Kingdom Protista:

"Protista" comes from Greek words meaning **"the very first"**

First organisms on earth 1.5 billion years ago were protists

·Eukaryotic
·Plant-like, Animal-like or Fungus-like
·VERY diverse group (should be divided into several kingdoms, but scientists can't agree on how to do it)
·Multicellular or Unicellular
·Must live in or near water (moist environments)
·Heterotroph or autotroph
·Reproduce sexually or asexually
·Mobility (flagella, cilia, psuedopodia)
·Cell membranes are very flexible-improves movement

Animal-like Protists: Protozoans

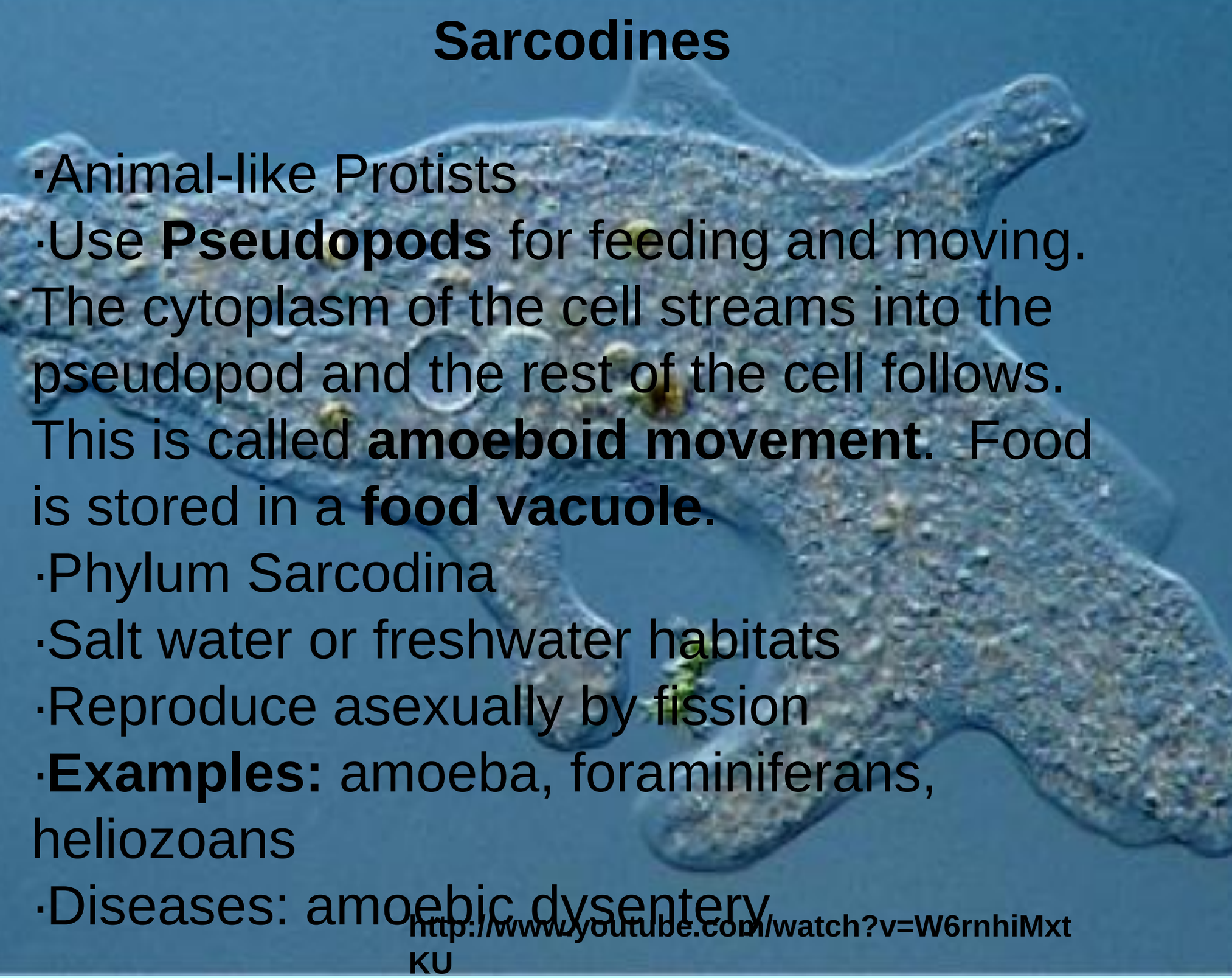
Protozoa means "first animals"

