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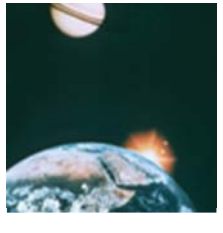
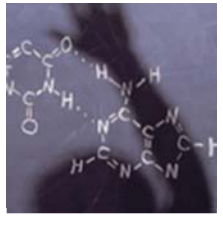
Biology

STAAR Field Guide

STAAR

The State of Texas of Assessment of Academic Readiness (STAAR) is based on the Texas Essential Knowledge and Skills (TEKS). Most of the state standards, if they are eligible for assessment in a multiple choice/short answer format, will be assessed on STAAR.

STAAR is designed as a vertical system. Just as the TEKS are structured in a vertically aligned manner, so is STAAR. Learning from one grade level is aligned with learning at the next grade level. Some skills are developed over the course of a student's educational career from kindergarten through high school, while other skills and learning may begin at a particular grade level and serve as the foundation for later learning. STAAR is an assessment of academic readiness. In other words, we can sum up the variation between the current assessment program (TAKS) and STAAR by reframing the questions we are asking.

TAKS: TAKS was designed to help teachers answer this question:
- Did students learn what they were supposed to learn in the current year's grade?

STAAR: STAAR is designed to ensure that teachers answer these questions:
- Did students learn what they were supposed to learn in the current year's grade?
- Are students ready for the next grade?
- And are they also ready for the grade after that?

So what's the big deal about that shift? Fundamentally, it requires that teachers relook at curriculum and instruction in a very different way than they have under previous assessment systems (TABS, TEAMS, TAAS, TAKS). Not only are teachers required to have a deep understanding of the content of the grade level they are teaching, but they must also be firmly grounded in how the content of that current grade level prepares students for subsequent grade levels. Overemphasis on grade level attainment ONLY may create a context where teachers in subsequent grade levels have to reteach foundational skills to accommodate for the gap created by the lack of appropriate emphasis earlier. It may require students "unlearn" previous ways of conceptualizing content and essentially start all over.

STAAR: focus, clarity, depth

[The TEKS] are designed to prepare students to succeed in college, in careers and to compete globally. However, consistent with a growing national consensus regarding the need to provide a more clearly articulated K–16 education program that focuses on fewer skills and addresses those skills in a deeper manner (TEA).

STAAR is designed around three concepts: focus, clarity, and depth:

Focus: STAAR will focus on grade level standards that are critical for that grade level and the ones to follow.

Clarity: STAAR will assess the eligible TEKS at a level of specificity that allow students to demonstrate mastery.

Depth: STAAR will assess the eligible TEKS at a higher cognitive level and in novel contexts.

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STAAR: the assessed curriculum – readiness, supporting, and process standards

A key concept that underpins the design of STAAR is that all standards (TEKS) do not play the same role in student learning. Simply stated, some standards (TEKS) have greater priority than others – they are so vital to the current grade level or content area that they must be learned to a level of mastery to ensure readiness (success) in the next grade levels. Other standards are important in helping to support learning, to maintain a previously learned standard, or to prepare students for a more complex standard taught at a later grade.

By assessing the TEKS that are most critical to the content area in a more rigorous ways, STAAR will better measure the academic performance of students as they progress from elementary to middle to high school. Based on educator committee recommendations, for each grade level or course, TEA has identified a set of readiness standards - the TEKS which help students develop deep and enduring understanding of the concepts in each content area. The remaining knowledge and skills are considered supporting standards and will be assessed less frequently, but still play a very important role in learning.

Readiness standards have the following characteristics:

- They are essential for success in the current grade or course.
- They are important for preparedness for the next grade or course.
- They support college and career readiness.
- They necessitate in-depth instruction.
- They address broad and deep ideas.

Supporting standards have the following characteristics:

- Although introduced in the current grade or course, they may be emphasized in a subsequent year.
- Although reinforced in the current grade or course, they may be emphasized in a previous year.
- They play a role in preparing students for the next grade or course but not a central role.
- They address more narrowly defined ideas.

STAAR assesses the eligible TEKS at the level at which the TEKS were written.

STAAR is a more rigorous assessment than TAKS (and TAAS, TEAMS, TABS before that). The level of rigor is connected with the cognitive level identified in the TEKS themselves. Simply stated, STAAR will measure the eligible TEKS at the level at which they are written.

The rigor of items will be increased by
- assessing content and skills at a greater depth and higher level of cognitive complexity
- assessing more than one student expectation in a test item

The rigor of the tests will be increased by
- assessing fewer, yet more focused student expectations and assessing them multiple times and in more complex ways
- including a greater number of rigorous items on the test, thereby increasing the overall test difficulty

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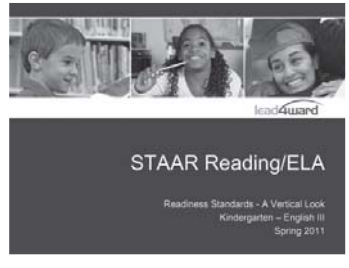
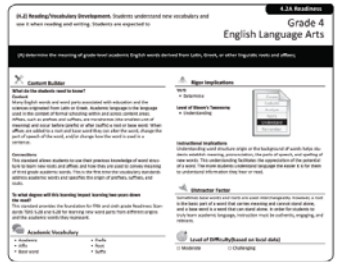
About the STAAR Field Guide

The STAAR Field Guide for Teachers is designed as a tool to help teachers prepare for instruction. The tools and resources in this guide are designed to supplement local curriculum documents by helping teachers understand how the design and components of STAAR are connected to the scope and sequence of instruction. In order to help students attain even higher levels of learning as assessed on STAAR, teachers need to plan for increasing levels of rigor. This guide contains the following components:

STAAR Grade Level Snapshot – one page overview of the standards assessed on STAAR, how those standards are classified (readiness, supporting, or process), the reporting categories around which those standards are clustered, and the number of items that will be on the test from each reporting category and from each type of standard.



STAAR Readiness Standards: A Vertical Look – a vertical look at the readiness standards in grade bands to show the progression of the assessment between grade levels



STAAR Readiness and Supporting Standards Analysis Sheets– overviews of the nature of each readiness and supporting standard assessed on STAAR, designed to be used in planning to build teacher content knowledge and ensure that current grade level instruction reinforces previous learning and prepares students for future grade levels.

STAAR-Curriculum Planning Worksheet – a tool to organize the pages in this guide to be used in planning and professional development

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Steps to Success

1. Download the TEA Documents to add to your STAAR Teacher Field Guide
   - STAAR Blueprint
   - Assessed Curriculum Documents
   - STAAR Test Design
   - STAAR Reference Materials

2. Review the STAAR Snapshot for your course/grade level and content area
   - Note the readiness standards
   - With your team, explore why those TEKS are classified as readiness standards – which criteria do they meet
   - Review the supporting standards and note any that may have played a larger role on TAKS

3. Review the STAAR Readiness Standards: A Vertical Look
   - Discuss how the readiness standards connect between grade levels
   - Explore the specific differences between the aligned readiness standards at each grade level

4. Review the components of the STAAR Readiness and Supporting Standards Analysis Sheets
   - Use the samples on pages 6 and 7 to explore the analysis sheets
   - Add additional information based on the discussion on the team

5. Create STAAR-Curriculum Planning Packets for each unit or grading period
   - Collect either the Scope and Sequence document (if it includes the TEKS standards for each unit of instruction) OR Unit Plan documents (where the TEKS standards are bundled together into units of instruction)
   - The STAAR Field Guide is arranged by standard type (readiness or supporting) in numeric order of the standards. You may need to photocopy certain pages/standards if they are repeated throughout multiple units.
   - Use the scope and sequence or unit plan documents to identify the TEKS taught in each unit/grading period
   - Compile the STAAR Readiness and Supporting Standards Analysis Sheets that correspond to the TEKS each unit/grading period
   - After the pages/standards are sorted into their appropriate unit, create a method of organizing the documents (binder, folder, file, etc).

6. Plan for instruction
   - Collect the curriculum documents used for planning
   - Use the STAAR- Curriculum Planning Worksheet as you plan each unit. The worksheet provides guiding questions and reflection opportunities to aide you in maximizing the material in the STAAR Field Guide.
   - Determine where the team needs additional learning
   - Evaluate instructional materials
   - Review the plan for appropriate levels of rigor

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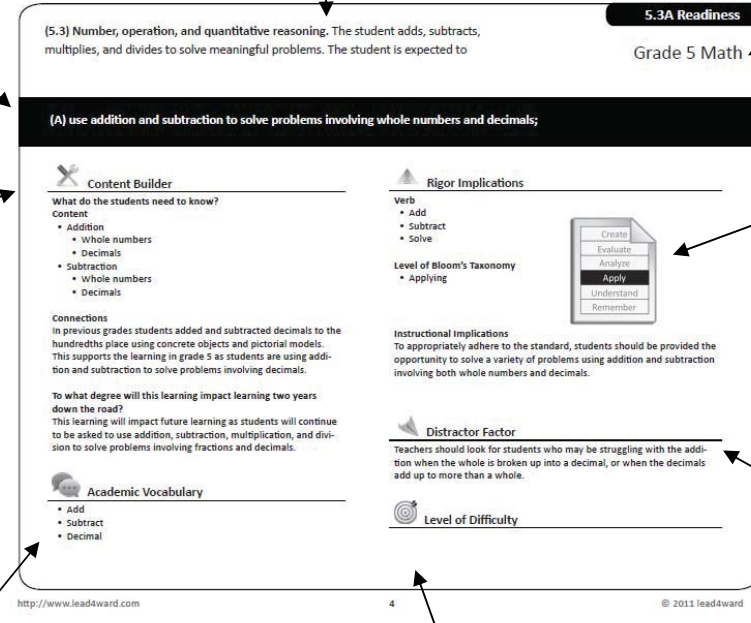
How to read
STAAR Readiness Standards analysis pages

Standard and Indication of "Readiness" or "Supporting"

Texas Essential Knowledge and Skills Statement

Student Expectation

Grade and Subject



Content Builder- The basics of the content within the standard are extracted in a bulleted list. Connections to prior learning/other standards are explained. Future implications of mastery of this standard are described to assist in understanding the impact of this learning in the future.

Rigor Implications- Uses the verb(s) from the Student Expectation to indicate the cognitive complexity of the standard and which level of Bloom's Taxonomy should be addressed during instruction, Instructional implications are also highlighted.

Distractor Factor - Alerts teachers to areas where students traditionally struggle, have misconceptions, or may need reinforcement.

Academic Vocabulary- Vocabulary words are extracted directly from the standard and/or associated with the instruction of the content within the standard.

Level of Difficulty- Standards are labeled either Challenging or Moderate. This determination is made by the campus using previous year data.

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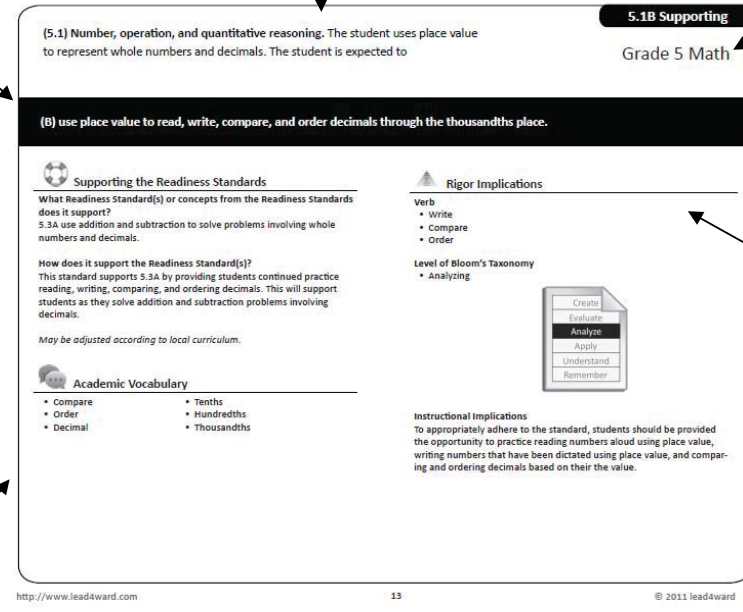
How to read
STAAR Supporting Standards analysis pages

Standard and Indication of "Readiness" or "Supporting"

Texas Essential Knowledge and Skills Statement

Student Expectation

Grade and Subject


5.1B Supporting

(5.1) Number, operation, and quantitative reasoning. The student uses place value to represent whole numbers and decimals. The student is expected to

Grade 5 Math

(B) use place value to read, write, compare, and order decimals through the thousandths place.

