

# SCIENCE CURRICULUM FRAMEWORK



## BIOLOGY

Updated February 1, 2005

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# Brownsville Independent School District

## MISSION STATEMENT

The mission of the Brownsville Independent School District, an international community respected for its rich cultural heritage is to produce responsible, well-rounded graduates

who

- have the ability to pursue a post-secondary education and/or career
- possess a capability for independent learning and thinking with a competitive edge in a multi-cultural, multi-lingual world

by

- identifying and maximizing physical, financial, and human resources and
- unifying community and school commitment to excellence in education and equal educational opportunity.

# Brownsville Independent School District

## BELIEF STATEMENT

- Excellence is our common goal.
- Parental responsibility is an integral factor in student success.
- Belief in self is fundamental to success.
- Everyone deserves respect as a human being.
- Perseverance and hard work are essential for success.
- Change creates opportunities for growth.
- Truthfulness is important for effective communication.
- Public schools are an extension of the community.
- Sensitivity is essential for understanding the needs of others.
- Great achievements follow high expectations.
- Cooperation is necessary to get things done.
- Active listening is essential for effective communication.
- Successful students are active participants in the learning process.

# Acknowledgment

The Brownsville Independent School District gratefully acknowledges the contributions given by the Science teachers who participated in the development of this secondary Science curriculum framework. Science teachers from the following campuses assisted in the development of the framework:

- ❖ Hanna High School
- ❖ Lopez High School
- ❖ Pace High School
- ❖ Porter High School
- ❖ Rivera High School
- ❖ Lincoln Park School
- ❖ BUSP Secondary Science Mentors
- ❖ Secondary Science Curriculum Specialist

# Introduction

Texas Legislation requires that all Texas school districts develop, implement, and evaluate a comprehensive educational program aimed at student mastery of the Texas Essential Knowledge and Skills as defined in Chapter 112.

The purpose of this Secondary Science Curriculum Framework is to match learning experiences to the Texas Essential Knowledge and Skills and provide a sequence of objectives and lab activities that are also aligned, including the **40% lab requirement** for all High School Science courses. Brownsville ISD also requires the 40% lab minimum curriculum requirement for all Middle School Science courses.

In addition, this document includes sample activities and **required “EXEMPLAR,” labs** to be taught in each course. EXEMPLAR labs are not intended to be the only labs taught in each course, but are provided to ensure consistency in high-quality instruction throughout the district. They should further serve to avoid overemphasis in one area while neglecting another, and thus, focus on student needs.

Pre-AP accommodations are indicated throughout the document, either as additional TEKS added to the course to meet the needs of the Pre-AP course sequence, or emphasized TEKS that need to be taught with added depth to the Pre-AP student in order to prepare them for the AP or Dual Enrollment course. Adaptations for other special populations will be made as needed, but the basic curriculum is the same for all students.

The textbook provided by the state is a resource for teaching the course, not the curriculum. Although the textbook “covers” all TEKS for the course, it does not necessarily provide instructional support for teaching the TEKS to the level of depth necessary to fulfill the TEKS intention. Therefore, it is highly recommended that teachers use a variety of additional resources from multiple sources in order to meet the TEKS requirements. Some of these resources may include, but are not limited to the +required Exemplar Labs, FOSS kits (which should be taught in their entirety as a unit), TEXTEAMS activities, Calculator-based Labs, Snapshot Activities and Vistas provided through the Charles A. Dana Center Science Toolkit.

This curriculum framework is primarily a working document that prescribes what is to be taught in a given subject or area of study. It gives both structure and direction to the educational program. As a formal document, it is an official statement of the curriculum and a teacher’s guide to instruction.

## Student Participation in TEKS-Based Inquiry and the BISD Science Fairs

Research, inquiry and invention are essential skills successful students must develop as they grow academically. Students must be able to discuss and evaluate social, technological and scientific issues evident today and trends influencing the future. A challenge for educators is to exploit the natural curiosity all students possess. Allowing time, opportunity and support during school hours for student-based inquiry permits learners to expose their misconceptions and pursue the “why” questions they have. Students should plan investigations and conduct research that can help them test their ideas, interpret differing points of view and justify consequent discoveries. Students are much more likely to internalize and remember concepts learned if they are actively involved with them, rather than passively observing them take place.

TEKS-based investigations enable students to effectively learn and use content-area concepts and skills. Through these types of direct investigations students are able to “maximize their ability to make sense of the world and to learn more about it.” (*Science for All Americans*) Therefore, it is a BISD requirement that all students participate in a research-based inquiry project at the sixth, eighth, and ninth grades. Participation at other grades or courses is highly recommended since successful research projects take two to four years. When students are engaged in research-based inquiry, they are involved in using a rich variety of primary and secondary source materials and the Science Process Skills as required by law in the Science TEKS.

A successful classroom science investigation may be developed into a research-based inquiry project and entered in the Science Fair. Students who choose to enter the fair will be able to create investigations from among fifteen different categories. The Science and Engineering Fair will be held annually in the fall, allowing teachers and students to prepare for one science competition per year following the rules of the Intel International Science and Engineering Fair, ([www.sciserv.org/iseef](http://www.sciserv.org/iseef)). All students will have the opportunity to complete an original investigation. Individual campuses, teachers and students will be able to choose which projects to enter in the Science and Engineering Fair.

# SECONDARY SCIENCE BIOLOGY SCOPE AND SEQUENCE

Six-Week Unit Content	Exemplar Lab(s)* <small>*Required Lab as part of 40% TEKS Lab/Field Requirement</small>	Concepts <b>TEKS</b> <small>*Lab</small>	Processes <b>TEKS</b>	<b>TAKS</b>
<p style="text-align: center;"><b>1<sup>st</sup> Six Weeks</b></p> <p><b>The Nature of Life</b></p> <ul style="list-style-type: none"> <li>• Safety and Lab/Field Skills</li> <li>• Chemistry</li> <li>•</li> </ul> <p><b>Science Fair</b></p> <ul style="list-style-type: none"> <li>• Topic</li> <li>• Research</li> <li>• Bibliography</li> <li>• Paperwork/Forms</li> <li>•</li> </ul> <p><b>Ecology</b></p> <ul style="list-style-type: none"> <li>• Biosphere</li> <li>• Ecosystems and Communities</li> <li>• Populations</li> <li>• Humans in the Biosphere</li> </ul>	<p>Required: Science Project</p> <p>Required:</p> <ul style="list-style-type: none"> <li>• <i>"Identifying Organic Compounds"</i></li> <li>• <i>Ecological Field Study 5-E Inquiry Lesson</i></li> <li>• <i>"Investigating Chemical Cycles in the Biosphere"</i></li> </ul> <p>Recommended:</p> <ul style="list-style-type: none"> <li>• <i>Inquiry Lab: Ice Balloons</i></li> <li>• <i>Population Labs</i></li> <li>• <i>PreAP/AP: TI 83</i></li> <li>• <i>"Fill The Bill"</i></li> <li>• <i>"Future Worlds"</i></li> <li>• <i>"Predator-Prey Simulation"</i></li> </ul>	<p>9 A, C, D 11 A, B, C, D 12 A, B, C, D, E 13A</p> <p>9A 8A</p>	<p>1 A, B 2 A, B, C, D 3 A, B, C, D, E, F</p>	<p>1, 2, 3, 4, 5</p>
<p style="text-align: center;"><b>2<sup>nd</sup> Six Weeks</b></p> <p><b>Science Fair</b></p> <ul style="list-style-type: none"> <li>• Experimentation</li> <li>• Communication – Showboards</li> </ul> <p><b>Cells</b></p> <ul style="list-style-type: none"> <li>• Cell Structure and Function</li> <li>• Photosynthesis</li> </ul>	<p>Required: Science Project (continued)</p> <p>Required:</p> <ul style="list-style-type: none"> <li>• <i>"Investigating Cell Structures &amp; Processes"</i></li> <li>• <i>"Observing Osmosis"</i></li> </ul> <p>Recommended:</p> <ul style="list-style-type: none"> <li>• <i>Diffusion / Osmosis</i></li> </ul>	<p>4 A, B 5 C 9 A, B,</p> <p>12 A 4 A, B</p>	<p>1 A, B 2 A, B, C, D 3 A, B, C, D, E, F</p>	<p>1, 2</p>
<p style="text-align: center;"><b>3<sup>rd</sup> Six Weeks</b> (Cells – continued)</p> <ul style="list-style-type: none"> <li>• Cellular Respiration</li> <li>• Cell Growth and Division</li> </ul> <p><b>Genetics</b></p> <ul style="list-style-type: none"> <li>• Introduction: Mendel, Probability, Meiosis</li> </ul>	<p>Required: Science Project (continued)</p> <p>Recommended:</p>	<p>4 B 6 A, B, C, D, E, F</p>	<p>1 A, B 2 A, B, C, D 3 A, B, C, D, E, F</p>	<p>1, 2</p>