- Heterotrophs
- 4 groups (Phyla) based on how they move
    1. zooflagellates (use flagella)
    2. cilliates (use cilia)
    3. sarcodines (ameoboid movement)
    4. sporozoans (don't move on their own)

Zooflagellates

- Animal-like protists that swim using flagella
- Phylum Zoomastigina
- Often called Zooflagellates
- Absorb food througth their cell membranes
- Live in lakes, streams or inside other organisms
- Most reproduce asexually
- **Example:** *Trichomonas vaginalis, trypansomas (pathogenic, responsible for sleeping sickness)*

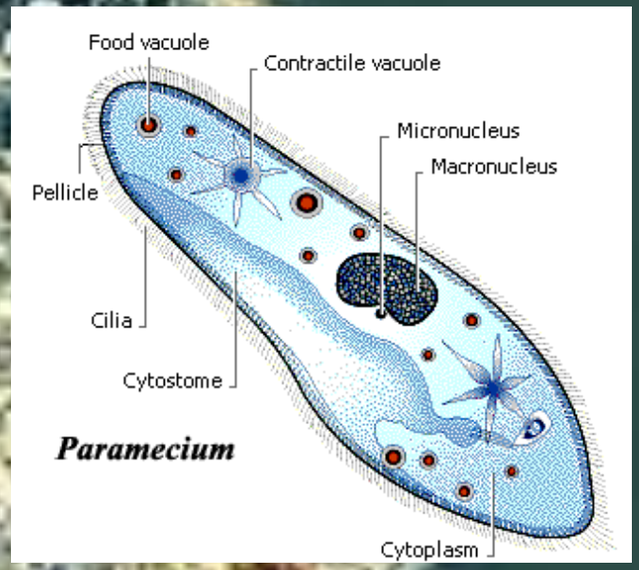
Sarcodines



- Animal-like Protists
- Use **Pseudopods** for feeding and moving. The cytoplasm of the cell streams into the pseudopod and the rest of the cell follows. This is called **amoeboid movement**. Food is stored in a **food vacuole**.
- Phylum Sarcodina
- Salt water or freshwater habitats
- Reproduce asexually by fission
- **Examples:** amoeba, foraminiferans, heliozoans
- Diseases: amoebic dysentery

http://www.youtube.com/watch?v=W6rnhiMxtKU

Ciliates



- Phylum Ciliophora
- Cilia are short hair-like projections
- Use cilia for feeding and movement
- Found in fresh and salt water
- Most are free living
- Most reproduce asexually by mitosis. Reproduce through conjugation when under stress.
- **Example: Paramecium** (have **trichocysts** for defense, two nuclei, **gullet** which is like a mouth, **anal pore** to remove wastes and **contractile vacuoles** to remove excess water so it doesn't explode)

