




# AWESOME MICROBES!



rafts   
4biotech



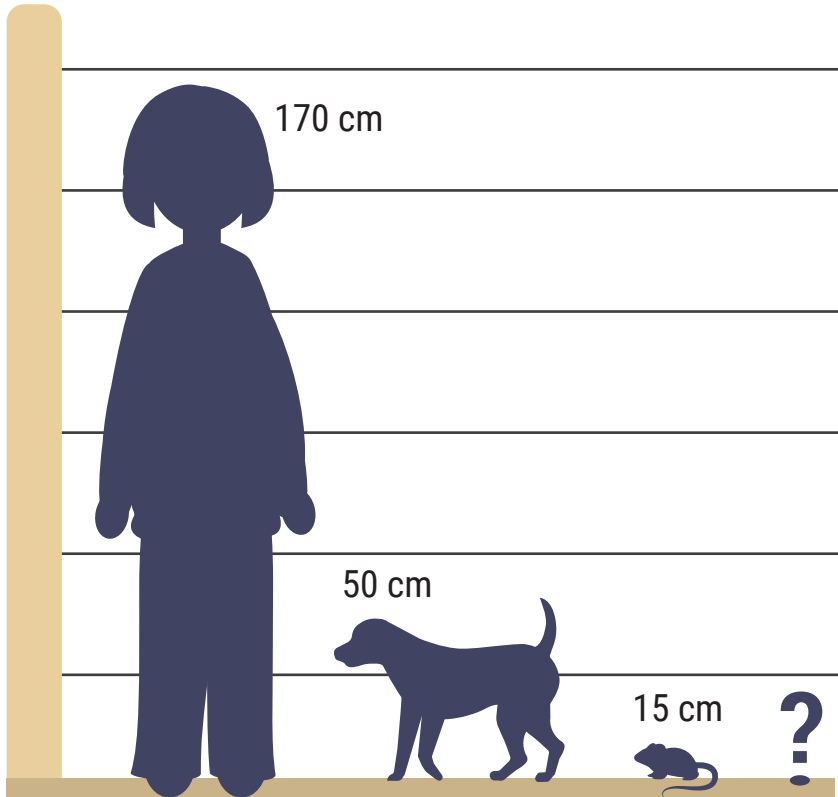
Content and design by Scienseed SL

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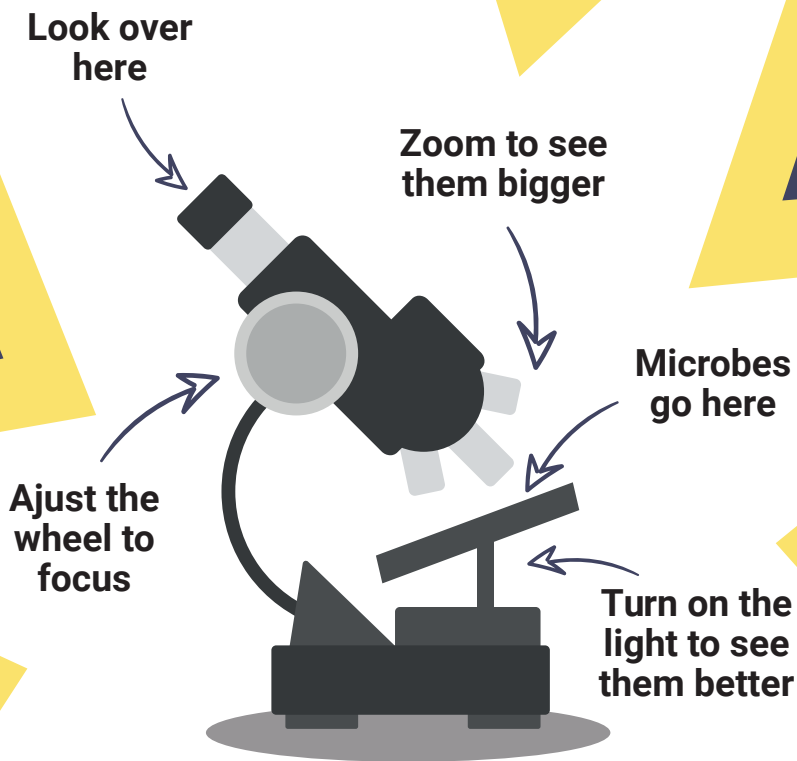
What is the **smallest living being** that you know? A dog? A mouse? Maybe an ant?



