



TEXES™ Core Subjects 4–8 (211)
Test at a Glance

See the test preparation manual for complete information about the test along with sample questions, study tips and preparation resources.

Test Name	Core Subjects 4–8		
Test Code	211		
Time	5 hours		
Number of Questions	200 multiple-choice questions		
Format	Computer-administered test (CAT)		
	Subject Test	Subject Test Title	Approx. Percentage of Test
	I.	English Language Arts and Reading (806)	37%
	II.	Mathematics (807)	21%
	III.	Social Studies (808)	21%
	IV.	Science (809)	21%

About This Test

The TExES Core Subjects 4–8 (211) test is designed to assess whether a test taker has the requisite knowledge and skills that an entry-level educator in Texas public schools must possess. The 200 multiple-choice questions are based on the Core Subjects 4–8 test framework.

The test may contain questions that do not count toward the score. The number of scored questions will not vary; however, the number of questions that are not scored may vary in the actual test. Your final scaled score will be based only on scored questions.

The test is structured with four Subject Tests: English Language Arts and Reading, Mathematics, Social Studies and Science.

If, upon completion of the entire Core Subjects 4-8 (211) test, a test taker does not pass one to three of the Subject Tests, they are eligible to retake one or more Subject Tests on another date 45 days after taking the initial Core Subjects 4-8 (211) test.

The timing for the Core Subjects 4-8 (211) test is by subject test, rather than the total test.

Subject Test	Total Items	Time
English Language Arts and Reading	74	1 hour and 55 minutes
Mathematics	42	1 hour and 5 minutes
Social Studies	42	50 minutes
Science	42	50 minutes
TOTAL	200	4 hours and 40 minutes

The Test Framework

The Core Subjects 4–8 test framework is based on the educator standards for this field. The content covered by the test is organized into broad areas of content called **domains**. Each domain covers one or more of the educator standards for this field. Within each domain, the content is further defined by a set of **competencies**. Each competency is composed of two major parts:

- The **competency statement**, which broadly defines what an entry-level educator in this field in Texas public schools should know and be able to do.
- The **descriptive statements**, which describe in greater detail the knowledge and skills eligible for testing.

The educator standards being assessed within each domain are listed beginning on the next page. These are followed by a complete set of the framework’s competencies and descriptive statements. Read each competency with its descriptive statements to get a more specific idea of the knowledge you will be required to demonstrate on the test.

Educator Standards

English Language Arts and Reading Standard I

Oral Language: Teachers of students in grades 4–8 understand the importance of oral language, know the developmental processes of oral language and provide a variety of instructional opportunities for students to develop listening and speaking skills.

English Language Arts and Reading Standard II

Foundations of Reading: Teachers of students in grades 4–8 understand the foundations of reading and early literacy development.

English Language Arts and Reading Standard III

Word Analysis Skills and Reading Fluency: Teachers understand the importance of word analysis skills (including decoding, blending, structural analysis, sight word vocabulary) and reading fluency and provide many opportunities for students to practice and improve their word analysis skills and reading fluency.

English Language Arts and Reading Standard IV

Reading Comprehension: Teachers understand the importance of reading for understanding, know the components of comprehension and teach students strategies for improving their comprehension.

English Language Arts and Reading Standard V

Written Language: Teachers understand that writing is a developmental process and provide instruction that helps students develop competence in written communication.

English Language Arts and Reading Standard VI

Study and Inquiry Skills: Teachers understand the importance of study and inquiry skills as tools for learning and promote students' development in applying study and inquiry skills.

English Language Arts and Reading Standard VII

Viewing and Representing: Teachers understand how to interpret, analyze, evaluate and produce visual images and messages in various media and to provide students with opportunities to develop skills in this area.

English Language Arts and Reading Standard VIII

Assessment of Developing Literacy: Teachers understand the basic principles of assessment and use a variety of literacy assessment practices to plan and implement instruction.

Mathematics Standard I

Number Concepts: The mathematics teacher understands and uses numbers, number systems and their structure, operations and algorithms, quantitative reasoning and technology appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in order to prepare students to use mathematics.

Mathematics Standard II

Patterns and Algebra: The mathematics teacher understands and uses patterns, relations, functions, algebraic reasoning, analysis and technology appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in order to prepare students to use mathematics.

Mathematics Standard III

Geometry and Measurement: The mathematics teacher understands and uses geometry, spatial reasoning, measurement concepts and principles and technology appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in order to prepare students to use mathematics.

Mathematics Standard IV

Probability and Statistics: The mathematics teacher understands and uses probability and statistics, their applications and technology appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in order to prepare students to use mathematics.

Mathematics Standard V

Mathematical Processes: The mathematics teacher understands and uses mathematical processes to reason mathematically, to solve mathematical problems, to make mathematical connections within and outside of mathematics and to communicate mathematically.

Mathematics Standard VI

Mathematical Perspectives: The mathematics teacher understands the historical development of mathematical ideas, the interrelationship between society and mathematics, the structure of mathematics and the evolving nature of mathematics and mathematical knowledge.

Mathematics Standard VII

Mathematical Learning and Instruction: The mathematics teacher understands how children learn and develop mathematical skills, procedures and concepts; knows typical errors students make; and uses this knowledge to plan, organize and implement instruction to meet curriculum goals and to teach all students to understand and use mathematics.

Mathematics Standard VIII

Mathematical Assessment: The mathematics teacher understands assessment and uses a variety of formal and informal assessment techniques appropriate to the learner on an ongoing basis to monitor and guide instruction and to evaluate and report student progress.

Social Studies Standard I

The social studies teacher has a comprehensive knowledge of the social sciences and recognizes the value of the social sciences.

Social Studies Standard II

The social studies teacher effectively integrates the various social science disciplines.

Social Studies Standard III

The social studies teacher uses knowledge and skills of social studies, as defined by the Texas Essential Knowledge and Skills (TEKS), to plan and implement effective curriculum, instruction, assessment and evaluation.

Social Studies Standard IV

History: The social studies teacher applies knowledge of significant historical events and developments, as well as of multiple historical interpretations and ideas, in order to facilitate student understanding of relationships between the past, the present and the future.

Social Studies Standard V

Geography: The social studies teacher applies knowledge of people, places and environments to facilitate students' understanding of geographic relationships in Texas, the United States and the world.

Social Studies Standard VI

Economics: The social studies teacher knows how people organize economic systems to produce, distribute and consume goods and services and uses this knowledge to enable students to understand economic systems and make informed economic decisions.

Social Studies Standard VII

Government: The social studies teacher knows how governments and structures of power function, provide order and allocate resources and uses this knowledge to facilitate student understanding of how individuals and groups achieve their goals through political systems.

Social Studies Standard VIII

Citizenship: The social studies teacher understands citizenship in the United States and other societies and uses this knowledge to prepare students to participate in our society through an understanding of democratic principles and citizenship practices.

Social Studies Standard IX

Culture: The social studies teacher understands cultures and how they develop and adapt and uses this knowledge to enable students to appreciate and respect cultural diversity in Texas, the United States and the world.

Social Studies Standard X

Science, Technology and Society: The social studies teacher understands developments in science and technology and uses this knowledge to facilitate student understanding of the social and environmental consequences of scientific discovery and technological innovation.

Science Standard I

The science teacher manages classroom, field and laboratory activities to ensure the safety of all students and the ethical care and treatment of organisms and specimens.

Science Standard II

The science teacher understands the correct use of tools, materials, equipment and technologies.

Science Standard III

The science teacher understands the process of scientific inquiry and its role in science instruction.

Science Standard IV

The science teacher has theoretical and practical knowledge about teaching science and about how students learn science.

Science Standard V

The science teacher knows the varied and appropriate assessments and assessment practices to monitor science learning.

Science Standard VI

The science teacher understands the history and nature of science.

Science Standard VII

The science teacher understands how science affects the daily lives of students and how science interacts with and influences personal and societal decisions.

Science Standard VIII

The science teacher knows and understands the science content appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in physical science.

Science Standard IX

The science teacher knows and understands the science content appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in life science.

Science Standard X

The science teacher knows and understands the science content appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in Earth and space science.

Science Standard XI

The science teacher knows unifying concepts and processes that are common to all sciences.

Domains and Competencies

SUBJECT TEST — ENGLISH LANGUAGE ARTS AND READING (806)

Standards Assessed: English Language Arts and Reading I–VIII

Competency 001 (Oral Language): *The teacher understands the importance of oral language, knows the developmental processes of oral language and provides a variety of instructional opportunities for students to develop listening and speaking skills.*

The beginning teacher:

- A. Knows basic linguistic concepts (e.g., phonemes, segmentation) and developmental stages in acquiring oral language, including stages in phonology, semantics, syntax and pragmatics, and recognizes that individual variations occur.
- B. Knows characteristics and uses of informal and formal oral language assessments and uses multiple, ongoing assessments to monitor and evaluate students' oral language skills.
- C. Provides language instruction that acknowledges students' current oral language skills and that builds on these skills to increase students' oral language proficiency.
- D. Plans, implements and adapts instruction that is based on informal and formal assessment of students' progress in oral language development and that addresses the needs, strengths and interests of individual students, including English-language learners (ELLs), in accordance with the English Language Proficiency Standards (ELPS).
- E. Recognizes when oral language delays or differences warrant in-depth evaluation and additional help or intervention.
- F. Knows how to provide explicit, systematic oral language instruction and supports students' learning and use of oral language through meaningful and purposeful activities implemented one-to-one and in a group.
- G. Selects and uses instructional materials and strategies that promote students' oral language development; that respond to students' individual strengths, needs and interests; that reflect cultural diversity; and that build on students' cultural, linguistic and home backgrounds to enhance their oral language development.
- H. Understands relationships between the development of oral language and the development of reading and provides instruction that interrelates oral and written language to promote students' reading proficiency and learning (e.g., preview-review, discussion, questioning).
- I. Knows similarities and differences between oral and written language and how to promote students' awareness of these similarities and differences.

