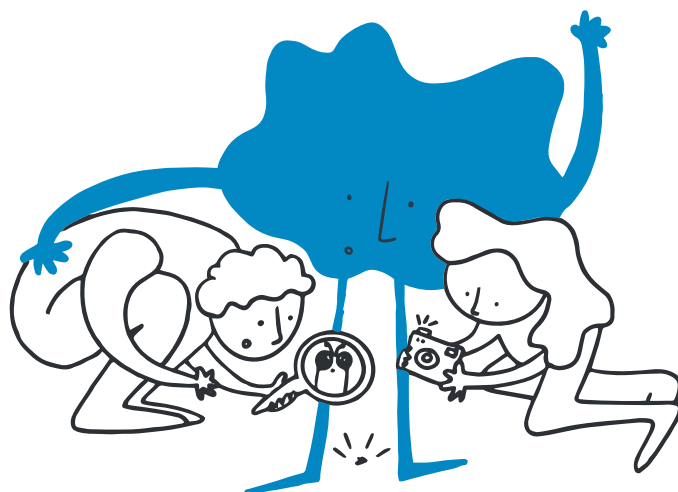


CURIOSITY MICROSCOPE

Getting to know plankton



EXPLORE – OBSERVE – SHARE



WWW.CURIOSITYMICROSCOPE.ORG

ACKNOWLEDGMENTS

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Plankton
Planet

Fondation
tara océan
explorer et partager

Concept and realisation by SeaLabX (www.sealabx.com)



Illustrations by Marta Musso (Instagram: @_possea)

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BIOcean5D



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Whether as a starting or ending point, observation can begin in

GAMES | Piquing curiosity through play

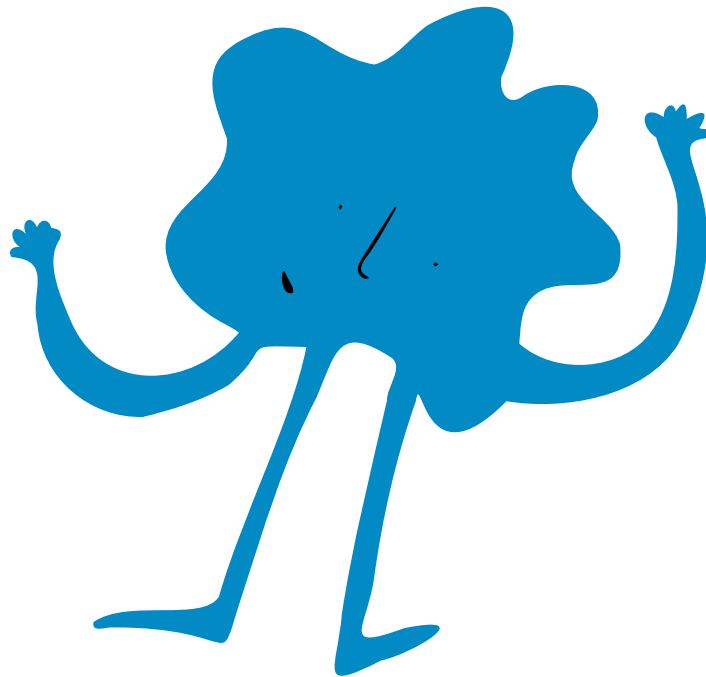
IMAGINATION | Imagining, dreaming of the invisible

IMMERSION | Taking people to the invisible and bringing the invisible to people

CREATION | Raising awareness through creativity

EXPLORATION | Enabling a global community of explorators

CONNECTION | Connecting people to the invisible and to each other.



LET'S DIVE IN !

This guide is a source of information on the observation of the invisible. It aims to inspire kids, grown-ups, teachers, science communicators, earth and marine enthusiasts as well as researchers towards a collective and responsible exploration of an invisible jungle!

Curiosity leads us to observation and helps to consolidate how we learn and understand the world. From the moment we are born, we learn through observing and imitating.

So, let's explore the largest playground available to us: Earth.

Within it, the ocean represents 70.8% of its surface, it is essential to life on it, provides oxygen, food, energy, leisure and so much more. Despite this, we have only explored a fraction of it. Indeed, 15% of the deep ocean has been mapped with modern technologies, and of that only 5% has been seen through human eyes!

From a puddle, a stream, a river, a garden, a field, a tree or a forest, observations can help us better understand the systems that regulate, at much larger scales, the functioning of our planet: how individuals or populations behave, the inter or intra-species relationships, the adaptation to the environment (the weather, eutrophication, pollution).

Fundamentally, in science, observation generates and answers many questions.

In this guide, we offer a few ideas to integrate observations in your scientific or educational activities.

To find the digital version of this guide and all the resources to help you make use of the microscope visit our website:



www.curiositymicroscope.org

PLANK... WHAT?

Plankton are tiny creatures that float around in the ocean. They can be so small that you can't see them with your eyes, but they are very important because they have many functions, these include:

Food for other animals: Plankton is an important source of food for many sea creatures. Just like how you need to eat to grow and be healthy, animals in the ocean also need to eat to survive. Plankton is like the bottom of the food chain - it provides food for bigger animals, like fish and whales.

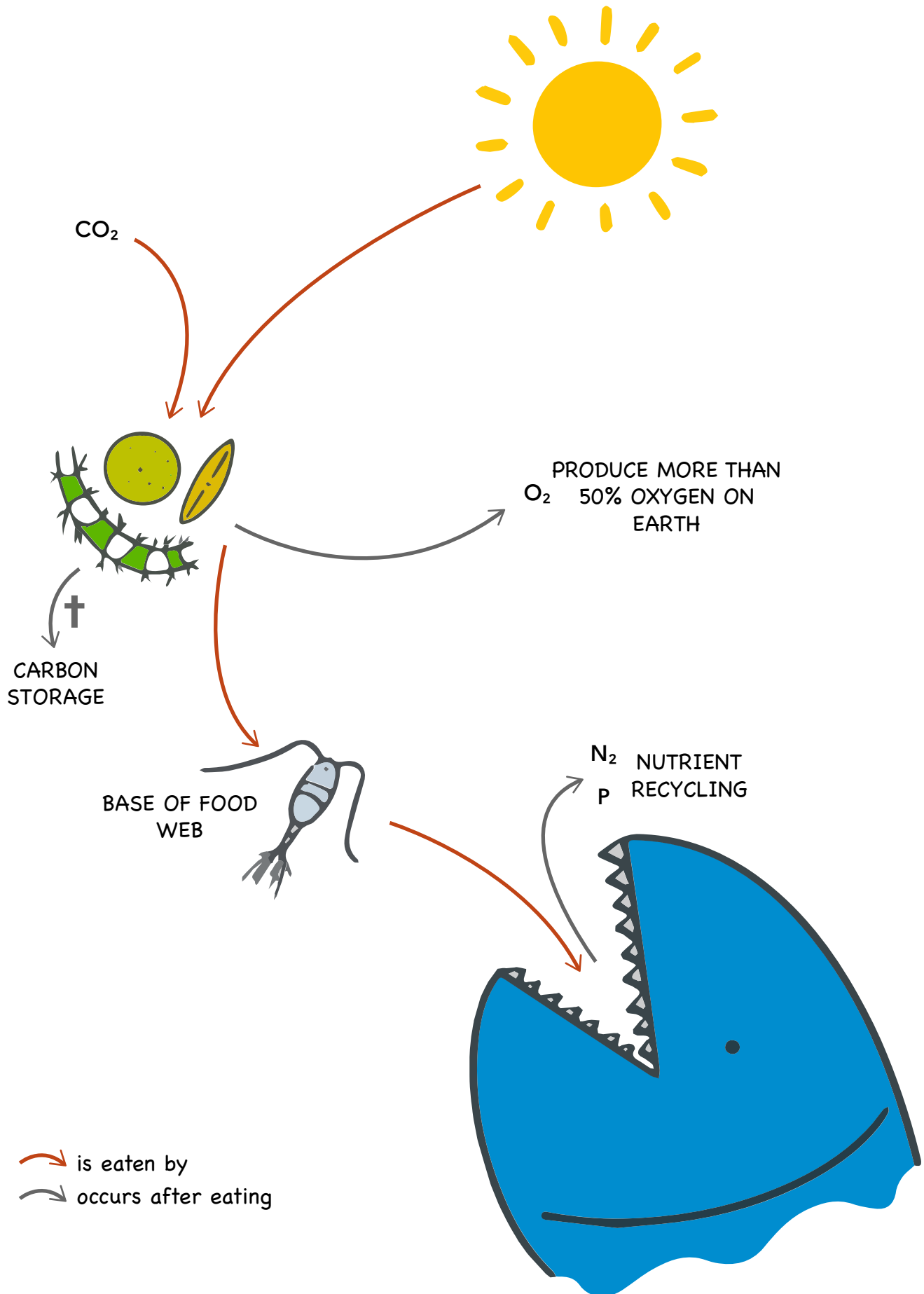
Oxygen production: Did you know that about half of the oxygen in the air we breathe comes from the ocean? A lot of this oxygen is produced by phytoplankton, which use sunlight to make food and release oxygen as a by-product.

