Pace Learning Systems

Nothing Teaches Like Success®

CORRELATION

Tests of Adult Basic Education (TABE) 11&12

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Pace Learning Systems Correlation
TABE 11/12

TABE 11&12 objectives are based on the College and Career Readiness (CCR) Standards for Adult Education and can be found in the "TABE 11&12 Blueprints" at tabetest.com. TABE is Copyright © 2018 by Data Recognition Corporation (DRC). For more information and the complete CCR Standards, visit: http://lincs.ed.gov/publications/pdf/CCRStandardsAdultEd.pdf.

TABE levels E, M, and D are covered in this correlation. For more information about literacy products appropriate for TABE L or using Pace Systems for students testing at TABE Level A, contact Pace Learning Systems at (800) 826-7223 or info@pacelearning.com.

Use the following key for references to Pace Lessons:

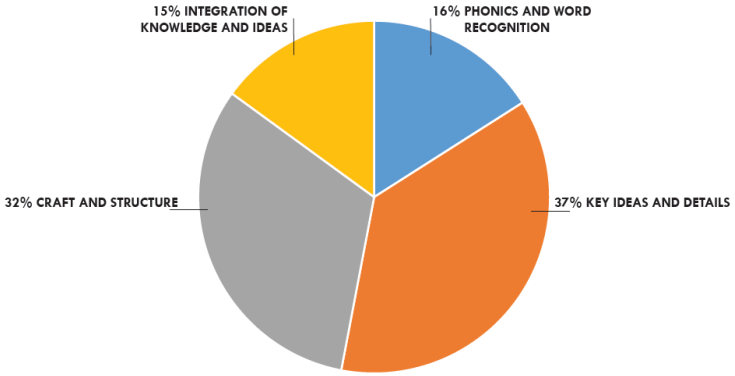
Accelerated Learning Lab:

Reading	R
Language	L
Writing	W
Spelling	Sp
Basic Math	BM
Advanced Math	AM
Science	Sc
Social Studies	SS

At Your Own Pace:

Reading	r
English	e
Math	m

Reading Level E Overview

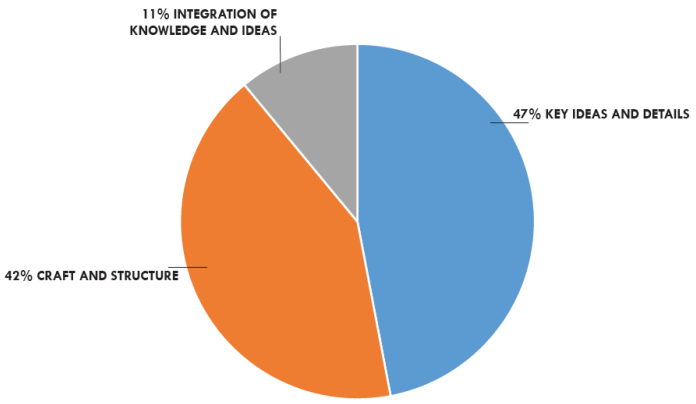


Reading Level E (CCR Grade Level Grouping B: 2nd-3rd)

Integration of Knowledge and Ideas (15%)	Explain how specific aspects of a text's illustrations contribute to what is conveyed by the words in a story (e.g., create mood, emphasize aspects of a character or setting). (RL.3.7)	**r200 r205 r215**
	Describe how reasons support specific points the author makes in a text. (RI.2.8)	**r205 r215 e220**
Phonics and Word Recognition (16%)	Know and apply grade-level phonics and word analysis skills in decoding words. (RF 2.3/3.3)	**Sp120 Sp100 Sp110**
Key Ideas and Details (37%)	Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (RI/RL.2.1)	**r205 r215**
	Determine the main idea of a text; recount the key details and explain how they support the main idea. (RI.3.2)	**r205 r215**
	Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (RI.3.3)	**r205 e225**
Craft and Structure (32%)	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. (RI.3.4)	**r141 r142**
	Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently. (RI.2.5)	**r215**

Craft and Structure (32%)	Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently. (RI.3.5)	**r141 r142 r215**
	Identify the main purpose of a text, including what the author wants to answer, explain, or describe. (RI.2.6)	**r215 e220**
	Distinguish their own point of view from that of the author of a text. (RI.3.6)	**r210 r215**

Reading Level M Overview

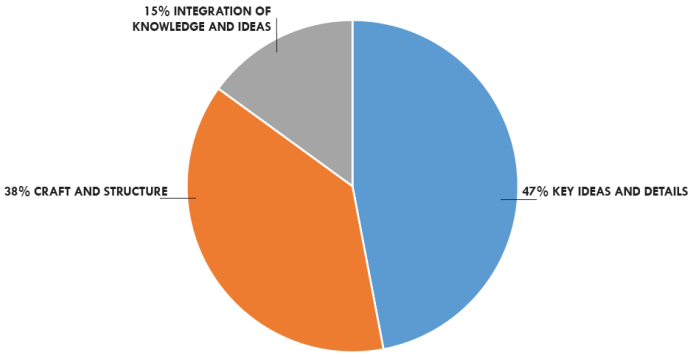


Reading Level M (CCR Grade Level Grouping C: 4th -5th)

Key Ideas and Details (47%)	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (RI/RL.4.1)	**R221 R222 R223**
	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (RI/RL.5.1)	**R230 R241 L650**
	Determine the main idea of a text and explain how it is supported by key details; summarize the text. (RI.4.2)	**R202 R221 R222**
	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. (RI.4.3)	**R201 R202 R241 R242**