-
- J. Selects and uses instructional strategies, materials, activities and models to strengthen students' oral vocabulary and narrative skills in spoken language and teaches students to connect spoken and printed language.
 - K. Selects and uses instructional strategies, materials, activities and models to teach students skills for speaking to different audiences for various purposes and for adapting spoken language for various audiences, purposes and occasions.
 - L. Selects and uses instructional strategies, materials, activities and models to teach students listening skills for various purposes (e.g., critical listening to evaluate a speaker's message, listening to enjoy and appreciate spoken language) and provides students with opportunities to engage in active, purposeful listening in a variety of contexts.
 - M. Selects and uses instructional strategies, materials, activities and models to teach students to evaluate the content and effectiveness of their own spoken messages and the messages of others.
 - N. Knows how to promote students' development of oral communication skills through the use of technology and applications found in smartphones, tablets and e-readers.

Competency 002 (Early Literacy Development): *The teacher understands the foundations of early literacy development.*

The beginning teacher:

- A. Understands the significance of phonological and phonemic awareness for reading and typical patterns in the development of phonological and phonemic awareness and recognizes that individual variations occur.
- B. Understands elements of the alphabetic principle (e.g., letter names, graphophonemic knowledge, the relationship of the letters in printed words to spoken language) and typical patterns of students' alphabetic skills development, and recognizes that individual variations occur.
- C. Understands that comprehension is an integral part of early literacy.
- D. Understands that not all written languages are alphabetic and that many alphabetic languages are more phonetically regular than English and knows the significance of this for students' literacy development in English.
- E. Understands that literacy acquisition generally develops in a predictable pattern from prereading (emergent literacy) to conventional literacy and recognizes that individual variations occur.
- F. Understands that literacy development occurs in multiple contexts through reading, writing, speaking and using various media.
- G. Knows characteristics of informal and formal literacy assessments (e.g., screening devices, criterion-referenced state tests, curriculum-based reading assessments, informal reading inventories, norm-referenced tests).
- H. Knows how to select, administer and use results from informal and formal assessments of literacy acquisition.
- I. Knows how to use ongoing assessment to determine when a student needs additional help or intervention to bring the student's performance to grade level, based on state content and performance standards for reading in the Texas Essential Knowledge and Skills (TEKS).
- J. Analyzes students' errors in reading and responds to individual students' needs by providing focused instruction to promote literacy acquisition.
- K. Selects and uses instructional materials that build on the current language skills of individual students, including English-language learners (in accordance with the ELPS), to promote development from emergent literacy to conventional literacy.
- L. Knows how to promote students' early literacy development skills through the use of technology and applications found in smartphones, tablets and e-readers.

Competency 003 (Word Identification Skills and Reading Fluency): *The teacher understands the importance of word identification skills (including decoding, blending, structural analysis and sight word vocabulary) and reading fluency and provides many opportunities for students to practice and improve word identification skills and reading fluency.*

The beginning teacher:

- A. Understands that many students develop word analysis skills and reading fluency in a predictable sequence and recognizes that individual variations occur.
- B. Understands differences in students' development of word identification skills and reading fluency and knows instructional practices for meeting students' individual needs in these areas.
- C. Understands the connection of word identification skills and reading fluency to reading comprehension.
- D. Knows the continuum of word analysis skills in the statewide curriculum and grade-level expectations for attainment of these skills.
- E. Knows how students develop fluency in oral and silent reading.
- F. Understands that fluency involves rate, accuracy and intonation and knows the norms for reading fluency that have been established in the Texas Essential Knowledge and Skills (TEKS) for various age and grade levels.
- G. Knows factors affecting students' word identification skills and reading fluency (e.g., home language, vocabulary development, learning disability).
- H. Understands important phonetic elements and conventions of the English language.
- I. Knows a variety of informal and formal procedures for assessing students' word identification skills and reading fluency on an ongoing basis and uses appropriate assessments to monitor students' performance in these areas and to plan instruction for individual students, including English-language learners (in accordance with the ELPS).
- J. Analyzes students' errors in word analysis and uses the results of this analysis to develop and adjust future instruction.
- K. Applies norms and expectations for word identification skills and reading fluency, as specified in the Texas Essential Knowledge and Skills (TEKS), to evaluate students' reading performance.
- L. Knows how to use ongoing assessment of word identification skills and reading fluency to determine when a student needs additional help or intervention to bring the student's performance to grade level, based on state content and performance standards for reading in the Texas Essential Knowledge and Skills (TEKS).
- M. Knows strategies for decoding increasingly complex words, including using the alphabetic principle, structural cues (e.g., prefixes, suffixes, roots) and syllables, and for using syntax and semantics to support word identification and confirm word meaning.

-
- N. Selects and uses instructional strategies, materials, activities and models to teach students to recognize high-frequency irregular words (e.g., by completing analogies, identifying meanings of foreign words commonly used in written English, identifying and explaining idioms and multiple-meaning words) to promote students' ability to decode increasingly complex words and to enhance word identification skills for students reading at different levels.
 - O. Selects and uses appropriate instructional strategies, materials, activities and models to improve reading fluency for students reading at different levels (e.g., having students read independent-level texts, engage in repeated reading activities, use self-correction).

Competency 004 (Reading Comprehension and Assessment): *The teacher understands the importance of reading for understanding, knows components and processes of reading comprehension and teaches students strategies for improving their comprehension.*

The beginning teacher:

- A. Understands reading comprehension as an active process of constructing meaning.
- B. Understands the continuum of reading comprehension skills in the statewide curriculum and grade-level expectations for these skills.
- C. Understands factors affecting students' reading comprehension (e.g., oral language development, word analysis skills, prior knowledge, language background, previous reading experiences, fluency, vocabulary development, ability to monitor understanding, characteristics of specific texts).
- D. Knows characteristics of informal and formal reading comprehension assessments (e.g., criterion-referenced state tests, curriculum-based reading assessments, informal reading inventories, norm-referenced tests).
- E. Selects and uses appropriate informal and formal assessments to monitor and evaluate students' reading comprehension.
- F. Analyzes student errors and provides focused instruction in reading comprehension based on the strengths and needs of individual students, including English-language learners (in accordance with the ELPS).
- G. Knows how to use ongoing assessment to determine when a student needs additional help or intervention to bring the student's performance to grade level, based on state content and performance standards for reading in the Texas Essential Knowledge and Skills (TEKS).
- H. Understands metacognitive skills, including self-evaluation and self-monitoring skills, and teaches students to use these skills to enhance their own reading comprehension.
- I. Knows how to determine students' independent, instructional and frustration reading levels and uses this information to select and adapt reading materials for individual students and to guide their selection of independent reading materials.
- J. Uses various instructional strategies to enhance students' reading comprehension (e.g., linking text content to students' lives and prior knowledge, connecting related ideas across different texts, engaging students in guided and independent reading, guiding students to generate questions and apply knowledge of text topics).
- K. Knows how to provide students with direct, explicit instruction in the use of strategies to improve their reading comprehension (e.g., previewing, self-monitoring, visualizing, retelling, summarizing, paraphrasing, inferring, identifying text structure).

-
- L. Uses various communication modes (e.g., written, oral) to promote students' reading comprehension.
 - M. Understands levels of reading comprehension and how to model and teach literal, inferential and evaluative comprehension skills.
 - N. Knows how to provide instruction to help students increase their reading vocabulary.
 - O. Understands reading comprehension issues for students with different needs and knows effective reading strategies for those students.
 - P. Knows the difference between guided and independent practice in reading and provides students with frequent opportunities for both.
 - Q. Knows how to promote students' development of an extensive reading and writing vocabulary by providing them with many opportunities to read and write.

Competency 005 (Reading Applications): *The teacher understands reading skills and strategies appropriate for various types of texts and contexts and teaches students to apply these skills and strategies to enhance their reading proficiency.*

The beginning teacher:

- A. Understands skills and strategies for understanding, interpreting and evaluating different types of written materials, including narratives, expository texts, persuasive texts, technical writing and content-area textbooks.
- B. Understands different purposes for reading and related reading strategies.
- C. Knows and teaches strategies to facilitate comprehension of different types of text before, during and after reading (e.g., previewing, making predictions, questioning, self-monitoring, rereading, mapping, using reading journals, discussing texts).
- D. Provides instruction in comprehension skills that support students' transition from "learning to read" to "reading to learn" (e.g., matching comprehension strategies to different types of text and different purposes for reading).
- E. Understands the importance of reading as a skill in all content areas.
- F. Understands the value of using dictionaries, glossaries and other sources to determine the meanings, pronunciations and derivations of unfamiliar words and teaches students to use these sources.
- G. Knows how to teach students to interpret information presented in various formats (e.g., maps, tables, graphs) and how to locate, retrieve and retain information from a range of texts and technologies.
- H. Knows how to help students comprehend abstract content and ideas in written materials (e.g., by using manipulatives, examples, diagrams) and formulate, express and support responses to various types of texts.
- I. Knows literary genres (e.g., historical fiction, poetry, myths, fables, drama) and their characteristics.
- J. Knows literary nonfiction genres (e.g., biographies, memoirs) and their characteristics.
- K. Recognizes a wide range of literature and other texts appropriate for students.
- L. Provides multiple opportunities for students to listen and respond to a wide variety of children's and young people's literature, both fiction and nonfiction, and to recognize characteristics of various types of narrative and expository texts.
- M. Understands and promotes students' development of literary response and analysis (e.g., formulating, expressing, and supporting responses to various types of literary texts) including teaching students elements of literary analysis (e.g., story elements, literary devices, figurative language, characterization, features of different literary genres, influences of historical and cultural contexts, themes and settings) and providing students with opportunities to apply comprehension skills to literature.

