

BLUE MINDS 4 TEACHERS



Melita Mokos

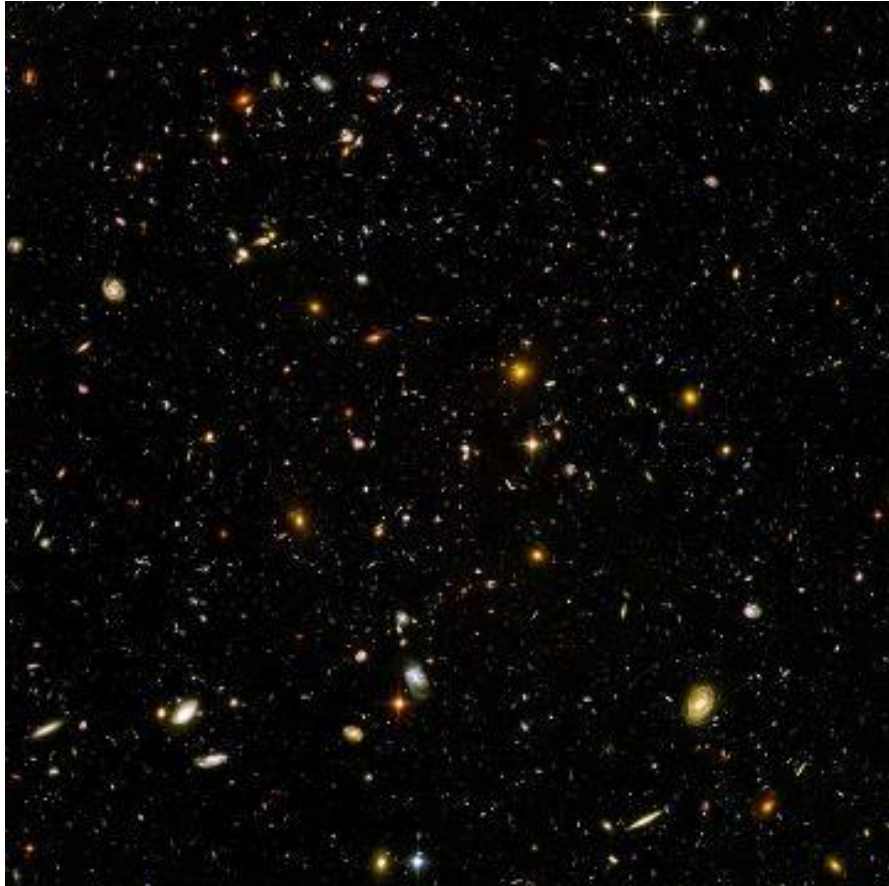
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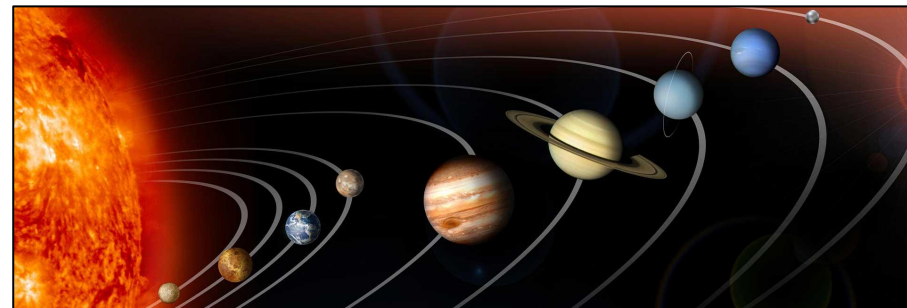
Principle 4: The ocean makes Earth habitable.



https://en.wikipedia.org/wiki/File:Hubble_ultra_deep_field.jpg, NASA and the European Space Agency.



<https://science.nasa.gov/resource/voyager-1s-pale-blue-dot/>, NASA/JPL-Caltech



<https://science.nasa.gov/solar-system/>

Principle 4: The ocean makes Earth habitable.

