How Do You Measure Freedom? TEKS Grades 3-5

**First Grade:**

**English and Reading:**

1) Reading/Beginning Reading Skills/Print Awareness. Students understand how English is written and printed. Students are expected to:

(A) recognize that spoken words are represented in written English by specific sequences of letters;

(B) identify upper- and lower-case letters;

(C) sequence the letters of the alphabet;

(D) recognize the distinguishing features of a sentence (e.g., capitalization of first word, ending punctuation);

(E) read texts by moving from top to bottom of the page and tracking words from left to right with return sweep;

(6) Reading/Vocabulary Development. Students understand new vocabulary and use it when reading and writing. Students are expected to:

(E) alphabetize a series of words to the first or second letter

(7) Reading/Comprehension of Literary Text/Theme and Genre. Students analyze, make inferences and draw conclusions about theme and genre in different cultural, historical, and contemporary contexts and provide evidence from the text to support their understanding. Students are expected to:

(A) connect the meaning of a well-known story or fable to personal experiences

(24) Research/Gathering Sources. Students determine, locate, and explore the full range of relevant sources addressing a research question and systematically record the information they gather. Students (with adult assistance) are expected to:

(A) gather evidence from available sources (natural and personal) as well as from interviews with local experts;

(C) record basic information in simple visual formats (e.g., notes, charts, picture graphs, diagrams).

(27) Listening and Speaking/Listening. Students use comprehension skills to listen attentively to others in formal and informal settings. Students continue to apply earlier standards with greater complexity. Students are expected to:

(A) listen attentively to speakers and ask relevant questions to clarify information; and

(B) follow, restate, and give oral instructions that involve a short related sequence of actions.

(28) Listening and Speaking/Speaking. Students speak clearly and to the point, using the conventions of language. Students continue to apply earlier standards with greater complexity. Students are expected to share information and ideas about the topic under discussion, speaking clearly at an appropriate pace, using the conventions of language.

(29) Listening and Speaking/Teamwork. Students work productively with others in teams. Students continue to apply earlier standards with greater complexity. Students are expected to follow agreed-upon rules for discussion, including listening to others, speaking when recognized, and making appropriate contributions.

Mathematics:

(1.1) Number, operation, and quantitative reasoning. The student uses whole numbers to describe and compare quantities. The student is expected to:

(A) compare and order whole numbers up to 99 (less than, greater than, or equal to) using sets of concrete objects and pictorial models;

(D) read and write numbers to 99 to describe sets of concrete objects

(1.7) Measurement. The student directly compares the attributes of length, area, weight/mass, capacity, and temperature. The student uses comparative language to solve problems and answer questions. The student selects and uses nonstandard units to describe length. The student is expected to:

(A) estimate and measure length using nonstandard units such as paper clips or sides of color tiles;

(B) compare and order two or more concrete objects according to length (from longest to shortest);

(C) describe the relationship between the size of the unit and the number of units needed to measure the length of an object;

(D) compare and order the area of two or more two-dimensional surfaces (from covers the most to covers the least);

(E) compare and order two or more containers according to capacity (from holds the most to holds the least);

(F) compare and order two or more objects according to weight/mass (from heaviest to lightest); and

(G) compare and order two or more objects according to relative temperature (from hottest to coldest).

(1.8) Measurement. The student understands that time can be measured. The student uses time to describe and compare situations. The student is expected to:

(A) order three or more events according to duration;

(1.11) Underlying processes and mathematical tools. The student applies Grade 1 mathematics to solve problems connected to everyday experiences and activities in and outside of school. The student is expected to:

(A) identify mathematics in everyday situations;

(B) solve problems with guidance that incorporates the processes of understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;

(C) select or develop an appropriate problem-solving plan or strategy including drawing a picture, looking for a pattern, systematic guessing and checking, or acting it out in order to solve a problem; and

(D) use tools such as real objects, manipulatives, and technology to solve problems.

Social Studies:

(1) History. The student understands the origins of customs, holidays, and celebrations. The student is expected to:

(A) describe the origins of customs, holidays, and celebrations of the community, state, and nation such as San Jacinto Day, Independence Day, and Veterans Day; and

(B) compare the observance of holidays and celebrations, past and present.

(2) History. The student understands how historical figures, patriots, and good citizens helped shape the community, state, and nation. The student is expected to:

(A) identify contributions of historical figures, including Sam Houston, George Washington, Abraham Lincoln, and Martin Luther King Jr., who have influenced the community, state, and nation;

(C) compare the similarities and differences among the lives and activities of historical figures and other individuals who have influenced the community, state, and nation.

(3) History. The student understands the concepts of time and chronology. The student is expected to:

(A) distinguish among past, present, and future;

12) Government. The student understands the role of authority figures, public officials, and citizens. The student is expected to:

(A) identify the responsibilities of authority figures in the home, school, and community;

(B) identify and describe the roles of public officials in the community, state, and nation; and

(C) identify and describe the role of a good citizen in maintaining a constitutional republic.

(13) Citizenship. The student understands characteristics of good citizenship as exemplified by historical figures and other individuals. The student is expected to:

(A) identify characteristics of good citizenship, including truthfulness, justice, equality, respect for oneself and others, responsibility in daily life, and participation in government by educating oneself about the issues, respectfully holding public officials to their word, and voting;

(B) identify historical figures such as Benjamin Franklin, Francis Scott Key, and Eleanor Roosevelt who have exemplified good citizenship; and

(C) identify other individuals who exemplify good citizenship.

(14) Citizenship. The student understands important symbols, customs, and celebrations that represent American beliefs and principles and contribute to our national identity. The student is expected to:

(A) explain state and national patriotic symbols, including the United States and Texas flags, the Liberty Bell, the Statue of Liberty, and the Alamo;

(B) recite and explain the meaning of the Pledge of Allegiance to the United States Flag and the Pledge to the Texas Flag;

(C) identify anthems and mottoes of Texas and the United States;

(D) explain and practice voting as a way of making choices and decisions;

(E) explain how patriotic customs and celebrations reflect American individualism and freedom; and

(F) identify Constitution Day as a celebration of American freedom.

