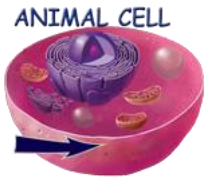
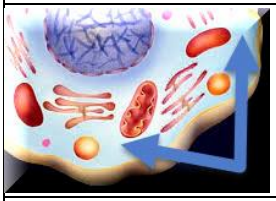
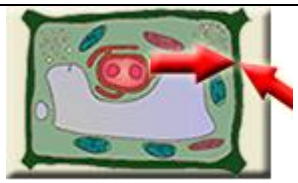
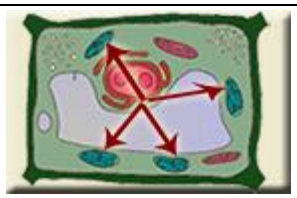
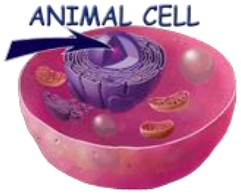
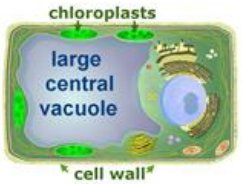
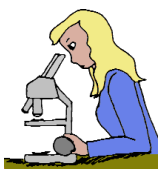
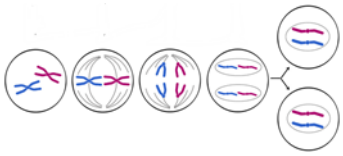
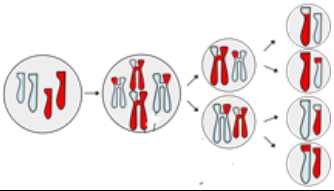
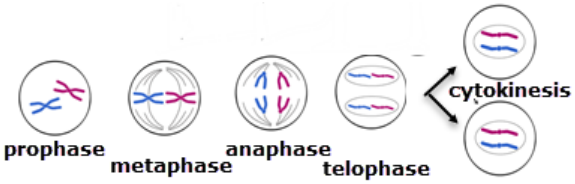
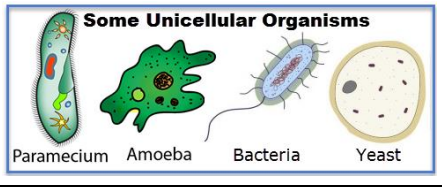
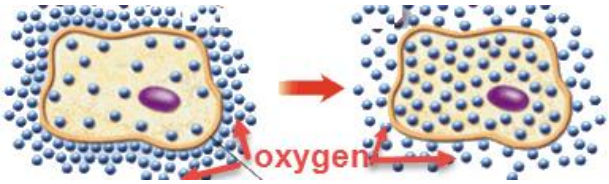
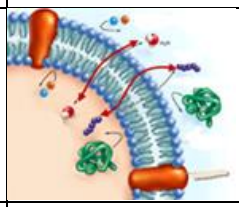
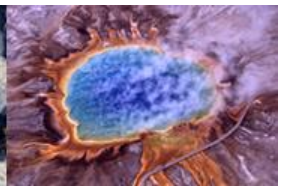
	Cell membrane
Purpose of cell membrane	Cell membrane
	Cytoplasm
Purpose of cytoplasm	Contains organelles and site of many chemical reactions
	Plant cell wall
Purpose of cell wall	Provides support (plants only)
	Chloroplasts
Purpose of chloroplasts	Needed for photosynthesis
	Large central vacuole in plant cell
Purpose of vacuole	Storage of material (water in plants)

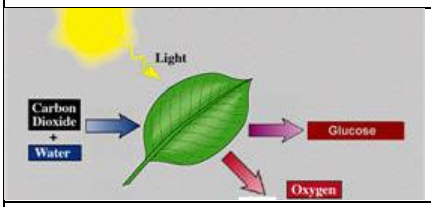
	Mitochondrion
Purpose of mitochondrion	Release energy for use by cell
 Endoplasmic reticulum	Endoplasmic reticulum
Purpose of endoplasmic reticulum	Transports materials through the cell
	Nucleus
Purpose of nucleus	Control center of cell
How plant cells differ from animal cells	 Plants have a **cell wall** to provide a defined shape, **chloroplasts,** and one **large central vacuole** rather than many smaller vacuoles
Cell theory	• All living things are composed of cells; • Cells are the smallest unit (structure) of living things that can perform the processes (functions) necessary for life; • Living cells come only from other living cells.
On what new technology did the development of the cell theory depend?	Microscope 

