



## Module 4: Part 1: Simple Marine Organisms Websites for Further Investigation

### Bacteria

Marine bacteria are found throughout the oceans, from the seafloor to the insides of fish stomachs. Far from being a uniform environment, their ocean home contains many distinct habitats, such as deep-sea sediments, and underwater seamounts. These bacteria have developed unique mechanisms to survive diverse conditions, including very salty to merely brackish water, and temperatures ranging from 35°C in tropical waters to -5°C in the polar and deep-sea waters. It's these unique survival mechanisms that make marine bacteria so promising as a source of new biologically active substances, with potential uses in industrial processing, medicines, and foods.

- <http://www.sciencedaily.com/releases/2007/01/070115102154.htm>
- <http://www.physorg.com/news203082120.html>
- <http://news.mongabay.com/2006/0801-coml.html>

### Diatoms

Diatoms are aquatic, single-celled algae which possess a hard shell. They thrive in salt water environments as long as some sunlight is available. Diatoms are the most abundant photosynthetic organisms. Diatoms are so tiny that hundreds of them can fit on the head of a pin. They are usually between 2 and 200 microns in diameter. As with many small organisms, what they lack in size, they make up in numbers. During diatom blooms, the waters can change color due to sudden population explosions resulting in the growth of many hundreds of thousands of diatom cells per liter of seawater.

- <http://news.bbc.co.uk/2/hi/science/nature/7608369.stm>
- <http://www.microscopy-uk.org.uk/mag/indexmag.html?http://www.microscopy-uk.org.uk/mag/art97b/diatom.html>
- <http://www.ucl.ac.uk/GeolSci/micropal/diatom.html>

### Dinoflagellates

Dinoflagellates are unicellular protists which exhibit a great diversity of form. The largest may be as large as 2 mm in diameter! These photosynthetic organisms often have a big impact on the environment around them. They manufacture their own food using the energy from sunlight, and providing a food source for other organisms. Some species are capable of producing their own light through a process known as bioluminescence.

- <http://botany.si.edu/references/dinoflag/>



- <http://www.geo.ucalgary.ca/~macrae/palynology/dinoflagellates/dinoflagellates.html>
- <http://tolweb.org/Dinoflagellates/2445>

### **Marine Algae Overview**

Marine algae are relatively undifferentiated organisms which, unlike plants, have no true roots, leaves, flowers or seeds. They are found in marine habitats. Their size varies from tiny microscopic unicellular forms of 3-10 microns to large macroscopic multicellular forms up to 70 meters long and growing at up to 50 cm per day. Marine algae do not have water-conducting tissues, as they are, at some stage, surrounded by water, which is also important for reproduction by spores. The spores may be motile or non-motile. Marine algae are photosynthetic organisms that have chlorophyll. Apart from chlorophyll, they contain additional pigments, which are the basis of scientific classification.

- <http://www.patentlens.net/daisy/AgroTran/g10/1020.html>
- [http://hawaii.edu/reefalgae/invasive\\_algae/](http://hawaii.edu/reefalgae/invasive_algae/)
- <http://www.aquaticcommunity.com/algae-control/marine.php>
- [http://marinelife.about.com/gi/o.htm?zi=1/XJ&zTi=1&sdn=marinelife&cdn=education&tm=33&gps=142\\_27\\_1259\\_874&f=20&su=p897.9.336.ip\\_&tt=3&bt=1&bts=1&zu=http%3A/www.seaweed.ie/](http://marinelife.about.com/gi/o.htm?zi=1/XJ&zTi=1&sdn=marinelife&cdn=education&tm=33&gps=142_27_1259_874&f=20&su=p897.9.336.ip_&tt=3&bt=1&bts=1&zu=http%3A/www.seaweed.ie/)

### **Nutrition of Algae**

Algae are capable of photosynthetic generation of energy. There are many different groups of photosynthetic algae. The different chlorophylls and other photosynthetic pigments allow algae to utilize different regions of the solar spectrum to drive photosynthesis. Hence, marine algae supply much of the organic compounds found in the bottom of the energy pyramid in the oceans.

- <http://www.nrel.gov/biomass/pdfs/dismukes.pdf>
- <http://www.biophotonen-online.de/abstract/abs2000-21.htm>
- <http://www.practicalbiology.org/areas/advanced/energy/photosynthesis/investigating-photosynthesis-using-immobilised-algae,54,EXP.html>

### **Plankton**

Plankton can be divided into broad functional groups. Phytoplankton are tiny algae that live near the water surface where there is sufficient light to support photosynthesis. Among the more important groups are the diatoms and dinoflagellates. Zooplankton are protists or small animals that feed on the phytoplankton. Larval stages of larger animals, such as fish, crustaceans, and annelids are considered a part of the plankton population. Bacterioplankton are

bacteria and blue-green algae which play an important role in nutrient cycles in the ocean.



- [http://www.njmsc.org/education/Lesson\\_Plans/Plankton.pdf](http://www.njmsc.org/education/Lesson_Plans/Plankton.pdf)
- <http://www.marine-phytoplankton-works.com/marine-phytoplankton.htm>
- <http://life.bio.sunysb.edu/marinebio/plankton.html>

### **Greenhouse Effect**

The greenhouse effect is the rise in temperature that the Earth experiences because certain gases in the atmosphere trap energy from the sun. Without these gases, heat would escape back into space and Earth's average temperature would be about 13<sup>0</sup> colder. Because of how they warm our world, these gases are referred to as greenhouse gases. It recent years that has been great concern as to the quantity of these gases in the atmosphere.

- <http://earthguide.ucsd.edu/earthguide/diagrams/greenhouse/>
- [http://www.ucar.edu/learn/1\\_3\\_1.htm](http://www.ucar.edu/learn/1_3_1.htm)
- <http://hyperphysics.phy-astr.gsu.edu/hbase/thermo/grnhse.html>
- <http://www.crystalinks.com/greenhouseeffect.html>