Ok, we know that an ant is pretty small but actually there are much smaller creatures out there: **microorganisms!**

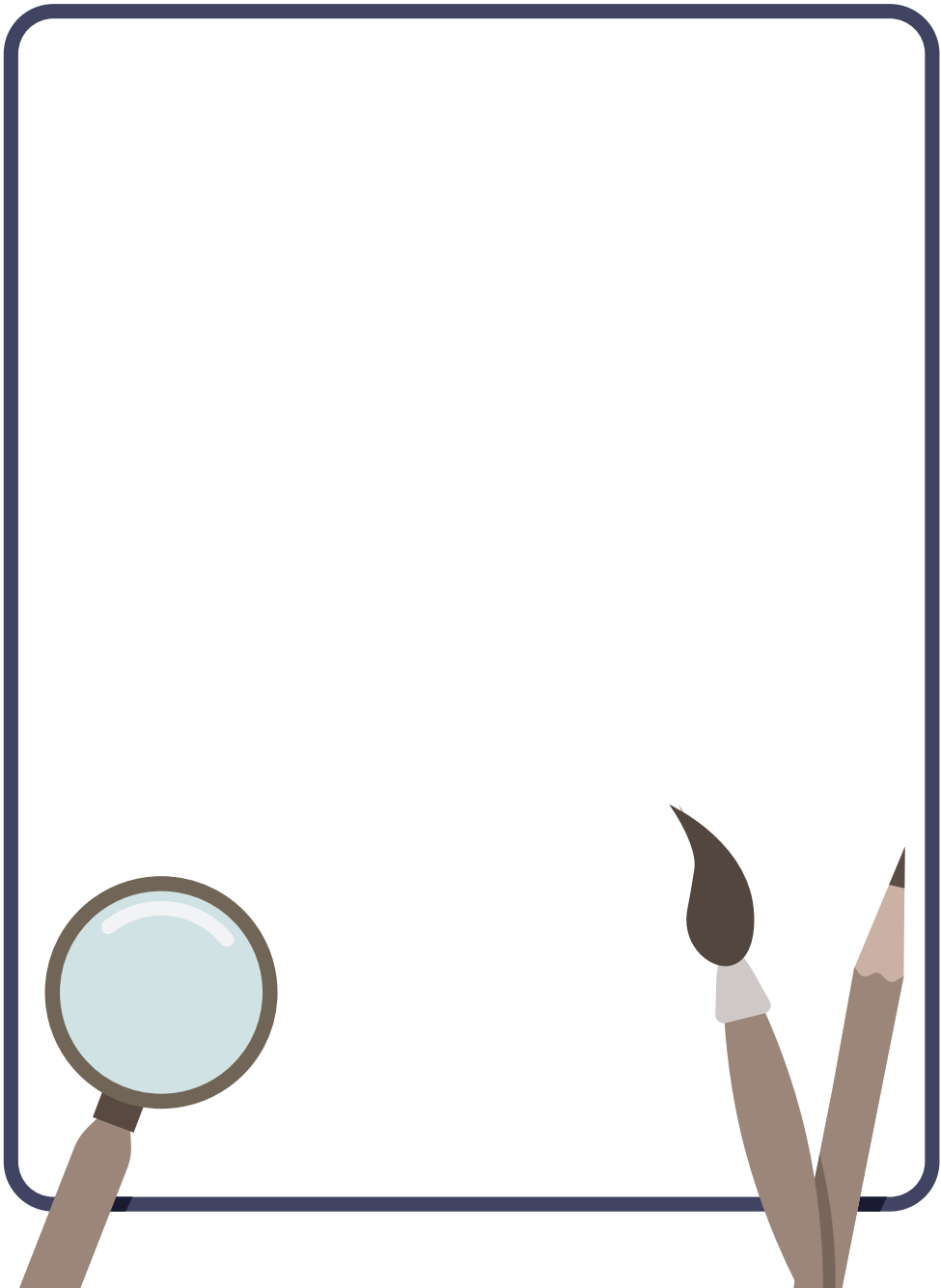
Microorganisms, also called **microbes**, are very **tiny organisms** that can only be seen using a microscope...





# MICROSCOPE

Have you ever heard about microbes before? What do you know about them? **Paint your own version** of a microbe in the box below:



# MICROBES

Let's now have a look at some pictures of **real microbes!** There are a lot of them, look how awesome they are!



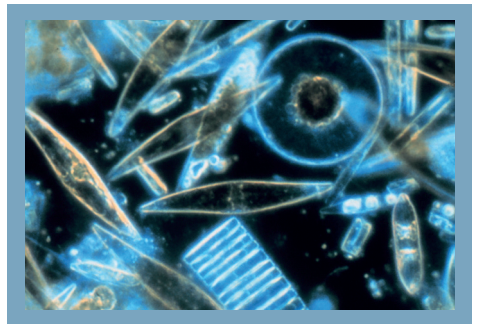
## Euglena!

They usually have a have a **green cylindrical** or sausage-like shape and a bright green colour. They move using a **small tail** that acts as a motor to **swim** around. Like plants, they can produce their own food by **photosynthesis!**



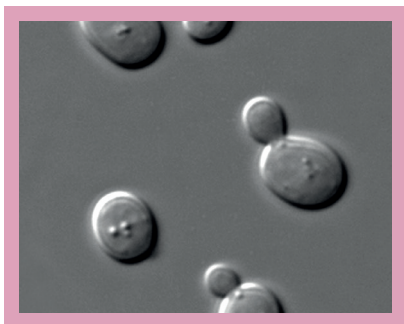
## Diatom!