http://www.youtube.com/watch?v=gblKiwlPp3c

http://www.youtube.com/watch?v=S1TmU2bb9XA&NR=1

Sporozoans

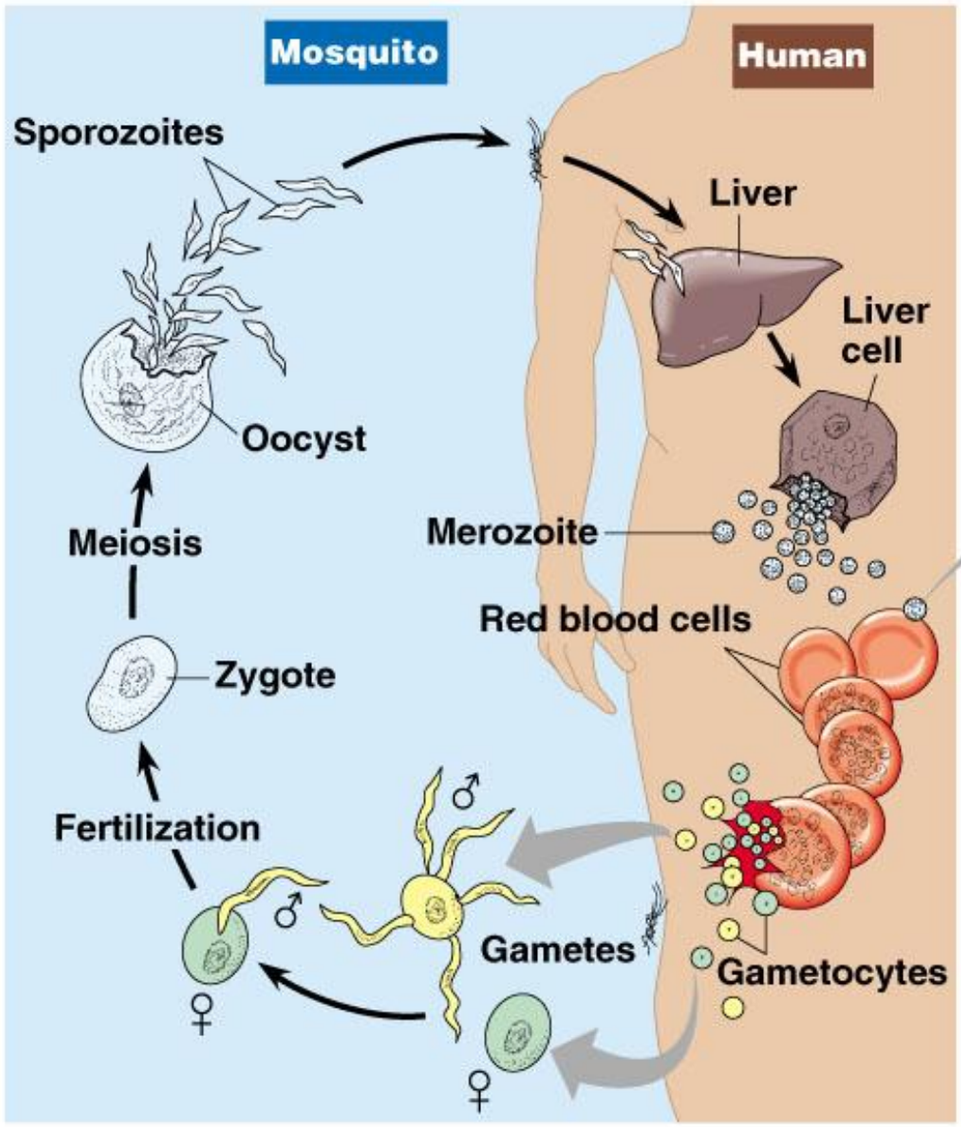
- Phylum Sporozoa
- Do not move on their own
- Parasitic
- Complex life cycles involving several hosts, sexual and asexual reproduction
- **Example: Malaria** is caused by the sporozoan *Plasmodium* and is carried by the female *Anopheles* mosquito. It kills 2 million people a yea