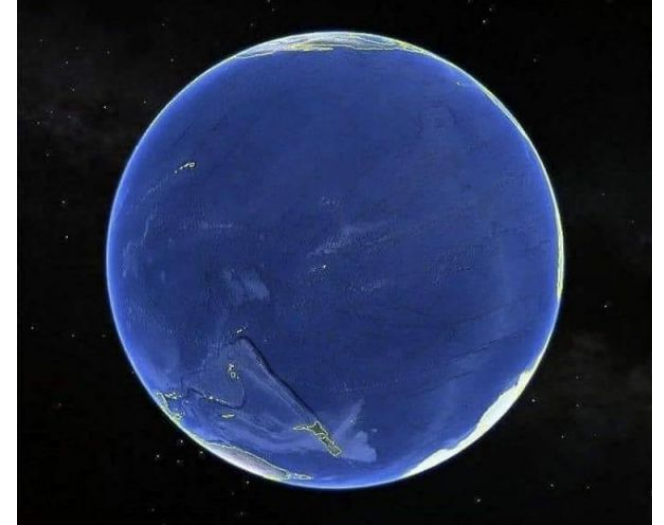
HOW???



Principle 4: The ocean makes Earth habitable.

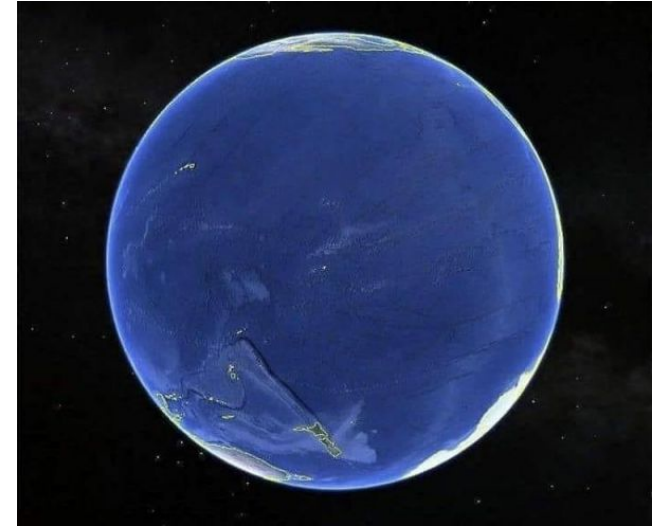


Liquid water.



Principle 4: The ocean makes Earth habitable.

- **Ocean** makes life on Earth possible because it is made mainly of **liquid water – unique feature in the known universe**
- Life originated in the ocean
- Phytoplankton produced oxygen which transferred from the ocean to the atmosphere
- **Photosynthesis**

