

CSISD Science Year at a Glance – Biology

| 1 st Six Weeks | 2 nd Six Weeks | 3 rd Six Weeks |
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| <p><u>Safety and Inquiry</u></p> <ul style="list-style-type: none"> • Demonstrate safe practices during laboratory investigations • Use scientific methods and equipment <p><u>Basic Chemistry</u></p> <ul style="list-style-type: none"> • Relate the physical and chemical behavior of an element, including bonding, to its placement on the Periodic Table • Relate the structure of water to its function as a solvent <p><u>Chemistry of Life</u></p> <ul style="list-style-type: none"> • Compare the structures and functions of different types of biomolecules, such as carbohydrates, lipids, proteins, and nucleic acids. • Identify and investigate the role of enzymes. • Analyze and evaluate evidence regarding the formation of simple organic molecules and their organization into long complex molecules such as proteins and DNA | <p><u>Cell Structure, Photosynthesis, and Respiration</u></p> <ul style="list-style-type: none"> • Understand that cells are the basic structures of living things with specialized parts that perform specific functions • Compare and contrast prokaryotic and eukaryotic cells • Investigate and explain cell process, including metabolic processes and energy conversions • Analyze and evaluate scientific explanations concerning the complexity of the cell <p><u>Cells and Their Environment</u></p> <ul style="list-style-type: none"> • Investigate and explain how molecules are transported into and out of the cell • Investigate and explain how cells respond to their environment as it changes <p><u>DNA and Replication</u></p> <ul style="list-style-type: none"> • Identify the components of DNA • Recognize that components making up the genetic code are common to all organisms • Explain the purpose and mechanism of DNA replication | <p><u>RNA: Transcription/Translation & Gene Regulation</u></p> <ul style="list-style-type: none"> • Explain how the genetic code in DNA is transcribed into RNA to produce proteins • Describe how information for specifying the traits of an organism is carried in the DNA • Explain the purpose and process of protein synthesis using models of DNA and RNA • Identify and illustrate changes in DNA and how these changes are significant • Recognize that gene expression is a regulated process <p><u>Cell Cycle and Mitosis</u></p> <ul style="list-style-type: none"> • Describe the stages of the cell cycle and mitosis • Explain the importance of the cell cycle to the growth of organisms • Recognize that disruptions of the cell cycle lead to diseases such as cancer • Describe the roles of DNA, RNA, and environmental factors in cell differentiation <p><u>Chromosomes & Meiosis</u></p> <ul style="list-style-type: none"> • Recognize the significance of meiosis to sexual reproduction • Describe and recognize the stages of meiosis • Investigate chromosomes and chromosome structure • Identify human chromosomal disorders using karyotypes |

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| 4 th Six Weeks | 5 th Six Weeks | 6 th Six Weeks |
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| <p><u>Genetics</u></p> <ul style="list-style-type: none"> Predict possible outcomes of various genetic combinations using different patterns of inheritance Describe how techniques such as DNA fingerprinting, genetic modifications, and chromosomal analysis are used to study the genomes of organism <p><u>Taxonomy & evolution</u></p> <ul style="list-style-type: none"> Analyze & evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies Analyze and evaluate scientific explanations concerning any data of sudden appearance, stasis, and sequential nature of groups in the fossil record Analyze and evaluate how natural selection produces change in populations, not individuals Analyze and evaluate how the elements of natural selection and a finite supply of environmental resources result in differential reproductive success Analyze and evaluate scientific explanations concerning the complexity of the cell Define taxonomy and recognize the importance of a standardized taxonomic system to the scientific community Categorize organisms using a hierarchical classification system Compare characteristics of taxonomic groups, including archaea, bacteria, protists, fungi, plants, and animals | <p><u>Microbiology (Bacteria, Viruses, Protista, Fungi)</u></p> <ul style="list-style-type: none"> Compare characteristics of taxonomic groups, including archaea, bacteria, protists, fungi, plants, and animals Compare the structures of viruses to cells, describe viral reproduction, and describe the role of viruses in causing diseases <p><u>Plant systems</u></p> <ul style="list-style-type: none"> Describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants Analyze the levels of organization in biological systems and relate the levels to each other and to the whole system Investigate and analyze how organisms respond to external factors <p><u>Animal Systems</u></p> <ul style="list-style-type: none"> Describe the interactions that occur among systems Analyze the levels of organization in biological systems and relate the levels to each other and to the whole system Describe the role of internal feedback mechanisms Investigate and analyze how organisms respond to external factors Summarize the role of microorganisms in both maintaining and disrupting the health of organisms | <p><u>Ecology</u></p> <ul style="list-style-type: none"> Investigate and analyze how organisms, populations, and communities respond to external factors Summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems Describe how events and processes that occur during ecological succession can change populations and species diversity. Interpret relationships among organisms and populations Compare variations and adaptations of organisms in different ecosystems; Analyze the flow of matter and energy through trophic levels and life cycles Recognize that long-term survival of species is dependent on changing resource bases that are limited Describe how environmental change can impact ecosystem stability Analyze and evaluate the relationship of natural selection to adaptation and to the development of diversity in and among species Analyze and evaluate the effects of other evolutionary mechanisms <p><u>Applications of biotechnology (after EOC)</u></p> <ul style="list-style-type: none"> Evaluate the impact of scientific research on society Collect data using gel electrophoresis apparatuses and micropipettors |

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Process Standards

Scientific Reasoning and Process Skills TEKS are taught throughout the year in all content units.

Safe and Environmental Practices

- Demonstrate safe practices during laboratory and field investigations
- Demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials

Scientific Methods of Investigation

- Know the definition of science and understand that it has limitations
- Know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence
- Know scientific theories are based on natural and physical phenomena and can be tested by multiple independent researchers
- Distinguish between scientific hypotheses and scientific theories
- Plan and implement descriptive, comparative, and experimental investigations
- Collect and organize qualitative and quantitative data and make measurements with precision and accuracy
- Analyze, evaluate, make inferences, and predict trends from data
- Communicate valid conclusions supported by the data

Critical Thinking, Scientific Reasoning, and Problem Solving

- Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing
- Communicate and apply scientific information extracted from various sources
- Draw inferences based on data related to promotional materials for products and services
- Evaluate the impact of scientific research on society and the environment
- Evaluate models according to their limitations in representing biological objects or events
- Research and describe the history of biology and contributions of scientists