They come in all kinds of **beautiful shapes** and are microscopic algae that can live in both **fresh** and **marine water**.

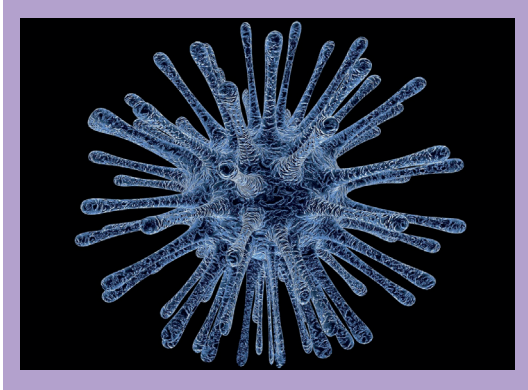
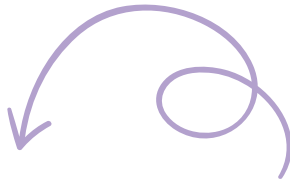


## Yeast!

They are small fungi usually with a **round or pear-like shape**. And do you know what? They help us with making products like **bread** or **beer!**







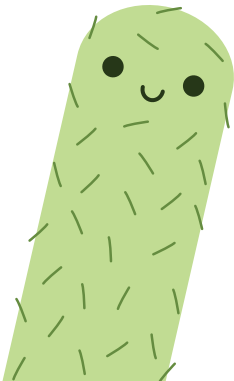
## Virus!

They are usually **the bad guys**. These small microbes **invade** other microorganisms, animals or plants **causing them harm**. The flu or COVID-19, for example, are caused by a virus!



## Bacteria!

They also come in **all kinds of shapes**! Like viruses, some of them can cause disease, but the great **majority** of them are **harmless** or even **beneficial** for us!

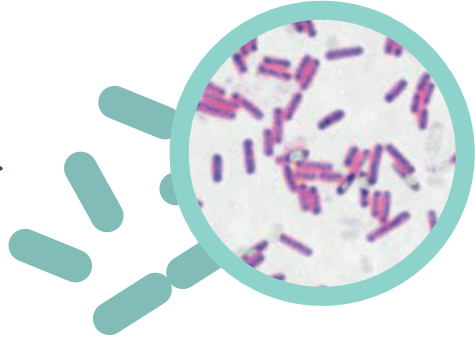


**Bacteria are our favourite group of microbes.**  
**Let's learn a bit more about them!**

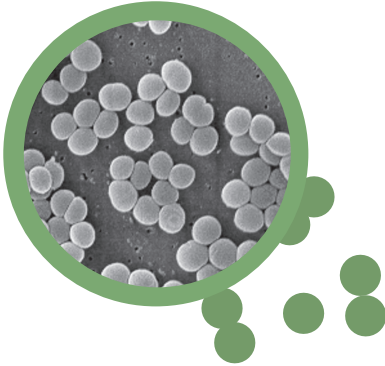
# BACTERIA

These are some of the **shapes** that bacteria can have:

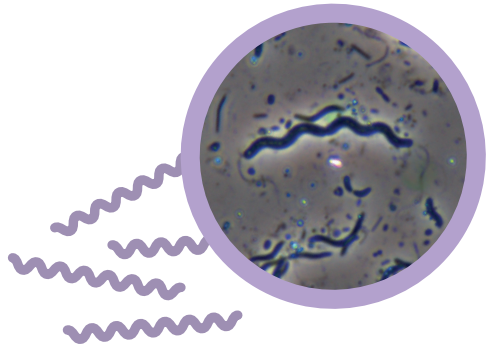
There are some that look like a stick, they are called **bacilli**.



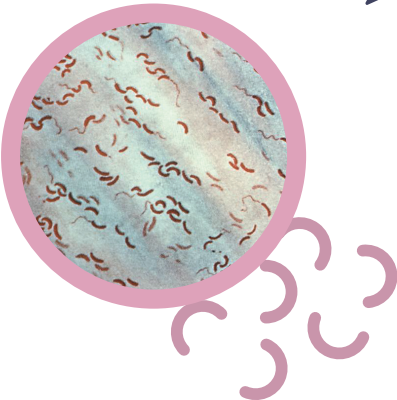
Some have a small ball shape, they are **cocci**.



Others are like a spring, their name is **spirilli**.



There are even some comma-shaped ones! The **vibrios**.



Do these microbes look similar to the ones you painted before?  
What do they have in common? What is different?

