

LIFE SCIENCES 11

PLANT-LIKE PROTISTS

Plant-like Protists

- also known as algae
 - all have some photosynthetic pigments, usually chlorophyll
 - many have secondary pigments that allow them to absorb light at greater depths
- a. Eulgenophyta (Euglenoids)**
- unicellular
 - mainly freshwater species
 - have chloroplasts (photosynthetic autotrophs), but can also be heterotrophic when light is lacking
 - have a pellicle instead of a cell wall
 - have a light sensitive eyespot that allows it to be positively phototrophic
 - reproduce by binary fission
 - most common members are in the Genus *Euglena*
- b. Pyrrophyta (dinoflagellates)**
- mostly unicellular
 - mainly marine species
 - some are photosynthetic autotrophs, and others are heterotrophic (carnivorous, parasitic or mutualistic with jellyfish, mollusks or coral)
 - photosynthetic species form a large part of phytoplankton
 - swim by means of two flagella
 - may have thick cellulose plates as cell walls – gives them an armored appearance
 - reproduce by binary fission
 - many demonstrate bioluminescence (produce light)
 - can cause algae blooms in favourable conditions
 - deplete water of nutrients
 - further deplete oxygen supply as they decompose after they die off – suffocate fish
 - clog fish gills (also causes suffocation)
- c. Bacillariophyta (diatoms)**
- unicellular
 - made up of two halves that fit together
 - photosynthetic autotrophs – golden-yellow colour due to carotenoid pigments
 - store food as oil – less buoyant than water so they float near the surface
 - major component of phytoplankton
 - lifecycle has both a sexual and asexual phase

- silicate cell walls – dead diatoms form diatomaceous earth that is used as a filtering agent and in polishes (toothpaste and metal polishes)

d. Chrysophyta (yellow-green algae and golden-brown algae)

- mainly unicellular, but some form colonies
- cell walls contain pectin (rather than cellulose)
- photosynthetic, but some are also heterotrophic

e. Chlorophyta (green algae)

- unicellular and multicellular types
- mainly freshwater
- thought to be an evolutionary link to land plants
 - both contain chlorophyll a and b
 - both have cellulose cell walls

f. Phaeophyta (brown algae)

- large, multicellular algae
- accessory pigment fucoxanthin results in the brown colour
- photosynthetic blades (leaf-like structures) kept near surface by air bladder
- anchored to the ground by a root-like holdfast

g. Rhodophyta (red algae)

- multicellular
- deep marine algae
- contain the photosynthetic red pigment phycobilin – absorb deeper penetrating wavelengths of light
- some help to form coral reefs

Uses for Algae

- food supply for people and animals
- used in food processing as stabilizers, thickeners and filters
- 70% of the Earth's oxygen supply is produced by phytoplankton

Algae Life Cycle

- life cycle in which there are two vegetative forms that each plant has; these forms alternate and each produces the other
- Sporophyte
 - Diploid generation ($2n$)
 - Stage that produces spores by meiosis
 - Spore then undergoes mitosis to produce the gametophyte

- Gametophyte
 - Haploid generation (n)
 - Stage that produces the gametes (egg and sperm) by mitosis
 - Sperm and egg fuse, then undergoes mitosis to produce the sporophyte

