Algae Fact Sheet

What are algae?

Algae is the informal term for a large group of photosynthetic eukaryotic organisms.

- Photosynthetic: the process that turns sunlight into energy in plants
- Eukaryotic: organisms that have cells with a nucleus that is inside a cell membrane

What kind of organisms are algae?

Some are unicellular microalgae – they are so small you have to look at them under a microscope! For example, *Chlorella* is a group of single cell green algae.

Diatoms are another big group of microalgae that are found in oceans, waterways, and even soil! They generate a lot of oxygen – almost 20% each year.

Multicellular, macroalgae are sorted into 3 groups: the brown algae, the red algae, and the green algae. They are most commonly known as seaweed!

Are algae and seaweeds the same thing?

In a sense, yes! Algae is the big umbrella term that includes macroalgae (big algae you can find on the beach) and microalgae while the term, Seaweed, refers to macroalgae.

What are the differences in the 3 groups of seaweed?

Brown algae aka Ochrophyta (scientific class name)

- Tend to be in colder waters in the northern hemisphere
- Great food source and habitat for marine organisms
- Dominant pigment that gives them their color: fucoxanthin which gives the seaweed a greenish-brown color
- Common brown algae:
    - Bull kelp, giant kelp, kelp, sargassum, rockweed, sea cauliflower

Green algae aka Chlorophyta

- Found in almost every habitat – soil, snow, ocean, rocks etc
- Dominant pigment that gives them their color: chlorophyll which gives them a green color
- Common green algae
    - Sea lettuce, sea moss, sea hair, sea staghorn

Red Algae aka Rhodophyta

- Oldest groups of eukaryotic algae
- Largest phyla (group) of algae – 7,000 recognized species
- ~5% of red alage found in freshwater environments

- Dominant pigment that gives them their color: phycoerythrin which gives them the red color
- Sometimes they can be greenish, yellowish, or brownish which makes them very hard to identify!
- Red algae stores starch which can be digested by humans
- Also have “agar” and “carrageenan” which humans use as an emulsifier (a substance that causes 2 liquids that don’t usually mix well to mix)
- Common red algae:
    - Coralline algae, nori, sea lettuce flakes, yellow seaweed, Turkish towel

Are all plants in the marine environment “algae”?

No! There are a few species of land plants that have re-adapted to living in salt water! For example:

- Sea asparagus
- Eelgrass
- Surfgrass

Why are algae important?

Algae provides habitat and food for many, many animals living in the ocean! They also produce oxygen for us and for marine animals.

Can you eat seaweeds?

Yes! Seaweed/algae has been a part of human diet for hundreds of years! Can you think of anything we eat that might have algae in it?

What is zonation?

Zonation is the different ways species (plants and animals) are distributed in a habitat. This is usually determined by temperature, altitude, latitude, and other conditions.

Splash Zone: barely any forms of seaweed because water never fully covers this area

High Intertidal Zone: only covered by the tides for shore periods of time so there are mainly brown seaweeds which are adapted to prevent them from drying out

Middle Intertidal Zone: for about half a day, the tide will cover this area so there are more species of seaweed here. There is a mix of red, brown, and green algae.

Lower Intertidal Zone: for most of the day, this zone will be covered by the tide, so the area has mostly green seaweeds with only a few brown seaweeds.

Under the Sea: mostly green seaweeds and large kelp because they won’t dry out! Also, plenty of sunlight in the first couple meters

Deeper into the Sea: as the water gets deeper, you start seeing fewer green seaweeds because they rely on bright sunlight to survive. You will start seeing more red algae because

their pigment, the phycoerythrin allows them to absorb sunlight more efficiently even when there is little light.

Structural Differences:

Vascular Plants – these are land plants! They are “vascular” because they have tissue that moves water and minerals throughout the plant.

Holdfast vs roots – marine plants don’t need roots to conduct water throughout their ‘body’ but do need an anchor, so they don’t get washed away.

Stipe vs stem – marine plants like kelp don’t have a stem. In land plants, they have a stem that moves nutrients throughout the plant. Stipes of a kelp are for structural support for the kelp blades.

Blade vs leaf – the blade of a kelp and leaf of a land plant are very similar; they are both used for photosynthesis.

Gas bladder – allows the marine plant to float

Frond – the frond of a kelp refers to the multiple divided section of blades