**Tell us** about it in this box:

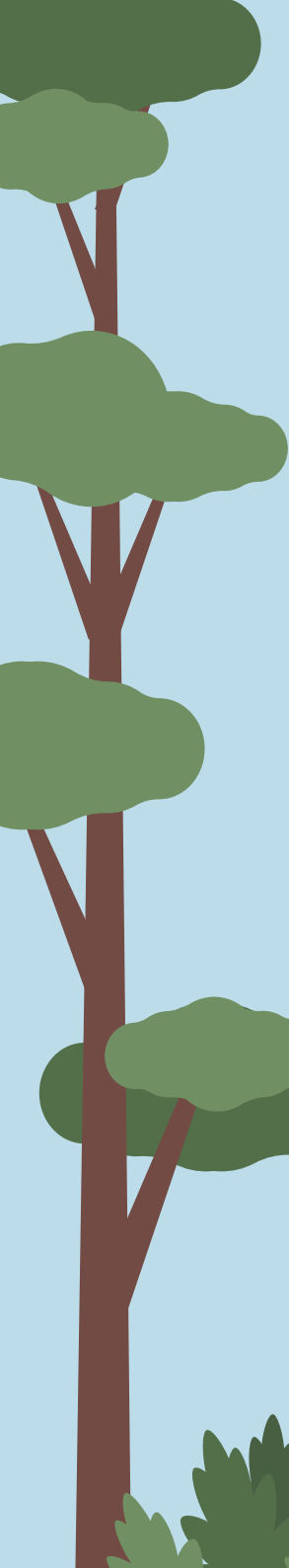


**Are you curious to know where these tiny microorganisms live?**

Well, bacteria live anywhere! On the ground, in the sea, on your sofa, in your food and even in your body.

Fascinating right? It is a pity that they are invisible to the naked eye...It would be great to visit them like we visit animals in the zoo. If only there was a bacterial park where we could see how they live, what they do, what they eat...

**IMAGINE THAT...**



WELCOME  
TO THE...





# BACTERIAL PARK

# MAP OF THE PARK





- 1** The endless forest
- 2** The extreme summits
- 3** The super fridge
- 4** The body's roller coaster
- 5** The industrial maze
- 6** The caves
- 7** The secret laboratories

# We introduce you to the tiny creatures that inhabit this island!

But we have a problem, now they are all mixed and some of them don't get along very well...**Would you help us bringing these bacteria to the area of the park where they belong?**

Read on to discover more about each inhabitant and area, you are going to become an expert in the bacterial park!

In the last pages you will find the **cutouts** of the bacteria!



You can **cut** them and **glue** them in the **park area** where you think they will feel at home.





### THE DECOMPOSER

I **break down** soil materials! Leaves, fruits, or even dead animals. I **clean up** and **recycle** nature's leftovers!



### THE FLASHLIGHT

One day I woke up and had the **power to shine!** Incredible, right? Now I help humans to **detect substances** that can be dangerous. When I'm around them...I shine!



### THE YOGURT MAKER

**Milk** is my favourite food! I actually drink it and turn it into **yoghurt**. Thanks to me yoghurt has that **creamy texture** and slightly **acidic flavour**.



### THE ICE QUEEN

I prefer the cold! I live in the icy waters of Antarctica, at **temperatures between 0 to 4°C!** Most of the other bacteria or animals would freeze at this temperature but I love it!



### THE GUESTS

We love diving refuge in your **gut**! It is so warm here, and there is plenty of food! But don't worry, we are **harmless**! We actually help you **digesting your food** and keeping you healthy!



### THE WATCHER

I help **plants** and **trees** getting the nutrients they need! I take nitrogen from the air and put it into the soil to **help plants grow** strong.



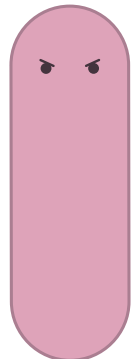
### THE LIFESAVER

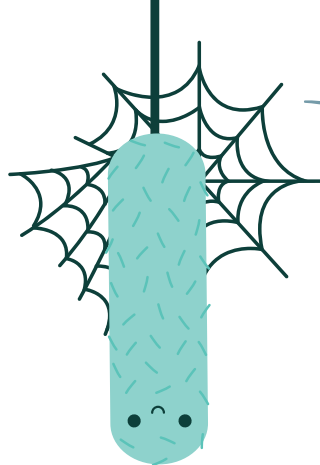
Bacteria like me naturally produce **antibiotics** and other useful compounds that you can use to **fight other bacteria** that cause disease!



### THE ANNOYING ONE

I am a pathogen that produces eye **infections**! Wash your hands before touching your face, or I will make your **eyes** swell and cry!



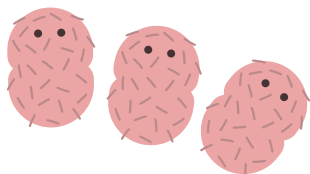


### SPIDER BACTERIA

How much I have learned from spiders! Now I **produce** a **silk-like material** that is used in many products. It's super tough! Do you want me to knit you a hat?

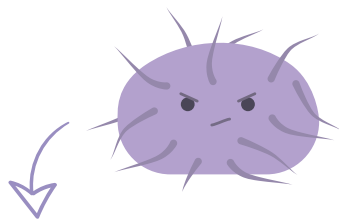
### THE HEAT LOVER

I love super hot water! The warmer the better! I usually live at **temperatures** that range **between 50 to 80°C**! If you visit me, be careful not to get burned!



