

| <p>TEKS<br/>           * = TAKS objective (tested for)<br/>           √ = TEKS that are tested on AP* exams<br/> <b>Bold</b> = high emphasis on AP exam(s)<br/> <i>Italics</i> = medium emphasis on AP exam(s)<br/>           Plain = low emphasis on AP exam(s)<br/>           “such as...” indicates a likely test item</p> | TAKS | AP BIOLOGY | AP CHEMISTRY | AP PHYSICS | AP ENVIRONMENTAL SCIENCE | Examples/<br>Activities   | Commentary   |
|---|------|------------|--------------|------------|--------------------------|---|--|
| <b>Biology</b>  |      |            |              |            |                          |   |  |
| <b>(1) Scientific processes.</b> 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:  |      |            |              |            |                          | <ul style="list-style-type: none"> <li>• 2000 APES question #2 (Recycling, environmental decision making, document based)</li> </ul>  |  |
| (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.  |      |            |              |            | √                        |   |  |
| <b>(2) Scientific processes.</b> The student uses scientific methods during field and laboratory investigations. The student is expected to:  |      |            |              |            |                          | <ul style="list-style-type: none"> <li>• 1999 APES question #1 (Environmental quality (water), experimental design)</li> <li>• 2000 APES question #1 (Energy conversions and calculations)</li> <li>• 2000 APES question #2 (Recycling, environmental decision making, document based)</li> <li>• 2001 APES question #2 (Experimental design, document based)</li> <li>• 2001 APES question #4 (Environmental quality (water), environmental law, data interpretation)</li> <li>• 1999 APBIO question #1 (Design an experiment for photosynthesis)</li> <li>• 2000 APBIO question #1 (Lab-based question on factors affecting enzymes)</li> <li>• 2002 APBIO question #1 (Human genome and biochemistry)</li> <li>• 2002 APBIO question #2</li> </ul> | Frequent laboratory experiences (40% minimum); inquiry labs encouraged once skills are mastered. |

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|  |      |            |              |            |                          | (Interpretation of data associated with physiology)<br><ul style="list-style-type: none"> <li>2002 APBIO question #4 (Osmosis-based data provided. Predict the effect of osmosis on plants)</li> </ul>  |   |
| <b>(A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;</b>  | *    | √          | √            | √          | √                        |   |   |
| <b>(B) collect data and make measurements with precision;</b>  | *    | √          | √            | √          | √                        |   | Collecting data is important for calculating rate of change in experiments. |
| <b>(C) organize, analyze, evaluate, make inferences, and predict trends from data; and</b>   | *    | √          | √            | √          | √                        | <ul style="list-style-type: none"> <li>2001 APBIO question #3 (Lab based question on dissolved oxygen and productivity)</li> </ul>  |   |
| <b>(D) communicate valid conclusions.</b>  | *    | √          | √            | √          | √                        |   |   |
| <b>(3) Scientific processes.</b> The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to:   |      |            |              |            |                          | <ul style="list-style-type: none"> <li>2000 APES question #2 (Recycling, environmental decision making, document based)</li> <li>2001 APES question #3 (Environmental quality (air), environmental law)</li> <li>2001 APES question #4 (Environmental quality (water), environmental law, data interpretation)</li> </ul> |   |
| <b>(A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;</b>   |      | √          |              |            | √                        |   |   |
| <i>(B) evaluate promotional claims that relate to biological issues such as product labeling and advertisements;</i>   |      |            |              |            | √                        |   |   |
| <i>(C) evaluate the impact of research on scientific thought, society,</i>   |      |            |              |            | √                        |   |   |

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| <i>and the environment;</i>   |      |            |              |            |                          |  |  |
| (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.   |      | √          |              |            |                          | <ul style="list-style-type: none"> <li>• 1999 APBIO question #4 (Characteristics of DNA and classic experiments that proved DNA is the molecule heredity)</li> </ul>   | Such as Mendel, Darwin, Watson, Crick, Hershey, Chase, Franklin, etc.                        |
| <b>(4) Science concepts.</b> The student know 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:   |      |            |              |            |                          |  | Structure and function is a major theme in APBIO.  |
| <b>(A) identify the parts of prokaryotic and eukaryotic cells;</b>  | *    | √          |              |            |                          | <ul style="list-style-type: none"> <li>• Basic Cell Lab using the microscope</li> <li>• 1999 APBIO question #3 (Taxonomic question about kingdoms)</li> </ul>  | Students should differentiate cell wall, cell membrane, nucleus, cytoplasm, and chloroplast. |
| <b>(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.</b>   | *    | √          |              |            |                          | <ul style="list-style-type: none"> <li>• Any Osmosis/Diffusion Lab</li> <li>• Energy Found in Food*               <ul style="list-style-type: none"> <li>• 2000 APBIO question #2 (Feedback mechanisms for factors in the body)</li> <li>• 2001 APBIO question #4 (Proteins and their relationship to DNA, RNA, and the cell membrane)</li> <li>• 2002 APBIO question #3 (Physiology and the evolution of systems in various phyla)</li> <li>• 2002 APBIO question #4 (Osmosis-based data provided. Predict the</li> </ul> </li> </ul> |  |

