SASTA OLIPHANT SCIENCE AWARDS

SOUTH AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

Prize Winner

Scientific Inquiry

Year 3-4

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Grange Primary School

Which everyday objects have the most bacteria?

Cameron Pearce and Tomi Morea

QUESTIONING AND PREDICTING:

What is the question that you are investigating?

Bacteria are small organisms that are found in all natural environments. Most can only be seen with a microscope as they are only a single cell. More than 100 trillion bacterial organisms live inside our gut, both good and bad. The helpful bacteria breaks-down nutrients from food, medicine and protect against diseases. Bacteria that cause diseases can get into the human body through your nose, mouth, and cuts in your skin. Bacteria quickly reproduce and cause infection. We can spread the bad bacteria by touching infected surfaces, body fluids and faeces, spreading bacteria in the air by coughing or spitting.

We are interested to know which surfaces around our house and the kind of environment that bacteria like to grow best. Our question is **"Which everyday objects have the most bacteria?"**

What do you predict will happen?

We will test 8 different surfaces and our predictions from most to least bacteria are:

1. Toilet seat
2. Bathroom faucet/sink
3. ipad
4. Car Keys
5. Steering wheel
6. Nintendo Switch Remote
7. Door knob
8. Light switch

We predict the toilet seat will have the most bacteria because when we go to the toilet the bacteria from our bottom falls onto the seat. The light switch will have the least as we don't use it often.

Bacteria might grow best on surfaces that are damp. Surface that we touch or use a lot would probably have more bacteria from our hands and body fluids.

PLANNING AND CONDUCTING:

Explain why you chose the particular method for your investigation.

To investigate our question we need to make Agar plates which are used a lot in science labs. They contain Agar and nutrients which makes a solid surface for the bacteria to grow on. Most bacteria divide to form two separate cells. These divide again and billions of bacteria can form from a single bacteria in only 24 hours. When bacteria grow on the Agar they form colonies which we can count without a microscope.

Which variable will you change?

The variable that we will change is the object/surface being tested (see predictions).

Which variable will you measure?

The variable that we will be measuring is the number of bacteria colonies.

Is your investigation a 'fair test'?

The investigation is a fair test because only one independent variable (object/surface) is changed and all the controlled conditions (temperature, light, air conditions, plates, time they will grow) are kept the same. A control plate is used to show it is the surfaces causing bacteria to grow not the conditions.

Describe all the steps of your investigation so that someone else could do it again exactly as you did it.

Methods:

Wash your hands and any materials you'll be using to help prevent germs from contaminating your experiment.

How to prepare 9 Agar plates:

Need adult supervision/help!

1. Wash and dry the petri dishes. Cover them with lids.
2. Add 2 cups of water to a pot and bring it to boil on the stovetop.
3. Add 2 teaspoons each of beef stock, sugar and agar to the boiling water. Stir until dissolved.
4. Take the mixture off the heat and allow it to cool for a few minutes.
5. Remove the lids from the petri dishes and fill each dish halfway with the mixture. Replace the lids and leave space for moisture to escape as the mixture cools.
6. Refrigerate your covered petri dishes for at least four hours to allow the Agar to set and ready to use.

Collect bacteria samples:

1. Wipe the iPad screen with a damp, clean cotton swab.
2. Open one petri dish and lightly rub your sample across the agar in a zig zag pattern (use the same pattern for all tests). Dispose of the swab.
3. Replace the lid on the dish and tape it closed.
4. Label the dish with the date and sample. place it into a sealed plastic bag and set aside.
5. Clean the surface of the iPad.
6. Repeat steps 1-4 in your second Petri dish with a new surface and keep doing this for all dishes.
7. Set up a control plate where you do not wipe anything on the surface.

Incubate the bacteria colonies:

1. Place your petri dishes upside down inside a box and close the lid.
2. Place the box near a warm spot. We put the computer modem on top of the box.
3. Leave them to incubate for 3 days.
4. Remove the petri dishes from the box. Count the number of bacterial colonies growing on each plate and describe them using the charts for morphology of bacterial colonies.
5. To dispose put all bags with dishes in a biological waste bag.

EQUIPMENT AND MATERIALS:

List all the equipment and materials that you used in your investigation.

Materials:

- 9 Petri dishes
- 2 teaspoons beef stock powder
- 2 cups water
- 2 teaspoons sugar
- 2 teaspoons Agar powder
- Pot
- Spoon
- Stove
- 9 sealable plastic bags
- Clear tape
- Permanent marker
- Cotton swabs
- Box
- Modem

List any possible risks that may result from the investigation and describe how they were controlled.

Biological Risk- We are working with bacteria and mould and could get infected or sick by the germs. We controlled this by not touching the bacteria, taping the lids on the plates, keeping them in bags only opened by adults, cleaning areas with antibacterial spray and disposed of the plates in biological waste bags.

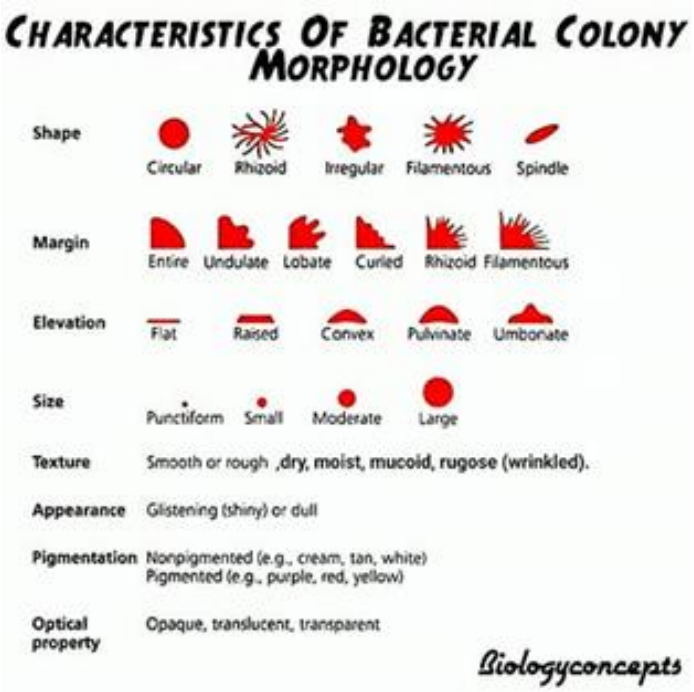
Thermal Risk- We are working with a stove and risk getting burnt by the fire. We controlled this by not putting our face or hands close to the stove and an adult turned it on/off.

PROCESSING AND ANALYSING DATA AND INFORMATION:

3 days after we set up our plates we counted the bacteria colonies and wrote down what we could see using these charts.

Colony Morphology of Bacteria

MARGIN	COLOUR	ELEVATION	TEXTURE	SHAPE
Curled	Orange	Raised	Slimy, moist	Round
Entire (smooth)	Red or pink	Umbonate	Matte, brittle	Punctiform
Filamentous	Black	Flat	Shiny, viscous	Rhizoid (root-like)
Undulate (wavy)	Brown	Convex	Dry, mucoid	Filamentous
Lobate	Opaque or white	Pulvinate (Cushion-shaped)	Translucent	Irregular
Erose (serrated)	Milky	Growth into culture medium	Iridescent (changes colour in reflected light)	Spindle