(15) Culture. The student understands the importance of family and community beliefs, customs, language, and traditions. The student is expected to:

(A) describe and explain the importance of various beliefs, customs, language, and traditions of families and communities;

(17) Social studies skills. The student applies critical-thinking skills to organize and use information acquired from a variety of valid sources, including electronic technology. The student is expected to:

(A) obtain information about a topic using a variety of valid oral sources such as conversations, interviews, and music;

(B) obtain information about a topic using a variety of valid visual sources such as pictures, symbols, electronic media, maps, literature, and artifacts; and

(C) sequence and categorize information.

(18) Social studies skills. The student communicates in oral, visual, and written forms. The student is expected to:

(A) express ideas orally based on knowledge and experiences; and

(B) create and interpret visual and written material.

(19) Social studies skills. The student uses problem-solving and decision-making skills, working independently and with others, in a variety of settings. The student is expected to:

(A) use a problem-solving process to identify a problem, gather information, list and consider options, consider advantages and disadvantages, choose and implement a solution, and evaluate the effectiveness of the solution; and

(B) use a decision-making process to identify a situation that requires a decision, gather information, generate options, predict outcomes, take action to implement a decision, and reflect on the effectiveness of that decision.

Physical Education

(6) Social development. The student understands basic components such as strategies and rules of structured physical activities including, but not limited to, games, sports, dance, and gymnastics. The student is expected to:

(A) demonstrate starting and stopping signals; and

(B) explain boundaries and rules for simple games.

(7) Social development. The student develops positive self-management and social skills needed to work independently and with others in physical activity settings. The student is expected to:

(A) follow directions and apply safe movement practices;

(B) interact, cooperate, and respect others; and

(C) resolve conflicts in socially acceptable ways such as talking and asking the teacher for help.

Art:

(1) Perception. The student develops and organizes ideas from the environment. The student is expected to:

(A) identify similarities, differences, and variations among subjects, using the senses;

(3) Historical/cultural heritage. The student demonstrates an understanding of art history and culture as records of human achievement. The student is expected to:

(A) identify simple ideas expressed in artworks through different media;

(B) select artworks that show families and groups; and

(C) identify the use of art in everyday life.

Second Grade:

English and Reading

(3) Reading/Beginning Reading/Strategies. Students comprehend a variety of texts drawing on useful strategies as needed. Students are expected to:

(A) use ideas (e.g., illustrations, titles, topic sentences, key words, and foreshadowing) to make and confirm predictions;

(B) ask relevant questions, seek clarification, and locate facts and details about stories and other texts and support answers with evidence from text; and

(C) establish purpose for reading selected texts and monitor comprehension, making corrections and adjustments when that understanding breaks down (e.g., identifying clues, using background knowledge, generating questions, re-reading a portion aloud).

(4) Reading/Fluency. Students read grade-level text with fluency and comprehension. Students are expected to read aloud grade-level appropriate text with fluency (rate, accuracy, expression, appropriate phrasing) and comprehension.

(5) Reading/Vocabulary Development. Students understand new vocabulary and use it when reading and writing. Students are expected to:

(A) use prefixes and suffixes to determine the meaning of words (e.g., allow/disallow);

(B) use context to determine the relevant meaning of unfamiliar words or multiple-meaning words;

(25) Research/Gathering Sources. Students determine, locate, and explore the full range of relevant sources addressing a research question and systematically record the information they gather. Students are expected to:

(A) gather evidence from available sources (natural and personal) as well as from interviews with local experts;

(B) use text features (e.g., table of contents, alphabetized index, headings) in age-appropriate reference works (e.g., picture dictionaries) to locate information; and

(C) record basic information in simple visual formats (e.g., notes, charts, picture graphs, diagrams).

(26) Research/Synthesizing Information. Students clarify research questions and evaluate and synthesize collected information. Students are expected to revise the topic as a result of answers to initial research questions.

(27) Research/Organizing and Presenting Ideas. Students organize and present their ideas and information according to the purpose of the research and their audience. Students (with adult assistance) are expected to create a visual display or dramatization to convey the results of the research.

(28) Listening and Speaking/Listening. Students use comprehension skills to listen attentively to others in formal and informal settings. Students continue to apply earlier standards with greater complexity. Students are expected to:

(A) listen attentively to speakers and ask relevant questions to clarify information; and

(B) follow, restate, and give oral instructions that involve a short related sequence of actions.

(29) Listening and Speaking/Speaking. Students speak clearly and to the point, using the conventions of language. Students continue to apply earlier standards with greater complexity. Students are expected to share information and ideas that focus on the topic under discussion, speaking clearly at an appropriate pace, using the conventions of language.

(30) Listening and Speaking/Teamwork. Students work productively with others in teams. Students continue to apply earlier standards with greater complexity. Students are expected to follow agreed-upon rules for discussion, including listening to others, speaking when recognized, and making appropriate contributions.

Mathematics:

(2.1) Number, operation, and quantitative reasoning. The student understands how place value is used to represent whole numbers. The student is expected to:

(A) use concrete models of hundreds, tens, and ones to represent a given whole number (up to 999) in various ways;

(B) use place value to read, write, and describe the value of whole numbers to 999; and

(C) use place value to compare and order whole numbers to 999 and record the comparisons using numbers and symbols (<, =, >).

(2.3) Number, operation, and quantitative reasoning. The student adds and subtracts whole numbers to solve problems. The student is expected to:

(A) recall and apply basic addition and subtraction facts ( to 18);

(B) model addition and subtraction of two-digit numbers with objects, pictures, words, and numbers;

(C) select addition or subtraction to solve problems using two-digit numbers, whether or not regrouping is necessary;

(D) determine the value of a collection of coins up to one dollar; and

(E) describe how the cent symbol, dollar symbol, and the decimal point are used to name the value of a collection of coins.

(2.4) Number, operation, and quantitative reasoning. The student models multiplication and division. The student is expected to:

(A) model, create, and describe multiplication situations in which equivalent sets of concrete objects are joined; and

(B) model, create, and describe division situations in which a set of concrete objects is separated into equivalent sets.

