Florida Department of Education
Adult General Education
Curriculum Framework

ADULT BASIC EDUCATION MATHEMATICS	
Program Title	Adult Basic Education (ABE)
Program Number	9900000
Course Title	ABE Mathematics
Course Number	School Districts: 9900001 Florida College System: ABX0100-ABX0199
CIP Number	1532010100
Grade Equivalent	0.0 – 8.9
Grade Level	30, 31
Program Length	Varies (See Program Length Section)

PURPOSE

Adult General Education Program: The Florida Department of Education (FDOE) administers the Adult General Education (AGE) Program in accordance with the statutory framework outlined in the following state and federal laws: Section (s.) 1004.02 Florida Statutes (F.S.),[1] s. 1004.93, F.S.,[2] and Title II of the Workforce Investment and Opportunity Act (WIOA), also known as the Adult Education and Family Literacy Act (AEFLA).[3]

As administered by the FDOE, the AGE Program encompasses the following programs, services and activities:

- Academic Skills Building (ASB) Program
- Adult Basic Education (ABE) Program
- Adult High School (AHS) Program
- Adult English for Speakers of Other Languages (ESOL) Program
- GED® Program
- Integrated Education and Training (IET) Service Approach
- Integrated English Literacy and Civics Education (IELCE) Service Approach
- 2-Generation and Family Literacy Service Approaches
- Workforce Preparation Activities

The AGE Program is designed to serve the following objectives:

- Provide literacy instruction to adults to obtain the knowledge and skills necessary for employment and economic self-sufficiency.
- Facilitate adult learners to attain a secondary school diploma and progress to postsecondary education and training, including career pathways.
- Empower parents to obtain the education and skills that are necessary to participate as full partners in the educational development of their children and to achieve sustainable economic opportunities for their families.

[1] http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=1000-1099/1004/Sections/1004.02.html
[2] http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&URL=1000-1099/1004/Sections/1004.93.html
[3] https://www.congress.gov/113/bills/hr803/BILLS-113hr803enr.pdf

- Deliver English language instruction to adult English language learners whose native language is other than English or who live in a family or community environment where a language other than English is the dominant language, to achieve competence in reading, writing, speaking and comprehension of the English language.

Adult Basic Education Program: The ABE Program is designed to maintain alignment and ensure educational continuity with Florida's K12 Benchmarks for Excellent Student Thinking (B.E.S.T.) Standards. The ABE Program consists of two courses, ABE Reasoning through Language Arts (RLA) and ABE Mathematics. Students may enroll in each course independently or in both courses simultaneously.

In accordance with s. 1004.02, F.S.,[4] the ABE Program is guided by the following objectives:

- Provide educational services that will enable adults to acquire:
    - The basic skills necessary to attain basic and functional literacy.
    - A high school diploma by completing the AHS program or by passing a high school equivalency examination.
    - An educational foundation that will enable them to become more employable, productive and self-sufficient citizens.
- Provide educational opportunities for adults who have earned a diploma or high school equivalency diploma but who lack the basic skills necessary to function effectively in everyday situations, to enter the job market or to enter career certificate instruction.
- Provide academic services in the following priority:
    - Students who demonstrate skills at less than a fifth-grade level, as measured by tests approved for this purpose by the State Board of Education and who are studying to achieve basic literacy.
    - Students who demonstrate skills at the fifth-grade level or higher, but below the ninth-grade level, as measured by tests approved for this purpose by the State Board of Education and who are studying to achieve functional literacy.
    - Students who are earning credits that are required for a high school diploma or who are preparing for the high school equivalency examination.
    - Students who have earned high school diplomas and require specific improvement to:
        - Obtain or maintain employment or benefit from certificate career education programs.
        - Pursue a postsecondary degree.
        - Develop competence in the English language to qualify for employment.

In accordance with AEFLA, the ABE Program is guided by the following objectives:

- Provide academic instruction and education services below the postsecondary level that increase an individual's ability to:
    - Read, write and speak in English and perform mathematics or other activities necessary for the attainment of a secondary school diploma or its recognized equivalent.
    - Progress to postsecondary education and training.
    - Obtain employment.

STUDENTS

Per State Board Rule 6A-6.014, Florida Administrative Code (F.A.C.) - General Requirements for Adult General Education[5], students eligible to enroll in the ABE Mathematics course are those who:

[4] http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=1000-1099/1004/Sections/1004.02.html
[5] https://www.flrules.org/gateway/ruleno.asp?id=6A-6.014

- Are 16 years of age or older.
- May or may not have a high school diploma.
- Obtain pre-test scores that place them within National Reporting System (NRS) ABE Levels 1 – 4.