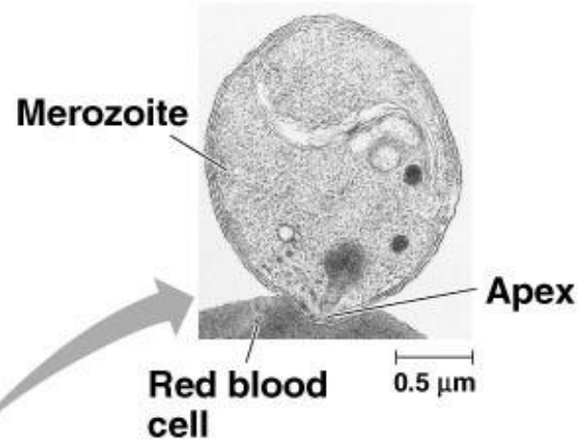
malaria

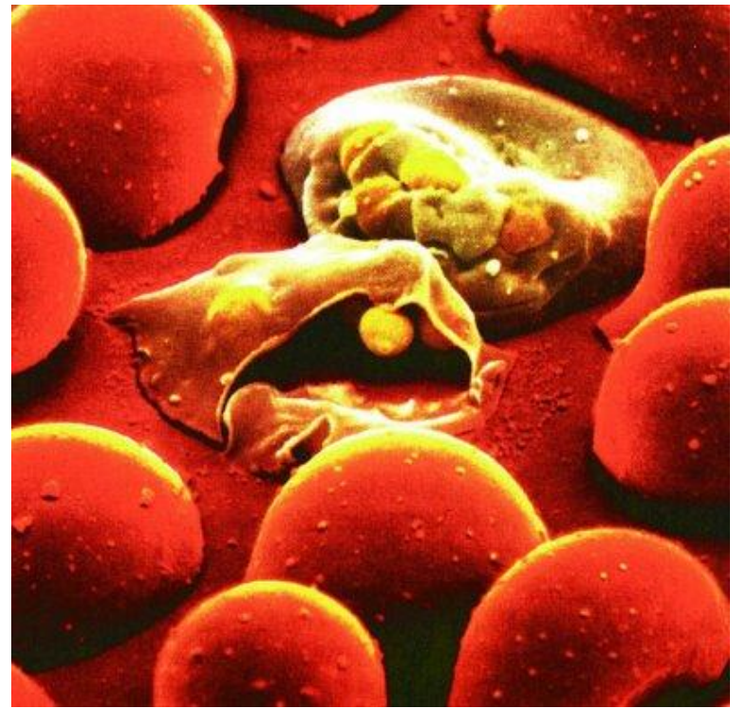
http://www.youtube.com/watch?v=szlfndj0TFE&f
ated

