TEST FRAMEWORK FOR GENERALIST 291: EC-6

DOMAIN I—ENGLISH LANGUAGE ARTS AND THE SCIENCE OF TEACHING READING (STR)

Competency 001 (Oral Language)

The teacher understands the importance of oral language, knows the developmental processes of oral language, and provides the students with varied opportunities to develop listening and speaking skills.

The beginning teacher:

A. Knows and teaches basic linguistic concepts (e.g., phonemes, segmentation) and the developmental stages in the acquisition of oral language—including phonology, semantics, syntax (subject-verb agreement to include inversion), and pragmatics—and recognizes that individual variations occur within and across languages, in accordance with the Science of Teaching Reading (STR)
B. Plans and implements systematic oral language instruction based on informal and formal assessment of all students, including English-language learners, fosters oral language development, and addresses students' individual needs, strengths, and interests, in accordance with the STR
C. Recognizes when speech or language delays or differences warrant in-depth evaluations and additional help or interventions
D. Designs a variety of one-on-one and group activities (e.g., meaningful and purposeful conversations, dramatic play, language play, telling stories, singing songs, creating rhymes, playing games, having discussions, questioning, sharing information) to build on students' current oral language skills
E. Selects and uses instructional materials and strategies that promote students' oral language development; that respond to students' individual needs, strengths, and interests; that reflect cultural diversity; and that build on students' cultural, linguistic, and home backgrounds to enhance their oral language development, in accordance with the STR
F. Understands relationships between oral language and literacy development and provides instruction that interrelates oral and written language to promote students' reading and writing proficiencies
G. 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
H. Selects and uses instructional strategies, materials, activities, and models to teach students skills for speaking to various audiences for various purposes and for adapting spoken language for various audiences, purposes, and occasions
I. 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

J. 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
K. Recognizes the interrelationships between oral language and the other components of reading, in accordance with the STR
L. Selects and uses appropriate technologies to develop students' oral communication skills

Competency 002 (Phonological and Phonemic Awareness)

The teacher understands phonological and phonemic awareness and employs a variety of approaches to help students develop phonological and phonemic awareness.

The beginning teacher:

A. Understands the significance of phonological and phonemic awareness for reading, is familiar with typical patterns in the development of phonological and phonemic awareness, and recognizes that individual variations occur, in accordance with the STR
B. Understands differences in students' development of phonological and phonemic awareness and adjusts instruction to meet the needs of individual students, including English-language learners
C. Plans, implements, and adjusts instruction based on the continuous use of formal and informal assessments of individual students' phonological development, in accordance with the STR
D. Knows the age ranges at which the expected stages and patterns of the various phonological and phonemic awareness skills should be acquired, the implications of individual variations in the development of phonological and phonemic awareness, and ways to accelerate students' phonological and phonemic awareness, in accordance with the STR
E. Uses a variety of instructional approaches and materials (e.g., language games, informal interactions, direct instruction) to promote students' phonological and phonemic awareness (e.g., hearing and manipulating beginning, medial, and final sounds in spoken words, recognizing spoken alliteration)
F. Understands how to foster collaboration with families and with other professionals to promote all students' phonological and phonemic awareness, both at school and at home
G. Recognizes the interrelationships between phonological and phonemic awareness and the other components of reading (vocabulary, fluency, and comprehension), in accordance with the STR

Competency 003 (Alphabetic Principle)

The teacher understands the importance of the alphabetic principle for reading English and provides instruction that helps students understand the relationship between spoken language and printed words.

The beginning teacher:

A. Understands the elements of the alphabetic principle (e.g., letter names, letter sequence, 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 with students
B. Understands that not all written languages are alphabetic; that many alphabetic languages are more phonetically regular than English; and knows the significance of that for students' literacy development in English
C. Selects and uses a variety of instructional materials and strategies, including multisensory techniques, to promote students' understanding of the elements of the alphabetic principle and the relationship between sounds and letters and between letters and words, in accordance with the STR
D. Uses formal and informal assessments to analyze individual students' alphabetic skills, monitor learning, and plan instruction, in accordance with the STR
E. Understands how to foster collaboration with families and with other professionals to promote all students' development of alphabetic knowledge

Competency 004 (Literacy Development)

The teacher understands that literacy develops over time, progressing from emergent to proficient stages, and uses a variety of approaches to support the development of students' literacy.

The beginning teacher:

A. Understands and promotes students' development of literary response and analysis, including teaching students the elements of literary analysis (e.g., story elements, features of different literary genres) and providing students with opportunities to apply comprehension skills to literature
B. Understands that the developing reader has a growing awareness of print in the environment, the sounds in spoken words, and the uses of print, in accordance with the STR
C. Selects and uses instructional strategies, materials, and activities to assist students in distinguishing letter forms from number forms and text from pictures
D. Understands the importance of students being able to differentiate words and spaces, first and last letters, left-right progression, and identification of basic punctuation, in accordance with the STR
E. Understands that literacy development occurs in multiple contexts through reading, writing, and the use of oral language
F. Selects and uses instructional strategies, materials, and activities that focus on functions of print and concepts about print, including concepts involving book handling, parts of a book, orientation, directionality, and the relationships between written and spoken words, in accordance with the STR
G. Demonstrates familiarity with literature and provides multiple opportunities for students to listen to, respond to, and independently read literature in various genres and to interact with others about literature
H. Selects and uses appropriate instructional strategies to inform students about authors,authors' purposes for writing, and author's point of view in a variety of texts

I. Selects and uses appropriate technology to teach students strategies for selecting their own books for independent reading
J. Understands how to foster collaboration with families and with other professionals to promote all students' literacy

Competency 005 (Word Analysis and Identification Skills)

The teacher understands the importance of word identification skills (including decoding, blending, structural analysis, sight word vocabulary, and contextual analysis) and provides many opportunities for students to practice and improve word identification skills.

The beginning teacher:

A. Understands that while many students develop word analysis and decoding skills in a predictable sequence, individual variations may occur, in accordance with the STR
B. Understands the importance of word recognition skills (e.g., letter-sound correspondences, decoding, blending, structural analysis, sight word vocabulary, contextual analysis) for reading comprehension and knows a variety of strategies for helping students develop and apply word analysis skills, including identifying, categorizing, and using common synonyms, antonyms, homographs, homophones, and analogies
C. Teaches the analysis of phonetically regular words in a simple-to-complex progression (i.e., phonemes, blending onsets and rimes, short vowels/long vowels, consonant blends, other common vowel and consonant patterns, syllable types), in accordance with the STR
D. Selects and uses instructional strategies, materials, activities, and models to teach students to recognize high-frequency words, to promote students' ability to decode increasingly complex words, and to enhance word identification skills of students reading at varying levels
E. Knows strategies for decoding increasingly complex words, including the alphabetic principle, vowel-sound combinations, structural cues (e.g., morphology-prefixes, suffixes, roots, base words, abbreviations, contractions), and syllable types and for using syntax and semantics to support word identification and confirm word meaning, in accordance with the STR
F. Understands the value of using dictionaries, glossaries, and other sources to determine the meanings and usage, pronunciations, correct spelling, and derivations of unfamiliar words and teaches students to use those sources
G. Understands how to foster collaboration with families and with other professionals to promote all students' word analysis and decoding skills

Competency 006 (Reading Fluency)

The teacher understands the importance of fluency for reading comprehension and provides many opportunities for students to improve their reading fluency.