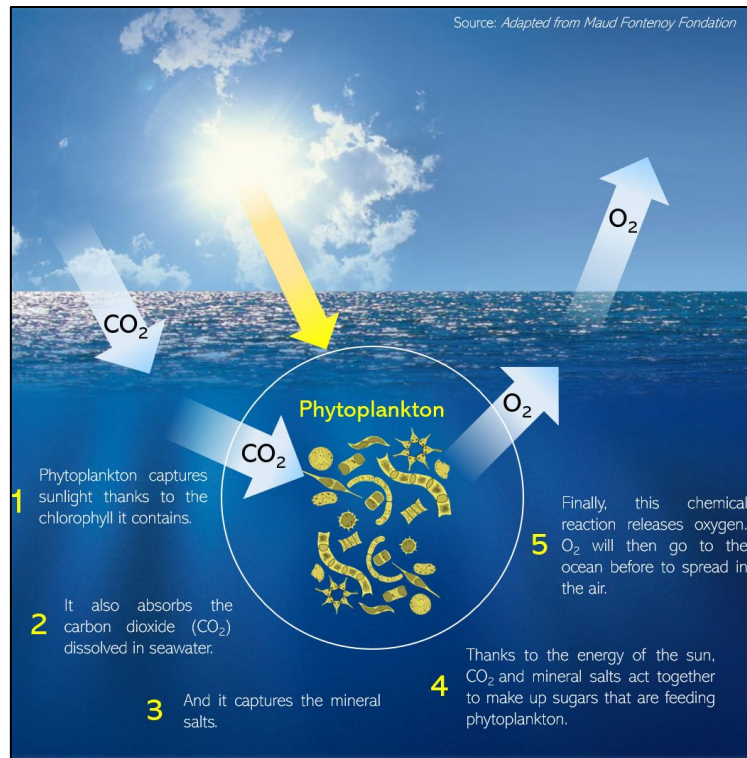


Google.maps

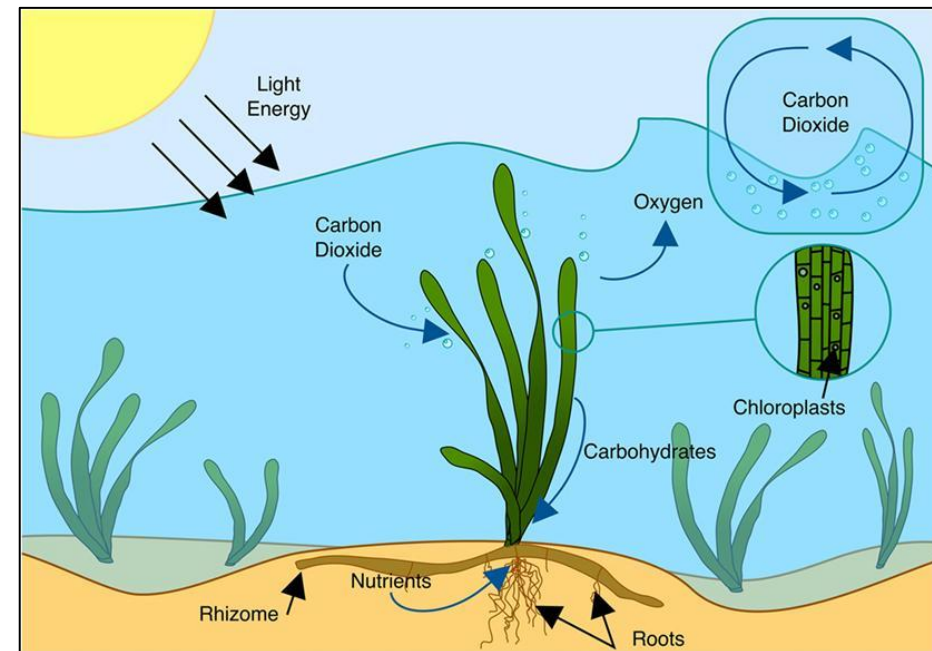
Principle 4: The ocean makes Earth habitable.

a) Most of the oxygen in the atmosphere originally came from the activities of photosynthetic organisms in the ocean. This accumulation of oxygen in Earth's atmosphere was necessary for life to develop and be sustained on land.

- life on land includes organisms living in terrestrial and **freshwater** ecosystems
- **PHOTOSYNTHESIS** (phytoplankton, algae/seaweed, seagrass – in the sea and freshwater)



<https://blog-isige.minesparis.psl.eu/2018/10/03/vitamin-sea/>



Cullen-Unsworth LC, Jones BL, Lilley R and Unsworth RKF (2018) Secret Gardens Under the Sea: What are Seagrass Meadows and Why are They Important?. *Front. Young Minds*. 6:2. doi: 10.3389/frym.2018.00002

