



UNIVERSITY OF LISBON
INTERDISCIPLINARY STUDIES
ON SUSTAINABLE ENVIRONMENT AND SEAS

MICROALGAE BIOMASS AS A SUSTAINABLE FOOD SOURCE

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SESSION I - General aspects: what microalgae are their impact on the planet, as major oxygen producers

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SESSION I - General aspects: what microalgae are their impact on the planet, as major oxygen producers

SUMMARY

What are microalgae?

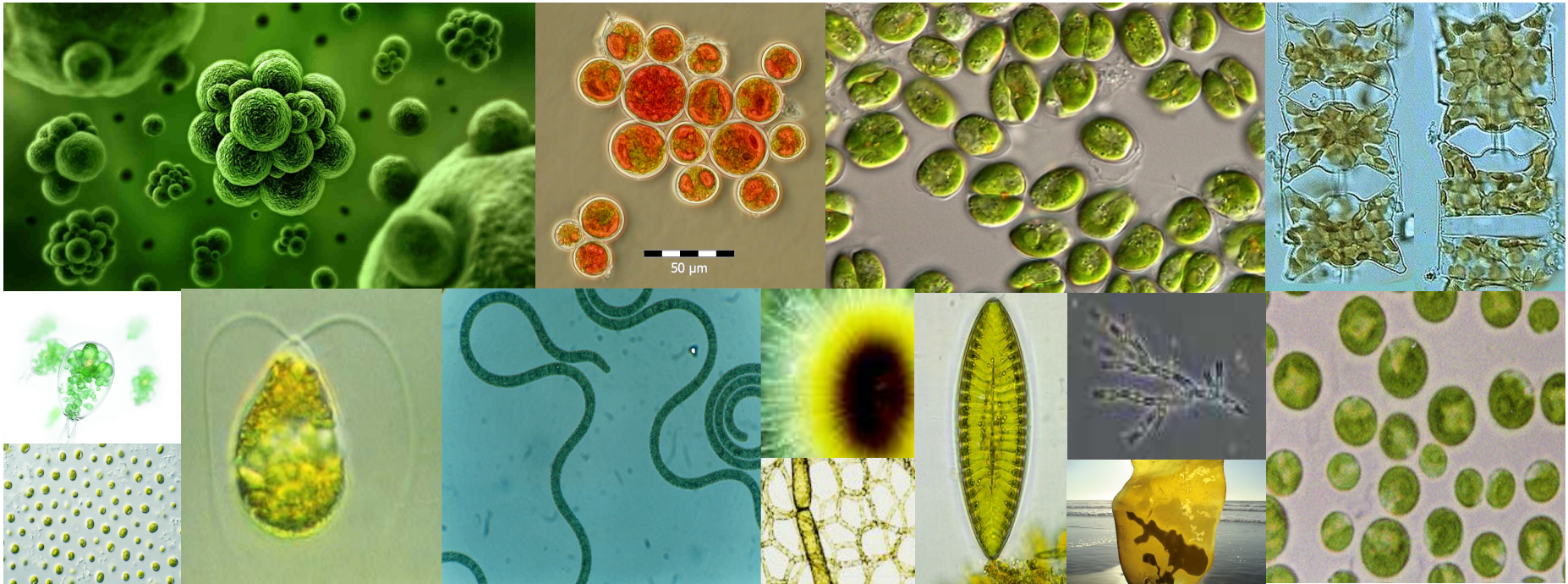
From the microalgae to seaweed

Phytoplankton – the first step in the aquatic food chain

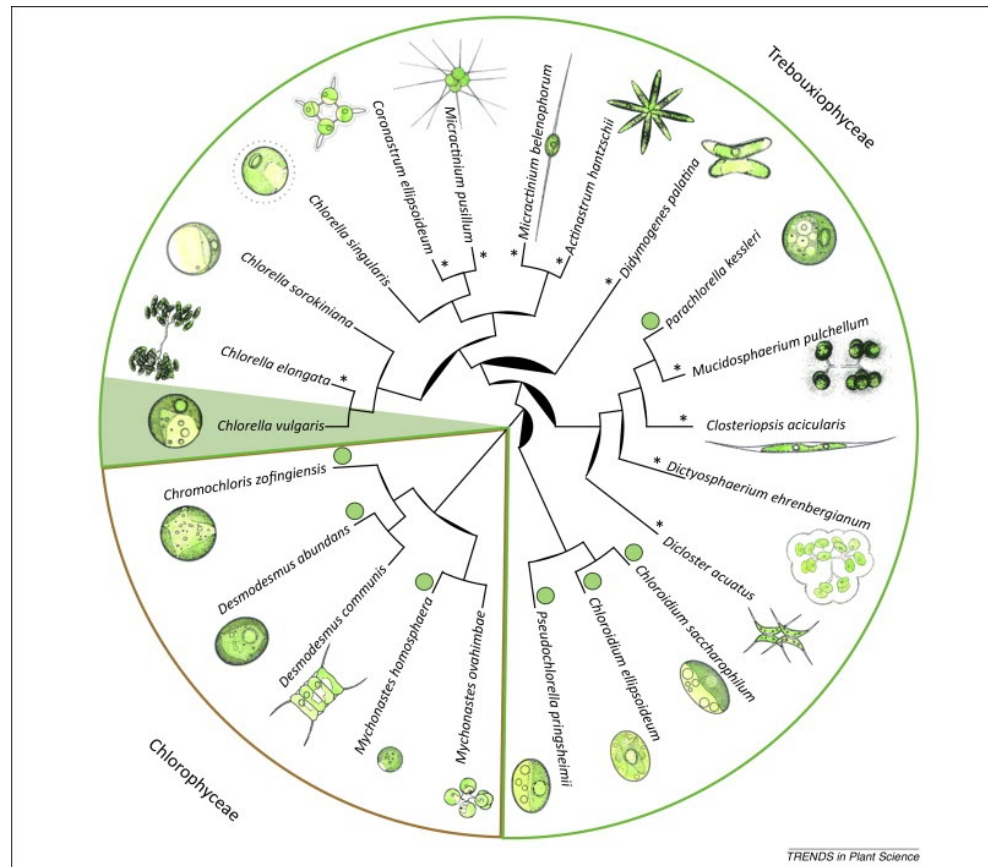
Microalgae has oxygen producers and its contribution to CO₂ mitigation

What are microalgae?

A fabulous microscopic world...

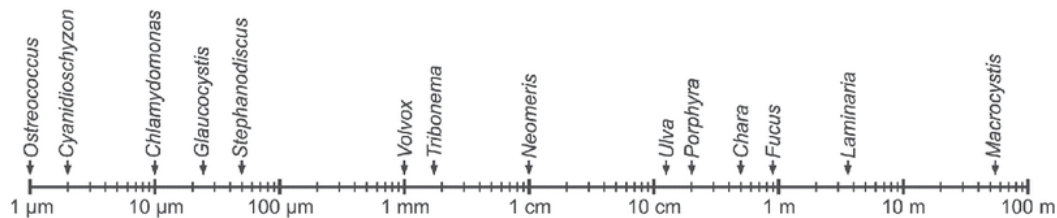
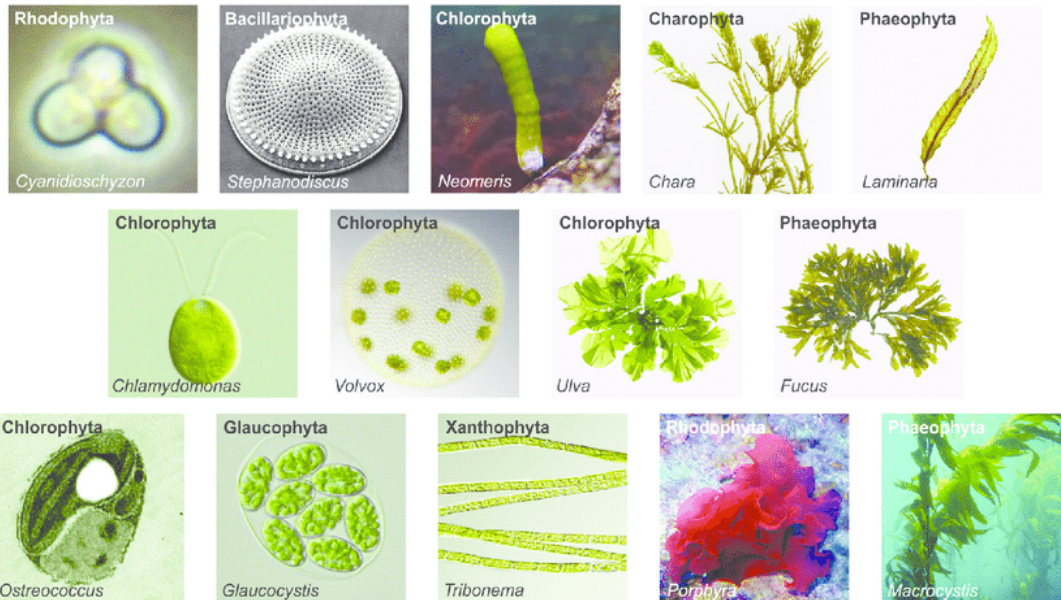