Craft and Structure (42%)	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a topic or subject area. (RI.5.4)	**R125 R130**
	Determine the meaning of words and phrases as they are used in a text, including figurative language such as metaphors and similes. (RL.5.4)	**R120 R130 R605**
	Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text. (RI.4.5)	**R201 R202**
	Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts. (RI.5.5)	**R201 R202**
	Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent. (RI.5.6)	**R251 R252 R620**
	Describe how a narrator's or speaker's point of view influences how events are described. (RL.5.6)	**r210 R252 R620**
Integration of Knowledge and Ideas (11%)	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. (RI.4.7)	**R440 R445 BM510 BM520**
	Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). (RI.5.8)	**r215 R202 R230 R470**

Reading Level D Overview

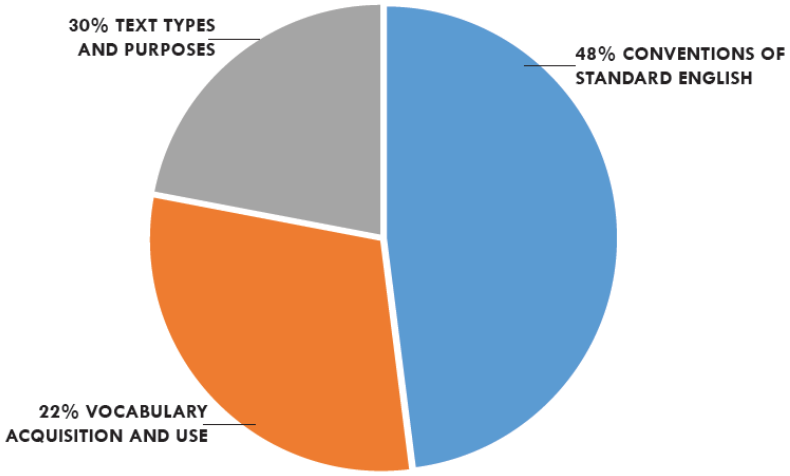


Reading Level D (CCR Grade Level Grouping D: 6th -8th)

Key Ideas and Details (47%)	Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. (RI/RL.7.1) • Application: cite specific textual evidence to support analysis of primary and secondary sources. (RH.6-8.1) • Application: cite specific textual evidence to support analysis of science and technical texts. (RST.6-8.1)	**R230 R470** **R460** **R460**
	Determine a theme or central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments. (RI/RL.6.2) • Application: determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. (RST.6-8.2)	**R221 R230 R260** **R221 R222 R223 R230**
	Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories). (RI.8.3) • Application: identify key steps in a text's description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered). (RH.6-8.3)	**R140 R202 R620** **R625**
Craft and Structure (38%)	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone. (RI/RL.6.4)	**R120 R130 R620**
	Analyze how a particular sentence, paragraph, chapter, or section fits into the overall structure of a text and contributes to the development of the ideas. (RI.6.5)	**R201 R202 L310 W530**

Craft and Structure (38%)	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to the development of the ideas. (RI.7.5)	**R201 R202 R620 L310**
	Determine an author's point of view or purpose in a text and analyze how the author acknowledges and responds to conflicting evidence or viewpoints. (RI.8.6)	**R251 R252 R260**
	Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts). (RH.6-8.6)	**R251 R252 R260**
Integration of Knowledge and Ideas (15%)	Integrate information presented in different media or formats (e.g., in charts, graphs, photographs, videos, or maps) as well as in words to develop a coherent understanding of a topic or issue. (RI.6.7)	**R440 R445 R452 R470**
	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (RST.6-8.7)	**R440 R445 Sc100**

Language Level E Overview



Language Level E (CCR Grade Level Grouping B: 2nd -3rd)

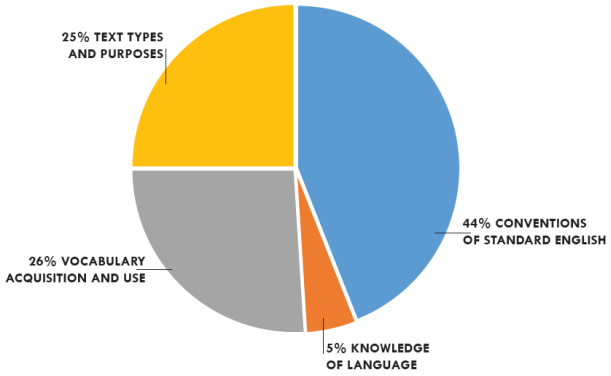
Conventions of Standard English (48%)	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. (L.2.1 and 3.1)	
	a. Use collective nouns (e.g., group).	**L100**
	b. Explain the function of nouns, pronouns, verbs, adjectives, and adverbs in general and their functions in particular sentences.	**e100 e105 e110 e115**
	c. Form and use regular and irregular plural nouns.	**e100**
	d. Use reflexive pronouns (e.g., myself, ourselves).	**e105**
	e. Form and use the past tense of frequently occurring irregular verbs (e.g., sat, hid, told).	**e110**
	f. Use abstract nouns (e.g., childhood).	**e100 r141 r165 r200**
	g. Form and use regular and irregular verbs.	**e110**
	h. Form and use the simple (e.g., I walked; I walk; I will walk) verb tenses.	**e110**
	i. Ensure subject-verb and pronoun-antecedent agreement.	**L110 L130**

Conventions of Standard English (48%)	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. (L.2.2 and 3.2)	
	a. Capitalize holidays, product names, and geographic names.	**e300**
	b. Capitalize appropriate words in titles.	**e300**
	c. Use commas in greetings and closings of letters.	**L400**
	d. Use commas in addresses.	**e311**
	e. Use commas and quotation marks in dialogue.	**e312 e320**
	f. Use an apostrophe to form contractions and frequently occurring possessives.	**e120 L640**
	g. Form and use possessives.	**e100 e120**