(2.9) Measurement. The student directly compares the attributes of length, area, weight/mass, and capacity, and uses comparative language to solve problems and answer questions. The student selects and uses nonstandard units to describe length, area, capacity, and weight/mass. The student recognizes and uses models that approximate standard units ( from both SI, also known as metric, and customary systems) of length, weight/mass, capacity, and time. The student is expected to:

(A) identify concrete models that approximate standard units of length and use them to measure length;

(B) select a non-standard unit of measure such as square tiles to determine the area of a two-dimensional surface;

(C) select a non-standard unit of measure such as a bathroom cup or a jar to determine the capacity of a given container; and

(D) select a non-standard unit of measure such as beans or marbles to determine the weight/mass of a given object.

(2.12) Underlying processes and mathematical tools. The student applies Grade 2 mathematics to solve problems connected to everyday experiences and activities in and outside of school. The student is expected to:

(A) identify the mathematics in everyday situations;

(B) solve problems with guidance that incorporates the processes of understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;

(C) select or develop an appropriate problem-solving plan or strategy including drawing a picture, looking for a pattern, systematic guessing and checking, or acting it out in order to solve a problem; and

(D) use tools such as real objects, manipulatives, and technology to solve problems.

Social Studies:

(1) History. The student understands the historical significance of landmarks and celebrations in the community, state, and nation. The student is expected to:

(A) explain the significance of various community, state, and national celebrations such as Veterans Day, Memorial Day, Independence Day, and Thanksgiving; and

(B) identify and explain the significance of various community, state, and national landmarks such as monuments and government buildings.

(2) History. The student understands the concepts of time and chronology. The student is expected to:

(A) describe the order of events by using designations of time periods such as historical and present times;

(B) apply vocabulary related to chronology, including past, present, and future; and

(C) create and interpret timelines for events in the past and present.

(3) History. The student understands how various sources provide information about the past and present. The student is expected to:

(A) identify several sources of information about a given period or event such as reference materials, biographies, newspapers, and electronic sources; and

(B) describe various evidence of the same time period using primary sources such as photographs, journals, and interviews.

(4) History. The student understands how historical figures, patriots, and good citizens helped shape the community, state, and nation. The student is expected to:

(A) identify contributions of historical figures, including Thurgood Marshall, Irma Rangel, John Hancock, and Theodore Roosevelt, who have influenced the community, state, and nation;

(11) Government. The student understands the purpose of governments. The student is expected to:

(A) identify functions of governments such as establishing order, providing security, and managing conflict;

(B) identify governmental services in the community such as police and fire protection, libraries, schools, and parks and explain their value to the community; and

(C) describe how governments tax citizens to pay for services.

(12) Government. The student understands the role of public officials. The student is expected to:

(A) name current public officials, including mayor, governor, and president;

(B) compare the roles of public officials, including mayor, governor, and president;

(C) identify ways that public officials are selected, including election and appointment to office; and

(D) identify how citizens participate in their own governance through staying informed of what public officials are doing, providing input to them, and volunteering to participate in government functions.

(13) Citizenship. The student understands characteristics of good citizenship as exemplified by historical figures and other individuals. The student is expected to:

(A) identify characteristics of good citizenship, including truthfulness, justice, equality, respect for oneself and others, responsibility in daily life, and participation in government by educating oneself about the issues, respectfully holding public officials to their word, and voting;

(C) identify other individuals who exemplify good citizenship; and

(D) identify ways to actively practice good citizenship, including involvement in community service.

(14) Citizenship. The student identifies customs, symbols, and celebrations that represent American beliefs and principles that contribute to our national identity. The student is expected to:

(A) recite the Pledge of Allegiance to the United States Flag and the Pledge to the Texas Flag;

(B) identify selected patriotic songs, including "The Star Spangled Banner" and "America the Beautiful";

(C) identify selected symbols such as state and national birds and flowers and patriotic symbols such as the U.S. and Texas flags and Uncle Sam; and

(D) identify how selected customs, symbols, and celebrations reflect an American love of individualism, inventiveness, and freedom.

(15) Culture. The student understands the significance of works of art in the local community. The student is expected to:

(A) identify selected stories, poems, statues, paintings, and other examples of the local cultural heritage; and

(B) explain the significance of selected stories, poems, statues, paintings, and other examples of the local cultural heritage.

(16) Culture. The student understands ethnic and/or cultural celebrations. The student is expected to:

(A) identify the significance of various ethnic and/or cultural celebrations; and

(B) compare ethnic and/or cultural celebrations.

(17) Science, technology, and society. The student understands how science and technology have affected life, past and present. The student is expected to:

(A) describe how science and technology change communication, transportation, and recreation; and

(B) explain how science and technology change the ways in which people meet basic needs.

(18) Social studies skills. The student applies critical-thinking skills to organize and use information acquired from a variety of valid sources, including electronic technology. The student is expected to:

(A) obtain information about a topic using a variety of valid oral sources such as conversations, interviews, and music;

(B) obtain information about a topic using a variety of valid visual sources such as pictures, maps, electronic sources, literature, reference sources, and artifacts;

(C) use various parts of a source, including the table of contents, glossary, and index, as well as keyword Internet searches to locate information;

(D) sequence and categorize information; and

(E) interpret oral, visual, and print material by identifying the main idea, predicting, and comparing and contrasting.

(19) Social studies skills. The student communicates in written, oral, and visual forms. The student is expected to:

(A) express ideas orally based on knowledge and experiences; and

(B) create written and visual material such as stories, poems, maps, and graphic organizers to express ideas.

(20) Social studies skills. The student uses problem-solving and decision-making skills, working independently and with others, in a variety of settings. The student is expected to:

(A) use a problem-solving process to identify a problem, gather information, list and consider options, consider advantages and disadvantages, choose and implement a solution, and evaluate the effectiveness of the solution; and

(B) use a decision-making process to identify a situation that requires a decision, gather information, generate options, predict outcomes, take action to implement a decision, and reflect on the effectiveness of that decision.

Art:

(1) Perception. The student develops and organizes ideas from the environment. The student is expected to:

(A) identify variations in objects and subjects from the environment, using the senses;

(3) Historical/cultural heritage. The student demonstrates an understanding of art history and culture as records of human achievement. The student is expected to:

(A) identify stories and constructions in a variety of artworks;

(B) compare ways individuals and families are depicted in different artworks;

Third Grade:

English And reading

(2) Reading/Beginning Reading/Strategies. Students comprehend a variety of texts drawing on useful strategies as needed. Students are expected to:

(A) use ideas (e.g., illustrations, titles, topic sentences, key words, and foreshadowing clues) to make and confirm predictions;

(B) ask relevant questions, seek clarification, and locate facts and details about stories and other texts and support answers with evidence from text; and

(C) establish purpose for reading selected texts and monitor comprehension, making corrections and adjustments when that understanding breaks down (e.g., identifying clues, using background knowledge, generating questions, re-reading a portion aloud).

