

LIFE SCIENCES 11

TYPES OF CELLS

Learning Outcomes:

- I can describe the differences between prokaryotic or eukaryotic cells.
- I can differentiate between unicellular and multicellular life.
- I can explain the advantages of cell specialization.

Two Types of Cells

1. Prokaryotic Cells

- simplest form of life – bacteria
- unicellular life forms that may form colonies
- lack a nucleus and other organelles except for ribosomes (for protein synthesis)
- DNA is naked inside the cytoplasm and forms a single, circular chromosome
- cell wall is composed mainly of peptidoglycans – long chains of disaccharides (2 sugar molecules) joined by short chains of identical amino acids

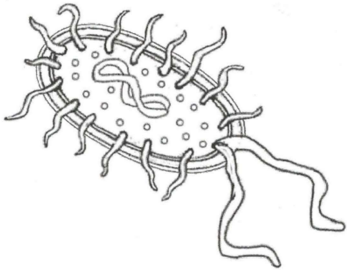
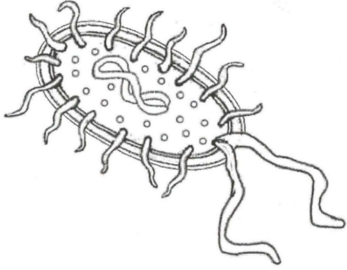
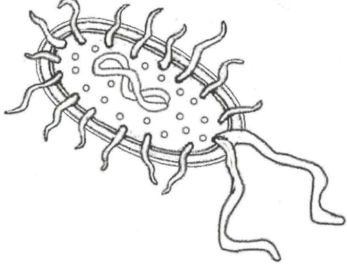
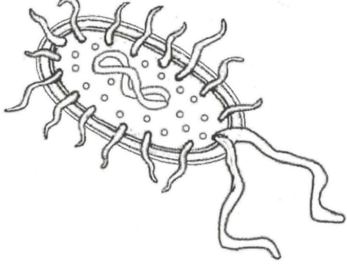
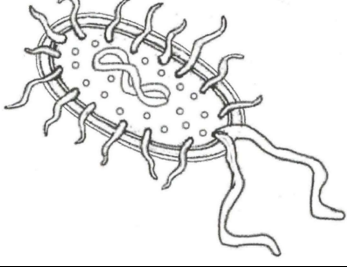
2. Eukaryotic Cells

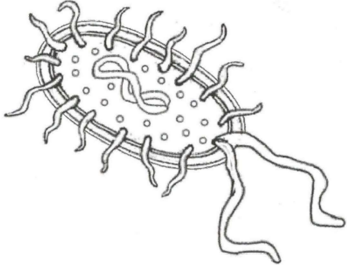
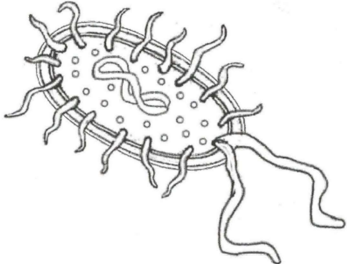
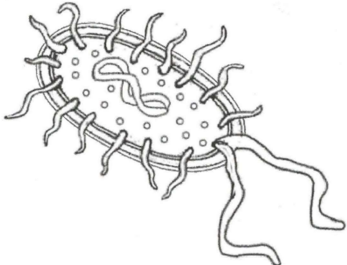
- include unicellular protists and multicellular organisms
- have a nucleus and other membrane bound organelles
- DNA is found within the nucleus and forms multiple linear chromosomes
- may have a cell wall composed of mainly of cellulose (plants and protists) or chitin (fungi)

Cell Organization

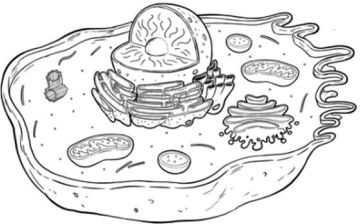
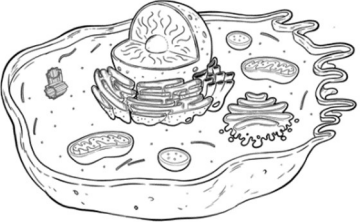
- unicellular organisms – each cell is responsible for gathering its own food and oxygen, and for getting rid of its own waste products
 - example: bacteria, most protists
- multicellular organisms - different cell groups are able to specialize in a single function and become very efficient
 - examples: plants, animals, fungus