The beginning teacher:

A. Knows the relationship between reading fluency and comprehension, in accordance with the STR
B. Understands that fluency involves rate, accuracy, prosody, and intonation and knows the norms for reading fluency that have been established by the Texas Essential Knowledge and Skills (TEKS) for various age and grade levels, in accordance with the STR
C. Understands the connection of word identification skills and reading fluency to reading comprehension
D. Understands differences in students' development of word identification skills and reading fluency and knows instructional practices for meeting students' individual needs in those areas, in accordance with the STR
E. Selects and uses instructional strategies, materials, and activities to develop and improve fluency (e.g., reading independent-level materials, reading orally from familiar texts, repeated reading, partner reading, silent reading for increasingly longer periods, self-correction), in accordance with the STR
F. Knows how to teach students strategies for selecting their own books for independent reading in accordance with the STR
G. 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
H. Uses strategies to encourage reading for pleasure and lifelong learning
I. Recognizes the interrelationships between reading fluency and the other components of reading, in accordance with the STR
J. Understands how to foster collaboration with families and with other professionals to promote all students' reading fluency

Competency 007 (Reading Comprehension and Applications)

The teacher understands the importance of reading for understanding, knows the components and processes of reading comprehension, and teaches students strategies for improving their comprehension, including using a variety of texts and contexts.

The beginning teacher:

A. Understands reading comprehension as an active process of constructing meaning, in accordance with the STR
B. Understands factors affecting students' reading comprehension (e.g., oral language development, word analysis skills, prior knowledge, language background/experience, previous reading experiences, fluency, vocabulary development, ability to monitor understanding, characteristics of specific texts), in accordance with the STR

C. Understands levels of reading comprehension and knows how to model and teach skills for literal comprehension (e.g., identifying stated main idea, recalling details, identifying point-of-view), inferential comprehension (e.g., inferring cause-and-effect relationships, moral lessons and themes, making predictions), and evaluative comprehension (e.g., analyzing character development and use of language, detecting faulty reasoning, explaining point of view)
D. Provides instruction in comprehension skills that support students' transition from "learning to read" to "reading to learn" (e.g., recognizing different types of texts, understanding text structure , using textual features such as headings and glossaries, appreciating the different purposes for reading) to become self-directed critical readers
E. 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, comparing different versions of the same story, explaining the meaning of common idioms, adages, and foreign words and phrases in written English, engaging students in guided and independent reading, guiding students to generate questions and apply knowledge of text topics)
F. Knows and teaches strategies that facilitate comprehension of different types of text (e.g., literary, expository, multistep directions, procedural) before, during, and after reading (e.g., previewing, making predictions, questioning, self-monitoring, rereading, mapping, using reading journals, discussing texts)
G. Knows and teaches strategies that facilitate making connections between and across multiple texts (e.g., summarizing and paraphrasing, locating and distinguishing between facts and opinions, and determining whether the text is for or against an issue)
H. Understands metacognitive skills, including self-evaluation and self-monitoring skills, and teaches students to use those skills to enhance their own reading comprehension, in accordance with the STR
I. Knows how to provide students with direct, explicit instruction and reinforcing activities to promote the use of strategies to improve their reading comprehension (e.g., previewing, self-monitoring, visualizing, recognizing sensory details, re-telling), in accordance with the STR
J. Selects and uses instructional strategies, materials, and activities to guide students' understanding of their own culture and the cultures of others through reading, in accordance with the STR
K. Teaches elements of literary analysis, such as story elements and figurative language, and features of various literary genres, including fables, myths, folktales, legends, drama, and poetry
L. Understands the continuum of reading comprehension skills in the state standards and grade-level expectations for those skills
M. Knows the difference between guided and independent practice in reading and provides students with frequent opportunities for both
N. Understands how to foster collaboration with families and with other professionals to promote all students' reading comprehension

Competency 008 (Vocabulary Development)

The teacher knows the importance of vocabulary development and applies that knowledge to teach reading, listening, speaking, and writing

A. Knows how to provide explicit, systematic instruction and reinforcing activities to help students increase their vocabulary, in accordance with the STR
B. Knows how to use direct and indirect methods to effectively teach vocabulary, in accordance with the STR
C. Selects and uses a wide range of instructional materials , strategies, and opportunities with rich contextual support for vocabulary development, in accordance with the STR (e.g. literature, expository texts, content-specific texts, magazines, newspapers, trade books, technology,)
D. Recognizes the importance of selecting, teaching, and modeling a wide range of general and specialized vocabularies
E. Understands how to assess and monitor students' vocabulary knowledge by providing systematic, age-appropriate instruction and reinforcing activities (e.g., morphemic analysis, etymology, use of graphic organizers, contextual analysis, multiple exposures to a word in various contexts)
F. Provides multiple opportunities to listen to, read, and respond to various types of literature and expository texts to promote students' vocabulary development

Competency 009 (Reading, Inquiry, and Research)

The teacher understands the importance of research and inquiry skills to students' academic success and provides students with instruction that promotes their acquisition and effective use of those study skills in the content areas.