Vocabulary Acquisition and use (22%)	Determine or clarify the meaning of unknown and multiple-meaning words and phrases, choosing flexibly from an array of strategies. (L.2.4)	
	a. Use sentence-level context as a clue to the meaning of a word or phrase.	**r141 r142**
	b. Determine the meaning of the new word formed when a known prefix is added to a known word (e.g., happy/unhappy, tell/retell).	**r121 r122**
	c. Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., addition, additional).	**r121 r122 r131 r132**
	d. Use knowledge of the meaning of individual words to predict the meaning of compound words (e.g., birdhouse, lighthouse, housefly; bookshelf, notebook, bookmark).	**Sp120**
	e. Use glossaries and beginning dictionaries, both print and digital, to determine or clarify the meaning of words and phrases.	**L900 R430**
	Demonstrate understanding of word relationships and nuances in word meanings. (L.3.5)	
	a. Distinguish the literal and non-literal meanings of words and phrases in context (e.g., take steps).	**r165**
	b. Identify real-life connections between words and their use (e.g., describe people who are friendly or helpful).	**r215 r141**
	c. Distinguish shades of meaning among related words that describe states of mind or degrees of certainty (e.g., knew, believed, suspected, heard, wondered).	**r105 r141 r150**

Vocabulary Acquisition and use (22%)	Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using adjectives and adverbs to describe (e.g., When other people are happy that makes me happy). (L.2.6) Acquire and use accurately level-appropriate conversational, general academic, and domain-specific words and phrases, including those that signal spatial and temporal relationships (e.g., After dinner that night we went looking for them). (L.3.6)	**e115** **e225 r141 r142**
Text Types and Purposes (30%)	Write opinion pieces on topics or texts, supporting a point of view with reasons. (W.3.1) a. Introduce the topic or text they are writing about, state an opinion, and create an organizational structure that lists reasons. b. Provide reasons that support the opinion. c. Use linking words and phrases (e.g., because, therefore, since, for example) to connect opinion and reasons. d. Provide a concluding statement or section.	**e215** **r205** **e210** **e220**
	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (W.3.2) a. Introduce a topic and group related information together; include illustrations when useful to aiding comprehension. b. Develop the topic with facts, definitions, and details. c. Use linking words and phrases (e.g., also, another, and, more, but) to connect ideas within categories of information. d. Provide a concluding statement or section.	**e215** **e220** **e205** **e220**

Language Level M Overview



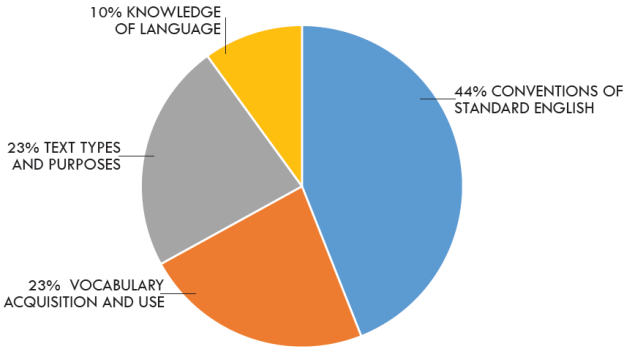
Language Level M (CCR Grade Level Grouping C: 4th – 5th)

Conventions of Standard English (44%)	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. (L.4.1 and 5.1 merge)	
	a. Explain the function of conjunctions, prepositions, and interjections in general and their function in particular sentences.	**L150**
	b. Use relative pronouns (who, whose, whom, which, that) and relative adverbs (where, when, why).	**e105; L110**
	c. Form and use the progressive (e.g., I was walking; I am walking; I will be walking) verb tenses.	**L120**
	d. Use modal auxiliaries (e.g., can, may, must) to convey various conditions.	**W200**
	e. Form and use the perfect (e.g., I had walked; I have walked; I will have walked) verb tenses.	**L120 W160**
	f. Use verb tense to convey various times, sequences, states, and conditions.	**R210 R235 L120**
	g. Recognize and correct inappropriate shifts in verb tense.	**L130 L240 L800 W160**
	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. (L.4.2 and 5.2)	
	a. Use correct capitalization.	**e300; L700**
	b. Use commas and quotation marks to mark direct speech and quotations from a text.	**e312 e320; L650**
	c. Use punctuation to separate items in a series.	**e311 e325; L610**
	d. Use a comma to separate an introductory element from the rest of the sentence.	**e311 e312; L630**
	e. Use a comma to set off the words yes and no, set off a tag question or indicate direct address (e.g., Is that you, Steve?).	**e311 e312; L620 L630**

Knowledge of Language (5%)	Use knowledge of language and its conventions when writing, speaking, reading, or listening. (L.5.3) a. Choose words and phrases to convey ideas precisely. b. Choose punctuation for effect.	**W240** **L630 L650 W170**
Vocabulary Acquisition and Use (26%)	Determine or clarify the meaning of unknown and multiple-meaning words and phrases, choosing flexibly from a range of strategies. (L.4.4 and 5.4) a. Use context (e.g., definitions, examples, restatements, cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase. b. Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., telegraph, autograph, photograph, photosynthesis). c. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases. Acquire and use accurately level-appropriate general academic and domain-specific words and phrases (L.4.6 and 5.6), including those that: • signal precise actions, emotions, or states of being (e.g., quizzed, whined, stammered). • are basic to a particular topic (e.g., wildlife, conservation, and endangered when discussing animal preservation). • signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).	**R125 R130 r141 r142** **r121 r122 r131 r132** **R400 R410 R430** **r200** **Sc200 Sc500 SS130 SS600** **R241 L320**
Text Types and Purposes (25%)	Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (W.5.1) a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped to support the writer's purpose. b. Provide logically ordered reasons that are supported by facts and details. c. Link opinion and reasons using words/phrases/clauses (e.g., consequently, specifically). d. Provide a concluding statement or section related to the opinion presented.	**R251 L300 L310** **R202 R251 L300 L310** **L320** **R202 R221**