(12) Reading/Comprehension of Informational Text/Culture and History. Students analyze, make inferences and draw conclusions about the author's purpose in cultural, historical, and contemporary contexts and provide evidence from the text to support their understanding. Students are expected to identify the topic and locate the author's stated purposes in writing the text.

(29) Listening and Speaking/Listening. Students use comprehension skills to listen attentively to others in formal and informal settings. Students continue to apply earlier standards with greater complexity. Students are expected to:

(A) listen attentively to speakers, ask relevant questions, and make pertinent comments; and

(B) follow, restate, and give oral instructions that involve a series of related sequences of action.

(30) Listening and Speaking/Speaking. Students speak clearly and to the point, using the conventions of language. Students continue to apply earlier standards with greater complexity. Students are expected to speak coherently about the topic under discussion, employing eye contact, speaking rate, volume, enunciation, and the conventions of language to communicate ideas effectively.

(31) Listening and Speaking/Teamwork. Students work productively with others in teams. Students continue to apply earlier standards with greater complexity. Students are expected to participate in teacher- and student-led discussions by posing and answering questions with appropriate detail and by providing suggestions that build upon the ideas of others.

Reading and Comprehensions Skills

(A) establish purposes for reading selected texts based upon own or others’ desired outcome to enhance comprehension;

(B) ask literal, interpretive, and evaluative questions of text;

(C) monitor and adjust comprehension (e.g., using background knowledge, creating sensory images, re-reading a portion aloud, generating questions);

(D) make inferences about text and use textual evidence to support understanding;

(E) summarize information in text, maintaining meaning and logical order; and

(F) make connections (e.g., thematic links, author analysis) between literary and informational texts with similar ideas and provide textual evidence.

Mathematics:

(3.1) Number, operation, and quantitative reasoning. The student uses place value to communicate about increasingly large whole numbers in verbal and written form, including money. The student is expected to:

(A) use place value to read, write (in symbols and words), and describe the value of whole numbers through 999,999;

(B) use place value to compare and order whole numbers through 9,999;

(3.3) Number, operation, and quantitative reasoning. The student adds and subtracts to solve meaningful problems involving whole numbers. The student is expected to:

(A) model addition and subtraction using pictures, words, and numbers; and

(B) select addition or subtraction and use the operation to solve problems involving whole numbers through 999.

(3.3) Number, operation, and quantitative reasoning. The student adds and subtracts to solve meaningful problems involving whole numbers. The student is expected to:

(A) model addition and subtraction using pictures, words, and numbers; and

(B) select addition or subtraction and use the operation to solve problems involving whole numbers through 999.

(3.4) Number, operation, and quantitative reasoning. The student recognizes and solves problems in multiplication and division situations. The student is expected to:

(A) learn and apply multiplication facts through 12 by 12 using concrete models and objects;

(B) solve and record multiplication problems (up to two digits times one digit);

(3.6) Patterns, relationships, and algebraic thinking. The student uses patterns to solve problems. The student is expected to:

(A) identify and extend whole-number and geometric patterns to make predictions and solve problems;

(B) identify patterns in multiplication facts using concrete objects, pictorial models, or technology;

(3.11) Measurement. The student directly compares the attributes of length, area, weight/mass, and capacity, and uses comparative language to solve problems and answer questions. The student selects and uses standard units to describe length, area, capacity/volume, and weight/mass. The student is expected to:

(A) use linear measurement tools to estimate and measure lengths using standard units;

(B) use standard units to find the perimeter of a shape;

(C) use concrete and pictorial models of square units to determine the area of two-dimensional surfaces;

(D) identify concrete models that approximate standard units of weight/mass and use them to measure weight/mass;

(E) identify concrete models that approximate standard units for capacity and use them to measure capacity; and

(F) use concrete models that approximate cubic units to determine the volume of a given container or other three-dimensional geometric figure.

Social Studies

1) History. The student understands how individuals, events, and ideas have influenced the history of various communities. The student is expected to:

(A) describe how individuals, events, and ideas have changed communities, past and present;

(B) identify individuals, including Pierre-Charles L'Enfant, Benjamin Banneker, and Benjamin Franklin, who have helped to shape communities; and

(C) describe how individuals, including Daniel Boone, Christopher Columbus, the Founding Fathers, and Juan de Oñate, have contributed to the expansion of existing communities or to the creation of new communities.

(2) History. The student understands common characteristics of communities, past and present. The student is expected to:

(A) identify reasons people have formed communities, including a need for security, religious freedom, law, and material well-being;

(3) History. The student understands the concepts of time and chronology. The student is expected to:

(A) use vocabulary related to chronology, including past, present, and future times;

(B) create and interpret timelines; and

(C) apply the terms year, decade, and century to describe historical times.

(9) Government. The student understands the basic structure and functions of various levels of government. The student is expected to:

(A) describe the basic structure of government in the local community, state, and nation;

(B) identify local, state, and national government officials and explain how they are chosen;

(C) identify services commonly provided by local, state, and national governments; and

(D) explain how local, state, and national government services are financed.

(10) Government. The student understands important ideas in historical documents at various levels of government. The student is expected to:

(A) identify the purposes of the Declaration of Independence and the U.S. Constitution, including the Bill of Rights; and

(B) describe and explain the importance of the concept of "consent of the governed" as it relates to the functions of local, state, and national government.

(11) Citizenship. The student understands characteristics of good citizenship as exemplified by historical and contemporary figures. The student is expected to:

(A) identify characteristics of good citizenship, including truthfulness, justice, equality, respect for oneself and others, responsibility in daily life, and participation in government by educating oneself about the issues, respectfully holding public officials to their word, and voting;

(B) identify historical figures such as Helen Keller and Clara Barton and contemporary figures such as Ruby Bridges and military and first responders who exemplify good citizenship; and

(C) identify and explain the importance of individual acts of civic responsibility, including obeying laws, serving the community, serving on a jury, and voting.