The beginning teacher:

A. Teaches students to develop open-ended research questions and a plan (e.g. timeline) to locate, retrieve, and record information from a range of content-area, narrative, and expository texts
B. Selects and uses instructional strategies to help students comprehend abstract content and ideas in written materials (e.g., manipulatives, examples, graphic organizers)
C. Selects and uses instructional strategies to teach students to interpret information presented in various formats (e.g., maps, tables, graphs) and how to locate, retrieve, and record information from technologies, print resources, and experts
D. Selects and uses instructional strategies to help students understand study and inquiry skills across the curriculum (e.g., brainstorming; generating questions and topics; using text organizers; taking notes; outlining; drawing conclusions; applying critical-thinking skills; previewing; setting purposes for reading; locating, organizing, evaluating, and communicating information; summarizing information; selecting relevant sources of information; using multiple sources of information; recognizing identifying features of sources, including primary and secondary sources; interpreting and using graphic sources of information) and knows the significance of organizing information from multiple sources for student learning and achievement
E. Knows grade-level expectations for study and inquiry skills in the Texas Essential Knowledge and Skills (TEKS) (e.g. in kindergarten, use pictures in conjunction with writing

to document research; in fifth-sixth grade, refine research through use of secondary questions)

F. Provides instruction to develop a topic sentence, summarize findings, and use evidence to support conclusions
G. Understands how to foster collaboration with peers, families, and with other professionals to promote all students' ability to develop effective research and comprehension skills in the content areas

Competency 010 (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. Understands that while many students go through predictable stages in acquiring writing conventions (e.g., physical and cognitive processes involved in scribbling; recognition of environmental print; mock letters; letter formation; word writing; sentence construction; spelling punctuation; and grammatical expression), individual students vary in their rates of development of those conventions
B. Understands the relationship between spelling and phonological and alphabetic awareness and understands the contribution of conventional spelling toward success in reading and writing
C. Understands the stages of spelling development (precommunicative "writing" [understands the function of writing but cannot make the forms], prephonemic, phonemic, transitional, and conventional) and knows how and when to support students' development from one stage to the next
D. Provides spelling instruction and gives students opportunities to use and develop spelling skills in the context of meaningful written expression (e.g., single syllable homophones, commonly used homophones, commonly confused terms, simple and complex contractions)
E. Selects and uses instructional strategies, materials, and hands-on activities for the development of the fine motor skills necessary for writing skills according to grade-level expectations in the Texas Essential Knowledge and Skills (TEKS)
F. Selects and uses instructional strategies, materials, and activities to help students use English writing conventions (e.g., grammar, capitalization, punctuation) in connected discourse
G. Recognizes the similarities and differences between spoken and written English (e.g., syntax, vocabulary choice, audience) and uses instructional strategies to help students apply English writing conventions and enhance their own writing
H. Knows writing conventions and appropriate grammar and usage and provides students with direct instruction and guided practice in those areas
I. Selects and uses instructional strategies, materials, and activities to teach pencil grip

Competency 011 (Written Communication)

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. Teaches purposeful, meaningful writing in connection with listening, reading, and speaking
B. Knows how to promote students' development of an extensive reading and writing vocabulary by providing students with many opportunities to read and write
C. Monitors students' writing development and provides instruction that addresses individual students' needs, strengths, and interests
D. Understands differences between first-draft writing and writing for publication and provides instruction in various stages of writing, including prewriting, drafting, revising to include self- and peer revision, and editing
E. Understands the benefits of technology for teaching basic writing skills and writing for publication and provides instruction in the use of technology to facilitate written communication
F. Understands writing for a variety of audiences, purposes, and settings and provides students with opportunities to write for various audiences, purposes, and settings and in various voices and styles
G. Teaches students to use appropriate conventions to support ideas in writing and to use an appropriate form of documentation to acknowledge sources (e.g. quotations, bibliographcial information, differentiation between paraphrasing and plagiarism)
H. Knows grade-level expectations in the Texas Essential Knowledge and Skills (TEKS)
I. Understands how to foster collaboration with families and with other professionals to promote students' development of writing skills

Competency 012 (Viewing and Representing)

The teacher understands skills for interpreting, analyzing, evaluating, and producing visual images and messages in various media, including electronic, and provides students with opportunities to develop skills in this area.

The beginning teacher:

A. Knows grade-level expectations for viewing and representing visual images and messages as described in the Texas Essential Knowledge and Skills (TEKS)
B. Understands and teaches the characteristics and functions of different types of media (e.g., film, print) and knows how different types of media influence and inform
C. Teaches students to compare and contrast print, visual, and electronic media, including levels of formality and informality (e.g. email, Web-based news article, blogs)
D. Teaches students to evaluate how visual image makers (e.g., illustrators, documentary filmmakers, political cartoonists, news photographers) represent messages and meanings, and provides students with opportunities to interpret and evaluate visual images in various media

E. Knows how to teach students to analyze visual image makers' choices (e.g., style, elements, media) and evaluate how those choices help represent or extend meaning
F. 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
G. Knows steps and procedures for teaching students to produce visual images and messages with various meanings to communicate with others
H. Teaches students how to select, organize, and produce visuals to complement and extend meanings
I. Provides students with opportunities to use technology for producing various types of communications (e.g., class newspapers, multimedia reports, video reports) and helps students analyze how language, medium, and presentation contribute to the message
J. Understands how to foster collaboration with families and with other professionals to promote students' development of media literacy

Competency 013 (Assessment of Developing Literacy)

The teacher understands the basic principles of literacy assessment and uses a variety of assessments to guide literacy instruction.

The beginning teacher:

A. Knows how to select, and administer formative and summative assessments, and use results to measure literacy acquisition (e.g., alphabetic skills, literacy development, word analysis and word identification skills, fluency, running records, miscue analysis, comprehension, writing conventions, written communications, visual images, study skills) and address individual students' needs from informal and formal assessments
B. Knows the characteristics of informal and formal reading comprehension assessments (e.g., criterion-referenced state tests, curriculum-based reading assessments, informal reading inventories, norm-referenced tests)
C. Analyzes students' reading and writing performance and uses the information as a basis for instruction
D. Knows the state content and performance standards for reading, writing, listening, and speaking that constitute the Texas Essential Knowledge and Skills (TEKS) and recognizes when a student needs additional help or intervention to bring performance up to grade level
E. Knows how to determine students' independent, instructional, and frustration reading levels and uses the information to select appropriate materials for individual students and to guide students' selection of independent reading materials
F. Uses ongoing assessments to determine when a student may be in need of classroom intervention or specialized reading instruction and to develop appropriate instructional plans
G. Understands the use of writing in assessment of students and provides opportunities for students to self-assess and peer assess writing (e.g., for clarity, interest to audience, comprehensiveness) and ongoing literacy development
H. Knows how to select, administer, and use results from informal and formal assessments of literacy acquisition

I. Analyzes students' errors in reading and responds to individual students' needs by providing focused instruction to promote literacy acquisition
J. Knows informal and formal procedures for assessing students' use of writing conventions and uses multiple, ongoing assessments to monitor and evaluate students' development in that area
K. Uses ongoing assessments of writing conventions to determine when students need additional help or intervention to bring students' performance to grade level based on state content and performance standards for writing in the Texas Essential Knowledge and Skills (TEKS)
L. Analyzes students' errors in applying writing conventions and uses the results of the analysis as a basis for future instruction
M. Selects and uses a variety of formal and informal procedures for monitoring students' reading comprehension and adjusts instruction to meet the needs of individual students, including English-language learners
N. Understands how to foster collaboration with families and communicate students' progress and for ongoing literacy development to parents/caregivers and to other professionals through a variety of means, including the use of examples of students' work

DOMAIN II—MATHEMATICS

Competency 014 (Mathematics Instruction)

The teacher understands how students learn mathematical skills and uses that knowledge to plan, organize, and implement instruction and assess learning.