mosquito life cycle

http://www.youtube.com/watch?v=wFfO7f8V
r9c





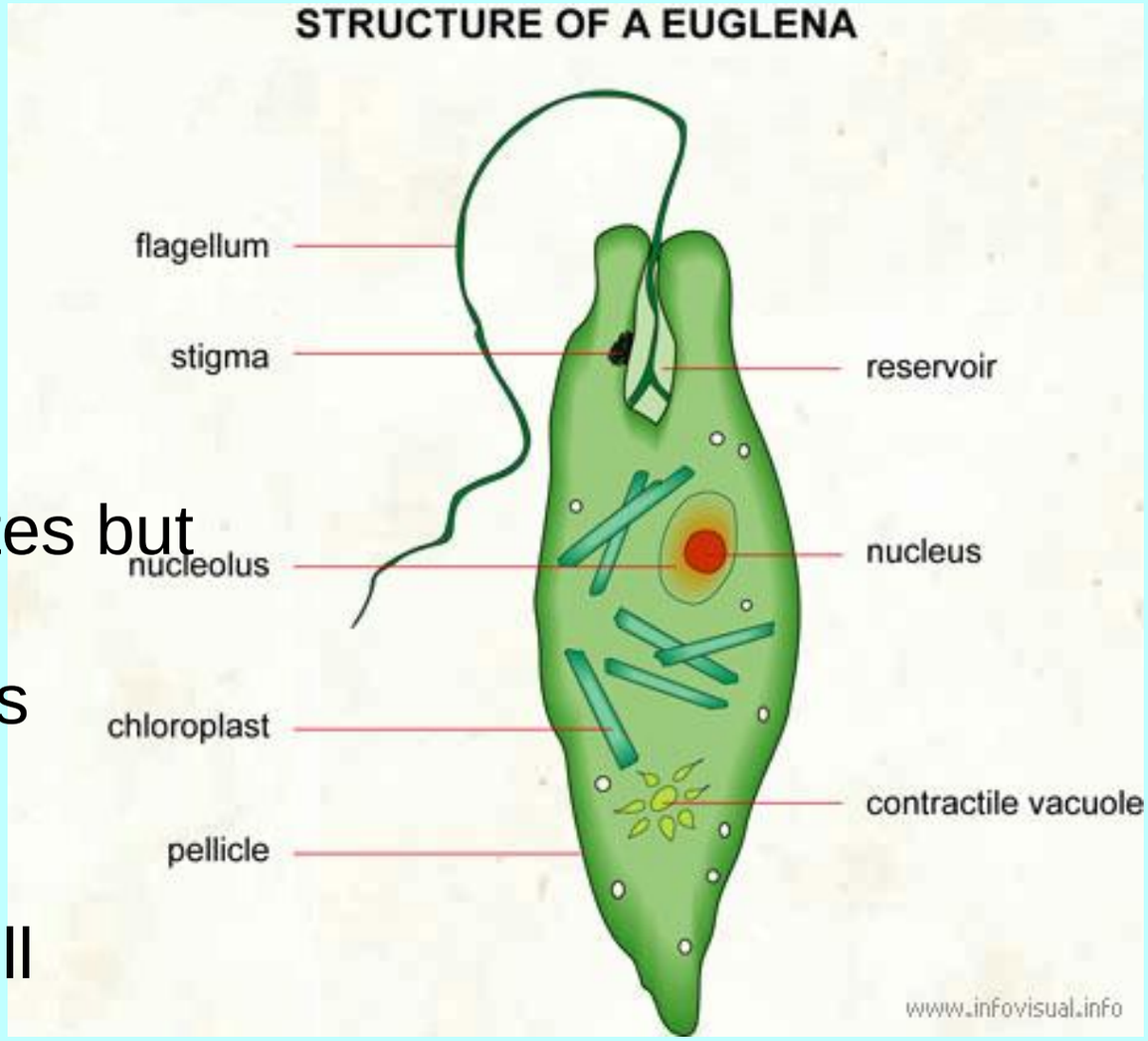


Plant-Like Protists: Algae

- Contain Chlorophyll
- Many move around freely
- Commonly called "algae"
- **7 Phyla** according to cellular characteristics
  - **First 4 Phyla: unicellular organisms**
    1. euglenophytes
    2. chrysophytes
    3. diatoms
    4. dinoflagellates
  - **Last 3 Phyla: multicellular organisms**
    1. red algae
    2. brown algae
    3. green algae

http://www.youtube.com/watch?v=1cLWKDhBYxo&feature=related

Euglenophytes



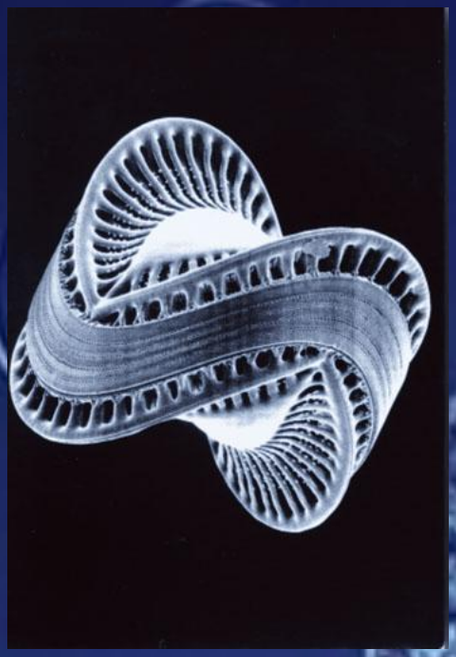
- Phylum Euglenophyta
- Plant-like Protists
- Have two flagella
- No cell wall
- They are like zooflagellates but they have chloroplasts
- Found in ponds and lakes Have a **gullet, eyespot** (pigment that helps it find sunlight), and **pellicle** (cell membrane)
- Can live as heterotrophs if sunlight is not available
- Reproduce asexually by binary fission

http://www.youtube.com/watch?v=0rNI8Bos_BQ&NR=1

http://www.youtube.com/watch?v=5fg3Q-hbSsI&feature=fvw

Chrysophytes

- Phylum Chrysophyta (means "golden plants")
- Yellow-green algae and Golden-brown algae
- Have golden colored chloroplasts
- Store food as oil, not starch
- Reproduce asexually and sexually
- Most are solitary, but some form colonies



