Classification of Organisms

1. Aristotle developed 1st classification system
2. Linneaus began the modern system of classification
3. Today we use a phylogenetic classification system
    -it uses binomial nomenclature (2 word naming system)
    -organisms are classified in a hierarchy of taxa
        -kingdom, phylum, class, order, family, genus, specie (from the broadest to the most specific)
4. Things biologists use to classify organisms are similarities in phylogeny (evolutionary relationships), structure, development, biochemistry and behavior
5. 5 or 6 Kingdoms
    -Monerans – prokaryotes without membrane bound nuclei (bacteria)
        -now being divided into 2 kingdoms; archaebacteria and eubacteria
    -Protists – eukaryotes without complex organ systems, usually live in water or moist environments (protozoans, algae, and slime molds)
    -Fungi – eukaryotes that obtain food by absorption
    -Plants – multicellular eukaryotes that produce own food
    -Animals – multicellular eukaryotes that are consumers (lack cell wall)
6. dichotomous key is a tool used to identify organisms: uses questions (2 at a time) to categorize an organism based on characteristics
7. cladograms and phylogenetic trees - A branching, treelike diagram in which the endpoints of the branches represent specific species of organisms. It is used to illustrate relationships and show points at which various species have diverged from common ancestral forms.

Viruses

1. made of only nucleic acids (usually RNA) and proteins, smaller than bacteria
2. not considered living because they don't meet the 4 criteria for life, the only thing they "do" is reproduce and they need a host to accomplish this
3. because they are nonliving, they are not included in the 6 kingdoms and they are not given Latin names
4. most viruses are specie specific and sometimes even cell type specific
5. they have 2 reproductive cycles (some viruses use only one type, some use both): the basic steps are the same, just the rate and mechanisms of certain steps are different
    A. the basic steps are as follows:
        1. attachment – the virus hooks on to the host cells plasma membrane
        2. entry – the virus must get inside the host cell, this usually happens when the virus "injects" its genetic material into the host cell
        3. replication – the host cell makes copies of the viral genetic material
        4. assembly – the viral genetic material is used to make viral proteins and the proteins and genetic material are put together to make new viruses
        5. release – the new viruses are released into the body, the host cell usually bursts open (lyses) which kills the host cell
    B. lytic cycle
        -attachment to host cell, entry (inject nucleic acid into host cell), replication (host DNA is destroyed and viral nucleic acid and proteins are produced), assembly (new virus particles are assembled), lysis and release (the host cell is broken open releasing all of the newly produced virus)
        -usually kills host cell
    C. lysogenic cycle
        -attachment and entry, provirus formation (viral nucleic acid becomes part of host chromosome), cell division (provirus is inactive but replicated with the host Nucleic acid)
        -can go into the lytic cycle at any time, the provirus comes out of the host nucleic acid and begins the lytic cycle
7. non-virus infectious agents; viroids (naked strands of RNA), prions (protein particles)

Kingdoms

Monerans – prokaryotes – "before nucleus" (no membrane bound organelles)

-now being considered as 2 separate kingdoms
-most abundant & most far flung kingdoms
-longest evolutionary history
-not all "bad"
-small, non-elaborate structure, but they aren't "simple" or inferior

1. Archaebacteria – more ancient type, inhabit extreme environments.
   -Three types: methanogens (oxygen free), halophiles (salt loving), thermophiles (heat loving)
2. Eubacteria – "common" bacteria
   -usually classified by shape
   -rods (bacillus)
   -spheres (coccus)
   -spirals (spirillum)

Protists

1. Most diverse kingdom, unicellular or multicellular
2. Eukaryotes, heterotrophs, autotrophs and some get nutrients from decaying organic matter
3. Three types
   A. Protozoans – animal like, unicellular, heterotrophs
   B. Algae – plant like protist, unicellular & multicellular, photosynthetic
   C. Fungus-like protist –obtain energy from decaying organic material, live in cool moist places

Fungi

1. multicellular, eukaryotes, live by decomposing living and nonliving organic matter (they are heterotrophs that carry out extracellular digestion)

Plants

1. eukaryotic, multicellular autotrophs (photosynthesis) with true roots, stems and leaves
2. plants are classified into 12 divisions (same as phyla)