Six-Week Unit Content	Exemplar Lab(s)* *Required Lab as part of 40% TEKS Lab/Field Requirement	Concepts TEKS <i>*Lab</i>	Processes TEKS	TAKS
<p align="center"><b>4<sup>th</sup> Six Weeks</b></p> <p><b>(Genetics – continued)</b></p> <ul style="list-style-type: none"> <li>DNA / RNA : Replication, Transcription, Translation, Mutations, Mutations</li> </ul> <p><b>FOR Pre AP/AP:</b></p> <ul style="list-style-type: none"> <li>Genetic Engineering</li> <li>Human Genome</li> </ul> <p><b>Evolution</b></p> <ul style="list-style-type: none"> <li>Darwin's Theory</li> <li>Evolution of Populations</li> <li>The History of Life</li> <li>Classification</li> </ul> <p><b>The Human Body</b></p> <ul style="list-style-type: none"> <li>Systems: Nervous, Skeletal, Muscular, Integumentary, Circulatory, Respiratory, digestive, Excretory, Endocrine, Reproduction, Immune System and Disease</li> </ul>	<p><b>Required:</b></p> <ul style="list-style-type: none"> <li><i>"Protein Synthesis Like a Banana Split" -(modified)</i></li> <li><i>DNA Extraction</i></li> <li><i>"Investigating Inherited Traits"</i></li> <li><i>Modeling a Gene Pool (PH-A)</i></li> </ul> <p><b>Recommended:</b></p> <ul style="list-style-type: none"> <li><i>"What A Beak" (Fill the Bill as Extension)</i></li> <li><i>"Bugs, Bugs, Bugs"</i></li> <li><i>"Making a Karyotype" ( for homework)</i></li> <li><i>"What Factors Affect Heart Rate?"</i></li> <li><i>"Investigating the Effects of Enzymes on Food Molecules"</i></li> </ul>	<p>4 A, B, C, D 5 A, B, C 6 C, D 7 A, B 8 B, C 9 A 10 A, B 11 A, B, C, D 12 D</p> <p>4 C</p>	<p>1 A, B 2 A, B, C, D 3 A, B, C, D, E, F</p>	<p>1, 2, 3</p>
<p align="center"><b>5<sup>th</sup> Six Weeks</b></p> <p><b>Microorganisms and Fungi</b></p> <ul style="list-style-type: none"> <li>Bacteria and Viruses</li> <li>Protists</li> <li>Fungi</li> </ul> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>Plant Diversity</li> <li>Roots, Stems, And Leaves</li> <li>Reproduction of Seed Plants</li> <li>Plant Responses and Adaptations</li> </ul>	<p><b>Required:</b></p> <ul style="list-style-type: none"> <li><i>"Sampling A Plant Community" - Transect Field Lab</i></li> <li><i>" Model Disease Transmission"</i></li> </ul> <p><b>Recommended:</b></p> <ul style="list-style-type: none"> <li><i>"Comparing the Characteristics of Molds"</i></li> <li><i>" Observing Root and Stem Structures"</i></li> <li><i>Dissections of Flowers-Monocots &amp; Dicots</i></li> <li><i>Using dichotomous Keys"</i></li> </ul>	<p>4 B, C, D 5 A, B, 6 E 7 A, B 8 A, C 9 A, 10 C 11 A, B, D 12 B, C 13 A, B 13 A, B9C 10 A, B, 11C</p>	<p>1 A, B 2 A, B, C, D 3 A, B, C, D, E, F</p>	<p>1, 2, 3</p>
<p align="center"><b>6<sup>th</sup> Six Weeks</b></p> <p><b>Invertebrates</b></p> <ul style="list-style-type: none"> <li>Sponges and Cnidarians</li> <li>Worms and Mollusks</li> <li>Arthropods and Echinoderms</li> <li>Comparing Invertebrates</li> </ul> <p><b>Chordates</b></p> <ul style="list-style-type: none"> <li>Nonvertebrate Chordates, Fishes, and Amphibians</li> <li>Reptiles and Birds</li> <li>Mammals</li> <li>Comparing Chordates</li> <li>Animal Behavior</li> </ul>	<p><b>Required:</b></p> <ul style="list-style-type: none"> <li><i>Zoology Dissections</i></li> </ul> <p><b>Recommended:</b></p> <ul style="list-style-type: none"> <li><i>Arthropods – Crayfish/Grasshopper</i></li> <li><i>"Investigating Frog Anatomy" (PH/A)</i></li> <li><i>"Observing Vertebrate Skeletons" PH/A, p237</i></li> <li><i>Fetal Pig</i></li> </ul>	<p>5 A, B 6 E 7 A, B 8 A, C 9 C 10 A, B 11 A, B, C, 12 B, C</p>	<p>1 A, B 2 A, B, C, D 3 A, B, C, D, E, F</p>	<p>1, 2, 3</p>

# Biology

**Time Frame: 1<sup>st</sup> Six Weeks—weeks 1-6 (page 1 of 4)**

<b>Unit Concepts:</b>	<b>Chapter Concepts:</b>	<b>Note:</b>
Nature of Life Including Science Fair Research Methods Ecology	Science of Biology Chemistry of Life Biosphere Ecosystems & Communities Populations Humans in the Biosphere	<b>Appendices: A, B, C, D:</b> (Science Skills, Safety, Metric System, Microscope); Field Labs; Science Projects

<b>T A K S Objective(s)</b>	<b>Concept and Process TEKS</b>	<b>Required Exemplar Labs, and Suggested Instructional Activities Integrating Concepts &amp; Processes</b>	<b>Suggested Resources</b> (Use of additional & various resources from multiple sources is necessary to meet the TEKS)
1	<p><b>Scientific Processes:</b> 1 A, B, 2 A, B, C, D, 3 A, B, C, D, E, F</p> <p><b>Teks:</b> 4B, 5B, 9A, D, 11 A, B, C, D 12 A, B, C, D, E</p> <p>(40% Course Requirement minimum)</p> <p>Ongoing / Integrated with concepts throughout unit.</p>	<p><b>Required:</b> Science Project</p> <p><b>Required:</b> “Identifying Organic Compounds” “Ecological Field Study”</p> <p>“Investigating Chemical Cycles in the Biosphere”</p>	<p><b>Biology:</b> Prentice Hall textbook. Chapters: 1- 6</p> <p>ISEF Science Fair: <a href="http://www.sciserve.org/isef/teachers/index.asp">http://www.sciserve.org/isef/teachers/index.asp</a></p> <p>P.H. Lab Manual A Ch.2 pp. 59 - 64</p> <p>5-E Inquiry Lesson Model (various labs from Lab Manual A, and probeware manuals). Biology Framework Resource Binder (BioFRB)</p> <p>Bio Lab Manual A pp. 65 - 68 Bio FRB</p>