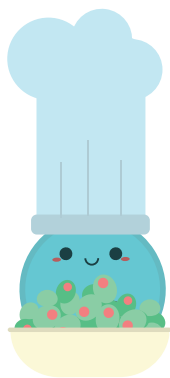
### THE SKIN PROTECTORS

We act as a **barrier** on top of your **skin**. We **protect** you from bad bacteria and infections!



### THE PARTY POOPER

I sometimes contaminate eggs or dairy products like milk. If you eat me, I will cause you **fever** and **stomach pain**. Be careful with me!



### THE VEGGIE

The **olives** drive me crazy! In just a few days I turn them into a **delicious snack**. Thanks to me, they become softer and a little bit acidic.




## THE ENDLESS FOREST

Forests, rivers, meadows...bacteria are very important for all our landscapes as they can **decompose materials** and serve as natural **fertilizers** for our soils! Can you guess which two bacterial species would like to live here?

## THE EXTREME SUMMITS

In this place, we have recreated the areas of the planet with the most extreme climates. How difficult it is to live here! High mountains with **frozen landscapes**, hot and dry **deserts** or boiling **hotsprings**.



Most organisms cannot stand these conditions, but even in these places, we find **bacteria** that **survive**. Who will be the brave ones?

## THE SUPER FRIDGE

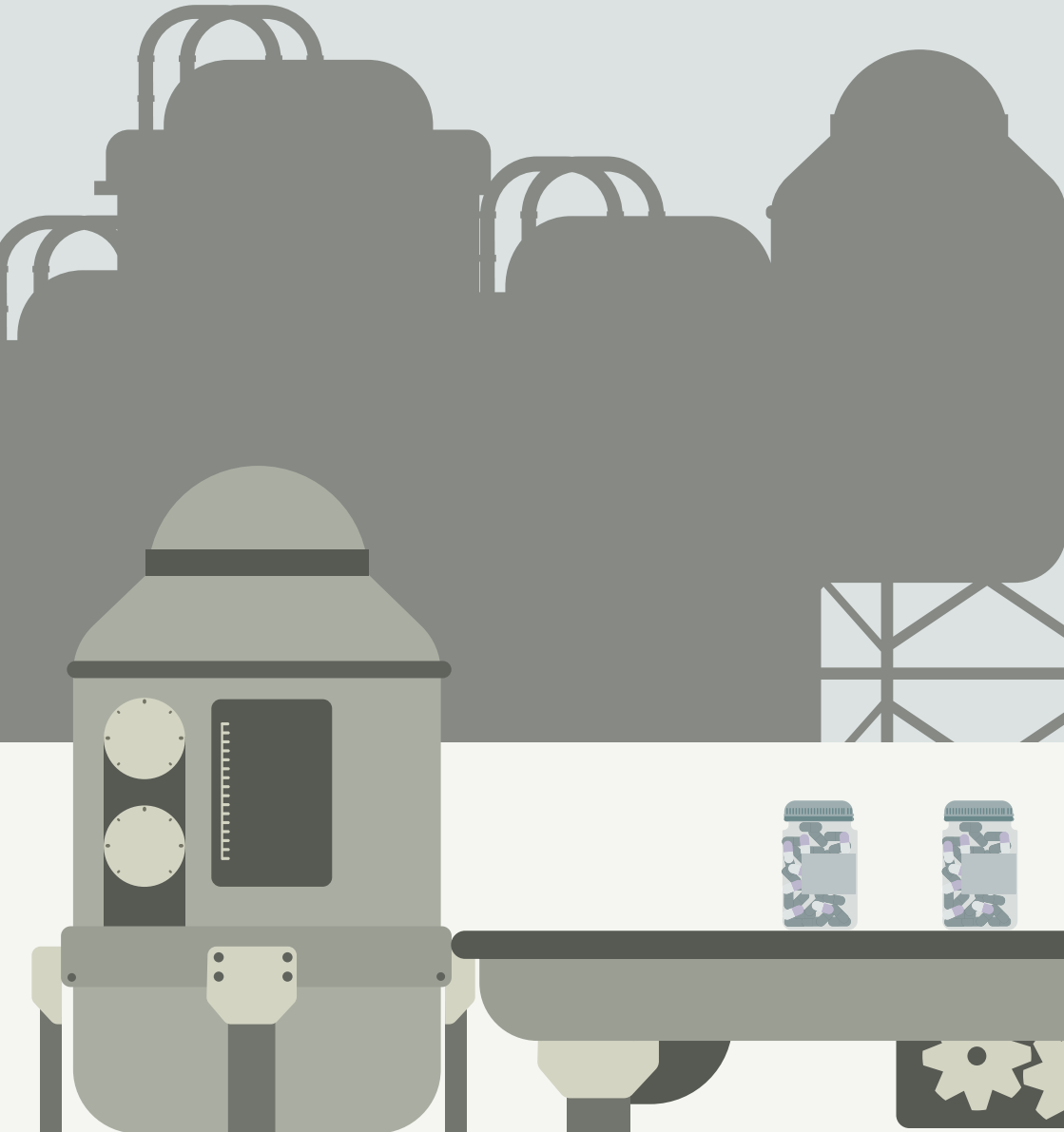
Tasty and healthy! Bacteria are also found in many **things that we eat** every day and they are responsible for their characteristic **flavour** and **texture**.