The beginning teacher:

A. Plans appropriate instructional activities for all students by applying research-based theories and principles of learning mathematics
B. Employs instructional strategies that build on the linguistic, cultural, and socioeconomic diversity of students and that relate to students' lives and communities
C. Plans and provides developmentally appropriate instruction that establishes transitions between concrete, symbolic, and abstract representations of mathematical knowledge and that builds on students' strengths and addresses their needs
D. Understands how manipulatives and technological tools can be used appropriately to assist students in developing, comprehending, and applying mathematical concepts
E. Creates a learning environment that motivates all students and actively engages 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. Uses a variety of tools (e.g., counters, standard and nonstandard units of measure, rulers, protractors, scales, stopwatches, measuring containers, money, calculators, software) to strengthen students' mathematical understanding
G. Implements a variety of instructional methods and tasks that promote students' ability to do the mathematics described in the Texas Essential Knowledge and Skills (TEKS)
H. Develops clear learning goals to plan, deliver, assess, and reevaluate instruction based on the mathematics in the Texas Essential Knowledge and Skills (TEKS)
I. Helps students make connections between mathematics and the real world, as well as between mathematics and other disciplines such as art, music, science, social science, and business
J. Uses a variety of questioning strategies to encourage mathematical discourse and to help students analyze and evaluate their mathematical thinking
K. Uses a variety of formal and informal assessments and scoring procedures to evaluate mathematical understanding, common misconceptions, and error patterns
L. 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
M. Understands the purpose, characteristics, and uses of various assessments in mathematics, including formative and summative assessments
N. Understands how mathematics is used in a variety of careers and professions and plans instruction that demonstrates how mathematics is used in the workplace

Competency 015 (Number Concepts and Operations)

The teacher understands concepts related to numbers, operations and algorithms, and the properties of numbers.

The beginning teacher:

A. Analyzes, creates, describes, compares, and models relationships between number properties, operations, and algorithms for the four basic operations involving integers, rational numbers and real numbers, including real-world situations.
B. Demonstrates an understanding of equivalency among different representations of rational numbers and between mathematical expressions.
C. Selects appropriate representations of real numbers (e.g., fractions, decimals, percents) for particular situations
D. Demonstrates an understanding of ideas from number theory (e.g., prime factorization, greatest common divisor, divisibility rules) as they apply to whole numbers, integers, and rational numbers, and uses those ideas in problem situations
E. Understands the relative magnitude of whole numbers, integers, rational numbers, and real numbers including the use of comparative language and sets of objects
F. Identifies and demonstrates an understanding of and uses of a variety of models and objects for representing numbers (e.g., fraction strips, diagrams, patterns, shaded regions, number lines)
G. Uses a variety of concrete and visual representations to demonstrate the connections between operations and algorithms
H. Indentifies, demonstrates, and applies knowledge of counting techniques, including combinations, to quantify situations and solve math problems (e.g., to include forward, backward, and skip counting, with or without models)
I. Identifies, represents, and applies knowledge of place value, (e.g., to compose and decompose numbers), rounding, and other number properties to perform mental mathematics and computational estimation with automaticity
J. Demonstrates a thorough understanding of fractions, use of various representations to teach fractions, and operations involving fractions
K. Uses a variety of strategies to generate and solve one and multi-step problems with fluency

Competency 016 (Patterns and Algebra)

The teacher understands concepts related to patterns, relations, functions, and algebraic reasoning.

The beginning teacher:

A. Illustrates relations and functions using concrete models, tables, graphs, and symbolic and verbal representations, including real-world applications
B. Demonstrates an understanding of the concept of linear function using concrete models, tables, graphs, and symbolic and verbal representations
C. Understands how to use algebraic concepts and reasoning to investigate patterns, make generalizations, formulate mathematical models, make predictions, and validate results

D. Formulates implicit and explicit rules to describe and construct sequences verbally, numerically, graphically, and symbolically
E. Knows how to identify, extend, and create patterns using concrete models, figures, numbers, and algebraic expressions
F. Uses properties, graphs, linear and nonlinear functions, and applications of relations and functions to analyze, model, and solve problems in mathematical and real-world situations
G. Translates problem-solving situations into expressions and equations involving variables and unknowns
H. Models and solves problems, including those involving proportional reasoning, using concrete, numeric, tabular, graphic, and algebraic methods (e.g., using ratios and percents with fractions and decimals)
I. Determines the linear function that best models a set of data
J. Understands and describes the concepts of and relationships among variables, expressions, equations, inequalities, and systems in order to analyze, model, and solve problems
K. Applies algebraic methods to demonstrate an understanding of whole numbers using any of the four basic operations

Competency 017 (Geometry and Measurement)

The teacher understands concepts and principles of geometry and measurement.

The beginning teacher:

A. Applies knowledge of spatial concepts such as direction, shape, and structure
B. Identifies, uses, understands, and models the development of formulas to find lengths, perimeters, areas, and volumes of geometric figures
C. Uses the properties of congruent triangles to explore geometric relationships
D. Identifies, uses and understands concepts and properties of points, lines, planes, angles, lengths, and distances
E. Analyzes and applies the properties of parallel and perpendicular lines
F. Uses a variety of representations (e.g., numeric, verbal, graphic, symbolic) to analyze and solve problems involving angles and two- and three-dimensional figures such as circles, triangles, polygons, cylinders, prisms, and spheres
G. Uses symmetry to describe tessellations and shows how they can be used to illustrate geometric concepts, properties, and relationships
H. Understands measurement concepts and principles, including methods of approximation and estimation, and the effects of error on measurement
I. Explains, illustrates, selects, and uses appropriate units of measurement to quantify and compare time, temperature, money, mass, weight, area, capacity, volume, percent, speed, and degrees of an angle
J. Uses translations, rotations, and reflections to illustrate similarities, congruencies, and symmetries of figures
K. Develops, justifies, and uses conversions within and between measurement systems
L. Understands logical reasoning, justification, and proof in relation to the axiomatic structure of geometry and uses reasoning to develop, generalize, justify, and prove geometric relationships

M. Understands attributes of various polygons, including names and how sides and angles of the polygon affect its attributes
N. Partitions or decomposes polygons to express areas as fractions of a whole or to find areas of nonstandard polygons
O. Demonstrates the value and relationships of United States coins and bills and uses appropriate symbols to name the value of a collection
P. Identifies, uses, and understands the concepts and properties of geometric figures and their relationships
Q. Describes the key attributes of the coordinate plane and models the process of graphing ordered pairs

Competency 018 (Probability and Statistics)

The teacher understands concepts related to probability and statistics and their applications.

