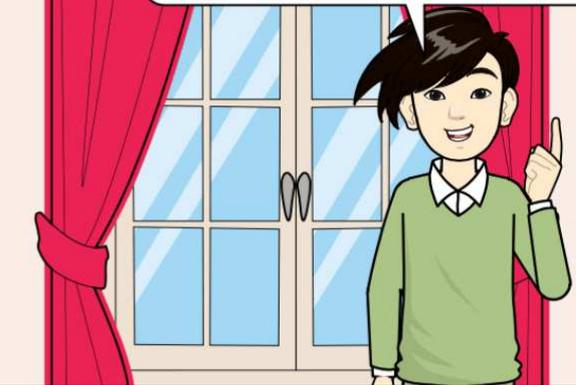


Bacteria also help us in the production of food. Through them we get yogurt, cheese and much more. They help us to have healthy water by filtering the water in sewage treatment plants. As you can see, bacteria are indispensable!



The world of fungi is not limited to white mushrooms and porcini mushrooms. Mushrooms are actually mostly made up of fine, root-like threads called mycelium. These allow them to spread in the earth.



The mushrooms are also indispensable for us. They enable us to produce many things such as wine, beer, bread, cheese, etc. They also help the plants to take up food so that they can grow well.



On the one hand, fungi and bacteria can be harmful, but they are also very important for our lives, be it for our food or our environment.



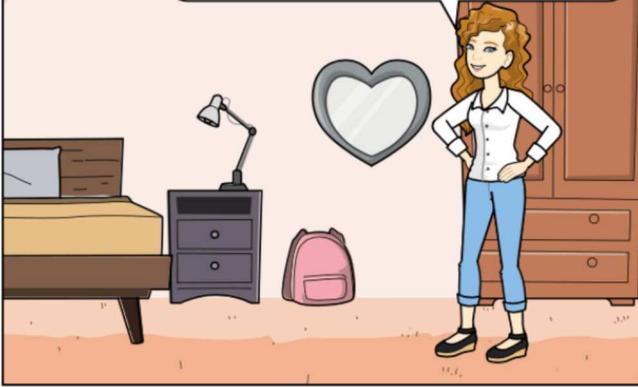
In order to be able to distinguish the fungi from the bacteria, you have to let them grow into colonies. The mushrooms produce a lot of mycelium that resembles threads, such as those found on rotten fruit and bread. Bacteria, on the other hand, unite to form colonies without threads and can take on different colors and shapes.



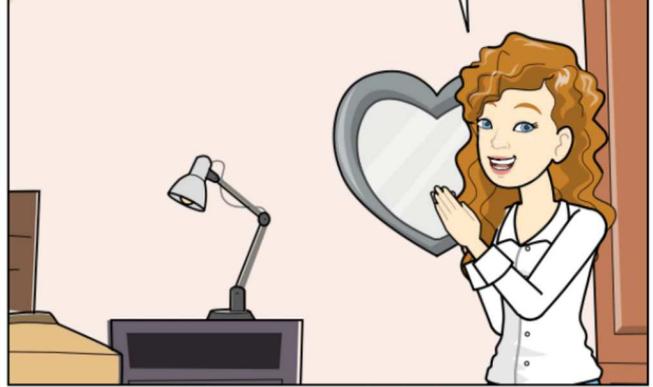
Now that you have gotten to know the world of microorganisms better, you will be able to solve the two exercises that Professor Microbe has prepared for you and that await you in the final quizz after completing your mission! :-)



Hello, my name is Protokolla! I will briefly explain your science kit that was given to you. I will explain to you what it is used for and how to use it. You can find more detailed information in the protocol that we gave you.



