

SUPPLEMENTAL MATERIALS

Committee on Academic and Workforce Success

AGENDA ITEM V-U

Consideration of adopting the staff recommendation to the Committee relating to the proposed revisions to the Texas College and Career Readiness Standards for English Language Arts and Math

Authority: Texas Education Code, Section 28.008
Advancement of College Readiness in Curriculum
83rd Texas Legislature, Regular Session

RECOMMENDATION: Approval

Background Information:

Texas Education Code (TEC), Section 28.008, entitled "Advancement of College Readiness in Curriculum," was created by the Third Special Called Session of the 79th Texas Legislature. This section requires that the Texas Education Agency (TEA) and Texas Higher Education Coordinating Board (THECB) establish discipline-based vertical teams (VT) to develop College and Career Readiness Standards (CCRS) that address what students must know and be able to do to succeed in entry-level college courses offered at Texas public community/technical colleges and universities. TEC, Section 28.008 was amended by the 83rd Texas Legislature, Regular Session, to require that vertical teams periodically review the college readiness standards and expectations and recommend any revisions of the standards for approval.

In fall 2017, the THECB contracted with Texas Tech University to facilitate the discipline-based vertical team review and revision process. Based on nominations solicited from all Texas public institutions of higher education, the THECB appointed academic and career/technical content experts to the English Language Arts (ELA) and Mathematics vertical teams. The TEA likewise appointed academic and career/technical content experts to each of the teams. The revised CCRS developed by the teams were shared with business and industry leaders to receive feedback for consideration in any final recommendations proposed by the vertical teams. The proposed revised CCRS were posted to the *Texas Register* on March 16, 2018, providing opportunity for written public comment, as outlined in TEC, Section 28.008. Following a 30-day comment period, eight (8) comments were received. After thorough review of the submitted comments, vertical team members recommended final approval of the proposed revised CCRS **with no changes**. A complete text of the proposed revisions to the CCRS for ELA and Math can be found at: <http://www.thecb.state.tx.us/TxCCRS>.

Jerel Booker, Assistant Commissioner for College Readiness and Success, will present this item and be available to answer questions.

Summary of Comments Received for English Language Arts (ELA) CCRS

Houston Community College

Comment: Houston Community College offers the following feedback/commentary on the proposed revisions to the Texas College and Career Readiness Standards (CCRS) for English/Language Arts (ELA) and Math: Deans approved of the standards for English Language Arts. There was some concern that there were no standards for English for Speakers of Other Languages. There were no formal comments regarding the proposed math standards.

ELA VT Response: Thank you for reviewing the CCRS. The academic standards related to college readiness, which is the purpose of the CCRS, is the same for all entering college students. A second and equal purpose of the CCRS is to communicate to Texas high schools and curriculum developers what a high school graduate should know and be able to do in order to succeed in entry-level college courses. There are not separate standards of college readiness. It should likewise be noted that standards are distinct from curriculum.

San Jacinto College District

Comment: Avoid strings of verbs in all standards. For example, in "Locate, evaluate, and select information from a variety of sources," the verb "select" will do. It assumes "locate" because you can't select them unless you've located them, and "evaluate" is evident in the list of 3 actions below this item. The same goes for "Read and analyze"—you can't analyze unless you've first read. But this may be nit-picking; multiple verbs are a pet peeve of mine but don't bother most people.

ELA VT Response: The Standards were authored and edited by a team of ELA professors. The string of verbs was necessary to summarize ideas without forming additional standards. Adding standards to avoid this would result in an overwhelmingly long document.

Comment: Regarding Standard II.D.2, what does "Recognize the potential of diverse texts to create empathy" mean? Empathy for whom? Couldn't this item be combined with the one below it: "Appreciate the aesthetic qualities and value of diverse texts"? Better yet, combine both of these into "Recognize the value of diverse texts."

ELA VT Response: The VTs wanted to draw out the importance of empathy with respect to the underlying text and characters. The combination of these standards would eliminate that importance. After analysis of the standard, the VTs did not feel that "empathy for whom" needed to be or should be clarified as this will vary across texts.

Comment: Under "Writing," new emphases on rhetorical strategies, genre, media, evidence and audience are all good; good idea to broaden the idea of thesis to include purpose statement.

ELA VT Response: No response required.