-
- N. Selects and uses a variety of materials to teach students about authors, including the cultural, historical and contemporary contexts, and about different purposes for writing.
 - O. Provides students with opportunities to engage in silent reading and extended reading of a wide range of materials, including expository texts and various literary genres.
 - P. Engages students in varied reading experiences and encourages students to interact with others about their reading.
 - Q. Uses strategies to encourage reading for pleasure and lifelong learning.
 - R. Knows how to teach students strategies for selecting their own books for independent reading.
 - S. Uses technology to promote students' literacy and teaches students to use technology to access a wide range of appropriate narrative and expository texts.

Competency 006 (Written Language — Writing Conventions): *The teacher understands the conventions of writing in English and provides instruction that helps students develop proficiency in applying writing conventions.*

The beginning teacher:

- A. Knows predictable stages in the development of writing conventions (including the physical and cognitive processes involved in letter formation, word writing, sentence construction, spelling, punctuation and grammatical expression) and recognizes that individual variations occur.
- B. Knows and applies appropriate instructional strategies and sequences to teach writing conventions and their applications to all students, including English-language learners (in accordance with the ELPS).
- C. Knows informal and formal procedures for assessing students' use of writing conventions and uses multiple ongoing assessments to monitor and evaluate students' development in this area.
- D. Uses ongoing assessment of writing conventions to determine when a student needs additional help or intervention to bring the student's performance to grade level, based on state content and performance standards for writing in the Texas Essential Knowledge and Skills (TEKS).
- E. Analyzes students' errors in applying writing conventions and uses the results of this analysis to develop and adjust future instruction.
- F. Knows writing conventions and appropriate grammar and usage and provides students with direct instruction and guided practice in these areas.
- G. Understands the use of conventional spelling and its importance for success in reading and writing.
- H. Understands stages of spelling development (prephonetic, phonetic, transitional and conventional) and how and when to support students' development from one stage to the next.
- I. Provides systematic spelling instruction and gives students opportunities to use and develop spelling skills in the context of meaningful written expression.

Competency 007 (Written Language — Composition): *The teacher understands that writing to communicate is a developmental process and provides instruction that promotes students' competence in written communication.*

The beginning teacher:

- A. Knows predictable stages in the development of written language and recognizes that individual variations occur.
- B. Promotes student recognition of the practical uses of writing, creates an environment in which students are motivated to express ideas in writing and models writing as an enjoyable activity and a tool for lifelong learning.
- C. Knows and applies appropriate instructional strategies and sequences to develop students' writing skills (e.g., effective introduction, clearly stated purpose, controlling ideas).
- D. Knows characteristics and uses of informal and formal written language assessments and uses multiple, ongoing assessments to monitor and evaluate students' writing development.
- E. Uses assessment results to plan focused instruction to address the writing strengths, needs and interests of all individuals and groups, including English-language learners (in accordance with the ELPS).
- F. Uses ongoing assessment of written language to determine when a student needs additional help or intervention to bring the student's performance to grade level, based on state content and performance standards for writing in the Texas Essential Knowledge and Skills (TEKS).
- G. Understands the use of self-assessment in writing and provides opportunities for students to self-assess their writings (e.g., for clarity, interest to audience, comprehensiveness) and their development as writers.
- H. Understands differences between first-draft writing and writing for publication, and provides instruction in various stages of writing, including prewriting, drafting, editing and revising.
- I. Understands and teaches writing as a tool for inquiry, research and learning.
- J. Provides instruction about plagiarism, academic honesty and integrity as applied to students' written work and their presentation of information from different sources, including electronic sources.
- K. Teaches students to critically evaluate the sources they use for their writing.
- L. Understands the development of writing in relation to the other language arts and uses instructional strategies that connect these various aspects of language.
- M. Understands similarities and differences between the language (e.g., syntax, vocabulary) used in spoken and written English and helps students use knowledge of these similarities and differences to enhance their own writing.
- N. Understands writing for a variety of audiences, purposes and settings and provides students with opportunities to write for various audiences, purposes and settings.

-
- O. Knows how to write using voices and styles appropriate for different audiences and purposes, and provides students with opportunities to write using various voices and styles.
 - P. Understands the benefits of technology for teaching writing and writing for publication and provides instruction in the use of technology to facilitate written communication.

Competency 008 (Viewing and Representing): *The teacher understands skills for interpreting, analyzing, evaluating and producing visual images and messages in various media and provides students with opportunities to develop skills in this area.*

The beginning teacher:

- A. Knows grade-level expectations in the Texas Essential Knowledge and Skills (TEKS) and procedures for assessing students' skills in interpreting, analyzing, evaluating and producing visual images, messages and meanings.
- B. Uses ongoing assessment and knowledge of grade-level expectations in the Texas Essential Knowledge and Skills (TEKS) to identify students' needs regarding the interpretation, analysis, evaluation and production of visual images, messages and meanings and to plan instruction.
- C. Understands characteristics and functions of different types of media (e.g., film, print) and knows how different types of media influence and inform.
- D. Compares and contrasts print, visual and electronic media (e.g., films and written stories).
- E. Evaluates how visual image makers (e.g., illustrators, documentary filmmakers, political cartoonists, news photographers) represent messages and meanings and provides students with varied opportunities to interpret and evaluate visual images in various media.
- F. Knows how to teach students to analyze visual image makers' choices (e.g., style, elements, media) and evaluate how these choices help to represent or extend meaning.
- G. Provides students with opportunities to interpret events and ideas based on information from maps, charts, graphics, video segments and technology presentations and to use media to compare ideas and points of view.
- H. Knows steps and procedures for producing visual images, messages and meanings to communicate with others.
- I. Teaches students how to select, organize and produce visuals to complement and extend meanings.
- J. Provides students with opportunities to use technology to produce various types of communications (e.g., digital media, class news-papers, multimedia reports, video reports, movies) and helps students analyze how language, medium and presentation contribute to the message.

Competency 009 (Study and Inquiry Skills): *The teacher understands the importance of study and inquiry skills as tools for learning in the content areas and promotes students' development in applying study and inquiry skills.*

The beginning teacher:

- A. Understands study and inquiry skills (e.g., using text organizers; taking notes; outlining; drawing conclusions; applying test-taking strategies; previewing; setting purposes for reading; locating, organizing, evaluating, synthesizing and communicating information; summarizing information; using multiple sources of information; correctly recording bibliographic information for notes and sources; interpreting and using graphic sources of information) and knows the significance of these skills for student learning and achievement.
- B. Knows grade-level expectations for study and inquiry skills in the Texas Essential Knowledge and Skills (TEKS) and procedures for assessing students' development and use of these skills.
- C. Knows and applies instructional practices that promote the acquisition and use of study and inquiry skills across the curriculum by all students, including English-language learners (in accordance with the ELPS).
- D. Knows how to provide students with varied and meaningful opportunities to learn and apply study and inquiry skills to enhance their achievement across the curriculum.
- E. Uses ongoing assessment and knowledge of grade-level expectations in the Texas Essential Knowledge and Skills (TEKS) to identify students' needs regarding study and inquiry skills, to determine when a student requires additional help or intervention and to plan instruction.
- F. Responds to students' needs by providing direct, explicit instruction to promote the acquisition and use of study and inquiry skills.

SUBJECT TEST – MATHEMATICS (807)

Standards Assessed: Mathematics I–VIII

Competency 001: *The teacher understands the structure of number systems, the development of a sense of quantity and the relationship between quantity and symbolic representations.*

The beginning teacher:

- A. Analyzes the structure of numeration systems and the roles of place value and zero in the base ten system.
- B. Understands the relative magnitude of whole numbers, integers, rational numbers, irrational numbers and real numbers.
- C. Demonstrates an understanding of a variety of models for representing numbers (e.g., fraction strips, diagrams, patterns, shaded regions, number lines).
- D. Demonstrates an understanding of equivalency among different representations of rational numbers.
- E. Selects appropriate representations of real numbers (e.g., fractions, decimals, percents, roots, exponents, scientific notation) for particular situations.
- F. Understands the characteristics of the set of whole numbers, integers, rational numbers, real numbers and complex numbers (e.g., commutativity, order, closure, identity elements, inverse elements, density).
- G. Demonstrates an understanding of how some situations that have no solution in one number system (e.g., whole numbers, integers and rational numbers) have solutions in another number system (e.g., real numbers, complex numbers and irrational numbers).
- H. Approximates (mentally and with calculators) the value of numbers.
- I. Represents fractions and decimals to the tenths or hundredths as distances from zero on a number line.

Competency 002: *The teacher understands number operations and computational algorithms.*

The beginning teacher:

- A. Works proficiently with real and complex numbers and their operations.
- B. Analyzes and describes relationships between number properties, operations and algorithms for the four basic operations involving integers, rational numbers and real numbers.
- C. Uses a variety of concrete and visual representations to demonstrate the connections between operations and algorithms.
- D. Justifies procedures used in algorithms for the four basic operations with integers, rational numbers and real numbers and analyzes error patterns that may occur in their application.
- E. Relates operations and algorithms involving numbers to algebraic procedures (e.g., adding fractions to adding rational expressions, division of integers to division of polynomials).
- F. Extends and generalizes the operations on rationals and integers to include exponents, their properties and their applications to the real numbers.
- G. Compares and orders real numbers with and without a calculator.
- H. Uses models, such as concrete objects, pictorial models and number lines, to add, subtract, multiply and divide integers and connect the real-world problems to algorithms, including equivalent ratios and rates.
- I. Divides whole numbers by unit fractions and unit fractions by whole numbers.