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|   |      |            |              |            |                          | effect of osmosis on plants)  |                                  |
| <p><i>(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</i></p>   | *    | √          |              |            |                          |   |                                  |
| <p><b>(D)</b> 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.</p>   | *    | √          |              |            |                          |   |                                  |
| <p><b>(5) Science concepts.</b> The student knows how an organism grows and how specialized cells, tissues, and organs develop. The student is expected to:</p>   |      |            |              |            |                          |   | at least 50% of APBIO curriculum |
| <p><i>(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;</i></p>  |      | √          |              |            |                          | <ul style="list-style-type: none"> <li>• Microscope lab using prepared slides</li> <li>• Cell Factory – HIP Biology Computer Imaging</li> <li>• 2001 APBIO question #1 (Relationship between structure and function in some human systems)</li> </ul>   |                                  |
| <p><b>(B)</b> identify cell differentiation in the development of organisms; and</p>  |      | √          |              |            |                          |   |                                  |
| <p><b>(C)</b> sequence the levels of organization in multicellular organisms to relate the parts to each other and to the whole.</p>  |      | √          |              |            |                          |   |                                  |
| <p><b>(6) Science concepts.</b> The student knows the structures and functions of nucleic acids in the mechanisms of genetics. The student is expected to:</p>  |      |            |              |            |                          | <ul style="list-style-type: none"> <li>• 1999 APBIO question #4 (Characteristics of DNA and classic experiment that proved DNA is the molecule heredity)</li> <li>• 2000 APBIO question #3 (DNA question asking students to relate DNA to mitosis)</li> <li>• 2000 APBIO question #4 (Adaptation and defense mechanisms)</li> <li>• 2001 APBIO question #4</li> </ul> | 25% of APBIO curriculum          |

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|  |      |            |              |            |                          | (Proteins and their relationship to DNA, RNA, and the cell membrane)<br><ul style="list-style-type: none"> <li>2002 APBIO question #1 (Human genome and biochemistry)</li> </ul>  |                           |
| <b>(A) describe components of deoxyribonucleic acid (DNA), and illustrate how information for specifying the traits of an organism is carried in the DNA;</b>  | *    | √          |              |            |                          | <ul style="list-style-type: none"> <li>Any DNA Extraction Lab</li> </ul>  |                           |
| <b>(B) explain replication, transcription, and translation using models of DNA and ribonucleic acid (RNA);</b>   | *    | √          |              |            |                          | <ul style="list-style-type: none"> <li>Paper Models or DNA kits can be used</li> </ul>  |                           |
| <i>(C) identify and illustrate how changes in DNA cause mutations and evaluate the significance of these changes.</i>  | *    | √          |              |            |                          | <ul style="list-style-type: none"> <li>Using a DNA Sequence *</li> </ul>  |                           |
| (D) compare genetic variations observed in plants and animals;   | *    | √          |              |            |                          | <ul style="list-style-type: none"> <li>Harris Hawk’s and Silver Hawthorne - HIP Biology Computer Imaging</li> </ul>   |                           |
| <b>(E) compare the processes of mitosis and meiosis and their significance to sexual and asexual reproduction;</b>   |      | √          |              |            |                          | <ul style="list-style-type: none"> <li>Mitosis Onion Root Tip Microscope Lab</li> <li>Meiosis Clay or Bead Simulation</li> </ul>  |                           |
| <i>(F) identify and analyze karyotypes.</i>  |      | √          |              |            |                          | <ul style="list-style-type: none"> <li>Paper lab or Karyotype from HIP Biology</li> </ul>   |                           |
| <b>(7) Science concepts.</b> The student knows the theory of biological evolution. The student is expected to:   |      |            |              |            |                          | <ul style="list-style-type: none"> <li>2000 APES question #3 (Endangered species, environmental law)</li> <li>2001 APBIO question #2 (Evolution and natural selection)</li> </ul> | Major theme in AP Biology |
| <b>(A) identify evidence of change in species using fossils, DNA sequences, anatomical similarities, physiological similarities, and embryology; and</b>   | *    | √          |              |            | √                        |   |                           |
| <b>(B) illustrate the results of natural selection in speciation, diversity, phylogeny, adaptation, behavior, and extinction.</b>  | *    | √          |              |            | √                        | <ul style="list-style-type: none"> <li>Adaptation Lab *</li> </ul>  |                           |
| <b>(8) Science concepts.</b> The student knows applications of taxonomy and can identify its limitations. The student is expected to:  |      |            |              |            |                          | <ul style="list-style-type: none"> <li>1999 APBIO question #3 (Kingdom taxonomy)</li> </ul>   |                           |
| (A) Collect and classify organisms at several taxonomic levels   |      | √          |              |            |                          | <ul style="list-style-type: none"> <li>Wildflower or Insect Collection</li> </ul>   | Taxonomy questions are    |