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
5.3A use addition and subtraction to solve problems involving whole numbers and decimals.

How does it support the Readiness Standard(s)?
This standard supports 5.3A by providing students continued practice reading, writing, comparing, and ordering decimals. This will support students as they solve addition and subtraction problems involving decimals.

May be adjusted according to local curriculum.

Academic Vocabulary

- Compare
- Order
- Decimal
- Tenths
- Hundredths
- Thousandths

Rigor Implications

Verb
- Write
- Compare
- Order

Level of Bloom's Taxonomy
- Analyzing

Create
Evaluate
Analyze
Apply
Understand
Remember

Instructional Implications
To appropriately adhere to the standard, students should be provided the opportunity to practice reading numbers aloud using place value, writing numbers that have been dictated using place value, and comparing and ordering decimals based on their the value.

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Supporting the Readiness Standards - Most supporting standards support a readiness standard in the current grade level. This section discusses the relationships of the standards that are often taught together.

Rigor Implications- Uses the verb(s) from the Student Expectation to indicate the cognitive complexity of the standard and which level of Bloom's Taxonomy should be addressed during instruction, Instructional implications are also highlighted.

Academic Vocabulary- Words are extracted directly from the standard and/or associated with the instruction of the content within the standard.

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Curriculum – STAAR Planning Worksheet

Course/Grade Level _____

Content Area _____

Grading Period/Unit _____

Readiness Standards	
Supporting Standards	

Action Steps	Guiding Questions & Notes
Read each analysis page.	What stands out? How many of the standards are a "Challenging" level of difficulty? How many of the standards are a high level of rigor (above apply on Bloom's Taxonomy)?
Content Builder (Readiness Standards only)	What other connections could you add to this section? Write them on your analysis pages! This content important for students' future learning. How will you assess retention?
Supporting the Readiness Standards (Supporting Standards only)	How can you use this information as you plan lessons? Do the supporting standards match with the readiness standards in your unit bundle? If not, arrange them according to your curriculum. Address the questions again "Which Readiness Standards does it support? How does it support the Readiness Standard(s)?"

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Action Steps	Guiding Questions & Notes
Vocabulary	What strategies will you use to ensure mastery of the vocabulary for each standard in this unit? What is your plan if students do not master the vocabulary?
Use the *Distractor Factor*	How can you address the information in the Distractor Factor section? From your teaching experience, is there anything you would add to this? Write it on your analysis pages!
Reflection	How have you taught this content in the past? How will you teach it differently this year? How will you utilize the readiness and supporting standards for formative and summative assessment?

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STAAR Standards Snapshot - Biology

Reporting Category	# of Items	Readiness Standards	Supporting Standards
1 Cell Structure and Function	11	B.4.B investigate and explain cellular processes, including homeostasis, energy conversions, transport of molecules, and synthesis of new molecules B.4.C compare the structures of viruses to cells, describe viral reproduction, and describe the role of viruses in causing diseases such as human immunodeficiency virus (HIV) and influenza B.5.A describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms B.9.A compare the structures and functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids	B.4.A compare and contrast prokaryotic and eukaryotic cells B.5.B examine specialized cells, including roots, stems, and leaves of plants; and animal cells such as blood, muscle, and epithelium B.5.C describe the roles of DNA, ribonucleic acid (RNA), and environmental factors in cell differentiation B.5.D recognize that disruptions of the cell cycle lead to diseases such as cancer B.9.D analyze and evaluate the evidence regarding formation of simple organic molecules and their organization into long complex molecules having information such as the DNA molecule for self-replicating life
2 Mechanisms of Genetics	11	B.6.A identify components of DNA, and describe how information for specifying the traits of an organism is carried in the DNA B.6.E identify and illustrate changes in DNA and evaluate the significance of these changes B.6.F predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses and non-Mendelian inheritance	B.6.B recognize that components that make up the genetic code are common to all organisms B.6.C explain the purpose and process of transcription and translation using models of DNA and RNA B.6.D recognize that gene expression is a regulated process B.6.G recognize the significance of meiosis to sexual reproduction B.6.H describe how techniques such as DNA fingerprinting, genetic modifications, and chromosomal analysis are used to study the genomes of organisms
3 Biological Evolution and Classification	10	B.7.A analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies, including anatomical, molecular, and developmental B.7.E analyze and evaluate the relationship of natural selection to adaptation and to the development of diversity in and among species B.8.B categorize organisms using a hierarchical classification system based on similarities and differences shared among groups	B.7.B analyze and evaluate scientific explanations concerning any data of sudden appearance, stasis, and sequential nature of groups in the fossil record B.7.C analyze and evaluate how natural selection produces change in populations, not individuals B.7.D analyze and evaluate how the elements of natural selection, including inherited variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental resources, result in differential reproductive success B.7.F analyze and evaluate the effects of other evolutionary mechanisms, including genetic drift, gene flow, mutation, and recombination B.7.G analyze and evaluate scientific explanations concerning the complexity of the cell B.8.A define taxonomy and recognize the importance of a standardized taxonomic system to the scientific community B.8.C compare characteristics of taxonomic groups, including archaea, bacteria, protists, fungi, plants, and animals
4 Biological Processes and Systems	11	B.10.A describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals B.10.B describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants	B.9.B compare the reactants and products of photosynthesis and cellular respiration in terms of energy and matter B.9.C identify and investigate the role of enzymes B.10.C analyze the levels of organization in biological systems and relate the levels to each other and to the whole system B.11.A describe the role of internal feedback mechanisms in the maintenance of homeostasis
5 Interdependence within Environmental Systems	11	B.11.D describe how events and processes that occur during ecological succession can change populations and species diversity B.12.A interpret relationships, including predation, parasitism, commensalism, mutualism, and competition among organisms B.12.C analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids B.12.F describe how environmental change can impact ecosystem stability	B.11.B investigate and analyze how organisms, populations, and communities respond to external factors B.11.C summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems B.12.B compare variations and adaptations of organisms in different ecosystems B.12.D recognize that long-term survival of species is dependent on changing resource bases that are limited B.12.E describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles
Total Items	54	32-25 test questions from Readiness Standards	19-22 test questions from Supporting Standards

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Scientific Process Skills			
Scientific Process Skills	≥ 40% of Items will be dual coded ≈ 22 items will be dual coded	B.1.A	demonstrate safe practices during laboratory and field investigations
		B.1.B	demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials
		B.2.A	know the definition of science and understand that it has limitations, as specified in chapter 112.34, subsection (b)(2) of 19 TAC
		B.2.B	know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories
		B.2.C	know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;
		B.2.D	distinguish between scientific hypotheses and scientific theories
		B.2.E	plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology
		B.2.F	collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, gel electrophoresis apparatuses, micropipettors, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, cameras, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures
		B.2.G	analyze, evaluate, make inferences, and predict trends from data
		B.2.H	communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports
		B.3.A	in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student
		B.3.B	communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials
		B.3.C	draw inferences based on data related to promotional materials for products and services
		B.3.D	evaluate the impact of scientific research on society and the environment
		B.3.E	evaluate models according to their limitations in representing biological objects or events
		B.3.F	research and describe the history of biology and contributions of scientists

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Science STAAR Readiness Standards - A Side-by-Side Look (High School)

REVISED 02.23.11

Reporting Category	Biology Readiness Standards	
1 Cell Structure and Function	B.4.B	investigate and explain cellular processes, including homeostasis, energy conversions, transport of molecules, and synthesis of new molecules
	B.4.C	compare the structures of viruses to cells, describe viral reproduction, and describe the role of viruses in causing diseases such as human immunodeficiency virus (HIV) and influenza
	B.5.A	describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms
	B.9.A	compare the structures and functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids
2 Mechanisms of Genetics	B.6.A	identify components of DNA, and describe how information for specifying the traits of an organism is carried in the DNA
	B.6.E	identify and illustrate changes in DNA and evaluate the significance of these changes
	B.6.F	predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses and non-Mendelian inheritance
3 Biological Evolution and Classification	B.7.A	analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies, including anatomical, molecular, and developmental
	B.7.E	analyze and evaluate the relationship of natural selection to adaptation and to the development of diversity in and among species
	B.8.B	categorize organisms using a hierarchical classification system based on similarities and differences shared among groups

Reporting Category	Chemistry Readiness Standards	
1 Matter and the Periodic Table	C.4.A	differentiate between physical and chemical changes and properties
	C.4.D	classify matter as pure substances or mixtures through investigation of their properties
	C.5.B	use the Periodic Table to identify and explain the properties of chemical families, including alkali metals, alkaline earth metals, halogens, noble gases, and transition metals
	C.5.C	use the Periodic Table to identify and explain periodic trends, including atomic and ionic radii, electronegativity, and ionization energy
2 Atomic Structure and Nuclear Chemistry	C.6.E	express the arrangement of electrons in atoms through electron configurations and Lewis valence electron dot structures
	C.12.B	describe radioactive decay process in terms of balanced nuclear equations
3 Bonding and Chemical Reactions	C.7.A	name ionic compounds containing main group or transition metals, covalent compounds, acids, and bases, using International Union of Pure and Applied Chemistry (IUPAC) nomenclature rules
	C.7.B	write the chemical formulas of common polyatomic ions, ionic compounds containing main group or transition metals, covalent compounds, acids
	C.7.C	construct electron dot formulas to illustrate ionic and covalent bonds
	C.8.B	use the mole concept to calculate the number of atoms, ions, or molecules in a sample of material
	C.8.D	use the law of conservation of mass to write and balance chemical equations

Reporting Category	Physics Readiness Standards	
1 Force and Motion	P.4.A	generate and interpret graphs and charts describing different types of motion, including the use of real-time technology such as motion detectors or photogates
	P.4.B	describe and analyze motion in one dimension using equations with the concepts of distance, displacement, speed, average velocity, instantaneous velocity, and acceleration
	P.4.D	calculate the effect of forces on objects, including the law of inertia, the relationship between force and acceleration, and the nature of force pairs between objects
2 Gravitational, Electrical, Magnetic, and Nuclear Forces	P.5.B	describe and calculate how the magnitude of the gravitational force between two objects depends on their masses and the distance between their centers
	P.5.F	design, construct, and calculate in terms of current through, potential difference across, resistance of, and power used by electric circuit elements connected in both series and parallel combinations
3 Momentum and Energy	P.6.A	investigate and calculate quantities using the work-energy theorem in various situations
	P.6.B	investigate examples of kinetic and potential energy and their transformations
	P.6.C	calculate the mechanical energy of, power generated within, impulse applied to, and momentum of a physical system
	P.6.D	demonstrate and apply the laws of conservation of energy and conservation of momentum in one dimension

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Science STAAR Readiness Standards - A Side-by-Side Look (High School)

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Reporting Category	Biology Readiness Standards	
4 Biological Processes and Systems	B.10.A	describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals
	B.10.B	describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants
5 Interdependence within Environmental Systems	B.11.D	describe how events and processes that occur during ecological succession can change populations and species diversity
	B.12.A	interpret relationships, including predation, parasitism, commensalism, mutualism, and competition among organisms
	B.12.C	analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids
	B.12.F	describe how environmental change can impact ecosystem stability