Competency 003: *The teacher understands ideas of number theory and uses numbers to model and solve problems within and outside of mathematics.*

The beginning teacher:

- A. Demonstrates an understanding of ideas from number theory (e.g., prime factorization, greatest common divisor) as they apply to whole numbers, integers and rational numbers and uses these ideas in problem situations.
- B. Uses integers, rational numbers and real numbers to describe and quantify phenomena such as money, length, area, volume and density.
- C. Applies knowledge of place value and other number properties to develop techniques of mental mathematics and computational estimation.
- D. Applies knowledge of counting techniques such as permutations and combinations to quantify situations and solve problems.
- E. Applies properties of real numbers to solve a variety of theoretical and applied problems.
- F. Makes connections among various representations of a numerical relationship and generates a different representation of data given another representation of data (such as a table, graph, equation or verbal description).

Competency 004: *The teacher understands and uses mathematical reasoning to identify, extend and analyze patterns and understands the relationships among variables, expressions, equations, inequalities, relations and functions.*

The beginning teacher:

- A. Uses inductive reasoning to identify, extend and create patterns using concrete models, figures, numbers, and algebraic expressions.
- B. Formulates implicit and explicit rules to describe and construct sequences verbally, numerically, graphically and symbolically.
- C. Makes, tests, validates and uses conjectures about patterns and relationships in data presented in tables, sequences or graphs.
- D. Gives appropriate justification of the manipulation of algebraic expressions.
- E. Illustrates the concept of a function using concrete models, tables, graphs and symbolic and verbal representations.
- F. Uses transformations to illustrate properties of functions and relations and to solve problems.
- G. Uses graphs, tables and algebraic representations to make predictions and solve problems.
- H. Uses letters to represent an unknown in an equation.
- I. Formulates problem situations when given a simple equation and formulates an equation when given a problem situation.

Competency 005: *The teacher understands and uses linear functions to model and solve problems.*

The beginning teacher:

- A. Demonstrates an understanding of the concept of linear function using concrete models, tables, graphs and symbolic and verbal representations.
- B. Demonstrates an understanding of the connections among linear functions, proportions and direct variation.
- C. Determines the linear function that best models a set of data.
- D. Analyzes the relationship between a linear equation and its graph.
- E. Uses linear functions, inequalities and systems to model problems.
- F. Uses a variety of representations and methods (e.g., numerical methods, tables, graphs, algebraic techniques) to solve systems of linear equations and inequalities.
- G. Demonstrates an understanding of the characteristics of linear models and the advantages and disadvantages of using a linear model in a given situation.
- H. Uses multiplication by a given constant factor (including unit rate) to represent and solve problems involving proportional relationships, including conversions between measurement systems, (e.g., ratio, speed, density, price, recipes, student teacher ratio).
- I. Identifies proportional or nonproportional linear relationships in problem situations and solves problems.

Competency 006: *The teacher understands and uses nonlinear functions and relations to model and solve problems.*

The beginning teacher:

- A. Uses a variety of methods to investigate the roots (real and complex), vertex and symmetry of a quadratic function or relation.
- B. Demonstrates an understanding of the connections among geometric, graphic, numeric and symbolic representations of quadratic functions.
- C. Demonstrates an understanding of the connections among proportions, inverse variation and rational functions.
- D. Understands the effects of transformations such as $f(x \pm c)$ on the graph of a nonlinear function $f(x)$.
- E. Applies properties, graphs and applications of nonlinear functions to analyze, model and solve problems.
- F. Uses a variety of representations and methods (e.g., numerical methods, tables, graphs, algebraic techniques) to solve systems of quadratic equations and inequalities.
- G. Understands how to use properties, graphs and applications of nonlinear relations including polynomial, rational, radical, absolute value, exponential, logarithmic, trigonometric and piecewise functions and relations to analyze, model and solve problems.

Competency 007: *The teacher uses and understands the conceptual foundations of calculus related to topics in middle school mathematics.*

The beginning teacher:

- A. Relates topics in middle school mathematics to the concept of limit in sequences and series.
- B. Relates the concept of average rate of change to the slope of the line and the concept of instantaneous rate of change as a slope of the line.
- C. Demonstrates an understanding of the use of calculus concepts to answer questions about rates of change, areas, volumes and properties of functions and their graphs.

Competency 008: *The teacher understands measurement as a process.*

The beginning teacher:

- A. Selects and uses appropriate units of measurement (e.g., temperature, money, mass, weight, area, capacity, density, percents, speed, acceleration) to quantify, compare and communicate information.
- B. Develops, justifies and uses conversions within measurement systems.
- C. Applies dimensional analysis to derive units and formulas in a variety of situations (e.g., rates of change of one variable with respect to another) and to find and evaluate solutions to problems.
- D. Describes the precision of measurement and the effects of error on measurement.
- E. Applies the Pythagorean Theorem, proportional reasoning and right triangle trigonometry to solve measurement problems.

Competency 009: *The teacher understands the geometric relationships and axiomatic structure of Euclidian geometry.*

The beginning teacher:

- A. Understands concepts and properties of points, lines, planes, angles, lengths and distances.
- B. Analyzes and applies the properties of parallel and perpendicular lines.
- C. Uses the properties of congruent triangles to explore geometric relationships and prove theorems.
- D. Describes and justifies geometric constructions.
- E. Applies knowledge of right angles to identify acute, right and obtuse triangles.
- F. Measures angles correctly using a protractor.

Competency 010: *The teacher analyzes the properties of two- and three-dimensional figures.*

The beginning teacher:

- A. Uses and understands the development of formulas to find lengths, perimeters, areas and volumes of basic geometric figures.
- B. Applies relationships among similar figures, scale and proportion and analyzes how changes in scale affect area and volume measurements.
- C. Uses a variety of representations (e.g., numeric, verbal, graphic, symbolic) to analyze and solve problems involving two- and three-dimensional figures such as circles, triangles, polygons, cylinders, prisms and spheres.
- D. Analyzes the relationship among three-dimensional figures and related two-dimensional representations (e.g., projections, cross-sections, nets) and uses these representations to solve problems.
- E. Generates formulas involving perimeter, area, circumference, volume and scaling.
- F. Estimates measurements and solves application problems involving length (including perimeter and circumference) and area of polygons and other shapes.
- G. Knows the various types of triangles (e.g., scalene, obtuse, acute) and how to calculate angle degrees.
- H. Uses geometry and spatial reasoning, compares and classifies two- and three-dimensional figures using geometric vocabulary and properties.

Competency 011: *The teacher understands algebra and geometry through the Cartesian coordinate system and demonstrates knowledge of transformational geometry.*

The beginning teacher:

- A. Describes and justifies geometric constructions made using a reflection device and other appropriate technologies.
- B. Uses translations, reflections, glide-reflections and rotations to demonstrate congruence and to explore the symmetries of figures.
- C. Uses dilations (expansions and contractions) to illustrate similar figures and proportionality.
- D. Uses symmetry to describe tessellations and shows how they can be used to illustrate geometric concepts, properties and relationships.
- E. Applies concepts and properties of slope, midpoint, parallelism and distance in the coordinate plane to explore properties of geometric figures and solve problems.
- F. Applies transformations in the coordinate plane.
- G. Uses geometry to model and describe the physical world.
- H. Identifies, locates and names points on a coordinate plane using ordered pairs of real numbers in all quadrants
- I. Graphs in the first quadrant of the coordinate plane ordered pairs of numbers arising from mathematical and real-world problems, including those generated by number patterns or found in an input-output table.
- J. Graphs reflections across the horizontal or vertical axis and graph translations on a coordinate plane.

Competency 012: *The teacher understands how to use graphical and numerical techniques to explore data, characterize patterns and describe departures from patterns.*

The beginning teacher:

- A. Organizes and displays data in a variety of formats (e.g., tables, frequency distributions, stem-and-leaf plots, box-and-whisker plots, histograms, pie charts).
- B. Applies concepts of center, spread, shape and skewness to describe a data distribution.
- C. Supports arguments, makes predictions and draws conclusions using summary statistics and graphs to analyze and interpret one-variable data.
- D. Demonstrates an understanding of measures of central tendency (e.g., mean, median, mode) and dispersion (e.g., range, interquartile range, variance, standard deviation).
- E. Analyzes connections among concepts of center and spread, data clusters and gaps, data outliers and measures of central tendency and dispersion.
- F. Calculates and interprets percentiles and quartiles.

Competency 013: *The teacher understands the theory of probability.*

The beginning teacher:

- A. Explores concepts of experimental and theoretical probability through data collection, experiments and simulations.
- B. Uses the concepts and principles of probability to describe the outcome of simple and compound events, including independent and dependent events.
- C. Generates, simulates and uses probability models to represent a situation.
- D. Determines probabilities by constructing sample spaces to model situations.
- E. Solves a variety of probability problems using combinations, permutations and geometric probability (i.e., probability as the ratio of two areas).
- F. Uses the binomial, geometric and normal distributions to solve problems.

Competency 014: *The teacher understands the relationship among probability theory, sampling and statistical inference and how statistical inference is used in making and evaluating predictions.*

The beginning teacher:

- A. Applies knowledge of designing, conducting, analyzing and interpreting statistical experiments to investigate real-world problems.
- B. Demonstrates an understanding of random samples, sample statistics and the relationship between sample size and confidence intervals.
- C. Applies knowledge of the use of probability to make observations and draw conclusions from single variable data and to describe the level of confidence in the conclusion.
- D. Makes inferences about a population using binomial, normal and geometric distributions.
- E. Demonstrates an understanding of the use of techniques such as scatter plots, regression lines, correlation coefficients and residual analysis to explore bivariate data and to make and evaluate predictions.