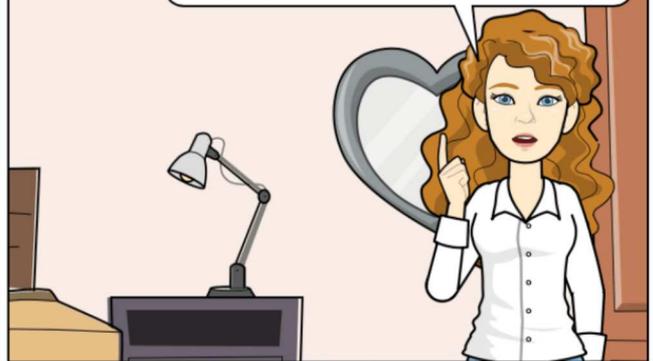
First of all, when you study microbes, you have to do your job very cleanly!



Since you cannot see them with your bare eyes, you have to use a special tool called a petri dish. These dishes are filled with food for microorganisms to allow them to multiply. So we can eventually see them. It's similar to making bread. Yeast is a fungus that needs time to multiply and so allows the dough to rise.



If you are working with petri dishes, you have to quickly add the sample to the gel and close the dish well with Parafilm. Parafilm is a kind of elastic adhesive tape. After that you must not open the bowl any more, otherwise it will be contaminated.



First of all, Professor Microbe wants you to capture the microorganisms that are hiding on your skin. You will need 2 petri dishes for this. In one you will carefully press your unwashed fingers into the gel, in the other you will take an impression of your washed fingers.



I wonder if there are any microorganisms left? I have prepared detailed instructions for you so that the capture goes well. You can find it under the title "Experiment 1" in the protocol.



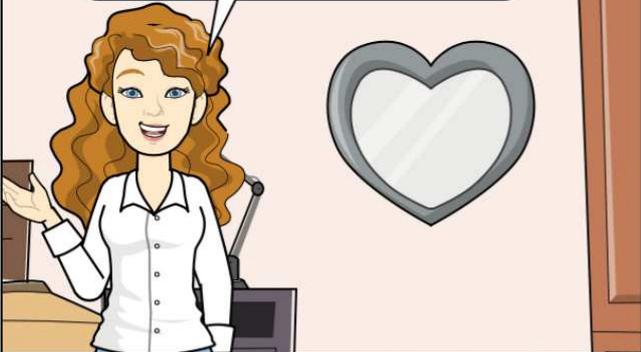
Now Professor Microbe wants you to capture the microorganisms that have taken refuge in the earth. To do this, you have to collect a crumb of earth and place it in the middle of the third petri dish.



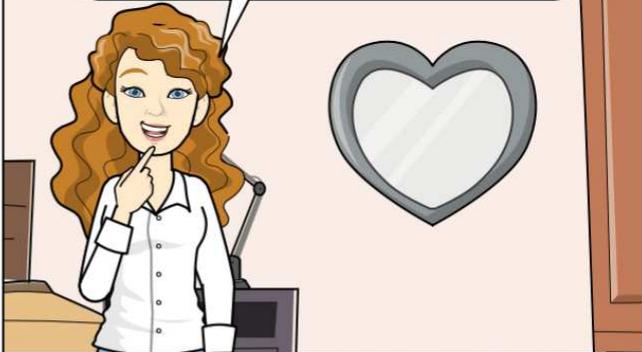
In the last dish we let you put what you would like. As we said before, the microorganisms are everywhere. The more different species you find, the happier Professor Microbe is!



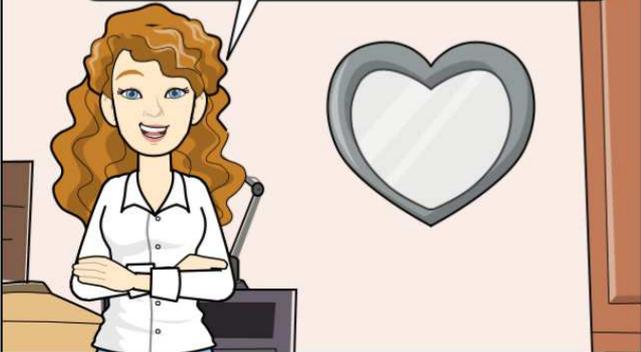
For example, you can put a piece of lead from your pencil, a hair, a bit of fur, or just leave the bowl open for a while. For the last two Petri dishes you will find the instructions under the title "Experiment 2" in the protocol.