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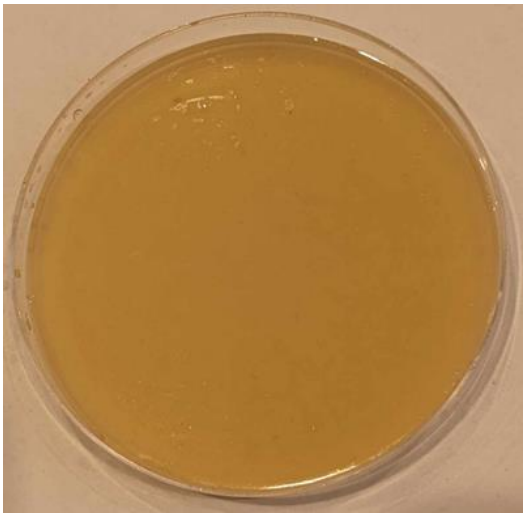
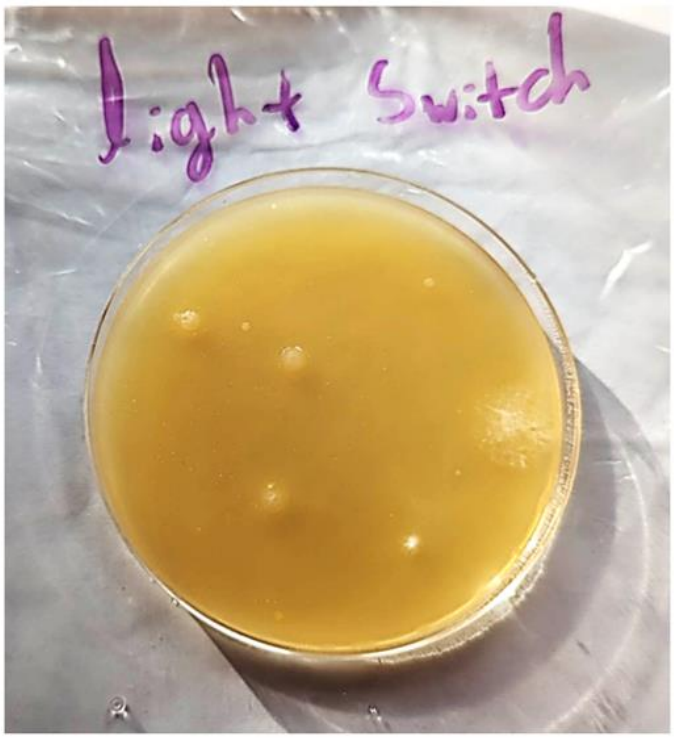
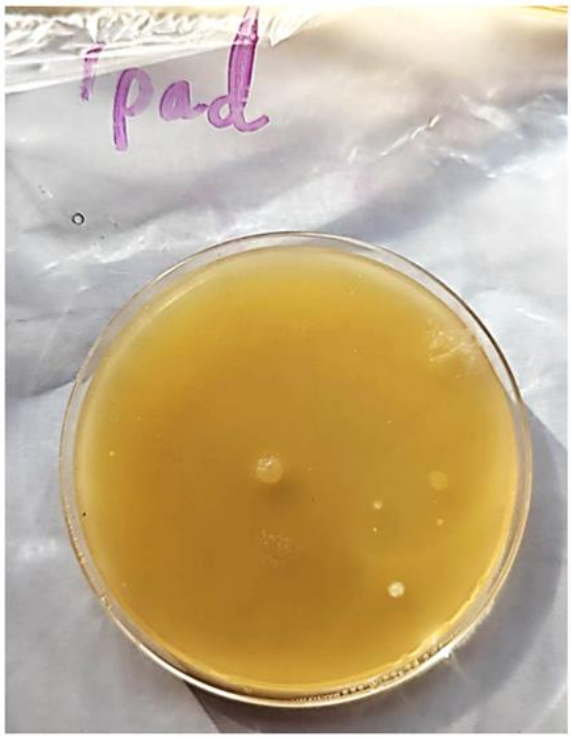


Control plate- shows no bacteria so the conditions such as air and agar dish did not cause bacteria to grow.

Bacteria growing on Agar plates 3 days after wiping the surfaces

Bacteria growing on our Agar plates 3 days after wiping the surfaces





RESULTS: Day 3 observations of each of the Agar plates

Surface	Approximate number of bacteria colonies	Size	Shape	Margin	Colour	Elevation	Texture
Bathroom faucet	Confluent (all grown together)	Dish Mostly covered	Irregular	Entire	Opaque	Raised	Shiny, viscous
Toilet Seat	Hundreds many many hundreds	Punctiform and small	Circular	Entire	White and opaque	Convex	Shiny, viscous
Car keys	91	Moderate	Circular	Entire	Opaque	Pulvinate	Translucent Shiny, Viscous
Steering Wheel	120	Punctiform and Small	Circular	Entire	Milky	Convex	Shiny, viscous
Light switch	11	Punctiform x5 Small x 3 Large x3	Fungus x 1 Circular	Entire	Milky, white	Pulvinate	Shiny, viscous
Ipad	9	Punctiform x 6 Small x 2 Large x 1	Fungus x 1 Circular	Entire	Opaque, white	Pulvinate	Shiny, viscous
Nintendo Switch Game Control	4	Punctiform	Circular	Entire	Opaque, white	Flat	Matte
Door knob	1	Punctiform	Circular	Entire	white	flat	Matte

Our table shows many different sizes and numbers of bacteria colonies growing on each of the surfaces.

Our conclusion from our results is that these surfaces have the most to least bacteria:

1. **Bathroom faucet and sink-** Had the most because the plate was covered all over with confluent bacteria.
2. **Toilet seat**- Hundreds of punctiform and small circular bacterial colonies.
3. **Car keys**- 91 moderate circular bacteria colonies.
4. **Steering wheel**-120 punctiform and small circular bacterial colonies. More colonies than the keys but were a lot smaller so we thought the keys had more overall bacteria.
5. **Light switch**-11 bacterial colonies (5 punctiform, 3 small, 3 large circular). Also has 1 fungus.
6. **iPad** –9 colonies (6 punctiform, 2 small, 1 large circular). It has 1 fungus.
7. **Nintendo control**-Only 4 punctiform circular bacteria colonies.
8. **Door-knob**-Only 1 punctiform circular colony.

We thought that the toilet seat would have the most bacteria but our results didn't show this. The bathroom faucet/sink had more bacteria that the toilet seat which is similar to a study we found that took samples from surfaces in a public toilet. The sink was top of their list with more than 100 colony forming units. The bathroom faucet/sink has the most bacteria because it has all our spit from when we brush our teeth, and bacteria from when we wash our hands.

We noticed that the top two surfaces with bacteria are used a lot and are in a moist environment which bacteria like to grow in.

We thought the iPad would have more bacteria, because Cameron uses it a lot but maybe he just cleaned it. The door knob may have been cleaned too as it had the least bacteria.

EVALUATING:

How could your investigation be improved?

We could improve our experiment by using a microscope to have more clear results of numbers. But we would need an expert.

How could your findings be useful to others?

This information helps us understand which objects grow the most bacteria and which need to be cleaned more often so that we don't get germs and get sick when we touch them.

What other related questions could be further investigated?

What are the different kinds of bacteria and fungus that grow on each of these different surfaces? It would be good to learn their proper names.

REFERENCES:

https://kids.kiddle.co/Agar_plate

https://www.mi-sci.org/learn/families/athomescience/

https://kids.britannica.com/kids/article/bacteria/352814

https://www/germinator.com/blog/how-do-germs-spread-on-surface/

https://www/studocu.com/en-ca/document/university-of-toronto/biology/2022-lab-2-microbes-i-worksheet-1/29277689

https://www.infectioncontroltoday.com/view/study-shows-bathroom-sink-more-contaminated-toilet

Word count: 1096

Which Everyday Objects Have The Most Bacteria?

What are we planning to do?

We are planning to dab cotton buds on ~~ten~~ eight different everyday surfaces, then to wipe the bacteria from the cotton buds on agar plates. When done we will put the agar plates into an incubator, then to see which surface has the most bacteria.

Surfaces we will be testing.....

- Toilet Seat
- door knob
- ~~phone~~ Ipad
- bathroom faucet + Sink
- Steering wheel
- light switch
- Switch remote
- Car keys

We are interested to know which surfaces and the kind of environment that bacteria like to grow on best. They might like to grow best on surfaces that are damp and the surfaces that we usually touch or use a lot would probably have [redacted] more bacteria from our hands and body fluids. This would help us understand which surfaces probably need to be cleaned most often so that we don't get germs and get sick when we touch them.

