

**Alabama High School Science  
Curriculum Standards, 2005**

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<b>Biology Core</b>	<b>Boardworks High School Biology Presentations</b>
2. Describe cell processes necessary for achieving homeostasis, including active and passive transport, osmosis, diffusion, exocytosis, and endocytosis.	Active Transport Diffusion Osmosis
Identifying functions of carbohydrates, lipids, proteins, and nucleic acids in cellular activities	Lipids Monosaccharides Nucleic Acids Polysaccharides Proteins The Fluid Mosaic Model
Comparing the reaction of plant and animal cells in isotonic, hypotonic, and hypertonic solutions	Diffusion Osmosis
Explaining how surface area, cell size, temperature, light, and pH affect cellular activities	Enzymes
Applying the concept of fluid pressure to biological systems, Examples: blood pressure, turgor pressure, bends, strokes	—
3. Identify reactants and products associated with photosynthesis and cellular respiration and the purposes of these two processes.	Aerobic Respiration Anaerobic Respiration Photosynthesis 1 Photosynthesis 2
4. Describe similarities and differences of cell organelles, using diagrams and tables.	Organelles
Identifying scientists who contributed to the cell theory, examples: Hooke, Schleiden, Schwann, Virchow, van Leeuwenhoek	Cell Theory
Distinguishing between prokaryotic and eukaryotic cells	Eukaryotic Cells Organelles Prokaryotic Cells
Identifying various technologies used to observe cells, examples: light microscope, scanning electron microscope, transmission electron microscope	Microscopy
5. Identify cells, tissues, organs, organ systems, organisms, populations, communities, and ecosystems as levels of organization in the biosphere.	Cells to Organisms Describing Populations Ecosystems

Recognizing that cells differentiate to perform specific functions, examples: ciliated cells to produce movement, nerve cells to conduct electrical charges	Cell Differentiation The Nervous System Nerve Impulses
6. Describe the roles of mitotic and meiotic divisions during reproduction, growth, and repair of cells.	Meiosis Mitosis The Stages of Meiosis The Stages of Mitosis
Comparing sperm and egg formation in terms of ploidy, example: ploidy-haploid, diploid	Meiosis The Stages of Meiosis
Comparing sexual and asexual reproduction	Asexual Reproduction Mitosis The Stages of Mitosis
7. Apply Mendel's law to determine phenotypic and genotypic probabilities of offspring.	Gregor Mendel
Defining important genetic terms, including dihybrid cross, monohybrid cross, phenotype, genotype, homozygous, heterozygous, dominant trait, recessive trait, incomplete dominance, codominance, and allele	Genes and Alleles Gregor Mendel Incomplete Dominance and Codominance Inherited Diseases Patterns of Inheritance
Interpreting inheritance patterns shown in graphs and charts	–
Calculating genotypic and phenotypic percentages and ratios using a Punnett square	Gregor Mendel Incomplete Dominance and Codominance Patterns of Inheritance
8. Identify the structure and function of DNA, RNA, and protein.	Nucleic Acids Proteins
Explaining relationships among DNA, genes, and chromosomes	DNA Genes and Alleles Controlling Protein Synthesis Nucleic Acids
Listing significant contributions of biotechnology to society, including agricultural and medical practices, examples: DNA fingerprinting, insulin, growth hormone	Genetic Engineering Genetic Engineering for Health Care Understanding Genomes
Relating normal patterns of genetic inheritance to genetic variation, example: crossing-over	Genetic Variation Meiosis

Relating ways chance, mutagens, and genetic engineering increase diversity, examples: insertion, deletion, translocation, inversion, recombinant DNA	Genetic Engineering Genetic Mutation Population Genetics
Relating genetic disorders and disease to patterns of genetic inheritance, examples: hemophilia, sickle cell anemia, Down's syndrome, Tay-Sachs disease, cystic fibrosis, color blindness, phenylketonuria (PKU)	Inherited Diseases
9. Differentiate between the previous five-kingdom and current six-kingdom classification systems.	Classification
Sequencing taxa from most inclusive to least inclusive in the classification of living things	Classification
Identifying organisms using a dichotomous key	Classification
Identifying ways in which organisms from the Monera, Protista, and Fungi kingdoms are beneficial and harmful, examples: beneficial-decomposers, harmful-diseases	Infectious Disease Decomposers
Justifying the grouping of viruses in a category separate from living things	–
Writing scientific names accurately by using binomial nomenclature	Classification
10. Distinguish between monocots and dicots, angiosperms and gymnosperms, and vascular and nonvascular plants.	–
Describing the histology of roots, stems, leaves, and flowers	Specialized Plant Cells
Recognizing chemical and physical adaptations of plants, examples: chemical-foul odor, bitter taste, toxicity; physical-spines, needles, broad leaves	Plant Adaptations
11. Classify animals according to type of skeletal structure, method of fertilization and reproduction, body symmetry, body coverings, and locomotion. Examples: skeletal structure-vertebrates, invertebrates; fertilization-external, internal; reproduction-sexual, asexual; body symmetry-bilateral, radial, asymmetrical; body coverings-feathers, scales, fur; locomotion-cilia, flagella, pseudopodia	Classification
12. Describe protective adaptations of animals, including mimicry, camouflage, beak type, migration, and hibernation.	Animal Adaptations Behavior
Identifying ways in which the theory of evolution explains the nature and diversity of organisms	Evolution
Describing natural selection, survival of the fittest, geographic isolation, and fossil record	The Process of Evolution Population Genetics
13. Trace the flow of energy as it decreases through the trophic levels from producers to the quaternary level in food chains, food webs, and energy pyramids.	Energy Transfer in Food Chains Energy Loss in Food Chains Food Chains Food Webs
Describing the interdependence of biotic and abiotic factors in an ecosystem, examples: effects of humidity on stomata size, effects of dissolved oxygen on fish respiration	Ecosystems and Succession
Contrasting autotrophs and heterotrophs	–
Describing the niche of decomposers	Ecosystems and Succession Decomposers
Using the ten percent law to explain the decreasing availability of energy through the trophic levels	Energy Loss in Food Chains

14. Trace biogeochemical cycles through the environment, including water, carbon, oxygen, and nitrogen.	Carbon Cycle Nitrogen Cycle Recycling Nutrients Water Cycle
Relating natural disasters, climate changes, nonnative species, and human activity to the dynamic equilibrium of ecosystems.	Air Pollution Climate Change Extinction Human Impact on the Environment Loss of Diversity Water Pollution
Describing the process of ecological succession	Ecosystems and Succession
15. Identify biomes based on environmental factors and native organisms, example: tundra-permafrost, low humidity, lichens, polar bears	–
16. Identify density-dependent and density-independent limiting factors that affect populations in an ecosystem, examples: density-dependent-disease, predator-prey relationships, availability of food and water; density-independent-natural disasters, climate	Describing Populations Predator-prey Relationships
Discriminating among symbiotic relationships, including mutualism, commensalism, and parasitism	Host-Parasite Relationships