



# Minds in Motion

## Germs: They're Everywhere!

### Activity Rundown:

We all know that some services are probably “dirtier” than others: toilets, door handles, and cell phones to name a few. While they may look clean and sparkly, there’s a very good chance that these surfaces have microscopic (very, very, very, small) living organisms on them just waiting to make you sick. You may know them better as GERMS! These teeny tiny invaders are so small, you need a microscope to see them. In this activity, we’ll be capturing some of them and watching them grow.

### You will need:

- + Four pieces of white bread.
- + Four sealable plastic bags. (We recommend Ziploc!)
- + Tongs or a fork.
- + A sharpie or sticky notes for labelling.
- + Spray-bottle with water.

### Let's do it!

1. First, we should create a “control” piece of bread. Controls are used in experiments as an example of (in this case) bread that has not come into contact with any germs. It’s used to reference and compare the other samples to when the experiment is over! Using a pair of tongs, grab a piece of white bread right from the bag and immediately place it into a sealable bag. Make sure not to touch this piece with your hands or let it touch anything besides the plastic bag!
2. Add one spritz of water to the bag and seal it tight. Use a sharpie to label the bag as your “control”.
3. Now it’s time to decide the other three germ-y surfaces you want to test! This step is really up to you, but here are some of our favourites:
  - Dirty hands
  - Cell phones
  - Just cough directly on it!



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- TV remotes
  - Door handles
  - Kitchen or bathroom counters
  - Keyboards
  - Light switches
4. For each surface you pick, take one piece of white bread and rub one of its faces across the item.
  5. Once you have rubbed it on a surface or item, place the bread into a sealable bag, add a spritz of water, seal it up, and make sure to label it! (If you decided to rub the bread on dirty hands, label the bag as “dirty hands”.)
  6. Once you have all four bread samples sealed and labeled, pick a dark, warm place for them to rest. A cabinet or a room with small windows works perfectly!
  7. Make some predictions! Which piece of bread will grow the most germs? Which surface do you think was the cleanest? Make sure to write your predictions down so you can look back at them when the experiment is complete.
  8. Allow the bread to sit for 3-4 weeks to see the best results, but check back every few days. It takes time for the germs to show, be patient!
  9. Compare your predictions to the results. Which surface was the dirtiest? Which was the cleanest? Do these results surprise you at all?



Once the experiment is over, the pieces of bread can be placed right into the compost or garbage.



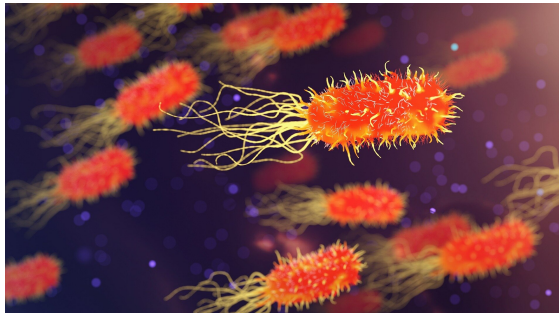
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## Background:

Germes are found all over the world, in all kinds of places! The four major types of germes are **bacteria, viruses, fungi, and protozoa**. They can invade plants, animals, and people, and sometimes they can make us sick.

- **Bacteria:** While humans have trillions of cells, these are tiny **single-celled organisms** that get nutrients from their environments. **But not all bacteria are bad.** Some bacteria are good for our bodies! Good bacteria live in our intestines and help us use the nutrients in the food we eat and make waste from what's left over. Some bacterias are even used in laboratories to make medicine!



*Microscope image of escherichia coli bacteria.*

- **Viruses:** These are even smaller than bacteria, they aren't even a full cell! Viruses need to use another cell's structures to reproduce, meaning they can't survive unless they're living inside something else. Once living in a body (human, cats, horses, plants...) they quickly multiply to make that body sick.