# Biology

**Time Frame: 1<sup>st</sup> Six Weeks—weeks 1-6 (page 2 of 4)**

<b>T A K S</b> <b>Objective(s)</b>	<b>Concept and Process TEKS</b>	<b>Required Exemplar Labs and Suggested Instructional Activities Integrating Concepts &amp; Processes</b>	<b>Suggested Resources</b> (Use of additional & various resources from multiple sources is necessary to meet the TEKS)
	<p>(5) Science concepts. The student knows how an organism grows and how specialized cells, tissues, and organs develop. The student is expected to:</p> <p>B) identify cell differentiation in the development of organisms; and</p> <p>(9) Science concepts. The student knows metabolic processes and energy transfers that occur in living organisms. The student is expected to:</p> <p>(A) compare the structures and functions of different types of biomolecules such as carbohydrates, lipids, proteins, and nucleic acids;</p> <p>(D) analyze the flow of matter and energy through different trophic levels and between organisms and the physical environment.</p> <p>(11) Science concepts. The student knows that organisms maintain homeostasis. The student is expected to:</p> <p>(A) identify and describe the relationships between internal feedback mechanisms in the maintenance of homeostasis;</p> <p>(B) investigate and identify how organisms, including humans, respond to external stimuli;</p> <p>(C) analyze the importance of nutrition, environmental conditions, and physical exercise on health; and</p> <p>(D) summarize the role of microorganisms in maintaining and disrupting equilibrium including diseases in plants and animals and decay in an ecosystem.</p>	<p><b>Recommended:</b></p> <p>“Ice Balloons”</p> <p>“Fill the Bill”</p> <p>“Future Worlds”</p> <p>“Owl Pellet Lab”</p> <p>“Biome Project Presentation”</p> <p>“The Effects of Acid Rain on Seed Germination”</p> <p>“Earthworm Night Crawlers”</p> <p>“Brine Shrimp Egg – Salt Concentration Experiment”</p> <p>“Predator – Prey Simulation”</p>	<p>NSF Inquiry Training Bio FRB</p> <p>WWF <i>Windows in the Wild</i>.</p> <p>Project WILD &amp; various other sources (can be ordered from scientific catalogues)</p> <p>Gorgas Science Curriculum</p> <p>Bio FRB</p> <p>“Graphs, Charts and Tables Activities: “Biology TEKS 2C”  <a href="http://www.tenet.edu/teks/science/instruction/tutorial.html">http://www.tenet.edu/teks/science/instruction/tutorial.html</a></p> <p>TEXTEAMS Biology Institute Activities.</p>

## Biology

**Time Frame: 1<sup>st</sup> Six Weeks—weeks 1-6 (page 3 of 4)**

<b>TEKS Objective(s)</b>	<b>Concept and Process TEKS</b>	<b>Required Exemplar Labs and Suggested Instructional Activities Integrating Concepts &amp; Processes</b>	<b>Suggested Resources</b> (Use of additional & various resources from multiple sources is necessary to meet the TEKS)
	<p><b>(12)</b> Science concepts. The student knows that interdependence and interactions occur within an ecosystem. The student is expected to:</p> <p>(A) analyze the flow of energy through various cycles including the carbon, oxygen,</p> <p>(B) interpret interactions among organisms exhibiting predation, parasitism, commensalisms, and mutualism;</p> <p>(C) compare variations, tolerances, and adaptations of plants and animals in different biomes;</p> <p>(D) identify and illustrate that long-term survival of species is dependent on a resource base that may be limited; and</p> <p>(E) Investigate and explain the interactions in an ecosystem including food chains, food webs, and food pyramids.</p>	<p><b>Science Project:</b></p> <ul style="list-style-type: none"> <li>• Create a plan for an experiment.</li> <li>• Complete ISEF Required paperwork; before beginning experimentation; consult with project sponsors.</li> <li>• Challenge and test hypothesis through experimentation (data collection) and analysis.</li> <li>• Evaluate the results of experiment and reach conclusions based on data.</li> </ul>	<p>ISEF Science Fair:  <a href="http://www.sciserve.org/isef/teachers/index.asp">http://www.sciserve.org/isef/teachers/index.asp</a></p>

## Biology

### Alignment and Correlations Charts

**Time Frame: 1<sup>st</sup> Six Weeks (page 4 of 4)**

**TEKS/TAKS Correlations\***

<b>Biology TEKS</b>	<b>Prior Knowledge (8<sup>th</sup> grade) TEKS</b>	<b>Knowledge (IPC) TEKS</b>	<b>Subsequent Knowledge (Chem &amp; Phys) TEKS</b>	<b>Exit level TAKS Correlation</b>
Concepts: 4a, b, c, d 5 a, b, c	8.6 a, b	8a	<u>Chem</u> : 12 c, 13 b	Objectives 2, 3
Processes: 1a, b 2a, b, c, d 3 a, b, c, d, e, f	8.1 a, b 8.2 a, b, c, d, e 8.3 a, b, c, d, e 8.4 a, b 8.5a, b, c	1 a, b 2 a, b, c, d 3 a, b, c, d, e	<u>Chem</u> : 1 a, b, 2a, b, c, d, e, 3 a, b, c, d, e <u>Phys</u> : 1a, b, 2 a, b, c, d, e, f, 3 a, b, c, d, e	Objective 1

*\*Refer to Appendix for complete TEKS and TAKS objectives.*

**Pre-AP Course Curricular Requirements\*\***

*\*\*See Appendix for Pre-AP/AP Alignment Chart*

**TEKS/National Science Education Standards Correlations\*\*\***

<b>TEKS</b>	<b>National Science Education Standards</b>
Concepts: 4 a, 4 b, 4 c, d 5 a, b, c	Life Science Standard C Life Science Standard C Physical Science Standard B Life Science Standard C Science in Personal and Social Perspectives Standard F Life Science Standard C
Processes: 1a, b 2a, b, c, d 3 a, 3 b, 3 c, d, e, 3 f	Science as Inquiry Standard A Science in Personal and Social Perspectives Standard F Science as Inquiry Standard A Science and Technology Standard E Science as Inquiry Standard A History and Nature of Science Standard G Science as Inquiry Standard A Science as Inquiry Standard A History and Nature of Science Standard G Science as Inquiry Standard A

*\*\*\*Refer to Appendix for complete TEKS Objectives and National Science Education Standards*

# Biology

**Time Frame:** 2<sup>nd</sup> Six Weeks—*weeks 7-12* (page 1 of 3)

Unit Concepts:	Chapter Concepts:	Notes:
Cells	Cell Structure and Function Photosynthesis Cellular Respiration Cell Growth and Division	Field Labs; Science Projects

T A K S Objective(s)	Concept and Process TEKS	Required Exemplar Labs and Suggested Instructional Activities Integrating Concepts & Processes	Suggested Resources  (Use of additional & various resources from multiple sources is necessary to meet the TEKS)
	<p><b>Scientific Processes:</b> 1 A, B, 2 A, B, C, D, 3 A, B, C, D, E, F</p> <p><b>Teks:</b> 4A, B, 5C, 9A, B</p> <p>(40% Course Requirement minimum)</p> <p>Ongoing / Integrated with concepts throughout unit.</p> <p>(4) 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:</p>	<p><b>Science Fair Project:</b> (continued)</p> <ul style="list-style-type: none"> <li>• Create a plan for an experiment.</li> <li>• Complete ISEF required paperwork; before beginning experimentation; consult with project sponsors.</li> <li>• Challenge and test hypothesis through experimentation (data collection) and analysis.</li> <li>• Evaluate the results of experiment and reach conclusions based on data.</li> </ul> <p><b>Required:</b> “Investigating Cell Structures &amp; Processes” “Observing / Osmosis</p>	<p><u>Biology:</u> Prentice Hall textbook. Chapters: 5 - 10</p> <p>ISEF Science Fair: <a href="http://www.sciserve.org/isef/teachers/index.asp">http://www.sciserve.org/isef/teachers/index.asp</a></p> <p>Prentice Hall textbook pp.194 - 195</p> <p>P.H. Lab Manual A pp. 85 - 90</p>



# Biology

## Alignment and Correlations Charts

Time Frame: 2<sup>nd</sup> Six Weeks (page 3 of 3)

### TEKS/TAKS Correlations\*

Biology TEKS	Prior Knowledge (8 <sup>th</sup> grade) TEKS	Prior Knowledge (IPC) TEKS	Subsequent Knowledge (Chem & Phys) TEKS	Exit level TAKS Correlation
Concepts: 13 a, b 6 a, b	8.6b 8.11 b			Objectives 2, 3
Processes: 1a, b 2a, b, c, d 3 a, b, c, d, e, f	8.1 a, b 8.2 a, b, c, d, e 8.3 a, b, c, d, e 8.4 a, b 8.5a, b, c	1 a, b 2 a, b, c, d 3 a, b, c, d, e	<u>Chem</u> : 1 a, b, 2a, b, c, d, e, 3 a, b, c, d, e <u>Phys</u> : 1a, b, 2 a, b, c, d, e, f, 3 a, b, c, d, e	Objective 1