There are thousands of species around the world, only a small number is identified and only four are allowed in human food. But they are really beautiful, in terms of colours and shapes and colours!!!! These microscopic beings are at the base of the food chain.



A complex family...

From the microalgae to seaweed



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PHYTOPLANKTON

THE FIRST LINK IN THE AQUATIC FOOD CHAIN



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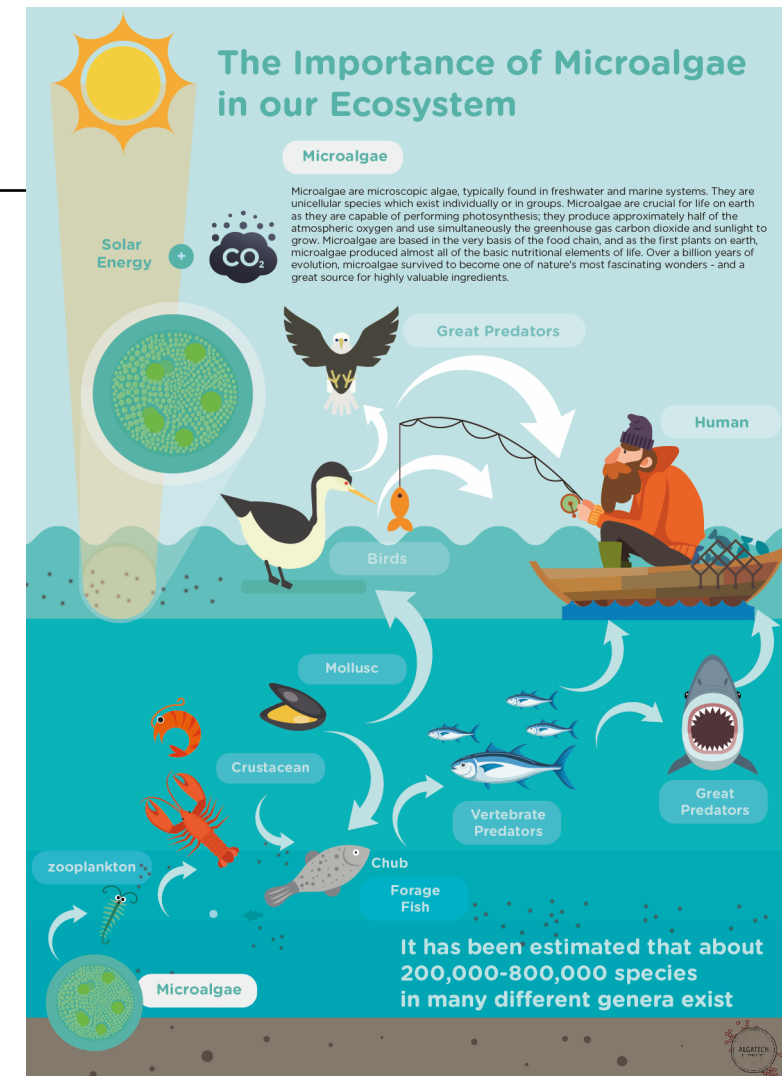
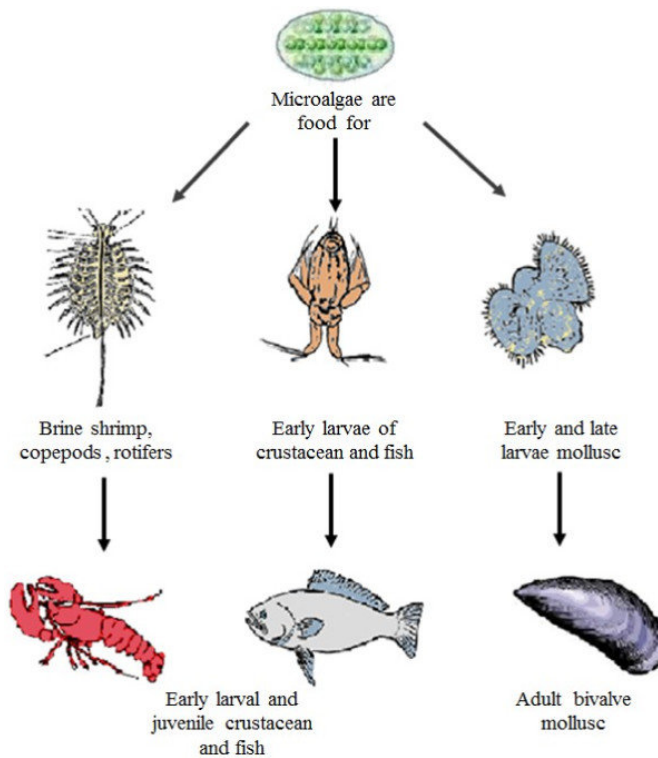
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Phytoplankton – the first step in the aquatic food chain