Comment: Under "Reading," it is an excellent idea to emphasize rhetorical and literary devices as ways to create meaning and connect with reader; excellent idea to "read widely" in American, British and World Literatures; excellent idea to emphasize vocabulary building; excellent focus on myth and oral tradition.

ELA VT Response: No response required.

Comment: Under "Speaking," it is an excellent idea to emphasize reasoned dialogue with people with different perspectives.

ELA VT Response: No response required.

Comment: Under "Research," good focus on primary vs. secondary sources; good emphasis on integrating sources into research paper; excellent focus on ethics of use and attribution of source material.

ELA VT Response: No response required.

South Texas College

Comment: In regards to the public comments to the proposed revisions to the Texas College and Career Readiness Standards, South Texas College developmental reading and writing chairs as well as the chair of the English department have reviewed the proposed changes to the college readiness standards for ELA and are impressed with the proposed changes.

They find that the changes adequately reflect the preparation needed for academic work and we appreciate the more active and concise wording of the required skills. They look forward to learning more on how the standards in ELA standards can be implemented in the other subjects such as Social Sciences, and History.

ELA VT Response: No response required.

Texas State University

Comment: Commentor recommended several changes to the wording in the ELA Standards.

ELA VT Response: The VT thanks the respondent for their efforts in editing the document based on his/her preference. However, the substance of the standards remains the same and reflects the intentions and collective editing of the VT, all of whom are ELA college instructors.

Victoria College

Comment: Victoria College faculty in Arts, Humanities, and Social Sciences have examined the proposed changes to college readiness standards and agree with the majority of the revisions. Some faculty believe that C.3 is too specific. Classical literature generally refers to literature from Ancient Greece and Rome, and we do not believe that was the intention of the standard.

ELA VT Response: II.C.3 is in reference to the Reading Standard. A and B of the Reading standard are designed to cover a broad spectrum of literature, whereas C.3 is focused on "...myths, oral traditions, and Classical literature." Taking the Reading Standard as a whole rather than looking at this single component, the concern raised here is addressed.

No changes were made to the proposed standards for English Language Arts based on any of the comments received.

Summary of Comments Received for Mathematics CCRS

Central Texas College

Comment: Under Algebraic Reasoning, (B) Manipulating expressions, the statement is "Recognize and use algebraic properties... to combine, transform and evaluate expressions." The primary focus should be "simplify" expressions using algebraic properties such as.... Emphasis should be placed on "simplifying" linear, polynomial, and rational expressions.

Math VT Response: The Standards are designed to be as concise as possible. This is necessary so as not to create an overwhelming list. "Linear Expressions" are contained within the term "polynomial," as they are a first order polynomial. "Simplification" is captured within the phrases "combine," "transform," and "evaluate." "Combine" and "Transform" include "Simplification" but are more explicit in the definition. "Transforming" moves beyond "Simplification" and is essential in mathematics. Polynomials and rational expressions are explicitly mentioned in the examples.

Comment: Under Algebraic Reasoning, (C) Solving equations, inequalities, and systems of equations and inequalities, the statement is "Recognize and use algebraic properties...to solve equations, inequalities, and systems of linear equations and inequalities. Emphasis should be placed on "solving" equations, inequalities, and systems of equations and inequalities using algebraic properties..." It would be helpful if students recognized linear, quadratic, and rational equations, and the method(s) for solving each.

Math VT Response: The three standards that comprise Algebraic Reasoning (A), (B), and (C) are designed to convey a build-up of background knowledge that is necessary to achieve (C) or the solution of equations, inequalities and systems of equations and inequalities. Recognition of the various equations is captured in II. Algebraic Reasoning, (A) Identify expressions and equations.

Comment: Both of these concepts are very important to success in College Algebra. Ultimately, students need to be able to simplify expressions and solve equations, not merely recognize properties. The properties are the tools, not the end result. That should be clear in the standards.

Math VT Response: II. Algebraic Reasoning, (C) "Solving equations, inequalities, and systems of equations and inequalities" is designed to capture the importance of solving equations. Simplification is captured in II. Algebraic Reasoning, (B) Manipulating expressions. Manipulation expressions includes "simplification" but with purpose, either for the purposes of simplification or to solve an equation.

Comment: Under Problem Solving and Reasoning, there is a specific section for proportional reasoning. There should be emphasis on linear and quadratic problem solving as well.

Math VT Response: This section is designed to capture the general content within problem solving rather than provide specific types of equations. The section is purposely inclusive of the broader set of equations.