Reporting Category	Chemistry Readiness Standards	
4 Gases and Thermochemistry	C.9.A	describe and calculate the relations between volume, pressure, number of moles, and temperature for an ideal gas as described by Boyle's law, Charles' law, Avogadro's law, Dalton's law of partial pressure, and the ideal gas law
	C.11.C	use thermochemical equations to calculate energy changes that occur in chemical reactions and classify reactions as exothermic or endothermic
5 Solutions	C.10.B	develop and use general rules regarding solubility through investigations with aqueous solutions
	C.10.E	distinguish between types of solutions such as electrolytes and nonelectrolytes and unsaturated, saturated, and supersaturated solutions
	C.10.F	investigate factors that influence solubilities and rates of dissolution such as temperature, agitation, and surface area
	C.10.H	understand and differentiate among acid-base reactions, precipitation reactions, and oxidation-reduction reactions

Reporting Category	Physics Readiness Standards	
4 Waves and Quantum Phenomena	P.7.B	investigate and analyze characteristics of waves, including velocity, frequency, amplitude, and wavelength, and calculate using the relationship between wavespeed, frequency, and wavelength
	P.7.D	investigate behaviors of waves, including reflection, refraction, diffraction, interference, resonance, and the Doppler effect
	P.8.A	describe the photoelectric effect and the dual nature of light

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Science STAAR Readiness Standards - A Side-by-Side Look (High School)

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Biology Scientific Process Skills	
B.1.A	demonstrate safe practices during laboratory and field investigations
B.1.B	demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials
B.2.A	know the definition of science and understand that it has limitations, as specified in chapter 112.34, subsection (b)(2) of 19 TAC
B.2.B	know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories
B.2.C	know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;
B.2.D	distinguish between scientific hypotheses and scientific theories
B.2.E	plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology
B.2.F	collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, gel electrophoresis apparatuses, micropipettors, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, cameras, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures
B.2.G	analyze, evaluate, make inferences, and predict trends from data
B.2.H	communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports
B.3.A	in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student
B.3.B	communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials
B.3.C	draw inferences based on data related to promotional materials for products and services
B.3.D	evaluate the impact of scientific research on society and the environment
B.3.E	evaluate models according to their limitations in representing biological objects or events
B.3.F	research and describe the history of biology and contributions of scientists

Chemistry Scientific Process Skills	
C.1.A	demonstrate safe practices during laboratory and field investigations, including the appropriate use of safety showers, eyewash fountains, safety goggles, and fire extinguishers
C.1.B	know specific hazards of chemical substances such as flammability, corrosiveness, and radioactivity as summarized on the Material Safety Data Sheets (MSDS)
C.1.C	demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials
C.2.A	know the definition of science and understand that it has limitations, as specified in chapter 112.35, subsection (b)(2) of 19 TAC
C.2.B	know that scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories
C.2.C	know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but may be subject to change as new areas of science and new technologies are developed;
C.2.D	distinguish between scientific hypotheses and scientific theories
C.2.E	plan and implement investigative procedures, including asking questions, formulating testable hypotheses, and selecting equipment and technology, including graphing calculators, computers and probes, sufficient scientific glassware such as beakers, Erlenmeyer flasks, pipettes, graduated cylinders, volumetric flasks, safety goggles, and burettes, electronic balances, and an adequate supply of consumable chemicals
C.2.F	collect data and make measurements with accuracy and precision
C.2.G	express and manipulate chemical quantities using scientific conventions and mathematical procedures, including dimensional analysis, scientific notation, and significant figures
C.2.H	organize, analyze, evaluate, make inferences, and predict trends from data
C.2.I	communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphs, journals, summaries, oral reports, and technology-based reports
C.3.A	in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student
C.3.B	communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials
C.3.C	draw inferences based on data related to promotional materials for products and services
C.3.D	evaluate the impact of research on scientific thought, society, and the environment
C.3.E	describe the connection between chemistry and future careers
C.3.F	research and describe the history of chemistry and contributions of scientists

Physics Scientific Process Skills	
P.1.A	demonstrate safe practices during laboratory and field investigations
P.1.B	demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials
P.2.A	know the definition of science and understand that it has limitations, as specified in chapter 112.39, subsection (b)(2) of 19 TAC
P.2.B	know that scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories
P.2.C	know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but may be subject to change as new areas of science and new technologies are developed
P.2.D	distinguish between scientific hypotheses and scientific theories
P.2.E	design and implement investigative procedures, including making observations, asking well-defined questions, formulating testable hypotheses, identifying variables, selecting appropriate equipment and technology, and evaluating numerical answers for reasonableness
P.2.F	demonstrate the use of course apparatus, equipment, techniques, and procedures, including multimeters (current, voltage, resistance), triple beam balances, batteries, clamps, dynamics demonstration equipment, collision apparatus, data acquisition probes, discharge tubes with power supply (H, He, Ne, Ar), hand-held visual spectroscopes, hot plates, slotted and hooked lab masses, bar magnets, horseshoe magnets, plane mirrors, convex lenses, pendulum support, power supply, ring clamps, ring stands, stopwatches, trajectory apparatus, tuning forks, carbon paper, graph paper, magnetic compasses, polarized film, prisms, protractors, resistors, friction blocks, mini lamps (bulbs) and sockets, electrostatics kits, 90-degree rod clamps, metric rulers, spring scales, knife blade switches, Celsius thermometers, meter sticks, scientific calculators, graphing technology, computers, cathode ray tubes with horseshoe magnets, ballistic carts or equivalent, resonance tubes, spools of nylon thread or string, containers of iron filings, rolls of white craft paper, copper wire, Periodic Table, electromagnetic spectrum charts, slinky springs, wave motion ropes, and laser pointers
P.2.G	use a wide variety of additional course apparatus, equipment, techniques, materials, and procedures as appropriate such as ripple tank with wave generator, wave motion rope, micrometer, caliper, radiation monitor, computer, ballistic pendulum, electroscope, inclined plane, optics bench, optics kit, pulley with table clamp, resonance tube, ring stand screen, four-inch ring, stroboscope, graduated cylinders, and ticker timer
P.2.H	make measurements with accuracy and precision and record data using scientific notation and International System (SI) units
P.2.I	identify and quantify causes and effects of uncertainties in measured data
P.2.J	organize and evaluate data and make inferences from data, including the use of tables, charts, and graphs
P.2.K	communicate valid conclusions supported by the data through various methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports
P.2.L	express and manipulate relationships among physical variables quantitatively, including the use of graphs, charts, and equations
P.3.A	in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student
P.3.B	communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials
P.3.C	draw inferences based on data related to promotional materials for products and services
P.3.D	explain the impacts of the scientific contributions of a variety of historical and contemporary scientists on scientific thought and society
P.3.E	research and describe the connections between physics and future careers
P.3.F	express and interpret relationships symbolically in accordance with accepted theories to make predictions and solve problems mathematically, including problems requiring proportional reasoning and graphical vector addition

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

Biology

(B) investigate and explain cellular processes, including homeostasis, energy conversions, transport of molecules, and synthesis of new molecules

Content Builder

What do the students need to know?
Content

- Just like the human body, cells must carry out many functions to survive. These functions include reproduction, transport of nutrients and waste products, production and use of energy, and communication.
- Understand the importance of cellular processes and the cellular structures that are involved in each process.
- Each part of the cell is designed to complete specific functions. The structure of the part is directly related to its function.
- Homeostasis is the ability of the cell to regulate itself and maintain the cell's equilibrium so that it functions to the best of its ability. An example of homeostasis in cells is osmotic balance.

Connections
Cells are introduced to students in 6th grade. At that time they study the parts of cells and are introduced to the concept of structure and function in relation to cells.
In 7th grade, students learned to differentiate between structure and function of plant and animal cell organelles and that similar functions occur at all levels of organization in living systems.

To what degree will this learning impact learning two years down the road?
Link to The Career and College Readiness Standards:
• VI Biology - F Systems and homeostasis
1. Know that organisms possess various structures and processes (feedback loops) that maintain steady internal conditions.
2. Describe, compare, and contrast structures and processes that allow gas exchange, nutrient uptake and processing, waste excretion, nervous and hormonal regulation, and reproduction in plants, animals, and fungi; give examples of each.

Academic Vocabulary

- Homeostasis
- Feedback loops

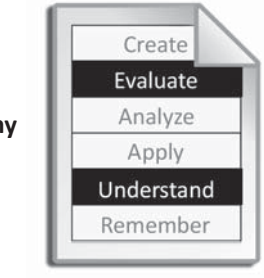
Rigor Implications

Verb

- Investigate
- Explain

Level of Bloom's Taxonomy

- Evaluating
- Understanding



Instructional Implications
A unit of instruction built around cellular processes should include standards related to cellular structure and function. The unit may include a number of standards that build on the overall concept of cellular structure and function, but these standards will be focused on more specifically in future units.

Distractor Factor

The instructor could pose questions related to a variety of cellular processes. Students might be asked about particular cell structures involved in the process and other structures might be listed as distractors.

Level of Difficulty (based on local data)

□ Moderate □ Challenging

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

Biology

(C) compare the structures of viruses to cells, describe viral reproduction, and describe the role of viruses in causing diseases such as human immunodeficiency virus (HIV) and influenza.

Content Builder

What do the students need to know?
Content

- Basic structures of a virus include a capsid, protein coat, envelope, and DNA or RNA.
- Viruses reproduce by taking over normal healthy cells and injecting their genomes into the cells.
- A given type of virus can only take over or infect specific types of cells.

Connections

To what degree will this learning impact learning two years down the road?
Link to The Career and College Readiness Standards:
• VI. Biology A. Structure and function of cells
1. Know that although all cells share basic features, cells differentiate to carry out specialized functions.
3. Describe the structure and function of major sub-cellular organelles.

Academic Vocabulary

- Capsid
- Envelope
- Nucleic acid
- DNA
- RNA
- Genome

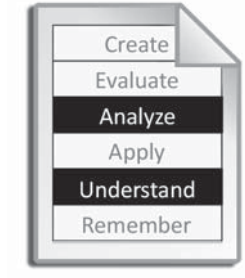
Rigor Implications

Verb

- Compare
- Describe

Level of Bloom's Taxonomy

- Analyzing
- Understanding



Instructional Implications
The study of viruses in new to the students and instruction should include the students making comparisons of the structures of viruses to the structures of cells, which they have studied since 6th grade. Students should also have opportunities to describe the role of viruses in causing diseases.
This is the only standard related to viruses. It could fit into a unit of instruction on cellular structure or could be put with a unit with microorganisms and focus on how viruses cause disease.

Distractor Factor

Questions on viruses could include diagrams of a virus with its surface markers and diagrams of cells with receptor sites. Distractors may be close but will not match the surface markers of the virus.

Level of Difficulty (based on local data)

☐ Moderate ☐ Challenging

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(B.5) Science concepts. The student knows how an organism grows and the importance of cell differentiation. The student is expected to

Biology

(A) describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms;

Content Builder

What do the students need to know?
Content

- The cell cycle is a set of stages; G0 phase or resting phase, G1 phase or growth phase, S phase or synthesis, G2 phase and M phase or mitosis.
- Interphase consists of the G1, S, and G2 phases
- During G1; cells increase in size.
- During S; DNA replication it taking place.
- G2; the gap between DNA synthesis and mitosis, the cell continues to grow in size, the cell prepares for mitosis
- M; the cell's chromosomes are divided into two daughter cells, cytokinesis takes place and the cell divides in half forming two new cells.
- Understand how the process of mitosis is related to the growth of the organism.

Connections

To what degree will this learning impact learning two years down the road?
Link to The Career and College Readiness Standards:
• VI. Biology A. Structure and function of cells
4. Describe the major features of mitosis and relate this process to growth and asexual reproduction
5. Understand the process of cytokinesis in plant and animal cells and how this process is related to growth.