Competency 015: *The teacher understands mathematical reasoning and problem solving.*

The beginning teacher:

- A. Demonstrates an understanding of proof, including indirect proof, in mathematics.
- B. Applies correct mathematical reasoning to derive valid conclusions from a set of premises.
- C. Demonstrates an understanding of the use of inductive reasoning to make conjectures and deductive methods to evaluate the validity of conjectures.
- D. Applies knowledge of the use of formal and informal reasoning to explore, investigate and justify mathematical ideas.
- E. Recognizes that a mathematical problem can be solved in a variety of ways and selects an appropriate strategy for a given problem.
- F. Evaluates the reasonableness of a solution to a given problem.
- G. Applies content knowledge to develop a mathematical model of a real-world situation and analyzes and evaluates how well the model represents the situation.
- H. Demonstrates an understanding of estimation and evaluates its appropriate uses.

Competency 016: *The teacher understands mathematical connections within and outside of mathematics and how to communicate mathematical ideas and concepts.*

The beginning teacher:

- A. Recognizes and uses multiple representations of a mathematical concept (e.g., a point and its coordinates, the area of circle as a quadratic function in r , probability as the ratio of two areas).
- B. Uses mathematics to model and solve problems in other disciplines, such as art, music, science, social science and business.
- C. Expresses mathematical statements using developmentally appropriate language, Standard English, mathematical language and symbolic mathematics.
- D. Communicates mathematical ideas using a variety of representations (e.g., numeric, verbal, graphic, pictorial, symbolic, concrete).
- E. Demonstrates an understanding of the use of visual media such as graphs, tables, diagrams and animations to communicate mathematical information.
- F. Uses the language of mathematics as a precise means of expressing mathematical ideas.
- G. Understands the structural properties common to the mathematical disciplines.
- H. Explores and applies concepts of financial literacy as it relates to teaching students (e.g., describes the basic purpose of financial institutions, distinguishes the difference between gross income and net income, identifies various savings options, defines different types of taxes, identifies the advantages and disadvantages of different methods of payments).
- I. Applies mathematics to model and solve problems to manage financial resources effectively for lifetime financial security as it relates to teaching students (e.g., distinguish between fixed and variable expenses, calculate profit in a given situation, develop a system for keeping and using financial records, describe actions that might be taken to balance a budget when expenses exceed income and balance a simple budget.)

Competency 017: *The teacher understands how children learn and develop mathematical skills, procedures and concepts.*

The beginning teacher:

- A. Applies theories and principles of learning mathematics to plan appropriate instructional activities for all students.
- B. Understands how students differ in their approaches to learning mathematics with regards to diversity.
- C. Uses students' prior mathematical knowledge to build conceptual links to new knowledge and plans instruction that builds on students' strengths and addresses students' needs.
- D. Understands how learning may be assisted through the use of mathematics manipulatives and technological tools.
- E. Understands how to motivate students and actively engage them in the learning process by using a variety of interesting, challenging and worthwhile mathematical tasks in individual, small-group and large-group settings.
- F. Understands how to provide instruction along a continuum from concrete to abstract.
- G. Recognizes the implications of current trends and research in mathematics and mathematics education.

Competency 018: *The teacher understands how to plan, organize and implement instruction using knowledge of students, subject matter and statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) to teach all students to use mathematics.*

The beginning teacher:

- A. Demonstrates an understanding of a variety of instructional methods, tools and tasks that promote students' ability to do mathematics described in the TEKS.
- B. Understands planning strategies for developing mathematical instruction as a discipline of interconnected concepts and procedures.
- C. Develops clear learning goals to plan, deliver, assess and reevaluate instruction based on the TEKS.
- D. Understands procedures for developing instruction that establishes transitions between concrete, symbolic and abstract representations of mathematical knowledge.
- E. Applies knowledge of a variety of instructional delivery methods, such as individual, structured small-group and large-group formats.
- F. Understands how to create a learning environment that provides all students, including English-language learners, with opportunities to develop and improve mathematical skills and procedures.
- G. Demonstrates an understanding of a variety of questioning strategies to encourage mathematical discourse and to help students analyze and evaluate their mathematical thinking.
- H. Understands how technological tools and manipulatives can be used appropriately to assist students in developing, comprehending and applying mathematical concepts.
- I. Understands how to relate mathematics to students' lives and a variety of careers and professions.

Competency 019: *The teacher understands assessment and uses a variety of formal and informal assessment techniques to monitor and guide mathematics instruction and to evaluate student progress.*

The beginning teacher:

- A. Demonstrates an understanding of the purpose, characteristics and uses of various assessments in mathematics, including formative and summative assessments.
- B. Understands how to select and develop assessments that are consistent with what is taught and how it is taught.
- C. Demonstrates an understanding of how to develop a variety of assessments and scoring procedures consisting of worthwhile tasks that assess mathematical understanding, common misconceptions and error patterns.
- D. Understands how to evaluate a variety of assessment methods and materials for reliability, validity, absence of bias, clarity of language and appropriateness of mathematical level.
- E. Understands the relationship between assessment and instruction and knows how to evaluate assessment results to design, monitor and modify instruction to improve mathematical learning for all students, including English-language learners.

SUBJECT TEST – SOCIAL STUDIES (808)

Standards Assessed: Social Studies I–X

Competency 001 (History): *The teacher understands and applies knowledge of significant historical events and developments, multiple historical interpretations and ideas and relationships between the past, the present and the future, as defined by the Texas Essential Knowledge and Skills (TEKS).*

The beginning teacher:

- A. Understands traditional historical points of reference in the history of Texas, the United States and the world.
- B. Analyzes how individuals, events and issues shaped the history of Texas, the United States and the world.
- C. Analyzes the influence of various factors (e.g., geographic contexts, processes of spatial exchange, science and technology) on the development of societies.
- D. Demonstrates knowledge of common characteristics of communities, past and present.
- E. Applies knowledge of the concept of chronology and its use in understanding history and historical events.
- F. Applies different methods of interpreting the past to understand, evaluate and support multiple points of view, frames of reference and the historical context of events and issues.
- G. Understands similarities and differences among Native-American groups in Texas, the United States and the Western Hemisphere before European colonization.
- H. Understands the causes and effects of European exploration and colonization of the United States and the Western Hemisphere.
- I. Understands the impact of individuals, events, and issues on the exploration of Texas (e.g., Cabeza de Vaca, Alonso Álvarez de Pineda, Francisco Coronado, la Salle, the search for gold, conflicting territorial claims between France and Spain).
- J. Identify important events, issues and individuals related to European colonization of Texas; Mexico becoming an independent nation, including the establishment of Catholic missions, towns and ranches (e.g., Fray Damián Massanet, José de Escandón, Antonio Margil de Jesús, Francisco Hidalgo, the Mexican Federal Constitution of 1824, and the State Colonization Law of 1825).

-
- K. Understands the foundations of representative government in the United States; significant individuals, events and issues of the revolutionary era; and challenges confronting the U.S. government in the early years of the republic (e.g., Mayflower Compact, Virginia Houses of Burgesses, John Adams, Abigail Adams, George Washington, Crispus Attucks, Battle of Saratoga, winter at Valley Forge, Battle of Yorktown, the arguments of the Federalists and Anti-Federalists, Articles of Confederation, United States Constitution, War of 1812).
 - L. Demonstrates knowledge of the individuals, events and issues related to the independence of Texas, the founding of the Republic of Texas, and Texas statehood (e.g., Moses Austin, Samuel Houston, Erasmo Seguín, Antonio López de Santa Anna, the Fredonian Rebellion, the Battle of the Alamo, the Battle of San Jacinto, the annexation of Texas, the U.S.-Mexican War).
 - M. Understands westward expansion and analyzes its effects on the political, economic and social development of the United States and Texas — including its effects on American Indian life (e.g., Louisiana Purchase, Monroe Doctrine, building of U.S. forts, the destruction of the buffalo, Indian Removal Act, Trail of Tears, Red River Indian War).
 - N. Analyzes ways in which political, economic and social factors led to the growth of sectionalism and the Civil War (e.g., nullification crisis, Compromise of 1850, the roles of John Quincy Adams, John C. Calhoun, Henry Clay and Daniel Webster).
 - O. Demonstrates knowledge of individuals, issues and events of the Civil War and analyzes the effects of Reconstruction on the political, economic and social life of the nation and Texas (e.g., Abraham Lincoln, Jefferson Davis, John Bell Hood, Vicksburg Campaign, Battle of Gettysburg, Emancipation Proclamation, Battle of Galveston, Battle of Palmito Ranch).
 - P. Demonstrates knowledge of major U.S. and Texas reform movements of the nineteenth and twentieth centuries (e.g., abolition movement, women suffrage movement, temperance movement, Civil Rights movement, agrarian groups, labor unions, James L. Farmer Jr., Jane Addams, Hector Pérez García, Oveta Culp Hobby, the League of United Latin American Citizens (LULAC), the evangelical movement).
 - Q. Understands important issues, events and individuals of the twentieth and twenty-first centuries that shaped the role of Texas in the United States and the world (e.g., Great Depression, First and Second World Wars, Civil Rights movement, Lyndon B. Johnson, emergence of a two-party system, political and economic controversies, immigration, migration).
 - R. Understands and traces the impact of boom-and-bust cycles of leading Texas industries (e.g., railroads, cattle, oil and gas, cotton, real estate, banking, computer technology).
 - S. Understands the contributions of people of various racial, ethnic and religious groups in Texas, the United States and the world.
 - T. Analyzes ways in which particular contemporary societies reflect historical events (e.g., invasions, conquests, colonizations, immigrations).