Comment: In general, there are college students who don't even recognize the difference between linear, quadratic, and rational expressions or equations, much less how to simplify or solve them. This makes it difficult to succeed in a college credit math course.

Math VT Response: This is captured across the collection of standards as opposed to individual statements.

San Jacinto College District

Comment: Under "Numeric Reasoning," the definition of complex numbers is a logical extension of the development of sets of numbers and should be kept. Include complex numbers in the discussion of irrational numbers instead of omitting it. Complex numbers have become an important part of life with computers and need to be studied in public schools.

Math VT Response: The mathematics VT determined that complex numbers are addressed, and usually introduced, at the college level and through college level courses. Knowledge of complex numbers is not necessary for entry-level college mathematics classes.

Comment: Under "Geometric and Spatial Reasoning," "Determine indirect measurements of geometric figures using a variety of methods," is too vague and hard to quantify. This needs to be more specific.

Math VT Response: It is the intention of the VTs to leave the methods for determining the indirect measurement of geometric figures open. The intention of this Standard is to encourage mathematical exploration in geometry. There are many methods that may be used to satisfy this standard.

Comment: Please include the study of right triangles including the Pythagorean theorem and some basic trigonometry to aid the calculations for laying pipe and the angles necessary to make the connections.

Math VT Response: This is captured in II.A.3. The Pythagorean theorem is not specifically identified, because it is captured in the reference to right angled relationships. The VT intentionally removed references to specific theorems because listing important mathematical theorems in this document would result in an overwhelming number of Standards. Alternately, listing some theorems as examples could have the unintended effect of suggesting that only certain theorems should be addressed.

Comment: "Measurement Reasoning" is an important element in College and Career Readiness. For instance, concepts such as scale drawing and using basic Trigonometry are crucial skills in the classroom and the workplace.

Math VT Response: In order to simplify the Standards, the VTs combined this previous set of Standards into III.D. The underlying support of the importance of this concept was not removed; it was moved. Trigonometry is addressed in III.A.3.

Tarrant County College

Comment: The proposed math changes are ok.

Math VT Response: No response required.

Texas State University

Comment: III.C.1 This should probably read "Make connections between geometry and algebraic equations and inequalities," so that regions (e.g. disks) can be understood as solutions to algebraic inequalities

Math VT Response: The Standards are designed to describe, as a collection, the knowledge that is necessary to succeed in entry-level college mathematics courses. Inequalities are covered in II.C.

Comment: Complex numbers have now been removed entirely from the list. That is a cause for concern for some.

Math VT Response: Complex numbers are often introduced and learned through introductory college level mathematics courses. The standards cover both introductory courses at community colleges and universities. Community colleges and many universities do not assume this information upon entry.

Comment: Change the word "computation" to "operations" in I.A.2.

Math VT Response: "Operations" is used within the broader category, I.A. This standard is used to describe the "how" for I.A. using computations. Jointly, I.A. considered with I.A.2. captures both operations and computations, as is the intent of the Standard.

Comment: In II.C. representation of a solution set should be included.

Math VT Response: Solving equations, inequalities, and systems of equations and inequalities requires that students calculate and represent a solution set. Without this competency, II.C. would not be addressed. This does not need to be explicitly stated, as it is a result of implementing the standard.

Comment: III.A.1. "Form" seems confusing. The previously used "make, test and use" are preferable.

Math VT Response: "Form and validate" captures the previous terms in a more concise manner and uses language that is common to mathematics.

Comment: III.C.1. Vague

Math VT Response: The Standards are designed to capture a broad set of concepts in a concise, manageable manner. This may result in some phrasing that is purposely broad, as is the case here.

Comment: VII.A.2 It is unclear for what one is to “formulate a plan or strategy.”

Math VT Response: The standards are designed in subcategories. VII.A.2. falls beneath VII.A. This indicates that it is to “Formulate a plan or strategy” for “Mathematical problem solving.” The use of subcategories is common and were used in the current set of standards.

Comment: VII.D. Change “Real-world problem solving” to “mathematical problems”

Math VT Response: This change is not the intent of the Standard, which is to bring real world problems to the classroom. The original wording more clearly defines this intent.

Comment: VII.D.1., VII.B.1., VIII.B.2. Suggests rewording.

Math VT Response: The proposed changes to wording do not affect the clarity or meaning of the Standards. The original wording is preferred by the VT.

