



# ALGAE



Algae are an important part of the marine ecosystem. They represent the beginning of the food chain and provide shelter for animals like the sea otter. Algae also produce oxygen through photosynthesis. Historically, algae were classified in the plant phylum because of their ability to photosynthesize. Recently, however, algae were reclassified into the protist phylum. The members of this phylum vary greatly and they do not all share specific characteristics, as do the members of the other phyla.

There are approximately 12,500 kinds of algae, most of which are marine algae. All types of algae have chlorophyll (a green pigment) which enable them to photosynthesize. Photosynthesis is the process by which plants convert sunlight energy, water, and carbon dioxide into sugar which is used by the plant as fuel for growth.

Algae is classified into three main groups according to color: red, brown, and green. There are different types of chlorophyll which result in the different algae colorations; the red algae also have pigments.

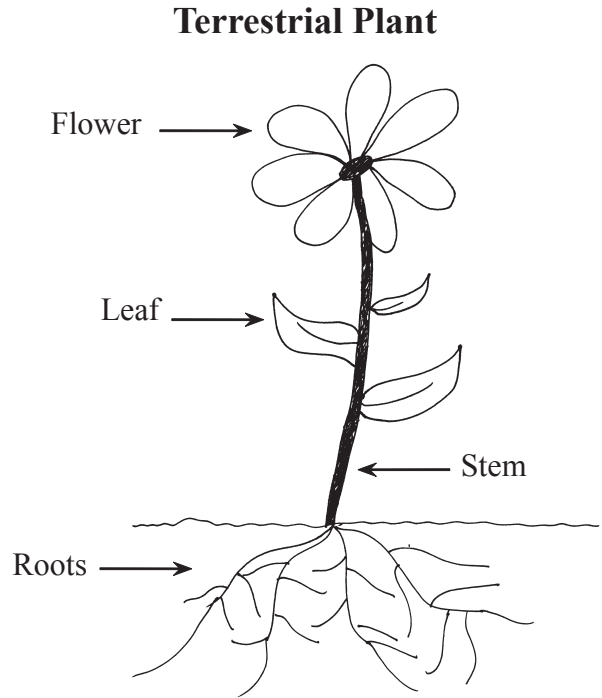
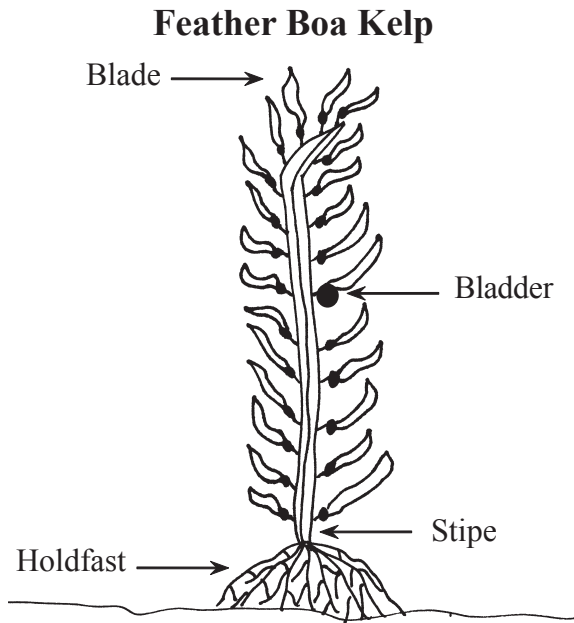
Most of the 4,000 species of red algae occur in the sea. They are more common in warm subtropical waters. The pigments they have are efficient at absorbing the green, violet, and blue light that penetrates deep into the sea. Therefore, red algae can grow at greater depths than brown and green algae. Agar and carrageenan, sugars that are found in red algae, are economically useful to humans. Agar is used in medicines for making gel capsules, as a material for making dental impressions, as a base in cosmetics, and as a media in which to grow bacteria, fungus, and other organisms in scientific laboratories. Agar is also used as a preservative in a variety of foods. Carrageenan is used in paints, ice cream, and cosmetics to stabilize mixtures of liquids.

Like red algae, most of the 1,500 species of brown algae grow in the marine environment. They dominate the rocky shores of temperate regions in North America and Eurasia. One group of brown algae are known as kelp. Some members of this group have plant-like structures. The blades, stipe, and holdfast of the kelp are similar to the leaves, stem, and roots, respectively, of plants.

Kelp provide a food source for many invertebrates, fishes, marine mammals, and birds. Some brown algae species can reach up to 100 meters in length. Some of the larger kelp are harvested commercially for sodium and potassium salts, iodine, and alginates, which are carbohydrates used in the formation of gels. Scientists are investigating the possibility of using kelp as a source of fuel.

Green algae includes approximately 7,000 species. The multicellular green algae are the evolutionary ancestors of the plant kingdom. They contain the same types of chlorophyll and carotenoids, and their chloroplasts are biochemically similar to those of plants. Green algae are mostly aquatic, although some grow on moist tree trunks and soils. One species of unicellular green algae can move rapidly in the water by beating their flagella, tail-like structures. These organisms also have one eyespot that allows them to see light and guides their swimming. Another green algae species, called sea lettuce, is a marine algae that is commonly found on the southern California coast. Some green algae species are being investigated as potential food sources for humans and other animals.

# Plant and Kelp Comparison



Plant Part	Function
Roots	<ul style="list-style-type: none"> <li>• Anchor</li> <li>• Absorb nutrients and water from the soil</li> </ul>
Stem	<ul style="list-style-type: none"> <li>• Support</li> <li>• Carries the nutrients and water absorbed by the roots</li> </ul>
Leaves	<ul style="list-style-type: none"> <li>• Contain chlorophyll</li> <li>• Absorb sunlight for photosynthesis</li> </ul>
Flowers	<ul style="list-style-type: none"> <li>• Contain reproductive structures</li> </ul>

Kelp Part	Function
Holdfast	<ul style="list-style-type: none"> <li>• Anchor</li> </ul>
Stipe	<ul style="list-style-type: none"> <li>• Support</li> </ul>
Blades	<ul style="list-style-type: none"> <li>• Contain chlorophyll</li> <li>• Absorb sunlight for photosynthesis</li> </ul>
Bladder	<ul style="list-style-type: none"> <li>• Structure filled with air that enables kelp to float and facilitates absorption of light</li> </ul>
Spores	<ul style="list-style-type: none"> <li>• Reproductive structure</li> </ul>