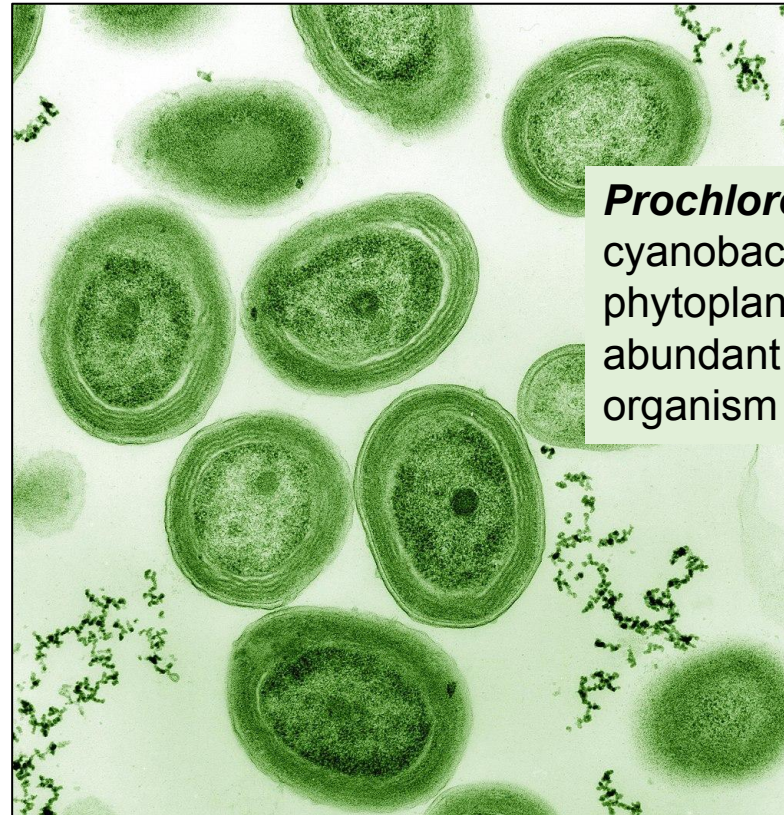
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Stromatolites – fossil cyanobacteria, 3.5 billion years old, Shark Bay Australia, evidence of **first life forms on Earth**



Rob Bayer/Shutterstock,
<https://www.livescience.com/57942-what-was-first-life-on-earth.html>

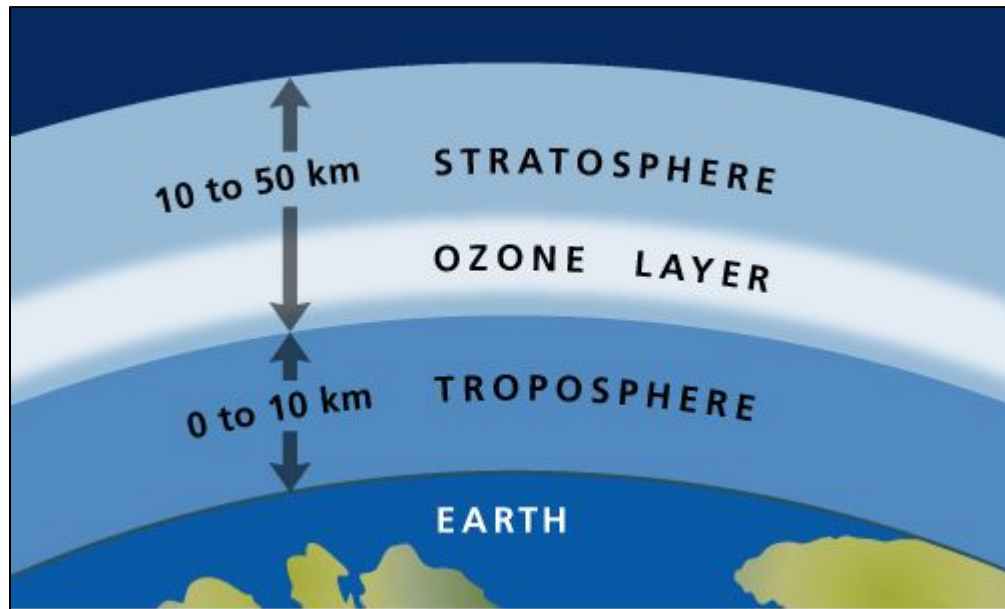


Prochlorococcus marinus – cyanobacteria, one of the smallest phytoplankton organisms, most abundant marine photosynthetic organism

Luke Thompson from Chisholm Lab and Nikki Watson from Whitehead, MIT - flickr, CC0, <https://commons.wikimedia.org/w/index.php?curid=79705118>