When you are finished with the experiments (after approx. 7 days), you can put the Petri dishes in a sealable plastic bag and throw them in the trash. This is very important, because you can't just throw microorganisms anywhere!



Your scientific set therefore includes 4 Petri dishes (2 for each experiment), Parafilm to seal the dishes well after you have put the samples in, a protocol that you have to follow for each experiment and a plastic bag to throw everything away in the end. Good luck, I believe in you!



Hello, my name is Resultina. Bravo, you caught the first microorganisms like a real scientist! I will explain how to proceed with your mission.



Now you should observe the development of the microorganisms for 5 days. Draw what you can see in your petri dishes every day. You need to pay attention to the color and shape of the colonies you are drawing. You are welcome to use colored pencils.



At the end of the 5 days, when you have finished your observations, you can answer the questions that Professor Mikrobe prepared especially for you. It is important that you answer them, then the professor will be proud of you! :-)



Professor Mikrobe and his whole team thank you for your valuable help! We hope you enjoy it. :-)



Don't loose heart, good luck in your hunt for microbes!



## Protocols

So now you will help Professor Microbe to regain the microorganisms that escaped from his collection!



### Experiment 1



For this first experiment, you will need 2 petri dishes to catch the microorganisms that are hidden between your fingers. 😊



**Unwashed hands**

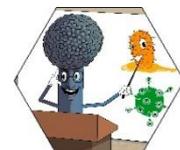


**Washed hands**

It is important to prepare both petri dishes on the same day, one at a time. And for the experiment to work well, you must not wash your hands before preparing the first Petri dish!

In addition, you must not forget to label the dishes so that you can later know which dish you used in which experiment. This is best done on the edge of the dish so that you can see what is growing in it afterwards.

So, let's go! 😊



## PROTOCOLS FOR EXPERIMENTS WITH CHILDREN

**Step 1:** Now you are preparing the first petri dish with unwashed hands!



Open it and place your 3 fingers, forefinger, middle finger and ring finger on the gel and press them lightly. As shown in the photo on the right.



Then you seal the bowl with parafilm:

1. Place the parafilm on the edge of the petri dish.



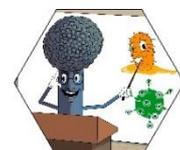
2. Carefully pull the parafilm horizontally along the edge.



3. Wrap the parafilm around the entire petri dish, **past the beginning**, so that the entire dish is wrapped at least once.



Done! Your first petri dish is now ready. Easy right?



## PROTOCOLS FOR EXPERIMENTS WITH CHILDREN

**Step 2:** Now you are preparing the second petri dish, this time with washed hands!

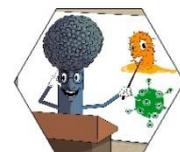


You repeat exactly what you did with the first dish, but only after you've washed your hands thoroughly!

To help you achieve the best possible result, we have included instructions on how to wash your hands properly:



(source : botanicalblendsstudio.com)



## PROTOCOLS FOR EXPERIMENTS WITH CHILDREN

### Step 3:



When you are done with the two petri dishes, leave them at room temperature, e.g. on your desk. **Caution:** Avoid direct sunlight and do not open the bowls any more! 😊

### Step 4:



After you have finished with the Petri dishes, your next task is to see what develops in them over the next 5 days.

And yes ... Professor Microbe's work requires patience. But we hope you won't be disappointed with the result!

At the end of this protocol, we have drawn empty petri dishes for you in which you can draw in every day what you can see in your dishes. 😊

**Caution:** Be careful that you draw in the correct bowl!

Draw everything you see as accurately as possible. 😊

**Little trick:** Take a photo of your petri dishes every day, then you can follow the change in real pictures!

You will also find questions that Professor Microbe has prepared for you for this experiment. You can answer them when you are done with your observations.