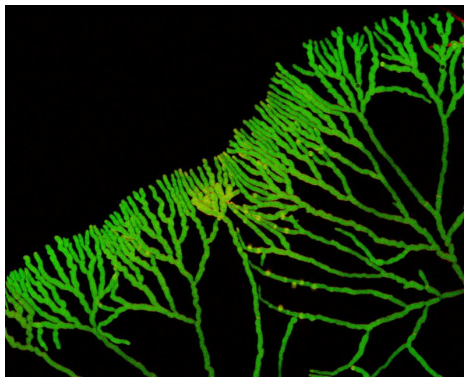
*Microscope image of a phage virus.*



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- **Fungi:** Despite their name, these guys aren't very much fun at all! They're multi-celled plant-like organisms, but unlike other plants they can't make their own nutrients from soil, air, and water. Instead, they get their nutrition from plants, people, and animals. They love to live in damp, warm places, and many fungi are not dangerous in healthy people.



*Microscope image of a neurospora fungi.*

- **Protozoa:** Bigger than bacteria, these one-cell organisms love moisture and often spread diseases through water. Some protozoa are parasites, meaning they need to live on or in another organism (like an animal, plant, or person) to survive.



*Microscope image of a didinium protozoa.*



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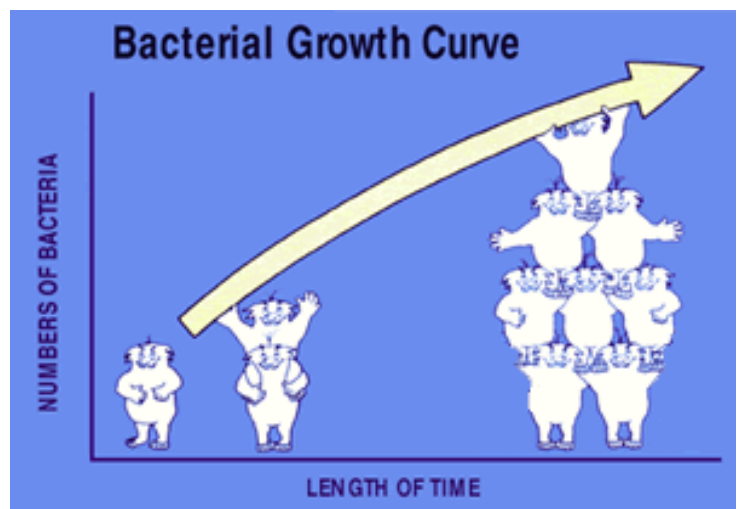


**How to protect yourself against germs:**

- ★ Wash and scrub your hands often with soap and water for at least 20 seconds!
- ★ Cover your nose/mouth when you cough or sneeze!
- ★ Routinely clean any germ surfaces like toilets, counters, phones, and more!
- ★ Drink, swim, and play in safe and clean water!
- ★ Many, many more! Check out this website for more information on how germs spread: <https://www.cdc.gov/handwashing/when-how-handwashing.html>

**How do the germs grow on the bread?**

- Two of the ingredients used to make bread include yeast and sugar that germs love to feed on. With this awesome source of food and a warm, moist environment, germs will flourish when given the proper amount of time!
- Happy germs will keep dividing (one bacteria will become two, two will become four, four become eight, so on and so forth) and overtaking the piece of bread as long as there's enough nutrients and space to go around.



**Fun (?) facts about germs:**

- Germs can survive for up to three hours on your hands.
- The number of germs on your fingertips doubles after you use the toilet.
- One germ can multiply into more than 8 million germs in just one day.
- One in five people don't wash their hands, and of those that do, only 3 out of every 10 people use soap.
- Covid-19 is a part of a larger family of viruses known as the coronaviruses. Keep you and your loved ones safe by washing your hands, practicing social distancing, and avoiding touching your face. Find out more about COVID-19 by following this link: <https://www.canada.ca/en/public-health/services/diseases/coronavirus-disease-covid-19.html>



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## **Take this experiment further!**

Repeat this experiment and test the importance of washing your hands! Keep one piece of bread as your control and touch the other three remaining pieces with dirty unwashed hands, hands that have been cleaned with soap and water, and hands that have been cleaned with hand sanitizer! What do you think the outcomes will be?

## **Reach out!**

We would love to hear from you about all the amazing STEM projects you are doing at home! Show us your finished products on any of the following social media platforms by tagging us or by using the following hashtags. We hope these projects have brought some excitement to your day during these difficult times.

Let us know how we did! Please [click here](#) to fill out a short survey on how well we did and what you would like to see more of in the future. Thank you!

Twitter: **@MyMindsInMotion**

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Please use the following hashtags!

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