*\*Refer to Appendix for complete TEKS and TAKS objectives.*

### Pre-AP Course Curricular Requirements\*\*

*\*\*See Appendix for Pre-AP/AP Alignment Chart*

### TEKS/National Science Education Standards Correlations\*\*\*

TEKS	National Science Education Standards
Concepts: 13 a, b 6 a, b	Life Science Standard C Life Science Standard C
Processes: 1a, b 2a, b, c, d 3 a, 3 b, 3 c, d, e, 3 f	Science as Inquiry Standard A Science in Personal and Social Perspectives Standard F Science as Inquiry Standard A Science and Technology Standard E Science as Inquiry Standard A History and Nature of Science Standard G Science as Inquiry Standard A Science as Inquiry Standard A History and Nature of Science Standard G Science as Inquiry Standard A

*\*\*\*Refer to Appendix for complete TEKS Objectives and National Science Education Standards*

# Biology

**Time Frame: 3<sup>rd</sup> Six Weeks—weeks 7-12 (page 1 of 3)**

<b>Unit Concepts:</b>	<b>Chapter Concepts:</b>	<b>Notes:</b>
Genetics	Work of G. Mendel Probability & Punnett Squares Exploring Mendelian Genetics Meiosis Linkage and Gene Maps	Science Project

<b>T A K S Objective(s)</b>	<b>Concept and Process TEKS</b>	<b>Required Exemplar Labs, and Suggested Instructional Activities Integrating Concepts &amp; Processes</b>	<b>Suggested Resources</b> <small>(Use of additional &amp; various resources from multiple sources is necessary to meet the TEKS)</small>
1 1 1	<p><b>Scientific Processes:</b> <b>1 A, B,</b> <b>2 A, B, C, D,</b> <b>3 A, B, C, D, E, F</b></p> <p><b>Teks: 4B</b> <b>6 A, B, C, D, E, F</b></p> <p>(40% Course Requirement minimum) Ongoing / Integrated with concepts throughout unit.</p>	<p><b>Required:</b> Science Project: (continued)</p> <ul style="list-style-type: none"> <li>Prepare report and exhibit.</li> </ul> <p><b>Required:</b> “Investigating Inherited Traits”</p>	<p><u>Biology</u>: Prentice Hall textbook. Chapters: 11, 12, 13, 14</p> <p>ISEF Science Fair: <a href="http://www.sciserve.org/isef/teachers/index.asp">http://www.sciserve.org/isef/teachers/index.asp</a></p>
2	<p><b>(4)</b> 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:</p>	<p>“DNA Extraction Lab”</p>	<p>P.H. Lab Manual A pp. 107 – 112</p> <p>Various Labs: TEXTTEAMS, Regional Biotech labs, Prentice Hall Textbook or P.H. Lab Manual A pp.113 - 118</p>
2	<p>(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;</p>	<p>“Protein Synthesis, Like a Banana Split”—Students analyze the relationships among DNA, mRNA, and protein synthesis.</p>	<p>“Protein Synthesis, Like a Banana Split”: TEXTTEAMS Biology Institute, pages MG15 – MG19, 1-10</p>

# Biology

**Time Frame: 3<sup>rd</sup> Six Weeks—weeks 7-12 (page 2 of 3)**

T A K S Objective(s)	Concept and Process TEKS	Required Exemplar Labs and Suggested Instructional Activities Integrating Concepts & Processes	Suggested Resources <small>(Use of additional &amp; various resources from multiple sources is necessary to meet the TEKS)</small>
3	<p><b>(6)</b> Science concepts. The student knows the structures and functions of nucleic acids in the mechanisms of genetics. The student is expected to:</p> <p>(A) describe components of deoxyribonucleic acid (DNA), and illustrate how information for specifying the traits of an organism is carried in the DNA; and</p> <p>(B) explain replication, transcription, and translation using models of DNA and ribonucleic acid (RNA).</p> <p>(C) identify and illustrate how changes in DNA cause mutations and evaluate the significance of these changes;</p> <p>(D) compare genetic variations observed in plants and animals;</p> <p>(E) compare the processes of mitosis and meiosis and their significance to sexual and asexual reproduction; and</p> <p>(F) identify and analyze karyotypes.</p>	<p><b>Recommended:</b></p> <ul style="list-style-type: none"> <li>• “Bugs, Bugs, Bugs”—understand that genes for traits are encoded and arranged on chromosomes, and that when reproduction occurs, offspring receive an equal number of chromosomes from the mother and father.</li> <li>• Making a Karyotype</li> <li>• Monohybrid and dihybrid crosses using Punnett squares. <b>(2C)</b> <b>(2D)</b> (use plants from TEKS 13)</li> <li>• “Mystery of the Crooked Cell”</li> <li>• Models of DNA and RNA sequences and their components in regard to cell processes. <b>(3E)</b></li> <li>• Research activity topics related to DNA including contributions made by scientists in the area of genetic engineering and genetic diseases. <b>(1A)</b> <b>(2A-D)</b></li> <li>• Pedigrees</li> </ul>	<p>“Bugs, Bugs, Bugs”: TEXTEAMS Biology Institute, pages MG7 – MG9, 1-8.</p> <p>P.H. Lab Manual A pp. 123 - 130</p> <p>Regional Biotech UT – Pan AM</p> <p>P.H. textbook p.313</p> <p>Nova online Killer DNA Fingerprint Gel Electrophoresis Lab Simulation</p> <p>P.H. textbook pp. 342 - 343</p>

**Biology  
Alignment and Correlations Charts**

**Time Frame: 3<sup>rd</sup> Six Weeks (page 3 of 3)**

**TEKS/TAKS Correlations\***

<b>Biology TEKS</b>	<b>Prior Knowledge (8<sup>th</sup> grade) TEKS</b>	<b>Prior Knowledge (IPC) TEKS</b>	<b>Subsequent Knowledge (Chem &amp; Phys) TEKS</b>	<b>Exit level TAKS Correlation</b>
Concepts: 6 c, d, e, f 7 a, b	8.11 a, b, c 8.11 a, b			Objectives 2, 3
Processes: 1a, b 2a, b, c, d 3 a, b, c, d, e, f	8.1 a, b 8.2 a, b, c, d, e 8.3 a, b, c, d, e 8.4 a, b 8.5a, b, c	1 a, b 2 a, b, c, d 3 a, b, c, d, e	<u>Chem</u> : 1 a, b, 2a, b, c, d, e, 3 a, b, c, d, e <u>Phys</u> : 1a, b, 2 a, b, c, d, e, f, 3 a, b, c, d, e	Objective 1

*\*Refer to Appendix for complete TEKS and TAKS objectives.*

**Pre-AP Course Curricular Requirements\*\***

*\*\*See Appendix for Pre-AP/AP Alignment Chart*

**TEKS/National Science Education Standards Correlations\*\*\***

<b>TEKS</b>	<b>National Science Education Standards</b>
Concepts: 6 c, d, e, f 7 a, b	Life Science Standard C Life Science Standard C
Processes: 1a, b 2a, b, c, d 3 a, 3 b, 3 c, d, e, 3 f	Science as Inquiry Standard A Science in Personal and Social Perspectives Standard F Science as Inquiry Standard A Science and Technology Standard E Science as Inquiry Standard A History and Nature of Science Standard G Science as Inquiry Standard A Science as Inquiry Standard A History and Nature of Science Standard G Science as Inquiry Standard A

*\*\*\*Refer to Appendix for complete TEKS Objectives and National Science Education Standards*

# Biology

**Time Frame: 4<sup>th</sup> Six Weeks—weeks10-12 (page 1 of 4)**

Unit Concepts:	Chapter Concepts:	Notes:
Evolution  The Human Body	Darwin’s Theory Evolution of Populations The History of Life Classification Systems: Nervous, Skeletal, Muscular, Integumentary, Circulatory, Respiratory, digestive, Excretory, Endocrine, Reproduction, Immune System and Disease	