The beginning teacher:

A. Investigates and answers questions by collecting, organizing, and displaying data in a variety of formats, as described in the Texas Essential Knowledge and Skills (TEKS), and draws conclusions from any data graph
B. Demonstrates an understanding of measures of central tendency (e.g., mean, median, mode) and range and uses those measures to describe a set of data
C. Explores concepts of probability through data collection, experiments, and simulations
D. Uses the concepts and principles of probability to describe the outcome of simple and compound events
E. Determines probabilities by constructing sample spaces to model situations
F. Applies deep knowledge of the use of probability, in different scenarios, to make observations, draw conclusions, and create relationships
G. Solves a variety of probability problems using combinations and geometric probability (e.g., probability as the ratio of two areas)
H. Supports arguments, makes predictions, and draws conclusions using summary statistics and graphs to analyze and interpret one-variable data
I. Applies knowledge of designing, conducting, analyzing, and interpreting statistical experiments to investigate real-world problems
J. Generates, simulates, and uses probability models to represent situations
K. Uses the graph of the normal distribution as a basis for making inferences about a population

Competency 019 (Mathematical Processes)

The teacher understands mathematical processes and knows how to reason mathematically, solve mathematical problems, and make mathematical connections within and outside of mathematics.

The beginning teacher:

A. Understands the role of logical reasoning in mathematics and uses formal and informal reasoning to explore, investigate, and justify mathematical ideas
B. Applies correct mathematical reasoning to derive valid conclusions from a set of premises
C. Applies principles of inductive reasoning to make conjectures and uses deductive methods to evaluate the validity of conjectures
D. Evaluates the reasonableness of a solution to a given problem
E. Understands connections among concepts, procedures, and equivalent representations in areas of mathematics (e.g., algebra, geometry)
F. Recognizes that a mathematical problem can be solved in a variety of ways and selects an appropriate strategy for a given problem
G. Expresses mathematical statements using developmentally appropriate language, Standard English, mathematical language, and symbolic mathematics
H. Communicates mathematical ideas using a variety of representations (e.g., numeric, verbal, graphic, pictorial, symbolic, concrete)
I. Demonstrates an understanding of the use of visual media such as graphs, tables, diagrams, and animations to communicate mathematical information
J. Demonstrates an understanding of estimation, including the use of compatible numbers, and evaluates its appropriate uses
K. Knows how to use mathematical manipulatives and a wide range of appropriate technological tools to develop and explore mathematical concepts and ideas
L. Demonstrates knowledge of the history and evolution of mathematical concepts, procedures, and ideas
M. Recognizes the contributions that different cultures have made to the field of mathematics and the impact of mathematics on society and cultures
N. Demonstrates an understanding of financial literacy concepts and their application as it relates to teaching students (e.g., describes the basic purpose of financial institutions, distinguishs the difference between gross and net income, identifies various savings options, defines different types of taxes, identifies the advantages and disadvantages of different methods of payments savings and credit uses and responsibilities)
O. Applies mathematics to model and solve problems to manage financial resources effectively for lifetime financial security as it relates to teaching students (e.g., distinguishes between fixed and variable expenses, calculates profit in a given situation, develops a system for keeping and using financial records, describes actions that might be taken to develop and balance a budget when expenses exceed income

DOMAIN III—SOCIAL STUDIES

Competency 020 (Social Science Instruction)

The teacher understands and applies social science knowledge and skills to plan, organize, and implement instruction and assess learning.

The beginning teacher:

A. Understands the social studies content and performance standards that constitute 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 and uses social studies terminology correctly
D. Understands the implications of stages of student growth and development for designing and implementing effective learning experiences in the social sciences (e.g., knowledge of and respect for self, family, and communities; sharing; following routines; working cooperatively in groups)
E. Selects and applies effective, developmentally appropriate instructional practices, activities, technologies, and materials to promote students' knowledge and skills in the social sciences
F. Selects and applies current technology as a tool for teaching and communicating social studies concepts
G. Selects and uses effective instructional strategies, activities, technologies, and materials to promote students' knowledge and skills in the social sciences
H. Understands how to promote students' use of social science skills, vocabulary, and research tools, including currently available technological tools
I. Applies instruction that relates skills, concepts, and ideas across different social science disciplines
J. Provides and facilitates instruction that helps students make connections between knowledge and methods in the social sciences and in other content areas
K. Uses a variety of formal and informal assessments 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 and students with special needs
L. Understands and relates practical applications of social science issues and trends
M. Creates maps and other graphics to represent geographic, political, historical, economic, and cultural features, distributions, and relationships
N. Communicates the value of social studies education to students, parents/caregivers, colleagues, and the community

Competency 021 (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. Demonstrates an understanding of 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 (e.g., the Texas Revolution, the Republic of Texas, and the annexation of Texas to the United States)
C. Demonstrates an understanding of similarities and differences among Native American groups in Texas, the United States, and the Western Hemisphere before European colonization
D. Demonstrates an understanding of the causes and effects of European exploration and colonization of Texas, the United States, and the Western Hemisphere
E. Analyzes the influence of various factors (e.g., geographic contexts, processes of spatial exchange, science, technology) on the development of societies
F. Understands common characteristics of communities: past and present, including reasons people have formed communities (e.g., need for security, religious freedom, law, and material well-being), ways in which different communities meet their needs (e.g., government, education, communication, transportation, recreation), and how historical figures, patriots, and good citizens helped shape communities, states, and nations.
G. Demonstrates an understanding of basic concepts of culture and the processes of cultural adaptation, diffusion, and exchange
H. Applies knowledge and analyzes the effects of scientific, mathematical, and technological innovations on political, economic, social, and environmental developments as they relate to daily life in Texas, the United States, and the world
I. Demonstrates an understanding of historical information and ideas in relation to other disciplines
J. Demonstrates an understanding of how to formulate historical research questions and use appropriate procedures to reach supportable judgments and conclusions in the social sciences
K. Demonstrates an understanding of historical research and knows how historians locate, gather, organize, analyze, and report information by using standard research methodologies
L. Knows the characteristics and uses of primary and secondary sources for historical research (e.g., databases, maps, photographs, media services, the Internet, biographies, interviews, questionnaires, artifacts), analyzes historical information from primary and secondary sources, understands and evaluates information in relation to bias, propaganda, point of view, and frame of reference
M. Applies and evaluates the use of problem-solving processes, gathering of information, listing and considering options, considering advantages and disadvantages, choosing and implementing solutions, and assessing the effectiveness of solutions
N. Applies and evaluates the use of decision-making processes to identify situations that require decisions by gathering information, identifying options, predicting consequences, and taking action to implement the decisions