Text Types and Purposes (25%)	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension. b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. c. Link ideas within categories of information using words and phrases (e.g., another, for example, also, because). d. Use precise language and domain-specific vocabulary to inform about or explain the topic e. Provide a concluding statement or section related to the information or explanation presented. (W.4.2)	**R201 L310 R221** **R202 W240** **L220 L320** **R130 R410 W230** **L310 R202**

Language Level D Overview



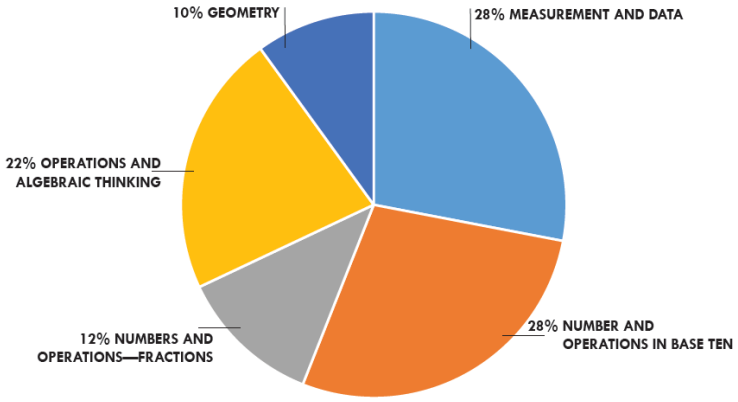
Language Level D (CCR Grade Level Grouping D: 6th – 8th)

Conventions of Standard English (44%)	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. (L.6.1 through 8.1) a. Ensure that pronouns are in the proper case (subjective, objective, possessive). b. Use intensive pronouns. c. Recognize and correct inappropriate shifts in pronoun number and person. d. Recognize and correct vague or unclear pronouns. e. Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.	**L110** **L110** **L110 L800 W140** **W140** **L240**

Conventions of Standard English (44%)	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. (L.6.2 through 8.2)	
	a. Use punctuation (commas, parentheses, ellipsis, dashes) to set off nonrestrictive/parenthetical elements.	**L630 W170**
	b. Use a comma to separate coordinate adjectives (e.g., It was a fascinating, enjoyable movie but not He wore an old[,] green shirt).	**L610**
	c. Use an ellipsis to indicate an omission.	
Knowledge of Language (10%)	Use knowledge of language conventions when writing/speaking/ reading/listening. (L.6.3 and 7.3)	
	a. Vary sentence patterns for meaning, interest, and style.	**R620 L220 L230 W400**
	b. Maintain consistency in style and tone.	**R620 W420**
Vocabulary Acquisition and Use (23%)	Determine or clarify the meaning of unknown and multiple-meaning words and phrases, choosing flexibly from a range of strategies. (L.6.4)	
	a. Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.	**R120 R125 R130**
	b. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., audience, auditory, audible).	**R101 R102 R103 R111 R112**
	c. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.	**R400 R430 L900**
	d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).	**R125 R130 R410**
	Acquire and use accurately level-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression. (L.8.6)	**R101 R102 R103 R111 R112 R125 R130**
Text Types and Purposes (23%)	Write arguments to support claims with clear reasons and relevant evidence.	
	a. Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically.	**R222 R223 R260 L310 W240**
	b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.	**R202 R230 R260 R470**
	c. Use words, phrases, and clauses to create cohesion and clarify relationships among claim(s), reasons, and evidence.	**L230 L320 W230 W240**
	d. Establish and maintain a formal style.	**R620 W420 W500 W530**

Text Types and Purposes (23%)	Write informative/explanatory texts to examine a topic and convey ideas/concepts/information through the selection, organization, and analysis of relevant content. [includes narration of historical events, scientific procedures/experiments, or technical processes.] (W/WHST.6-8.2)	
	a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.	**R130 R201 R202 R241 R242 W520 W530 Sc100**
	b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.	**R470 W240**
	c. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.	**L230 L320 W520 W530**
	d. Use precise language and domain-specific vocabulary to inform about/explain the topic.	**R125 R130 W230**
	e. Establish and maintain a formal style.	**R620 W500**
	f. Provide a concluding statement or section that follows from and supports the information or explanation presented.	**R230 W520 W530**

Math Level E Overview



Math Level E (CCR Grade Level Grouping B: 2nd – 3rd)

Number and Operations: Base Ten (28%)

Understand place value. Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones.	**m100, BM100**

Understand the following as special cases: a. 100 can be thought of as a bundle of ten tens — called a "hundred."	**BM100**
b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones). (2.NBT.1)	**m100, BM100**
Count within 1000; skip-count by 5s, 10s, and 100s. (2.NBT.2)	**m100, BM100**
Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. (2.NBT.3)	**m100, BM100**
Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons. (2.NBT.4)	**m100, BM100, AM100**
Use place value understanding and properties of operations to add and subtract.	
Add up to four two-digit numbers using strategies based on place value and properties of operations. (2.NBT.6)	**BM140**
Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds. (2.NBT.7)	**m105, m110 OR BM140, BM150**
Use place value understanding and properties of operations to perform multi-digit arithmetic.	
Use place value understanding to round whole numbers to the nearest 10 or 100. (3.NBT.1)	**BM120**
Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. (3.NBT.2)	**BM140, BM150**
Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 times 80, 5 times 60) using strategies based on place value and properties of operations. (3.NBT.3)	**BM160**