Cheese, milk, pickles or olives are some of the delicious foods that bacteria prepare! Help us discover which park dwellers would be happy in this fridge!



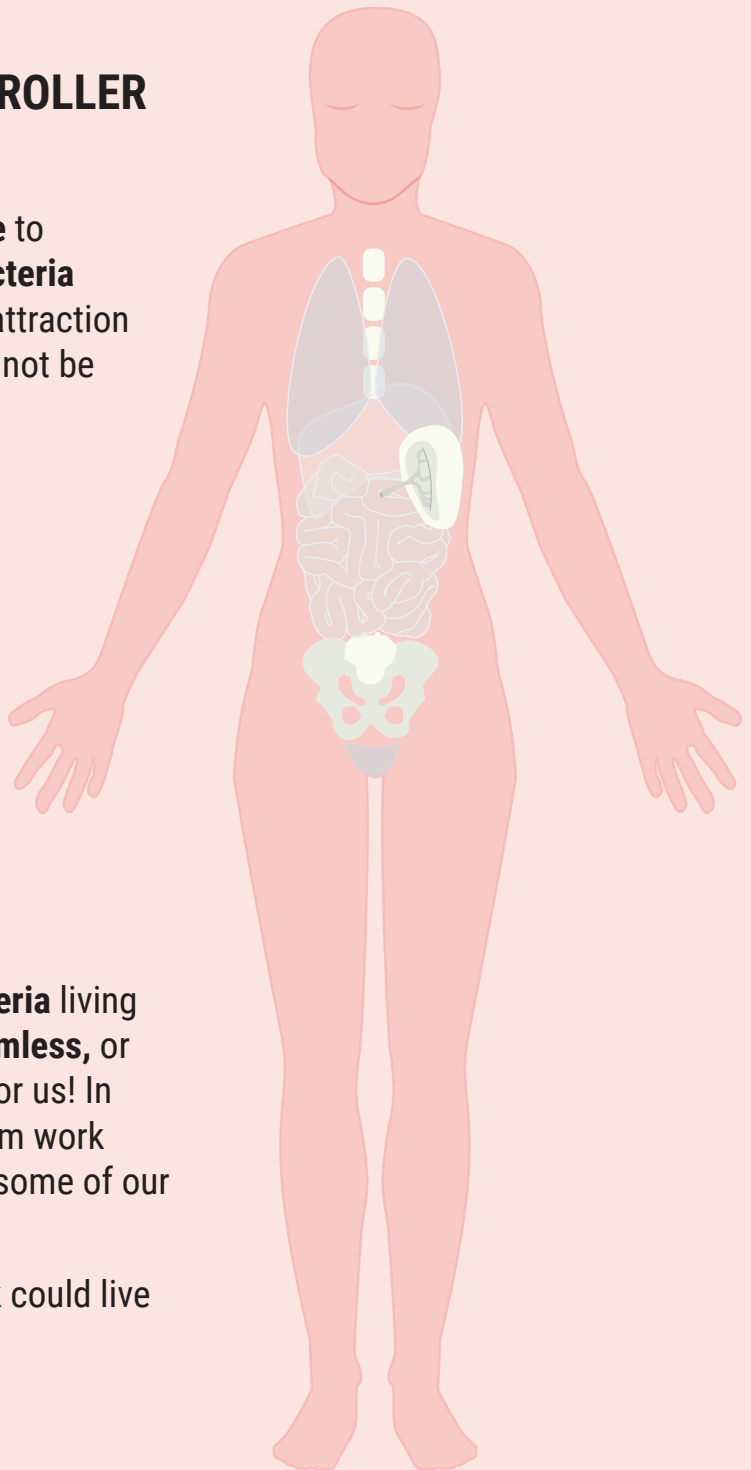
# THE INDUSTRIAL MAZE

Microorganisms naturally produce **useful substances** like pigments or antibiotics. That's why we use them to help us make products like **medicines** or **dyes**. Which bacterium do you think could live in this maze of machines, bioreactors, and pipes?



# THE BODY'S ROLLER COASTER

Our body is **home** to **thousands of bacteria species**, so this attraction in the park could not be missing!



**Most of the bacteria** living within us are **harmless**, or even **beneficial** for us! In fact, many of them work helping us to do some of our body functions.

Who do you think could live here?