Comment: VII.D.2. Questions to what the Standard refers.

Math VT Response: VII.D.2. is a subcategory of VII.D. When recognized as a subcategory, the reference is clear. It references “Real world problem solving,” the larger category. The method of subcategorization which expands or clarifies an overarching category is consistent with the framework of the original Standards.

Comment: VIII.C.1. Questions the use of the term “models.”

Math VT Response: There are a variety of mathematical models. This Standard does not define “models” but rather emphasizes the appropriateness of the one selected for clear mathematical communication.

No changes were made to the proposed standards for Mathematics based on any of the comments received.

General Comments

San Jacinto College District

Comment: The elimination of redundant words and ambiguous descriptions is considered a positive addition.

VT Response: No response required.

The University of Texas at El Paso

Comment: The program directors for the Developmental English and Math programs at The University of Texas at El Paso both feel that the revisions are good and make the college readiness standards more clear. We appreciate the opportunity to provide feedback.

VT Response: No response required.

No changes were made to the proposed standards for English Language Arts or Math based on any of the comments received.

Revised College and Career Readiness Standards for English/Language Arts

I. Writing

- A. Compose a variety of texts that demonstrate clear focus, the logical development of ideas in well-organized paragraphs, and the use of appropriate language that advances the author's purpose.
1. Determine effective approaches, genres, ~~[forms,]~~ rhetorical techniques, and media that demonstrate understanding of the writer's purpose and audience.
 2. Generate ideas, ~~[and-]~~ gather information, and manage evidence relevant to the topic and purpose, ~~[-keeping careful records of outside sources.]~~
 3. Evaluate relevance, quality, sufficiency, and depth of preliminary ideas and information; ~~[-]~~ organize material generated; ~~[-]~~ and formulate a thesis or purpose statement.
 4. Review feedback and revise each draft by organizing it more logically and fluidly, refining key ideas, and using language more precisely and effectively. ~~[Recognize the importance of revision as the key to effective writing. Each draft should refine key ideas and organize them more logically and fluidly, use language more precisely and effectively, and draw the reader to the author's purpose.]~~
 5. Edit writing for audience, purpose, context, and style, ~~[proper voice, tense and syntax]~~ assuring that it conforms to Standard American ~~[standard]~~ English, when appropriate.

II. Reading

- A. ~~[Locate explicit textual information, draw complex inferences, and-]~~ Identify, analyze, and evaluate ~~[the]~~ information ~~[and meaning]~~ within and across texts of varying lengths and genres.
1. Use effective reading strategies to determine a written work's purpose and intended audience.
 2. Use text features ~~[and graphics]~~ to form an overview of ~~[informational texts and to determine where]~~ content and to locate information.
 3. Identify explicit and implicit textual information including main ideas and author's purpose.
 4. Make evidence-based inferences about a text's meaning, intent, and values. ~~[Draw and support complex inferences from text to summarize, draw conclusions, and distinguish facts from simple assertions and opinions.]~~
 5. Analyze and evaluate implicit and explicit arguments in a variety of texts for the quality and coherence of evidence and reasoning. ~~[the presentation of information and the strength and quality of evidence used by the author, and judge the coherence and logic of the presentations and the credibility of an argument.]~~
- ~~[6.—Analyze imagery in literary texts.]~~