Art

(1) Perception. The student develops and organizes ideas from the environment. The student is expected to:

(A) identify sensory knowledge and life experiences as sources for ideas about visual symbols, self, and life events; and

(B) identify art elements such as color, texture, form, line, space, and value and art principles such as emphasis, pattern, rhythm, balance, proportion, and unity in artworks.

(3) Historical/cultural heritage. The student demonstrates an understanding of art history and culture as records of human achievement. The student is expected to:

(A) compare content in artworks from the past and present for various purposes such as telling stories and documenting history and traditions;

(B) compare selected artworks from different cultures; and

(C) relate art to different kinds of jobs in everyday life

**Fourth Grade Math:**

(b)  Knowledge and skills.

(1)  Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(A)  apply mathematics to problems arising in everyday life, society, and the workplace;

(B)  use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C)  select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

(D)  communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E)  create and use representations to organize, record, and communicate mathematical ideas;

(F)  analyze mathematical relationships to connect and communicate mathematical ideas; and

(G)  display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

(2)  Number and operations. The student applies mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. The student is expected to:

(A)  interpret the value of each place-value position as 10 times the position to the right and as one-tenth of the value of the place to its left;

(B)  represent the value of the digit in whole numbers through 1,000,000,000 and decimals to the hundredths using expanded notation and numerals;

(C)  compare and order whole numbers to 1,000,000,000 and represent comparisons using the symbols >, <, or =;

(D)  round whole numbers to a given place value through the hundred thousands place;

(E)  represent decimals, including tenths and hundredths, using concrete and visual models and money;

(F)  compare and order decimals using concrete and visual models to the hundredths;

(G)  relate decimals to fractions that name tenths and hundredths; and

(H)  determine the corresponding decimal to the tenths or hundredths place of a specified point on a number line.

(3)  Number and operations. The student applies mathematical process standards to represent and generate fractions to solve problems. The student is expected to:

(A)  represent a fraction *a*/*b* as a sum of fractions 1/*b*, where *a* and *b* are whole numbers and *b* > 0, including when a > b;

(B)  decompose a fraction in more than one way into a sum of fractions with the same denominator using concrete and pictorial models and recording results with symbolic representations;

(C)  determine if two given fractions are equivalent using a variety of methods;

(D)  compare two fractions with different numerators and different denominators and represent the comparison using the symbols >, =, or <;

(E)  represent and solve addition and subtraction of fractions with equal denominators using objects and pictorial models that build to the number line and properties of operations;

(F)  evaluate the reasonableness of sums and differences of fractions using benchmark fractions 0, 1/4, 1/2, 3/4, and 1, referring to the same whole; and

(G)  represent fractions and decimals to the tenths or hundredths as distances from zero on a number line.

(4)  Number and operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. The student is expected to:

(A)  add and subtract whole numbers and decimals to the hundredths place using the standard algorithm;

(B)  determine products of a number and 10 or 100 using properties of operations and place value understandings;

(C)  represent the product of 2 two-digit numbers using arrays, area models, or equations, including perfect squares through 15 by 15;

(D)  use strategies and algorithms, including the standard algorithm, to multiply up to a four-digit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties;

(E)  represent the quotient of up to a four-digit whole number divided by a one-digit whole number using arrays, area models, or equations;

(F)  use strategies and algorithms, including the standard algorithm, to divide up to a four-digit dividend by a one-digit divisor;

(G)  round to the nearest 10, 100, or 1,000 or use compatible numbers to estimate solutions involving whole numbers; and

(H)  solve with fluency one- and two-step problems involving multiplication and division, including interpreting remainders.

(5)  Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

(A)  represent multi-step problems involving the four operations with whole numbers using strip diagrams and equations with a letter standing for the unknown quantity;

(B)  represent problems using an input-output table and numerical expressions to generate a number pattern that follows a given rule representing the relationship of the values in the resulting sequence and their position in the sequence;

(C)  use models to determine the formulas for the perimeter of a rectangle (*l* + *w* + *l* + *w* or 2*l* + 2*w*), including the special form for perimeter of a square (4*s*) and the area of a rectangle (*l* x *w*); and

(D)  solve problems related to perimeter and area of rectangles where dimensions are whole numbers.

(6)  Geometry and measurement. The student applies mathematical process standards to analyze geometric attributes in order to develop generalizations about their properties. The student is expected to:

(A)  identify points, lines, line segments, rays, angles, and perpendicular and parallel lines;

(B)  identify and draw one or more lines of symmetry, if they exist, for a two-dimensional figure;

(C)  apply knowledge of right angles to identify acute, right, and obtuse triangles; and

(D)  classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size.

(7)  Geometry and measurement. The student applies mathematical process standards to solve problems involving angles less than or equal to 180 degrees. The student is expected to:

(A)  illustrate the measure of an angle as the part of a circle whose center is at the vertex of the angle that is "cut out" by the rays of the angle. Angle measures are limited to whole numbers;

(B)  illustrate degrees as the units used to measure an angle, where 1/360 of any circle is one degree and an angle that "cuts" *n*/360 out of any circle whose center is at the angle's vertex has a measure of *n* degrees. Angle measures are limited to whole numbers;

(C)  determine the approximate measures of angles in degrees to the nearest whole number using a protractor;

(D)  draw an angle with a given measure; and

(E)  determine the measure of an unknown angle formed by two non-overlapping adjacent angles given one or both angle measures.

(8)  Geometry and measurement. The student applies mathematical process standards to select appropriate customary and metric units, strategies, and tools to solve problems involving measurement. The student is expected to:

(A)  identify relative sizes of measurement units within the customary and metric systems;

(B)  convert measurements within the same measurement system, customary or metric, from a smaller unit into a larger unit or a larger unit into a smaller unit when given other equivalent measures represented in a table; and

(C)  solve problems that deal with measurements of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate.

(9)  Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:

(A)  represent data on a frequency table, dot plot, or stem-and-leaf plot marked with whole numbers and fractions; and

(B)  solve one- and two-step problems using data in whole number, decimal, and fraction form in a frequency table, dot plot, or stem-and-leaf plot.

§111.7. Grade 5, Adopted 2012.