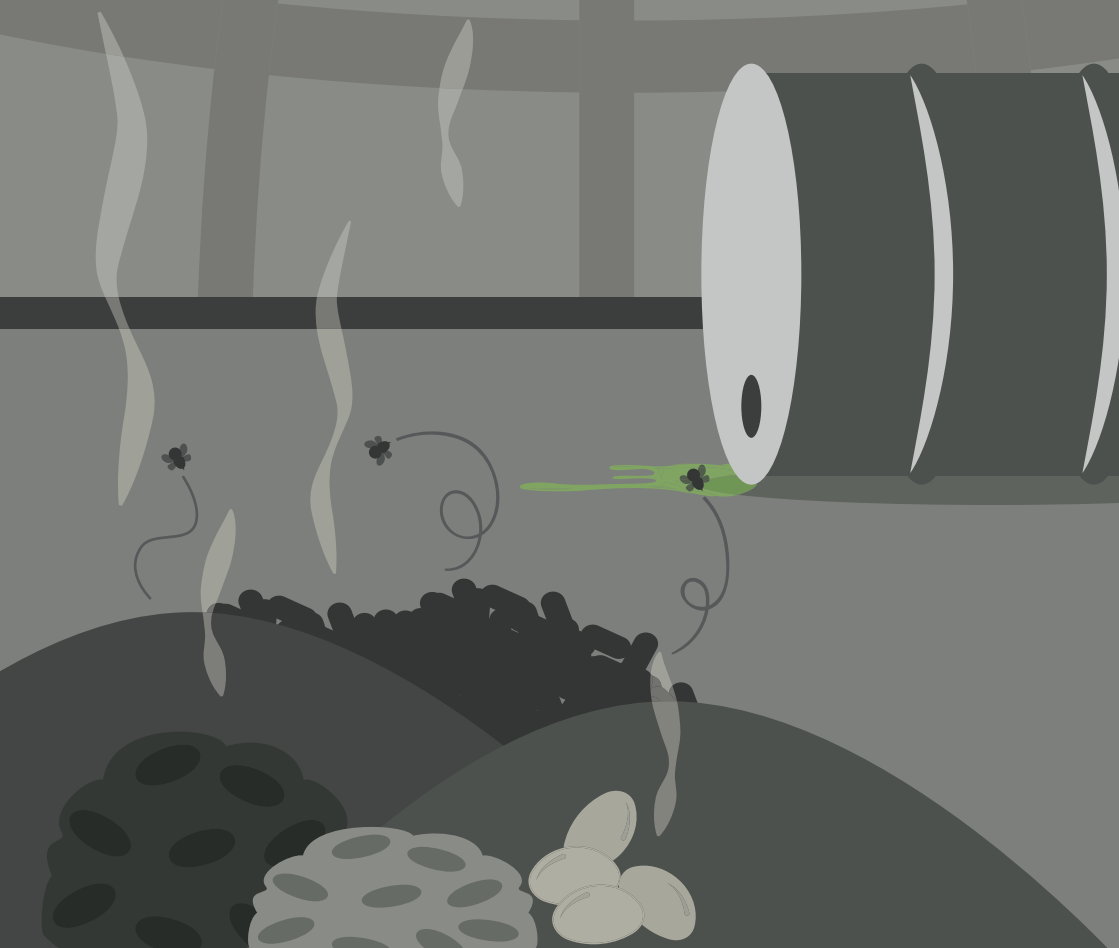


## THE CAVES

Some of the bacteria that like living in our bodies can cause us **diseases** too. We call them **pathogens**.

But there is no need to worry, in the park we will have them well guarded.

Help us find them to take them to the caves!



# THE SECRET LABORATORIES:

Can we **modify microorganisms**?

In addition to their natural abilities, scientists can modify bacteria and give them **new features**!

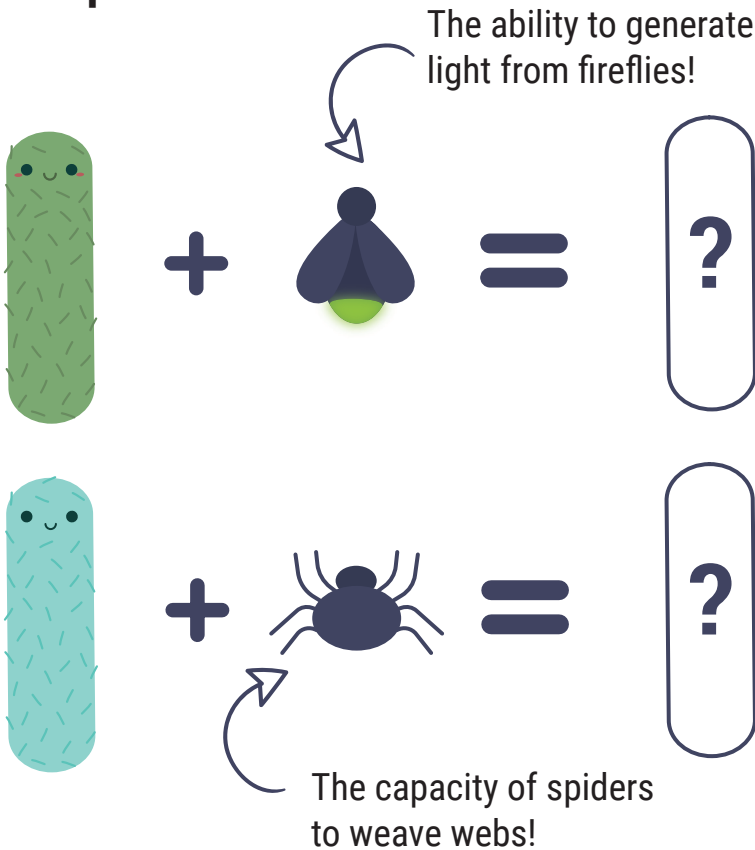
In this way, they can help us produce many **useful products** such as clothing or dyes. Welcome to the Laboratory of Synthetic Biology!  
Would you help our scientist to find the right bacteria?