Diatoms

- Phylum Bacillariophyta
- Most abundant and beautiful organisms on Earth
- Produce thin, delicate cell walls of silicon (glass) that fit together like a box and have fine lines and patterns etched into them

http://www.youtube.com/watch?v=sIJgB4RbUI4&NR=1

http://www.youtube.com/watch?v=JYB5529hDPI

http://www.youtube.com/watch?v=98Ra2q1ZqUU&feature=related

Dinoflagellates

- Phylum Pyrrophyta
- About half are photosynthetic, other half are heterotrophs
- Usually have 2 flagella
- Most reproduce asexually by binary fission
- Many are luminescent
- *Pyrrophyta* means "fire plants"
- Cause Red tides

TURN SOUND OFF

http://www.youtube.com/watch?v=T2xh9-UPSlU

http://www.youtube.com/watch?v=q6CefMUMtv4

http://www.youtube.com/watch?v=4m9MRbG1Nkk&feature=related

http://www.youtube.com/watch?v=BCOy-2ohFR4

Phytoplankton

- Small, photosynthetic organisms found near the surface of the ocean
- Carry out 1/2 of all photosynthesis that occurs on Earth
- Provide food for organisms

http://video.google.com/videoplay?docid=-3883032799867506425#

Algal Blooms

·Over growth of algae where nutrients in the water are high
·These deplete the water of nutrients and when they die they use oxygen when they decompose
·Fish die because there is no oxygen
·"Red Tides" are algal blooms of dinoflagellates. They produce dangerous toxins and kill shellfish. Eating the toxic shell fish can cause serious illness in humans and fish

Red Algae

- Phylum Rhodophyta
- Can live at greater depths (up to 260 meters) because they gather light efficiently
- Contain red pigments called phycobilins that absorb blue light
- Most are multicellular
- Have complex life cycles
- Help maintain coral reefs by providing food and calcium carbonate that stabilizes the reef

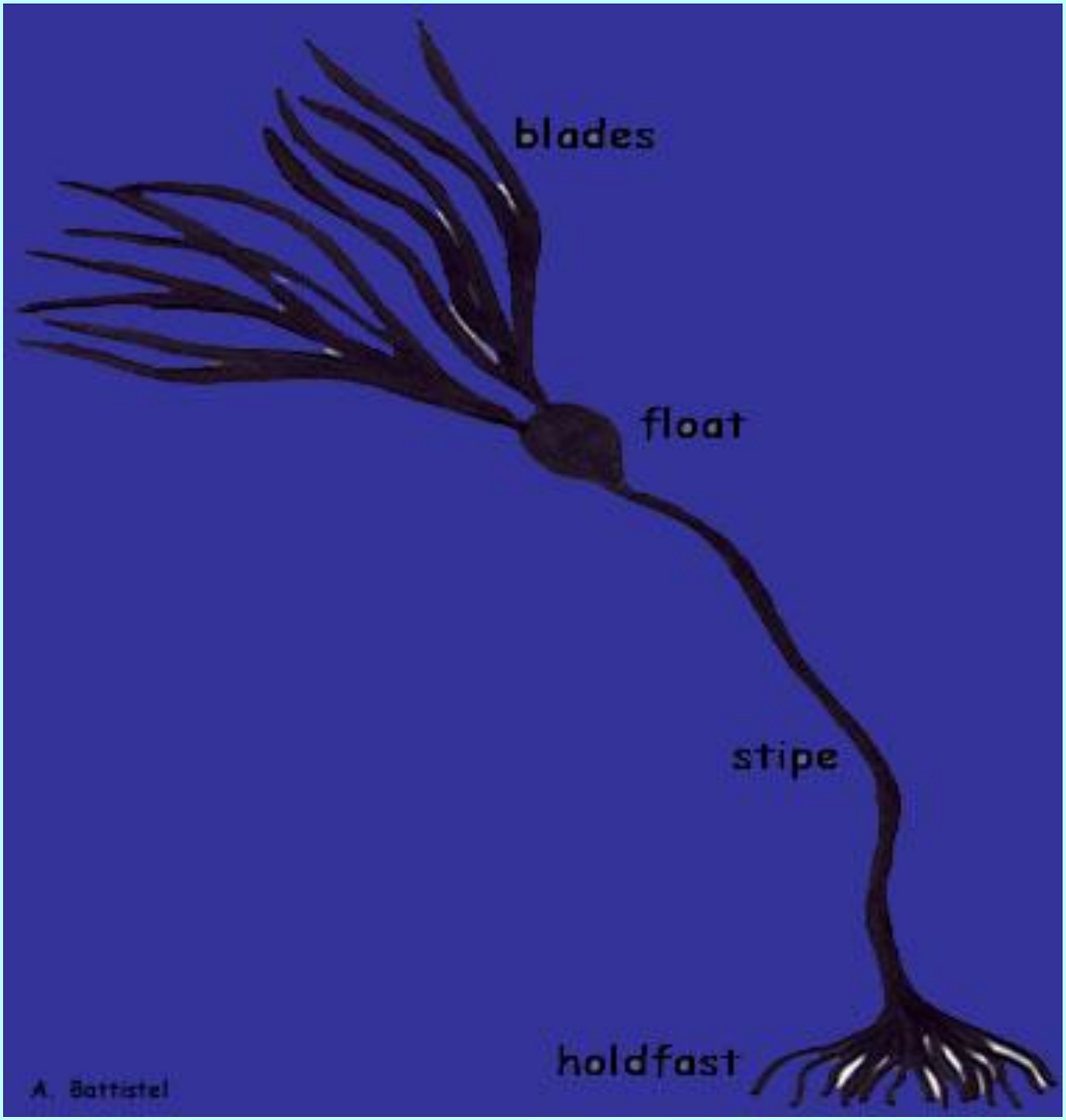
http://www.oceanfootage.com/video_clips/VM04_037