Academic Vocabulary

- Deoxyribonucleic Acid (DNA)
- Cytokinesis
- Chromosome
- Mitosis

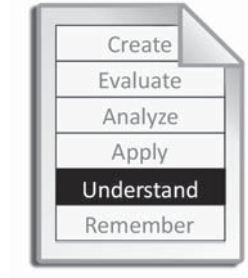
Rigor Implications

Verb

- Describe

Level of Bloom's Taxonomy

- Understanding



Instructional Implications
Students need to be given the opportunity to model and describe each of the stages of the cell cycle. The processes of mitosis and meiosis should be taught in units very close to each other so that the students get an opportunity to compare the two different processes and still relate each one specifically to its function.

Distractor Factor

Students often memorize the stages without developing a thorough understanding of what is taking place during each stage. Additionally, they often confuse the processes of mitosis and meiosis.

Level of Difficulty (based on local data)

□ Moderate □ Challenging

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(B.9) Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. The student is expected to

Biology

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

Content Builder

What do the students need to know?
Content

- Biomolecules are organic molecules that are made up of carbon, hydrogen, nitrogen, oxygen, and sometimes phosphorus.
- Carbohydrates are made up of only carbon, hydrogen, and oxygen. Carbohydrates store energy, add structure to organisms (cellulose), and play a role in DNA and RNA.
- Proteins are made up of chains of amino acids that can be used to make the proteins that the body needs to maintain muscles, bones, and other body organs. Proteins control structure and metabolism of cells.
- DNA controls syntheses of several types of RNA. RNA molecules work with proteins to synthesize new proteins.
- Students should be able to relate the major role of carbohydrates, lipids, proteins, and nucleic acids to the biological structure and metabolism of the organism.

Connections

To what degree will this learning impact learning two years down the road?
Link to The Career and College Readiness Standards:
• VI. Biology B. Biochemistry
1. Understand the major categories of biological molecules: lipids, carbohydrates, proteins, and nucleic acids.
• VII. Chemistry – J. Basic structure and function of biological molecules: proteins, carbohydrates, lipids, and nucleic acids
1. Understand the major categories of biological molecules: proteins, carbohydrates, lipids, and nucleic acids.

Academic Vocabulary

- Biomolecules
- Carbohydrates
- Lipids
- Proteins
- Nucleic acids

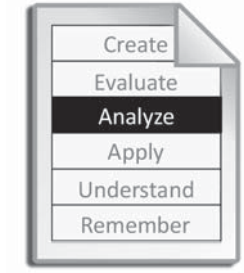
Rigor Implications

Verb

- Compare

Level of Bloom's Taxonomy

- Analyzing



Instructional Implications
A unit of instruction focused on biochemistry should include the concepts of the structure and function of biomolecules from Biology 9A, the formation of simple and complex organic molecules in Biology 9D, and the role of enzymes in Biology 9C.

Distractor Factor

The large molecular chains associated with organic molecules can make many of the molecules resemble each other. Students may be asked to identify a particular biomolecule from the written formulas or written chains. The distracters may include other elements or be completely different biomolecules.

Level of Difficulty (based on local data)

□ Moderate □ Challenging

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(B.6) Science concepts. The student knows the mechanisms of genetics, including the role of nucleic acids and the principles of Mendelian Genetics. The student is expected to

Biology

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

Content Builder

What do the students need to know?
Content

- Structure of a DNA molecule, including shape, hydrogen bonds, and phosphodiester bonds.
- Structure of nucleotides, including phosphate group, dexoyribose sugar, and nitrogen base.
- Base paring rules.
- DNA is a nucleic acid that contains all genetic instructions for a given organism.
- One gene corresponds to only one polypeptide.
- The process of DNA replication.
- Describe using words and illustrations the molecular structure of DNA and RNA and the process for DNA replication.

Connections
7th grade 7.14C expects the students to recognize that inherited traits are governed in the genetic material found in the genes within chromosomes in the nucleus.

To what degree will this learning impact learning two years down the road?
Link to The Career and College Readiness Standards:
• VI. Biology D. Molecular genetics and heredity
3. Understand the molecular structures and functions of nucleic acids.

Academic Vocabulary

- Traits
- Hydrogen bonds
- Phosphate group
- Dexoyribose sugar
- Nitrogen base
- Replication
- DNA
- RNA
- Codons

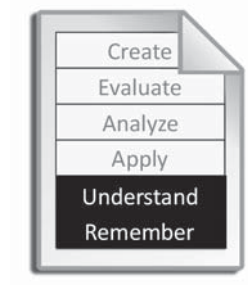
Rigor Implications

Verb

- Identify
- Describe

Level of Bloom's Taxonomy

- Remembering
- Understanding



Instructional Implications
A unit of instruction on genetics should include many of the student expectations in the Biology TEKS 6. Many of these student expectations can be combined so that students get the complete picture of genetics, including: the components of DNA and its role in specifying traits, the genetic code that is common to all organisms, transcription and translation, the regulated process of gene expression, changes that can occur in DNA and what those changes can mean to an organism, the use of Punnett squares to predict various genetic combinations including monohybrid and dihybrid cross and non-Mendelian inheritance.

Distractor Factor

A complementary strand of DNA may not follow the base paring rules. Uracil may be used for a DNA sequence when uracil is only found in RNA strands.

Level of Difficulty (based on local data)

□ Moderate □ Challenging

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(B.6) Science concepts. The student knows the mechanisms of genetics, including the role of nucleic acids and the principles of Mendelian Genetics. The student is expected to

Biology

(E) identify and illustrate changes in DNA and evaluate the significance of these changes;

Content Builder

What do the students need to know?
Content

- Changes in DNA are called mutations.
- Understand the causes of genetic disorders.
- Nondisjunction is when chromosomal pairs do not separate properly during cell division.

Connections

To what degree will this learning impact learning two years down the road?
Link to The Career and College Readiness Standards:
• V. Cross-Disciplinary Themes C. Change over time/equilibrium.
1. Recognize patterns of change.
• VI. Biology D. Molecular genetics and heredity
3. Understand the molecular structures and functions of nucleic acids.

Academic Vocabulary

- Mutations
- Nondisjunction

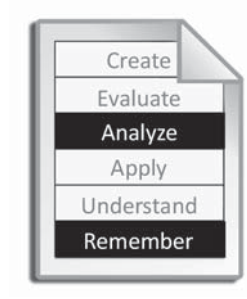
Rigor Implications

Verb

- Identify
- Illustrate

Level of Bloom's Taxonomy

- Remembering
- Analyzing



Instructional Implications
A unit of instruction on genetics should include many of the student expectations in the Biology TEKS 6. Many of these student expectations can combine so that students get the complete picture of genetics, including: the components of DNA and its role in specifying traits, the genetic code that is common to all organisms, transcription and translation, the regulated process of gene expression, changes that can occur in DNA and what those changes can mean to an organism, the use of Punnett squares to predict various genetic combinations including monohybrid and dihybrid cross and non-Mendelian inheritance.

Distractor Factor

Students may be asked to look at chromosome pairs and pick out one pair in which non-disjunction has occurred. The chromosome pairs may be different sizes and show only parts of the chromosomes.

Level of Difficulty (based on local data)

☐ Moderate ☐ Challenging

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(B.6) Science concepts. The student knows the mechanisms of genetics, including the role of nucleic acids and the principles of Mendelian Genetics. The student is expected to

Biology

(F) predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses and non-Mendelian inheritance

Content Builder

What do the students need to know?
Content

- Use Punnett squares to predict genetic outcomes of monohybrid crosses and dihybrid crosses.
- Genotypes predictions and phenotype ratios.
- Understand how incomplete dominance, co-dominance, and sex-linked traits fit into genotype predictions and phenotype ratios.
- Use the laws of Mendelian genetics.

Connections

To what degree will this learning impact learning two years down the road?
Link to The Career and College Readiness Standards:
• VI. Biology D. Molecular genetics and heredity
1. Understand Mendel's laws of inheritance.
2. Know modifications to Mendel's laws.

Academic Vocabulary

- Punnett squares
- Genotype
- Phenotype
- Incomplete dominance
- Co-dominance
- Sex-linked traits
- Principle of dominance
- Law of segregation
- Law of independent assortment

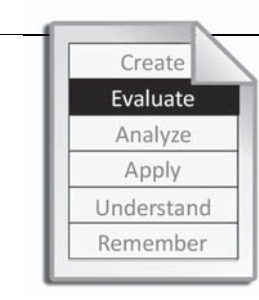
Rigor Implications

Verb

- Predict

Level of Bloom's Taxonomy

- Evaluating



Instructional Implications
Students need many opportunities to use Punnett squares to make predictions of genotypes and calculate phenotype ratios in both monohybrid and dihybrid crosses.
A unit of instruction on genetics should include many of the student expectations in the biology TEKS 6. Many of these student expectations can combine so that students get the complete picture of genetics, including: the components of DNA and its role in specifying traits, the genetic code that is common to all organisms, transcription and translation, the regulated process of gene expression, changes that can occur in DNA and what those changes can mean to an organism, the use of Punnett squares to predict various genetic combinations including monohybrid and dihybrid cross and non-Mendelian inheritance.

Distractor Factor

Dihybrid crosses require a larger Punnett square with more combination possibilities. This gives the students many more opportunities to make an error in their final calculations.

Level of Difficulty (based on local data)

☐ Moderate ☐ Challenging

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(B.7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to

Biology

(A) analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies, including anatomical, molecular, and developmental;

Content Builder

What do the students need to know?
Content

- Fossil records are the preserved remains or impressions of organisms that lived in the past. There is a lot of information that can be found by the placement and number of fossils along the layers of sedimentary rock.
- Biogeography is simply the study of which organisms exist at what abundance in a certain geographical area. It tries to explain the patterns of species distribution within a given area.
- Homologies are similar structures between parts of different organisms.

To what degree will this learning impact learning two years down the road?
Link to The Career and College Readiness Standards:
• I. Nature of Science: Scientific Ways of Learning and Thinking A. Cognitive skills in science
2. Use creativity and insight to recognize and describe patterns in natural phenomena.
• VI. Biology C. Evolution and populations
1. Know multiple categories of evidence for evolutionary change and how this evidence is used to infer evolutionary relationships among organism.

Academic Vocabulary

- Biogeography
- Homologies

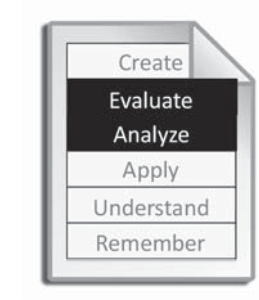
Rigor Implications

Verb

- Analyze
- Evaluate

Level of Bloom's Taxonomy

- Analyzing
- Evaluating



Instructional Implications
Students should be given opportunities to analyze and evaluate evidence found in fossil records, biogeography, and homologies. Students are expected to develop an understanding of these concepts at a high rigor. Instruction can include such things as research, debate, investigations, and essays or opinion papers.

This standard is usually combined with other standards into a unit of study on evolution.

Distractor Factor

Questions could involve extracting information from a diagram. The distracters can be information that cannot be extracted from the diagram or wrong information.

Level of Difficulty (based on local data)

☐ Moderate ☐ Challenging

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(B.7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to

Biology

(E) analyze and evaluate the relationship of natural selection to adaptation and to the development of diversity in and among species;

Content Builder

What do the students need to know?
Content

- Adaptation is a process where a population becomes better prepared to survive in a given habitat.
- Natural selection is a process where changes in a population occur from one generation to the next. These changes cause the organisms of the population to become better adapted to their habitat.
- Diversity relates to the variations of different organisms that can be successful in a given ecosystem.

Connections

To what degree will this learning impact learning two years down the road?
Link to The Career and College Readiness Standards:
• V. Cross-Disciplinary Themes C. Change over time/equilibrium.
1. Recognize patterns of change.
• VI. Biology C. Evolution and populations
2. Recognize variations in population sizes, including extinction, and describe mechanisms and conditions that produce these variations.