Number and Operations: Fractions (12%)

Develop understanding of fractions as numbers.	
Understand a fraction 1 / b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/ b as the quantity formed by a parts of size 1 / b. (3.NF.1)	**m200 OR BM200**
Understand a fraction as a number on the number line; represent fractions on a number line diagram. (3.NF.2)	
• Represent a fraction 1 / b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1 / b and that the endpoint of the part based at 0 locates the number 1/ b on the number line. (3.NF.2a)	**AM100**
• Represent a fraction a /b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line. (3.NF.2b)	**AM100**
Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. (3.NF.3)	
• Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. (3.NF.3a)	**m200, BM200, AM100**
• Recognize and generate simple equivalent fractions, e.g., ½ = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model. (3.NF.3b)	**m200, BM200**
• Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 / 1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram. (3.NF.3c)	**m200, BM200**
• Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. (3.NF.3d)	**m210, BM210, AM100**

Operations and Algebraic Thinking (22%)

Represent and solve problems involving addition and subtraction. Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (2.OA.1)	**BM190, BM510, BM520, BM580**
Represent and solve problems involving multiplication and division. Interpret products of whole numbers, e.g., interpret 5*7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7. (3.OA.1)	**m115, BM160**
Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8. (3.OA.2)	**BM170**
Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (3.OA.3)	**BM190, BM510, BM520, BM580, BM620**
Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 x ? = 48, 5 = □ / 3, 6 x 6 = ?. (3.OA.4)	**BM160, BM170**

Understand properties of multiplication and the relationship between multiplication and division. Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3/ 2 can be found by 3 × 5= 15, then 15 x 2 = 30, or by 5 x 2 = 10 then 3 x 10 = 30 (Associative property of multiplication.). Knowing that 8 x 5 = 40 and 8 x 2 = 16, one can find 8 x 7 as 8 × (5+2)= (8 x 5) + (8 x 2) = 40 + 15 = 56. (Distributive property.) (3.OA.5) Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8. (3.OA.6)	**BM160, BM170, BM180** **m120, BM170**
Multiply and divide within 100. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 times 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. Know from memory all products of two one-digit numbers. (3.OA.7)	**BM160, BM170**
Solve problems involving the four operations, and identify and explain patterns in arithmetic. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (3.OA.8) Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends. (3.OA.9)	**BM190, BM500, BM580**

Geometry (10%)

Reason with shapes and their attributes. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (2.G.1) Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. (3.G.1)	**m400, m410, m415** **m400, m410, m415**

Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape. (3.G.2)	**m200, BM200**
Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape. (2.G.3)	**m200, BM200**

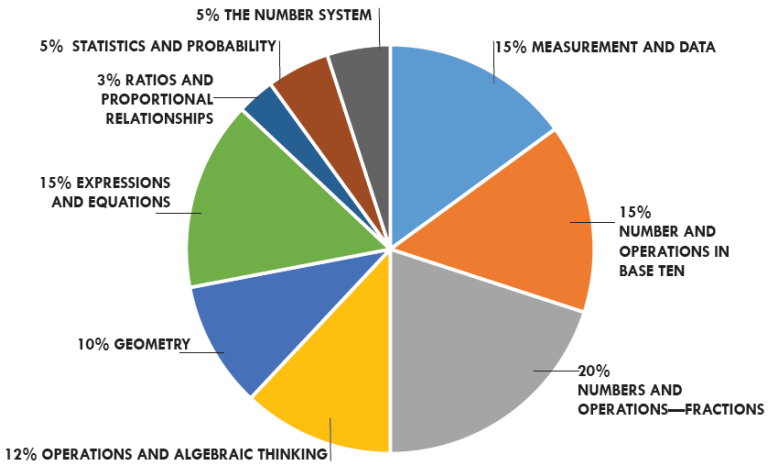
Measurement and Data (28%)

Measure and estimate lengths in standard units. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen. (2.MD.2)	**BM640**
Estimate lengths using units of inches, feet, centimeters, and meters. (2.MD.3)	**BM500, BM640, AM250**
Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit. (2.MD.4)	**BM620, BM640**
Relate addition and subtraction to length. Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram. (2.MD.6)	**AM100, AM120**
Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram. (3.MD.1)	**m305, BM630**
Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3.MD.2)	**BM610, BM620**

Represent and interpret data. Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (2.MD.10)	**BM510**
Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets. (3.MD.3)	**BM510**
Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3.MD.4)	**BM640**
Geometric measurement: understand concepts of area and relate to area of multiplication and addition. Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area. b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units. (3.MD.5)	**AM220**
Geometric measurement: understand concepts of area and relate to area of multiplication and addition. Measure areas by counting unit squares (square cm, square m, square in, square ft.) (3.MD.6)	**AM220**
Relate area to the operations of multiplication and addition. (3.MD.7) • Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. (3.MD.7a)	**AM220**
• Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. (3.MD.7b)	**AM220**
• Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning. (3.MD.7c)	**AM220**

• Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems. (3.MD.7d)	**AM230**
Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters. (3.MD.8)	**m405, AM220, AM230**

Math Level M Overview



Math Level M (CCR Grade Level Grouping C: 4th-5th)

Measurement and Data (15%)

Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. (4.MD.2)	**BM530, BM550, BM580, BM620, BM630, BM640**

Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.* (4.MD.3)	**AM220**
Geometric measurement: understand concepts of angle and measure angles. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles. b. An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees. (4.MD.5) Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. (4.MD.6)	**AM200, AM205** **AM205**
Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure. (4.MD.7)	**AM270**
Convert like measurement units within a given measurement system. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. (5.MD.1)	**BM600, BM610, BM620**

Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	
Recognize volume as an attribute of solid figures and understand concepts of volume measurement: a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. b. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units. (5.MD.3)	**AM240**
Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. (5.MD.4)	**AM240**
Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. (5.MD.5)	**AM240**
• Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. (5.MD.5a)	
• Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems. (5.MD.5b)	**AM240**
• Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems. (5.MD.5c)	**AM240**

Number and Operations: Fractions (20%)

Extend understanding of fraction equivalence and ordering.	
Explain why a fraction a/b is equivalent to a fraction (n*a)/(n*b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. (4.NF.1)	**BM200**
Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. (4.NF.2)	**BM200, BM210, AM100**

Build fractions from unit fractions by applying and extending previous understanding of operations on whole numbers. Understand a fraction *a* / *b* with *a* > 1 as a sum of fractions 1 / *b*. (4.NF.3)	
• Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. (4.NF.3a)	**BM220, BM230**
• Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8=1/8+1/8+1/8; 3/8=1/8+2/8*(4.NF.3b)	**BM200, BM210**
• Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. (4.NF.3c)	**BM200, BM220, BM230**
• Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem. (4.NF.3d)	**m245, BM260**
Apply/extend understandings of multiplication to multiply a fraction by a whole number. (4.NF.4)	
• Understand a fraction *a* / *b* as a multiple of 1 / *b*. *For example, use a visual fraction model to represent 5 / 4 as the product 5 x 1/4, recording the conclusion by the equation 5 / 4 = 5 *(1 / 4).* (4.NF.4a)	**BM200, BM240**
• Understand a multiple of *a* / *b* as a multiple of 1 / *b*, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3*(2/5) as 6*(1/5), recognizing this product as 6/5. (In general, n* (a/ b) = (n*a) / b .)* (4.NF.4b)	**BM200, BM240**
• Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3 / 8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?* (4.NF.4c)	**BM200, BM260**
Understand decimal notation for fractions, and compare decimal fractions. Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.* (4.NF.6)	**BM110, BM200, BM300, AM100**

Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model. (4.NF.7)	**BM130, AM100**
Use equivalent fractions as strategy to add and subtract fractions. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3+ 5/4=8/12 +15/12 = 23/12. (In general, a/ b+ c/d = a/d+b/c=bd)* (5.NF.1) Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 1/2 = 3/7, by observing that 3/7 < 1/2.* (5.NF.2)	**BM210, BM220, BM230** **BM200, BM210, BM220, BM230, BM260, BM500**
Apply/extend understanding of multiplication and division to multiply and divide fractions. Interpret a fraction as division of the numerator by the denominator ($a / b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3 / 4 as the result of dividing 3 by 4, noting that 3 / 4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?* (5.NF.3) Apply/extend understandings of multiplication to multiply a fraction or whole number by a fraction. (5.NF.4) Interpret multiplication as scaling (resizing), by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a / b = (n \times a) / (n \times b)$ to the effect of multiplying a / b by 1. (5.NF.5)	**BM200, BM250, BM260** **BM240** **BM160** **BM200, BM240, BM250**

Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem. (5.NF.6)	**BM240, BM260**
Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (5.NF.7) • Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for (1/3) ÷ 4 , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/2 because (1/12) x 4 = 1/3.* (5.NF.7a) • Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5) , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 x (1/5) = 4.* (5.NF.7b) • Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1 / 2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?* (5.NF.7c)	**BM250** **BM250** **BM250, BM260**

Number and Operations: Base Ten (+ The Number System) (15%)

Generalize place value understanding for multi-digit whole numbers. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division. (4.NBT.1) Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. (4.NBT.2) Use place value understanding to round multi-digit whole numbers to any place. (4.NBT.3)	**BM100, BM160, BM170** **BM100, AM100** **BM120**
Use place value understanding and properties of operations to perform multi-digit arithmetic.	**BM140, BM150**

Fluently add and subtract multi-digit whole numbers using the standard algorithm. (4.NBT.4)	**BM140, BM150**
Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (4.NBT.5)	**BM160, AM300**
Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (4.NBT.6)	**BM170, AM300**
Perform operations with multi-digit whole numbers and with decimals to hundredths.	
Fluently multiply multi-digit whole numbers using the standard algorithm. (5.NBT.5)	**BM160**
Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (5.NBT.6)	**BM170, AM300**
Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (5.NBT.7) [Note from panel: Applications involving financial literacy should be used.]	**BM160, BM180, BM190 Financial: BM530, BM540, BM550, BM560, BM570**

Statistics and Probability (5%)

Develop understanding of statistical variability.	
Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages. (6.SP.1)	**BM440**
Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. (6.SP.2)	**BM440**

Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number. (6.SP.3)	
Summarize and describe distributions. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (6.SP.4) [Also see S.ID.1]	**BM450, BM510**

Operations and Algebraic Thinking (10%)

Use the four operations with whole numbers to solve problems. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (4.OA.1)	**BM160**
Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. (4.OA.2)	**BM190, AM150, AM320**
Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (4.OA.3)	**BM500, AM150, AM450**
Gain familiarity with factors and multiples. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite. (4.OA.4)	**BM200**

Generate and analyze patterns. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers.* (4.OA.5)	
Write and interpret numerical expressions. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. (5.OA.1)	**AM100, AM170**
Write simple expressions that record calculations with numbers and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 X (8+7). Recognize that 3 x (2100 + 425) is three times as large as the 2100 + 425, without having to calculate the indicated sum or product.* (5.OA.2)	**AM300**

Geometry (10%)

Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4.G.1)	**AM200**
Graph points on the coordinate plane to solve real-world and mathematical problems. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate). (5.G.1) Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (5.G.2)	**AM350** **AM350, AM360, AM370**
Classify two-dimensional figures into categories based on their properties. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.* (5.G.3)	**AM200**

