

Experiment 3

Grow your own microbes

Summary

Do you know where microbes live? What conditions are needed for them to survive and grow? In this experiment, you will learn how to grow your own microbes and find out which areas of the school are “clean” or “dirty”.

Microbes need food and water to grow. Whilst microbes are very small, they can grow into big “colonies” which we can see easily. In this experiment, microbes eat the bread and grow into large colonies. The number of colonies which grow is dependent on how dirty a surface is.

Learning objectives

1. Use basic techniques to sample surfaces to find out which areas are clean, and which are dirty
2. Understand the conditions needed for microbes to grow

Materials

There are two different approaches to this experiment. The “basic” experiment (method 1) is easiest; the materials can be purchased at any supermarket. The advanced experiment (method 2) requires more planning but will provide better results and will allow students to sample more areas (e.g. the mouth, fingertips etc).

Method 1 (basic) materials:

- Sliced bread (the cheaper the better) (*Pain en tranche (le moins cher possible)*)
- Sterile water (boil the water in advance to sterilise it then allow to cool) (*Eau stérilisée (faire bouillir l'eau en amont et la laisser refroidir)*)
- Transparent sandwich bags (*Sacs de congélation*)
- Permanent marker pen (*Feutre permanent*)

Method 2 (advanced) materials:

- Agar plates (*plaques de gélifiant/gélose*) – use these instead of bread **à utiliser à la place du pain**
- Sterile water (*Eau stérilisée*)
- Cotton buds (*Coton tige*) – these are used to sample surfaces (*Utilisés pour les prélèvements de surface*)

- Sellotape (*ruban adhésif*)
- Permanent marker pen (*feutre permanent*)

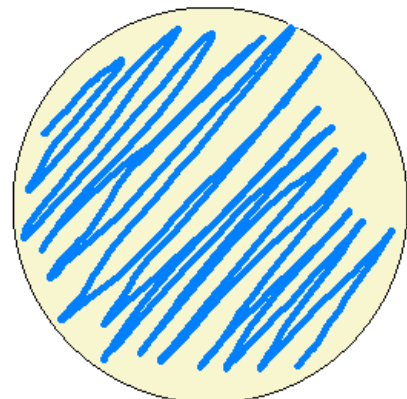
Method 1 (basic)

1. Create a results table (example on next page) with the students and predict which areas will be the most dirty/clean.
2. Use water to wet the slice of bread
3. Wipe bread across the surface. For hands, wipe hand across the bread.
4. Place bread in sandwich bag and label with pen
5. As a “control”, wet some bread and place in a bag **without** wiping a surface.
6. Tie bags shut and place in warm dark area (e.g., near a radiator) for several days. Check bread each day to see if mould has grown. It should look like the picture below after a few days.
7. Examine the bread and record results in the table. Discuss which areas were dirty and which were clean

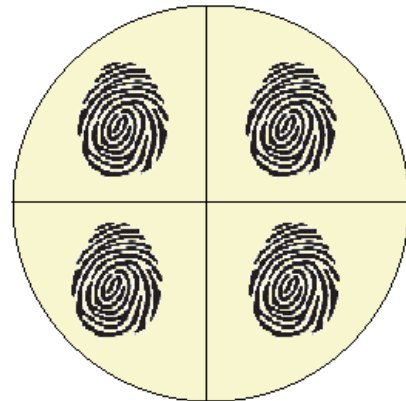


Method 2 (advanced)

1. **Tip: write on the agar side of the plate when marking plates (not the lid).**
2. Create a results table with the students and predict which areas will be the most dirty/clean.
3. Wet the cotton bud with the water and then wipe cotton bud across the surface being sampled. Twist whilst you wipe to make sure the whole cotton bud is covered with microbes



4. Remove lid from agar plate. Wipe cotton bud across entire surface of the agar using a “zigzag” pattern (**diagram on the right**)
5. For fingers: use marker pen to divide plate into four sections. Students place a finger on the surface of the agar and press down gently (**diagram on the right**).
6. Seal plates with Sellotape and place in warm dark place for 24-48 hours. Observe plates and record the results
7. **DO NOT remove the Sellotape or open the plates. Bacteria/fungi are dangerous and can cause infections**



Example results table

Area	Predicted number of microbes OR “rank” (1 = most microbes)	Actual number of microbes OR “rank”
Toilet	1	4
Desk	5	5
Book	6	6
Puddle	3	3
Floor	2	2
Hands (before washing)	4	1
Hands (after washing)	7	7

Student's paper



Experiment 3 - Grow your own microbes

Materials

I will need:

- Sliced bread (the cheaper the better)



- Sterile water (boil the water in advance to sterilise it then allow to cool)



- Transparent sandwich bags



- Permanent marker pen



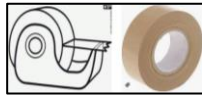
- Agar plates – use these instead of bread







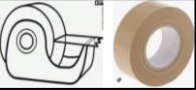


- Cotton buds – these are used to sample surfaces



- Sellotape

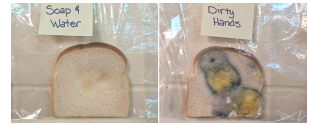


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Method

Method 1 (basic)







1. Predict which areas will be the most dirty/clean. Write in your book...
2. Use water to wet the slice of bread.
3. Wipe bread across the surface. For hands, wipe hand across the bread.
4. Place bread in sandwich bag and label with pen.
5. As a “control”, wet some bread and place in a bag **without** wiping a surface.
6. Tie bags shut and place in warm dark area (e.g., near a radiator) for several days. Check bread each day to see if mould has grown. It should look like the picture below after a few days.
7. Examine the bread and record results in the table.
8. Discuss which areas were dirty and which were clean.



Method 2 (advanced)

1. Tip: write on the agar side of the plate when marking plates (not the lid).
2. Predict which areas will be the most dirty/clean.
3. Wet the cotton bud with the water and then wipe cotton bud across the surface being sampled. Twist whilst you wipe to make sure the whole cotton bud is covered with microbes.
4. Remove lid from agar plate. Wipe cotton bud across entire surface of the agar using a “zigzag” pattern. 
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Results table

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....			