Academic Vocabulary

- Adaptation
- Natural selection
- Biodiversity
- Diversity
- Extinction

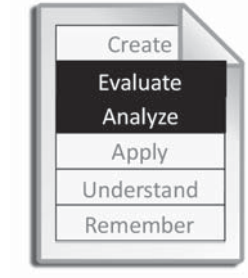
Rigor Implications

Verb

- Analyze
- Evaluate

Level of Bloom's Taxonomy

- Analyzing
- Evaluating



Instructional Implications
The mechanisms involved in adaptation, natural selection, and species diversity should be developed in a unit of instruction that relates to the concepts of evolution and revisited each time a unit of instruction involves the study of the structure and function of a group of organisms and the interrelationship of organisms with the environment. Students need to be able to see the patterns of change.

Distractor Factor

The instructor might choose to create multiple-choice questions that contain misleading options for answers. For example, one question might ask the student to select factors that might negatively affect an organism, and the distracting answer would list factors that would work in the organisms favor.

Level of Difficulty (based on local data)

☐ Moderate ☐ Challenging

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(B.8) Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made. The student is expected to

Biology

(B) categorize organisms using a hierarchical classification system based on similarities and differences shared among groups;

Content Builder

What do the students need to know?

Content

- The classification system of organisms is based on similarities and differences shared among groups.
- The number of Kingdoms in the classification system changes as new information and discoveries of new organisms are made. The most current classification system includes six Kingdoms; Archaeabacteria, Eubacteria, Protists, Fungi, Plants, and Animals.
- Understand the hierarchical classification system of organisms as they relate to domains, kingdoms, and the major phyla within the animal and plant kingdoms.
- Know the Linnaean system of classification, taxonomy of organisms, and alternative classification systems such as cladistics.

Connections

6th grade 6.12 requires students to recognize the taxonomic classification of organisms based on the domains.

To what degree will this learning impact learning two years down the road?

Link to The Career and College Readiness Standards:

• V. Cross-Disciplinary Themes D. Classification

1. Understand that scientists categorize things according to similarities and differences.

Academic Vocabulary

- Archaeabacteria
- Eubacteria
- Protists
- Fungi
- Plants
- Animals

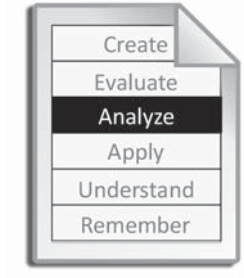
Rigor Implications

Verb

- Categorize

Level of Bloom's Taxonomy

- Analyzing



Instructional Implications

There are too many organisms for the students to be familiar with all the phyla in every kingdom. Make sure the students have a working knowledge of the characteristics of each kingdom and the major phyla for the plant and animal kingdoms.

This standard can be introduced in a unit of instruction on classification, where the students develop the overall picture of the classification system. It can then be revisited with units of study that each focus on one major classification of organisms such as plants, animals, and microorganisms.

Distractor Factor

Students often get caught up in the terminology of the naming system and can be easily distracted by the new terms.

Level of Difficulty (based on local data)

☐ Moderate ☐ Challenging

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(B.10) Science concepts. The student knows that biological systems are composed of multiple levels. The student is expected to

Biology

(A) describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals;

Content Builder

What do the students need to know?
Content

- The functions of regulation include interactions between the endocrine, excretory, and integumentary systems.
- The function of nutrient absorption includes interactions between the digestive, respiratory, cardiovascular, and circulatory systems.
- Reproduction is directed by the reproductive system, however many other systems and functions in the body need to interact for reproduction to occur successfully.
- Defenses require interactions by any number of systems, depending on the type of defense that it taking place.

Connections

To what degree will this learning impact learning two years down the road?
Link to The Career and College Readiness Standards:
• VI. Biology F. Systems and homeostasis
2. Describe, compare, and contrast structures and processes that allow gas exchange, nutrient uptake and processing, waste excretion, nervous and hormonal regulation, and reproduction in plants, animals, and fungi; give examples of each.

Academic Vocabulary

- Regulation
- Nutrient absorption
- Reproduction
- Defenses

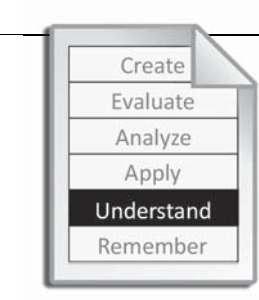
Rigor Implications

Verb

- Describe

Level of Bloom's Taxonomy

- Understanding



Instructional Implications
Instruction should include opportunities for students to develop an understanding of and describe to other students the processes of regulation, nutrient absorption, reproduction, and defense. This understanding should include which body systems interact to perform these functions and the role each system plays in each process.

This standard fits into a unit of instruction on animals. This unit can include the interactions of the systems of the body, regulation processes and homeostasis, classification and characteristics of animals, and animals' responses to external stimuli.

Distractor Factor

Students may be taught about several systems found in the bodies of animals, most of which interact to perform a function, and they will need to decide which system is not involved or less directly involved in that function.

Level of Difficulty (based on local data)

☐ Moderate ☐ Challenging

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(B.10) Science concepts. The student knows that biological systems are composed of multiple levels. The student is expected to

Biology

(B) describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants;

Content Builder

What do the students need to know?
Content

- Transport in plants can include the movement of water and nutrients within individual cells, from cell to cell, and the transport of the sap within the xylem and phloem.
- Transport can include the plant roots, stems, leaves, xylem, phloem, stoma, and guard cells.
- Reproduction in plants includes the flower (petals, carpel, stamen), seeds, pollen, and method of transport of pollen.
- Plants respond to the amount of light available (length of day), gravity, and temperature.
- Understand the interactions that occur among the systems of plants.

Connections

To what degree will this learning impact learning two years down the road?
Link to The Career and College Readiness Standards:
• VI. Biology F. Systems and homeostasis
2. Describe, compare, and contrast structures and processes that allow gas exchange, nutrient uptake and processing, waste excretion, nervous and hormonal regulation, and reproduction in plants, animals, and fungi; give examples of each.

Academic Vocabulary

- Transport
- Xylem
- Phloem
- Stoma
- Guard cells

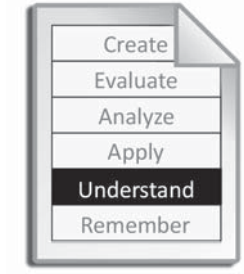
Rigor Implications

Verb

- Describe

Level of Bloom's Taxonomy

- Understanding



Instructional Implications
Instruction should include opportunities for students to develop an understanding of and describe to other students the processes of transport, reproduction, and response in plants. This understanding should include which plant systems interact to perform these functions and the role each system plays in each process.

This standard fits into a unit of instruction on plants. This unit can include the interactions of the systems of the plant, regulation processes, classification and characteristics of plants, and how plants respond to external stimuli.

Distractor Factor

Students may be taught about several systems found in plants, most of which interact to perform a function, and they will need to decide which system is not involved or less directly involved in that function.

Level of Difficulty (based on local data)

☐ Moderate ☐ Challenging

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(B.11) Science concepts. The student knows that biological systems work to achieve and maintain balance. The student is expected to

Biology

(D) describe how events and processes that occur during ecological succession can change populations and species diversity.

Content Builder

What do the students need to know?

Content

- Ecological succession is the gradual change in ecosystems over time.
- Primary succession.
- Secondary succession.

Connections

To what degree will this learning impact learning two years down the road?

Link to The Career and College Readiness Standards:

• V. Cross-Disciplinary Themes C. Change over time/equilibrium.

1. Recognize patterns of change.

• VI. Biology G. Ecology

4. Know the process of succession.

Academic Vocabulary

- Primary succession
- Secondary succession
- Populations
- Species diversity

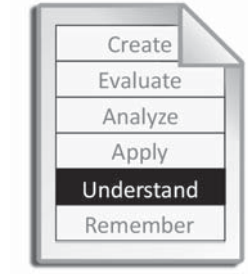
Rigor Implications

Verb

- Describe

Level of Bloom's Taxonomy

- Understanding



Instructional Implications

Students should study different examples of both primary and secondary succession so that they can understand the difference and how they contribute to changes in populations and species diversity.

This standard fits into a unit of instruction on ecology or environmental systems. This unit should include the interactions and interdependence that occur within environmental systems.

Distractor Factor

Students may be given several scenarios that represent ecosystems and asked to pick out the one that demonstrates primary or secondary succession. Distractors will be scenarios that demonstrate the type of succession the students were not asked to identify.

Level of Difficulty (based on local data)

☐ Moderate ☐ Challenging

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(B.12) Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to

Biology

(A) interpret relationships, including predation, parasitism, commensalism, mutualism, and competition among organisms;

Content Builder

What do the students need to know?

Content

- Relationships between organisms.
- Symbiotic relationships – parasitism, commensalism, mutualism.
- Community interactions – predator-prey relationships, competition.

Connections

Students studied the relationships between organisms as they occur in food webs in 8th grade.

To what degree will this learning impact learning two years down the road?

Link to The Career and College Readiness Standards:

• VI. Biology G. Ecology

2. Know patterns of energy flow and material cycling in Earth's ecosystems.

3. Understand typical forms of organismal behavior.

Academic Vocabulary

- Predation
- Parasitism
- Commensalism
- Mutualism
- Competition

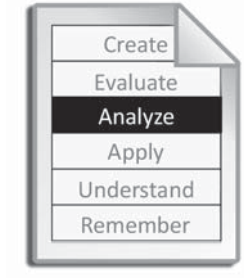
Rigor Implications

Verb

- Interpret

Level of Bloom's Taxonomy

- Analyzing



Instructional Implications

Students need to understand not only each type of relationship and interaction, but the balance in the ecosystem and the biodiversity that exists related to these relationships.

This standard fits into a unit of instruction on ecology or environmental systems. This unit should include the interactions and interdependence that occur within environmental systems. All of the student expectations in TEKS 12 play a role in the overall picture of interdependence and interactions in environmental systems and should be bundled into the same unit of instruction.

Distractor Factor

Relationships between a variety of organisms can be displayed in a diagram or a graph and students may be asked to label the type of relationship that exists between two organisms.

Level of Difficulty (based on local data)

☐ Moderate ☐ Challenging

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(B.12) Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to

Biology

(C) analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids;

Content Builder

What do the students need to know?

Content

- Trophic levels
- Autotrophs (producers)
- Heterotrophs (consumers) – primary, secondary, tertiary
- Herbivores, carnivores, omnivores, decomposers, detrivore

Connections

Food chains and food webs have been studied by students since elementary school.

To what degree will this learning impact learning two years down the road?

• V. Cross-Disciplinary Themes E. Measurements and models
1. Use models to make predictions.
• VI. Biology G. Ecology
2. Know patterns of energy flow and material cycling in Earth's ecosystems.

Academic Vocabulary

- Food web
- Food chain
- Ecological pyramid
- Trophic levels

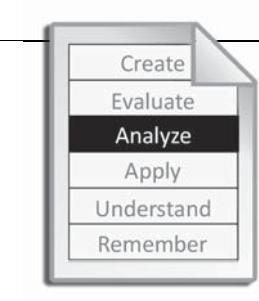
Rigor Implications

Verb

- Analyze

Level of Bloom's Taxonomy

- Analyzing



Instructional Implications

Instruction should include opportunities to create models of food chains, food webs, and ecological pyramids. Students should analyze the flow of matter that can be represented by each model.

This standard fits into a unit of instruction on ecology or environmental systems. This unit should include the interactions and interdependence that occur within environmental systems. All of the student expectations in TEKS 12 play a role in the overall picture of interdependence and interactions in environmental systems and should be bundled into the same unit of instruction.

Distractor Factor

Questions often include diagrams of food chains, food webs, and ecological pyramids and ask the students to extract information based on the diagram. Distractors will include information that cannot be found in the diagram or that is wrong according to the diagram.

Level of Difficulty (based on local data)

☐ Moderate ☐ Challenging

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(B.12) Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to

Biology

(F) describe how environmental change can impact ecosystem stability.

Content Builder

What do the students need to know?
Content
Environmental changes that can impact ecosystem stability including:
- the greenhouse effect (global warming),
- acid rain
- deforestation, and
- pollution.

Connections
Students studied the relationships between organisms as they occur in food webs in 8th grade.

To what degree will this learning impact learning two years down the road?
Link to The Career and College Readiness Standards:
• V. Cross-Disciplinary Themes C. Change over time/equilibrium.
1. Recognize patterns of change.