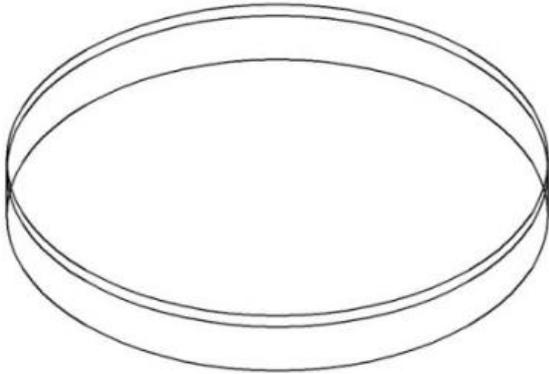
Name:

First Name:

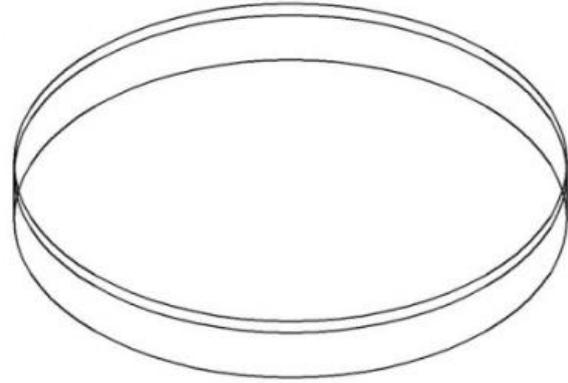
Class:

PROTOCOLS FOR EXPERIMENTS WITH CHILDREN

**Day 1:**

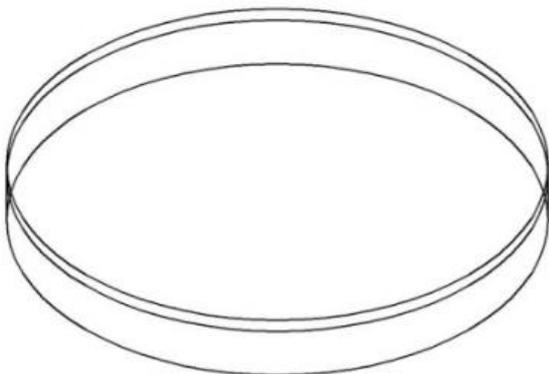


**Unwashed Hands**

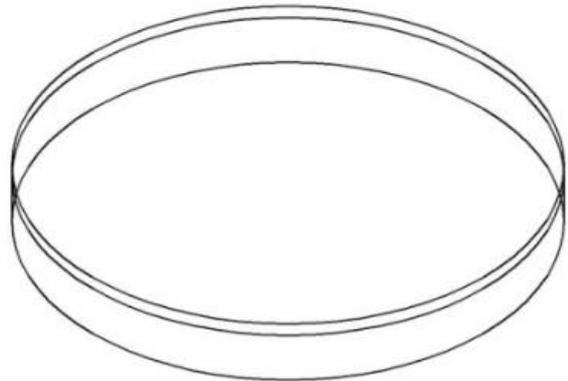


**Washed Hands**

**Day 2:**

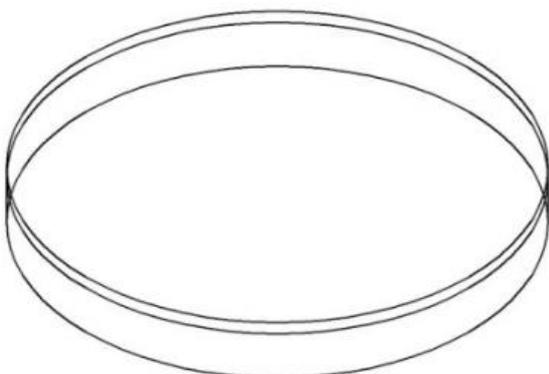


**Unwashed Hands**

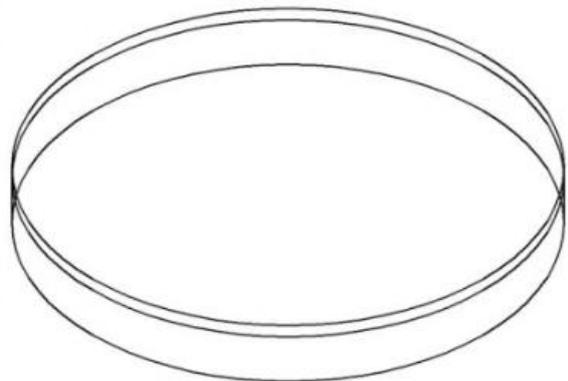


**Washed Hands**

**Day 3:**



**Unwashed Hands**



**Washed Hands**

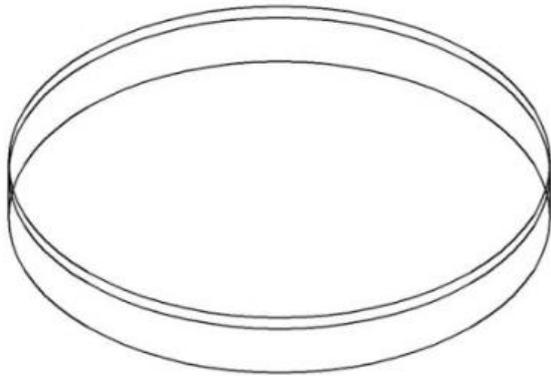
Name:

First Name:

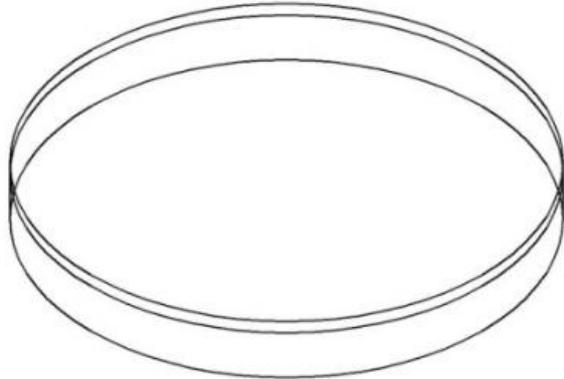
Class:

**PROTOCOLS FOR EXPERIMENTS WITH CHILDREN**

**Day 4:**

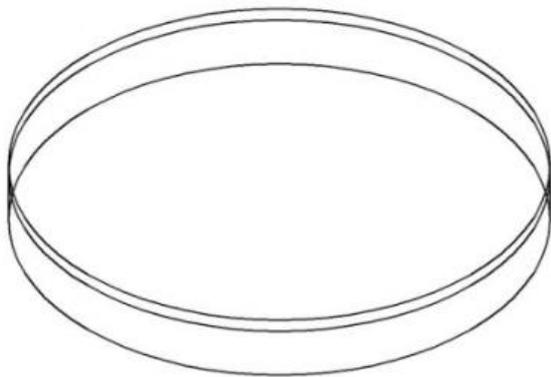


**Unwashed Hands**

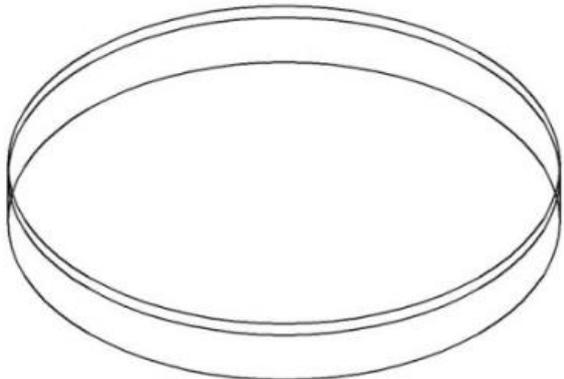


**Washed Hands**

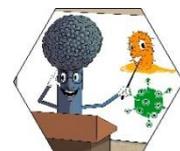
**Day 5:**



**Unwashed Hands**



**Washed Hands**

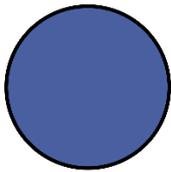


## PROTOCOLS FOR EXPERIMENTS WITH CHILDREN

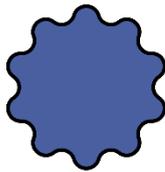
This can help you fill out Professor Microbe's questionnaire. 😊