EDUCATIONAL FUNCTIONING LEVELS

Educational Functioning Level (EFL) is a term found in WIOA (Code of Federal Regulations Title 34 Subtitle B Chapter IV Part 462) that refers to the mathematics levels in the ABE Mathematics course.[6] The ABE Mathematics course has 4 EFLs, each representing a specific set of ABE Mathematical skills. Additional information on the term EFL is available in the official NRS Technical Assistance Guide.[7]

PROGRAM LENGTH

The maximum number of instructional hours recommended by the FDOE is 450 hours per EFL. Acknowledging the individualized nature of learning, some students may finish an EFL in fewer (or more) hours than the recommended maximum duration indicated.

Table 2: Recommended Maximum Number of Hours by Educational Functioning Level

Course Title and Number	NRS Educational Functioning Levels	Recommended Maximum Hours
ABE Mathematics • School Districts: 9900001 • Florida College System: ABX0100-ABX0199	ABE Level 1	450
	ABE Level 2	450
	ABE Level 3	300
	ABE Level 4	300

CURRICULUM AND INSTRUCTION

The ABE Mathematics curriculum framework opens by presenting instructors with the Anchor Standards encompassing seven strands: Number Sense and Operations, Fractions, Algebraic Reasoning, Function, Measurement, Geometric Reasoning and Data and Probability. Emphasizing the term "framework," it serves as the cornerstone for designing curriculum, aiding agencies and teachers in the selection or creation of instructional materials, techniques and continuous assessment. The FDOE disseminates the ABE Mathematics curriculum framework to agencies statewide, empowering local agency personnel to craft a curriculum relevant to the objectives of their students and instructors. Below is a structured outline of elements to consider when creating the local agency's curriculum:

1. **Educational Outcomes:**
    - Clearly define the educational outcomes that students are expected to achieve upon completion of the course.
2. **Core Instructional Materials:**
    - Develop or select a set of core instructional materials (both print and digital) that are aligned with the defined educational outcomes. This can include textbooks, workbooks, online resources and multimedia materials.
3. **Needs Assessment Tools:**
    - Create a series of needs assessment tools to help teachers identify the specific learning needs and educational goals of individual students. This will aid in prioritizing standards and tailoring instruction to meet the varying needs of learners.

[6] https://www.ecfr.gov/current/title-34/subtitle-B/chapter-IV/part-462
[7] https://nrsweb.org/policy-data/nrs-ta-guide

4. **Supplementary Workbooks:**
    - Provide supplementary workbooks that provide exercises for skill-building on topics such as number sense and operations, fractions, algebraic reasoning, measurement, geometric reasoning and data and probability.
5. **Pacing Guides and Matrices:**
    - Develop pacing guides and matrices that clearly outline the scope and sequence of the curriculum. This helps with organizing the content over the duration of the course and ensures a logical progression of skills.
6. **Recommended Resources:**
    - Compile a list of recommended websites, films and digital learning tools that can be utilized by teachers to supplement the curriculum. Ensure that these resources are relevant, up-to-date and support the varying needs of adult learners.
7. **Overview of Content:**
    - Provide an overview of the content to be covered in the course, including math standards and any additional content created or collected by instructors.
8. **Learning Activities:**
    - Describe a variety of learning activities that can be used regularly for reinforcement. Include a mix of individual and group activities, hands-on projects and real-world application exercises.

It is recommended to continuously assess and update the agency's curriculum based on feedback, changes in educational standards and the evolving needs of learners. Regular collaboration with instructors and seeking input from the FDOE Bureau of Adult Education can further enhance the quality and effectiveness of the agency's curriculum.

Instructors are not obligated to follow the standards sequentially. The distinct needs of each group of students can guide instruction, empowering instructors to modify the sequence of teaching the standards and benchmarks.

