

Question: Test the 5 second rule and see how the different types of bacteria change based on location and determine the best way to avoid bacteria.

How? I will take a cotton swab and put it on the surface that I am testing. I will do this twice, once with the swab on for 2 seconds and the other for 5 seeing how much 3 seconds can affect the bacteria levels.

Materials: Petri dishes, Agar Agar powder, cotton swabs, surfaces.

Surfaces to test and why

Your kitchen counter-even though we clean it we don't clean it each time and bacteria can grow there because it's moist and warm.

Kitchen table- this is what we eat off of and where we constantly drop food and still eat it

Your phone-you don't wash your phone often at all and we are always touching our phone putting bacteria from all over our body on it

A door handle-touched by many people who could have a cough for example and then that bacteria can be spread

A public street-a public street is notably not very clean as that is where we walk and garbage ends up there some people also spit out gum or just spit on the street spreading even more germs

A toilet-a toilet is a publicly shared object so it is exposed to a lot of bacteria

Floor- I will test the floor as food is very often dropped there and eaten.

My hypothesis: It is hypothesized that the bacteria levels will change based on the time it is exposed to new bacteria. It's hypothesized that the dirtiest will be a phone due to the fact that it's not cleaned nearly as often as the other surfaces, and that the cleanest surface will be the toilet because it is consistently cleaned to remain hygienic.

My Procedure: In order to grow the bacteria petri dishes that come pre-sterilized and agar agar powder is required, and will be used to make agar plates. To prepare the agar agar plates first use a clean pot. Add 150ml of water then stir in 2 tablespoons of agar agar powder until completely dissolved. The mixture should have a light brown color to it. Next, heat the mixture for 4 minutes. Pour the mixture into the petri dishes fast while keeping the stove on low heat to make sure the mixture does not harden in the pot. After pouring the agar powder into your petri dishes allow them to cool and set overnight. Then introduce the bacteria by taking a cotton

swab to the surfaces and then swiping it over the agar plates. For best results get the agar plates as smooth as possible.

Conclusion-

The original hypothesis was incorrect as it stated that the phone would be the dirtiest due to it being consistently touched by many different people therefore being exposed to many different types of bacteria. This experiment is still ongoing but so far the public street has the most bacteria and it has grown a black fuzzy mold. The hypothesis is correct in some ways as the toilet seat is currently the cleanest surface tested.

Application-

This experiment is relevant to today's world as children are told about the five second rule when it is used as an excuse to eat a piece of food that has fallen on the floor or a surface alike. We need to stop telling young people that it is okay to eat food that has been dropped on any surface as long as it is less than 5 seconds. This harms all people especially children, seniors, and people with weakened immune systems, as so much bacteria is consumed they get sick and for certain people it can even be fatal from simply eating their lollipop that they dropped.

Analysis-

Looking at the data from different surfaces, I have discovered that some of the areas we often deem as clean, and safe to eat off of, are the exact opposite. The toilet is one of the yuckiest places anyone can think to eat off of, but my experiment has proven that it contains less bacteria than the floor, or a regular kitchen counter. I believe that the results are what they are because we cook, bake, play with stuff on our kitchen counter therefore introducing a lot of different contaminants that can then be transferred onto our food, hands, even cutlery. We then consume this bacteria. Whereas we keep surfaces such as the toilet super clean. This causes it to have less bacteria and less likely for you to consume the germs on the toilet seat.

Date experiment started: January 7th 2026

Observations

January 7th- Project started. The sample was introduced and was placed in a warm dark place to give bacteria its best environment to grow. No bacteria is visible to the naked eye.