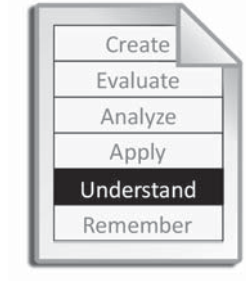
Academic Vocabulary

- Global warming
- Greenhouse effect
- Deforestation
- Acid rain
- Stability

Rigor Implications

Verb
- Describe

Level of Bloom's Taxonomy
- Understanding



Instructional Implications
Instruction should include an understanding of ecosystem stability. Students should have opportunities to describe to other students how a specific environmental change can impact ecosystem stability.

This standard fits in a unit of instruction on ecology or environmental systems. This unit should include the interactions and interdependence that occur within environmental systems. All of the student expectations in TEKS 12 play a role in the overall picture of interdependence and interactions in environmental systems and should be bundled into the same unit of instruction.

Distractor Factor

Questions may include a scenario where an ecosystem's stability is affected and the students will need to determine the environmental change that directly affected the ecosystem. Distractors could be other environmental changes that have no effect on the ecosystem.

Level of Difficulty (based on local data)

☐ Moderate ☐ Challenging

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

Biology

(A) compare and contrast prokaryotic and eukaryotic cells;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This supporting standard is background information that the students can use to build on when they are learning concepts that require the students to have information related to cell structures from Biology 4B investigate and explain cellular processes, and 4C compare the structures of viruses to cells.

How does it support the Readiness Standard(s)?
This supporting standard addresses a narrowly defined idea that does not directly support a readiness standard. It does however supply background information.

Link to The Career and College Readiness Standards:
VI. Biology – A. Structure and function of cells
2 – Explain in your own words how cells can be categorized into two major types: prokaryotic and eukaryotic, and describe major features that distinguish one from the other.

VI. Biology – A. Structure and function of cells
3 – Describe the structure and function of major sub-cellular organelles.

May be adjusted according to local curriculum.

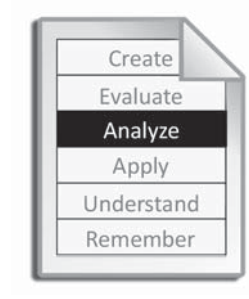
Academic Vocabulary

- Prokaryote
- Eukaryote
- Organelles

Rigor Implications

Verb
- Compare
- Contrast

Level of Bloom's Taxonomy
- Analyzing



Instructional Implications
Instruction should include the students creating some type of graphic organizer that allows them to distinguish between prokaryotic to eukaryotic cells. They should also be able to analyze a cell to classify it as a prokaryote or a eukaryote and be prepared to justify their classification.

This standard fits well in a unit of instruction on cells that is generally sequenced just before a unit of instruction on cellular processes.

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(B.5) Science concepts. The student knows how an organism grows and the importance of cell differentiation. The student is expected to

Biology

(B) examine specialized cells, including roots, stems, and leaves of plants; and animal cells such as blood, muscle, and epithelium;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. This knowledge is important for the students to know and will help to build background knowledge related to the structure and function of plant and animal cells.

How does it support the Readiness Standard(s)?
This supporting standard addresses a narrowly defined idea that relates to instruction that develops an understanding of plants and animals.
Link to The Career and College Readiness Standards:
VI. Biology – A. Structure and function of cells
1 – Know that, although all cells share basic features, cells differentiate to carry out specialized functions.

May be adjusted according to local curriculum.

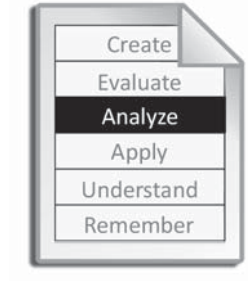
Academic Vocabulary

- Xylem
- Phloem
- Epithelial
- Cellulose

Rigor Implications

Verb
- Examine

Level of Bloom's Taxonomy
- Analyzing



Instructional Implications
Instruction should include students having multiple opportunities to examine a variety of different types of plant and animal cells. The students should be able to recognize the different types of cells from drawings and with visual observations through a microscope. They should be prepared to summarize the specialization of a given cell based on structure and function.

This standard fits well with units of instruction that focus on cells, plants, and animals. It may be introduced in a unit on cells or it could be addressed with a cell review in a unit on plants and a unit on animals.

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(B.5) Science concepts. The student knows how an organism grows and the importance of cell differentiation. The student is expected to

Biology

(C) describe the roles of DNA, ribonucleic acid (RNA), and environmental factors in cell differentiation;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This supporting standard is indirectly related to the Biology Readiness Standard 5A. It gives the students opportunities to apply the information related to the stages of the cell cycle to the roles that DNA, RNA, and environmental factors play in cell differentiation.

How does it support the Readiness Standard(s)?
This standard supports the readiness standard biology 5A by building on the knowledge of the stages of the cell cycle and bringing in the roles of DNA, RNA, and environmental factors in cell differentiation.
Link to The Career and College Readiness Standards:
VI. Biology – D. Molecular genetics and heredity
3. Understand the molecular structures and functions of nucleic acids.

May be adjusted according to local curriculum.

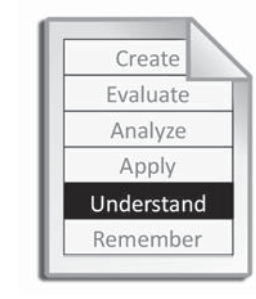
Academic Vocabulary

- DNA
- RNA
- Cell differentiation

Rigor Implications

Verb
- Describe

Level of Bloom's Taxonomy
- Understanding



Instructional Implications
Students should be given opportunities to describe the roles DNA, RNA, and environmental factors play in cell differentiation to other students.

This standard fits well in a unit of instruction on genetics where the instruction focuses on gene expression and its relationship to cell differentiation.

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(B.5) Science concepts. The student knows how an organism grows and the importance of cell differentiation. The student is expected to

Biology

(D) recognize that disruptions of the cell cycle lead to diseases such as cancer.

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. This standard takes the knowledge from 5A related to the cell cycle and looks at it from the perspective of what may happen if disruptions are made in the process.

How does it support the Readiness Standard(s)?
This information adds relevance to the study of the cell cycle found in the readiness standard 5A.
Link to The Career and College Readiness Standards:
VI. Biology – D. Molecular genetics and heredity
3. Understand the molecular structures and functions of nucleic acids.

May be adjusted according to local curriculum.

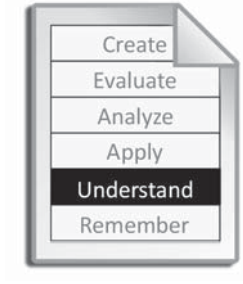
Academic Vocabulary

- Cell division
- Disease

Rigor Implications

Verb
- Recognize

Level of Bloom's Taxonomy
- Understanding



Instructional Implications
This standard fits best in a unit of study on cellular processes with 5A.

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(B.6) Science concepts. The student knows the mechanisms of genetics, including the role of nucleic acids and the principles of Mendelian Genetics. The student is expected to

Biology

(B) recognize that components that make up the genetic code are common to all organisms;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. This is important information but not necessarily required for the body of knowledge in the readiness standard biology 6A, which asks the students to predict outcomes of various genetic combinations.

How does it support the Readiness Standard(s)?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. It adds information to the body of knowledge in biology 6F.

Link to The Career and College Readiness Standards:
VI. Biology – D. Molecular genetics and heredity
3. Understand the molecular structures and functions of nucleic acids.

May be adjusted according to local curriculum.

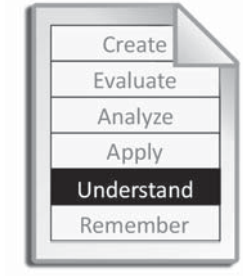
Academic Vocabulary

- Genetic code

Rigor Implications

Verb
- Recognize

Level of Bloom's Taxonomy
- Understanding



Instructional Implications
This standard belongs in a unit of instruction on genetics that includes many of the student expectations in the biology TEKS 6. Many of these student expectations can combine so that students get the complete picture of genetics including the components of DNA and its role in specifying traits, the genetic code that is common to all organisms, transcription and translation, the regulated process of gene expression, changes that can occur in DNA and what those changes can mean to an organism, the use of Punnett squares to predict various genetic combinations including monohybrid and dihybrid cross and non-Mendelian inheritance.

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(B.6) Science concepts. The student knows the mechanisms of genetics, including the role of nucleic acids and the principles of Mendelian Genetics. The student is expected to

Biology

(C) explain the purpose and process of transcription and translation using models of DNA and RNA;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard supports the information in the Readiness Standards biology 6A related to the components of DNA and how is carries the information for specifying traits, 6E which refers to changes in DNA, and 6F which requires the students to predict possible outcomes of various genetic combinations.

How does it support the Readiness Standard(s)?
This standard is important information that will build on the body of knowledge from the biology readiness standards 6A, 6E, and 6F.
Link to The Career and College Readiness Standards:
V. Cross-Disciplinary Themes – E. Measurements and models
1 – Use models to make predictions.

VI. Biology – D. Molecular genetics and heredity
3 – Understand the molecular structures and functions of nucleic acids.

May be adjusted according to local curriculum.

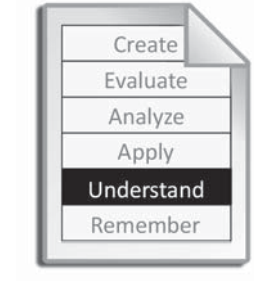
Academic Vocabulary

- Transcription
- Translation
- Nitrogen bases
- Codon

Rigor Implications

Verb
- Explain

Level of Bloom's Taxonomy
- Understanding



Instructional Implications
This standard belongs in a unit of instruction on genetics that includes many of the student expectations in the biology TEKS 6. Many of these student expectations can combine so that students get the complete picture of genetics including the components of DNA and its role in specifying traits, the genetic code that is common to all organisms, transcription and translation, the regulated process of gene expression, changes that can occur in DNA and what those changes can mean to an organism, the use of Punnett squares to predict various genetic combinations including monohybrid and dihybrid cross and non-Mendelian inheritance.

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(B.6) Science concepts. The student knows the mechanisms of genetics, including the role of nucleic acids and the principles of Mendelian Genetics. The student is expected to

Biology

(D) recognize that gene expression is a regulated process;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. However, it builds on the body of knowledge found in the readiness standards biology 6A related to the components of DNA and how is carries the information for specifying traits, 6E which refers to changes in DNA, and 6F which requires the students to predict possible outcomes of various genetic combinations.

How does it support the Readiness Standard(s)?
This standard is important information that will build on the body of knowledge from the biology readiness standards 6A, 6E, and 6F.
Link to The Career and College Readiness Standards:
VI. Biology – D. Molecular genetics and heredity
3. Understand the molecular structures and functions of nucleic acids.

May be adjusted according to local curriculum.

Academic Vocabulary

- Gene expression

Rigor Implications

Verb
- Recognize

Level of Bloom's Taxonomy
- Understanding

Instructional Implications
This standard belongs in a unit of instruction on genetics that includes many of the student expectations in the biology TEKS 6. Many of these student expectations can combine so that students get the complete picture of genetics including the components of DNA and its role in specifying traits, the genetic code that is common to all organisms, transcription and translation, the regulated process of gene expression, changes that can occur in DNA and what those changes can mean to an organism, the use of Punnett squares to predict various genetic combinations including monohybrid and dihybrid cross and non-Mendelian inheritance.

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(B.6) Science concepts. The student knows the mechanisms of genetics, including the role of nucleic acids and the principles of Mendelian Genetics. The student is expected to

Biology

(G) recognize the significance of meiosis to sexual reproduction;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard supports and adds depth to the readiness standard biology 6F which requires the students to predict possible outcomes of various genetic combinations. The body of knowledge in this standard should be addressed prior to biology 6F.

How does it support the Readiness Standard(s)?
It builds background and develops knowledge for the Readiness Standard biology 6F.
Link to The Career and College Readiness Standards:
VI. Biology –D. Molecular genetics and heredity
5. Describe the major feature of meiosis and relate this process to Mendel's laws of inheritance.