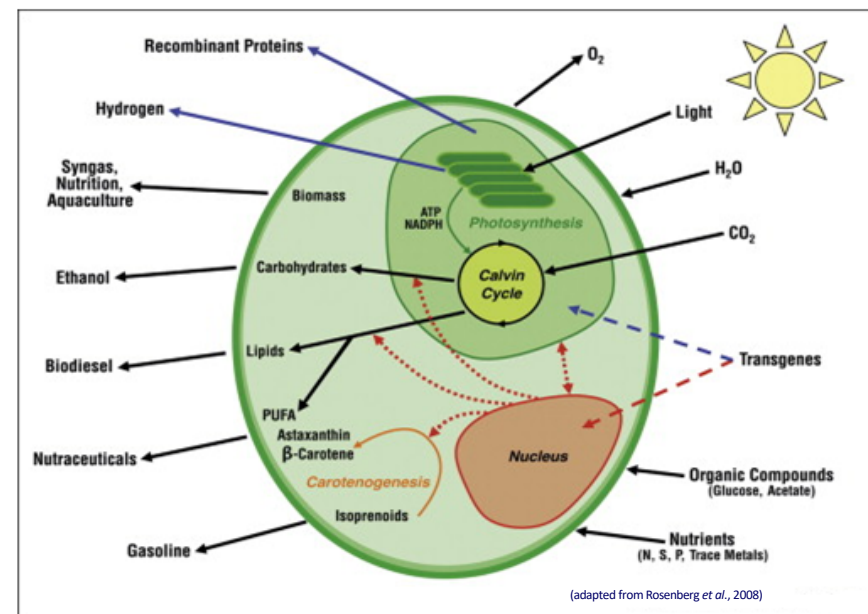
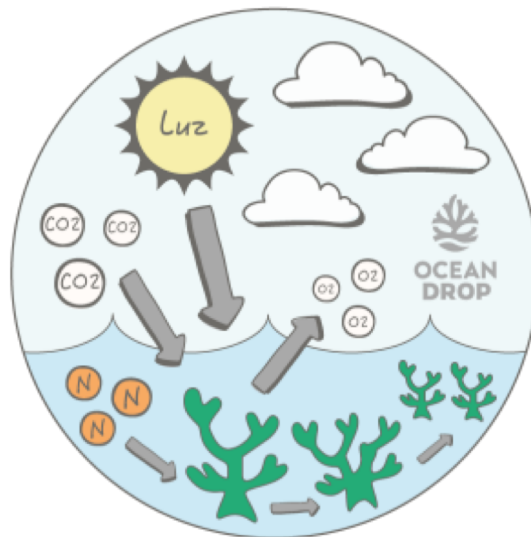


Microalgae has oxygen producers and its contribution to CO₂ mitigation

Microalgae: source of naturally encapsulated bioactive compounds

Photosynthetic unicellular organisms used for thousands of years as a **natural food** or for **medicinal purposes**

They have an important role on CO₂ mitigation



Microalgae has oxygen producers and its contribution to CO₂ mitigation

Microalgae represent a diverse group of plant-like, unicellular organisms. It is estimated that about 300 000 different species exist on earth. Around 40 000 species are actually described and a few are analysed in detail. "Microalgae" includes prokaryotic cyanobacteria as well as eukaryotic microalgae species capable of growing in presence of **sea water (e.g. oceans), fresh water (e.g. lakes, rivers)** and on several kinds of ground surfaces (e.g. soil).