Animals

I. General Characteristics
   A. Multicellular, heterotrophic, eukaryotes, mostly motile (can move) during some part of their life
II. Invertebrate Phyla
   A. Porifera -sponges
   B. Cnidaria – jellyfish, coral
   C. Platyhelminthes – flatworms
   D. Nematoda – roundworms
   E. Annelida – segmented worms
   F. Mollusca - clams, snails, octopus, squid
   G. Arthropoda – "jointed appendages", largest animal phyla, insects, spiders, crabs
   H. Echinodermata – starfish, sea urchins
III. Phylum Chordata
   A. Invertebrate Chordates (Hemichordates)
      - Urochordates – tunicates, sea squirts
      - Cephalochordates – lancelets
   B. Vertebrate Chordates
      - Fish – scales, gills, cold-blooded
         a. Agnathans – jawless fish
         b. Gnathostomates – jawed fish
            a. class Chondrichthyes – cartilaginous
            b. class Osteoichthyes – bony
      - Tetrapods – four limbs
         a. class Amphibia – Amphibians, smooth/moist skin, eggs in water, cold-blooded, change
         b. class Reptilia – Reptiles, dry/scaly skin, egg with leathery shell, cold-blooded
         c. class Aves – birds, warm-blooded, eggs with hard shell, feathers
         d. class Mammalia – Mammals, hair, milk for young

Kingdom		Phylum		Characteristics	Example
Archaebacteria *prokaryotes				Prokaryotes in very extreme environments	Thermophiles, halophiles & methanogens
[illegible]cteria [illegible]karyotes				Prokaryotes grouped according to shape	E. coli, Streptococcus
Protists *eukaryotes	Protozoans	Sarcodina Zoomastigina		*animal like, heterotrophic	*Amoebas & paramecia
		Ciliophora Apicomplexa (sporozoans)			
	Algae	Euglenophyta		*plant like, autotrophic	*euglena, diatoms, red algae, brown algae, spirogyra
		Bacillariophyta			
		Dinoflagellates			
		Rhodophyta			
		Phaeophyta			
		Chlorophyta			
	Fungus-like	Myxomycota		*decomposers	*slime molds, water molds, downy mildew
		Acrasiomycota			
		Oomycota			
Fungi *eukaryotes		Zycomycota		*decomposers, extracellular digestion, chitin in cell walls, hyphae and mycelium	*bread mold, yeast, morels, mushrooms, penicillium
		Ascomycota			
		Basidiomycota			
		Deuteromycota			
Plant *eukaryotes		Hepaticophyta		*multicellular, autotrophs with true roots, stems, and leaves	*liverworts
		Anthocerophyta			*hornworts
		Bryophyta			*mosses
		Arthrophyta			*horsetails
		Psilophyta			*whiskferns
		Lycophyta			*club mosses
		Pterophyta			*ferns
		Cycadophyta			
		Gnetophyta			
		Ginkophyta			*Ginko biloba
		Coniferophyta			*pine trees
		Anthophyta			*flowering plants
Animal *eukaryotes	Invertebrates	Porifera		*multicellular, heterotrophs	*sponges
		Cnidarian			*jellyfish
		Platyhelminthes			*flatworms
		Nematoda			*roundworms
		Annelida			*segmented worms
		Mollusca			*clams, squid
		Arthropoda			*insects, crabs
		Echinodermata			*starfish
		Choradata	Urochordata		*tunicates
			Cephalochordata		*lancelets
	Vertebrates		Agnathans		*hagfish,lamprey
			Chondrichthyes		*sharks, rays
			Osteoichthyes		*perch, bass
			Amphibia		*frogs, toads
			Reptilia		*snakes, lizards
			Aves		*birds
			Mammalia		
			-monotremes		*platypus
			-marsupials		*kangaroo
			-eutherians		*humans

[illegible]es – nonliving

Germ Theory of Disease

1. Today we recognize that "germs" (a generic term which can include; viruses, bacteria, protists, fungi, etc) make us sick. So, we have new methods of preventing disease. Some include; safe handling of food, aseptic techniques (autoclave, disinfectant, pasteurization, etc.), vaccines (against viruses) and the use of chemicals to destroy micro-organisms. Remember, one of the easiest but best things you can do to prevent the spread of germs is wash your hands!