Basic Biology
Calendar: 1st Semester
Target Group: High School- basic class

Unit/Name	Objectives	Possible Labs/Activities	Time	TEKS	TAKS Objective
Review of science method	Scientific Method	Asking Scientific Questions What is Science? Nature of Scientific Explanations "Ice"samples and Scientific Method	1 wk	1A, 2A, 2B, 2C, 3A, 3E	List follows
Basic Unit of Life- Chapter 1	Building an understanding of cell metabolism & roles of organelles	3D cells	2 wks	4A, 5B, 5C, 6E	List follows
Organizing Living Things- Chapter 2	Differentiating between living & non-living, characteristics that separate them Introduction to taxonomy	Lab of living & non-living items	2.5 wks	2D, 5A, 8B, 8C, 11A & 11B	List follows
Classifying Animals- Chapter 3	Building an understanding of taxonomy & its history Understanding taxonomy of animals Understanding metamorphosis- complete & incomplete	Classifying living & "spirit" collection of animal kingdom. Study examples of vertebrates Foldables on vertebrates & invertebrates Vertebrates & invertebrates game	2.5 wks	5A, 6D, 8A, 8B, 8C & 12C	List follows

Unit/Name	Objectives	Possible Labs/Activities	Time	TEKS	TAKS Objective
Classifying Plants- Chapter 4	Building an understanding of plant taxonomy & its history Understanding taxonomy of plants Differencing vascular & nonvascular plants Differencing agiosperms & gynosperms	Planting seeds, cuttings & bulbs. Leaf identification Study moss, ferns & humus Study seeds of dicots & monocots Plant game	2.5 wks	2B, 5A, 6D, 8B, 8C, 10C, 13A	List follows
How plants live- Chapter 7	Understanding the structures of plants- roots, stems, leaves, flowers, vascular tissue, seeds & spores Understanding photosynthesis Understanding the oxygen/ carbon dioxide cycle Understanding plant reproduction	Study living plants- roots, stems, leaves, flowers, vascular tissue, seeds & spores Study tree cookies- tree rings Take leaf cuttings & watch	3.5 wks	1A, 2B, 2C, 9B, 9D, 10C, 12C, 13A, 13B	List follows

Unit/Name	Objectives	Possible Labs/Activities	Time	TEKS	TAKS Objective
Bacteria, Protists & Fungi- Chapter 5	Understanding the nitrogen cycle Differencing mutualism & commensalism Differencing bacteria shapes & kinds Understanding reproduction in bacteria Understanding bacteria, protists & fungi diseases Understanding osmosis & water balance	Grow mold on bread & fungi on fruit. Grow yeast & check under microscope Study lichens, molds, protist & fungi under microscope	3 wks	3D, 3E, 4A, 4C, 4D, 8B, 8C, 11D	List follows
How animals stay alive- Chapter 6	Understanding life processes-digestion, respiration, circulation, water balance, excretion & coordination	Herbivore, carnivore & omnivore Organs in systems Model of heart Demonstration of osmosis Dissection of systems	2 wks	4B, 11D	List follows
Review	Review of chapters 1-7		1 wk		

Basic Biology
Calendar: 2nd Semester
Target Group: High School- basic class

Unit/Name	Objectives	Possible Labs/Activities	Time	TEKS	TAKS Objective
Human Body Systems- Chapter 8	Understanding systems of the human body- digestion, circulatory, respiratory, nervous, excretory, endocrine, skeletal & muscular	Study human models of organs Digestion lab Study heart models Cardio/ respiration lab Sensory lab Tasting lab	3 wk	3D, 3E, 4B, 5A, 10A, 10B, 11B, 11D	List follows
Reproduction, Growth & Development- Chapter 9	Differentiating asexual & sexual reproduction- Understanding mitosis & meiosis	Drawing phases of mitosis & meiosis Metamorphosis game Graphing gestation times Birth defect research	2 wks	3E, 3F, 6E,10A, 10B, 11A	List follows
Staying Healthy- Chapter 10	Understanding the factors to good health- good nutrition & healthy habits Understanding the immune system & infectious diseases	Posters for good health Research infection diseases Food labels reading Vitamin & mineral research Good habits/ bad habits survey	2 wks	3B, 3E, 3D, 4A, 4C, 4D, 9A & 11C	List follows