ASSESSMENT

For guidance on the assessment guidelines and requirements for ABE Mathematics, see State Board Rule 6.A-6.014, F.A.C.[8]

References for Assessment and Reporting: For complete information regarding assessment procedures and policies, see the FDOE Assessment Technical Assistance Paper.[9] For guidelines on the procedures for reporting data related to student test results, see the FDOE Division of Career and Adult Education (DCAE) Office of Research and Evaluation.[10]

Pre-testing: Federal and state regulations mandate that local adult education agencies conduct pre-tests for all new students within the initial 12 hours of enrollment activity. The FDOE defines a new student as someone not previously enrolled in the local agency during the current or preceding program year. New ABE Mathematics students are required to pre-test in the mathematics skill area. The agency is responsible for submitting the pre-test results to the FDOE in accordance with the guidelines outlined by the DCAE Office of Research and Evaluation.

Post-testing: Once a student completes the recommended instructional hours specified by the test publisher, the local agency will administer post-tests in mathematics. Subsequently, the agency is required to submit the post-test results to the FDOE in accordance with the guidelines established by the DCAE Office of Research and Evaluation.

[8] https://www.flrules.org/gateway/ruleno.asp?id=6A-6.014
[9] https://www.fldoe.org/core/fileparse.php/5398/urlt/2024FLAssessmentPolicy.pdf
[10] https://www.fldoe.org/academics/career-adult-edu/research-evaluation/

Course Completion: For state and federal reporting purposes, completion of the ABE Mathematics course occurs when the student's post-test scores exceed NRS ABE level 4. The agency is responsible for reporting the post-test results to the FDOE following the guidelines outlined by the DCAE Office of Research and Evaluation.

ACCOMMODATIONS

Both federal and state laws mandate the provision of accommodation(s) for students with disabilities to address individual needs and guarantee equal access. Adult students with disabilities are required to self-identify, submit documentation and request the necessary accommodation(s). Accommodation(s) for students with disabilities may be necessary in various areas, including instructional methods and materials, assignments and assessments, time constraints and schedules, learning environments, assistive technology and special communication systems. Documentation detailing the requested and provided accommodation(s) should be securely stored in a confidential file.

ADULT EDUCATION INSTRUCTOR CERTIFICATION REQUIREMENTS

As per s. 1012.39 (1)(b), F.S.,[11] each school district shall establish the minimal qualifications for part-time and full-time teachers in adult education agencies.

FDOE INTEGRATED EDUCATION AND TRAINING (IET) SERVICE APPROACH[12]

The FDOE promotes the planning, development and implementation of an IET service approach that provides concurrent and contextualized adult education and literacy activities in combination with workforce preparation activities and workforce training for a specific occupation or occupational cluster.

Florida's IET service approach is well-suited for meeting the specific needs of ABE students. Agencies are encouraged to create opportunities that seamlessly integrate education and career-focused content and deliver workforce preparation and training for ABE students.

The IET service approach provides students at all levels of adult education with the opportunity to acquire the skills needed to:

- Progress to and complete postsecondary education and training programs.
- Obtain employment and advance in employment leading to economic self-sufficiency.
- Exercise the rights and responsibilities of citizenship.

All IET Programs must include the following three components as noted in the following sections of WIOA.[13]

- Adult education and literacy activities (WIOA Section 203(2)).
- Workforce preparation activities (WIOA Section 203(17)).
- Workforce training services (one or more) for a specific occupation or occupation cluster (WIOA Section 134(c)(3)(D)).

To meet the "integrated" requirement of IET, all services must include the following:

[11] https://www.flsenate.gov/laws/statutes/2011/1012.39
[12] https://www.fldoe.org/academics/career-adult-edu/adult-edu/adult-edu-career-pathways.stml
[13] https://www.congress.gov/113/bills/hr803/BILLS-113hr803enr.pdf

- Adult education and literacy activities run concurrently and contextually with workforce preparation activities and workforce training for a specific occupation or occupational cluster for the purpose of educational and career advancement.
- Activities are of sufficient intensity and quality and based on the most rigorous research available, particularly with respect to improving reading, writing, mathematics and English proficiency of eligible individuals.
- Occur simultaneously.
- Use occupationally relevant instructional materials.

The IET program must have a single set of learning objectives that identifies specific adult education content, workforce preparation activities, workforce training competencies and the program activities function cooperatively.

ABE STANDARDS BACKGROUND

In Program Year 2022-2023, the FDOE aligned its ABE Standards to Florida's K-12 Benchmarks for Excellent Student Thinking (B.E.S.T.) Standards for Mathematics in accordance with Executive Order 19-32[14] dated January 31, 2019. This current version of the ABE Mathematics Standards is the result of that alignment. Professional curriculum writers developed the current set of standards with extensive input from a team of Florida Adult Education practitioners who thoroughly reviewed the standards. The current standards address the high-priority skills and content that students need to advance toward their postsecondary and career goals.