- ~~6.[7.]—Identify and analyze the author’s use of rhetorical and literary devices to create meaning and affect the reader.[Evaluate the use of both literal and figurative language to inform and shape the perceptions of readers.]~~
- ~~7.[8.] Compare and analyze how [generic] features of genre are used across texts.~~
- ~~8.[9.] Identify, [and] analyze, and evaluate similarities and differences in how multiple texts present information, argue a position, or relate a theme.[the audience, purpose, and message of an informational or persuasive text.]~~
- ~~[10. Identify and analyzed how an author’s use of language appeal to the senses, creates imagery, and suggests mood.]~~
- ~~[11. Identify, analyze, and evaluate similarities and differences in how multiple texts present information, argue a position, or relate a theme.]~~
- B. Apply a variety of strategies to determine the meanings of unfamiliar words and phrases.~~[Understand new vocabulary and concepts and use them accurately in reading speaking, and writing.]~~
 1. Identify new words and concepts acquired through study of their relationships to other words and concepts.
 2. Apply knowledge of roots and affixes to infer the meanings of new words.
 3. Use reference guides to confirm the meanings of new words or concepts.
 4. Make inferences about the denotative and connotative meanings of unfamiliar words using context clues.
- C. Read and analyze literary and other texts from a variety of cultural and historical contexts.~~[Describe, analyze, and evaluate information within and across literary and other texts from a variety of cultures and historical periods.]~~
 1. Read widely, including complete~~a wide variety of~~ texts from American, British, ~~[European]~~ and world literatures.
 2. Analyze the relationships between works of literature and the historical periods and cultural contexts in which they were written.~~[Analyze themes, structures, and elements of myths, traditional narratives, and classical and contemporary literature.]~~
 3. Examine the influence of myths, oral traditions, and Classical literature on subsequent works over time.~~Analyze works of literature for what they suggest about the historical period and cultural contexts in which they were written.~~
 - ~~[4. Analyze and compare the use of language in literary works from a variety of world cultures.]~~
- D. Acquire insights about oneself, others, or the world from reading diverse texts.~~[Explain how literary and other texts evoke personal experience and reveal character in particular historical circumstances.]~~
 1. Make text-to-self, text-to-text, and text-to-world connections.~~[Describe insights gained about oneself, others, or the world from reading specific texts.]~~

2. Recognize the potential of diverse texts to cultivate empathy. [Analyze the influence of myths, folktales, fables, and classical literature from a variety of world cultures on later literature and film.]
3. Appreciate the aesthetic qualities and values of diverse texts.

III. Speaking

- A. Understand the elements of both formal and informal communication in group discussions, one-on-one situations, and presentations. [Understand the elements of communication both in informal group discussions and formal presentations (e.g., accuracy, relevance, rhetorical features, organization of information).]
1. Participate actively, effectively, and respectfully in one-on-one oral communication as well as in group discussions. [Understand how style and content of spoken language varies in different contexts and influences listener's understanding.]
 2. Engage in reasoned dialogue, including with people who have different perspectives. [Adjust presentation (delivery, vocabulary, length) to particular audiences and purposes.]
 3. Understand how style, register, and content of spoken language vary in different contexts and influence the listener's understanding.
 4. Adjust delivery, vocabulary, and length of message for particular audiences, purposes, and contexts.
 5. Plan and deliver focused, coherent presentations that convey clear and distinct perspectives and demonstrate sound reasoning.
- [B.—Develop effective speaking styles for both group and one-on-one situations.
- 1.—Participate actively and effectively in one-on-one oral communication situations.
 - 2.—Participate actively and effectively in group discussions.
 - 3.—Plan and deliver focused and coherent presentations that convey clear and distinct perspectives and demonstrate solid reasoning.]

IV. Listening

- A. Apply listening skills [as an individual and as a member of a group] in a variety of settings and contexts. [(e.g., lectures, discussions, conversations, team projects, presentations, interviews).]
1. Use a variety of active listening strategies to enhance comprehension. [Analyze and evaluate the effectiveness of a public presentation.]
 2. Listen critically and respond appropriately. [Interpret a speaker's message; identify the position taken and the evidence in support of the position.]
 3. Develop an awareness of rhetorical and stylistic choices used to convey a message. [Use a variety of strategies to enhance listening comprehension (e.g., focus attention on message, monitor message for clarity and understanding, note cues such as change of pace or particular words that

~~indicate a new point is about to be made, select and organize key information).~~]

4. Comprehend detailed instructions, explanations, and directions in a range of contexts (e.g., specialized contexts such as workplace procedures and operating instructions).
5. Recognize fillers, intentional pauses, and placeholders in speech (e.g., um) and make inferences in context.

~~[B.—Listen effectively in informal and formal settings.~~

- ~~1.—Listen critically and respond appropriately to presentations.~~
- ~~2.—Listen actively and effectively in one-on-one communication situations.~~
- ~~3.—Listen actively and effectively in group discussions.]~~

V. Research

A. Formulate topic and questions.

1. Articulate and investigate research questions.~~[-Formulate research questions.]~~
2. Explore and refine a research topic.
3. Devise~~[-Refine research topic and devise]~~ a plan~~[-timeline]~~ for completing work on time.