Unit/Name	Objectives	Possible Labs/Activities	Time	TEKS	TAKS Objective
Genetics- Chapter 11	Understanding the history of genetics- Mendel & Morgan Human heredity- twins & genetic diseases Applied genetics- selective breeding in animals & genetic engineered foods	Dominant / recessive traits lab Punnett squares DNA models Pedigree Lab Genetic engineered food sampling-fruits & vegetables	2.5 wks	3D, 3E, 3F, 6A, 6B, 6C, 6D, 6E, 6F & 7B	List follows
Ecology- Chapter 12	Understanding the parts of the biosphere & their relationships Differentiating ecosystems, organisms, populations & communities Reviewing the living & nonliving things in ecosystems Understanding ecosystem successions Understanding the water cycle	Food web game Food chain, food web & pyramid of numbers diagram posters Researching human impact on ecosystems Producers & consumers game Drawing water cycles, oxygen/ carbon dioxide cycle & nitrogen cycles	2 wks	3D, 9D, 11D, 12A, 12B, 12C, 12D, 12E,13A, 13B	List follows
The Behavior of Organisms- Chapter 13	Differentiating innate & learned behavior Understanding behavior communication	Plant lab on phototropism & gravitropism Straw mazes Animal messages computer animated detective experience	3 wks	3D, 3E, 3F, 7B,10A & 10B	List follows

Unit/Name	Objectives	Possible Labs/Activities	Time	TEKS	TAKS Objective
Evolution- Chapter 14	Understanding the theory of evolution Reviewing the evidence for evolution- fossil records, vestigial structures, embryo development & homologous structures Understanding changes in populations	Making plaster of Paris fossils Homologous structures lab	2 wks	3E, 3F, 7A, 7B & 8A	List follows
Review	Final chapters 1-14	Review games- Round the World, “Do you want to be an A student”, “Are you smarter than a classmate”, Vocabulary team games	1 wk		List follows

Texas Essential Knowledge and Skills (TEKS) Correlations:

§112.43. Biology.

(a) General requirements. Students shall be awarded one credit for successful completion of this course. Prerequisites: none. This course is recommended for students in Grades 9, 10, or 11.

(b) Introduction.

(1) In Biology, students conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical-thinking and scientific problem-solving. Students in Biology study a variety of topics that include: structures and functions of cells and viruses; growth and development of organisms; cells, tissues, and organs; nucleic acids and genetics; biological evolution; taxonomy; metabolism and energy transfers in living organisms; living systems; homeostasis; ecosystems; and plants and the environment.

(2) Science is a way of learning about the natural world. Students should know how science has built a vast body of changing and increasing knowledge described by physical, mathematical, and conceptual models, and also should know that science may not answer all questions.

(3) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.

(4) Investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and that methods, models, and conclusions built from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.

(c) Knowledge and skills.

(1) **Scientific processes.** The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:

(A) demonstrate safe practices during field and laboratory investigations; and

(B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.

(2) **Scientific processes.** The student uses scientific methods during field and laboratory investigations. The student is expected to:

(A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;

(B) collect data and make measurements with precision;

(C) organize, analyze, evaluate, make inferences, and predict trends from data; and

(D) communicate valid conclusions.

(3) **Scientific processes.** The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to:

(A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;

(B) evaluate promotional claims that relate to biological issues such as product labeling and advertisements;

(C) evaluate the impact of research on scientific thought, society, and the environment;

(D) describe the connection between biology and future careers;

(E) evaluate models according to their adequacy in representing biological objects or events; and

(F) research and describe the history of biology and contributions of scientists.

(4) **Science concepts.** The student knows that cells are the basic structures of all living things and have specialized parts that perform specific functions, and that viruses are different from cells and have different properties and functions. The student is expected to:

(A) identify the parts of prokaryotic and eukaryotic cells;

(B) investigate and identify cellular processes including homeostasis, permeability, energy production, transportation of molecules, disposal of wastes, function of cellular parts, and synthesis of new molecules;

(C) compare the structures and functions of viruses to cells and describe the role of viruses in causing diseases and conditions such as acquired immune deficiency syndrome, common colds, smallpox, influenza, and warts; and

(D) identify and describe the role of bacteria in maintaining health such as in digestion and in causing diseases such as in streptococcus infections and diphtheria.