ABE MATHEMATICAL THINKING AND REASONING SKILLS STANDARDS FOR ADULT EDUCATION

ABE Mathematical students are expected to engage with mathematics through the Mathematical Thinking and Reasoning (MTR) Standards. These standards are written in clear language so all stakeholders can understand them and students can use them as self-monitoring tools. The MTR Standards promote deeper learning and understanding of mathematics. The clarifications are included to guide teachers in the integration of the MTR Standards within mathematics instruction. To obtain more information on the MTR Standards, refer to the FDOE Bureau of Standards and Instructional Support web page.[15]

Mathematical Thinking and Reasoning Standards	
MA.ABE.MTR.1.1	Actively participate in effortful learning both individually and collectively. Mathematicians who participate in effortful learning both individually and with others: Analyze the problem in a way that makes sense given the task. Ask questions that will help with solving the task. Build perseverance by modifying methods as needed while solving a challenging task. Stay engaged and maintain a positive mindset when working to solve tasks. Help and support each other when attempting a new method or approach. *Clarifications: Teachers who encourage students to participate actively in effortful learning both individually and with others: Cultivate a community of growth mindset learners. Foster perseverance in students by choosing tasks that are challenging. Develop students' ability to analyze and problem solve. Recognize students' effort when solving challenging problems.*
MA.ABE.MTR.2.1	Demonstrate understanding by representing problems in multiple ways. Mathematicians who demonstrate understanding by representing problems in multiple ways: Build understanding through modeling and using manipulatives. Represent solutions to problems in multiple ways using objects, drawings, tables, graphs and equations. Progress from modeling problems with objects and drawings to

[14] https://www.flgov.com/2019/01/31/governor-ron-desantis-issues-executive-order-19-32/
[15] https://www.fldoe.org/academics/standards/subject-areas/math-science/mathematics/bestmath.stml

	using algorithms and equations. Express connections between concepts and representations. Choose a representation based on the given context or purpose. *Clarifications: Teachers who encourage students to demonstrate understanding by representing problems in multiple ways: Help students make connections between concepts and representations. Provide opportunities for students to use manipulatives when investigating concepts. Guide students from concrete to pictorial to abstract representations as understanding progresses. Show students that various representations can have different purposes and can be useful in different situations.*
MA.ABE. MTR.3.1	Complete tasks with mathematical fluency. Mathematicians who complete tasks with mathematical fluency: Select efficient and appropriate methods for solving problems within the given context. Maintain flexibility and accuracy while performing procedures and mental calculations. Complete tasks accurately and with confidence. Adapt procedures to apply them to a new context. Use feedback to improve efficiency when performing calculations. *Clarifications: Teachers who encourage students to complete tasks with mathematical fluency: Provide students with the flexibility to solve problems by selecting a procedure that allows them to solve them efficiently and accurately. Offer multiple opportunities for students to practice efficient and generalizable methods. Provide opportunities for students to reflect on the method they used and determine if a more efficient method could have been used.*
MA.ABE. MTR.4.1	Engage in discussions that reflect on the mathematical thinking of self and others. Mathematicians who engage in discussions that reflect on the mathematical thinking of self and others: Communicate mathematical ideas, vocabulary and methods effectively. Analyze the mathematical thinking of others. Compare the efficiency of a method to those expressed by others. Recognize errors and suggest how to correctly solve the task. Justify results by explaining methods and processes. Construct possible arguments based on evidence. *Clarifications: Teachers who encourage students to engage in discussions that reflect on the mathematical thinking of self and others: Establish a culture in which students ask questions of the teacher and their peers and error is an opportunity for learning. Create opportunities for students to discuss their thinking with peers. Select, sequence and present student work to advance and deepen understanding of correct and increasingly efficient methods. Develop students' ability to justify methods and compare their responses to the responses of their peers.*
MA.ABE. MTR.5.1	Use patterns and structure to help understand and connect mathematical concepts. Mathematicians who use patterns and structure to help understand and connect mathematical concepts: Focus on relevant details within a problem. Create plans and procedures to logically order events, steps or ideas to solve problems. Decompose a complex problem into manageable parts. Relate previously learned concepts to new concepts. Look for similarities among problems. Connect solutions of problems to more complicated large-scale situations. *Clarifications: Teachers who encourage students to use patterns and structure to help understand and connect mathematical concepts: Help students recognize the patterns in the world around them and connect these patterns to mathematical concepts. Support students to develop generalizations based on the similarities found among problems. Provide opportunities for students to create plans and procedures to solve problems. Develop students' ability to construct relationships between their current understanding and more sophisticated ways of thinking.*
MA.ABE. MTR.6.1	Assess the reasonableness of solutions. Mathematicians who assess the reasonableness of solutions: Estimate to discover possible solutions. Use benchmark quantities to determine if a solution makes sense. Check calculations when solving problems. Verify possible solutions by explaining the methods used.