With a bit of science, we can **improve** some **bacteria** so that they eat plastic and help us fight pollution. We can even make them clean the oil from the sea! The **possibilities** are **almost endless!**

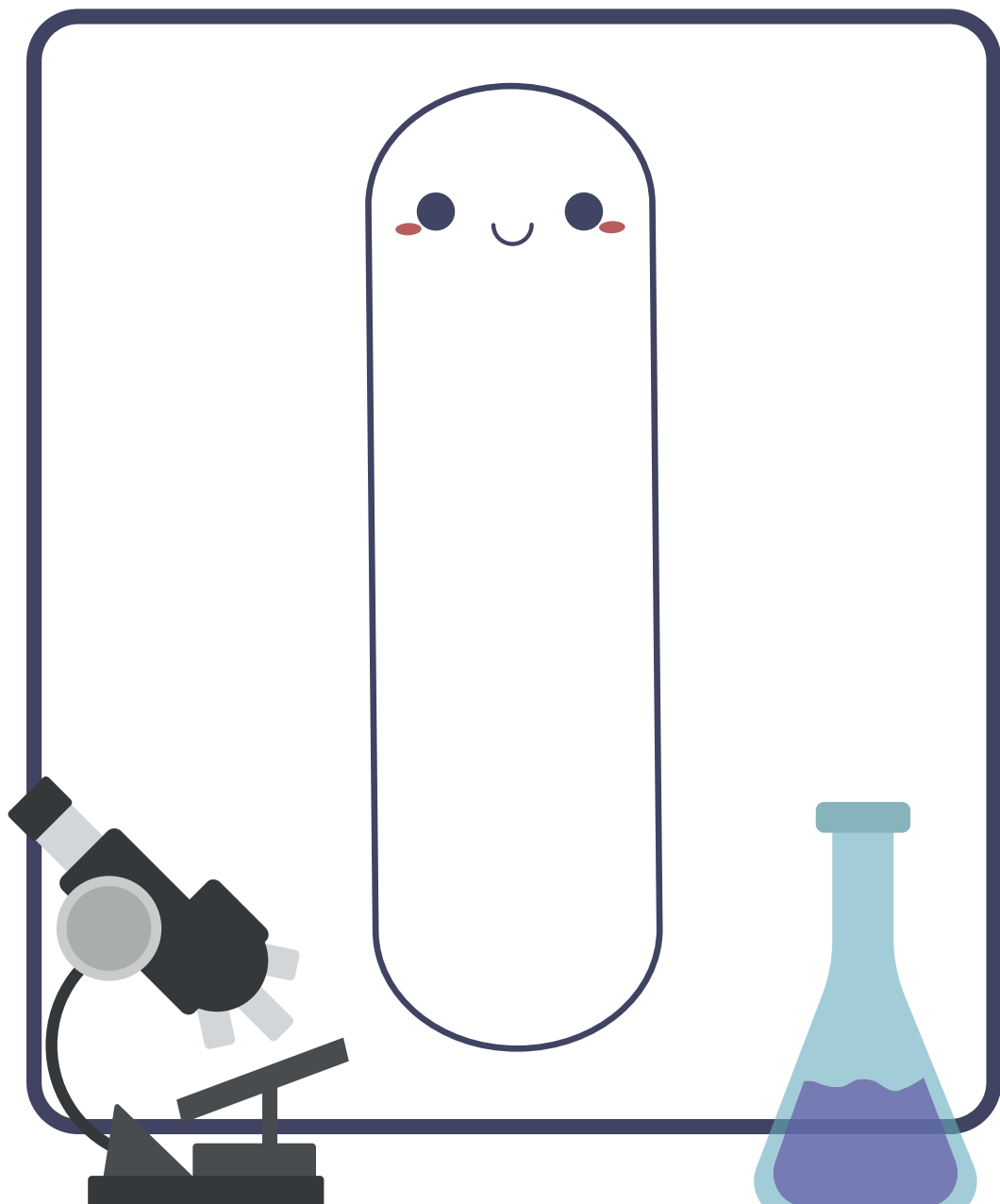
Look at these **real examples**:

## Bacteria plus...



**Which bacteria were designed in the laboratory?**

And since we are in the laboratories, would you like to become a researcher for a day? **Design your own bacterium!** What features would it have? What would you like it to be able to do? **Paint it in the box below!**



## **THANKS SO MUCH FOR YOUR HELP!**

Bacteria are much happier now, we hope you enjoyed the experience in the park. Don't forget about these tiny organisms and...

**COME BACK SOON!**