Microalgae, are called phytoplankton since they are small plant-like organisms between **1-50 micrometres** in diameter without roots or leaves.

Together with the seaweeds (macroalgae or large aquatic plants), microalgae are part of the **aquatic biomass** and they are **basis for most food chains**.

Most species contain chlorophyll, use sunlight as an energy source and convert carbon dioxide (CO₂) into biomass - photosynthesis process to produce oxygen (O₂).

On a global scale microalgae produce more than 75% of the oxygen required for animals and humans.

<http://www.algaeparc.com/about-algae>

Microalgae: not only in the ocean...



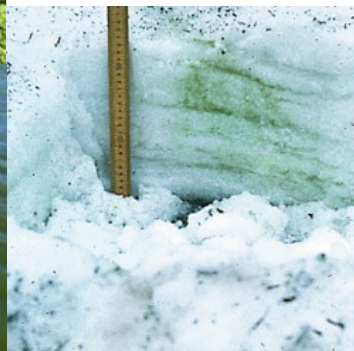
Lakes



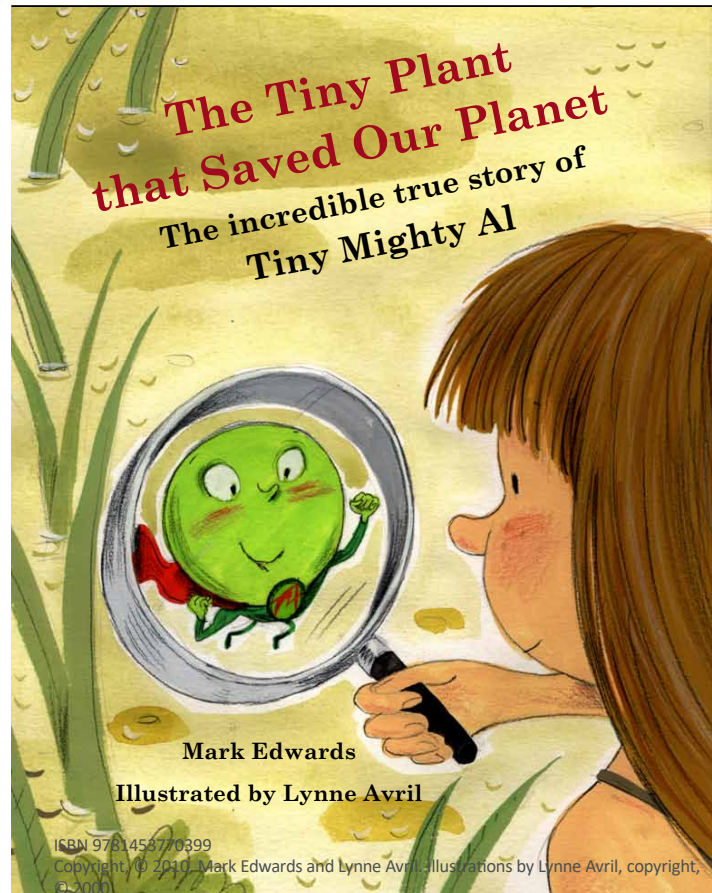
Snow; watermelon snow



salt flats *Dunaliella salina*

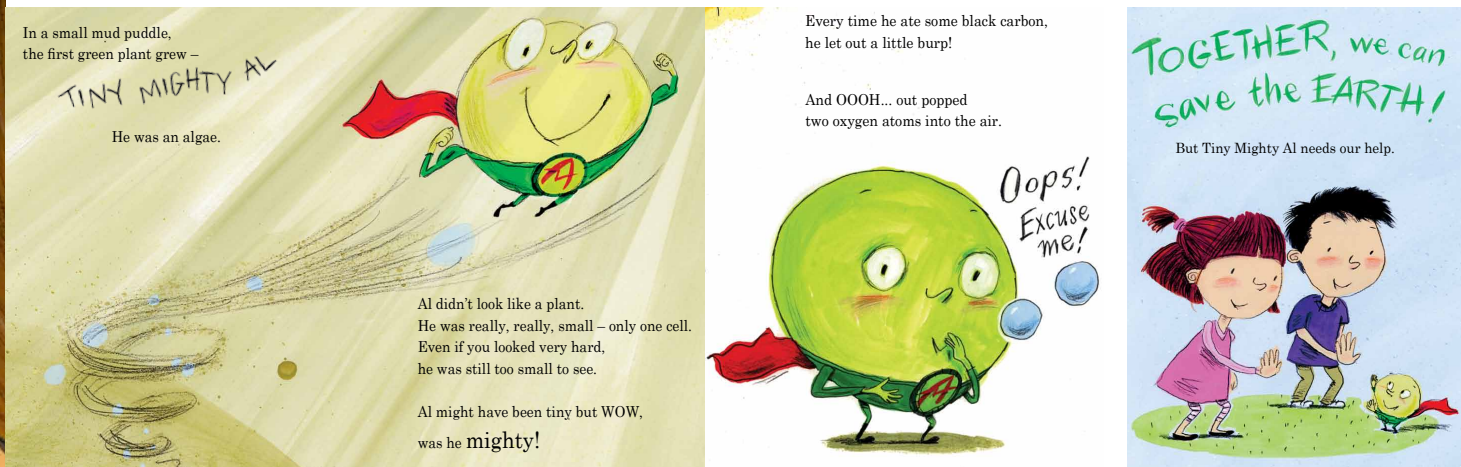


Non arable land



The preservation of microalgae and their use as a new crop is essential for the future and it must be shared with the youngest generations...

Can I introduce you to Tiny Mighty Al's story?



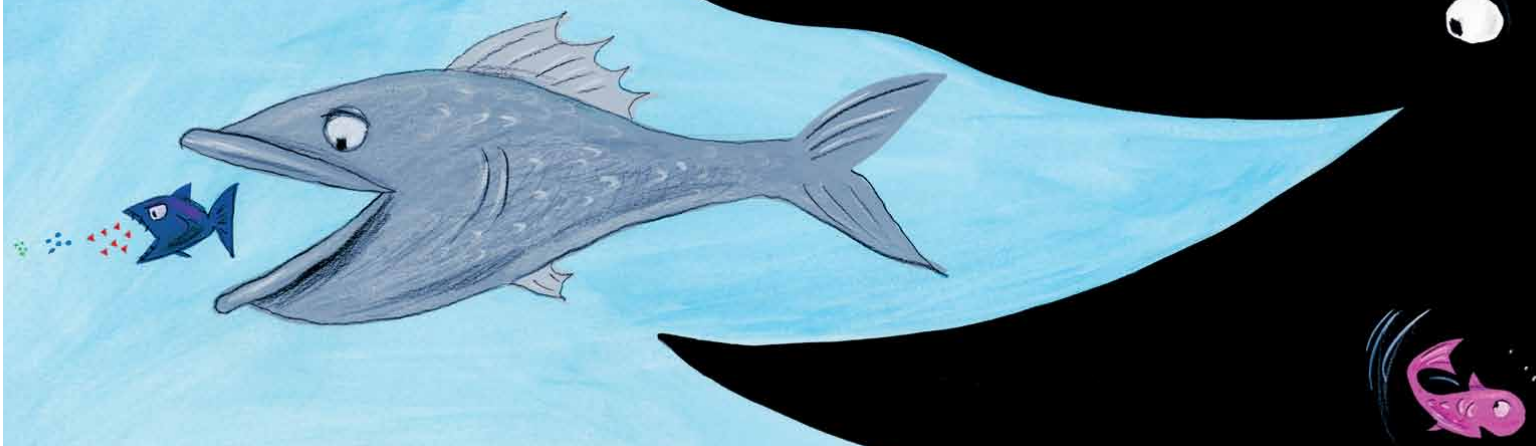
Tiny Mighty AI had made life possible
but he was not done helping us.
Now the Earth was cool and had oxygen.

But there was no food!
All creatures needed food to eat.

So Tiny Mighty AI
became the first food on Earth.
AI became the bottom of the food chain.

Everything lunched on AI,
from the smallest fish to the
largest blue whale.

If it weren't for AI,
what would all our creatures eat?



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Messages to take home

There is a huge diversity of microalgae and many species are not yet explored.

Microalgae are a marine resource with a high potential for exploitation, being the first element of the aquatic food chain.

Microalgae are excellent oxygen producers, being a key element in the mitigation of atmospheric CO₂, contributing to minimize climate change.

An underwater photograph showing a sea turtle swimming towards the left. The water is filled with various pieces of plastic waste, including a large, crumpled plastic bag on the left, several plastic bottles, and other debris floating near the surface. A school of small fish is visible in the background. The overall tone is somber, highlighting the impact of ocean pollution.

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