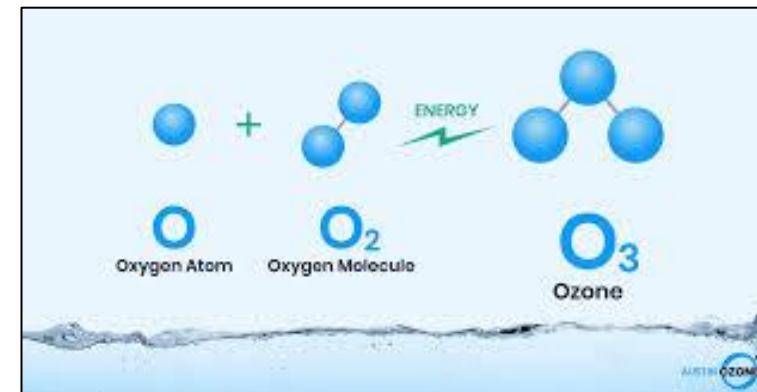
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O₃ - OZONE

- In the upper layers of the atmosphere, O₂ transforms into ozone
- Ozone layer protects life on Earth from harmful ultraviolet (UV) radiation from the sun.



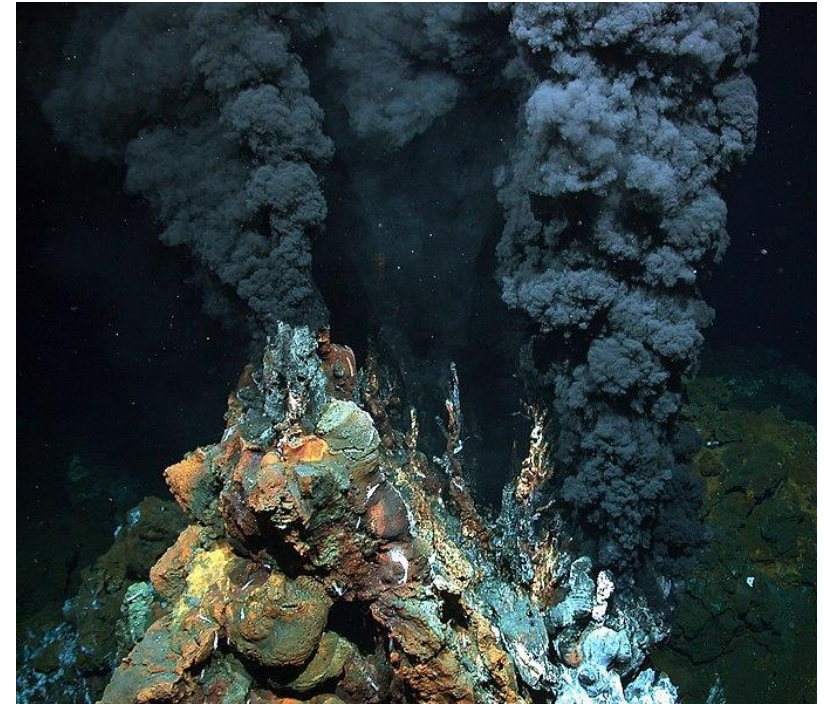
Principle 4: The ocean makes Earth habitable.

- b) The ocean is the cradle of life; the earliest evidence of life is found in the ocean. Millions of different species of organisms on Earth today are related by descent from common ancestors that evolved in the ocean and continue to evolve today.

EVOLUTION

- The fossil records of ancient life forms provide evidence for the theory of evolution and the important role the ocean played in the evolution of life on Earth
- One of the dominant theories on the evolution of the prime forms of life (prokaryotes) holds that they have evolved circa 3.7 billion years ago in the deep ocean in the hydrothermal vents