Surface Variable - This is what we will be changing. 4/6/23

We think the keys for my dads car will have a decent amount of bacteria.

I think it will have a decent amount of bacteria because every time you drive the car you touch the car keys.

We know ~~think~~ that Cameron plays Nintendo switch a lot and never washes his hands before playing.

And also when ever we plays just dance our sweat goes into the remote!

Camerons dad\~~mom~~ car has a lot of bacteria because every time he drives the car he touches the steering wheel, and he probably doesn't wash his hands before driving the car.

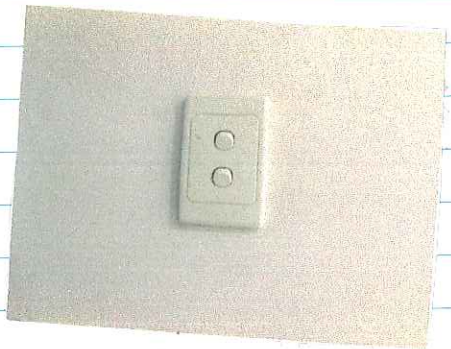
We ~~dont~~ desipitely ~~know~~ think that the tidet seat has the most bacteria because every time we have to go to the toilet we sit down, or stand up and all the bacteria from our bum falls down into the toilet seat.

4/6/23

faucet + Sink

We think the ~~toilet~~ will have a lot of bacteria because it is being used all the time to wash peoples hands, and where we spit our spit.
That's why we think the toilet & faucet will lots of bacteria.

The door handle will have a quite normal amount of bacteria because this is the door to the kitchen, and we have to clean our hand before going into the kitchen.



The light ~~switch~~ switch would have a ~~decent~~ bit ~~amount~~ of bacteria because you don't normally turn the light off & on much ~~and that means that the light doesn't usually get turned on much~~

The ipad would have a lot of bacteria because we use it a lot for school and for gaming.

3

What We Think

9.6.03

most bacteria from most to least.

1. Toilet
2. bathroom faucet + sink
3. Ipad
4. keys
5. Steering wheel
6. 'Nintendo' 'Switch remote'
7. 'door knob' ....
8. 'light switch'

most ↕ least

The dependant variable that we will be measuring is bacterial growth.

In order to test our question we need to try and make some agar dishes to grow the bacteria on.

Agar plates are a Petri dish that contains agar and some nutrients for the bacteria to grow bacteria. When bacteria grow on the agar plate they form colonies. Each colony has similar genetic characteristics.

The investigation is a fair test, as only one variable (the independant variable - the different surfaces tested) is changed and all other conditions (controlled variables - for example the temperature, light, air conditions, agar plates, time they will be grown, are kept the same.

The dependent variable measured or observed is bacterial growth. We also set up a control plate that did not have anything Wiped onto it so that we knew that it was the surface that was causing the bacteria to grow, not the conditions.

What We Need.....

9.6.23

From https://www.mi-sci.org/learn/families/athomescience/

Materials:

- Petri dishes or serval condiment cups with lids.
- 1 teaspoon of beef stock powder or beef bullion.
- 1 cup of water.
- 1 teaspoon of sugar.
- 1 teaspoon of agar powder ~~or gelatin~~.
- Spoon
- ~~two~~ sealable plastic bags/clear tape for each dish.
- permanent marker or felt-tip pen.
- 2 cotton swabs per dish.
- medium sized cardboard box.
- A helpfull adult.

Pot / Oven

How to prepare an agar plate.....

Note: Sanitation is very important in this experiment! Though you won't reach completely sterile conditions while experimenting at home, it's important to wash your hands, the counter and any materials you'll be using thoroughly. This will help prevent germs from entering your petri dish and contaminating your experiment.

1. After Washing and drying the petri dishes or condiment cup's, Cover them with the lids.
2. With the help of your adult, add the cup of water to a pot, and bring it to a boil on the Stovetop.
3. Add the beef stock powder, Sugar, and gelatine to the boiling Water. Stir until dissolved.
4. Take the mixture off the heat and allow it to cool for ten minutes.
5. Remove the lid from the petri dish, and with the help of your adult, feel each petri dish half-way with the mixture. Quickly Set the lid atop each petri dish, leaving for moisture to escape ast the mixture cools.
6. Refrigerate the covered dishes for ~~atleo~~ at least four hours, to allow the agar to set.
7. Keep plates refrigerated till ready to use.

Setting up some test plates to see if we can grow bacteria. S 16 123

- we followed the methods to prepare some agar plates.
- in step 4, it says to allow to cool for 10 minutes before pouring the solution in the petri dishes. But the agar was starting to become solid by 10 minutes. So we remelted it to liquid, so it only needs to wait a few minutes before pouring.
- We poured 3 plates and put it in the fridge overnight.

We typed this on a computer ↓

What is Bacteria?

Bacteria are small organisms, or living things, that are found in all natural environments , for example, soil, water, plants, animals, radioactive waste. Most can only be seen with a microscope as they are made of a single cell.

Bacteria do not have most of the structures found in the cells of other organisms. They are much simpler and smaller than all other cells of living things.

Bacteria take in food and get rid of waste through their cell walls. Most bacteria reproduce by dividing down the middle to form two separate cells. These cells then each divide again to form into four cells. Through this process, billions of bacteria may form from a single bacterium in only 24 hours.

Right now, there are more than 100 trillion bacterial microorganisms in your body, both good and bad, that are living inside the gut of our stomach. The helpful bacteria helps break down nutrients from food, break down medicine and protect against diseases. But when the body gets too much bacteria in our gut, they need to fight them off to keep healthy.

Bacteria that cause diseases can get into the human body through the nose, the mouth, and cuts in the skin. Bacteria quickly reproduce and cause infection. We can spread the bad bacteria by touching infected surfaces or foods, bodily fluids, spreading bacteria in the air by coughing or spitting and contact with faeces.

https://kids.britannica.com/kids/article/bacteria/352814

https://www.germinator.com/blog/how-do-germs-spread-on-surfaces/

9/6/23

- How to collect bacteria samples.

-1, Wipe the screen of the ipad with a clean cotton swab.

-2, Open the petri dish, and lightly rub your sample across the agar in zig zag patterns. Dispose of the cotton swab after use.

-3, Replace the lid on the petri dish, and tape it closed.

4, Use a marker to label the dish with the date and the date and the name of the sample. Place the plate in a sealed plastic bag and set aside.