May be adjusted according to local curriculum.

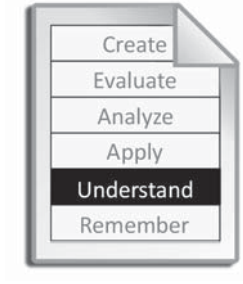
Academic Vocabulary

- Meiosis
- Sex cells
- Genetic variability
- Mendel's laws of inheritance
- Crossing over
- Independent assortment

Rigor Implications

Verb
- Recognize

Level of Bloom's Taxonomy
- Understanding



Instructional Implications
This standard may fit in a unit of instruction on genetics that includes many of the student expectations in the biology TEKS 6, or it could be addressed in a unit of instruction that focuses on cellular processes. The unit on cellular process should be sequenced before the unit on genetics.

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(B.6) Science concepts. The student knows the mechanisms of genetics, including the role of nucleic acids and the principles of Mendelian Genetics. The student is expected to

Biology

(H) describe how techniques such as DNA fingerprinting, genetic modifications, and chromosomal analysis are used to study the genomes of organisms.

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

This standard relates directly to the information found in the readiness standards biology 6A related to the components of DNA and how it carries the information for specifying traits, 6E which refers to changes in DNA, and 6F which requires the students to predict possible outcomes of various genetic combinations. However it does not directly support these standards, it supplies new information.

How does it support the Readiness Standard(s)?

This standard takes information that the students have learned in biology 6A,B,C,D,E,F, and G and gives them an opportunity to understand the techniques used in the real world to study the genomes of organisms.

Link to The Career and College Readiness Standards:

VI. Biology – D. Molecular genetics and heredity

3 – Understand the molecular structures and functions of nucleic acids.

May be adjusted according to local curriculum.

Academic Vocabulary

- Genome
- DNA fingerprinting
- Electrophoresis

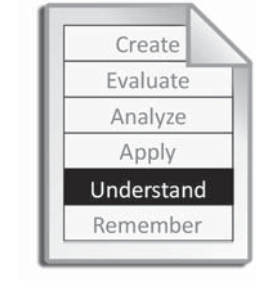
Rigor Implications

Verb

- Describe

Level of Bloom's Taxonomy

- Understanding



Instructional Implications

This standard belongs in a unit of instruction on genetics that includes many of the student expectations in the biology TEKS 6. Many of these student expectations can combine so that students get the complete picture of genetics including the components of DNA and its role in specifying traits, the genetic code that is common to all organisms, transcription and translation, the regulated process of gene expression, changes that can occur in DNA and what those changes can mean to an organism, the use of Punnett squares to predict various genetic combinations including monohybrid and dihybrid cross and non-Mendelian inheritance.

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(B.7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to

Biology

(B) analyze and evaluate scientific explanations concerning any data of sudden appearance, stasis, and sequential nature of groups in the fossil record;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
The readiness standard biology 7A expects students to analyze and evaluate evidence of common ancestry among groups and the fossil record is one of the specifics the standard addresses. This standard supports the readiness standard biology 7A by giving guidance to the students related to where some of the evidence may be debatable.

How does it support the Readiness Standard(s)?
It instructs students to evaluate scientific explanations related to the readiness standard biology 7A.
Link to The Career and College Readiness Standards:
I. Nature of Science – A. Cognitive skills in science
2 – Use creativity and insight to recognize and describe patterns in natural phenomena.

May be adjusted according to local curriculum.

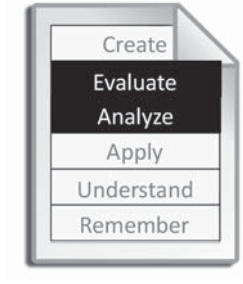
Academic Vocabulary

- Fossil record
- Homologies
- Biogeography

Rigor Implications

Verb
- Analyze
- Evaluate

Level of Bloom's Taxonomy
- Analyzing
- Evaluating



Instructional Implications
Students should have opportunities to evaluate all sides of the scientific explanations related to evolution to encourage critical thinking by the student.

This standard fits in a unit of instruction on evolution with biology 7A.

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(B.7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to

Biology

(C) analyze and evaluate how natural selection produces change in populations, not individuals;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
The readiness standard biology 7E expects students to analyze and evaluate the relationship of natural selection to adaptation and to the development of the diversity of species. This standard supports the readiness standard 7E by focusing on the role natural selection plays in changes in populations.

How does it support the Readiness Standard(s)?
This standard introduces the information that natural selection happens at the population level and not the individual level. This adds to the information related to natural selection in 7E.
Link to The Career and College Readiness Standards:
I. Nature of Science – A. Cognitive skills in science
2 – Use creativity and insight to recognize and describe patterns in natural phenomena.

VI. Biology C. Evolution and populations
2 – Recognize variations in population sizes, including extinction, and describe mechanisms and conditions that produce these variations.

May be adjusted according to local curriculum.

Academic Vocabulary

- Natural selection
- Disruptive selection
- Directional selection
- Stabilizing selection
- Populations

Rigor Implications

Verb
- Analyze
- Evaluate

Level of Bloom's Taxonomy
- Analyzing
- Evaluating

Instructional Implications
This standard fits into a unit of instruction on evolution with 7D and 7E.

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(B.7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to

Biology

(D) analyze and evaluate how the elements of natural selection, including inherited variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental resources, result in differential reproductive success;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
The readiness standard biology 7E expects students to analyze and evaluate the relationship of natural selection to adaptation and to the development of the diversity of species. This standard supports the readiness standard 7E by building a more complete understanding on natural selection.

How does it support the Readiness Standard(s)?
This builds background that will support the students' ability to learn the information in biology 7E.
Link to The Career and College Readiness Standards:
I. Nature of Science – A. Cognitive skills in science
2 – Use creativity and insight to recognize and describe patterns in natural phenomena.

VI. Biology – C. Evolution and populations
2 – Recognize variations in population sizes, including extinction, and describe mechanisms and conditions that produce these variations.

May be adjusted according to local curriculum.

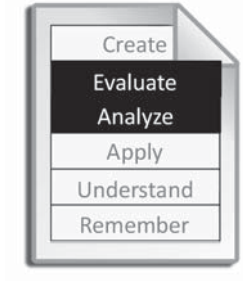
Academic Vocabulary

- Inherited variation
- Reproductive success

Rigor Implications

Verb
- Analyze
- Evaluate

Level of Bloom's Taxonomy
- Analyzing
- Evaluating



Instructional Implications
This standard fits into a unit of instruction on evolution with 7C, and 7E.

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(B.7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to

Biology

(F) analyze and evaluate the effects of other evolutionary mechanisms, including genetic drift, gene flow, mutation, and recombination;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. It does not support a readiness standard however it does add knowledge to a unit of instruction on evolution.

How does it support the Readiness Standard(s)?
This supporting standard is directly related to the knowledge statement for biology 7.
Link to The Career and College Readiness Standards:
VI. Biology – C. Evolution and populations
2 – Recognize variations in population sizes, including extinction, and describe mechanisms and conditions that produce these variations.

May be adjusted according to local curriculum.

Academic Vocabulary

- Genetic drift
- Gene flow
- Mutation
- Recombination
- Artificial selection
- Non-random mating

Rigor Implications

Verb
- Analyze
- Evaluate

Level of Bloom's Taxonomy
- Analyzing
- Evaluating

Instructional Implications
This standard will add to the body of knowledge in a unit of instruction on evolution.

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(B.7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to

Biology

(G) analyze and evaluate scientific explanations concerning the complexity of the cell.

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. It does not support a readiness standard however it does add knowledge to a unit of instruction on cells and cellular processes.

How does it support the Readiness Standard(s)?
It does not support a readiness standard in this category, however, it does relate to the readiness standard biology 4B from category 1 which focuses on cellular processes.
Link to The Career and College Readiness Standards:
VI. Biology – A. Structure and function of cells
1 – Know that although all cells share basic features, cells differentiate to carry out specialized functions.

May be adjusted according to local curriculum.

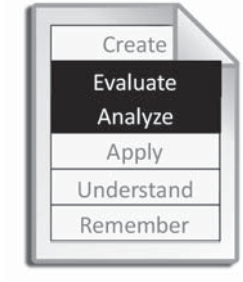
Academic Vocabulary

- Endosymbiosis

Rigor Implications

Verb
- Analyze
- Evaluate

Level of Bloom's Taxonomy
- Analyzing
- Evaluating



Instructional Implications
This standard fits into and adds to the body of knowledge in a unit of instruction on cells or cellular processes.

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Biology

(B.8) Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made. The student is expected to

(A) define taxonomy and recognize the importance of a standardized taxonomic system to the scientific community;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard directly supports the readiness standard biology 8B which requires students to categorize organisms using a hierarchical classification system. This standard requires the students to define taxonomy and develop an understanding of the importance of a standardized taxonomic system.

How does it support the Readiness Standard(s)?
This standard builds background information students will need to be successful with 8B.
Link to The Career and College Readiness Standards:
I. Nature of Science – A. Cognitive skills in science
2 – Use creativity and insight to recognize and describe patterns in natural phenomena.

V. Cross-Disciplinary Themes – D. Classification
1. Understand that scientists categorize things according to similarities and differences.

VI. Biology – E. Classification and taxonomy
1 – Know ways in which living things can be classified based on each organism's internal and external structure, development, and relatedness of DNA sequences.

May be adjusted according to local curriculum.

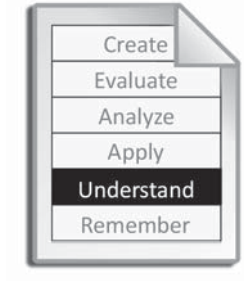
Academic Vocabulary

- Taxonomy
- Binomial nomenclature
- Dichotomous key

Rigor Implications

Verb
- Define
- Recognize

Level of Bloom's Taxonomy
- Understanding



Instructional Implications
Instruction should bundle TEKS biology 8A, 8B, and 8C together in a unit of instruction on classification. This unit should be sequenced before units of instruction where characteristics of specific organisms such as plants and animals are studied.

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Biology

(B.8) Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made. The student is expected to

(C) compare characteristics of taxonomic groups, including archaea, bacteria, protists, fungi, plants, and animals.

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard directly supports the readiness standard biology 8B which requires students to categorize organisms using a hierarchical classification system. This standard requires the students to compare characteristics of taxonomic groups, which are an import aspect to address while classifying organisms.

How does it support the Readiness Standard(s)?
This standard specifically lists the taxonomic groups that organisms are to categorize into in biology 8B.
Link to The Career and College Readiness Standards:
I. Nature of Science – A. Cognitive skills in science
2 – Use creativity and insight to recognize and describe patterns in natural phenomena.

V. Cross-Disciplinary Themes – D. Classification
1. Understand that scientists categorize things according to similarities and differences.

VI. Biology – E. Classification and taxonomy
1 – Know ways in which living things can be classified based on each organism's internal and external structure, development, and relatedness of DNA sequences.

May be adjusted according to local curriculum.

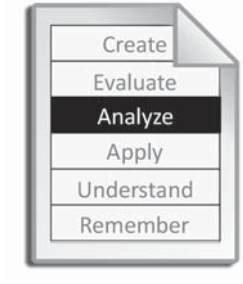
Academic Vocabulary

- Archaea
- Bacteria
- Protists
- Fungi
- Plants
- Animals

Rigor Implications

Verb
- Compare

Level of Bloom's Taxonomy
- Analyzing



Instructional Implications
Instruction should bundle TEKS biology 8A, 8B, and 8C together in a unit of instruction on classification. This unit should be sequenced before units of instruction where characteristics of specific organisms such as plants and animals are studied. This standard may also appear in the specific units of study on organisms.

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(B.9) Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. The student is expected to

Biology

(B) compare the reactants and products of photosynthesis and cellular respiration in terms of energy and matter;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. It does not support a readiness standard however it does add knowledge to a unit of instruction on cells and cellular processes.