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| such as species, phylum, and kingdom using dichotomous keys;   |      |            |              |            |                          |   | found on the APBIO test but specimen collections are not essential.  |
| <b>(B) analyze relationships among organisms and develop a model for a hierarchical classification system bases on similarities and differences using taxonomic nomenclature; and</b>  |      | √          |              |            |                          | <ul style="list-style-type: none"> <li>Animal Hands- HIP Biology</li> <li>2002 APBIO question #3 (Physiology and the evolution of systems in various phyla)</li> </ul>  |  |
| <i>(C) identify characteristics of kingdoms including monerans, protists, fungi, plants, and animals.</i>  | *    | √          |              |            |                          | <ul style="list-style-type: none"> <li>Have students make a comparison chart of these kingdoms</li> </ul>   | If taught in an earlier grade, less emphasis is needed now.          |
| <b>(9) Science concepts.</b> The student knows metabolic processes and energy transfers that occur in living organisms. The student is expected to:  |      |            |              |            |                          | <ul style="list-style-type: none"> <li>2001 APES question #2 (Experimental design, document based)</li> <li>2000 APBIO question #1 (Lab based question on factors effecting enzymes)</li> </ul>                           | Major theme (energy transfer) for APBIO                              |
| <b>(A) compare the structures and functions of different types of biomolecules such as carbohydrates, lipids, proteins, and nucleic acids;</b>   |      | √          |              |            |                          | <ul style="list-style-type: none"> <li>Use molecular models</li> <li>Any Testing of Organic Compounds lab</li> <li>2001 APBIO question #4 (Proteins and their relationship to DNA, RNA, and the cell membrane)</li> </ul> |  |
| <b>(B) compare the energy flow in photosynthesis to the energy flow in cellular respiration;</b>   |      | √          |              |            |                          | <ul style="list-style-type: none"> <li>Photosynthesis Lab *</li> <li>Respiration Lab *</li> <li>1999 APBIO question #1 (Design an experiment for photosynthesis)</li> </ul>   |  |
| <i>(C) investigate and identify the effects of enzymes on food molecules; and</i>  |      | √          |              |            |                          | <ul style="list-style-type: none"> <li>Any Enzyme Lab</li> </ul>  | Expand this to cover effects of enzymes on other types of molecules. |
| <i>(D) analyze the flow of matter and energy through different trophic levels and between organisms and the physical environment.</i>  | *    | √          |              |            | √                        | <ul style="list-style-type: none"> <li>Winogradsky Column and Biofilm Lab*</li> <li>Productivity Lab *</li> </ul>   | Mainly covered in Pre-APBIO  |