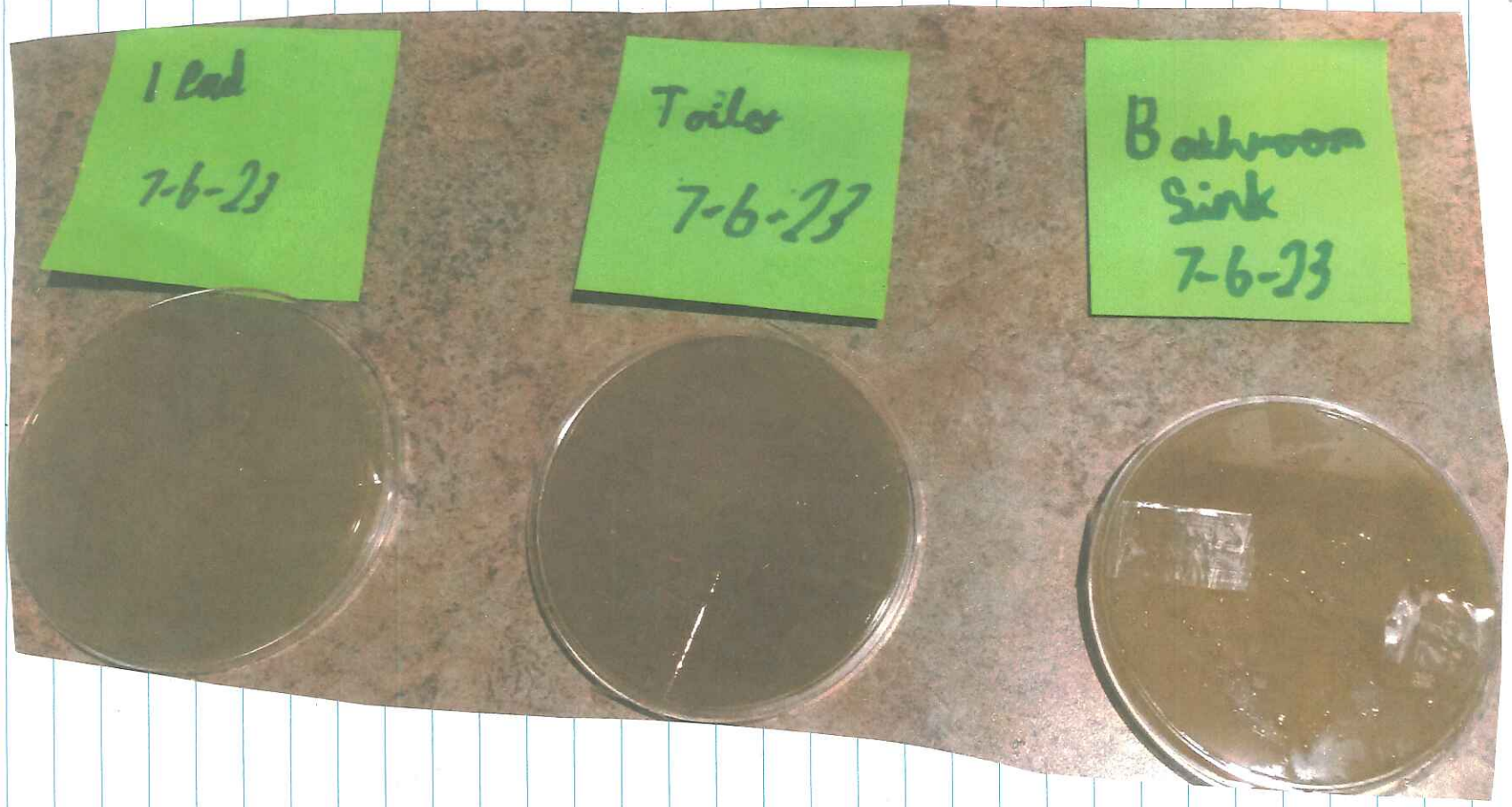
5, clean the surface of the ipad, ~~and use a new, clean cotton swab to wipe the surface again.~~

6, Repeat steps 1-4 in your ~~second~~ third petri dish with bathroom sink and toilet.

Incubate the bacteria colonies:

1. Place your petri dishes upside down inside a box and close the lid.
2. Set up your incubator by placing the box near a warm spot, We put it under a Modem, under the computer desk.
3. leave the plate to incubate for 2-5 days.

7


1 Cad
7-6-23
Toilet
7-6-23
Bathroom
Sink
7-6-23

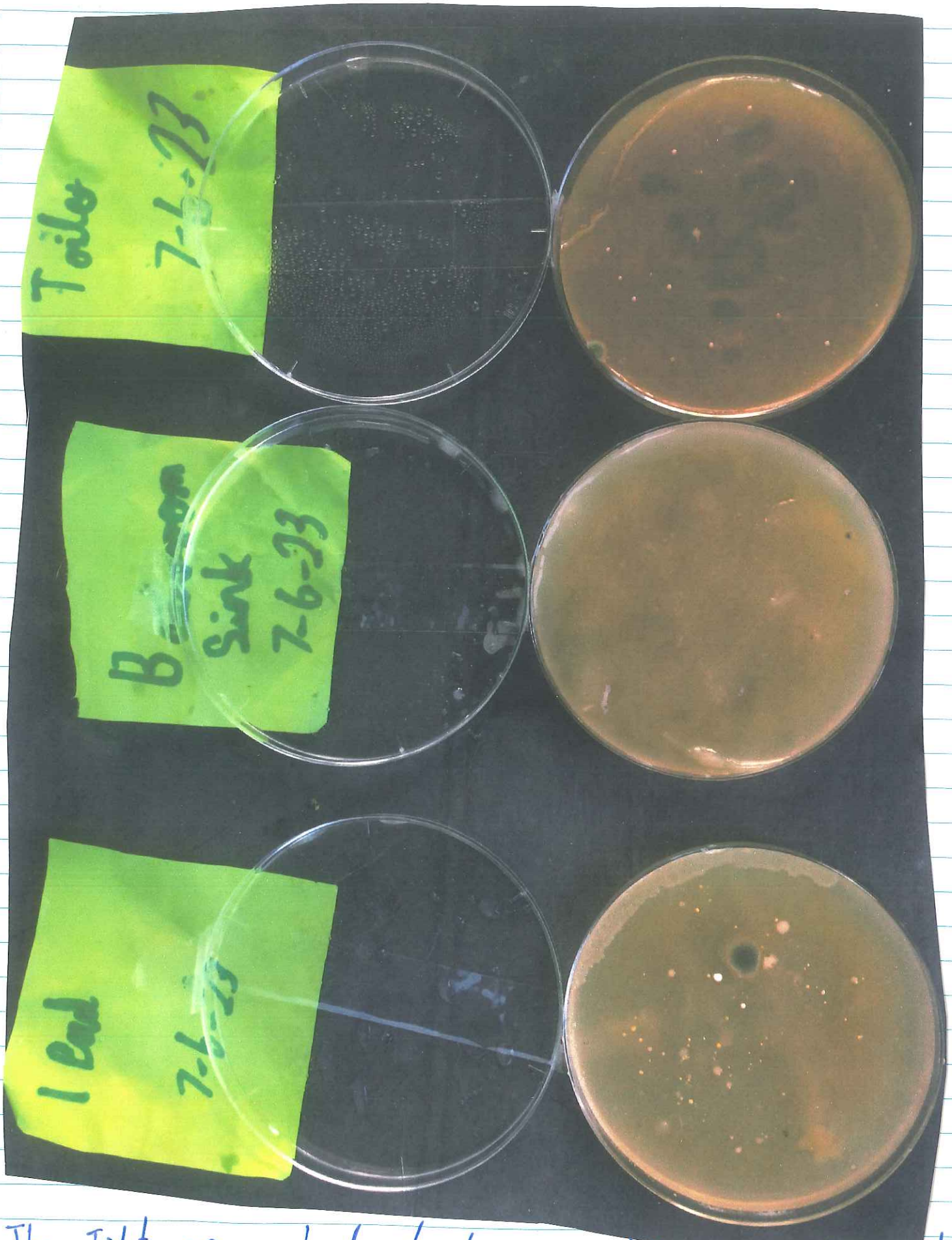
Setting up agar dishes (real experiment) 9.6.23

We prepared nine agar plates as written on page (5). We needed to do it two times to make enough agar. So used 2 cups of water, 2 teaspoons of sugar and 2 teaspoons of agar powder and 2 teaspoons of beefstock.

We kept these in the fridge until needed.

Checking The Practice Plates

9/6/23



The Toilet agar had chunks of solid agar when poured. It needs to be liquid next time

OBSERVATION

9/6/23

- Ipad observation:

- it has a fungus spot.
- it has multiple white bacteria.

bathroom sink

- it is a colonised with grey/black/clear bacteria.
- it also has one little black dot.