Recycling nutrients: When animals in the ocean eat plankton, they break it down and release nutrients like nitrogen and phosphorus back into the water. These nutrients are important for the growth of new plankton, which in turn provides food for other animals.

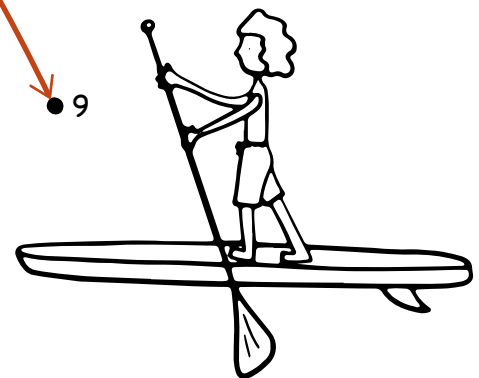
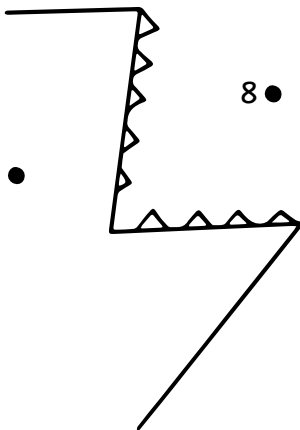
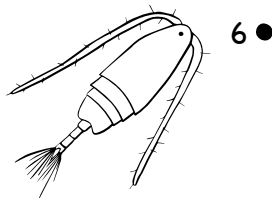
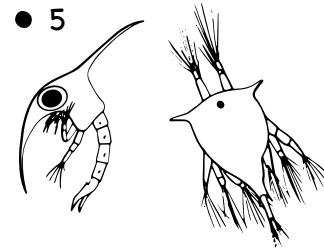
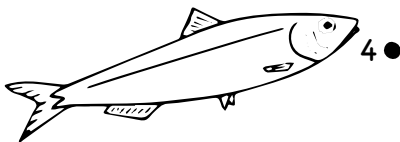
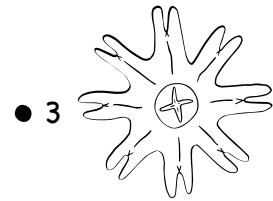
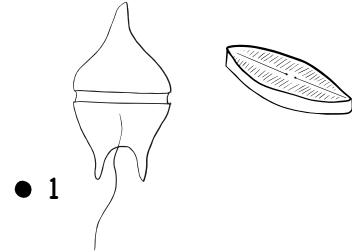
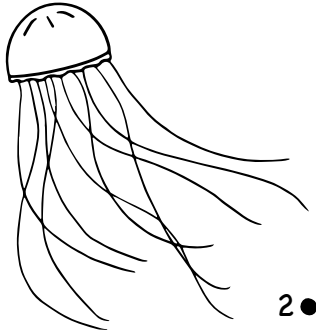
Carbon storage: Phytoplankton can also absorb carbon dioxide from the atmosphere, which helps to reduce the amount of this greenhouse gas in the air. This is important for helping to prevent climate change.

So you see, even though plankton might seem small and unimportant, it actually plays a very big role in the ocean and in the world around us!

PLANKTONIC FOOD WEBS



CAN YOU FIND OUT WHO'S EATING WHOM?



 is eaten by
Solutions on last page

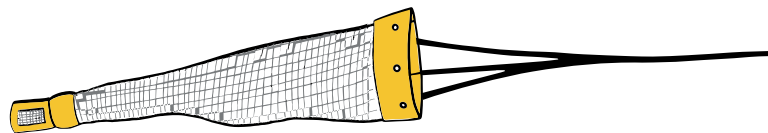
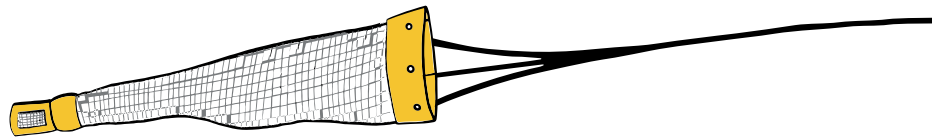
HOW TO COLLECT?

There are different ways to collect plankton, depending on what we want to know and which type of creature we are looking for. Here are some ways you can do it:

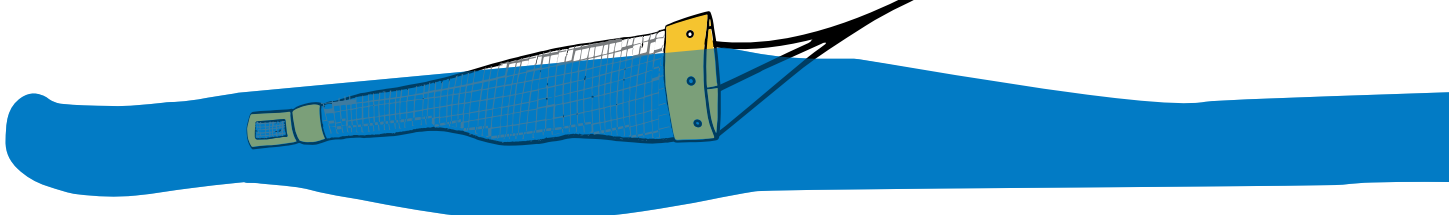
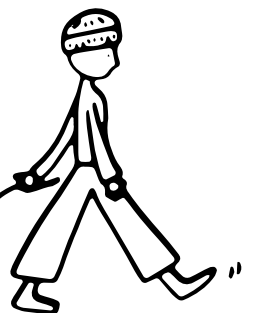
Plankton Nets: We use a special net with tiny holes to catch the plankton while towing it behind a boat, or while walking along the water edges (be careful not fall in!) for example along a pontoon.