	Evaluate results based on the given context. *Clarifications: Teachers who encourage students to assess the reasonableness of solutions: Have students estimate or predict solutions prior to solving. Prompt students to continually ask, "Does this solution make sense? How do you know?" Reinforce that students check their work as they progress within and after a task. Strengthen students' ability to verify solutions through justifications.*
MA.ABE. MTR.7.1	Apply mathematics to real-world contexts. Mathematicians who apply mathematics to real-world contexts: Connect mathematical concepts to everyday experiences. Use models and methods to understand, represent and solve problems. Perform investigations to gather data or determine if a method is appropriate. Redesign models and methods to improve accuracy or efficiency. *Clarifications: Teachers who encourage students to apply mathematics to real-world contexts: Provide opportunities for students to create models, both concrete and abstract and perform investigations. Challenge students to question the accuracy of their models and methods. Support students as they validate conclusions by comparing them to the given situation. Indicate how various concepts can be applied to other disciplines.*

ABE MATHEMATICS STANDARDS CODING SCHEME

The ABE Mathematics curriculum framework has these components: Strands, Standards and Benchmarks. The Strands include Number Sense and Operations, Fractions, Algebraic Reasoning, Function, Measurement, Geometric Reasoning and Data and Probability. Each Standard is associated with one or more Benchmarks. The instructor may present topic-centered and/or project-based lessons that integrate standards from multiple strands.

Table 3: Coding Scheme of ABE Mathematics Curriculum Framework

ABE Mathematics Standards Coding Scheme

Strands:

NSO = Number Sense and Operations
FR = Fractions
AR = Algebraic Reasoning
F = Function
M = Measurement
GR = Geometric Reasoning
DP = Data and Probability

Subject	NRS Level	Strand	Standard	Benchmark
Mathematics	L3	NSO	1a	1

Examples:

MA.L3.NSO.1a Understand the place value of multi-digit numbers.
MA.L3.NSO.1a.1 Express how the value of a digit in a multi-digit whole number changes if the digit moves one place to the left or right.
MA.L3.NSO.1a.2 Read and write multi-digit whole numbers from 0 to 1,000,000 using standard form, expanded form and word form.
MA.L3.NSO.1a.3 Plot, order and compare multi-digit whole numbers up to 1,000,000.
MA.L3.NSO.1a.4 Round whole numbers from 0 to 10,000 to the nearest 10,100 or 1,000.
MA.L3.NSO.1a.5 Plot, order and compare decimals up to the hundredths.

ABE MATHEMATICS STANDARDS STRANDS AND NRS LEVELS

The ABE Mathematics Standards are presented in two broad instructional groupings:

1. **Basic** = NRS levels 1 and 2 (Grade Equivalent 0.0 – 3.9)
2. **Intermediate** = NRS levels 3 and 4 (Grade Equivalent 4.0 – 8.9)

Seven strands (also known as domains) comprise Florida's ABE mathematic standards across four NRS Educational Functioning Levels. Each of the four EFLs of the ABE Mathematics course has a limited number of standards. This allows mathematical instruction at each NRS level to have a narrow and deep focus that allows the student to develop an understanding of the following areas:

- Mathematical Foundations
- Mathematical Concepts
- Mathematical Procedural skills
- Mathematical Fluency.

The shaded areas in Table 4 below indicate that the domain does not have a standard or primary focus for instruction at that instructional level. Instructors may introduce, practice, reinforce and develop fluency at lower and/or higher instructional levels.