Competency 002 (Geography): *The teacher understands and applies knowledge of geographic relationships involving people, places and environments in Texas, the United States and the world, as defined by the Texas Essential Knowledge and Skills (TEKS).*

The beginning teacher:

- A. Understands and applies the geographic concept of region.
- B. Knows how to create and use geographic tools and translate geographic data into a variety of formats (e.g., grid systems, legends, scales, databases, construction of maps, graphs, charts, models).
- C. Knows the location and the human and physical characteristics of places and regions in Texas, the United States and the world.
- D. Analyzes ways in which humans adapt to, use and modify the physical environment.
- E. Knows how regional physical characteristics and human modifications to the environment affect people's activities, settlement, immigration and migration patterns.
- F. Analyzes ways in which location (absolute and relative) affects people, places and environments.
- G. Demonstrates knowledge of physical processes (e.g., erosion, deposition and weathering; plate tectonics; sediment transfer; the flows and exchanges of energy and matter in the atmosphere that produce weather and climate) and their effects on environmental patterns.
- H. Understands the characteristics, distribution and migration of populations in Texas, the United States and the world.
- I. Understands the physical and environmental characteristics of Texas, the United States and the world, past and present, and how humans have adapted to and positively and negatively modified the environment (e.g., air and water quality, building of dams, use of natural resources, the impact on habitats and wildlife).
- J. Analyzes how geographic factors have influenced settlement patterns, economic and social development, political relationships and policies of societies and regions in Texas, the United States and the world (e.g., the Galveston hurricane of 1900, the Dust Bowl, limited water resources, alternative energy sources).
- K. Analyzes interactions between people and the physical environment and the effects of these interactions on the development of places and regions.
- L. Understands comparisons among various world regions and countries (e.g., aspects of population, disease and economic activities) by analyzing maps, charts, databases and models.

Competency 003 (Economics): *The teacher understands and applies knowledge of economic systems and how people organize economic systems to produce, distribute and consume goods and services, as defined by the Texas Essential Knowledge and Skills (TEKS).*

The beginning teacher:

- A. Understands that basic human needs are met in many ways.
- B. Understands and applies knowledge of basic economic concepts (e.g., goods and services, free enterprise, interdependence, needs and wants, scarcity, economic system, factors of production).
- C. Demonstrates knowledge of the ways in which people organize economic systems and the similarities and differences among various economic systems around the world.
- D. Understands the value and importance of work and purposes for spending and saving money.
- E. Demonstrates knowledge of occupational patterns and economic activities in Texas, the United States and the world, past and present (e.g., the plantation system, the spread of slavery, industrialization and urbanization, transportation, the American ideals of progress, equality of opportunity).
- F. Understands the characteristics, benefits and development of the free enterprise system in Texas and the United States.
- G. Analyzes the roles of producers and consumers in the production of goods and services.
- H. Understands the effects of government regulation and taxation on economic development.
- I. Demonstrates knowledge of how businesses operate in the U.S. free-enterprise system and international markets (e.g., government regulation, world competition, the importance of morality and ethics in maintaining a functional enterprise system).
- J. Applies knowledge of the effects of supply and demand on consumers and producers in a free-enterprise system.
- K. Demonstrates knowledge of categories of economic activities and methods used to measure a society's economic level.
- L. Uses economic indicators to describe and measure levels of economic activity.
- M. Understands the causes of major events and trends in economic history (e.g., factors leading societies to change from agrarian to urban, economic reasons for exploration and colonization, economic forces leading to the Industrial Revolution, processes of economic development in world areas, factors leading to the emergence of different patterns in jobs, economic activity in regions of the United States).

-
- N. Analyzes the interdependence of Texas, United States and world economies.
 - O. Understands how geographic factors such as immigration, migration, location, climate and limited resources have influenced the development of economic activities in Texas, the United States, and the world.
 - P. Applies knowledge of significant economic events and issues and their effects in Texas, in the United States and the world.

Competency 004 (Government and Citizenship): *The teacher understands and applies knowledge of government, democracy and citizenship, including ways in which individuals and groups achieve their goals through political systems, as defined by the Texas Essential Knowledge and Skills (TEKS).*

The beginning teacher:

- A. Demonstrates knowledge of the historical origins of democratic forms of government, such as ancient Greece.
- B. Understands the purpose of rules and laws; the relationship between rules, rights and responsibilities; and the individual's role in making and enforcing rules and ensuring the welfare of society.
- C. Knows the basic structure and functions of the U.S. government, the Texas government and local governments (including the roles of public officials) and relationships among national, state and local governments.
- D. Demonstrates knowledge of key principles and ideas in major political documents of Texas and the United States (e.g., Articles of Confederation, Declaration of Independence, U.S. Constitution, Bill of Rights, Texas Constitution) and relationships among political documents.
- E. Understands early United States political issues, including those surrounding Alexander Hamilton, Patrick Henry, James Madison, George Mason; the arguments of the Federalists and Anti-Federalists; states' rights issues; and the nullification crisis.
- F. Knows how American Indian groups and settlers organized governments in precolonial America, and during the early development of Texas and North America.
- G. Demonstrates knowledge of how state and local governments use sources of revenue such as property tax and sales tax, and the funding of Texas public education.
- H. Demonstrates knowledge of types of government (e.g., constitutional, totalitarian), their effectiveness in meeting citizens' needs and the reasons for limiting the power of government.
- I. Knows the formal and informal process of changing the U.S. and Texas constitutions and the impact of constitutional changes on society.
- J. Understands the impact of landmark Supreme Court cases (e.g., *Marbury v. Madison*, *Dred Scott v. Sandford*, *McCulloch v. Maryland*, *Gibbons v. Ogden*).
- K. Understands components of the democratic process (e.g., voting, contacting local and state representatives, voluntary individual participation, effective leadership, expression of different points of view) and their significance in a democratic society.
- L. Demonstrates knowledge of important customs, symbols, landmarks and celebrations that represent American and Texan beliefs and principles and that contribute to national unity (e.g., Uncle Sam, "The Star-Spangled Banner," the San Jacinto Monument, "Texas, our Texas").

-
- M. Demonstrates knowledge of the importance, accomplishments and leadership qualities of United States and Texas leaders (e.g., presidents Washington, Adams, Jefferson, Madison, Monroe, Lincoln; U.S. senators Calhoun, Webster, Clay; Texas governors and local Texas representatives).
 - N. Analyzes the relationship among individual rights, responsibilities and freedoms in democratic societies.
 - O. Applies knowledge of the nature, rights and responsibilities of citizens in Texas, the United States, and various societies, past and present.
 - P. Understands the contributions and importance of political figures, members of Congress, military leaders and social reformers who modeled active participation in the democratic process in Texas and in the United States (e.g., Frederick Douglass, Susan B. Anthony, Sam Houston, Barbara Jordan, Henry B. González, Kay Bailey Hutchinson, Audie Murphy, William Carney, Philip Bazaar).

Competency 005 (Culture; Science, Technology and Society): *The teacher understands and applies knowledge of cultural development, adaptation and diversity and understands and applies knowledge of interactions among science, technology and society, as defined by the Texas Essential Knowledge and Skills (TEKS).*

The beginning teacher:

- A. Understands basic concepts of culture and the processes of cultural adaptation, diffusion and exchange.
- B. Analyzes similarities and differences in the ways various peoples at different times in history have lived and met basic human needs.
- C. Applies knowledge of the role of families in meeting basic human needs and how families and cultures develop and use customs, traditions and beliefs to define themselves.
- D. Demonstrates knowledge of institutions that exist in all societies and how characteristics of these institutions may vary among societies.
- E. Understands how people use oral tradition, stories, real and mythical heroes, music, paintings and sculpture to create and represent culture in communities in Texas, the United States and the world.
- F. Demonstrates knowledge of significant examples of art, music and literature from various periods in U.S. and Texas history (e.g., John James Audubon, Henry David Thoreau, transcendentalism, the painting *American Progress*, "Yankee Doodle," "Battle Hymn of the Republic," Amado Peña, Diane Gonzales Bertrand, Scott Joplin).
- G. Understands the universal themes found in the arts and their relationship with the times and societies in which they are produced, including how contemporary issues influence creative expressions and how the arts can transcend the boundaries of societies (e.g., religion, justice, the passage of time).
- H. Understands the contributions of people of various racial, ethnic and religious groups in Texas, the United States and the world.
- I. Demonstrates knowledge of relationships among world cultures and relationships between and among people from various groups, including racial, ethnic and religious groups, in the United States and throughout the world.
- J. Analyzes relationships among religion, philosophy and culture, and the impact of religion on ways of life in the United States and throughout the world.
- K. Understands the concept of diversity within unity.
- L. Analyzes the effects of race, gender, socioeconomic class, status and stratification on ways of life in the United States and throughout the world.
- M. Understands the various roles of men, women, children and families in cultures past and present.

-
- N. Understands how the self develops and the dynamic relationship between self and social context.
 - O. Demonstrates knowledge of the discoveries, technological innovations and accomplishments of notable inventors and individuals in the field of science from the United States, Texas and the world (e.g., Benjamin Franklin, Eli Whitney, Cyrus McCormick, Thomas Alva Edison, Alexander Graham Bell, Michael DeBakey, Millie Hughes-Fulford, Walter Cunningham, Denton Cooley, Michael Dell).
 - P. Applies knowledge of the effects of scientific discoveries and technological innovations on political, economic, social and environmental developments and on everyday life in Texas, the United States and the world in the past, present and future.
 - Q. Analyzes how science and technology relate to political, economic, social and cultural issues and events.
 - R. Demonstrates knowledge of the origins, diffusions and effects of major scientific, mathematical and technological discoveries throughout history.
 - S. Knows how developments in science and technology have affected the physical environment; the growth of economies and societies; and definitions of, access to and use of physical and human resources.
 - T. Knows how changes in science and technology affect moral and ethical issues.