B. Locate, evaluate, and select ~~[Select]~~ information from a variety of sources.

1. Explore and collect a range of potential sources.~~[-Gather relevant sources.]~~
2. Distinguish between and among primary and secondary sources.~~[-Evaluate the validity and reliability of sources.]~~
3. Assess the relevance and credibility of sources.~~[-Synthesize and organize information effectively.]~~

C. Design and produce an effective product.~~[-Produce and design a document.]~~

1. Integrate and organize material effectively.~~[-Design and present an effective product.]~~
2. Use and attribute source material ethically.~~[-Use source material ethically.]~~
3. Follow relevant rules governing attribution.

Revised College and Career Readiness Standards for Mathematics**I. Numeric Reasoning**

- A. Number representations and operations
 - 1. Compare relative magnitudes of rational and irrational numbers, [real numbers] and understand that numbers can be represented in different ways.
 - 2. Perform computations with rational and irrational numbers.[-Define and give examples of complex numbers.]
- B. Number sense and number concepts[-operations]
 - 1. Use estimation to check for errors and reasonableness of solutions.[-Perform computations with real and complex numbers.]
 - 2. Interpret the relationships between the different representations of numbers.
- C. Systems of measurement[-Number sense and number concepts]
 - 1. Select or use the appropriate type of method, unit, and tool for the attribute being measured.[-Use estimation to check for errors and reasonableness of solutions.]
 - 2. Convert units within and between systems of measurement.

II. Algebraic Reasoning

- A. Identifying e[E]xpressions and equations
 - 1. Explain [and differentiate] the difference between expressions and equations,[- using words such as "solve," "evaluate," and "simplify."]
- B. Manipulating expressions
 - 1. Recognize and use algebraic [(field)] properties, concepts, [procedures,] and algorithms to combine, transform, and evaluate expressions (e.g., polynomials, radicals, rational expressions).
- C. Solving equations, inequalities, and systems of equations and inequalities
 - 1. Describe and interpret solution sets of equalities and inequalities.[-Recognize and use algebraic (field) properties, concepts, procedures, and algorithms to solve equations, inequalities, and systems of linear equations.]
 - 2. Explain the difference between the solution set of an equation and the solution set of an inequality.
 - 3. Recognize and use algebraic properties, concepts, and algorithms to solve equations, inequalities, and systems of linear equations and inequalities.
- D. Representing relationships[-Representations]
 - 1. Interpret multiple representations of equations, inequalities, and relationships.

2. Convert~~[Translate]~~ among multiple representations of equations,
inequalities, and relationships.

III. **Geometric and Spatial Reasoning**

- A. Figures and their properties
 1. Recognize characteristics and dimensional changes of two- and three-dimensional figures.~~[Identify and represent the features of plane and space figures.]~~
 2. Form and validate~~[Make, test, and use]~~ conjectures about one-, two-, and three-dimensional figures and their properties.
 3. Recognize and apply right triangle relationships including basic trigonometry.
- B. Transformations and symmetry
 1. Identify ~~[and apply]~~ transformations and symmetries of ~~[to]~~ figures.
 2. Use transformations to investigate congruence, similarity, and symmetries of figures.~~[Identify the symmetries of a plane figure.]~~
 - ~~[3. Use congruence transformations and dilations to investigate congruence, similarity, and symmetries of plane figures.]~~
- C. Connections between geometry and other mathematical content strands
 1. Make connections between geometry and algebraic equations.~~[algebra.]~~
 2. Make connections between geometry, statistics, and probability.
 - ~~[3. Make connections between geometry and measurement.]~~
- D. Measurements involving geometry and algebra~~[Logic and reasoning in geometry]~~
 1. Find the perimeter and area of two-dimensional figures.~~[Make and validate geometric conjectures.]~~
 2. Determine the surface area and volume of three-dimensional figures.
~~[Understand that Euclidean geometry is an axiomatic system.]~~
 3. Determine indirect measurements of geometric figures using a variety of methods.