Brown Algae

- Phylum Rhaeophyta ("dusky Plants")
- Contain chlorophyll and fucoxanthin
- The largest and most complex algae
- All are multicellular
- Most are marine
- Largest is giant kelp (60 meters)
- Sargassum floats in mats in the Atlantic Ocean

http://www.youtube.com/watch#!v=9GVxUDCCNvI&feature=related

http://www.youtube.com/watch?v=f-7GIsOCjuI


blades
float
stipe
holdfast
A. Battistel

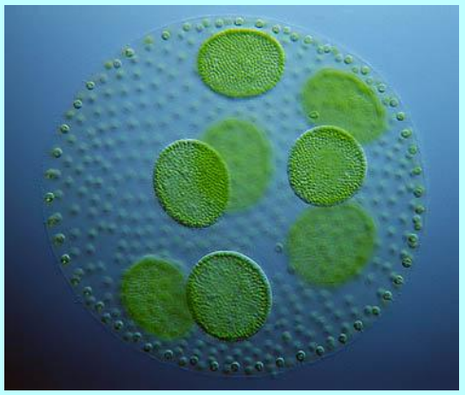
Green Algae

- Phylum Chlorophyta "green plants"
- Share many characteristics with plants because they have cellulose in their cell walls and contain chlorophyll and store food as starch, just like land plants
- In fresh and salt water
- Many live as single cells, others form colonies
- Multicellular and unicellular

Unicellular Green Algae

In ponds, ditches, wet soil

Example: *Chlamydomonas*



*Col***onial Green Algae**

Example: *Volvox* and *Spirogyra*

Multiple organisms connected together

http://www.youtube.com/watch#!v=b8ugGN9lCu0&feature=related

http://www.youtube.com/watch?v=6RxR3PTqr6E

Mul**ticellular Green Algae**

Example: *Ulva* (only 2 cells thick)

Fungus-Like Protists

Slime Molds

▪Heterotrophs that absorb nutrients from dead organic matter

·Have centrioles (fungi don't)

·Don't have Chitin in their cell walls (fungi do)

Cellular Slime Molds

▪Phylum Acrasiomycota

·Complex life cycles

·Look like amoeba at first, then they produce fruiting bodies to reproduce

Acellular Slime Molds

▪Phylum Myxomycota

·Look like amoeba at first, then a plasmodium, then produce fruiting bodies

http://www.youtube.com/watch?v=3SdadVrVMK4

Water Molds

- Phylum Oomycota
- Live on dead organic matter in water
- Some are plant parasites on land (mildew and blights)
- Produce thin filaments called hyphae
- Sexual and asexual reproduction
- Important recyclers and decomposers
- Irish Potato Famine was caused by a water mold