Solve real-world and mathematical problems involving area, surface area, and volume. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. (6.G.1) Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems. (6.G.3) Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems. (6.G.4)	**AM220, AM230** **AM200, AM270, AM350, AM360**

Expressions and Equations (15%)

Apply and extend previous understandings of arithmetic to algebraic expressions. Write and evaluate numerical expressions involving whole-number exponents. (6.EE.1) Write, read, and evaluate expressions in which letters stand for numbers. (6.EE.2) • Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.* (6.EE.2a) • Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2(8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.* (6.EE.2b) • Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas V= s^3 and A= $6s^2$ to find the volume and surface area of a cube with sides of length s = 1/2.* (6.EE.2c)	**AM130** **AM150, AM320** **AM150, AM300, AM320** **AM150, AM300** **AM150, AM160, AM170 AM220(perimeter), AM230(perimeter), AM240(volume)**

Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3(2+x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.* (6.EE.3)	**AM310**
Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.* (6.EE.4)	**AM150, AM310**
Reason about and solve one-variable equations and inequalities. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. (6.EE.5)	**AM300, AM340**
Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (6.EE.6)	**AM150, AM320**
Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers. (6.EE.7)	**AM300, AM450**
Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams. (6.EE.8)	**AM340**
Represent and analyze quantitative relationships between dependent and independent variables. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.* (6.EE.9)	**BM510, BM520, BM580**

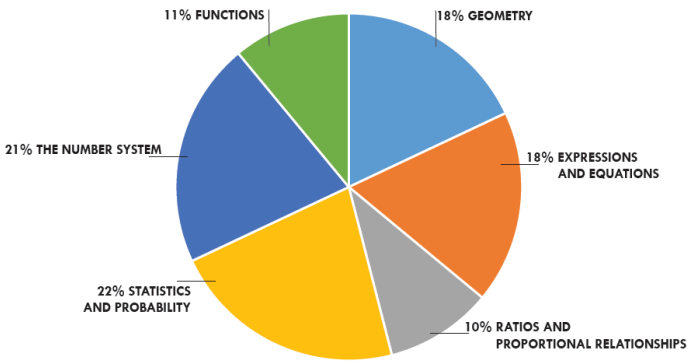
Ratios and Proportional Relationships (3%)

Understand ratio concepts and use ratio reasoning to solve problems. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."* (6.RP.1)	**BM410**
Understand the concept of a unit rate a/b associated with a ratio a:b with b not equal to zero, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."21 (6.RP.2)	**BM410**

The Number System (5%)

Apply and extend previous understandings of multiplication and division to divide fractions by fractions. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4)= 8/9 because 3 / 4 of 8 / 9 is 2/3. (In general, (a / b) ÷ (c / d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4 -cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1 / 2 square mi?* (6.NS.1)	**BM250, BM260**

Math Level D Overview



Math Level D (CCR Grade Level Grouping D: 6th – 8th)

The Number System (21%)

Apply and extend previous understandings of numbers to the system of rational numbers. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (6.NS.5)	**BM590, BM650**
Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. (6.NS.6)	**AM100, AM350**
• Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., -(-3)=3 and that 0 is its own opposite. (6.NS.6a)	**AM100**
• Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. (6.NS.6b)	**AM350**
• Find and position integers and other rational numbers on a horizontal/vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. (6.NS.6c)	**AM100, AM350**
Understand ordering and absolute value of rational numbers. (6.NS.7) • Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret – 3 > – 7 as a statement that – 3 is located to the right of –7 on a number line oriented from left to right.* (6.NS.7a)	**AM100**

• Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write – 3°C > – 7° to express the fact that – 3° is warmer than – 7° .* (6.NS.7b)	**AM100**
• Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of – 3 dollars, write |– 30| = 30 to describe the size of the debt in dollars.* Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.* (6.NS.7c)	
Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. (6.NS.8)	**AM350, AM360**
Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. (7.NS.1)	
• Describe situations in which opposite quantities combine to make 0. *For example, if a check is written for the same amount as a deposit, made to the same checking account, the result is a zero increase or decrease in the account balance.* (7.NS.1a)	**BM590, AM100**
• Understand $p + q$ as the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. (7.NS.1b)	**AM100, AM120**
• Understand subtraction of rational numbers as adding the additive inverse, $p – q = p + (– q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference and apply this principle in real-world contexts. (7.NS.1c)	**AM100, AM120**
• Apply properties of operations as strategies to add and subtract rational numbers. (7.NS.1d)	**AM120, AM310**

Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. (7.NS.2)	
• Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (– 1) (–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. (7.NS.2a)	**AM110, AM170, AM310**
• Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If *p* and *q* are integers, then –(*p* / *q*) = (– *p*) / *q* = *p* / (–*q*). Interpret quotients of rational numbers by describing real-world contexts. (7.NS.2b)	**AM110**
• Apply properties of operations as strategies to multiply and divide rational numbers. (7.NS.2c)	**AM110, AM310**
• Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. (7.NS.2d)	**BM180, AM140**
Solve real-world and mathematical problems involving the four operations with rational numbers. (7.NS.3)	**BM190, AM450**
Know that there are numbers that are not rational, and approximate them by rational numbers. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *For example, by truncating the decimal expansion of √ 2, show that √ 2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations*. (8.NS.2)	**AM140**
Understand ratio concepts and use ratio reasoning to solve problems. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. (6.RP.3)	**BM400, BM410, BM580**
• Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in tables, and plot pairs of values; use tables to compare ratios. (6.RP.3a)	**BM540, BM580**
• Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* (6.RP.3b)	**BM400, BM410**

• Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 3 1 times the quantity); solve problems involving finding the whole, given a part and the percent. (6.RP.3c)	**BM600, BM610, BM620**
• Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. (6.RP.3d)	**BM410, BM600, BM610, BM620**
Analyze proportional relationships and use them to solve real-world and mathematical problems.	
Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1 / 2 mile in each 1 / 4 hour, compute the unit rate as the complex fraction $^{1/2}$ / $_{1/4}$ miles per hour, equivalently 2 miles per hour.* (7.RP.1)	**BM410, BM580**
Recognize and represent proportional relationships between quantities. (7.RP.2)	**BM410**
• Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. (7.RP.2a)	**BM410, AM350, AM370**
• Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. (7.RP.2b) [Also see 8.EE.5]	**BM410, BM570, BM580, AM360**
• Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.* (7.RP.2c)	**BM410, BM560, BM580, AM300**
• Explain what a point *(x, y)* on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r)* where *r* is the unit rate. (7.RP.2d)	**BM410, BM580, AM350, AM370**
Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.* (7.RP.3) [Also see 7.G.1 and G.MG.2]	**BM400, BM410 BM550(sales, tax), BM560(interest), BM570(commission)**

Expressions and Equations (18%)

Use properties of operations to generate equivalent expressions.	
Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. (7.EE.1)	**AM300, AM310, AM320, AM330**
Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."* (7.EE.2) [Also see A.SSE.2, A.SSE.3, A.SSE.3a, A.CED.4]	**AM300, AM310, AM320, AM330**
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 / 4 inches long in the center of a door that is 2 ½ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.* (7.EE.3)	**BM500, AM330, AM450**
Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (7.EE.4) [Also see A.CED.1 and A.REI.3]	**AM150, AM320, AM330, AM450**
• Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* (7.EE.4a) [Also see A.CED.1 and A.REI.3]	**AM450**
• Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.* (7.EE.4b) [Also see A.CED.1 and A.REI.3]	**AM340**
Work with radicals and integer exponents. Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3^2 \times 3^{(-5)} = 3^{(-3)} = (1/3)^3 = 1/27$. (8.EE.1) [Also see F.IF.8b]	**AM130**

Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √ 2 is irrational. (8.EE.2) [Also see A.REI.2]	**AM140**
Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. *For example, estimate the population of the United States as 3 x 10^8 and the population of the world as 7 x 10^9, and determine that the world population is more than 20 times larger.* (8.EE.3)	**AM130, Sc110**
Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. (8.EE.4) [Also see N.Q.3]	**Sc110**
Understand the connections between proportional relationships, lines, and linear equations. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.* (8.EE.5) [Also see 7.RP.2b]	**BM410, BM580, AM360, AM370**
Analyze and solve linear equations and pairs of simultaneous linear equations. Solve linear equations in one variable. (8.EE.7) [Also see A.REI.3] • Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). (8.EE.7a)	**AM320, AM370**
• Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. (8.EE.7b)	**AM310, AM320, AM330**
Analyze and solve pairs of simultaneous linear equations. (8.EE.8) • Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. (8.EE.8a)	**AM390**

• Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.* (8.EE.8b) [A.REI.6]	**AM370, AM380, AM390, AM450**
• Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.* (8.EE.8c)	**AM370, AM380, AM390, AM450**

Functions (11%)

Define, evaluate, and compare functions. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (8.F.1) [F.IF.1] Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function $A= s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.* (8.F.3)	**AM360, AM370, AM380**
Use functions to model relationships between quantities. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. (8.F.4) [Also see F.BF.1 and F.LE.5] Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. (8.F.5) [Also see A.REI.10 and F.IF.7]	

Geometry (15%)

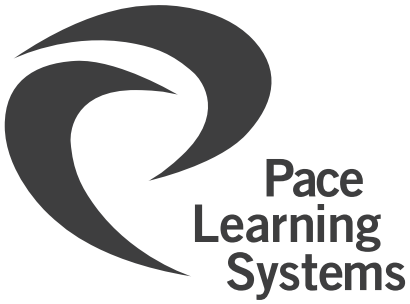
Draw, construct, and describe geometrical figures and describe the relationships between them. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. (7.G.1) [Also see 7.RP.3]	**AM260**
Solve real-life and mathematical problems involving angle, measure, area, surface area, and volume. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. (7.G.4) Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. (7.G.5) Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (7.G.6) [Also see G.GMD.3]	**AM230** **AM270** **AM220, AM230, AM240**
Understand congruence and similarity using physical models, transparencies, or geometry software. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. (8.G.2) [Also see G.SRT.5] Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. (8.G.4) [Also see G.SRT.5] Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so. (8.G.5)	**AM272** **AM272**
Understand and apply the Pythagorean Theorem. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems. (8.G.7)	**AM271**

Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. (8.G.8)	**AM271, AM350, AM360**

Statistics and Probability (22%)

Summarize and describe distributions. Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. (6.SP.5)	**BM440, BM450, BM510**
Use random sampling to draw inferences about a population. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. (7.SP.1) Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be. (7.SP.2)	**BM450** **BM440, BM450, Sc100**
Draw informal comparative inferences about two populations. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions is noticeable. (7.SP.3)	

Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in one chapter of a science book are generally longer or shorter than the words in another chapter of a lower level science book. (7.SP.4) [Also see S.ID.3]	**BM440, BM450, Sc100**
Investigate chance processes and develop, use, and evaluate probability models. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around ½ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. (7.SP.5)	**BM420**
Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times. (7.SP.6)	**BM420, BM430**
Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. (7.SP.7)	
• Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected. (7.SP.7a)	**BM420, BM430**
• Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies? (7.SP.7b)	**BM420, BM430, BM450**
Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. (7.SP.8a)	**BM420, BM430**
Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event. (7.SP.8b)	**BM420, BM430**



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