(b)  Knowledge and skills.

(1)  Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(A)  apply mathematics to problems arising in everyday life, society, and the workplace;

(B)  use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C)  select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

(D)  communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E)  create and use representations to organize, record, and communicate mathematical ideas;

(F)  analyze mathematical relationships to connect and communicate mathematical ideas; and

(G)  display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

(2)  Number and operations. The student applies mathematical process standards to represent, compare, and order positive rational numbers and understand relationships as related to place value. The student is expected to:

(A)  represent the value of the digit in decimals through the thousandths using expanded notation and numerals;

(B)  compare and order two decimals to thousandths and represent comparisons using the symbols >, <, or =; and

(C)  round decimals to tenths or hundredths.

(3)  Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(A)  estimate to determine solutions to mathematical and real-world problems involving addition, subtraction, multiplication, or division;

(B)  multiply with fluency a three-digit number by a two-digit number using the standard algorithm;

(C)  solve with proficiency for quotients of up to a four-digit dividend by a two-digit divisor using strategies and the standard algorithm;

(D)  represent multiplication of decimals with products to the hundredths using objects and pictorial models, including area models;

(E)  solve for products of decimals to the hundredths, including situations involving money, using strategies based on place-value understandings, properties of operations, and the relationship to the multiplication of whole numbers;

(F)  represent quotients of decimals to the hundredths, up to four-digit dividends and two-digit whole number divisors, using objects and pictorial models, including area models;

(G)  solve for quotients of decimals to the hundredths, up to four-digit dividends and two-digit whole number divisors, using strategies and algorithms, including the standard algorithm;

(H)  represent and solve addition and subtraction of fractions with unequal denominators referring to the same whole using objects and pictorial models and properties of operations;

(I)  represent and solve multiplication of a whole number and a fraction that refers to the same whole using objects and pictorial models, including area models;

(J)  represent division of a unit fraction by a whole number and the division of a whole number by a unit fraction such as 1/3 ÷ 7 and 7 ÷ 1/3 using objects and pictorial models, including area models;

(K)  add and subtract positive rational numbers fluently; and

(L)  divide whole numbers by unit fractions and unit fractions by whole numbers.

(4)  Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

(A)  identify prime and composite numbers;

(B)  represent and solve multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity;

(C)  generate a numerical pattern when given a rule in the form *y* = *ax* or *y* = *x* + *a* and graph;

(D)  recognize the difference between additive and multiplicative numerical patterns given in a table or graph;

(E)  describe the meaning of parentheses and brackets in a numeric expression;

(F)  simplify numerical expressions that do not involve exponents, including up to two levels of grouping;

(G)  use concrete objects and pictorial models to develop the formulas for the volume of a rectangular prism, including the special form for a cube (*V* = *l* x *w* x *h*, *V* = *s* x *s* x *s*, and *V* = *Bh*); and

(H)  represent and solve problems related to perimeter and/or area and related to volume.

(5)  Geometry and measurement. The student applies mathematical process standards to classify two-dimensional figures by attributes and properties. The student is expected to classify two-dimensional figures in a hierarchy of sets and subsets using graphic organizers based on their attributes and properties.

(6)  Geometry and measurement. The student applies mathematical process standards to understand, recognize, and quantify volume. The student is expected to:

(A)  recognize a cube with side length of one unit as a unit cube having one cubic unit of volume and the volume of a three-dimensional figure as the number of unit cubes (*n* cubic units) needed to fill it with no gaps or overlaps if possible; and

(B)  determine the volume of a rectangular prism with whole number side lengths in problems related to the number of layers times the number of unit cubes in the area of the base.

(7)  Geometry and measurement. The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving measurement. The student is expected to solve problems by calculating conversions within a measurement system, customary or metric.

(8)  Geometry and measurement. The student applies mathematical process standards to identify locations on a coordinate plane. The student is expected to:

(A)  describe the key attributes of the coordinate plane, including perpendicular number lines (axes) where the intersection (origin) of the two lines coincides with zero on each number line and the given point (0, 0); the *x*-coordinate, the first number in an ordered pair, indicates movement parallel to the *x*-axis starting at the origin; and the *y*-coordinate, the second number, indicates movement parallel to the *y*-axis starting at the origin;

(B)  describe the process for graphing ordered pairs of numbers in the first quadrant of the coordinate plane; and

(C)  graph 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.

(9)  Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:

(A)  represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots;

(B)  represent discrete paired data on a scatterplot; and

(C)  solve one- and two-step problems using data from a frequency table, dot plot, bar graph, stem-and-leaf plot, or scatterplot.

**§111.26. Grade 6, Adopted 2012.**

(b)  Knowledge and skills.

(1)  Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(A)  apply mathematics to problems arising in everyday life, society, and the workplace;

(B)  use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C)  select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

(D)  communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E)  create and use representations to organize, record, and communicate mathematical ideas;

(F)  analyze mathematical relationships to connect and communicate mathematical ideas; and

(G)  display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

(2)  Number and operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:

(A)  classify whole numbers, integers, and rational numbers using a visual representation such as a Venn diagram to describe relationships between sets of numbers;

(B)  identify a number, its opposite, and its absolute value;

(C)  locate, compare, and order integers and rational numbers using a number line;

(D)  order a set of rational numbers arising from mathematical and real-world contexts; and

(E)  extend representations for division to include fraction notation such as *a/b* represents the same number as *a* ÷ *b* where *b* ≠ 0.

(3)  Number and operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying solutions. The student is expected to:

(A)  recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values;

(B)  determine, with and without computation, whether a quantity is increased or decreased when multiplied by a fraction, including values greater than or less than one;

(C)  represent integer operations with concrete models and connect the actions with the models to standardized algorithms;

(D)  add, subtract, multiply, and divide integers fluently; and

(E)  multiply and divide positive rational numbers fluently.