O. Communicates and interprets historical 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)
P. Analyzes historical information by categorizing, comparing and contrasting, making generalizations and predictions, and drawing inferences and conclusions (e.g., studying population statistics, patterns of migration, voting trends and patterns)
Q. Applies knowledge of the concept of chronology and its use in understanding history and historical events
R. 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
S. Demonstrates an understanding of the foundations of representative government in the United States, significant individuals, events, and issues of the Revolutionary era, and challenges confronting the United States government in the early years of the Republic
T. Demonstrates an understanding of 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.
U. Analyzes ways that political, economic, and social factors led to the growth of sectionalism and the Civil War
V. Understands individuals, issues, and events involved in the Civil War and analyzes the effects of Reconstruction on the political, economic, and social life of the United States and Texas
W. Demonstrates an understanding of major United States and Texas reform movements of the nineteenth and twentieth centuries (e.g., abolitionism, woman suffrage, civil rights, temperance)
X. Demonstrates knowledge of "boom and bust" cycles of leading Texas industries (e.g., railroads, the cattle industry, oil and gas production, cotton, real estate, banking, computer technology).
Y. Demonstrates an understanding of important individuals, issues, and events of the twentieth and twenty-first centuries in Texas, the United States, and the world (e.g., urbanization, Great Depression, Dust Bowl, Second World War, growth of the oil and gas industry.)
Z. Analyzes ways that particular contemporary societies reflect historical events (e.g., invasion, conquests, colonization, immigration)

Competency 022 (Geography and Culture)

The teacher understands and applies knowledge of geographic relationships involving people, places, and environments in Texas, the United States, and the world; the teacher also understands and applies knowledge of cultural development, adaptation, diversity, and interactions among science, technology, and society as defined by the Texas Essential Knowledge and Skills (TEKS).

The beginning teacher:

A. Analyzes and applies knowledge of key concepts in geography (e.g., location, distance, region, grid systems) and knows the locations and the human and physical characteristics (e.g., culture, diversity) of places and regions in Texas, the United States, and the world

B. Analyzes ways that location (absolute and relative) affects people, places, and environments (e.g., the location of renewable and nonrenewable natural resources such as fresh water, fossil fuels, fertile soils, and timber)
C. Analyzes how geographic factors have influenced settlement patterns, economic development, political relationships, and historical and contemporary societies, including those of Texas, the United States, and the world
D. Demonstrates an understanding of physical processes (e.g., erosion, deposition, weathering; plate tectonics; sediment transfer; flows and exchanges of energy and matter in the atmosphere that produce weather and climate; weather patterns) and their effects on environmental patterns
E. Analyzes how humans adapt to, use, and modify the physical environment and how the physical characteristics of places and human modifications to the environment affect human activities and settlement patterns
F. Demonstrates an understanding of the physical environmental characteristics of Texas, the United States, and the world, past and present, and analyzes how humans have adapted to and modified the environment
G. Examines how developments in science and technology affect the physical environment, the growth of economies and societies; and definitions of, access to, and the use of physical and human resources
H. Creates and interprets maps of places and regions that contain map elements, draws sketch maps that illustrate various places and regions, and uses the compass rose, grid system, and symbols to locate places on maps and globes
I. Demonstrates an understanding of basic concepts of culture, processes of cultural adaptation, diffusion, and exchange, and positive and negative qualities of a multicultural society
J. Demonstrates an understanding of the contributions made by people of various racial, ethnic, and religious groups
K. Analyzes the effects of race, gender, socioeconomic class, status, and stratification on ways of life in Texas, the United States, and the world
L. Identifies, explains, and compares various ethnic and/or cultural customs, celebrations, and traditions
M. Demonstrates an understanding of relationships between and among cultures of people from various groups, including racial, ethnic, and religious groups, in the United States and throughout the world (e.g., conflict and cooperation between and among cultures, factors that influence cultural change, such as improved communication, transportation, and economic development)
N. Compares and analyzes similarities and differences in the ways various peoples at different times in history have lived and have met basic human needs, including the various roles of men, women, children, and families in past and present cultures
O. Compares similarities and differences between Native American groups in Texas, the United States, and the Western Hemisphere before European colonization
P. 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
Q. Understands and applies the concept of diversity within unity
R. Relates geographic and cultural information and ideas to information and ideas in other social sciences and other disciplines
S. Formulates geographic and cultural research questions and uses appropriate procedures to reach supportable judgments and conclusions

T. Demonstrates an understanding of research related to geography and culture and knows how social scientists in those fields locate, gather, organize, analyze, and report information using standard research methodologies

U. Demonstrates an understanding of the characteristics and uses of various primary and secondary sources (e.g., databases, maps, photographs, media services, the Internet, biographies, interviews, questionnaires, artifacts), utilizes information from a variety of sources to acquire social science information, answers social science questions, and evaluates information in relation to bias, propaganda, point of view, and frame of reference

V. Applies evaluative, problem-solving, and decision-making skills to geographic and cultural information, ideas, and issues by identifying problems, gathering information, listing and considering options, considering advantages and disadvantages, choosing and implementing solutions, and assessing the solutions' effectiveness

W. Communicates and interprets geographic and cultural information in written, oral, and visual form (e.g., maps and other graphics) and translates the information from one medium to another (e.g., written to visual, statistical to written or visual)

X. Analyzes geographic and cultural data using geographical tools and basic mathematical and statistical concepts and analytic methods

Y. Understands and analyzes the characteristics, distribution, and migration of populations and the interactions between people and the physical environment, including the effects of those interactions on the development of Texas, the United States, and the world

Z. Demonstrates knowledge of the institutions that exist in all societies and how the characteristics of those institutions may vary among societies

AA. Demonstrates an understanding of how people use oral tradition, stories, real and mythical heroes, music, paintings, and sculpture to represent culture in communities in Texas, the United States, and the world (e.g., importance of individual writers and artists to the cultural heritage of communities, significant examples of art, music, and literature from various periods)

BB. Understands the relationship between the arts and the times and societies in which they are produced, including how past and contemporary issues influence creative expressions, and identifies examples of art, music, and literature that have transcended the boundaries of societies and convey universal themes such as religion, justice, and the passage of time

CC. Analyzes relationships among religion, philosophy, and culture and their effect on ways of life in Texas, the United States, and the world

DD. Understands and analyzes how changes in science and technology relate to political, economic, social, and cultural issues and events

Competency 023 (Economics)

The teacher understands and applies knowledge of economic systems and how people organize economic systems to produce, distribute, and consume goods and services.