Competency 006 (Social Studies Foundations and Skills): *The teacher understands the foundations of social studies education and applies knowledge of skills used in the social sciences.*

The beginning teacher:

- A. Understands the philosophical foundations of the social science disciplines and knows how knowledge generated by the social sciences affects society and people's lives.
- B. Understands how social science disciplines relate to each other.
- C. Understands practical applications of social studies education.
- D. Relates philosophical assumptions and ideas to issues and trends in the social sciences.
- E. Knows characteristics and uses of various primary and secondary sources (e.g., databases, maps, photographs, media services, the Internet, biographies, interviews, questionnaires, artifacts) and uses information from a variety of sources to acquire social science information and answer social science questions.
- F. Knows how to formulate research questions and use appropriate procedures to reach supportable judgments and conclusions in the social sciences.
- G. Understands social science research and knows how social scientists locate, gather, organize, analyze and report information using standard research methodologies.
- H. Evaluates the validity of social science information from primary and secondary sources regarding bias issues, propaganda, point of view and frame of reference.
- I. Understands and evaluates multiple points of view and frames of reference relating to issues in the social sciences.
- J. Knows how to analyze social science information (e.g., by categorizing, comparing and contrasting, making generalizations and predictions, drawing inferences and conclusions).
- K. Communicates and interprets social science information in written, oral and visual forms and translates information from one medium to another (e.g., written to visual, statistical to written or visual).
- L. Uses standard grammar, spelling, sentence structure, punctuation and proper citation of sources.
- M. Knows how to use problem-solving processes to identify problems, gather information, list and consider options, consider advantages and disadvantages, choose and implement solutions and evaluate the effectiveness of solutions.
- N. Knows how to use decision-making processes to identify situations that require decisions, gather information, identify options, predict consequences and take action to implement decisions.

-
- O. Knows how to create maps and other graphics to present geographic, political, historical, economic and cultural features, distributions, and relationships.
 - P. Analyzes social science data by using basic mathematical and statistical concepts and analytical methods.
 - Q. Knows how to apply skills for resolving conflict, including persuasion, compromise, debate and negotiation.
 - R. Understands and uses social studies terminology correctly.

Competency 007 (Social Studies Instruction and Assessment): *The teacher plans and implements effective instruction and assessment in social studies.*

The beginning teacher:

- A. Knows state content and performance standards for social studies that are used in the Texas Essential Knowledge and Skills (TEKS).
- B. Understands the vertical alignment of the social sciences in the Texas Essential Knowledge and Skills (TEKS) from grade level to grade level, including prerequisite knowledge and skills.
- C. Understands the implications of stages of child growth and development for designing and implementing effective learning experiences in the social sciences.
- D. Understands the appropriate use of technology as a tool for learning and communicating social studies concepts.
- E. Selects and uses effective instructional practices, activities, technologies and materials to promote students' knowledge and skills in the social sciences.
- F. Knows how to promote students' use of social science skills, vocabulary and research tools, including technological tools.
- G. Knows how to communicate the value of social studies education to students, parents/caregivers, colleagues and the community.
- H. Knows how to provide instruction that relates skills, concepts and ideas in different social science disciplines.
- I. Provides instruction that makes connections between knowledge and methods in the social sciences and in other content areas.
- J. Demonstrates knowledge of forms of assessment appropriate for evaluating students' progress and needs in the social sciences.
- K. Uses multiple forms of assessment and knowledge of the Texas Essential Knowledge and Skills (TEKS) to determine students' progress and needs and to help plan instruction that addresses the strengths, needs and interests of all students, including English-language learners.

SUBJECT TEST – SCIENCE (809)

Standards Assessed: Science I–XI

Competency 001: *The teacher understands how to manage learning activities to ensure the safety of all students.*

The beginning teacher:

- A. Understands safety regulations and guidelines for science facilities and science instruction.
- B. Knows procedures for and sources of information regarding the appropriate handling, use, disposal, care and maintenance of chemicals, materials, specimens and equipment.
- C. Knows procedures for the safe handling and ethical care and treatment of organisms and specimens.

Competency 002: *The teacher understands the correct use of tools, materials, equipment and technologies.*

The beginning teacher:

- A. Selects and safely uses appropriate tools, technologies, materials and equipment needed for instructional activities.
- B. Understands concepts of precision, accuracy and error with regard to reading and recording numerical data from a scientific instrument.
- C. Understands how to gather, organize, display and communicate data in a variety of ways (e.g., charts, tables, graphs, diagrams, written reports, oral presentations, maps, satellite views).
- D. Understands various units of measure such as the International System of Units (SI or metric system), light years and degrees Celsius, and performs unit conversions within measurement systems (e.g., grams to kilograms, meters to millimeters).

Competency 003: *The teacher understands the process of scientific inquiry and the history and nature of science.*

The beginning teacher:

- A. Understands the characteristics of various types of scientific investigations (e.g., descriptive studies, comparative data analysis, experiments).
- B. Understands how to design, conduct and communicate the results of a variety of scientific investigations.
- C. Understands the historical development of science (e.g., cell theory, plate tectonics, laws of motion, universal gravity, atomic theory) and the contributions that diverse cultures and individuals of both genders have made to scientific knowledge.
- D. Understands the roles that logical reasoning, verifiable evidence, prediction and peer review play in the process of generating and evaluating scientific knowledge.
- E. Understands principles of scientific ethics (e.g., honest and complete reporting of data, informed consent, legal constraints).
- F. Develops, analyzes and evaluates different explanations for a given scientific result.
- G. Demonstrates an understanding of potential sources of error in an investigation.
- H. Demonstrates an understanding of how to communicate and defend the results of an investigation.
- I. Demonstrates an ability to identify, review and evaluate legitimate sources of scientific information.

Competency 004: *The teacher understands how science impacts the daily lives of students and interacts with and influences personal and societal decisions.*

The beginning teacher:

- A. Understands that decisions about the use of science are based on factors such as ethical standards, economics and personal and societal needs.
- B. Applies scientific principles and the theory of probability to analyze the advantages of, disadvantages of or alternatives to a given decision or course of action.
- C. Applies scientific principles and processes to analyze factors that influence personal choices concerning fitness and health, including physiological and psychological effects and risks associated with the use of substances and substance abuse.
- D. Understands concepts, characteristics and issues related to changes in populations and human population growth.
- E. Understands the types and uses of natural resources and the effects of human consumption on the renewal and depletion of global resources (e.g., energy, sustainability).
- F. Understands the role science can play in helping resolve personal, societal and global challenges (e.g., water quality, public health, climate change).

Competency 005: *The teacher knows and understands the unifying concepts and processes that are common to all sciences.*

The beginning teacher:

- A. Understands how the following concepts and processes provide a unifying explanatory framework across the science disciplines: systems, order and organization; evidence, models and explanation; change, constancy and measurements; evolution and equilibrium; and form and function.
- B. Demonstrates an understanding of how patterns in observations and data can be used to make explanations and predictions.
- C. Analyzes interactions and interrelationships between systems and subsystems.
- D. Applies unifying concepts to explore similarities in a variety of natural phenomena.
- E. Understands how properties and patterns of systems can be described in terms of space, time, energy and matter.
- F. Understands how change and constancy occur in systems.
- G. Understands the complementary nature of form and function in a given system.
- H. Understands how models are used to represent the natural world and how to evaluate the strengths and limitations of a variety of scientific models (e.g., physical, conceptual, mathematical).

Competency 006: *The teacher understands forces and motion and their relationships.*

The beginning teacher:

- A. Demonstrates an understanding of properties of universal forces (e.g., gravitational, electrical, magnetic).
- B. Understands how to measure, graph and describe changes in motion using concepts of displacement, velocity and acceleration.
- C. Understands the vector nature of force.
- D. Identifies the forces acting on an object and applies Newton's laws to describe the motion of an object.
- E. Analyzes the relationship between force and motion in a variety of situations (e.g., simple machines, blood flow, geologic processes).

Competency 007: *The teacher understands physical properties of and changes in matter.*

The beginning teacher:

- A. Describes the physical properties of substances (e.g., density, boiling point, solubility, thermal and electrical conductivity).
- B. Describes the physical properties and molecular structure of solids, liquids and gases.
- C. Describes the relationship between the molecular structure of materials (e.g., metals, crystals, polymers) and their physical properties.
- D. Relates the physical properties of an element to its placement in the periodic table.
- E. Distinguishes between physical and chemical changes in matter.
- F. Applies knowledge of physical properties of and changes in matter to processes and situations that occur in life science and in Earth/space science (e.g., evaporation, changes in air pressure).

Competency 008: *The teacher understands chemical properties of and changes in matter.*

The beginning teacher:

- A. Describes the structure and components of the atom.
- B. Distinguishes among elements, mixtures and compounds and describes their properties.
- C. Relates the chemical properties of an element to its placement in the periodic table.
- D. Describes chemical bonds and chemical formulas.
- E. Analyzes chemical reactions and their associated chemical equations.
- F. Explains the importance of a variety of chemical reactions that occur in daily life (e.g., rusting, burning of fossil fuels, photosynthesis, cell respiration, chemical batteries, digestion of food).
- G. Understands applications of chemical properties of matter in physical, life and Earth/space science and technology (e.g., materials science, biochemistry, transportation, medicine, telecommunications).