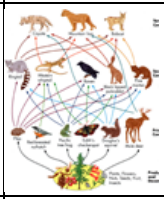
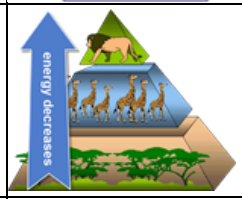
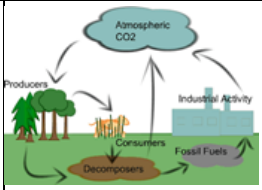
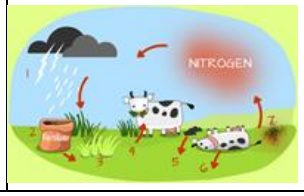
Phases of the cell cycle	Interphase, mitosis, and cytokinesis.
	Mitosis
	Meiosis
Phases of mitosis.	
Purpose of mitosis	To produce new cells for growth and repair that are identical to the parent cell.
Purpose of meiosis	To produce reproductive (sex) cells that carry half the genetic material of the parent.
LS.3	
How cells that have the same function group together	Cells form tissues; Tissues form organs; Organs form organ systems
Unicellular organism	A single-celled organism – one cell has to conduct all life processes by itself.
Examples of unicellular organisms	

multicellular organism	Has groups of cells that specialize to perform specific functions.
Name some cell functions and processes	• Cellular respiration • waste breakdown and removal, • growth and division • cellular transport
	osmosis
Osmosis	The passive transport of water molecules across a cell membrane to area of less concentration.
	Diffusion
What is diffusion?	The passive transport of substances other than water across a cell membrane (oxygen passes into blood cells)
Selective permeability	 Allows the cell to control which molecules can pass through the membrane, moving into or out of the cell.
Passive transport	When molecules move across the membrane without the cell having to expend any extra energy (includes osmosis and diffusion)
Name several life processes carried out by living things	• Ingestion (taking food into the body), • digestion (breaking down of food) and removal of waste, • stimulus response, • growth and repair, • gas exchange, and • reproduction
LS.4	

Levels of hierarchy for classifying organisms by physical features (broader to more specific)	Domain, kingdom, phylum, class, order, family, genus and species
Three domains	Archaea, Bacteria and Eukarya.
Bacteria	Single-celled – include most of the bacteria we are familiar with, including those that are helpful and those that make us sick.
  Archaea	simple, single-celled organisms that are able to survive in extreme environments are believed to be fundamentally different from other organisms
Eukarya kingdoms (4)	Protista, Fungi, Plants, and Animals
Protista Kingdom	 Most are unicellular - include all microscopic organisms that are not bacteria, not animals, not plants and not fungi. Examples: protozoa, slim molds, algae
Fungi Kingdom	 Mushrooms, mold and mildew - Unlike plants, cannot make their own food. Feed on plant decay in soil.
Plants Kingdom	Multicellular; complex cells; all make their own food.
Animal Kingdom	Multicellular; complex; feed on other organisms
Scientific naming system	Binomial nomenclature

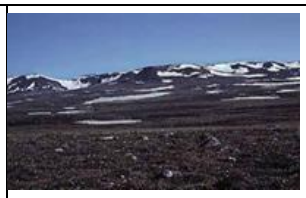
Homo sapiens	Humans – Homo is the genus, sapiens is the species
Major animal phyla	cnidarians, mollusks, annelids, arthropods, echinoderms, and chordates
 Jellyfish phyla	Cnidarian
 Worm phyla	Annelid
 Insect, spider phyla	Arthropod
 Starfish phyla	Echinoderm
 Humans, cats, dogs (all vertebrates)	Chordates
 Snails, clams, oysters	Mollusk
Major plant divisions	Mosses, ferns, conifers, and flowering plants
 Fir trees, pine trees and other cone-bearing trees	Conifers

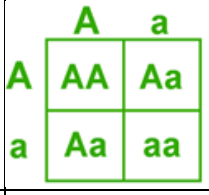
Vascular plants that reproduce with spores rather than seeds	 Ferns
nonvascular plants that reproduce with spores rather than seeds	 Mosses
Plants with seeds enclosed in an ovary which turns into a fruit	Flowering plants
A group of similar looking organisms that can reproduce	Species
LS-5	
A chemical in plants that can absorb or trap light energy	Chlorophyll
 Process that transforms light energy into chemical energy	Photosynthesis
Organelle involved in photosynthesis	 Chloroplasts
Raw materials are needed for photosynthesis	 Carbon dioxide and water (and sunlight)
Produced by photosynthesis from water and carbon dioxide	 Oxygen (goes into the atmosphere) and sugar (energy stored in plant molecules)