Table 4: ABE Mathematics Strands/Domains across NRS Educational Functioning Levels and Grade Equivalents

ABE Mathematics Strands, NRS Levels and Grade Equivalents				
Strands	**Basic**		**Intermediate**	
	NRS ABE Level 1 GE 0 – 1.9	**NRS ABE Level 2 GE 2.0 – 3.9**	**NRS ABE Level 3 GE 4.0 – 5.9**	**NRS ABE Level 4 GE 6.0 – 8.9**
Number Sense and Operations	✓	✓	✓	✓
Fractions		✓	✓	
Algebraic Reasoning	✓	✓	✓	✓
Function*				✓*
Measurement	✓	✓	✓	
Geometric Reasoning	✓	✓	✓	✓
Data and Probability	✓	✓	✓	✓

* In the Function domain, the suggested instruction should begin at the mid-point of the NRS level.

ABE MATHEMATICS (MA) STANDARDS
Mathematics Standards NRS Level 1 (Basic)
Beginning ABE Literacy, GE 0.0 – 1.9

NRS level 1 emphasizes understanding place value. Mathematics instruction begins with basic literacy skills. The primary focus of level 1 is counting, cardinality, number sense and base-ten operations. Students at this level are developing their understanding of whole number relationships, developing an understanding of measurement of physical objects, money and time, two-digit place value and understanding the relationship between addition and subtraction.

This level begins building a foundation for algebra by introducing the concept of an equation, a variable and the meaning of the equal sign, all within the context of addition and subtraction within 20.

Lastly, instruction provides some attention to categorizing, composing and decomposing two- and three- dimensional geometric figures as a basis for understanding the properties of congruence, similarity and symmetry.

ABE Mathematics Standards NRS Level 2 (Basic)
Beginning Basic Education, GE: 2.0 – 3.9

NRS level 2 emphasizes understanding place value for whole numbers to 1000; adding and subtracting multi-digit whole numbers, including using a standard algorithm and building towards fluency and algebraic reasoning in addition and subtraction to 3 digits; understanding and exploring strategies for multiplication and division within 100 and connecting to area of rectangles. These skills are a crucial foundation for fractions and prepare students for work with rational numbers, ratios, rates and proportions in subsequent levels.

In the areas of measurement and geometry, priorities are using standard units to measure objects, time and perimeter of geometric figures. Students develop the foundation for area, volume, congruence and symmetry by working with rectangular arrays and areas. Additionally, students extend geometric reasoning to lines and the attributes of quadrilaterals.

ABE Mathematics Standards NRS Level 3 (Intermediate)
Low Intermediate Basic Education, GE: 4.0 – 5.9

In NRS level 3, the focus is providing a conceptual foundation for learning functions. The emphasis on standards for numbers and operations continues; however, attention to algebra and geometry increase considerably.

Fluency with multi-digit whole numbers, using the standard algorithm, as well as calculations with fractions and decimals, are critical at this level. This extends to working with the concept of ratio and rates, addition and subtraction of fractions and decimals with procedural fluency and understanding why the procedures for multiplying and dividing decimals and fractions make sense.

Students at level 3 generate patterns in numbers and shapes and focus on reading, writing and interpreting expressions and equations. In addition, developing an understanding of the coordinate plane and plotting pairs of numbers in the first quadrant, classifying and measuring angles and developing and finding volumes of right rectangular prisms take precedence.

Measurement and data instruction adds the understanding of measures of center, spread and display of collected data with line plots. Students also interpret mean, median, mode and range.

ABE Mathematics Standards NRS Level 4
High Intermediate Basic Education, GE: 6.0 – 8.9

Like preceding levels, NRS level 4 also emphasizes number sense and operations, but here the attention is on fluency in all four operations with rational numbers – both negative and positive. Students must understand and translate between fractions, decimals and percents. The foundation for understanding of irrational numbers is built here, including calculation with square and cube roots, solving simple quadratic equations and representing numbers in scientific notation.

Another area of concentration is algebra and functions: formulating and reasoning about expressions and equations, creating equivalent expressions using Law of Exponents and solving linear equations and inequalities as well as systems of linear equations; grasping the concept of a function; and using functions to describe quantitative relationships.

Building on the geometric analysis in level 3, the focus turns to analyzing two- and three-dimensional figures (including circles and cylinders), using distance, angle, similarity and congruence and understanding basic right triangle trigonometry. Extending geometric reasoning to plotting points on the coordinate plane, area and volume of geometric figures and applying the Pythagorean Theorem.

NRS level 4 is where understanding and applying ratios, rates and proportional reasoning are developed and applied to solve problems and a bridge between rational number operations and algebraic relationships is created. Students also develop an understanding of proportional relationships in two variables.