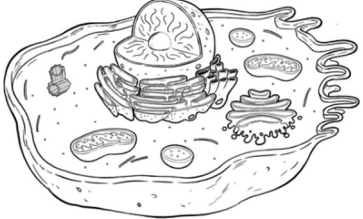
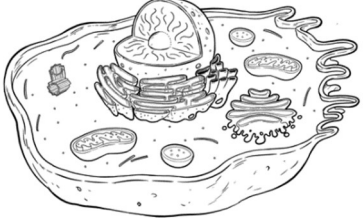
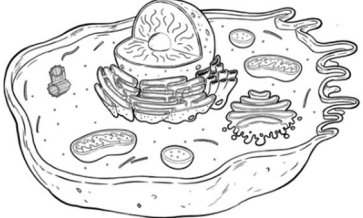
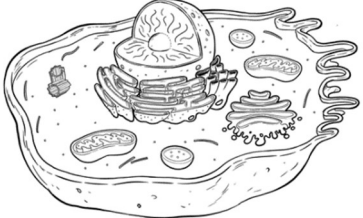
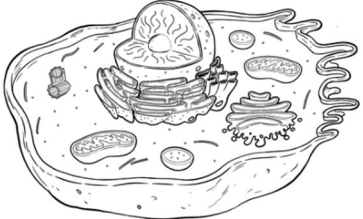
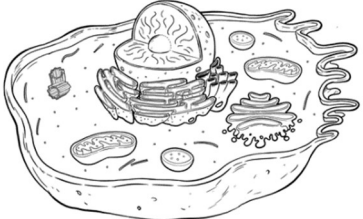
Parts of a Prokaryotic Cell (Bacteria)

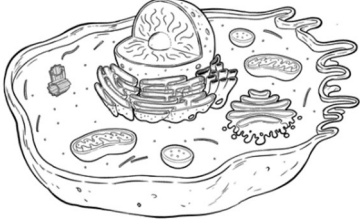
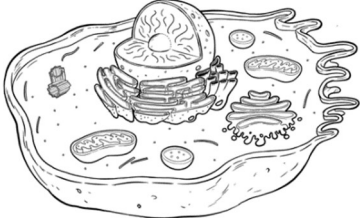
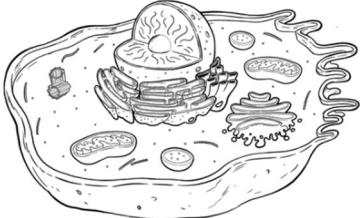
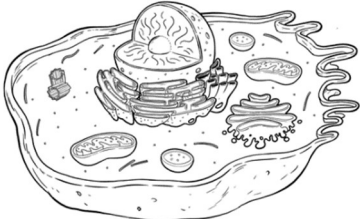
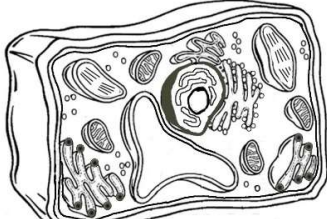
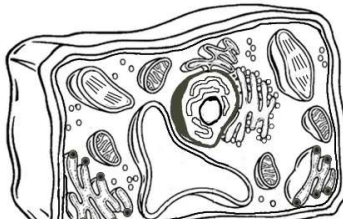
Cell Wall 	• inside layer • provides shape and protection
Cell Membrane 	• middle layer • phospholipid bilayer • controls movement of materials into or out of cell
Capsule 	• outer layer • keeps cell from drying out and helps it attach to surfaces
Pili 	• hair-like protein structures • help bacteria attach to surfaces • can be used as a conjugation bridge (exchange genetic material)
DNA 	• genetic information • single circular chromosome

Ribosomes 	• only organelle • site of protein synthesis
Cytoplasm 	• gelatinous liquid • all cell reactions occur in the cytoplasm
Flagellum 	• made of protein filaments • used for movement by most bacteria

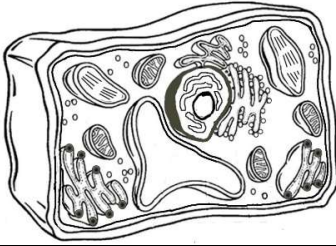
Parts of a Eukaryotic Cell

Cell Membrane 	• phospholipid bilayer • controls movement of materials into or out of cell
Nucleus 	• surrounded by a double membrane with large pores • contains the cell's DNA

Nucleolus 	• located in the nucleus • site of ribosome formation
Mitochondria 	• double membrane organelle • site of cellular respiration • produces ATP energy molecule
Ribosome 	• site of protein synthesis for use within the cell
Smooth ER 	• series of folded membranes attached to nuclear membrane • synthesizes lipids and steroids • detoxifies harmful products
Rough ER 	• has ribosomes attached to it • site of protein synthesis for cell membrane or export
Golgi Apparatus 	• series of flattened membranous stacks • packages proteins from the rough ER into vesicles for movement out of the cell

Cytoplasm 	• gelatinous liquid that holds all of the cell's organelles
Vesicles 	• membrane bound sacs used for transporting or temporarily storing materials
Lysosomes 	• special type of vesicle • contain digestive enzymes for breaking down materials or killing pathogens
Centrioles 	• occur in pairs in animal cells • form spindle fibres used to separate chromosomes during cell division
Cell Wall 	• provides mechanical support for plant and fungi cells • plants - made of cellulose and lignin • fungi – made of chitin
Chloroplast 	• double membrane organelle • site of photosynthesis in plant cells • produces glucose and oxygen

Large Central Vacuole



- large permanent vesicle in plant cells
- stores mainly water
- used to maintain turgor pressure in plant cells