Toilet seat

- The toilet seat also has fungus.
- it has plenty of white bacteria. And yellow

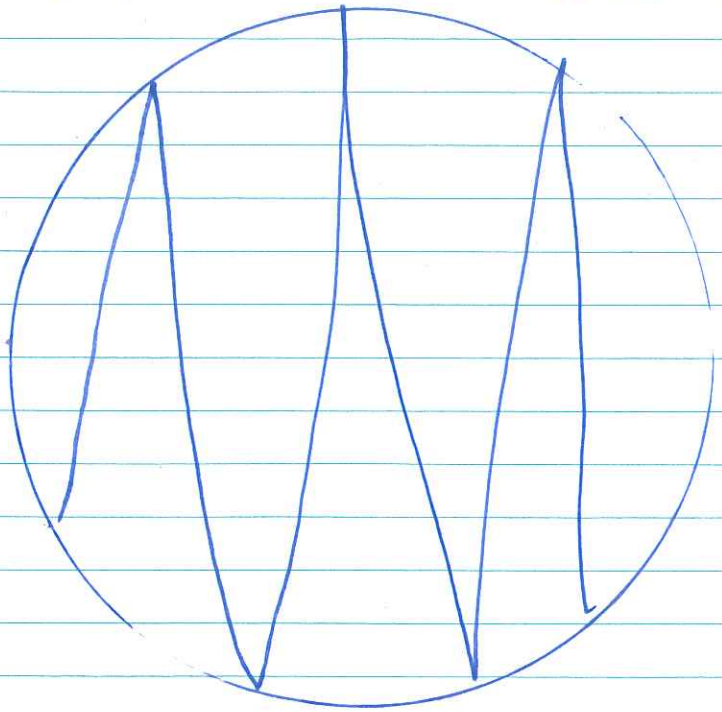
- This evidence that we can actually grow bacteria on our agar dishes, so we'll go ahead with the real experiment.

NOTE: Cameons mum helped by taking the photos so we didn't touch the bacteria.

Collecting bacteria Samples

12/6/23.

- We collected bacteria samples from the eight surfaces. (as written on page 1).
- We used the same zig zag pattern to make sure it was controlled between 4 tests.



CHARACTERISTICS OF BACTERIAL COLONY MORPHOLOGY

Shape	Circular, Rhizoid, Irregular, Filamentous, Spindle
Margin	Entire, Undulate, Lobate, Curled, Rhizoid, Filamentous
Elevation	Flat, Raised, Convex, Pulvinate, Umbonate
Size	Punctiform, Small, Moderate, Large
Texture	Smooth or rough ,dry, moist, mucoid, rugose (wrinkled).
Appearance	Glistening (shiny) or dull
Pigmentation	Nonpigmented (e.g., cream, tan, white) Pigmented (e.g., purple, red, yellow)
Optical property	Opaque, translucent, transparent

Biologyconcepts

Results

16/6/23

In order to describe the bacteria growing on each of the 8 plates and we found some information to help us describe the morphology of the bacterial colony.

We can't count each bacteria, as we need a microscope. So we are just counting bacteria colonies.

Colony Morphology of Bacteria

MARGIN	COLOUR	ELEVATION	TEXTURE	SHAPE
Curled	Orange	Raised	Slimy, moist	Round
Entire (smooth)	Red or pink	Umbonate	Matte, brittle	Punctiform
Filamentous	Black	Flat	Shiny, viscous	Rhizoid (root-like)
Undulate (wavy)	Brown	Convex	Dry, mucoid	Filamentous
Lobate	Opaque or white	Pulvinate (Cushion-shaped)	Translucent	Irregular
Erose (serrated)	Milky	Growth into culture medium	Iridescent (changes colour in reflected light)	Spindle

Size: Large, Moderate, Small, Punctiform

https://www.studocu.com/en-ca/document/university-of-toronto/biology/2022-lab-2-microbes-i-worksheet-1/29277689.

Results Day 3

15/6/23

3 days after plating, our control plate showed that it didn't have any bacteria at all, therefore any bacteria growing in the other plates is due for the surface variable

control

Results Day 3

15/6/23

Bacteria Growing 3 Days After Plating.

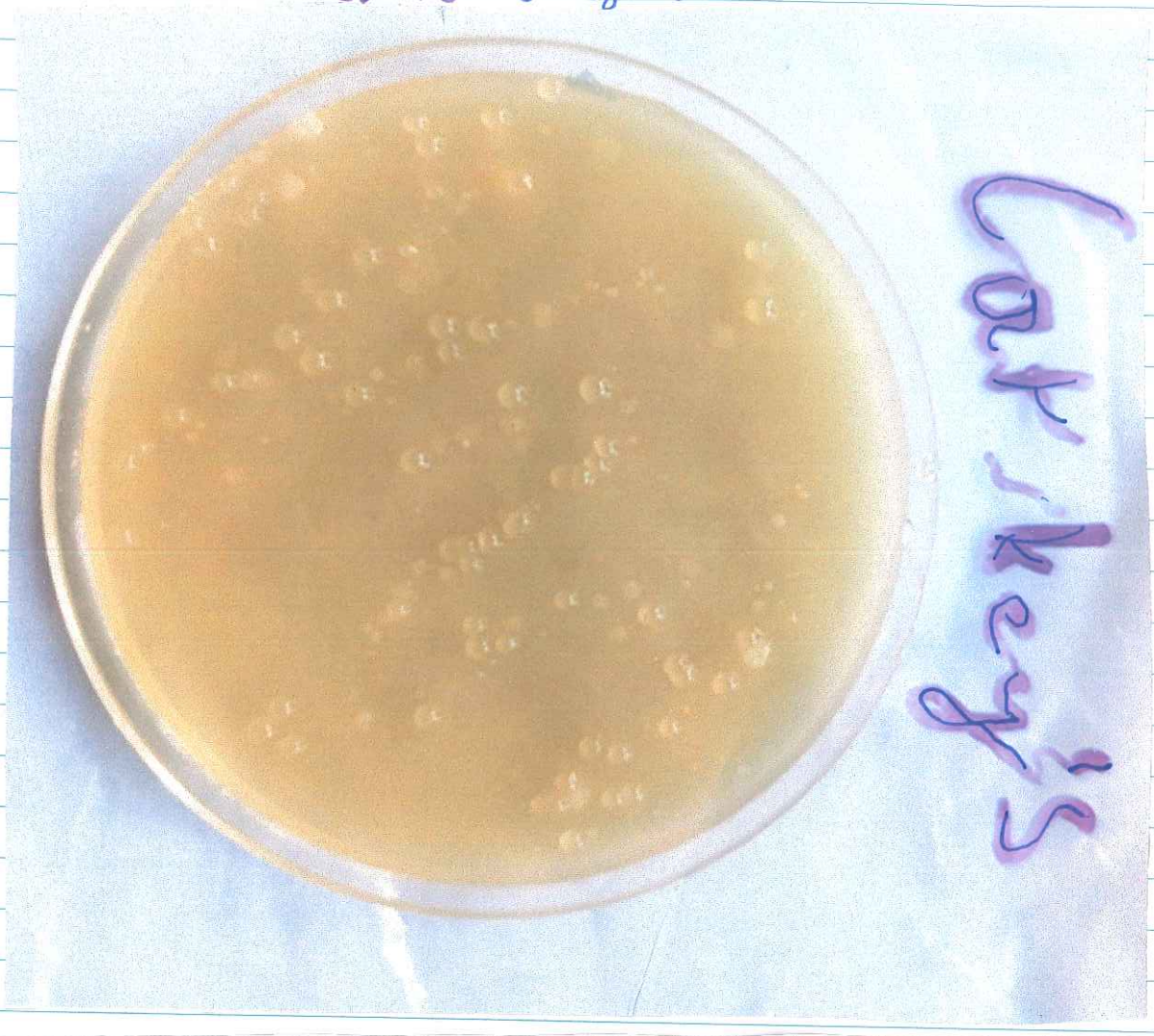
Bathroom Surface + Sink

Toilet Seat

(15)