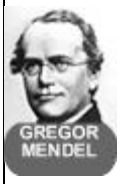
How plants and animals use the sugars from photosynthesis	Converted into other materials used growth, repair and energy
Photosynthesizing organisms obtain their energy from the sun	 Producers
Organisms that are the foundations of virtually all food chains	 Producers
Process used by both plants and animals to turn glucose (sugars) produced during photosynthesis back into energy	 Cellular respiration
LS.6	
Shows how energy cycles through a system	 Food web
Name the trophic levels of an energy pyramid starting with the base	 producer, first-order consumer, second-order consumer, third-order consumer
The change in energy available at each successive trophic level of an energy pyramid	 Moving up an energy pyramid, the available energy decreases
Changes in this cycle can affect the temperature of the Earth	 Carbon cycle
Decomposition is part of this cycle	 Nitrogen cycle

Precipitation is part of this cycle	 Water cycle
 Water cycle consists of:	Evaporation, Condensation, Precipitation, Surface Runoff
LS.7 - 8	
Basic animal needs	food, water, gases, shelter and space for which they compete
Two basic ways animals interact	Competition, cooperation
 The type of relationship between a consumer that hunts for another consumer	Predator-prey
The relationship between two or more organisms of different species that live and work together	Symbiosis
3 types of symbiotic relationships	Mutualism, commensalism, parasitism
 Relationship in which both organisms benefit	Mutualism
 Relationship in which one organism benefits and the other is unaffected	Commensalism

 Relationship in which one organism benefits and the other is harmed	Parasitism
 An organism's unique place in its community	Niche
LS.9	
The living organisms within a specific area and their physical environment	An ecosystem
Abiotic factors in an ecosystem	Non-living factors (water, air, soil etc)
Biotic factors in an ecosystem	Living factors – plants, animals etc
 Salt-water (ocean) ecosystem	Marine ecosystem
 Lake and stream ecosystem	Freshwater ecosystem
large regions characterized by certain conditions	 Biomes
Major biomes	 Desert; Forest; Grassland; Tundra

The coldest biome, near the Arctic circle	 Tundra
The driest biome	Desert
LS.10	
 Plants respond to light by growing toward it or away from it	phototropism
 Animals respond to cold with a period of lowered metabolism	hibernation
 Some plants respond to adverse conditions with a period of lowered or suspended metabolism	dormancy
Name some long-term changes that may affect entire communities and ecosystems	dramatic changes in climate; and catastrophic events, such as fire, drought, flood, and earthquakes; addition of excess nutrients to the system (eutrophication), which alters environmental balance
Eutrophication	addition of excess nutrients to the system
Difference between terms: populations, communities, ecosystems	Population – one type of organisms in a specific area Community – all populations that live in an area Ecosystem – the community of organisms in an area, plus the physical environment
Name some catastrophic events that can affect entire communities and ecosystems	Fire, drought, flood, earthquakes

LS.12	
Contains coded instructions that store and pass on genetic information from one generation to the next	 DNA
Shape of DNA	A double helix molecule
Components of the DNA molecule	Sugars, nitrogenous bases, and phosphates
Strands of tightly wound DNA	 Chromosomes
Sections of a chromosome that carry the code for a particular trait	Genes
An alternate form of a gene	An allele
Basic laws explaining how the transmission of most traits can be inherited from generation to generation	Mendelian genetics
Model used to predict the possible combinations of inherited factors resulting from single trait crosses	 A Punnett square
A trait that will appear in the offspring if one of the parents contributes it.	Dominant trait

A trait that must be contributed by both parents in order to appear in the offspring.	Recessive trait
The specific combination of dominant and recessive gene forms	Genotype
An organism's actual observed properties	Phenotype
Through his work on pea plants, he discovered the fundamental laws of inheritance.	 Gregor Mendel
Worked on the X-ray diffraction images of DNA which led to the discovery of the DNA double helix.	 Rosalind Franklin
Came up with the structure for DNA	 James Watson and Francis Crick
LS.13	
The “survival of the fittest”, that is, those with traits that best enable them to survive in their environment	Natural selection
A change DNA code	A mutation
Structures, functions, or behaviors that enable a species to survive	Adaptations

Sources of evidence for evolution	• fossil record; • radiometric dating; • genetic information; • the distribution of organisms; • anatomical and developmental similarities across species
Occurs in populations that cannot adapt to changes in their habitat	Extinction
Evolution occurs as a result of these processes.	• mutation • adaptation • natural selection • extinction
Because mutations are changes in DNA code, mutations are _____ (passed along to offspring)	inheritable