The beginning teacher:

A. Compares and contrasts similarities and differences in how various peoples at different times in history have lived and met basic human needs, including the various roles of men, women, children, and families in past and present cultures
B. Understands and applies knowledge of basic economic concepts (e.g., economic system, goods and services, free enterprise, interdependence, needs and wants, scarcity, roles of producers and consumers, factors of production, specialization and trade, entrepreneurship), knows that basic human needs are met in many ways, and understands the value and importance of work and purposes for spending, saving, and budgeting money
C. Demonstrates knowledge of the ways people organize economic systems and of the similarities and differences among various economic systems around the world.
D. Understands and applies knowledge of the characteristics, benefits, and development of the free-enterprise system in Texas and the United States and how businesses operate in the United States free-enterprise system (e.g., importance of morality and ethics in maintaining a fuctional free-enterprise system and the impact of past and present entrepreneurs)
E. Applies knowledge of the effects of supply and demand on consumers and producers in a free-enterprise system
F. Demonstrates knowledge of patterns of work and economic activities in Texas and the United States, past and present, including the roles of consumers and producers, and the impact of geographic factors, immigration, migration, limited resources, mass production, specialization and division of labor, and American ideas about progress and equal opportunity
G. Demonstrates knowledge of categories of economic activities, economic indicators, and how a society's economic level is measured
H. Understands the effects of government regulation and taxation on consumers, economic development, and business planning
I. Demonstrates an understanding of major events, trends, and issues in economic history (e.g., factors leading societies to change from rural to urban or agrarian to industrial, economic reasons for exploration and colonization, economic forces leading to the Industrial Revolution, processes of economic development in different areas of the world, factors leading to the emergence of different patterns of economic activity in the various regions of the United States)
J. Analyzes the interdependence of the Texas economy with those of the United States and the world

Competency 024 (Government and Citizenship)

The teacher understands and applies knowledge of concepts of government, democracy, and citizenship, including ways that individuals and groups achieve their goals through political systems.

The beginning teacher:

A. Demonstrates knowledge of historical origins of democratic forms of government, such as ancient Greece
B. Understands and applies the purpose of rules and laws; the relationship between rules, rights, and responsibilities; the fundamental rights of American citizens guaranteed in the Bill of Rights and other amendments to the United States Constitution; and the individual's role in making and enforcing rules and ensuring the welfare of society
C. Understands the basic structure and functions of the United Staes government, the Texas government, and local governments (including the roles of public officials) the relationships among national, state, and local governments, and how local, state, and national government services are financed
D. Demonstrates knowledge of key principles and ideas contained in major political documents of Texas and the United States (e.g., Declaration of Independence, U.S. Constitution, Texas Constitution) and of relationships among political documents
E. Demonstrates an understanding of how people organized governments in colonial America and during the early development of Texas
F. Understands the political processes in the United States and Texas and how the U.S. political system works
G. Demonstrates knowledge of types of government (e.g., democratic, totalitarian, monarchical) and their respective levels of effectiveness in meeting citizens' needs (e.g., reasons for limiting the power of government, record of human rights abuses by limited and unlimited governments)
H. Understands the formal and informal processes of changing the United States and Texas Constitutions and the impact of changes on society
I. Understands and promotes students' understanding of the impact of landmark Supreme Court cases
J. Understands the components of the democratic process (e.g., voluntary individual participation, effective leadership, expression of different points of view, how public officials are chosen) and their significance in a democratic society
K. Understands the importance of effective leadership in a constitutional republic and identifies past and present leaders in state, local, and national governments and their leadership qualities and contributions
L. Demonstrates knowledge of important customs, symbols, landmarks, and celebrations that represent American and Texan beliefs and principles and contribute to national unity
M. Analyzes the relationships between individual rights, responsibilities, and freedoms in democratic societies
N. Applies knowledge of the rights and responsibilities of citizens and non-profit and civic in Texas and the United States, past and present, and understands characteristics of good citizenship (e.g., community service) as exemplified by historical and contemporary figures
O. Understands how the nature, rights, and responsibilities of citizenship vary among societies.

DOMAIN IV—SCIENCE

Competency 025 (Lab Processes, Equipment, and Safety)

The teacher understands how to manage learning activities, tools, materials, equipment, and technologies 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
D. Selects and safely uses appropriate tools, technologies, materials, and equipment needed for instructional activities
E. Understands concepts of precision, accuracy, and error with regard to reading and recording numerical data from a scientific instrument
F. Understands how to gather, organize, display, and communicate data in a variety of ways (e.g., charts, tables, graphs, diagrams, written reports, oral presentations)
G. Understands the international system of measurement (i.e., metric system) and performs unit conversions within measurement systems including the use of non-standard units

Competency 026 (History and Nature of Science)

The teacher understands the history and nature of science, the process and role of scientific inquiry, and the role of inquiry in science instruction.

The beginning teacher:

A. Understands, plans, designs and implements instruction that provides opportunities for all students to engage in nonexperimental- and experimental-inquiry 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. Understands and 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 and posing questions to guide investigations
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 including that repeated investigations may increase reliability
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
I. Understands principles of scientific ethics
J. Understands the roles that logical reasoning, verifiable evidence, prediction, and peer review play in the process of generating and evaluating scientific knowledge
K. Understands the historical development of science (e.g., cell theory, plate tectonics, laws of motion, universal gravity) and technology and the contributions that diverse cultures and individuals of both genders have made to scientific and technological knowledge

Competency 027 (Impact of Science)

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 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. Identifies and understands the types and uses of natural resources and the effects of human consumption on the renewal and depletion of resources
F. Understands the role science and scientists can play in helping resolve personal, societal, and global challenges

Competency 028 (Concepts and Processes)

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

The beginning teacher:

A. Understands how a unifying, explanatory framework across the science disciplines is provided by the concepts and processes of systems, order, and organization; evidence, models, and explanation; change, constancy, and measurements; 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 029 (Students as Learners and Science Instruction)

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

The beginning teacher:

A. Understands how developmental characteristics, prior knowledge and experience, and students' attitudes influence science learning
B. Selects and adapts science curricula, content, instructional materials, collaborations, vocabulary, and activities to meet the levels of interest, knowledge, and understanding as well as the 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 common misconceptions in science and has effective ways to address those misconceptions
E. Understands developmentally appropriate design and implementation of hands-on learning experiences in science and selects effective, appropriate instructional practices, activities, technologies, and materials to promote students' scientific knowledge, skills, and inquiry processes
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 the planning of activities that are inclusive and that accommodate the needs of all students
H. Understands how to sequence learning activities in a way that enables students to build on their prior knowledge and that challenges them to expand their understanding of science

Competency 030 (Science Assessment)

The teacher knows the varied and appropriate assessments and assessment practices for monitoring science learning in laboratory, field, and classroom settings.