(4)  Proportionality. The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:

(A)  compare two rules verbally, numerically, graphically, and symbolically in the form of *y = ax* or *y = x + a* in order to differentiate between additive and multiplicative relationships;

(B)  apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratios and rates;

(C)  give examples of ratios as multiplicative comparisons of two quantities describing the same attribute;

(D)  give examples of rates as the comparison by division of two quantities having different attributes, including rates as quotients;

(E)  represent ratios and percents with concrete models, fractions, and decimals;

(F)  represent benchmark fractions and percents such as 1%, 10%, 25%, 33 1/3%, and multiples of these values using 10 by 10 grids, strip diagrams, number lines, and numbers;

(G)  generate equivalent forms of fractions, decimals, and percents using real-world problems, including problems that involve money; and

(H)  convert units within a measurement system, including the use of proportions and unit rates.

(5)  Proportionality. The student applies mathematical process standards to solve problems involving proportional relationships. The student is expected to:

(A)  represent mathematical and real-world problems involving ratios and rates using scale factors, tables, graphs, and proportions;

(B)  solve real-world problems to find the whole given a part and the percent, to find the part given the whole and the percent, and to find the percent given the part and the whole, including the use of concrete and pictorial models; and

(C)  use equivalent fractions, decimals, and percents to show equal parts of the same whole.

(6)  Expressions, equations, and relationships. The student applies mathematical process standards to use multiple representations to describe algebraic relationships. The student is expected to:

(A)  identify independent and dependent quantities from tables and graphs;

(B)  write an equation that represents the relationship between independent and dependent quantities from a table; and

(C)  represent a given situation using verbal descriptions, tables, graphs, and equations in the form *y = kx* or *y = x + b*.

(7)  Expressions, equations, and relationships. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

(A)  generate equivalent numerical expressions using order of operations, including whole number exponents and prime factorization;

(B)  distinguish between expressions and equations verbally, numerically, and algebraically;

(C)  determine if two expressions are equivalent using concrete models, pictorial models, and algebraic representations; and

(D)  generate equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties.

(8)  Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to represent relationships and solve problems. The student is expected to:

(A)  extend previous knowledge of triangles and their properties to include the sum of angles of a triangle, the relationship between the lengths of sides and measures of angles in a triangle, and determining when three lengths form a triangle;

(B)  model area formulas for parallelograms, trapezoids, and triangles by decomposing and rearranging parts of these shapes;

(C)  write equations that represent problems related to the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers; and

(D)  determine solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers.

(9)  Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to represent situations. The student is expected to:

(A)  write one-variable, one-step equations and inequalities to represent constraints or conditions within problems;

(B)  represent solutions for one-variable, one-step equations and inequalities on number lines; and

(C)  write corresponding real-world problems given one-variable, one-step equations or inequalities.

(10)  Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to solve problems. The student is expected to:

(A)  model and solve one-variable, one-step equations and inequalities that represent problems, including geometric concepts; and

(B)  determine if the given value(s) make(s) one-variable, one-step equations or inequalities true.

(11)  Measurement and data. The student applies mathematical process standards to use coordinate geometry to identify locations on a plane. The student is expected to graph points in all four quadrants using ordered pairs of rational numbers.

(12)  Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to analyze problems. The student is expected to:

(A)  represent numeric data graphically, including dot plots, stem-and-leaf plots, histograms, and box plots;

(B)  use the graphical representation of numeric data to describe the center, spread, and shape of the data distribution;

(C)  summarize numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution; and

(D)  summarize categorical data with numerical and graphical summaries, including the mode, the percent of values in each category (relative frequency table), and the percent bar graph, and use these summaries to describe the data distribution.

(13)  Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to solve problems. The student is expected to:

(A)  interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots; and

(B)  distinguish between situations that yield data with and without variability.

*Source: The provisions of this §111.26 adopted to be effective September 10, 2012, 37 TexReg 7109.*

**§111.27. Grade 7, Adopted 2012.**

(b)  Knowledge and skills.

(1)  Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(A)  apply mathematics to problems arising in everyday life, society, and the workplace;

(B)  use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C)  select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

(D)  communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E)  create and use representations to organize, record, and communicate mathematical ideas;

(F)  analyze mathematical relationships to connect and communicate mathematical ideas; and

(G)  display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

(2)  Number and operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of rational numbers.

(3)  Number and operations. The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions. The student is expected to:

(A)  add, subtract, multiply, and divide rational numbers fluently; and

(B)  apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.

(4)  Proportionality. The student applies mathematical process standards to represent and solve problems involving proportional relationships. The student is expected to:

(A)  represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphical, and algebraic representations, including *d = rt*;

(B)  calculate unit rates from rates in mathematical and real-world problems;

(C)  determine the constant of proportionality (*k = y/x*) within mathematical and real-world problems;

(D)  solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems; and

(E)  convert between measurement systems, including the use of proportions and the use of unit rates.

(5)  Proportionality. The student applies mathematical process standards to use geometry to describe or solve problems involving proportional relationships. The student is expected to:

(A)  generalize the critical attributes of similarity, including ratios within and between similar shapes;

(B)  describe π as the ratio of the circumference of a circle to its diameter; and

(C)  solve mathematical and real-world problems involving similar shape and scale drawings.

(6)  Proportionality. The student applies mathematical process standards to use probability and statistics to describe or solve problems involving proportional relationships. The student is expected to:

(A)  represent sample spaces for simple and compound events using lists and tree diagrams;

(B)  select and use different simulations to represent simple and compound events with and without technology;

(C)  make predictions and determine solutions using experimental data for simple and compound events;

(D)  make predictions and determine solutions using theoretical probability for simple and compound events;

(E)  find the probabilities of a simple event and its complement and describe the relationship between the two;

(F)  use data from a random sample to make inferences about a population;

(G)  solve problems using data represented in bar graphs, dot plots, and circle graphs, including part-to-whole and part-to-part comparisons and equivalents;

(H)  solve problems using qualitative and quantitative predictions and comparisons from simple experiments; and

(I)  determine experimental and theoretical probabilities related to simple and compound events using data and sample spaces.

(7)  Expressions, equations, and relationships. The student applies mathematical process standards to represent linear relationships using multiple representations. The student is expected to represent linear relationships using verbal descriptions, tables, graphs, and equations that simplify to the form *y = mx + b*.

(8)  Expressions, equations, and relationships. The student applies mathematical process standards to develop geometric relationships with volume. The student is expected to:

(A)  model the relationship between the volume of a rectangular prism and a rectangular pyramid having both congruent bases and heights and connect that relationship to the formulas;

(B)  explain verbally and symbolically the relationship between the volume of a triangular prism and a triangular pyramid having both congruent bases and heights and connect that relationship to the formulas; and

(C)  use models to determine the approximate formulas for the circumference and area of a circle and connect the models to the actual formulas.

