All organisms are made of cells
Cells are the smallest living things

Eukaryotic cells have internal membranes and organelles
Prokaryotic cells do not

Basic features:
Plasma membrane
Semifluid substance (cytosol)
Chromosomes
Ribosomes

Prokaryotic cells:
no nucleus
DNA is in an unbound region celled nucleoid
no membrane-bound organelles
cytoplasm bound by plasma membrane

Eukaryotic cells:
DNA is in nucleus
Nucleus has a separate membrane
All organelles have their own membranes
Cytoplasm in the region between plasma membrane and nucleus

Plasma membrane is a selective barrier that allows some things to come in and out
Oxygen, nutrients and waste can pass through

Structures in eukaryotic cell:
Plasma membrane
Nucleus - storage of DNA
Flagellum
Nucleolus
Ribosomes - use DNA to make proteins
Chromatin
Peroxisomes - oxidative organelles
Endoplasmic Reticulum - may have ribosomes attached
Smooth ER

- synthesizes lipids
- metabolizes carbohydrates
- detoxifies drugs and poisons
- stores calcium ions

Rough ER

- has bound ribosomes
- distributes transport vessels

- membrane factory for the cell

Golgi apparatus

- modifies products of ER
- manufactures certain macromolecules
- sorts and packages materials into transport vesicles

Mitochondria - converts oxygen to ATP
Cytoskeleton - keeps stuff in place
Lysosomes

- membranous sac of hydrolytic enzymes
- digests macromolecules
- works best in acidic environments

Vacuoles - perform various functions
food vacuoles - formed by phagocytosis
Contractile vacuoles - found in freshwater protists, pump excess water out

Plant cells:
Cell wall
Plasmodesmata - opening that allow materials to move between cells
Chloroplast - convert sunlight to chemical energy
Peroxisome - water converted into peroxide
Central vacuole - contains water for the plant

mitochondria and chloroplasts have similarities with bacteria

- enveloped by a double membrane
- have their own DNA which is circular
- contain free ribosomes
- grow and reproduce somewhat independently

endosymbiont theory - theory that proto-eukaryotic cells somehow became dependent on mitochondria