Competency 009: *The teacher understands energy and interactions between matter and energy.*

The beginning teacher:

- A. Describes concepts of work, power and potential and kinetic energy.
- B. Understands the concept of heat energy and the difference between heat and temperature.
- C. Understands the principles of electricity and magnetism and their applications (e.g., electric circuits, motors, audio speakers, nerve impulses, lighting).
- D. Applies knowledge of types (longitudinal, transverse), properties (e.g., wavelength and frequency) and behaviors (e.g., reflection, refraction, dispersion) to describe a variety of waves (e.g., water, electromagnetic, sound, seismic waves).
- E. Applies knowledge of properties and behaviors of light to describe the function of optical systems and phenomena (e.g., camera, microscope, rainbow, eye).
- F. Demonstrates an understanding of the properties, production and transmission of sound.

Competency 010: *The teacher understands energy transformations and the conservation of matter and energy.*

The beginning teacher:

- A. Describes the processes that generate energy in the sun and other stars.
- B. Applies the law of conservation of matter to analyze a variety of situations (e.g., the water cycle, food chains, decomposition, balancing chemical equations).
- C. Describes sources of electrical energy and processes of energy transformation for human uses (e.g., fossil fuels, solar panels, hydroelectric plants).
- D. Understands exothermic and endothermic chemical reactions and their applications (e.g., hot and cold packs, energy content of food).
- E. Applies knowledge of energy concepts in a variety of situations (e.g., the production of heat, light, sound and magnetic effects by electrical energy; the process of photosynthesis; weather processes; food webs; food/energy pyramids).
- F. Applies the law of conservation of energy to analyze a variety of physical phenomena (e.g., specific heat, heat transfer, thermal equilibrium, nuclear reactions, efficiency of simple machines, collisions).
- G. Understands applications of energy transformations and the conservation of matter and energy in life and Earth/space science.

Competency 011: *The teacher understands the structure and function of living things.*

The beginning teacher:

- A. Describes characteristics of organisms from the major taxonomic groups.
- B. Analyzes how structure complements function in cells.
- C. Analyzes how structure complements function in tissues, organs, organ systems and organisms.
- D. Identifies human body systems and describes their functions.
- E. Describes how organisms obtain and use energy and matter.
- F. Describes the composition, structure and function of the basic chemical components (e.g., proteins, carbohydrates, lipids, nucleic acids) of living things.

Competency 012: *The teacher understands reproduction and the mechanisms of heredity.*

The beginning teacher:

- A. Compares and contrasts sexual and asexual reproduction.
- B. Understands the organization of hereditary material (e.g., DNA, genes, chromosomes).
- C. Describes how an inherited trait can be determined by one or many genes and how more than one trait can be influenced by a single gene.
- D. Distinguishes between dominant and recessive alleles and predicts the probable outcomes of genetic combinations (i.e., genotypes and phenotypes).
- E. Evaluates the influence of environmental and genetic factors on the traits of an organism.
- F. Describes current applications of genetic research (e.g., related to cloning, reproduction, health, industry, agriculture).

Competency 013: *The teacher understands adaptations of organisms and the theory of evolution.*

The beginning teacher:

- A. Describes similarities and differences among various taxonomical groups and methods of classifying organisms.
- B. Describes adaptations in a population or species that enhance its survival and reproductive success.
- C. Describes how populations and species may evolve through time.
- D. Applies knowledge of the mechanisms and processes of biological evolution (e.g., diversity, variation, mutation, environmental factors, natural selection).
- E. Describes evidence that supports the theory of evolution of life on Earth.

Competency 014: *The teacher understands regulatory mechanisms and behavior.*

The beginning teacher:

- A. Describes how organisms respond to internal and external stimuli.
- B. Applies knowledge of structures and physiological processes that maintain stable internal conditions (homeostasis).
- C. Demonstrates an understanding of feedback mechanisms that allow organisms to maintain stable internal conditions.
- D. Understands how evolutionary history of a species affects behavior (e.g., migration, nocturnality, territoriality).

Competency 015: *The teacher understands the relationships between organisms and the environment.*

The beginning teacher:

- A. Identifies the abiotic and biotic components of an ecosystem.
- B. Analyzes the interrelationships among producers, consumers and decomposers in an ecosystem.
- C. Identifies factors that influence the size of populations in an ecosystem (e.g., limiting factors, growth rate).
- D. Analyzes adaptive characteristics that result in a population's or species' unique niche in an ecosystem.
- E. Describes and analyzes energy flow through various types of ecosystems.
- F. Knows how populations or species modify and affect ecosystems.

Competency 016: *The teacher understands the structure and function of Earth systems.*

The beginning teacher:

- A. Understands the composition and structure of Earth (mantle, crust and core) and analyzes constructive and destructive processes that produce geologic change (e.g., plate tectonics, weathering, erosion, deposition).
- B. Understands the form and function of surface water and ground water.
- C. Applies knowledge of the composition and structure of the atmosphere and its properties.
- D. Applies knowledge of how human activity and natural processes, both gradual and catastrophic, can alter Earth systems.
- E. Identifies the sources of energy (e.g., solar, geothermal) in Earth systems and describes mechanisms of energy transfer (e.g., convection, radiation).

Competency 017: *The teacher understands cycles in Earth systems.*

The beginning teacher:

- A. Understands the rock cycle and how rocks, minerals and soils are formed.
- B. Understands the water cycle and its relationship to weather processes.
- C. Understands biogeochemical cycles (e.g., carbon, nitrogen, oxygen) and their relationship to Earth systems.
- D. Understands the relationships and interactions that occur among the various cycles in the biosphere, geosphere, hydrosphere and atmosphere.

Competency 018: *The teacher understands the role of energy in weather and climate.*

The beginning teacher:

- A. Understands the elements of weather (e.g., humidity, wind speed, pressure, temperature) and how they are measured.
- B. Compares and contrasts weather and climate.
- C. Analyzes weather charts and data to make weather predictions (e.g. fronts, pressure systems).
- D. Applies knowledge of how transfers of energy among Earth systems affect weather and climate.
- E. Analyzes how Earth's position, orientation and surface features affect weather and climate (e.g., latitude, altitude, proximity to bodies of water).

Competency 019: *The teacher understands the characteristics of the solar system and the universe.*

The beginning teacher:

- A. Applies knowledge of the Earth-Moon-Sun system and resulting phenomena (e.g., seasons, tides, lunar phases, eclipses).
- B. Identifies properties of the components of the solar system.
- C. Recognizes characteristics of stars, nebulas, comets, asteroids and galaxies and knows their distribution in the universe.
- D. Demonstrates an understanding of evidence for the scientific theories of the origin of the universe.

Competency 020: *The teacher understands the history of the Earth system.*

The beginning teacher:

- A. Understands dating methods and the geologic time scale as it relates to geologic processes.
- B. Demonstrates an understanding of theories about the Earth's origin and geologic history.
- C. Demonstrates an understanding of how tectonic forces have shaped landforms over time.
- D. Understands the formation of fossils and the importance of the fossil record in explaining the Earth's history.

Competency 021: *The teacher has theoretical and practical knowledge about teaching science and about how students learn science.*

The beginning teacher:

- A. Understands how the developmental characteristics, prior knowledge and experience and attitudes of students influence science learning.
- B. Selects and adapts science curricula, content, instructional materials, vocabulary and activities to meet the interests, knowledge, understanding, abilities, experiences and needs of all students, including English-language learners.
- C. Understands how to use situations from students' daily lives to develop instructional materials that investigate how science can be used to make informed decisions.
- D. Understands effective ways to address common misconceptions in science.
- E. Understands the use of active learning including the appropriate use of inquiry processes for students and other instructional models (e.g., collaborative learning groups).
- F. Understands questioning strategies designed to elicit higher-level thinking and how to use them to move students from concrete to more abstract understanding.
- G. Understands the importance of planning activities that are inclusive and accommodate the needs of all students.
- H. Understands how to sequence learning activities in a way that allows students to build upon their prior knowledge and challenges them to expand their understanding of science.

Competency 022: *The teacher understands the process of scientific inquiry and its role in science instruction.*

The beginning teacher:

- A. Plans and implements instruction that provides opportunities for all students to engage in investigations.
- B. Focuses inquiry-based instruction on questions and issues relevant to students and uses strategies to assist students with generating, refining and focusing scientific questions and hypotheses.
- C. Instructs students in the safe and proper use of a variety of grade-appropriate tools, equipment, resources, technology and techniques to access, gather, store, retrieve, organize and analyze data.
- D. Knows how to guide students in making systematic observations and measurements, including repeating investigations to increase reliability.
- E. Knows how to promote the use of critical-thinking skills, logical reasoning and scientific problem solving to reach conclusions based on evidence.
- F. Knows how to teach students to develop, analyze and evaluate different explanations for a given scientific result.
- G. Knows how to teach students to demonstrate an understanding of potential sources of error in inquiry-based investigation.
- H. Knows how to teach students to demonstrate an understanding of how to communicate and defend the results of an inquiry-based investigation.

Competency 023: *The teacher knows the varied and appropriate assessments and assessment practices to monitor science learning in laboratory, field and classroom settings.*

The beginning teacher:

- A. Understands the relationships among science curriculum, assessment and instruction and bases instruction on information gathered through assessment of students' strengths and needs.
- B. Understands the importance of monitoring and assessing students' understanding of science concepts and skills on an ongoing basis.
- C. Understands the importance of carefully selecting or designing formative and summative assessments for the specific decisions they are intended to inform.
- D. Selects or designs and administers a variety of appropriate assessment methods (e.g., performance assessment, self-assessment, formal/informal, formative/summative) to monitor student understanding and progress.
- E. Uses formal and informal assessments of student performance and products (e.g., projects, lab journals, rubrics, portfolios, student profiles, checklists) to evaluate student participation in and understanding of the inquiry process.
- F. Understands the importance of sharing evaluation criteria and assessment results with students.