https://www.youtube.com/watch?v=de1hiS_XjWg&t=281s

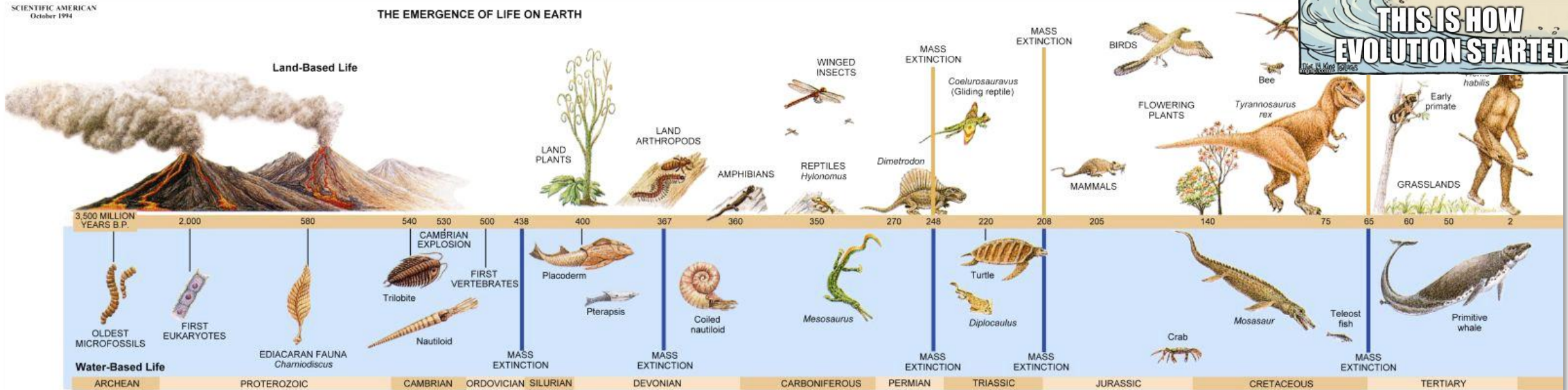
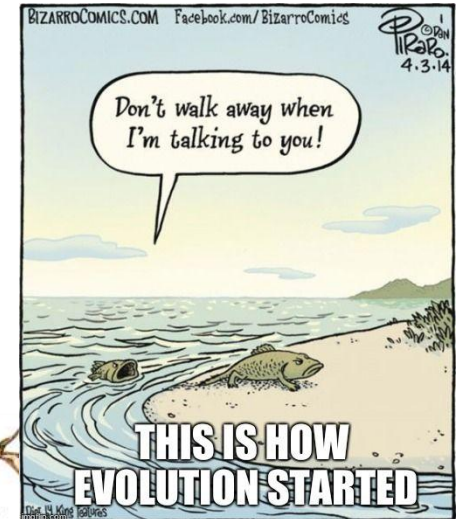