January 8th- No bacteria is visible to the naked eye

January 9th- No bacteria is visible to the naked eye

January 10th-no bacteria visible to the naked eye

Jan 11- some dirt and stuff visible

Jan 12- the street is starting to grow black fuzzy bacteria

Jan13- bacteria is appearing on most of the samples

Jan 14- I was not at home so i dont know the state of the bacteria

Jan 15- some white splotches are appearing on the phone and table
Jan16- the black on the street sample is growing
Jan 17- The street sample has a good amount of black fuzzy bacteria
Jan18- The toilet has minimal bacterial growth
Jan 19- The street has the most bacteria so far
Jan 20- The kitchen counter is looking to grow more white blotches
Jan 21- There is growth on all samples
Jan 22- Samples have not had visible change
Jan 23-The phone has a good amount of bacterium growth
Jan 24-the floor appears to be growing the same black stuff as the road
Jan 25- The floor appears to be 2nd dirtiest
Jan 26- The kitchen counter has progressing white spots
Jan 27-There is more fuzz on the street
Jan 28-Toilet is still the cleanest
Jan 29-The most sanitary is toilet and the least sanitary is street

Sources of error

One of the sources of error in this project was that some of the agar touched my fingers which can lead to additional bacteria growing. I was also away from home for a day and was unable to record my observations from that day. One of the biggest sources of error was that one of my petri dishes fell and shattered so I was unable to have both samples for the kitchen counter as I was unable to make more agar plates.

Research

- 4 million people annually get food poisoning with 11,500 hospitalized and 3000 die approximately.
- Carpet is the safest surface to eat the food after it has been dropped
- Most people are inclined to eat something sweet off the floor then items like vegetables.
- Dry food such as toast is less of a bacteria magnet then watermelon for example.

What is the 5 second rule?

The 5 second rule is a commonly heard of myth. It states that if you drop a piece of food on the floor that germs and bacteria won't actually contaminate the food for 5 seconds. This rule has

been heard of by many. While nobody ever seems to question it but instead accept it as fact. This rule was said to have come from Genghis Khan because food that was made for him was fine for anyone else to eat no matter where it was dropped so if the food was dropped you would leave it there until he told you that you can pick it up and you have to eat it. Later on people started to look at bacteria and microorganisms and people learnt that you can't always see what is on your food. So people started to be more conscious about germs on food. The infamous rule gained popularity when Julia Child said on a TV show that "You can always pick it up if you're alone in the kitchen. Who is going to see?" This then started the twenty second rule which turned into ten then finally the well known five second rule.

What makes the perfect happy little home for that unwanted bacteria? All bacteria need the same basic necessities as humans to stay alive, those being water, food, and shelter. For bacteria to grow it needs to have a source of water as about 70% of a bacterial cell is made out of water. Unlike humans bacteria can not ingest its own water so if bacteria is in a dry place it cannot live long and is unable to reproduce. Bacteria need nutrients to survive and thrive so if it is unable to get enough nutrients it will be unable to survive long. Bacteria may be strong but just like you and me it needs a place to live if it doesn't have those homes or food it can't survive without. So the best place to grow some nice little bacteria outside your body or food is, a warm, damp, dark environment with a source of nutrients and water.

When we are young we hear about the five second rule when people around us drop their food and pick it up. They then state less than five seconds it's all good they might blow it off and then eat it. So we start to do that too. Most times when the five second rule is used it is for a sweet. We are more likely to pick a sweet treat up off the floor over a vegetable. Little do most know 4 million people annually get food poisoning with 11,500 hospitalized and 3000 die approximately. But if you are going to eat food that fell on the floor, carpet is the safest to eat off. As a bacterial cell needs water to survive, a piece of juicy fruit like watermelon is more of a bacteria magnet, rather than your piece of toast.

[Is the 5-Second Rule for Food Real?](#)

[The Origin Of 'The Five-Second Rule'](#)

[Is the five-second rule true? Don't push your luck. | Popular Science](#)

[What Three Conditions Are Ideal For Bacteria To Grow?](#)

[Table 2-3. The Approximate Chemical Composition of a Bacterial Cell - Molecular Biology of the Cell - NCBI Bookshelf](#)