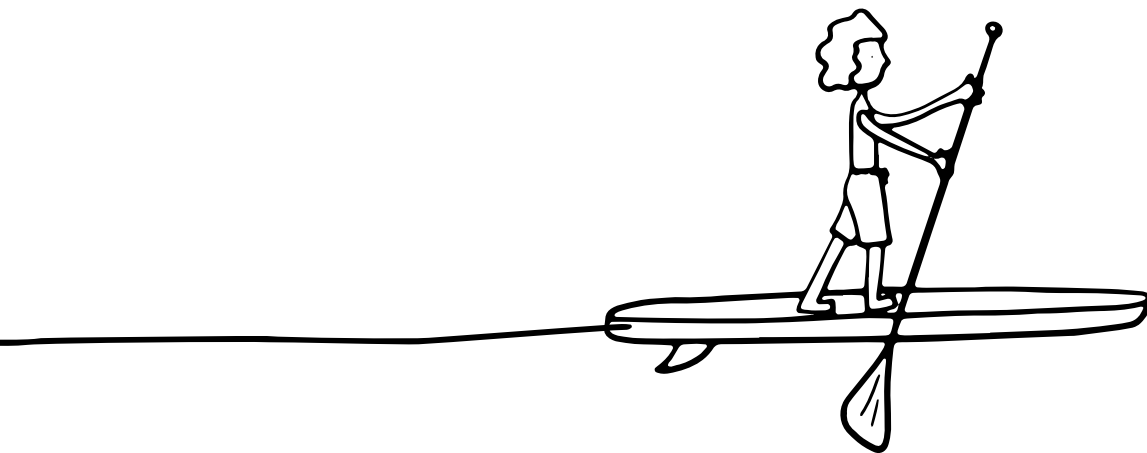
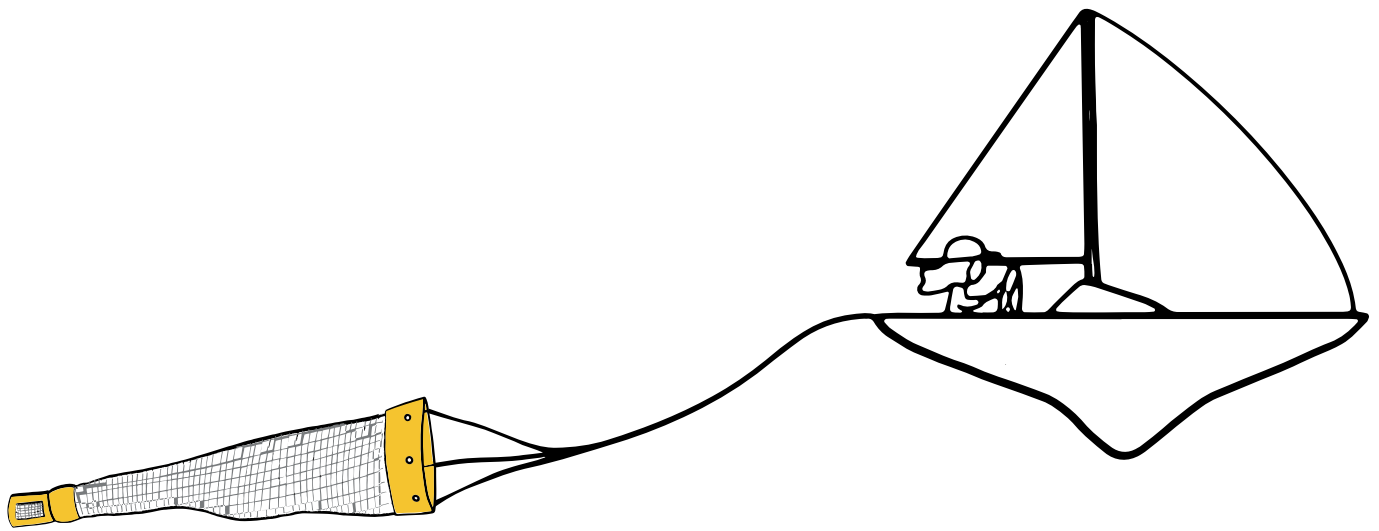
Plankton scoop: We use a special hand-held sieve to collect the sample. This is useful for shallow depths, for example in rivers, puddles, lakes and ponds or from the seashore, if you don't have any means of going on the water.

Have a look at these videos to see how it is done:

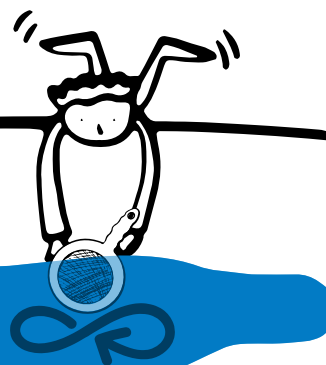


Drag the net along the pontoon





Dip the plankton scoop into the water and draw ∞ shapes to concentrate the plankton.

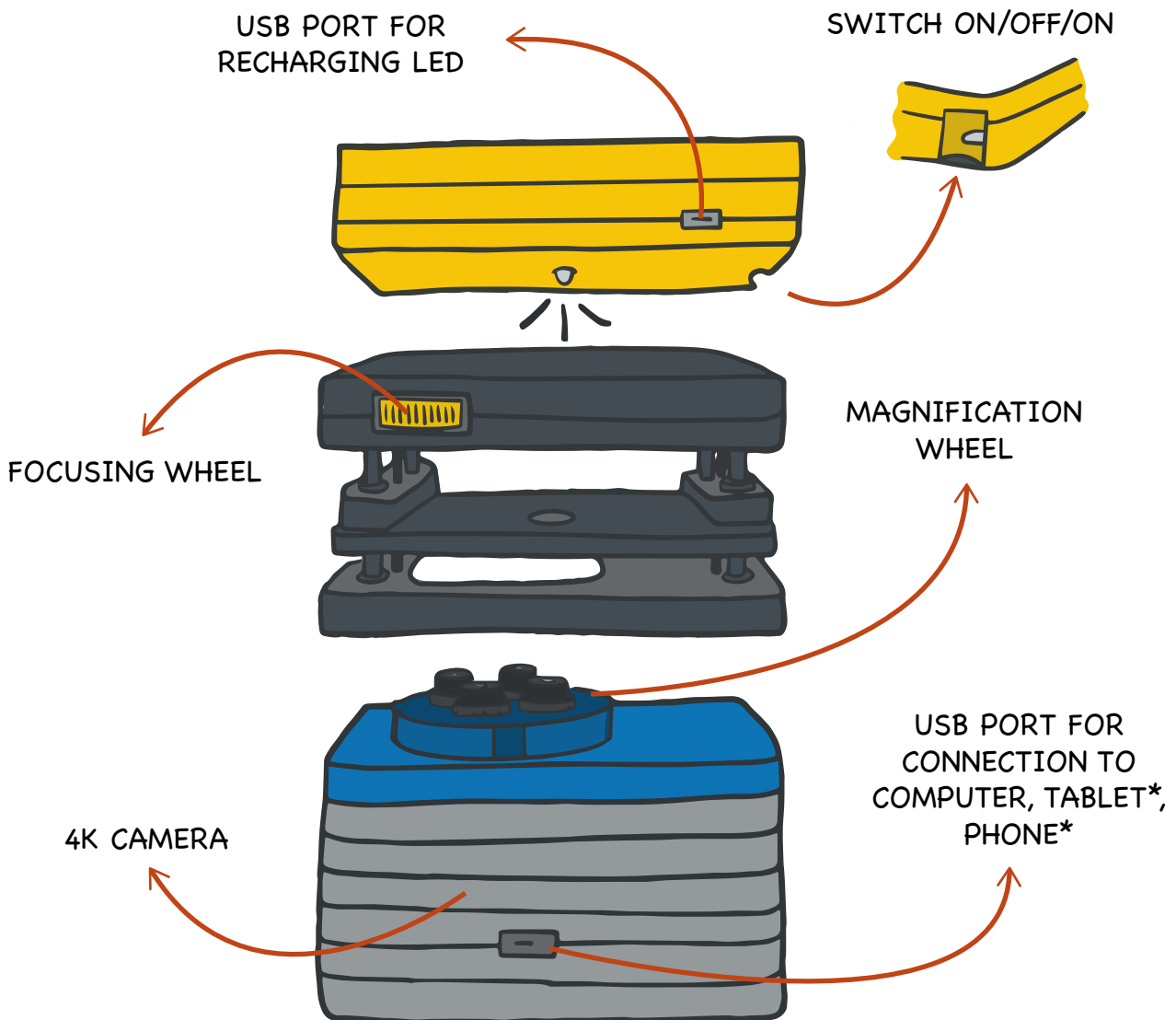


ARE YOU CURIOUS?