(5) **Science concepts.** The student knows how an organism grows and how specialized cells, tissues, and organs develop. The student is expected to:

(A) compare cells from different parts of plants and animals including roots, stems, leaves, epithelia, muscles, and bones to show specialization of structure and function;

(B) identify cell differentiation in the development of organisms; and

(C) sequence the levels of organization in multicellular organisms to relate the parts to each other and to the whole.

(6) **Science concepts.** The student knows the structures and functions of nucleic acids in the mechanisms of genetics. The student is expected to:

(A) describe components of deoxyribonucleic acid (DNA), and illustrate how information for specifying the traits of an organism is carried in the DNA;

(B) explain replication, transcription, and translation using models of DNA and ribonucleic acid (RNA);

(C) identify and illustrate how changes in DNA cause mutations and evaluate the significance of these changes;

(D) compare genetic variations observed in plants and animals;

(E) compare the processes of mitosis and meiosis and their significance to sexual and asexual reproduction; and

(F) identify and analyze karyotypes.

(7) **Science concepts.** The student knows the theory of biological evolution. The student is expected to:

(A) identify evidence of change in species using fossils, DNA sequences, anatomical similarities, physiological similarities, and embryology; and

(B) illustrate the results of natural selection in speciation, diversity, phylogeny, adaptation, behavior, and extinction.

(8) **Science concepts.** The student knows applications of taxonomy and can identify its limitations. The student is expected to:

(A) collect and classify organisms at several taxonomic levels such as species, phylum, and kingdom using dichotomous keys;

(B) analyze relationships among organisms and develop a model of a hierarchical classification system based on similarities and differences using taxonomic nomenclature; and

(C) identify characteristics of kingdoms including monerans, protists, fungi, plants, and animals.

(9) **Science concepts.** The student knows metabolic processes and energy transfers that occur in living organisms. The student is expected to:

(A) compare the structures and functions of different types of biomolecules such as carbohydrates, lipids, proteins, and nucleic acids;

(B) compare the energy flow in photosynthesis to the energy flow in cellular respiration;

(C) investigate and identify the effects of enzymes on food molecules; and

(D) analyze the flow of matter and energy through different trophic levels and between organisms and the physical environment.

(10) **Science concepts.** The student knows that, at all levels of nature, living systems are found within other living systems, each with its own boundary and limits. The student is expected to:

(A) interpret the functions of systems in organisms including circulatory, digestive, nervous, endocrine, reproductive, integumentary, skeletal, respiratory, muscular, excretory, and immune;

(B) compare the interrelationships of organ systems to each other and to the body as a whole; and

(C) analyze and identify characteristics of plant systems and subsystems.

(11) **Science concepts.** The student knows that organisms maintain homeostasis. The student is expected to:

(A) identify and describe the relationships between internal feedback mechanisms in the maintenance of homeostasis;

(B) investigate and identify how organisms, including humans, respond to external stimuli;

(C) analyze the importance of nutrition, environmental conditions, and physical exercise on health; and

(D) summarize the role of microorganisms in maintaining and disrupting equilibrium including diseases in plants and animals and decay in an ecosystem.

(12) **Science concepts.** The student knows that interdependence and interactions occur within an ecosystem. The student is expected to:

(A) analyze the flow of energy through various cycles including the carbon, oxygen, nitrogen, and water cycles;

(B) interpret interactions among organisms exhibiting predation, parasitism, commensalism, and mutualism;

(C) compare variations, tolerances, and adaptations of plants and animals in different biomes;

(D) identify and illustrate that long-term survival of species is dependent on a resource base that may be limited; and

(E) investigate and explain the interactions in an ecosystem including food chains, food webs, and food pyramids.

(13) **Science concepts.** The student knows the significance of plants in the environment. The student is expected to:

(A) evaluate the significance of structural and physiological adaptations of plants to their environments; and

(B) survey and identify methods of reproduction, growth, and development of various types of plants.