Results day 3

15/6/23

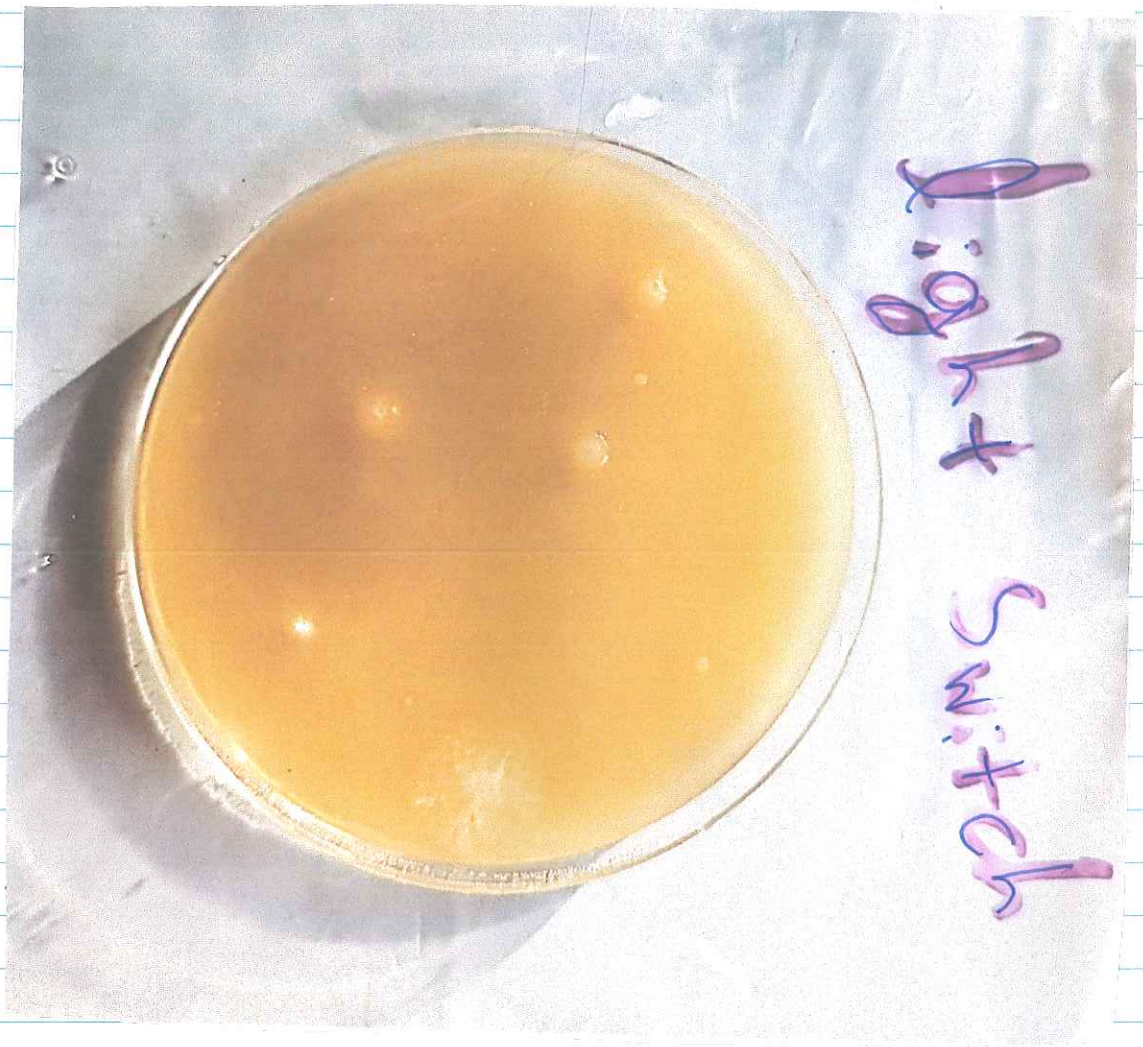


Control key's

Streaking where

16

15/6/23



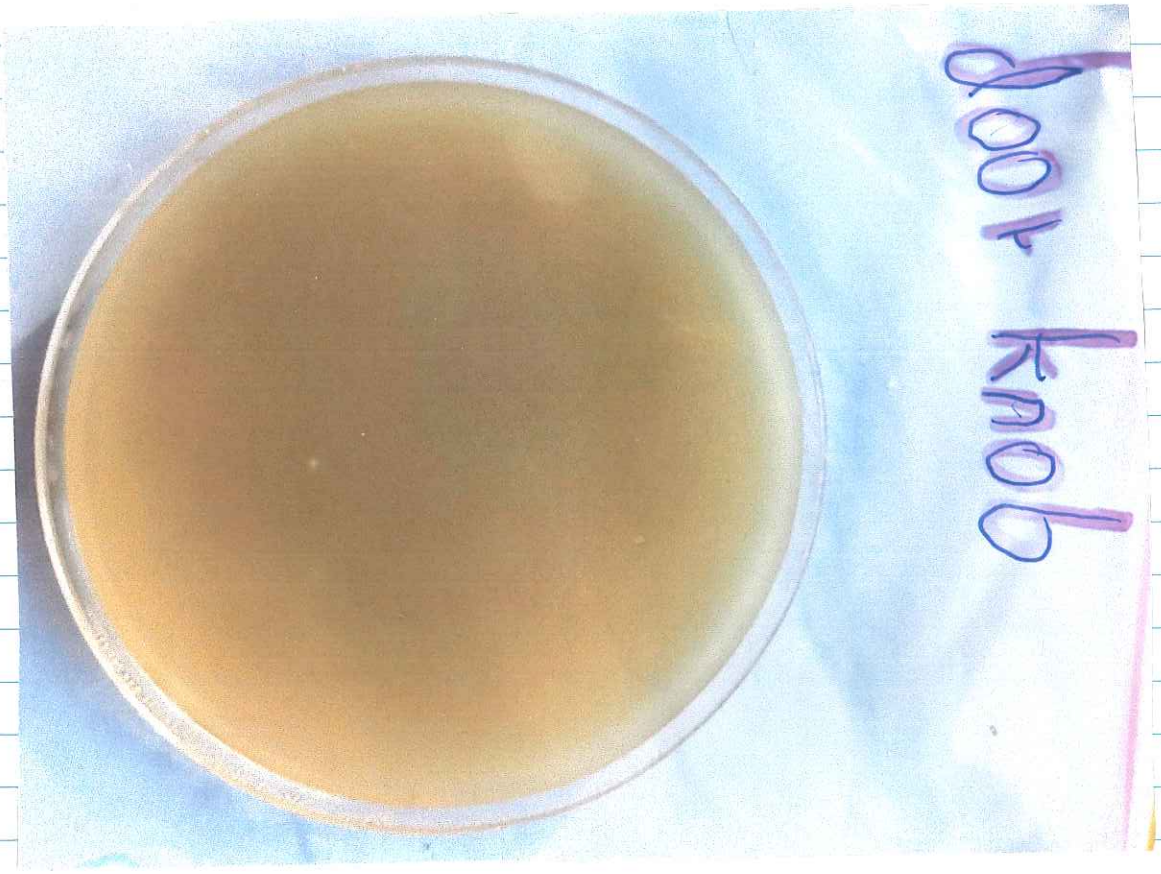
Light + Switch

Pad

Results day 3

15 / 6 / 23

Gram ⊖ control



door knob

15/6/23

Surface	Approx no. of colonies	Size	Shape	Margin	Colour	Elevation	Texture
Bathroom faucet	Confluent (all grown together)	(mostly covered)	Irregular	entire	opaque	raised	Shiny, Viscous
Toilet Seat	hundreds many many hundreds	Punctiform	Circular	entire	White and opaque	Convex	Shiny, Viscous
Car Keys	91	Moderate	Circular	entire	opaque	Pulvinate	Translucent Shiny, Viscous
Steering wheel	120	Punctiform and Small	Circular	entire	milky.	Convex	Shiny Viscous
light Switch	11	Punctiform x5 large x3, small x3	fungus x1 Circular	entire	milky, white	Pulvinate	Shiny Viscous
I pad	9	large x1 Punctiform x6 Small x2	furrow x1 Circular	entire	opaque White	Pulvinate	Shiny Viscous
game Control	4	Punctiform	Circular	entire	opaque, White	flat	matte
door knob	1	Punctiform	Circular	entire	White	flat	matte

Last

Results/Conclusion

18.6.23

Based on day three results we observed many different sizes of bacterial colonies on the eight different plates as well as the amount growing from each of the surfaces.