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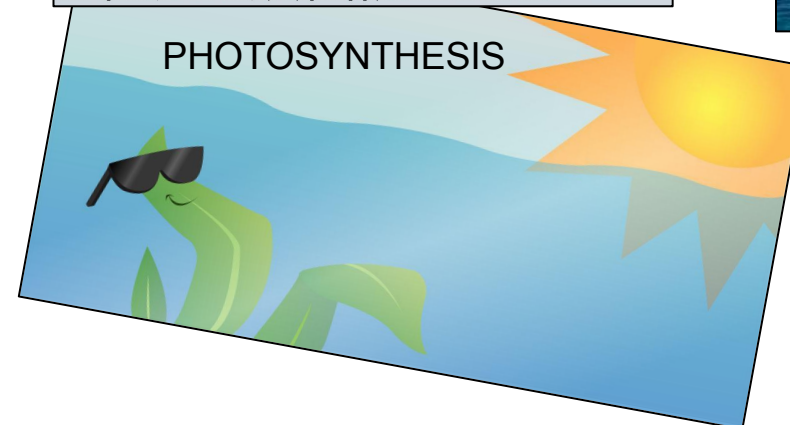
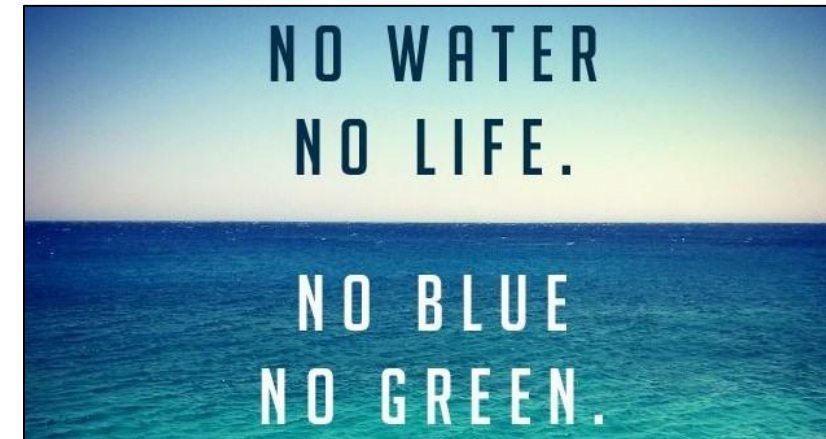
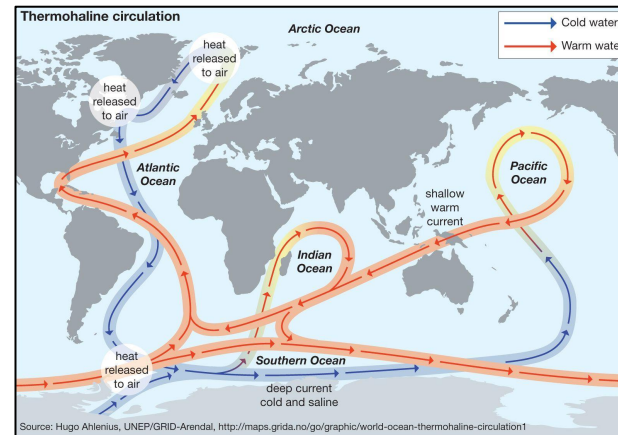
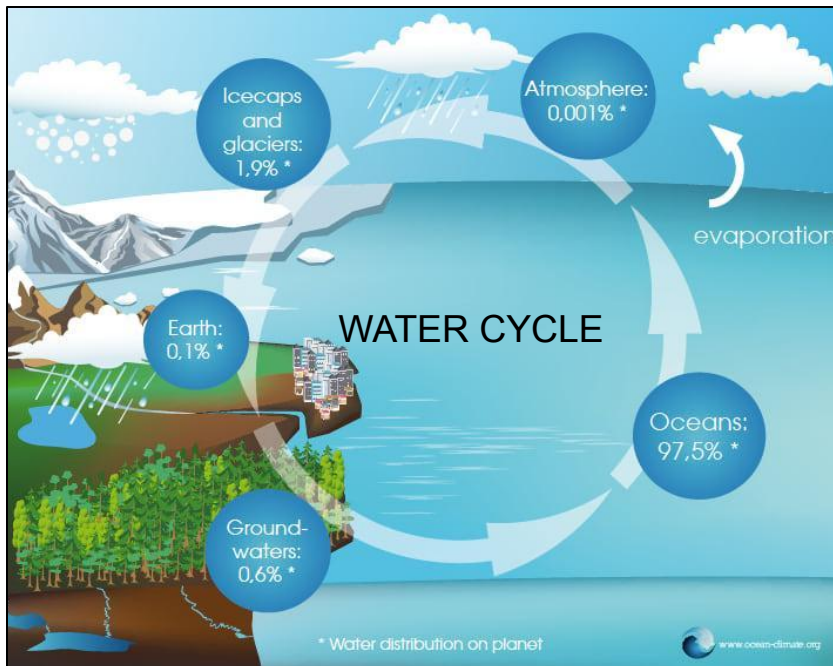
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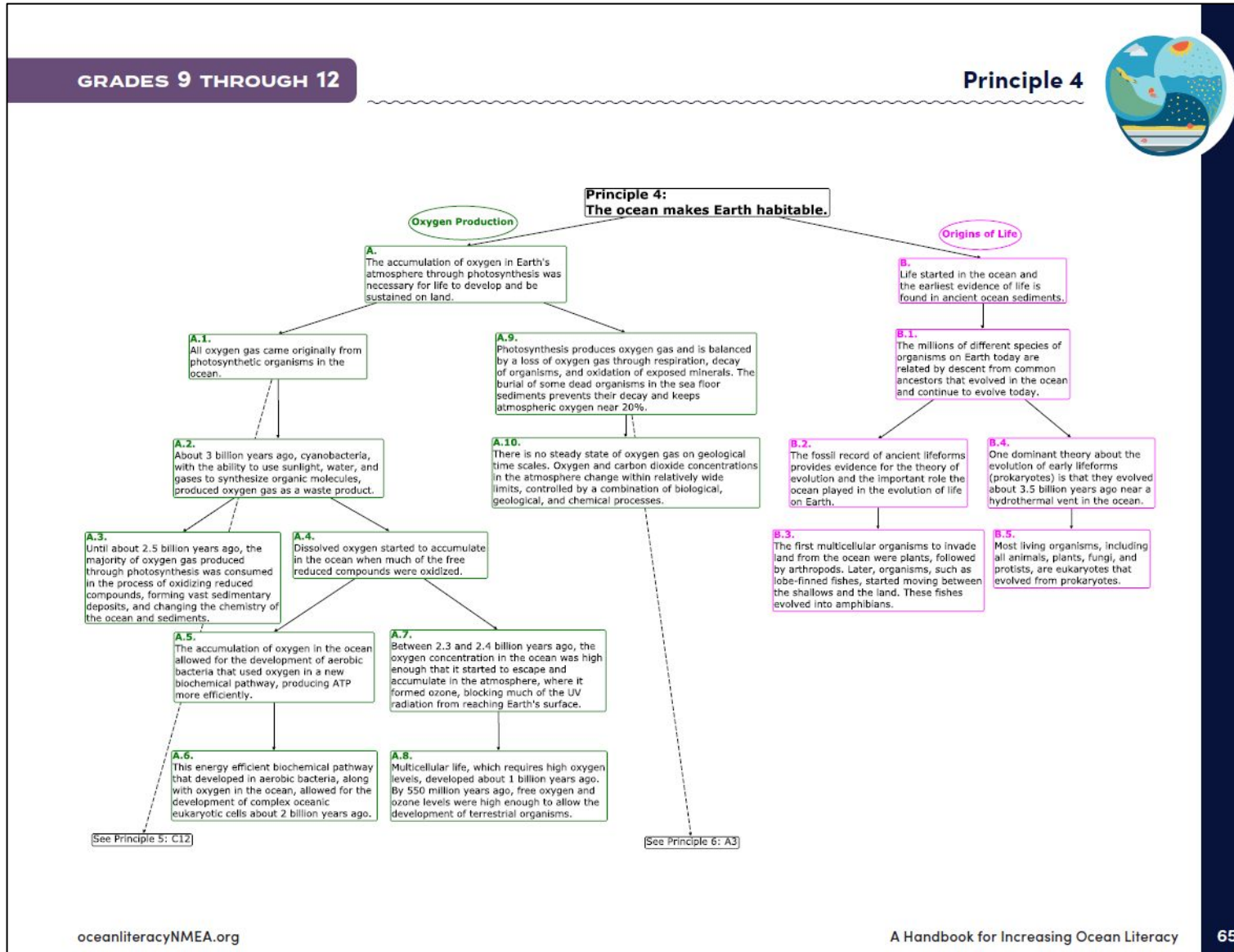


Principle 4: The ocean makes Earth habitable.

- c) The ocean provided and continues to provide water, oxygen, and nutrients, and moderates the climate needed for life to exist on Earth
- Water cycle connects all living organisms with the ocean because most of the water that falls on land evaporates from the ocean, especially from the tropical part of the ocean.



Scope and Sequence conceptual flow diagram



https://www.marine-ed.org/ocean-literacy/scope-and-sequence

Examples of projects and activities

- *Voyage of a water droplet / Sun+water=rain* – hydrological cycle in a bag
- Photosynthesis song: https://www.youtube.com/watch?v=C1_uez5WX1o (English, Science, Music)
- A wave of European Blue Schools. Handbook for teachers https://maritime-forum.ec.europa.eu/system/files/2021-02/handbook_european_blue_schools_220221.pdf