The beginning teacher:

A. Understands the relationships between a 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, including how to use formal and informal assessments of student performance and how to use products (e.g., projects, lab journals, rubrics, portfolios, student profiles, checklists) to evaluate students' understanding of and participation in the inquiry process
C. Selects—or designs—and administers a variety of appropriate assessment methods (e.g., performance assessment, self-assessment, formal/informal assessment, formative/summative assessment) to monitor students' understanding and progress and to plan for instruction
D. Understands the importance of communicating evaluation criteria and assessment results to students

Competency 031 (Forces and Motion)

The teacher understands forces and motion and their relationships.

The beginning teacher:

A. Demonstrates an understanding of the properties of universal forces (e.g., gravitational, electrical, magnetic)
B. Understands how to measure, graph, and describe changes in motion by using concepts of position, direction of motion, and speed
C. Analyzes the ways unbalanced forces acting on an object cause changes in the position or motion of the object
D. Analyzes the relationship between force and motion in a variety of situations (e.g., simple machines, geologic processes)

Competency 032 (Physical and Chemical Properties)

The teacher understands the physical and chemical properties of and changes in matter.

The beginning teacher:

A. Describe and measure the physical and chemical properties of substances (e.g., size, shape, temperature, magnetism, hardness, mass, conduction, density)
B. Describes the physical properties of solids, liquids, and gases

C. Distinguishes between physical and chemical changes in matter
D. Applies knowledge of physical and chemical properties (including atomic structure) of and changes in matter to processes and situations that occur in life and in earth and space science
E. Distinguishes between elements, compounds, mixtures and solutions and describes their properties
F. Describes and explains the occurrence and 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)

Competency 033 (Energy and Interactions)

The teacher understands energy and interactions between matter and energy.

The beginning teacher:

A. Understands conservation of energy and energy transformations and analyzes how energy is transformed from one form to another (e.g., potential, kinetic, mechanical, sound, heat, light, chemical, electrical) in a variety of everyday situations and how increasing or decreasing amounts affect objects
B. Understands the basic concepts of heat energy and related processes (e.g., melting, evaporation, boiling, condensation conduction, convection, and radiation)
C. Understands the principles of electricity and magnetism and their applications (e.g., electric circuits, electromagnetic fields, motors, audio speakers, lightning)
D. Applies knowledge of properties of light (e.g., reflection, refraction) to describe the functioning of optical systems and phenomena (e.g., camera, microscope, rainbow, eye)
E. Demonstrates an understanding of the properties, production, and transmission of sound

Competency 034 (Energy Transformations and Conservation)

The teacher understands energy transformations and the conservation of matter and energy.

The beginning teacher:

A. Describes sources of electrical energy and processes of energy transformation for human uses (e.g., fossil fuels, solar panels, hydroelectric plants)
B. Applies knowledge of transfer of energy 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 and energy pyramids)
C. Understands applications of energy transformations and the conservation of matter and energy in life and in earth and space science

Competency 035 (Structure and Function of Living Things)

The teacher understands the structure and function of living things.

The beginning teacher:

A. Understands that living systems have different structures that perform different functions
B. Understands and describes stages in the life cycles of common plants and animals (including animals that experience complete and incomplete metamorphosis)
C. Understands that organisms have basic needs
D. Analyzes how structure complements function in cells, tissues, organs, organ systems, and organisms
E. Identifies human body systems and describes their functions
F. Understands the relationship between characteristics, structures and functions and corresponding taxonomic classifications

Competency 036 (Reproduction and the Mechanisms of Heredity)

The teacher understands reproduction and the mechanisms of heredity.

The beginning teacher:

A. Describes the processes by which plants and animals grow and reproduce and explains how hereditary information is passed from one generation to the next
B. Compares and contrasts inherited traits and learned characteristics
C. Understands the organization of hereditary material and 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 traits and predicts the probable outcomes of genetic combinations
E. Evaluates the influence of environmental and genetic factors on the traits of an organism

Competency 037 (Adaptations and Evolution)

The teacher understands adaptations of organisms and the theory of evolution.

The beginning teacher:

A. Demonstrates knowledge of adaptive characteristics and explains how adaptations influence the survival of populations or species
B. Describes how populations and species change through time
C. Describes processes that enable traits to change through time, including selective breeding, mutation, and other natural occurrences

Competency 038 (Organisms and the Environment)

The teacher understands the relationships between organisms and the environment.

The beginning teacher:

A. Understands that organisms respond to internal or external stimuli and analyzes the role of internal and external stimuli in the behavior of organisms
B. Understands relationships between organisms and the environment and describes ways that living organisms depend on each other and on the environment to meet their basic needs
C. Identifies organisms, populations, or species with similar needs and analyzes how they compete with one another for resources
D. Analyzes the interrelationships and interdependence among producers, consumers, and decomposers in an ecosystem (e.g., food webs, food chains, competition, predation)
E. Identifies factors that influence the size and growth of populations in an ecosystem
F. Analyzes adaptive characteristics that result in a population's or species' unique niche in an ecosystem
G. Knows how populations and species modify and affect ecosystems

Competency 039 (Structure and Function of Earth Systems)

The teacher understands the structure and function of Earth systems.

The beginning teacher:

A. Understands the structure of Earth and analyzes constructive and destructive processes (including plate tectonics, weathering and erosion) that produce geologic change including the history of Earth
B. Understands the form and function of surface water and groundwater
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

Competency 040 (Cycles in Earth Systems)

The teacher understands cycles in Earth systems.

The beginning teacher:

A. Understands the rock cycle and how rocks, minerals, and soils are formed, and their respective properties
B. Understands the water cycle and its relationship to weather processes
C. Understands the nutrient (e.g., carbon, nitrogen) cycle and its relationship to Earth systems
D. Applies knowledge of how human and natural processes affect Earth systems

E. Understands and describes the properties and uses of Earth materials (e.g., rocks, soils, water, atmospheric gases)

Competency 041 (Energy in Weather and Climate)

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 and direction pressure, temperature) and the tools used for measurement
B. Compares and contrasts weather and climate
C. Analyzes weather charts and data to make weather predictions
D. Applies knowledge of how transfers of energy between Earth systems affect weather and climate
E. Analyzes how Earth's position, orientation, and surface features affect weather and climate

Competency 042 (Solar System and the Universe)

The teacher understands the characteristics of the solar system and the universe.

The beginning teacher:

A. Understands the properties and characteristics of objects in the sky
B. Applies knowledge of the Earth-Moon-Sun system and the interactions between them (e.g., day/night, seasons, lunar phases, eclipses)
C. Identifies properties of the components of the solar system and their history