Based on our results:... from most to least bacterial colonies

1. Bathroom faucet + Sink - Bacteria grew on most of the surface
2. Toilet seat
3. Car keys } Hard to tell apart as car keys had
4. Steering Wheel } largest but less colonies, but steering wheel had more but punctiform.
5. light switch
6. I pad
7. game control
8. door-knob

Discussion

We thought that the toilet seat would have the most bacteria growing in the plate. But the bathroom faucet had more bacteria then the toilet seat.

We found a study that found a similar results to what we had. They took multiple samples from objects and surfaces in a public toilet and tested them for levels of bacteria. The top of the list was the sink which showed more then 1,000 colony forming units (https://www.infectioncontroltoday.com/view/study-shows-bathroom-sink-more-contaminated-toilet)

The bathroom faucet, has the most bacteria because it has all our spit, our bacteria when we wash our hands. (from when we brush our teeth)

- the sink, has a lot of moisture which supports bacterial growth.

- We though that the ipad would have a lot more of bacteria because Cameron plays a lot and uses it for school every day, but perhaps Cameron wiped it not long ago.

- We also thought the door knob and Ninterdo control would also have a decent amount of bacteria transferred from dirty hands, but they had the least.

Extra Observations.

20 / 6 / 23

We wanted to observe the bacterial colonies after 7 days of grōth on the agar plates. But

But the results from day 3 were pretty clear and on day 7, there was a lot of fungels/mould growing on the dishes, so was hard to observe bacteria colonies.

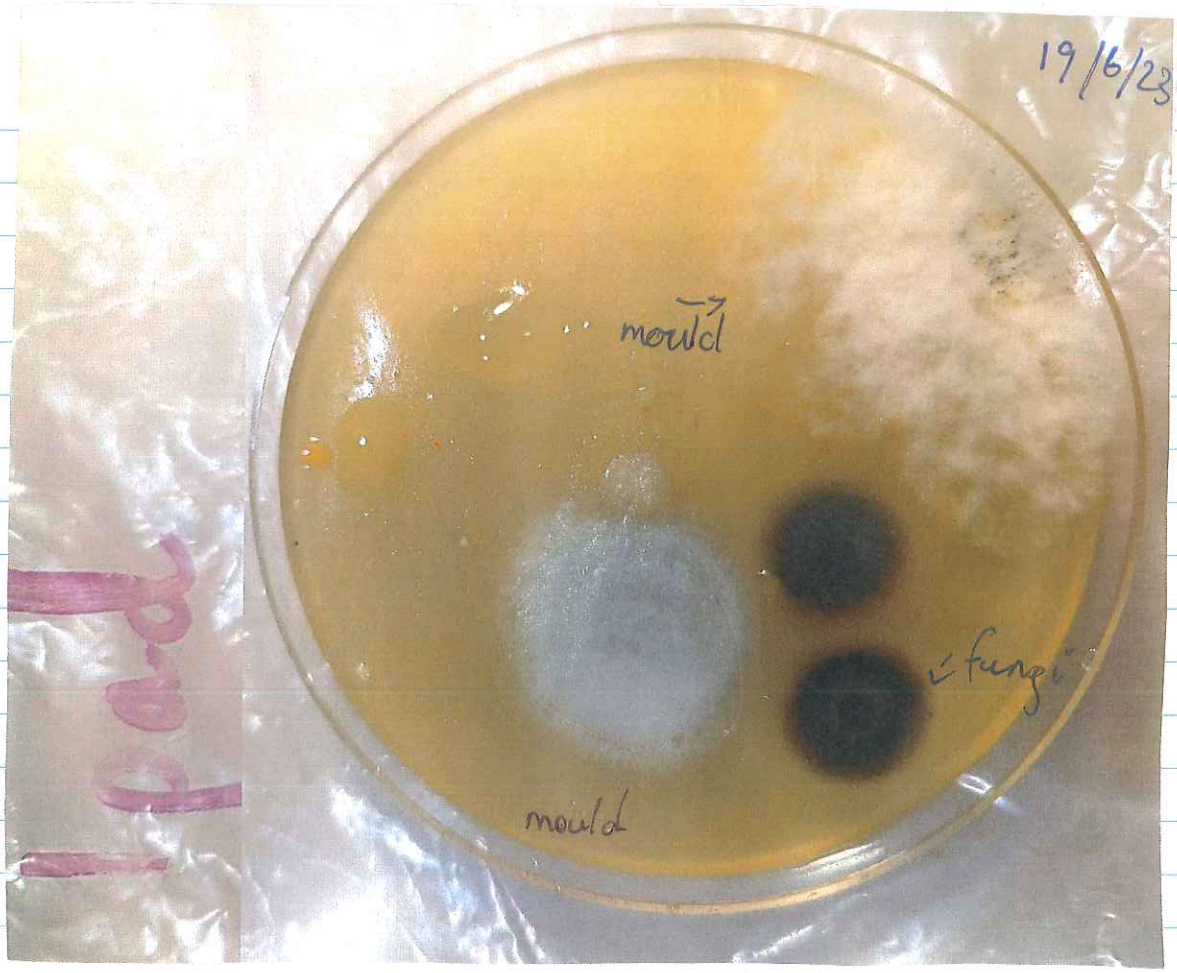
So we aded the photos just to show the grouth of the different types of bacteria and mould/fungi.