T A K S Objective(s)	Concept and Process TEKS	Required Exemplar Labs, and Suggested Instructional Activities Integrating Concepts & Processes	Suggested Resources  (Use of additional & various resources from multiple sources is necessary to meet the TEKS)
1 1 1	<p><b>Scientific Processes:</b> 1 A, B, 2 A, B, C, D, 3 A, B, C, D, E, F</p> <p><b>Teks:</b> 4 A, B, C, D 5 A, B, C 6C, D 7 A, B 8 B, C 9 A 10 A, B 11 A, B, C, D 12 D</p> <p>(40% Course Requirement minimum)</p> <p>Ongoing / Integrated with concepts throughout unit.</p> <p>4) Science concepts. The student knows that cells are the basic</p>	<p><b>Required:</b></p> <p>“What a Beak”</p> <p><b>Recommended:</b></p> <p>“Fill the Bill”</p> <p>“What Factors affect Heart Rate?”</p> <p>“Investigating the Effects of Enzymes on Food Molecules”</p>	<p><b>Biology:</b> Prentice Hall textbook. Chapters: 15 - 18, 35 - 40</p> <p>Snapshot Activities: 8A, 8B, 10 A, 10B, 10C <a href="http://www.tenet.edu/teks/science/instruction/teksper.html">http://www.tenet.edu/teks/science/instruction/teksper.html</a></p> <p>Graphs, Charts and Tables Activities: <a href="http://www.tenet.edu/teks/science/instruction/tutorial.html">http://www.tenet.edu/teks/science/instruction/tutorial.html</a></p> <p>“Density of Bird and Mammal Bones”: <a href="#">Texas Instruments T<sup>3</sup> Chem-Bio Institute (2000)</a>. Pages 6-2 to 6-4. <i>Get this lab from your department</i></p>

<p>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:</p> <p>(A) identify the parts of prokaryotic and eukaryotic cells:</p> <p>(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:</p> <p>( 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</p> <p>(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.</p> <p>(5) Science concepts. The student knows how an organism grows and how specialized cells, tissues, and organs develop. The student is expected to:</p> <p>(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;</p> <p>(B) identify cell differentiation in the development of organisms; and</p> <p>(C) sequence the levels of organization in multicellular</p>		<p><i>chair.</i></p>
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<p>organisms to relate the parts to each other and to the whole.</p> <p><b>(6)</b> Science concepts. The student knows the structures and functions of nucleic acids in the mechanisms of genetics. The student is expected to:</p> <p>(C) identify and illustrate how changes in DNA cause mutations and evaluate the significance of these changes;</p> <p>(D) compare genetic variations observed in plants and animals;</p> <p><b>(7)</b> Science concepts. The student knows the theory of biological evolution. The student is expected to:</p> <p>(A) identify evidence of change in species using fossils, DNA sequences, anatomical similarities, physiological similarities, and embryology; and</p> <p>(B) illustrate the results of natural selection in speciation, diversity, phylogeny, adaptation, behavior, and extinction.</p> <p><b>(8)</b> Science concepts. The student knows applications of taxonomy and can identify its limitations. The student is expected to:</p> <p>(B) analyze relationships among organisms and develop a model of a hierarchical classification system based on similarities and differences using taxonomic nomenclature; and</p>		
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*4<sup>th</sup> Three Weeks Unit continued on next page*

# Biology

**Time Frame: 4<sup>th</sup> Six Weeks—weeks 10-12 (page 2 of 4)**

T A K S Objective(s)	Concept and Process TEKS	Required Exemplar Labs, and Suggested Instructional Activities Integrating Concepts & Processes	Suggested Resources  (Use of additional & various resources from multiple sources is necessary to meet the TEKS)
2	<p>(C) identify characteristics of kingdoms including monerans, protists, fungi, plants, animals.</p> <p><b>(9)</b> Science concepts. The student knows metabolic processes and energy transfers that occur in living organisms. The student is expected to:</p> <p style="padding-left: 40px;">(A) compare the structures and functions of different types of biomolecules such as carbohydrates, lipids, proteins, and nucleic acids;</p>	<p>“What a Beak”—determine how variations in bird beaks could lead to speciation. (“Fill the Bill” also makes a good extension to this activity.”)</p> <p><b>Activity:</b> The student will demonstrate an understanding of the concepts and applications of taxonomy and will identify its limitations:</p> <ul style="list-style-type: none"> <li>• Make a collection of diverse plants and animals that will be the basis of a dichotomous key to be created by the student. <b>(1A) (2A-C) (3E)</b></li> </ul>	<p>Vista: “Biological Evolution”: <a href="http://www.tenet.edu/teks/science/instruction/vistas/index.html?hi">http://www.tenet.edu/teks/science/instruction/vistas/index.html?hi</a></p> <p>“What a Beak”: TEXTEAMS Biology Institute, pages BE 20, 1-3.</p>
2	<p><b>(10)</b> 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:</p> <p style="padding-left: 40px;">(A) interpret the functions of systems in organisms including circulatory, digestive, nervous, endocrine, reproductive, integumentary, skeletal, respiratory, muscular, excretory, and immune;</p>	<ul style="list-style-type: none"> <li>• Collect and classify characteristic members of the six kingdoms. <b>(1A) (2A-C) (3E)</b></li> <li>• Conduct comparative anatomy through dissection. <b>(1A) (2A-C) (3E)</b></li> </ul>	<p>“Call It...Dominant or Recessive”: <u>Explorations:</u> <u>Biology with the TI-83 Plus.</u> Texas Instruments. ©2001. Activity 5, p. 41.</p> <p>TEXTEAMS Biology Institute</p>
2		<p><b>Activity:</b> The student will demonstrate an understanding of the concept of all the levels of nature, living systems that are found within other living systems, each with its own boundary and limits:</p> <ul style="list-style-type: none"> <li>•</li> <li>•</li> </ul>	

# Biology

**Time Frame: 4<sup>th</sup> Six Weeks—weeks 10-12 (page 3 of 4)**

<b>T A K S Objective(s)</b>	<b>Concept and Process TEKS</b>	<b>Required Exemplar Labs and Suggested Instructional Activities Integrating Concepts &amp; Processes</b>	<b>Suggested Resources</b> <small>(Use of additional &amp; various resources from multiple sources is necessary to meet the TEKS)</small>
	<p>(B) compare the interrelationships of organ systems to each other and to the body as a whole; and</p> <p><b>(11)</b> Science concepts. The student knows that organisms maintain homeostasis. The student is expected to:</p> <p style="padding-left: 20px;">(A) identify and describe the relationships between internal feedback mechanisms in the maintenance of homeostasis;</p> <p style="padding-left: 20px;">(B) investigate and identify how organisms, including humans, respond to external stimuli;</p> <p style="padding-left: 20px;">(C) analyze the importance of nutrition, environmental conditions, and physical exercise on health; and</p> <p style="padding-left: 20px;">(D) summarize the role of microorganisms in maintaining and disrupting equilibrium including diseases in plants and animals and decay in an ecosystem.</p> <p><b>(12)</b> Science concepts. The student knows that interdependence and interactions occur within an ecosystem. The student is expected to:</p> <p style="padding-left: 20px;">(D) identify and illustrate that long-term survival of species is dependent on a resource base that may be limited; and</p>	<p><b>Exemplar Lab:</b></p> <p><b>Suggested Lab:</b> Density of Bird and Mammal Bones”—compare densities of bird and mammal bones, relate bone density to bone function.</p> <p><b>Activity:</b> The student will demonstrate an understanding of the concept of the structures and functions of nucleic acids in the mechanisms of genetics:</p> <ul style="list-style-type: none"> <li>• Use the scientific method to conduct mutation and karyotype labs to explain genetic variations. <b>(1A) (2A-D)</b></li> <li>• Dissect animal and plant specimens in order to identify specific organ system and functions. <b>(1A-B)</b></li> <li>• Research and describe topics related to systems in organisms and include contributions made by scientists in the appropriate field. <b>(3C) (3F)</b></li> <li>• View and identify plant structures using stereo/compound microscope observations in order to illustrate their significance in plant survival. <b>(1A-B)</b></li> </ul>	<p>Vista: “Survival of the Fittest”:  <a href="http://www.tenet.edu/teks/science/instruction/vistas/index.html?hi">http://www.tenet.edu/teks/science/instruction/vistas/index.html?hi</a></p>

		<ul style="list-style-type: none"> <li>• Describe the connection between cell cycle and mitosis and their significance in relation to reproduction. <b>(3E)</b></li> </ul> <p>Create a pedigree chart showing inheritance patterns. <b>(2)</b></p>	
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**STUDENT PRODUCTS** may include (but are not limited to): • Models • Projects • Labs • Research Papers • Presentations

*4<sup>th</sup> Three Weeks Unit continued on next page*

Copy of Exemplar Lab, “Density of Bird and Mammal Bones” is available from your department chair.