The different shapes the colonies can have:

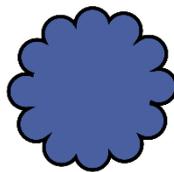
### Contour



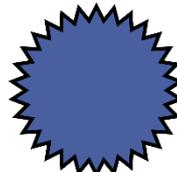
smooth



undulating



lobed



serrated



filaments



concentric  
zones

### Profile



flat



raised



convex



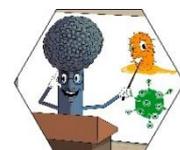
fried egg



convex with  
protuberances



ridge



Name:

First Name:

Class:

## PROTOCOLS FOR EXPERIMENTS WITH CHILDREN

### Questionnaire of Professor Mikrobe

What do you see in the petri dishes? Which color (s) and which shape (s)?

Dish "Washed hands":

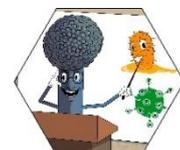
Dish "Unwashed hands":

In which dish do you see more colonies? If you don't know what colonies are anymore, ask Theoriko! 😊



In which Petri dish do you see fewer colonies?

What can you infer from your observations?



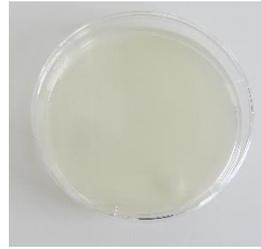
## Experiment 2



Now that you've helped Professor Microbe find some of his escaped microorganisms between your fingers, you can still help him find others in the soil and on an object of your choice.



Soil sample



Object of your choice

**Step 1:** When you have collected your soil sample (from the garden, if you have one, from a flower pot, or elsewhere), open the first Petri dish and put some soil in the center, ideally with a small, clean spoon.

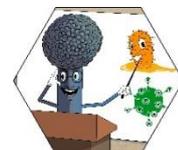


Here you will find instructions on how to take your sample and to fill it into the Petri dish:

1. Wash your hands.
2. Take some soil from wherever you want, preferably with a small, clean spoon.
3. Open your petri dish and put some soil in the center of the dish. Use the spoon for this, as shown in the photo. 😊



4. Label the Petri dish and seal it tightly, use Parafilm as you did in Experiment 1. 😊



## PROTOCOLS FOR EXPERIMENTS WITH CHILDREN

### Step 2:



For your second petri dish, you can yourself choose an object to find the microbes that are on it and that cannot be seen with the naked eye!

For example: a hair of yours or of your pet, a leaf or something that you find interesting and that fits in the dish.

Now follow the instructions from Step 1!

### Step 3:

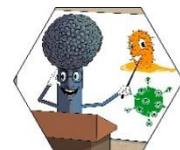


When you have finished preparing the two petri dishes, leave them as in [Experiment 1](#) at room temperature, e.g. on your desk. Again, be careful: do not place them in direct sunlight and do not open them again!

### Step 4:



As in [Experiment 1](#), it is now your job to observe what is developing in your dishes during the next 5 days.



## PROTOCOLS FOR EXPERIMENTS WITH CHILDREN

At the end of this document, I drew you models of empty petri dishes in which you can draw in what you can see in the dishes every day!

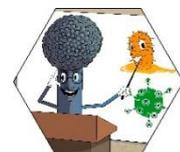
**Attention:** be careful that you draw in the correct bowl!

And yes ... draw everything you see and as accurately as you can. 😊

**Trick:** Take a photo of your petri dishes every day, like you did in **Experiment 1!**

Again, you will find questions from Professor Microbe that he has prepared for you and that you can fill in when you have finished with your observations.

Where in the protocol "your sample" is written, write down what you have chosen as the research object.