The Curiosity microscope is a tiny microscope designed to encourage curiosity and exploration in users, particularly children. It can be used to magnify small objects and specimens, such as insects, leaves... or plankton!

The Curiosity microscope is designed with playful features, such as bright colours, fun shapes, and easy-to-use buttons, so that it is more appealing to everyone. It is lightweight and portable, which makes it easy to bring it along on your outdoor adventures or to take to school or science class.

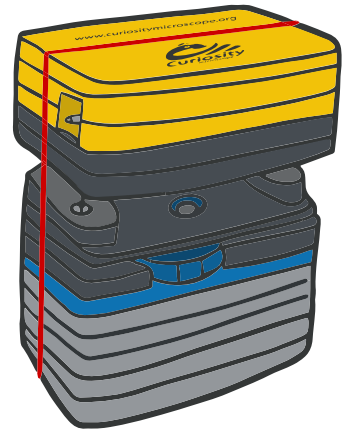
The goal of the Curiosity microscope is to inspire to explore and investigate the world around us, and to foster a sense of curiosity and wonder about the natural world. By using a Curiosity microscope, you can see details and patterns in objects that you might not have noticed before.



WHAT'S IN THE KIT?

Microscope:

- Light module
- Sample holder module
- Magnification module
- Camera module
- USB cable



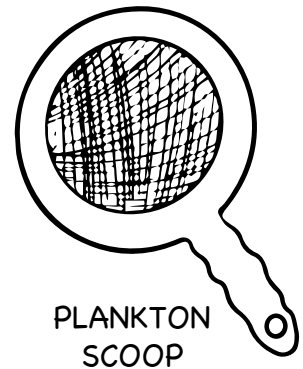
CURIOSITY MICROSCOPE

Accessories included in different kits:

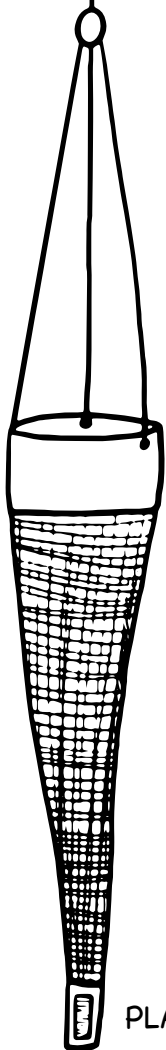
- Microscope (as above)
- 1 Petri dish holder
- 1 manual pump
- 1 observation glass tube
- Glassware accessories
- Plankton scoop

Separate accessories purchased separately:

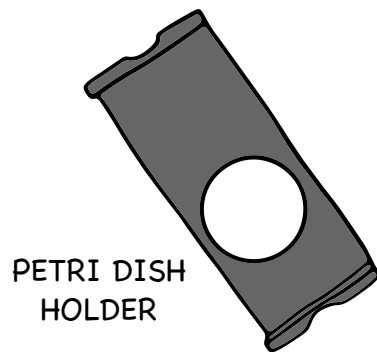
- Plankton net
- Counting blade



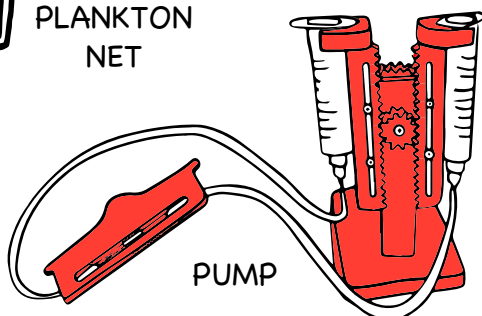
PLANKTON SCOOP



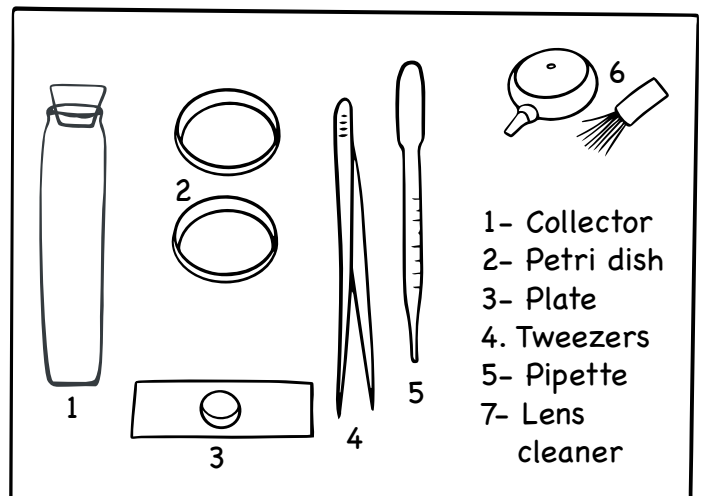
PLANKTON NET



PETRI DISH HOLDER

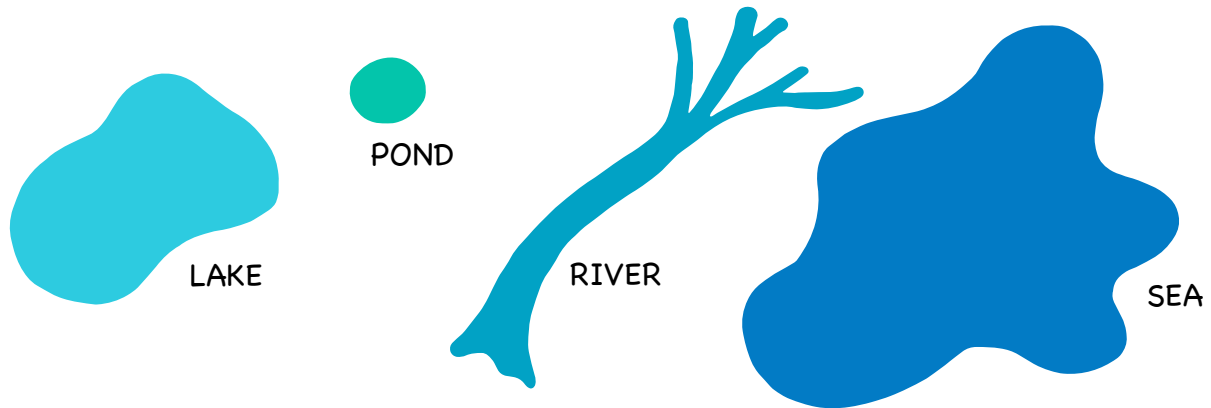


PUMP

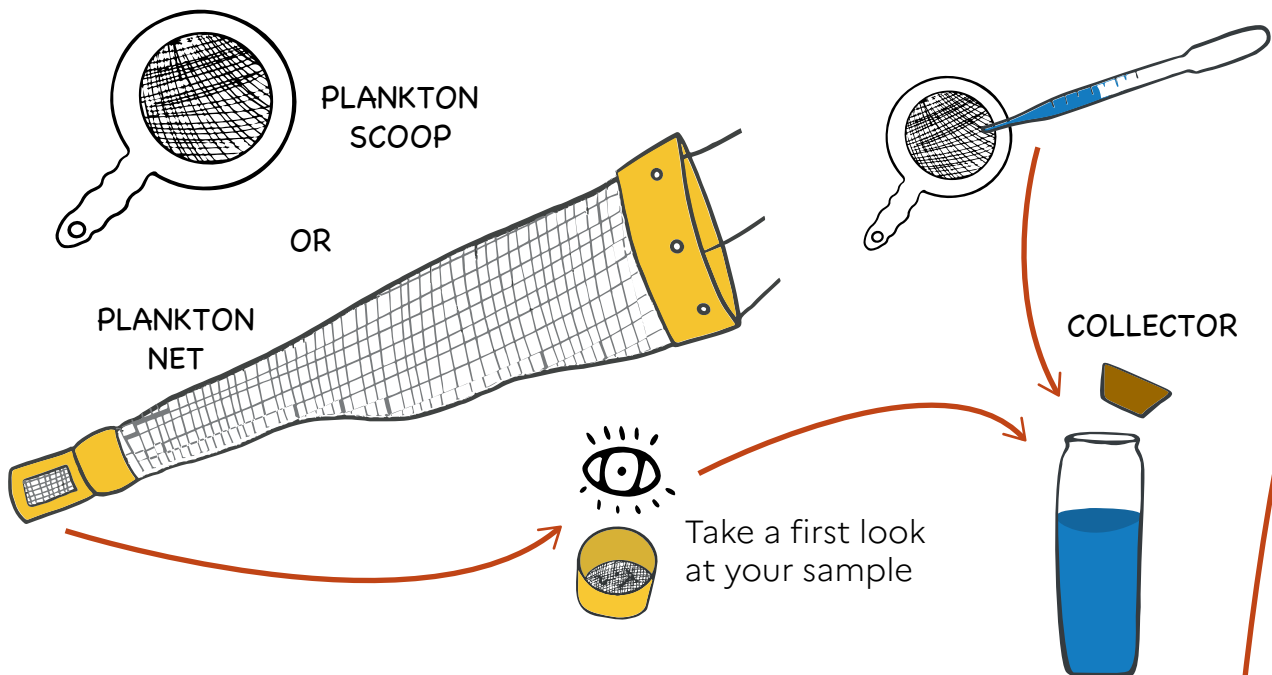


HOW TO COLLECT?

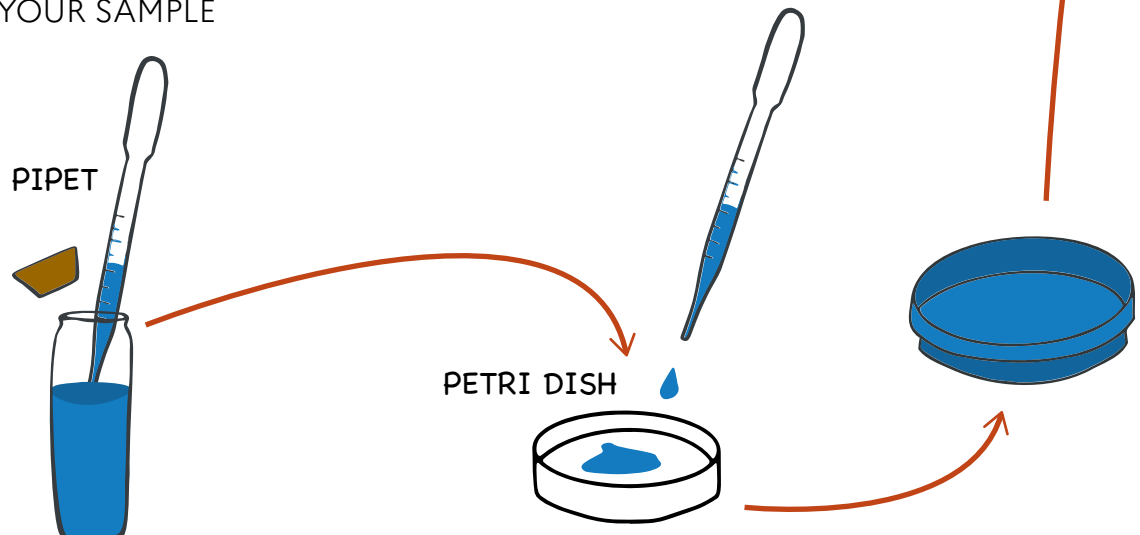
1. CHOOSE THE SPOT TO GET YOUR SAMPLE FROM



2. WATER FILTRATION

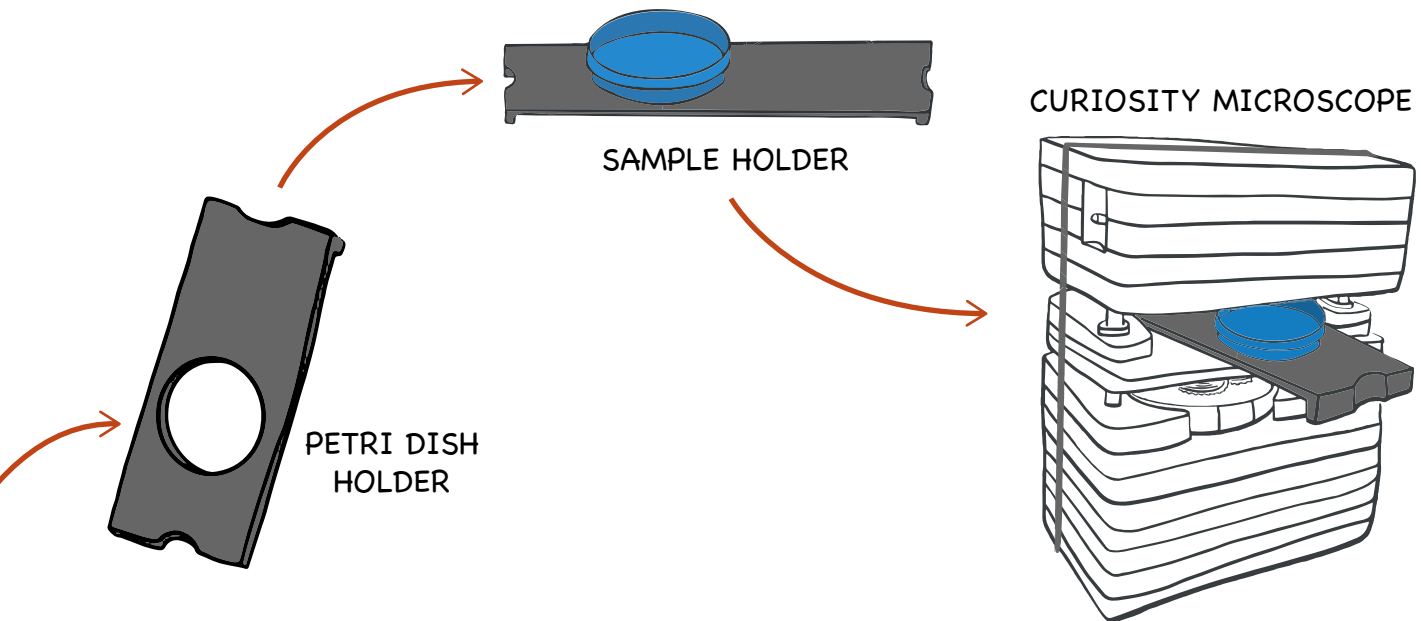


3. PREPARE YOUR SAMPLE

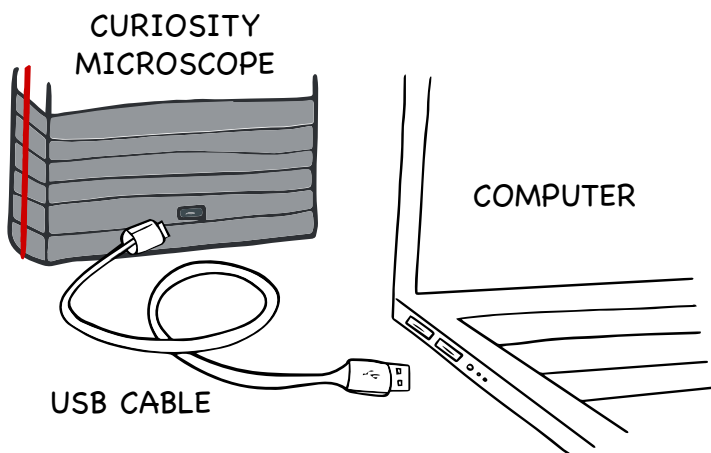




HOW TO CONNECT?