# Biology

## Alignment and Correlations Charts

Time Frame: 4<sup>th</sup> Six Weeks (page 4 of 4)

### TEKS/TAKS Correlations\*

Biology TEKS	Prior Knowledge (8 <sup>th</sup> grade) TEKS	Prior Knowledge (IPC) TEKS	Subsequent Knowledge (Chem & Phys) TEKS	Exit level TAKS Correlation
Concepts: 8 a, b, c 10 a, b, c	8.6 a	8 a		Objective 2
Processes: 1a, b 2a, b, c, d 3 a, b, c, d, e, f	8.1 a, b 8.2 a, b, c, d, e 8.3 a, b, c, d, e 8.4 a, b 8.5a, b, c	1 a, b 2 a, b, c, d 3 a, b, c, d, e	<u>Chem</u> : 1 a, b, 2a, b, c, d, e, 3 a, b, c, d, e <u>Phys</u> : 1a, b, 2 a, b, c, d, e, f, 3 a, b, c, d, e	Objective 1

\*Refer to Appendix for complete TEKS and TAKS objectives.

### Pre-AP Course Curricular Requirements\*\*

\*\*See Appendix for Pre-AP/AP Alignment Chart

### TEKS/National Science Education Standards Correlations\*\*\*

TEKS	National Science Education Standards
Concepts: 8 a, b, c 10 a, b, c	Life Science Standard C Life Science Standard C
Processes: 1a, b 2a, b, c, d 3 a, 3 b, 3 c, d, e, 3 f	Science as Inquiry Standard A Science in Personal and Social Perspectives Standard F Science as Inquiry Standard A Science and Technology Standard E Science as Inquiry Standard A History and Nature of Science Standard G Science as Inquiry Standard A Science as Inquiry Standard A History and Nature of Science Standard G Science as Inquiry Standard A

\*\*\*Refer to Appendix for complete TEKS Objectives and National Science Education Standards

# Biology

**Time Frame: 5<sup>th</sup> Six Weeks—weeks 13-15 (page 1 of 6)**

Unit Concepts:	Chapter Concepts:	Notes:
Microorganisms and Fungi  Plants	Bacteria and Viruses Protists Fungi Plant Diversity Roots, Stems, and Leaves Reproduction of Seed Plants Plant Responses & Adaptations	

TAKS Objective(s)	Concept and Process TEKS	Required Exemplar Labs, and Suggested Instructional Activities Integrating Concepts & Processes	Suggested Resources (Use of additional & various resources from multiple sources is necessary to meet the TEKS)
1 1 1	<p><b>Scientific Processes:</b>  <b>1 A, B,</b>  <b>2 A, B, C, D,</b>  <b>3 A, B, C, D, E, F</b></p> <p><b>Teks:</b>  <b>4 B, C, D</b>  <b>5 A, B</b>  <b>6 E</b>  <b>7 A, B</b>  <b>8 A, C</b>  <b>10 C</b>  <b>11 A, B, D</b>  <b>12 B, C</b>  <b>13 A, B</b></p> <p>(40% Course Requirement minimum)            Ongoing / Integrated with concepts throughout unit.</p> <p><b>(8)</b> Science concepts. The student knows applications of taxonomy and can identify its limitations. The student is expected to:</p> <p>(A) collect and classify organisms at several taxonomic levels such as species, phylum, and kingdom using dichotomous keys;</p>	<p><b>Required:</b></p> <p><b>Recommended:</b></p> <p><b>Activity:</b> The student will demonstrate an understanding of the concept of metabolic processes and energy transfers that occur in living organisms:</p> <ul style="list-style-type: none"> <li>• Create and use models to illustrates structure of biomolecules. <b>(3E)</b></li> <li>• Use the scientific method to conduct biomolecule labs which investigate the findings of biomolecules in daily conception of foods. <b>(1A-B) (2A-D)</b></li> <li>• Collect and analyze nutritional labels to evaluate the importance of biomolecules in our body. <b>(3B)</b></li> </ul>	<p><u>Biology</u>: Prentice Hall textbook.            Chapters: 19 – 21, 22 - 25</p> <p>Snapshot Activities:            9A, 9B, 9C, 9D,            12 A, 12B, 12C, 12D,            12E:  <a href="http://www.tenet.edu/teks/science/instruction/teksperts.html">http://www.tenet.edu/teks/science/instruction/teksperts.html</a></p> <p>Graphs, Charts and Tables Activities,            “Who Lives Here?”:  <a href="http://www.tenet.edu/teks/science/instruction/tutorial.html">http://www.tenet.edu/teks/science/instruction/tutorial.html</a></p>

# Biology

**Time Frame: 5<sup>th</sup> Six Weeks—weeks 13-15 (page 2 of 6)**

T A K S Objective(s)	Concept and Process TEKS	Required Exemplar Labs, and Suggested Instructional Activities Integrating Concepts & Processes	Suggested Resources (Use of additional & various resources from multiple sources is necessary to meet the TEKS)
3	<p><b>(9)</b> Science concepts. The student knows metabolic processes and energy transfers that occur in living organisms. The student is expected to:</p> <p>(A) compare the structures and functions of different types of biomolecules such as carbohydrates, lipids, proteins, and nucleic acids;</p> <p>(B) compare the energy flow in photosynthesis to the energy flow in cellular respiration;</p> <p>(C) investigate and identify the effects of enzymes on food molecules; and</p> <p>(D) analyze the flow of matter and energy through different trophic levels and between organisms and the physical environment.</p>	<ul style="list-style-type: none"> <li>• Compare and contrast photosynthesis and cellular respiration. <b>(3A)</b></li> <li>• Use scientific procedures to conduct enzyme labs in order to support the effect that enzymes have on metabolic processes. <b>(1A-B) (2A-D)</b></li> <li>• Create a model which supports the importance of the flow of matter and energy (food chain, food web, pyramid). <b>(3E)</b></li> </ul> <p><b>Activity:</b> The student will demonstrate an understanding of the concept of cells which 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:</p>	<p>“Metabolic Magicians”: <u>Explorations:</u> <u>Biology with the TI-83 Plus (2001).</u> Activity 3 Page 25</p>
3	<p><b>(12)</b> Science concepts. The student knows that interdependence and interactions occur within an ecosystem. The student is expected to:</p> <p>(A) analyze the flow of energy through various cycles including the carbon, oxygen, nitrogen, and water cycles;</p> <p>(B) interpret interactions among organisms exhibiting predation, parasitism, commensalism, and mutualism;</p>	<ul style="list-style-type: none"> <li>• Research infectious diseases including the importance of contributions made by scientists which have an impact on current and future societal issues. <b>(3C) (3F)</b></li> <li>• Use the scientific method to conduct a disease transfer investigation in order to model the transfer of infectious diseases. <b>(1A – B)</b></li> </ul>	

# Biology

**Time Frame: 5<sup>th</sup> Six Weeks—weeks 13-15 (page 3 of 6)**

T A K S Objective(s)	Concept and Process TEKS	Required Exemplar Labs, and Suggested Instructional Activities Integrating Concepts & Processes	Suggested Resources <small>(Use of additional &amp; various resources from multiple sources is necessary to meet the TEKS)</small>
3	<p>(C) compare variations, tolerances, and adaptations of plants and animals in different biomes;</p> <p>(D) identify and illustrate that long-term survival of species is dependent on a resource base that may be limited; and</p> <p>(E) investigate and explain the interactions in an ecosystem including food chains, food webs, and food pyramids.</p>	<p><b>Activity:</b> The student will demonstrate an understanding of the concept of interdependence and interactions occurring within an ecosystem:</p> <ul style="list-style-type: none"> <li>• Diagram the various cycles utilizing models. <b>(3E)</b></li> <li>• Symbolize models showing organism interactions through role playing. <b>(3E)</b></li> <li>• Create a biome travel brochure with technology resources. <b>(3C)</b></li> <li>• Identify and examine local examples of symbiotic relationships using scientific procedures. <b>(1A)</b></li> <li>• Model genetic equilibrium with the identification and measurement of a current population with a subsequent one (Hardy-Weinberg). <b>(3E)</b></li> </ul>	

*5<sup>th</sup> Three Weeks Unit continued on next page*

# Biology

**Time Frame: 5<sup>th</sup> Six Weeks—weeks 13-15 (page 4 of 6)**

T A K S Objective(s)	Concept and Process TEKS	Required Exemplar Labs, and Suggested Instructional Activities Integrating Concepts & Processes	Suggested Resources <small>(Use of additional &amp; various resources from multiple sources is necessary to meet the TEKS)</small>
		<p><b>Exemplar Lab:</b></p> <p>“Metabolic Magicians”—understand the relationship between environmental factors and enzyme reaction rates, recognize metabolic differences between endotherms and ectotherms, generate graphs on collected data.</p>	

**STUDENT PRODUCTS** may include (but are not limited to): • Models • Projects • Labs • Research Papers • Presentations

*5<sup>th</sup> Three Weeks Unit continued on next page*

Copy of Exemplar Lab, “Metabolic Magicians” located in Appendix.

