visit <u>www.agclassroom.org/ok</u>

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Activity 1 Worksheet 3: Count the Germs ANSWER KEY

Name:

Date:



Count the germs on each hand. Write the numbers in the blanks below.



Right Hand

ഗ



For more lessons and resources, please visit <u>www.agclassroom.org/ok</u>

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Activity 1 Worksheet 4: Complete the Pattern

Name: _



Date:

Cut out the pictures at the bottom.

Glue a picture at the end of each line to complete the pattern.





Activity 1 Worksheet 4: Complete the Pattern ANSWER KEY

Name: ___



Date:

Cut out the pictures at the bottom of the page. Glue a picture at the end of each line to complete the pattern.