4. PREPARE YOUR CURIOSITY MICROSCOPE

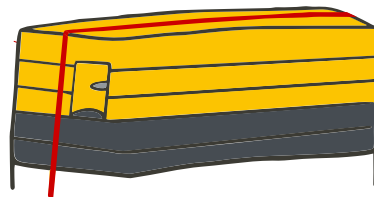


5. CONNECT TO YOUR COMPUTER, TABLET*, OR SMARTPHONE*



-  On **Mac**: open the «QuickTime Player» app, select «New video recording», then source «4K USB Camera»
 -  On **Windows**: open the «Camera» app, select the «4K USB Camera» source
 -  On **Android**: install then open the «Next Camera» app, select the «4K USB Camera» source
 -  On **iOS**: install then open the «USB Camera Pro» app, select the «4K USB Camera» source
- *only compatible with USBc devices

SWITCH ON
THE LIGHT



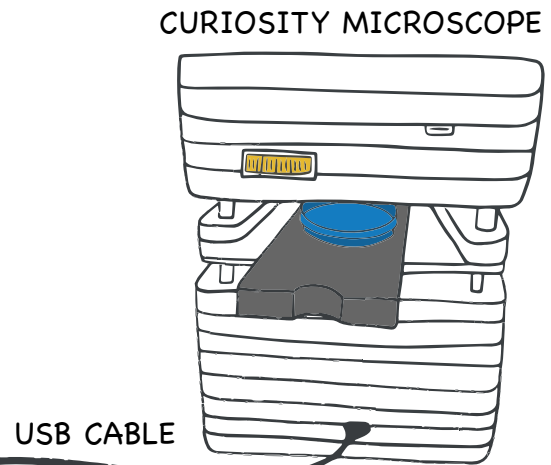
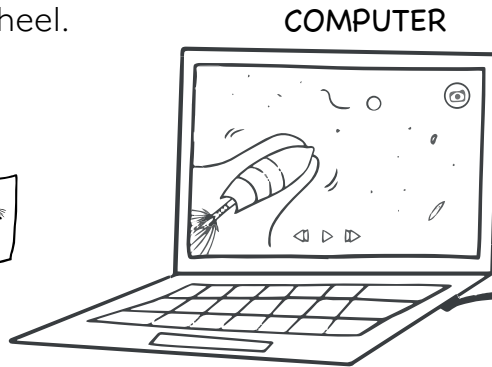
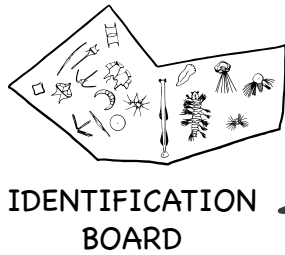
SWITCH ON/OFF/ON



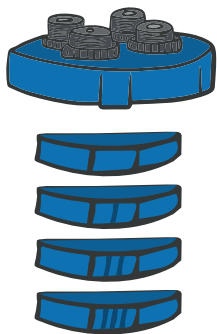
HOW TO OBSERVE?

6. OBSERVATIONS

Adjust the focus using the focusing wheel.



8. OBJECTIVES & MAGNIFICATIONS



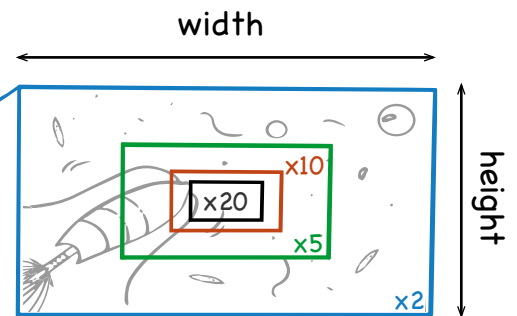
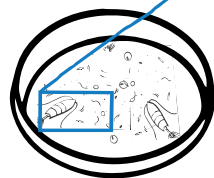
FIELDS OF OBSERVATION
(width x height)

x2 → 4mm x 2.25mm

x5 → 2mm x 1.12mm

x10 → 1mm x 0.56mm

x20 → 0.7mm x 0.39mm



7. RECORD OBSERVATIONS

With the app you use you can record videos and take pictures very easily by usually clicking a single button. The images are then saved on the device you used. Don't forget to share them with us!

Don't forget to share your experience with the community!

#curiositymicroscope



WHAT DO YOU OBSERVE?

DATE:

NAME:

SAMPLING LOCATION:

μm

SCALE*

*1mm = 1,000 μm



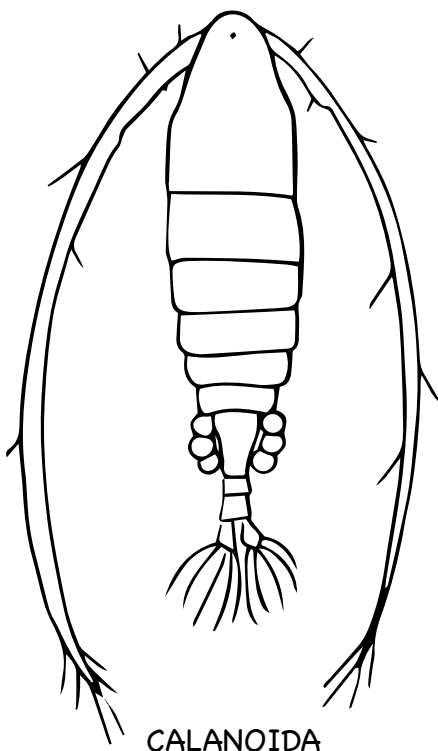
WHAT'S A COPEPOD?

A copepod is a tiny creature that lives in water, like a small shrimp. They are found almost everywhere in the world, from deep oceans to small ponds. Copepods eat lots of different things like algae, bacteria, and even other tiny animals. They are very important in the food chain because they are eaten by many larger animals.

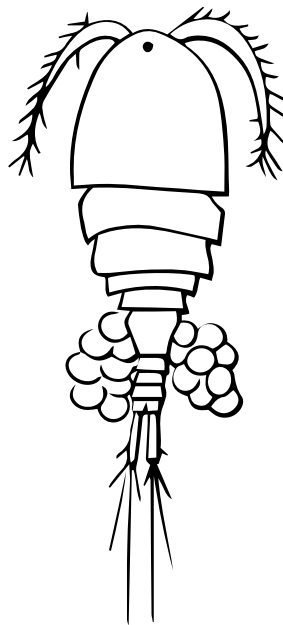
Copepods have a special body shape that helps them move easily through water. They have a big eye to help them see, and some species have small eyes too. They go through different stages in their life cycle, starting as eggs and then becoming larvae and juveniles before becoming adults.

Copepods can have many different colours and patterns, and there are more than 10,000 different kinds in the world! Some species of copepods can survive tough conditions by making special eggs that can wait until the conditions are better to hatch.

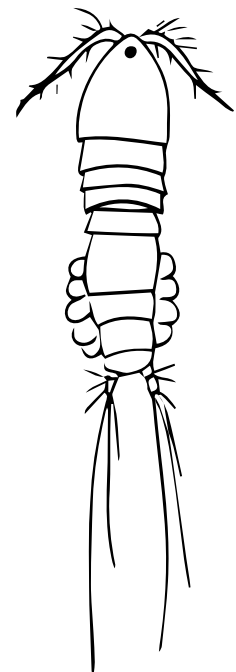
Scientists study copepods to learn about the health of aquatic ecosystems, and changes in the environment can affect their numbers. So even though they are small, copepods play a big role in the world's water systems!