# Biology

## Alignment and Correlations Charts

Time Frame: 5<sup>th</sup> Six Weeks (page 5 of 6)

### TEKS/TAKS Correlations\*

<b>Biology TEKS</b>	<b>Prior Knowledge (8<sup>th</sup> grade) TEKS</b>	<b>Prior Knowledge (IPC) TEKS</b>	<b>Subsequent Knowledge (Chem &amp; Phys) TEKS</b>	<b>Exit level TAKS Correlation</b>
Concepts: 9 a, b, c, d 12 a, b, c, d, e	8.10c	6a	Chem: 5a	Objective 3
Processes: 1a, b 2a, b, c, d 3 a, b, c, d, e, f	8.1 a, b 8.2 a, b, c, d, e 8.3 a, b, c, d, e 8.4 a, b 8.5a, b, c	1 a, b 2 a, b, c, d 3 a, b, c, d, e	<u>Chem</u> : 1 a, b, 2a, b, c, d, e, 3 a, b, c, d, e <u>Phys</u> : 1a, b, 2 a, b, c, d, e, f, 3 a, b, c, d, e	Objective 1

*\*Refer to Appendix for complete TEKS and TAKS objectives.*

### Pre-AP Course Curricular Requirements\*\*

*\*\*See Appendix for Pre-AP/AP Alignment Chart*

*5<sup>th</sup> Three Weeks Unit continued on next page*

# Biology

## Alignment and Correlations Charts (continued)

Time Frame: 5<sup>th</sup> Six Weeks (page 6 of 6)

### TEKS/National Science Education Standards Correlations\*\*\*

TEKS	National Science Education Standards
Concepts: 9 a 9 b, c 9d 12 a 12 b, c 12 d 12e	Life Science Standard C Life Science Standard C Physical Science Standard B Physical Science Standard B Physical Science Standard B Life Science Standard C Earth and Space Science Standard D Life Science Standard C Life Science Standard C Science in Personal and Social Perspectives Standard F Life Science Standard C
Processes: 1a, b 2a, b, c, d 3 a, 3 b, 3 c, d, e, 3 f	Science as Inquiry Standard A Science in Personal and Social Perspectives Standard F Science as Inquiry Standard A Science and Technology Standard E Science as Inquiry Standard A History and Nature of Science Standard G Science as Inquiry Standard A Science as Inquiry Standard A History and Nature of Science Standard G Science as Inquiry Standard A

**\*\*\*Refer to Appendix for complete TEKS Objectives and National Science Education Standards**

# Biology

**Time Frame: 6<sup>th</sup> Six Weeks—weeks 16-18 (page 1 of 3)**

Unit Concepts:	Chapter Concepts:	Notes:
Invertebrates  Chordates	Sponges and Cnidarians Worms and Mollusks Arthropods and Echinoderms Comparing Invertebrates Nonvertebrate Chordates, Fishes, and Amphibians Reptiles and Birds Mammals Comparing Chordates Animal Behavior	

T A K S Objective(s)	Concept and Process TEKS	Required Exemplar Labs, and Suggested Instructional Activities Integrating Concepts & Processes	Suggested Resources (Use of additional & various resources from multiple sources is necessary to meet the TEKS)
1 1 1	<p><b>Scientific Processes:</b> 1 A, B, 2 A, B, C, D, 3 A, B, C, D, E, F</p> <p><b>Teks:</b> 5 A, B 6 E 7 A, B 8 A, C 9 C 10 A, B 11 A, B, C 12 B, C</p> <p>(40% Course Requirement minimum)</p> <p>Ongoing / Integrated with concepts throughout unit.</p> <p>(5) Science concepts. The student knows how an organism grows and how specialized cells, tissues, and organs develop. The student is expected to:</p>	<p><b>Required:</b></p> <p><b>Recommended:</b></p> <p><b>Activity:</b> The student will demonstrate an understanding of the concept of organisms maintaining homeostasis:</p> <ul style="list-style-type: none"> <li>Research conditions that alter homeostasis and how organisms respond. (3C)</li> <li>Evaluate the effects that physical and environmental stimuli have on body mechanisms utilizing technology resources. (1A-B) (2A-D)</li> </ul>	<p><a href="#">Biology: Prentice Hall textbook.</a> Chapters: 26 – 29, 30 - 34</p> <p>Snapshot Activities: 11A, 11B, 11C, 11D, <a href="http://www.tenet.edu/teks/science/instruction/teksperfs.html">http://www.tenet.edu/teks/science/instruction/teksperfs.html</a></p> <p>Graphs, Charts and Tables Activities, “Who Lives Here?”: <a href="http://www.tenet.edu/teks/science/instruction/tutorial.html">http://www.tenet.edu/teks/science/instruction/tutorial.html</a></p> <p>“Why Whales Don’t Have Legs,” <a href="#">Texas Instruments T<sup>3</sup> Chem-Bio Institute (2000).</a> Pages 6-24 - 6-26.</p>

# Biology

**Time Frame: 6<sup>th</sup> Three Weeks—weeks 16-1 (page 2 of 3)**

<b>T A K S Objective(s)</b>	<b>Concept and Process TEKS</b>	<b>Required Exemplar Labs and Suggested Instructional Activities Integrating Concepts &amp; Processes</b>	<b>Suggested Resources</b> (Use of additional & various resources from multiple sources is necessary to meet the TEKS)
	<p>(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;</p> <p>(B) identify cell differentiation in the development of organisms; and</p> <p><b>(6)</b> Science concepts. The student knows the structures and functions of nucleic acids in the mechanisms of genetics. The student is expected to:</p> <p>(E) compare the processes of mitosis and meiosis and their significance to sexual and asexual reproduction;</p> <p><b>(7)</b> Science concepts. The student knows the theory of biological evolution. The student is expected to:</p> <p>(A) identify evidence of change in species using fossils, DNA sequences, anatomical similarities, physiological similarities, and embryology; and</p> <p>(B) illustrate the results of natural selection in speciation, diversity, phylogeny, adaptation, behavior, and extinction</p> <p><b>(8)</b> Science concepts. The student knows applications of taxonomy and can identify its limitations. The student is expected to:</p>	<p><b>Exemplar Labs:</b></p> <p>“<a href="#">Why Whales Don’t Have Legs</a>”—discover the effect of changing surface area on the rate of heat transfer.</p> <p>“<a href="#">The Problem of the Cooling Coffee</a>”—collect cooling data and the CBL/TI-83 to determine cooling constant k.</p>	<p>“The Problem of the Cooling Coffee”, <a href="#">Texas Instruments T<sup>3</sup> Chem-Bio Institute (2000)</a>. Pages 6-36 to 6-38. <i>Get this lab from your department chair.</i></p>