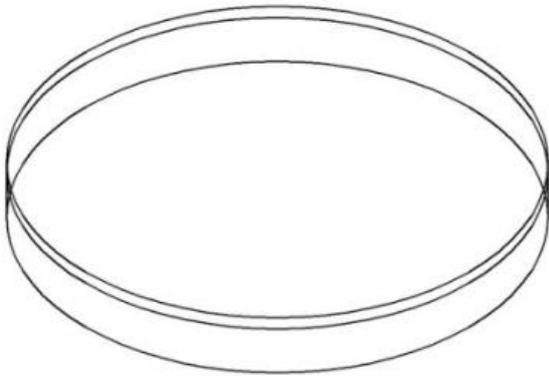
Name:

First Name:

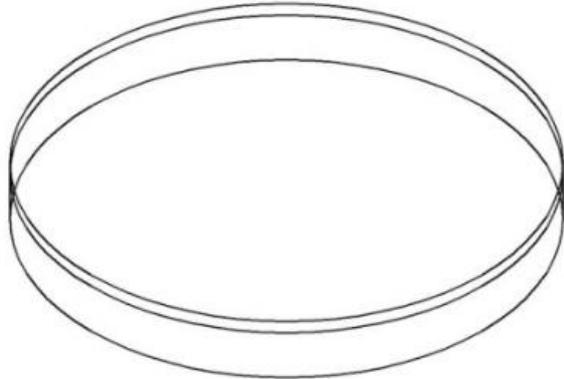
Class:

PROTOCOLS FOR EXPERIMENTS WITH CHILDREN

**Day 1:**

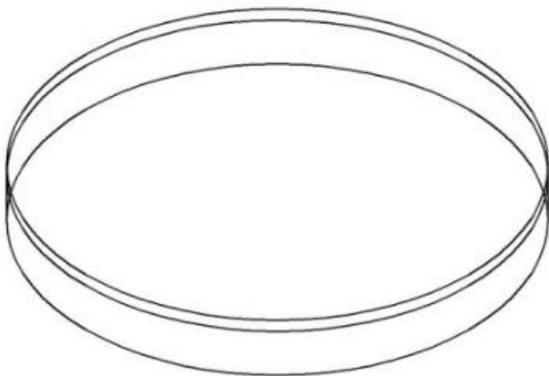


**Soil sample**

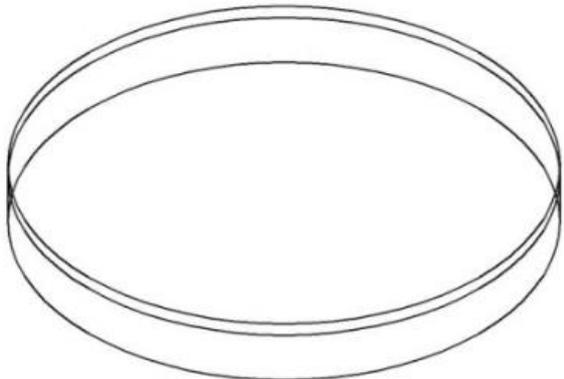


**Your sample**

**Day 2:**

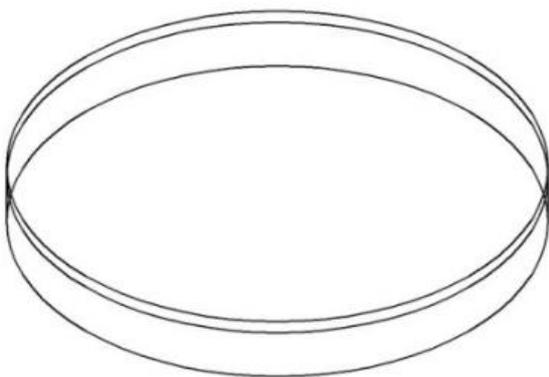


**Soil sample**

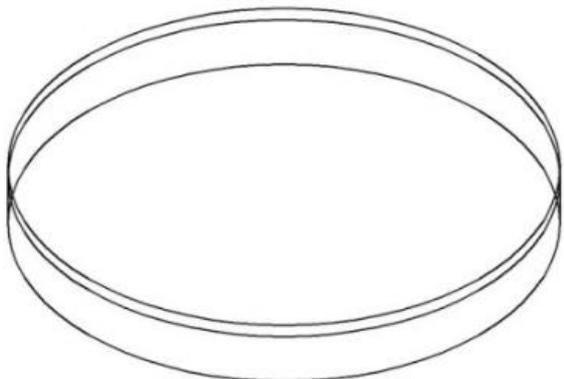


**Your sample**

**Day 3:**



**Soil sample**



**Your sample**

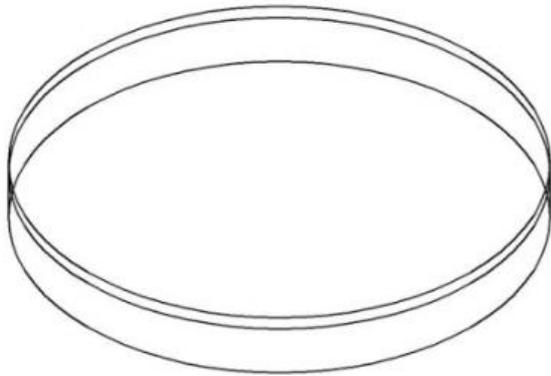
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First Name:

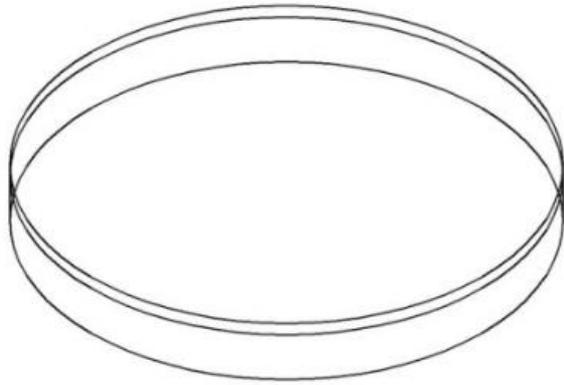
Class:

**PROTOCOLS FOR EXPERIMENTS WITH CHILDREN**

**Day 4:**

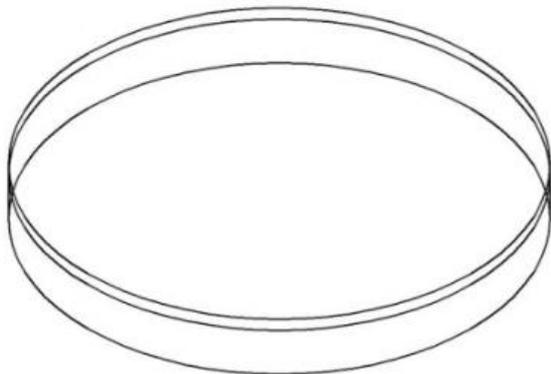


**Soil sample**

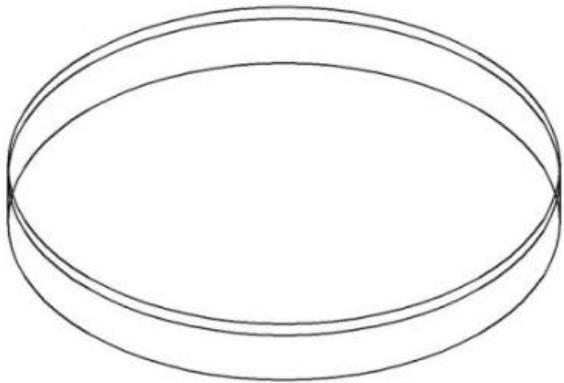


**Your sample**

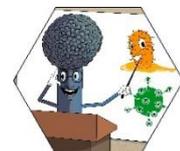
**Day 5:**



**Soil sample**



**Your sample**



Name:

First Name:

Class:

## PROTOCOLS FOR EXPERIMENTS WITH CHILDREN

### Questionnaire of Professor Mikrobe

Are there any differences from what you observed in Experiment 1? If yes, which?

What kind of microorganisms (bacteria or fungi) do you think they are? Give reasons for your answer. If you need help, ask Theoriko. 😊



Find simple criteria by which you can distinguish the different microorganisms that you can recognize in the bowls. Again, you can ask Theoriko if you need help. 😊