(9)  Expressions, equations, and relationships. The student applies mathematical process standards to solve geometric problems. The student is expected to:

(A)  solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids;

(B)  determine the circumference and area of circles;

(C)  determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles; and

(D)  solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net.

(10)  Expressions, equations, and relationships. The student applies mathematical process standards to use one-variable equations and inequalities to represent situations. The student is expected to:

(A)  write one-variable, two-step equations and inequalities to represent constraints or conditions within problems;

(B)  represent solutions for one-variable, two-step equations and inequalities on number lines; and

(C)  write a corresponding real-world problem given a one-variable, two-step equation or inequality.

(11)  Expressions, equations, and relationships. The student applies mathematical process standards to solve one-variable equations and inequalities. The student is expected to:

(A)  model and solve one-variable, two-step equations and inequalities;

(B)  determine if the given value(s) make(s) one-variable, two-step equations and inequalities true; and

(C)  write and solve equations using geometry concepts, including the sum of the angles in a triangle, and angle relationships.

(12)  Measurement and data. The student applies mathematical process standards to use statistical representations to analyze data. The student is expected to:

(A)  compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads;

(B)  use data from a random sample to make inferences about a population; and

(C)  compare two populations based on data in random samples from these populations, including informal comparative inferences about differences between the two populations.

*Source: The provisions of this §111.27 adopted to be effective September 10, 2012, 37 TexReg 7109.*

**§111.28. Grade 8, Adopted 2012**

(b)  Knowledge and skills.

(1)  Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(A)  apply mathematics to problems arising in everyday life, society, and the workplace;

(B)  use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C)  select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

(D)  communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E)  create and use representations to organize, record, and communicate mathematical ideas;

(F)  analyze mathematical relationships to connect and communicate mathematical ideas; and

(G)  display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

(2)  Number and operations. The student applies mathematical process standards to represent and use real numbers in a variety of forms. The student is expected to:

(A)  extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers;

(B)  approximate the value of an irrational number, including π and square roots of numbers less than 225, and locate that rational number approximation on a number line;

(C)  convert between standard decimal notation and scientific notation; and

(D)  order a set of real numbers arising from mathematical and real-world contexts.

(3)  Proportionality. The student applies mathematical process standards to use proportional relationships to describe dilations. The student is expected to:

(A)  generalize that the ratio of corresponding sides of similar shapes are proportional, including a shape and its dilation;

(B)  compare and contrast the attributes of a shape and its dilation(s) on a coordinate plane; and

(C)  use an algebraic representation to explain the effect of a given positive rational scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation.

(4)  Proportionality. The student applies mathematical process standards to explain proportional and non-proportional relationships involving slope. The student is expected to:

(A)  use similar right triangles to develop an understanding that slope, *m*, given as the rate comparing the change in *y*-values to the change in *x*-values, (y2 - y1)/ (x2 - x1), is the same for any two points (x1, y1) and (x2, y2) on the same line;

(B)  graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship; and

(C)  use data from a table or graph to determine the rate of change or slope and *y*-intercept in mathematical and real-world problems.

(5)  Proportionality. The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to:

(A)  represent linear proportional situations with tables, graphs, and equations in the form of *y = kx*;

(B)  represent linear non-proportional situations with tables, graphs, and equations in the form of *y = mx + b*, where *b* ≠ 0;

(C)  contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a linear relationship from a graphical representation;

(D)  use a trend line that approximates the linear relationship between bivariate sets of data to make predictions;

(E)  solve problems involving direct variation;

(F)  distinguish between proportional and non-proportional situations using tables, graphs, and equations in the form *y = kx* or *y = mx + b*, where *b* ≠0;

(G)  identify functions using sets of ordered pairs, tables, mappings, and graphs;

(H)  identify examples of proportional and non-proportional functions that arise from mathematical and real-world problems; and

(I)  write an equation in the form *y = mx + b* to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations.

(6)  Expressions, equations, and relationships. The student applies mathematical process standards to develop mathematical relationships and make connections to geometric formulas. The student is expected to:

(A)  describe the volume formula *V = Bh* of a cylinder in terms of its base area and its height;

(B)  model the relationship between the volume of a cylinder and a cone having both congruent bases and heights and connect that relationship to the formulas; and

(C)  use models and diagrams to explain the Pythagorean theorem.

(7)  Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to solve problems. The student is expected to:

(A)  solve problems involving the volume of cylinders, cones, and spheres;

(B)  use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders;

(C)  use the Pythagorean Theorem and its converse to solve problems; and

(D)  determine the distance between two points on a coordinate plane using the Pythagorean Theorem.

(8)  Expressions, equations, and relationships. The student applies mathematical process standards to use one-variable equations or inequalities in problem situations. The student is expected to:

(A)  write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants;

(B)  write a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants;

(C)  model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants; and

(D)  use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

(9)  Expressions, equations, and relationships. The student applies mathematical process standards to use multiple representations to develop foundational concepts of simultaneous linear equations. The student is expected to identify and verify the values of *x* and *y* that simultaneously satisfy two linear equations in the form *y = mx + b* from the intersections of the graphed equations.

(10)  Two-dimensional shapes. The student applies mathematical process standards to develop transformational geometry concepts. The student is expected to:

(A)  generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane;

(B)  differentiate between transformations that preserve congruence and those that do not;

(C)  explain the effect of translations, reflections over the *x*- or *y*-axis, and rotations limited to 90°, 180°, 270°, and 360° as applied to two-dimensional shapes on a coordinate plane using an algebraic representation; and

(D)  model the effect on linear and area measurements of dilated two-dimensional shapes.

(11)  Measurement and data. The student applies mathematical process standards to use statistical procedures to describe data. The student is expected to:

(A)  construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data;

(B)  determine the mean absolute deviation and use this quantity as a measure of the average distance data are from the mean using a data set of no more than 10 data points; and

(C)  simulate generating random samples of the same size from a population with known characteristics to develop the notion of a random sample being representative of the population from which it was selected.