CALANOIDA



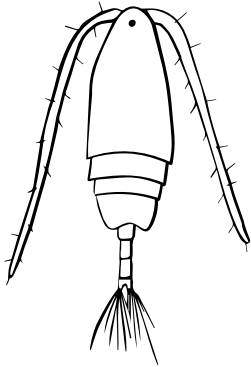
CYCLOPODIA



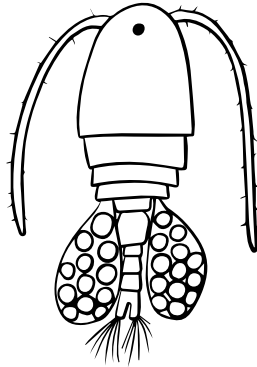
HARPACTICOIDA

HOW MANY DIFFERENT COPEPODS CAN YOU OBSERVE?

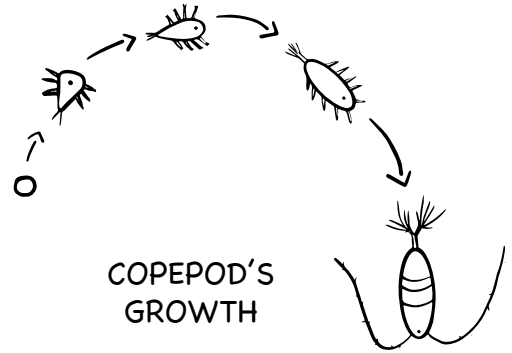
IS IT WITH OR WITHOUT EGGS?



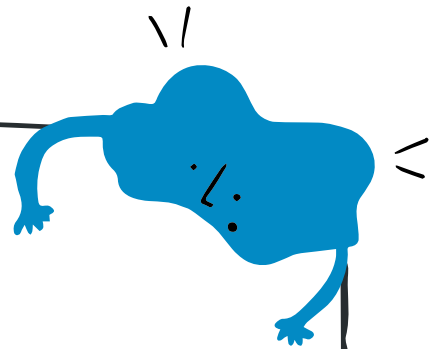
CALANOIDA
WITHOUT EGGS



CALANOIDA
WITH EGGS



DATE:
NAME:
SAMPLING LOCATION:



μm

SCALE*

*1mm = 1,000 μm

HAVE YOU HEARD OF DINOS, DIATOMS & CYANOBACTERIA?

Dinoflagellates, diatoms, and cyanobacteria are tiny living things that are too small to see with just your eyes. They live in water, like in the ocean or in lakes. Even though they are all tiny, they are different from each other.

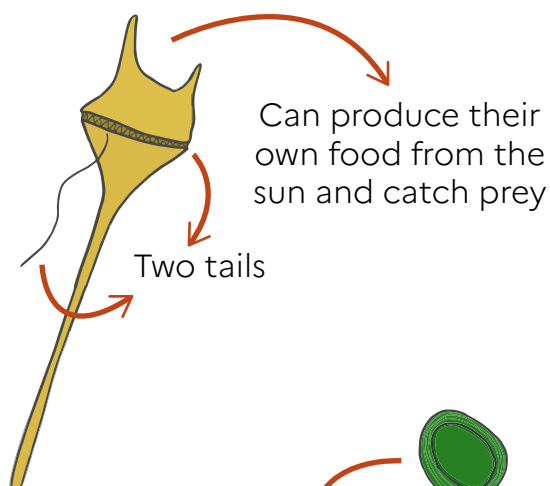
Dinoflagellates have a special shape and two little tails that they use to move around. Some of them can make their own food from the sun, some of them need to eat other tiny creatures to survive, and some can do both. Some kinds of dinoflagellates can even light up at night!

Diatoms are like tiny plants that live in water. They have special cell walls made of a material called silica (glass) that makes them look pretty when you look at them up close. They make their own food from the sun and are very important because they help create oxygen that animals in the water need to breathe.

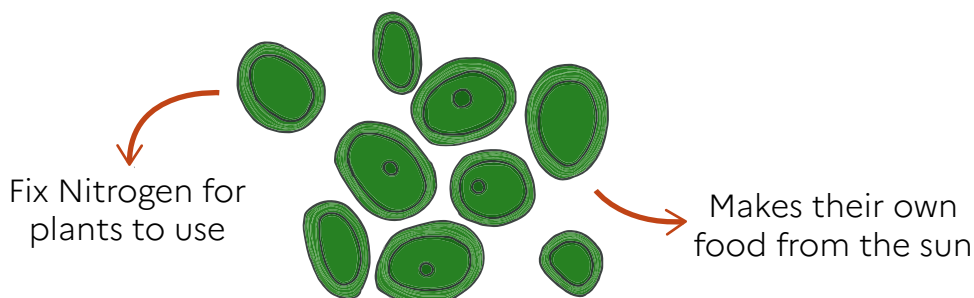
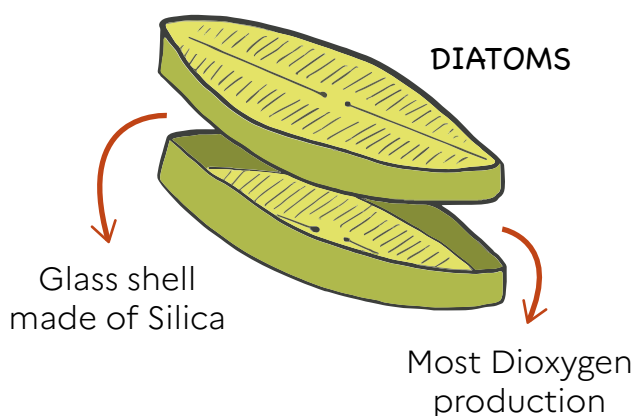
Cyanobacteria are a type of tiny bacteria that can also make their own food from the sun, just like plants. They are important because they can help turn nitrogen from the air into something that plants can use to grow. Some cyanobacteria can stick together and make big groups that look like little strands or balls.

Even though these tiny living things are so small, they are really important to our world. They help make sure there is enough food and oxygen in the water, and they are part of a big circle of life where one thing depends on another.

DINOFLAGELLATES



DIATOMS



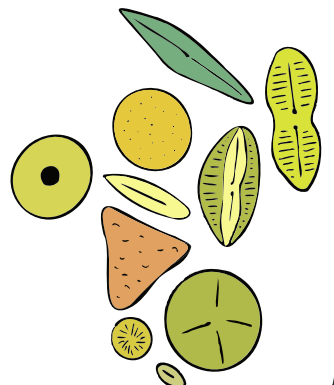
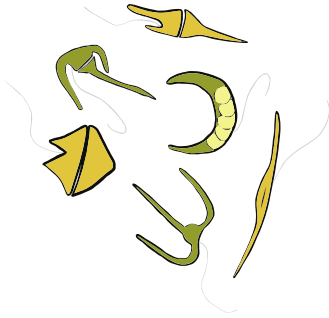
CYANOBACTERIA

DRAW SOME DINOS AND DIATOMS

DATE:

NAME:

SAMPLING LOCATION:



μm

SCALE*

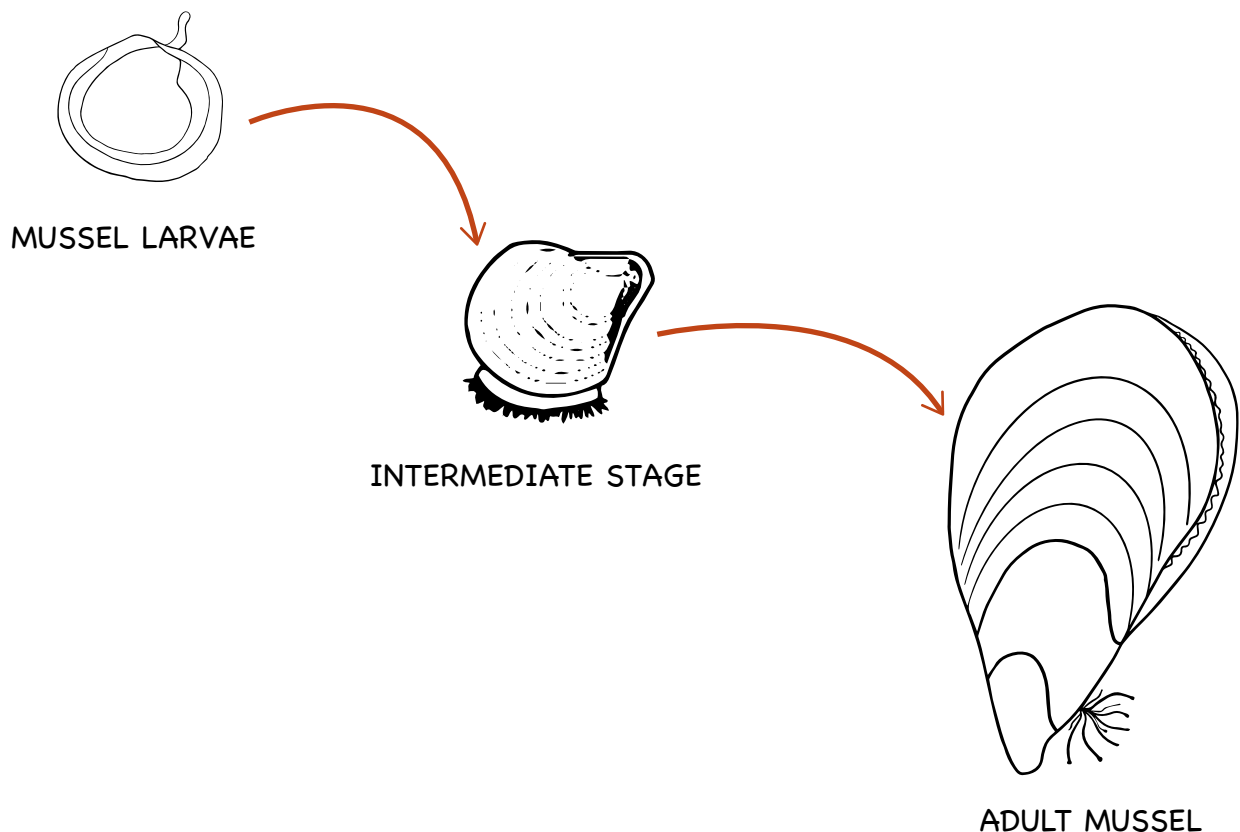
*1mm = 1,000 μm

WHO'S BABY IS THIS?

In plankton, larvae are baby animals that live in the ocean and are an important part of many marine animals' lives. They are very small, compared to their adult size, and they float around with the ocean currents while they eat and grow. Different types of larvae look different and have special features to help them swim or protect themselves from other animals that might want to eat them.

The time it takes for larvae to grow up depends on the animal and the environment they live in. While they are growing, they change a lot and learn important things that they will need when they become adults.

Larvae are very important for the ocean because they help move and spread different types of marine animals around. They also help bigger animals find food and are an important part of the food chain in the ocean. Scientists study larvae to learn more about the ocean and how different animals live and grow there.



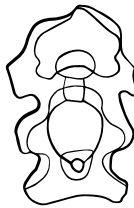
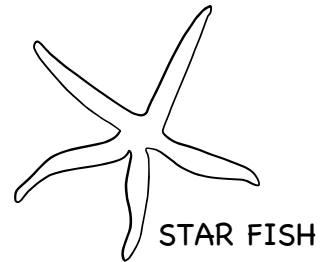
CAN YOU SEE ANY LARVAE?

GUESS WHICH ANIMALS THESE LARVAE BELONG TO



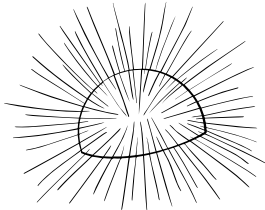
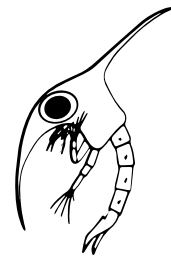
1 ●

● a



2 ●

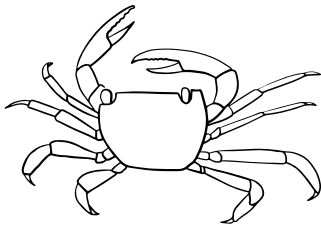
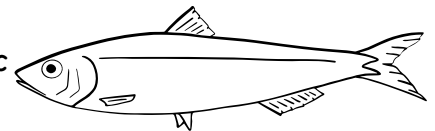
● b



3 ●

SEA URCHIN

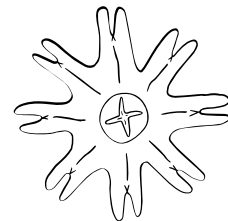
● c



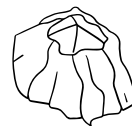
4 ●

CRAB

● d



● e

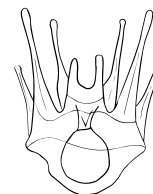


BARNACLE

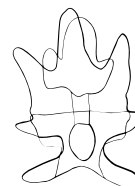


5 ●

● f



● g



6 ●



7 ●

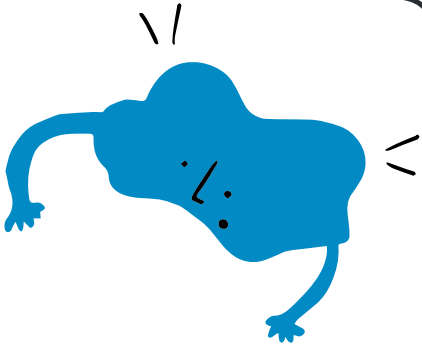
SEA CUCUMBER

Solutions on last page

IMAGINE WHAT YOUR LARVAE WOULD BE LIKE IF YOU WERE A PLANKTON

DATE:

NAME:



μm

SCALE*

*1mm = 1,000 μm

ANSWERS TO THE LARVAE GAME:

1 - e | 2 - a | 3 - f | 4 - b | 5 - c | 6 - d | 7 - g

ANSWERS TO THE GAME «*WHO IS EATED BY WHOM?*»:

1 - 2 | 1 - 6 | 1 - 3 | 1 - 5 | 1 - 7 | 2 - 4 | 2 - 8 | 3 - 4 | 4 - 2 | 4 - 9 | 4 - 8 | 5 - 3 | 5 - 2 | 5 - 4 | 6 - 2 | 6 - 3 | 6 - 4 | 7 - 4 | 7 - 2 | 8 - 9

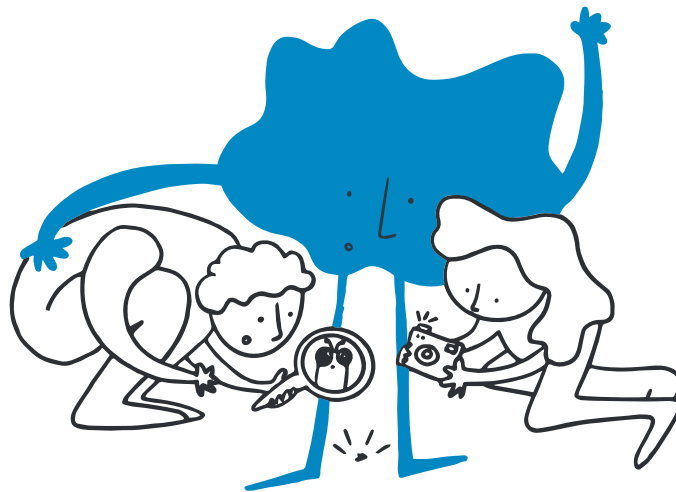
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