How does it support the Readiness Standard(s)?

It does not support a readiness standard in this category, however, it does relate to the readiness standard biology 4B from category 1, which focuses on cellular processes.

Link to The Career and College Readiness Standards:

VI. Biology – B. Biochemistry
3 – Describe the major features and chemical events of photosynthesis.
VI. Biology – B. Biochemistry
4 – Describe the major features and chemical events of cellular respiration.
VI. Biology – B. Biochemistry
5 – Know how organisms respond to presence or absence of oxygen, including mechanisms of fermentation.
VI. Biology – B. Biochemistry
6 – Understand coupled reaction processes and describe the role of ATP in energy coupling and transfer.
VII. Chemistry – H. Thermochemistry
2 – Understand energy changes and chemical reactions.

May be adjusted according to local curriculum.

Academic Vocabulary

- Photosynthesis
- Cellular respiration

Rigor Implications

Verb

- Compare

Level of Bloom's Taxonomy

- Analyzing

Instructional Implications

This standard fits into and adds to the body of knowledge in a unit of instruction on cellular processes.

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(B.9) Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. The student is expected to

Biology

(C) identify and investigate the role of enzymes

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. It does not support a readiness standard however it does add knowledge to a unit of instruction on biochemistry by adding the role of enzymes.

How does it support the Readiness Standard(s)?
It does not support a readiness standard however it directly supports a career and college readiness standard.

Link to The Career and College Readiness Standards:
VI. Biology – B. Biochemistry
2 – Describe the structure and function of enzymes.

May be adjusted according to local curriculum.

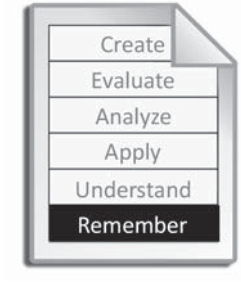
Academic Vocabulary

- Enzymes
- Catalyst
- Substrate
- Activation energy

Rigor Implications

Verb
- Identify

Level of Bloom's Taxonomy
- Remembering



Instructional Implications
This standard fits into and adds to the body of knowledge in a unit of instruction on biochemistry that should be sequenced before a unit of instruction on cellular processes.

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(B.9) Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. The student is expected to

Biology

(D) analyze and evaluate the evidence regarding formation of simple organic molecules and their organization into long complex molecules having information such as the DNA molecule for self-replicating life.

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
The readiness standard biology 9A expects students to compare the structures and functions of different types of biomolecules, this standard supports biology 9A by adding to the body of knowledge and introducing the formations of simple organic molecules and how they are structured into long complex molecules.

How does it support the Readiness Standard(s)?
This standard analyzes the evidence related to the formation of the simple and complex organic molecules that are compared in biology 9A.
Link to The Career and College Readiness Standards:
VI. Biology – B. Biochemistry
1 – Understand the major categories of biological molecules: lipids, carbohydrates, proteins, and nucleic acids.

May be adjusted according to local curriculum.

Academic Vocabulary

- Organic Molecule

Rigor Implications

Verb
- Analyze
- Evaluate

Level of Bloom's Taxonomy
- Analyzing
- Evaluating

Instructional Implications
This standard fits into and adds to the body of knowledge in a unit of instruction on biochemistry that should be sequenced before a unit of instruction on cellular processes.

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(B.10) Science concepts. The student knows that biological systems are composed of multiple levels. The student is expected to

Biology

(C) analyze the levels of organization in biological systems and relate the levels to each other and to the whole system.

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard supports the Readiness Standards biology 10A which expects students to describe the interactions that occur among biological systems that perform functions in animals, and 10B which expects students to describe the interactions that occur among biological systems that perform functions in plants.

How does it support the Readiness Standard(s)?
This standard is the overview that relates the levels of organization in biological systems to the system as a whole and supports the readiness standards biology 10A and 10B.
Link to The Career and College Readiness Standards:
I. Nature of Science – A. Cognitive skills in science
2 – Use creativity and insight to recognize and describe patterns in natural phenomena.

May be adjusted according to local curriculum.

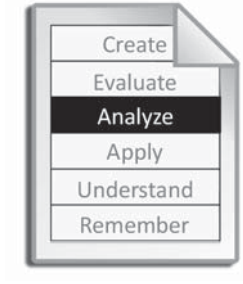
Academic Vocabulary

- Atom
- Molecule
- Organelle
- Cell
- Tissue
- Organ
- Organ system
- Organism
- Population
- Community
- Ecosystem

Rigor Implications

Verb
- Analyze

Level of Bloom's Taxonomy
- Analyzing



Instructional Implications
This standard should be introduced in a unit of instruction on biochemistry or cells and revisited throughout the year as different levels of organization are introduced.

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(B.11) Science concepts. The student knows that biological systems work to achieve and maintain balance. The student is expected to

Biology

(A) describe the role of internal feedback mechanisms in the maintenance of homeostasis.

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. This standard focuses on the role of internal feedback mechanisms to homeostasis.

How does it support the Readiness Standard(s)?
This standard does not support a readiness standard, it is new information related to the knowledge statement 11B. Each student expectation in this TEKS has a different focus but relates back to the overall body of knowledge that pertains to maintaining balance in systems and organisms.
Link to The Career and College Readiness Standards:
VI. Biology – F. Systems and homeostasis
1 – Know that organisms possess various structures and processes (feedback loops) that maintain steady internal conditions.

May be adjusted according to local curriculum.

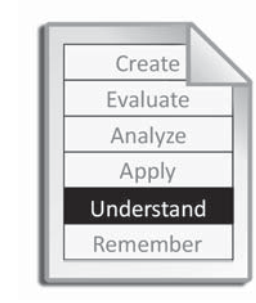
Academic Vocabulary

- Internal feedback
- Feedback loops
- Homeostasis

Rigor Implications

Verb
- Describe

Level of Bloom's Taxonomy
- Understanding



Instructional Implications
This standard fits into units of instruction on specific organisms and may be revisited in a unit of instruction on ecology.

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(B.11) Science concepts. The student knows that biological systems work to achieve and maintain balance. The student is expected to

Biology

(B) investigate and analyze how organisms, populations, and communities respond to external factors;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. This standard focuses on the external factors that affect organisms, populations, and communities.

How does it support the Readiness Standard(s)?
This standard does not support a readiness standard, it is new information related to the knowledge statement 11.B. Each student expectation in this TEKS has a different focus but relates back to the overall body of knowledge that pertains to maintaining balance in systems and organisms.
Link to The Career and College Readiness Standards:
VI. Biology – C. Evolution and populations
2 – Recognize variations in population sizes, including extinction, and describe mechanisms and conditions that produce these variations.

May be adjusted according to local curriculum.

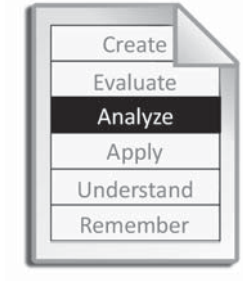
Academic Vocabulary

- External Factors

Rigor Implications

Verb
- Investigate
- Analyze

Level of Bloom's Taxonomy
- Analyzing



Instructional Implications
This standard fits into units of instruction on specific organisms and revisited in a unit of instruction on ecology.

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(B.11) Science concepts. The student knows that biological systems work to achieve and maintain balance. The student is expected to

Biology

(C) summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. This standard focuses on the role microorganisms play in maintaining the health of organisms and environments both good and bad.

How does it support the Readiness Standard(s)?
This standard does not support a readiness standard, it is new information related to the knowledge statement B.11. Each student expectation in this TEKS has a different focus but relates back to the overall body of knowledge that pertains to maintaining balance in systems and organisms.
Link to The Career and College Readiness Standards:
VI. Biology – G. Ecology
2 – Know patterns of energy flow and material cycling in Earth's ecosystems.

May be adjusted according to local curriculum.

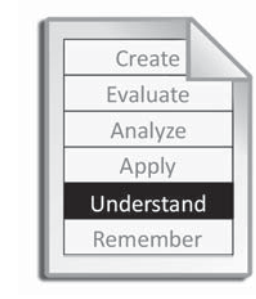
Academic Vocabulary

- Microorganisms

Rigor Implications

Verb
- Summarize

Level of Bloom's Taxonomy
- Understanding



Instructional Implications
This standard fits into units of instruction on specific organisms and may be revisited in a unit of instruction on ecology.

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(B.12) Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to

Biology

(B) compare variations and adaptations of organisms in different ecosystems;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. This standard compares adaptations of organisms to the ecosystems where they live.

How does it support the Readiness Standard(s)?
This standard does not support a readiness standard, it is new information related to the knowledge statement B.12. Each student expectation in this TEKS has a different focus but relates back to the overall body of knowledge that interdependence and interactions within environments.
.Link to The Career and College Readiness Standards:
VI. Biology – G. Ecology
1 – Identify Earth's major biomes, giving their locations, typical climate conditions, and characteristic organisms present in each.

May be adjusted according to local curriculum.

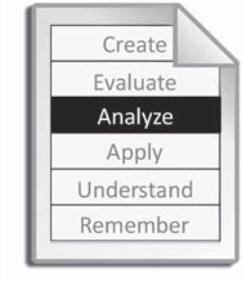
Academic Vocabulary

- Adaptations

Rigor Implications

Verb
- Compare

Level of Bloom's Taxonomy
- Analyzing



Instructional Implications
This standard fits in a unit of instruction on ecology or environmental systems. This unit should include the interactions and interdependence that occur within environmental systems. All of the student expectations in TEKS 12 play a role in the overall picture of interdependence and interactions in environmental systems and should be bundled into the same unit of instruction.

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(B.12) Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to

Biology

(D) recognize that long-term survival of species is dependent on changing resource bases that are limited;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. This standard focuses on species dependence on resources.

How does it support the Readiness Standard(s)?
This standard does not support a readiness standard, it is new information related to the knowledge statement B.12. Each student expectation in this TEKS has a different focus but relates back to the overall body of knowledge that interdependence and interactions within environments.
Link to The Career and College Readiness Standards:
VI. Biology – G. Ecology
2 – Know patterns of energy flow and material cycling in Earth's ecosystems.

May be adjusted according to local curriculum.

Academic Vocabulary

- Limiting factor
- Carrying capacity

Rigor Implications

Verb
- Recognize

Level of Bloom's Taxonomy
- Understanding

Instructional Implications
This standard fits in a unit of instruction on ecology or environmental systems. This unit should include the interactions and interdependence that occur within environmental systems. All of the student expectations in TEKS 12 play a role in the overall picture of interdependence and interactions in environmental systems and should be bundled into the same unit of instruction.

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(B.12) Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to

Biology

(E) describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles;

Supporting the Readiness Standards

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
This standard meets the criteria of a supporting standard because it addresses a more narrowly defined idea that is historically part of the body of knowledge of biology. This standard focuses specifically on the carbon and nitrogen cycles, the role of these cycles to the environment, and the consequences to the environment to disrupting these cycles.

How does it support the Readiness Standard(s)?
This standard does not support a readiness standard, it is new information related to the knowledge statement B.12. Each student expectation in this TEKS has a different focus but relates back to the overall body of knowledge that interdependence and interactions within environments.
Link to The Career and College Readiness Standards:
VI. Biology – G. Ecology
2 – Know patterns of energy flow and material cycling in Earth's ecosystems

May be adjusted according to local curriculum.

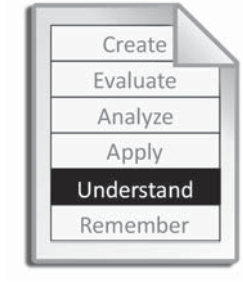
Academic Vocabulary

- Carbon cycle
- Nitrogen cycle

Rigor Implications

Verb
- Describe
- Explain

Level of Bloom's Taxonomy
- Understanding



Instructional Implications
This standard fits in a unit of instruction on ecology or environmental systems. This unit should include the interactions and interdependence that occur within environmental systems. All of the student expectations in TEKS 12 play a role in the overall picture of interdependence and interactions in environmental systems and should be bundled into the same unit of instruction.

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