Control

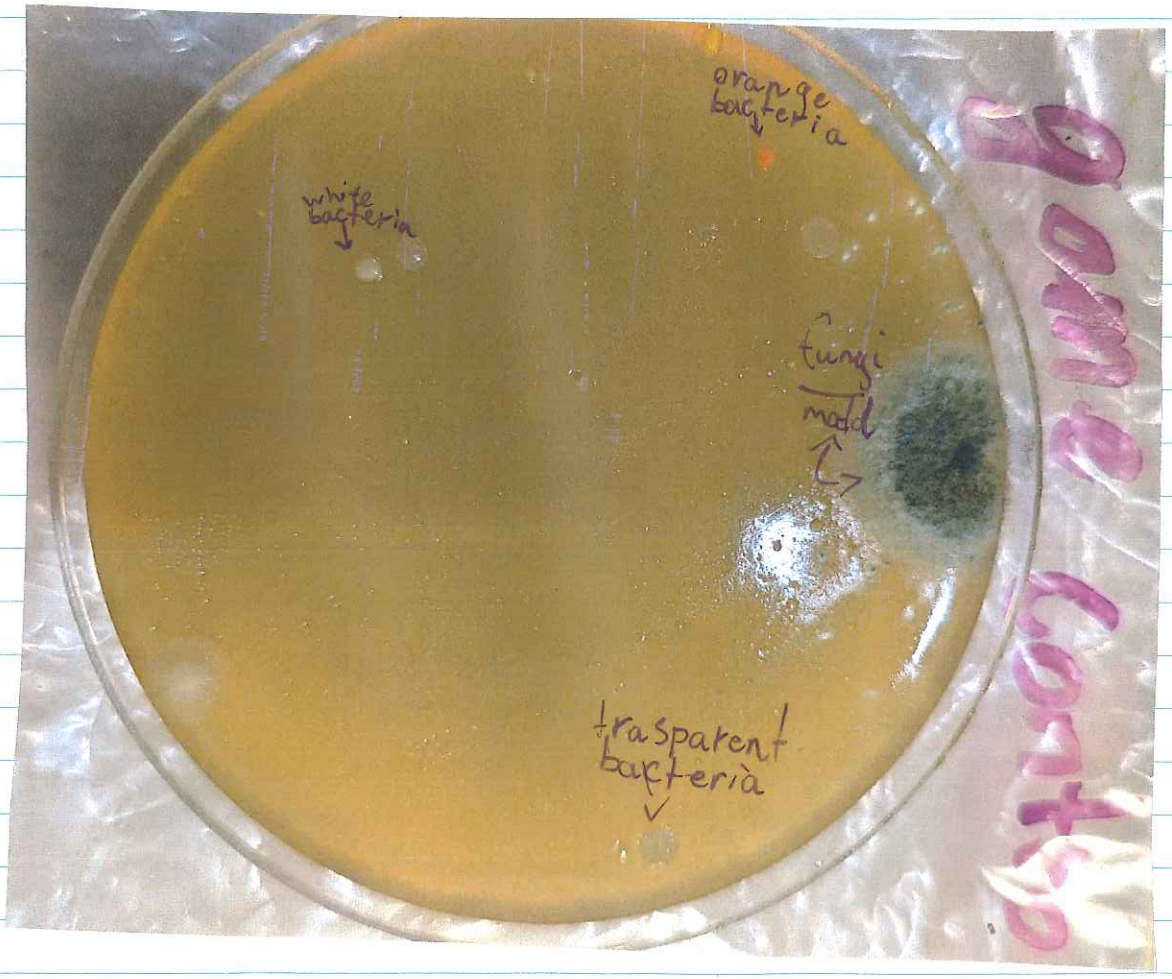
Still NO Bacteria

19/6/23

Day 7 Results



Petri dish



Petri dish

Day 7 Results 19/6/23

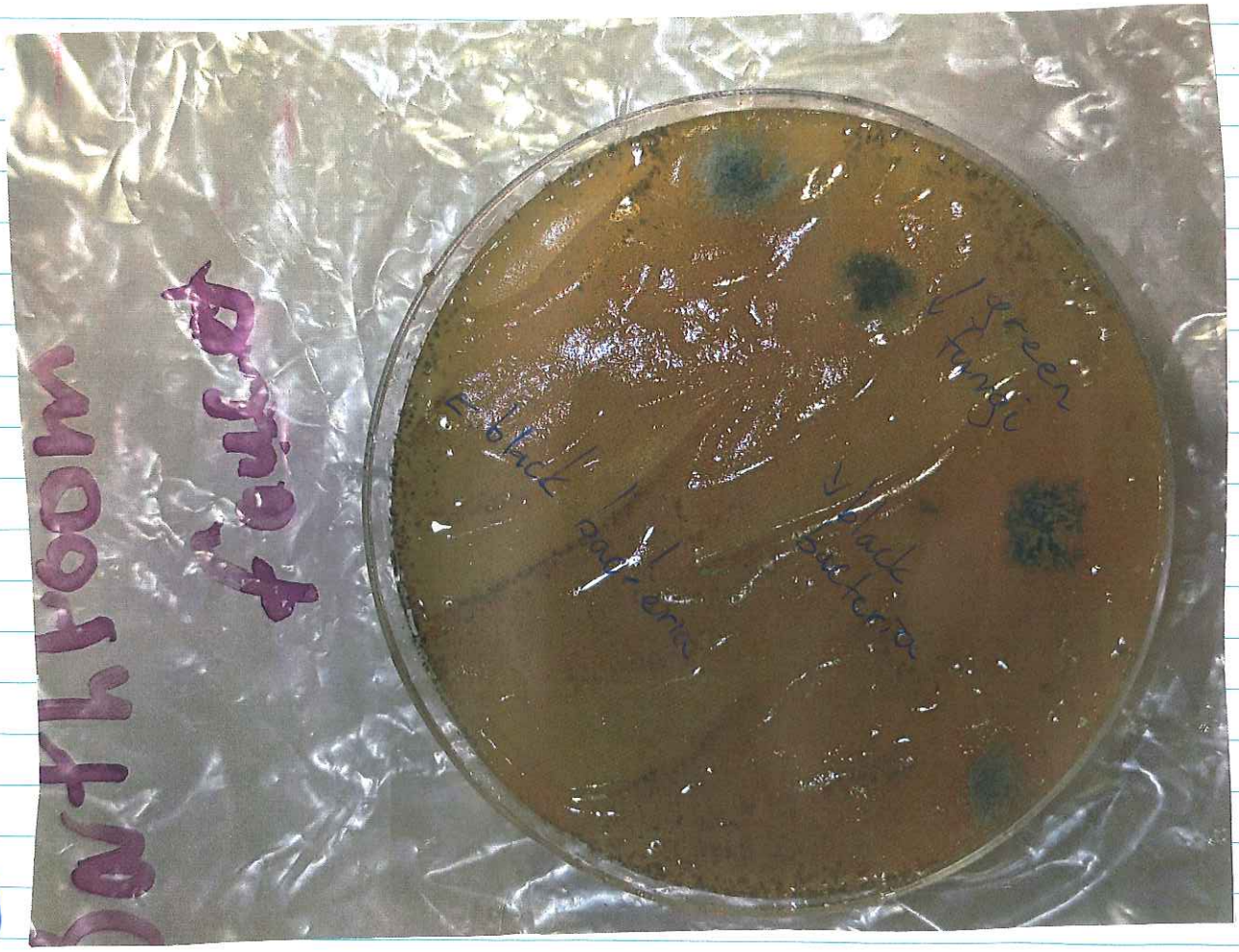
Day 7 Results

19/6/23

Day 7 Results

1:1 + Switch

Anthroom + Powder



Further questions that we can investigate...

- What are the different types of bacteria and fungi growing on the plate.

OSA RISK ASSESSMENT FORM

for all entries in (✓) ☐ Models & Inventions and ☑ Scientific Inquiry

This must be included with your report, log book or entry. One form per entry.

STUDENT(S) NAME: Cameron Pearce, Tomi Morea ID: 0218-039

SCHOOL: Grange Primary

Activity: Give a brief outline of what you are planning to do.

We are planning to investigate eight different surfaces to see which has the most bacteria. We will be testing the bacteria on agar plates.

Are there possible risks? Consider the following:

- Chemical risks: Are you using chemicals? If so, check with your teacher that any chemicals to be used are on the approved list for schools. Check the safety requirements for their use, such as eye protection and eyewash facilities, availability of running water, use of gloves, a well-ventilated area or fume cupboard.
- Thermal risks: Are you heating things? Could you be burnt?
- Biological risks: Are you working with micro-organisms such as mould and bacteria?
- Sharps risks: Are you cutting things, and is there a risk of injury from sharp objects?
- Electrical risks: Are you using mains (240 volt) electricity? How will you make sure that this is safe? Could you use a battery instead?
- Radiation risks: Does your entry use potentially harmful radiation such as UV or lasers?
- Other hazards.

Also, if you are using other people as subjects in an investigation you must get them to sign a note consenting to be part of your experiment.

Risks	How I will control/manage the risk
• We are working with bacteria and maybe mould which could make us very sick. • Thermal risk we are heating things on a stove.	We will keep the agar plates lid's taped on and in a bag. Wash our hands. We will not touch the bacteria. We will clean areas touched with antibacterial spray Only an adult with gloves and mask took the lid off for photo's. We will dispose in a biological waste bin We will be careful and have parental supervision.

(Attach another sheet if needed.)

Risk Assessment indicates that this activity can be safely carried out

RISK ASSESSMENT COMPLETED BY (student name(s)): Cameron, Tomi

SIGNATURE(S): Cpearce , tomi tmorea

☑ By ticking this box, I/we state that my/our project adheres to the listed criteria for this Category.

TEACHER'S NAME: Margaret Abela

SIGNATURE: M Abela DATE: 13/6/23