I. What are protists?

A. Eukaryotes that are not fungi, plants and animals

B. Paraphyletic group

II. Unifying traits

1. Membrane bound organelles & nucleus

2. Sexual and asexual reproduction (meiosis and mitosis)

3. Usually unicellular

4. Usually aquatic

III. Incredibly diverse. Most major groups as distantly related from other protists

as animals are from plants.

1. Range in nutritional mode

1. Plant-like protists (autotrophs; can photosynthesize)
   1. Algae (Charophyceans, golden, red, green & brown)
   2. Diatoms
   3. Dinoflagellates
2. Fungus-like protists (absorptive heterotrophs; exoenzymes; decomposers)
   1. Slime molds
   2. Water molds (Oomycetes)
3. Animal-like protists (ingestive heterotrophs)
   1. Pretty much everything else

2. Range in Locomotion

- pseudopods

- flagella

- cilia

- sessile

1. Range in endosymbiotic events. Original endosymbiotic event leads to the evolution of eukaryotes from prokaryotes, creating the mitochondrion. Subsequent endosymbiotic events occurred in some lineages that give rise to other organelles like chloroplats.

1. Primary endosymbiosis – eukaryotic heterotroph engulfs photosynthetic cyanobacterium. Bacterium membrane lost, forms organelle (i.e. chloroplast). This lineage give rise to the red and green algae.

2. Secondary endosymbiosis – In both the red and green algae lineages, multiple independent endosymbiotic events occur.

1. Range in size from small, 1um long organisms to large multicellular

algae (e.g. kelp)

IV. Five supergroups

A. Excavata

1. Unifying traits

a. Highly modified mitochondria, multiple flagella, 'excavated' feeding groove

**2. Why should you care?**

a. cause numerous human diseases (e.g. Chagas disease, sleeping

sickness, non-bacterial gastroenteritis, STDs that increase HIV suceptability)

3. Examples

a. Giardia – causes non-bacterial gastroenteritis

b. Trichomonis – most common protist infection in industrialized

countries

c. Euglena – a mixotroph (can be photosynthetic or heterotrophic)

d. Trapanosoma – cause disease such as sleeping sickness &

chagas

B. Chromalveolata

1. Derived from secondary endosymbiosis of red algae

**2. Why should you care?**

a. Dinoflagelates are the main component of plankton

i. cause red tides, some of which produce harmful

neurotoxins or deplete oxygen levels in water

ii. photosynthesis endosymbiotes of coral. Temperature rise

causes coral bleaching (loss of zoothanthellae)

iii. Bioluminescent

b. Cause human diseases

i. Apicomplexa cause malaria

c. Diatoms contribute to almost 45% of ocean primary

productivity, providing vast amounts of energy and oxygen

3. Examples

a. Dinoflagellates

b. Apicomplexa

c. Ciliates

d. Diatoms

e. Brown algae

C. Rhizaria

1. Amoeba like; thread-like pseudopodia

**2. Why should you care?**

a. parasites of plants and animals

b. make excellent index fossils!

3. Examples

a. Foraminifera

b. Radiolarians

D. Archaeplastida

1. Main groups include red algae, green algae and land plants

**2. Why should you care?**

a. help with reef formation

b. edible (e.g. nori used to wrap sushi)

3. Examples

a. Red algae

b. Green algae

E. Unikonta

1. Amoebazoans; tube-like pseudopodia

**2. Why should I care?**

a. Cause human diseases (e.g. amoebic dysentery)

2. Examples

a. Plasmodial slime mold (giant, multinucleated single cell)

b. Cellular slime mold (small single cell that joins other cells to

reproduce

c. Entamoeba