[IV. — Measurement Reasoning

- A. ~~Measurement involving physical and natural attributes~~
 - ~~1. Select or use the appropriate type of unit for the attribute being measured.~~
- B. ~~Systems of measurement~~
 - ~~1. Convert from one measurement system to another.~~
 - ~~2. Convert within a single measurement system.~~
- C. ~~Measurement involving geometry and algebra~~
 - ~~1. Find the perimeter and area of two dimensional figures.~~
 - ~~2. Determine the surface area and volume of three dimensional figures.~~

- 3. ~~Determine indirect measurements of figures using scale drawings, similar figures, the Pythagorean Theorem, and basic trigonometry.~~
- D. ~~Measurement involving statistics and probability~~
 - 1. ~~Compute and use measures of center and spread to describe data.~~
 - 2. ~~Apply probabilistic measures to practical situations to make an informed decision.~~

IV. [V.] Probabilistic Reasoning

- A. Counting principles
 - 1. Determine the nature and the number of elements in a finite sample space.
- B. Computation and interpretation of probabilities
 - 1. Compute and interpret the probability of an event and its complement.
 - 2. Compute and interpret the probability of [conditional and] compound events.
- C. Measurement involving probability
 - 1. Use probability to make informed decisions.

V. [VI.] Statistical Reasoning

- A. Design a study [~~Data collection~~]
 - 1. Formulate a statistical question, plan an investigation, and collect data. [~~Plan a study.~~]
- B. Describe data
 - 1. Classify [~~Determine~~] types of data.
 - 2. Construct [~~Select and apply~~] appropriate visual representations of data.
 - 3. Compute and describe the study data with measures of center and basic notions of spread. [~~summary statistics of data.~~]
 - 4. Describe patterns and departure from patterns in the study [~~a set of~~] data.
- C. [~~Read,~~] Analyze, interpret, and draw conclusions from data
 - 1. Analyze data sets using graphs and summary statistics. [~~Make predictions and draw inferences using summary statistics.~~]
 - 2. Analyze relationships between paired data using spreadsheets, graphing calculators, or statistical software. [~~Analyze data sets using graphs and summary statistics.~~]
 - 3. Make predictions using summary statistics. [~~Analyze relationships between paired data using spreadsheets, graphing calculators, or statistical software.~~]
 - 4. Identify and explain misleading uses of data. [~~Recognize reliability of statistical results.~~]

VI. [VII.] Functions

- A. Recognition and representation of functions

1. Recognize ~~if~~ [whether] a relation is a function.
 2. Recognize and distinguish between different types of functions.
- B. Analysis of functions
1. Understand and analyze features of a functions.
 2. Algebraically construct and analyze new functions.
- C. Model real-world situations with functions
1. Apply known functions to model real-world situations. [~~models.~~]
 2. Develop a function to model a situation.

VII. ~~[VIII.]~~ Problem Solving and Reasoning

- A. Mathematical problem solving
1. Analyze given information.
 2. Formulate a plan or strategy.
 3. Determine a solution.
 4. Justify the solution.
 5. Evaluate the problem-solving process.
- B. Proportional [Logical] reasoning
1. Use proportional reasoning to solve problems that require fractions, ratios, percentages, decimals, and proportions in a variety of contexts using multiple representations. [~~Develop and evaluate convincing arguments.~~]
 - [2. ~~Use various types of reasoning.~~]
- C. Logical reasoning [~~Real-world problem solving~~]
1. Develop and evaluate convincing arguments. [~~Formulate a solution to a real world situation based on the solution to a mathematical problem.~~]
 2. Understand attributes and relationships with inductive and deductive reasoning. [~~Use a function to model a real world situation.~~]
 - [3. ~~Evaluate the problem-solving process.~~]
- D. Real-world problem solving
1. Interpret results of the mathematical problem in terms of the original real-world situation.
 2. Evaluate the problem-solving process.

VIII. ~~[IX.]~~ Communication and Representation

- A. Language, terms, and symbols of mathematics
1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem.
 2. Use mathematical language to represent and communicate the mathematical concepts in a problem.

3. Use mathematical [~~mathematics as a~~] language for reasoning, problem solving, making connections, and generalizing.
- B. Interpretation of mathematical work
 1. Model and interpret mathematical ideas and concepts using multiple representations.
 2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.
- C. Presentation and representation of mathematical work
 1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words.
 2. Create and use representations to organize, record, and communicate mathematical ideas.
 3. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications.

IX. [~~X.~~] Connections

- A. Connections among the strands of mathematics
 1. Connect and use multiple key concepts [~~strands~~] of mathematics in situations and problems.
 2. Connect mathematics to the study of other disciplines.
- B. Connections of mathematics to nature, real-world situations, and everyday life
 1. Use multiple representations to demonstrate links between mathematical and real-world situations.
 2. Understand and use appropriate mathematical models in the natural, physical, and social sciences.
 3. Know and understand the use of mathematics in a variety of careers and professions.