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| <b>(10) Science concepts.</b> 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:   |      |            |              |            |                          | <ul style="list-style-type: none"> <li>2002 APBIO question #2 (Interpretation of data associated with physiology)</li> </ul>   | 50% of APBIO curriculum                  |
| <b>(A) interpret the functions of systems in organisms including circulatory, digestive, nervous, endocrine, reproductive, integumentary, skeletal, respiratory, muscular, excretory, and immune;</b>   | *    | √          |              |            |                          | <ul style="list-style-type: none"> <li>Value of Villi – HIP Biology</li> <li>2000 APBIO question #4 (Adaptation and defense mechanisms)</li> <li>2001 APBIO question #1 (Relationship between structure and function in some human systems)</li> </ul>   |  |
| (B) compare the interrelationships of organ systems to each other and to the body as a whole; and   | *    | √          |              |            |                          |  |  |
| <i>(C) analyze and identify characteristics of plant systems and subsystems.</i>  |      | √          |              |            |                          | <ul style="list-style-type: none"> <li>Plant Lab- HIP Biology</li> <li>Stomate Lab *</li> </ul>  |  |
| <b>(11) Science concepts.</b> The student knows that organisms maintain homeostasis. The student is expected to:  |      |            |              |            |                          | <ul style="list-style-type: none"> <li>1999 APES question #3 (Environmental quality (air), graph interpretation)</li> <li>2001 APES question #3 (Environmental quality (air), environmental law)</li> <li>2002 APES question #3 (Environmental quality (toxicity levels), graphing)</li> <li>1999 APBIO question #2 (Communication among different cells)</li> </ul> |  |
| (A) identify and describe the relationships between internal feedback mechanisms in the maintenance of homeostasis; The student is expected to:   |      | √          |              |            |                          | <ul style="list-style-type: none"> <li>2000 APBIO question #2 (Feedback mechanisms for factors in the body)</li> </ul>   |  |
| (B) investigate and identify how organisms, including humans, respond to external stimuli;  |      | √          |              |            |                          |  | Important in earlier grades or Pre-APBIO |
| (C) analyze the importance of nutrition, environmental conditions,  |      |            |              | √          |                          |  |  |

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| 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.   |      | √          |              |            | √                        | <ul style="list-style-type: none"> <li>Make posters of the Nitrogen cycle</li> </ul>  |  |
| <b>(12) Science concepts.</b> The student knows that interdependence and interactions occur within an ecosystem. The student is expected to:   |      |            |              |            |                          | <ul style="list-style-type: none"> <li>2001 APES question #2 (Experimental design, document based)</li> <li>2002 APES question #3 (Environmental quality (toxicity levels), graphing)</li> </ul>          | Major theme in APBIO                   |
| <i>(A) analyze the flow of energy through various cycles including the carbon, oxygen, nitrogen, and water cycles;</i>   |      | √          |              |            | √                        | <ul style="list-style-type: none"> <li>Winogradsky and Biofilm Lab *</li> <li>Draw the various cycles; role play the different cycles (C, O, N, water)</li> </ul>   |  |
| <i>(B) interpret interactions among organisms exhibiting predation, parasitism, commensalism, and mutualism;</i>   | *    | √          |              |            | √                        | <ul style="list-style-type: none"> <li>Predator/Prey lab simulation (beans as prey, spoon as predator – set rules for reproduction, graph data – found in several different biology lab books)</li> </ul> | Important in earlier grades or Pre-AP* |
| <i>(C) compare variations, tolerances, and adaptations of plants and animals in different biomes;</i>  |      | √          |              |            | √                        | <ul style="list-style-type: none"> <li>Adaptation Lab*</li> <li>2000 AP Biology question #4 (Adaptation and defense mechanisms)</li> </ul>  | Can be covered in evolution            |
| (D) identify and illustrate that long-term survival of species is dependent on a resource base that may be limited; and  |      | √          |              |            | √                        |   | Covered earlier                        |
| <i>(E) investigate and explain the interactions in an ecosystem including food chains, food webs, and food pyramids.</i>   | *    | √          |              |            | √                        | <ul style="list-style-type: none"> <li>2001 AP Biology question #3 (Lab-based question on dissolved oxygen and productivity)</li> </ul>   | Covered earlier                        |
| <b>(13) Science concepts.</b> The student knows the significance of plants in the environment. The student is expected to:   |      |            |              |            |                          |   |  |
| <i>(A) evaluate the significance of structural and physiological adaptations of plants to their environments; and</i>  | *    | √          |              |            | √                        | <ul style="list-style-type: none"> <li>Stomate Lab *</li> <li>2000 APBIO question #4 (Question on the topic of adaptation and defense mechanisms)</li> </ul>  |  |



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| (B) survey and identify methods of reproduction, growth, and development of various types of plants.   |      | √          |              |            |                          | <ul style="list-style-type: none"> <li>Flower Dissection Lab</li> <li>2002 APBIO question #4 (Osmosis-based data provided. Predict the effect of osmosis on plants)</li> </ul> |            |

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