Plankton: the drifters

Phytoplankton
- Photosynthesize – base of the energy pyramid

Two general categories of Plankton
- **Phytoplankton**: those that photosynthesize (photoautotrophs), and produce oxygen
  - Pico-, nano-, microplankton
  - Nano and microplankton:
    - Diatoms (Bacillariophytes)
    - Dinoflagellates (dinophyta)
- **Zooplankton**: animal plankton
  - Holoplankton – stay bas plankton all their lives
  - Meroplankton – a larval stage is planktonic, then they become ‘nekton’

Plankton Adaptations
- Small size
- Complex shapes
- Slow sinking rates
- Fats and oils**
- Cysts (dormancy) for bad conditions
- Spines (limit grazing pressure)

**Most need to be near the surface why?

Many plankton form the ‘deep scattering layer’ and migrate, often from deep during the day (few predators) to the surface at night (to feed)
Diatoms, Bacillariophyta

Diatoms (Phylum Bacillariophyta): one of the heterokont algae. Diatoms have unique glasslike cell walls made of silica. They are very abundant as "plankton" in the surface waters of lakes, rivers, and oceans. They reproduce sexually only rarely.

- Photoautotrophs
- Solitary or colonial
- Make up phytoplankton in oceans, lakes, streams - extremely important contributors to global Oxygen!
- Silica cell walls
- Primarily asexual reproduction, diploid - some sexual reproduction
- Form auxospores - resting stage
- Chlorophyll a and c and fucoxanthin (a carotenoid)

Pseudo-nitzchia australis
pennate vs. centric shapes

Diatom Life Cycle
asexual Reproduction

They get smaller with successive generations!

Diatomaceous Earth
Figure 28.10 Dinoflagellates spin due to the beating of a pair of spiral flagella lying in a groove encircling the cell.

Figure 28.9 Alveolates are characterized by membrane-bound sacs (alveoli) beneath the plasma membrane.

Dinoflagellates (Dinophyta)
- Mostly photosynthetic autotrophs, some are heterotrophic
- Unicellular
- 2 flagella (many)
- Chlorophyll a & c, carotenoids (peridinin)
- Cellulose cell wall (or none)
- Many are bioluminescent
- Some are mutualistic symbionts in marine invertebrates
- Some species are responsible for red tides (toxins)
Pfiesteria - kills and then eats fish!

Zooxanthellae - keys to coral reef productivity

Figure 32.1. A coral reef. Corals are colonial animals, with photosynthetic dinoflagellate symbionts.

Zooplankton: animals

Holoplankton: stay plankton their whole life

Copepods: important grazers in the plankton world
MEROPLANKTON: Will stay plankton part of their lives. They are usually larvae. Many will grow to be familiar organisms such as fish, urchins, squid etc.