<p>(A) collect and classify organisms at several taxonomic levels such as species, phylum, and kingdom using dichotomous keys;</p> <p>( C ) identify characteristics of kingdoms including monerans, protists, fungi, plants, and animals.</p> <p><b>(9)</b> Science concepts. The student knows metabolic processes and energy transfers that occur in living organisms. The student is expected to:</p> <p>(C) investigate and identify the effects of enzymes on food molecules; and</p> <p><b>(10)</b> 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:</p> <p>(A) interpret the functions of systems in organisms including circulatory, digestive, nervous, endocrine, reproductive, integumentary, skeletal, respiratory, muscular, excretory, and immune;</p> <p>(B) compare the interrelationships of organ systems to each other and to the body as a whole; and</p> <p><b>(11)</b> Science concepts. The student knows that organisms maintain homeostasis. The student is expected to:</p> <p>(A) identify and describe the relationships between internal feedback mechanisms in the maintenance of homeostasis;</p> <p>(B) investigate and identify how organisms, including humans, respond to external stimuli;</p> <p>(C) analyze the importance of nutrition, environmental conditions, and physical exercise on health; and</p>		
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<p>(12) Science concepts. The student knows that interdependence and interactions occur within an ecosystem. The student is expected to:</p> <p>(B) interpret interactions among organisms exhibiting predation, parasitism, commensalism, and mutualism;</p> <p>(B) interpret interactions among organisms exhibiting predation, parasitism, commensalism, and mutualism;</p> <p>(C) compare variations, tolerances, and adaptations of plants and animals in different biomes;</p>		
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**STUDENT PRODUCTS** may include (but are not limited to): • Models • Projects • Labs • Research Papers • Presentations

*6<sup>th</sup> Three Weeks Unit continued on next page*

Copies of Exemplar Labs, “Why Whales Don’t Have Legs” and “The Problem of the Cooling Coffee” are available from your department chair.

# Biology

## Alignment and Correlations Charts

Time Frame: 6<sup>th</sup> Three Weeks (page 3 of 3)

### TEKS/TAKS Correlations\*

Biology TEKS	Prior Knowledge (8 <sup>th</sup> grade) TEKS	Prior Knowledge (IPC) TEKS	Subsequent Knowledge (Chem & Phys) TEKS	Exit level TAKS Correlation
Concepts: 11 a, b, c, d				
Processes: 1a, b 2a, b, c, d 3 a, b, c, d, e, f	8.1 a, b 8.2 a, b, c, d, e 8.3 a, b, c, d, e 8.4 a, b 8.5a, b, c	1 a, b 2 a, b, c, d 3 a, b, c, d, e	<u>Chem</u> : 1 a, b, 2a, b, c, d, e, 3 a, b, c, d, e <u>Phys</u> : 1a, b, 2 a, b, c, d, e, f, 3 a, b, c, d, e	Objective 1

*\*Refer to Appendix for complete TEKS and TAKS objectives.*

### Pre-AP Course Curricular Requirements\*\*

*\*\*See Appendix for Pre-AP/AP Alignment Chart*

### TEKS/National Science Education Standards Correlations\*\*\*

TEKS	National Science Education Standards
Concepts: 11 a, b 11 c 11 d	Life Science Standard C Life Science Standard C Science in Personal and Social Perspectives Standard F Life Science Standard C
Processes: 1a, b 2a, b, c, d 3 a, 3 b, 3 c, d, e, 3 f	Science as Inquiry Standard A Science in Personal and Social Perspectives Standard F Science as Inquiry Standard A Science and Technology Standard E Science as Inquiry Standard A History and Nature of Science Standard G Science as Inquiry Standard A Science as Inquiry Standard A History and Nature of Science Standard G Science as Inquiry Standard A

*\*\*\*Refer to Appendix for complete TEKS Objectives and National Science Education Standards*

# APPENDIX

Texas Essential Knowledge and Skills (<http://www.tea.state.tx.us/teks/index.html>)

Eighth Grade Science

Integrated Physics and Chemistry

Biology

Chemistry

Physics

Texas Assessment of Knowledge and Skills Objectives

(<http://www.tea.state.tx.us/student.assessment/taks/booklets/index.html>)

Tenth Grade and Exit Level (10<sup>th</sup> and 11<sup>th</sup> Grade)

National Science Education Standards

Science TEKS Toolkit Excerpts (<http://www.tenet.edu/teks/science/instruction/index.html>)

Materials and Safety Equipment List

Checklist for Science Field Investigations

Science Facility Safety Checklist

Laboratory Safety Survey

Assessment Methods

Web-Based Resources

Texas Environmental Education Advisory Committee Contact Information

(<http://www.tea.state.tx.us/curriculum/teeac.html>)

Pre-AP and AP Science Scope and Sequence Grades 6-12

Required Exemplar Labs:

“Protein Synthesis, Like a Banana Split”

“Bugs, Bugs, Bugs”

*\*\*\* These labs are **available from your Science Department Chair** and are not located in this document. (We do not have permission to print them in this document.)*

## Biology Exemplar Labs

Number	TEKS	Exemplar Lab	Source
1. 1st Six Weeks	2A,B	"Metric / English Volume Conversions"	**T <sup>3</sup> CHEM-BIO Institute. Texas Instruments © 2000. p. 6-23.
2. 1st Six Weeks	4B, 5A,B	"The Bigger, the Better?"	Explorations: Biology with the TI-83 Plus. Texas Instruments. © 2001. Activity 2, p13-22.
3. 2nd Six Weeks	6A,B,C	"Protein Synthesis, Like a Banana Split"	TEXTEAMS BIOLOGY Learning Experience 4, p. MG-15 to MG-19, and activity p. 1-10.
4. 2nd Six Weeks	6A,D	"Bugs, Bugs, Bugs"	TEXTEAMS BIOLOGY Learning Experience 2, p. MG-7 to MG-9, and activity p. 1-8.
5. 3 <sup>rd</sup> Six Weeks	6D	"Call it... Dominant or Recessive"	Explorations: Biology with the TI-83 Plus. Texas Instruments. © 2001. Activity 5, p 41-50.
6. 3 <sup>rd</sup> Six Weeks	6D, 7A,B	"What a Beak"	TEXTEAMS BIOLOGY Learning Experience 5p. BE-20, and activity p. 1-3.
7. 4 <sup>th</sup> Six Weeks	10A,B	"Density of Bird and Mammal Bones"	**T <sup>3</sup> CHEM-BIO Institute. Texas Instruments © 2000. p. 6-2 to 6-4.
8. 4 <sup>th</sup> Six Weeks	9A,B,C	"Metabolic Magicians"	Explorations: Biology with the TI-83 Plus. Texas Instruments. © 2001. Activity 3, p. 25-30.
9. 5 <sup>th</sup> Six Weeks	11A	"Why Whales Don't Have Legs"	**T <sup>3</sup> CHEM-BIO Institute. Texas Instruments © 2000. p. 6-24 to 6-26.
10. 5 <sup>th</sup> Six Weeks	11A	"The Problem of the Cooling Coffee"	**T <sup>3</sup> CHEM-BIO Institute. Texas Instruments © 2000. p. 6-35 to 6-38.
11. 6 <sup>th</sup> Six Weeks			
12. 6 <sup>th</sup> Six Weeks			

\*\*These labs were distributed during the T<sup>3</sup> Training Institutes. Please see your Department Chair if you do not have copies.

**Note:** Although directions may be given for the TI-73 graphing calculator, the activity will work using the TI-83 model with minor modifications. These labs are provided in "cookbook" format. They may be modified by the teacher to be inquiry formatted as appropriate. It is the responsibility of the campus to provide the probeware, calculators, and other equipment required for by the labs for all students. This may require campus departments to plan ahead and share resources, and may require departments to make wise decisions when purchasing instructional supplies and equipment.

# National Science Education Content Standards for Grades 9 - 12

<b>Content Standard</b>	
A: Science As Inquiry	Abilities to do scientific inquiry Understandings about scientific inquiry
B: Physical Science	Structure of atoms Structure and properties of matter Chemical reactions Motions and forces Conservation of energy and increase in disorder Interactions of energy and matter
C: Life Science	The cell Molecular basis of heredity Biological evolution Interdependence of organisms Matter, energy, and organization in living systems Behavior of organisms
D: Earth and Space Science	Energy in the earth system Geochemical cycles Origin and evolution of the earth system Origin and evolution of the universe
E: Science and Technology	Abilities of technological design Understandings about science and technology
F: Science in Personal and Social Perspectives	Personal and community health Population growth Natural resources Environmental quality Natural and human-induced hazards Science and technology in local, national, and global challenges
G: History and Nature of Science	Science as a human endeavor Nature of scientific knowledge Historical perspectives