Having worked with measurement data in previous levels, students learn to understand summary statistics and distributions and develop statistical thinking, including representing and comparing categorical and numerical data and creating and reasoning about linear relationships including modeling an association in bivariate data with a linear equation. Students will also develop an understanding of probability.

ABE MATHEMATICS (MA) **Standards and Benchmark Skills** **ABE Educational Functioning Levels 1 through 4**	
Number Sense and Operations **MA.L1.NSO (GE: 0.0 – 1.9)**	
MA.L1.NSO.1 Recite number names sequentially within 100 and extend counting sequences. Develop an understanding for the place value of two-digit numbers.	**MA.L1.NSO.1.1** Recite the number names to 100 by ones and by tens. **MA.L1.NSO.1.2** Starting at a given number, count forward and backwards within 120 by ones. Skip count by 2s to 20 and by 5s to 100. **MA.L1.NSO.1.3** Read numbers from 0 to 100 written in standard form, expanded form and word form. Write numbers from 0 to 100 using standard form and expanded form. **MA.L1.NSO.1.4** Compose and decompose two-digit numbers in multiple ways using tens and ones. Demonstrate each composition or decomposition with objects, drawings and expressions or equations. **MA.L1.NSO.1.5** Plot, order and compare whole numbers up to 100 using the number line and terms less than, equal to or greater than.
MA.L1.NSO.2 Develop an understanding of addition and subtraction operations with one and two-digit whole numbers.	**MA.L1.NSO.2.1** Explore addition of two whole numbers from 0 to 10 and related subtraction facts. **MA.L1.NSO.2.2** Recall addition facts with sums to 10 and related subtraction facts with automaticity. **MA.L1.NSO.2.3** Add two whole numbers with sums from 0 to 20 and subtract using related facts with procedural reliability. **MA.L1.NSO.2.4** Identify the number that is one more, one less, ten more and ten less than a given two-digit number. **MA.L1.NSO.2.5** Explore the addition of a two-digit number and a one-digit number with sums to 100.
Number Sense and Operations **MA.L2.NSO (GE: 2.0 – 3.9)**	
MA.L2.NSO.1 Understand the place value of four-digit whole numbers.	**MA.L2.NSO.1.1** Read and write numbers from 0 to 10,000 using standard form, expanded form and word form. **MA.L2.NSO.1.2** Compose and decompose four-digit numbers in multiple ways using thousands, hundreds, tens and ones. Demonstrate each composition or decomposition using objects, drawings and expressions or equations. **MA.L2.NSO.1.3** Plot, order and compare whole numbers up to 10,000.

	MA.L2.NSO.1.4 Round whole numbers from 0 to 1,000 to the nearest 10 or 100.
MA.L2.NSO.2 Add and subtract multi-digit whole numbers. Build an understanding of multiplication and division operations.	**MA.L2.NSO.2.1** Recall addition facts with sums to 20 and related subtraction facts with automaticity. **MA.L2.NSO.2.2** Add and subtract multi-digit whole numbers, including using a standard algorithm with procedural fluency. **MA.L2.NSO.2.3** Identify the number that is ten more, ten less, one hundred more and one hundred less than a given three-digit number. **MA.L2.NSO.2.4** Explore multiplication of two whole numbers with products from 0 to 144 and related division facts. **MA.L2.NSO.2.5** Explore the addition of two whole numbers with sums up to 1,000. Explore the subtraction of a whole number from a whole number, each no larger than 1,000. **MA.L2.NSO.2.6** Multiply a one-digit whole number by a multiple of 10, up to 90 or a multiple of 100, up to 900, with procedural reliability. **MA.L2.NSO.2.7** Multiply two whole numbers from 0 to 12 and divide using related facts with procedural reliability.
Number Sense and Operations **MA.L3.NSO (GE: 4.0 – 5.9)**	
MA.L3.NSO.1a Understand the place value of multi-digit numbers.	**MA.L3.NSO.1a.1** Express how the value of a digit in a multi-digit whole-number changes if the digit moves one place to the left or right. **MA.L3.NSO.1a.2** Read and write multi-digit whole numbers from 0 to 1,000,000 using standard form, expanded form and word form. **MA.L3.NSO.1a.3** Plot, order and compare multi-digit whole numbers up to 1,000,000. **MA.L3.NSO.1a.4** Round whole numbers from 0 to 10,000 to the nearest 10,100 or 1,000. **MA.L3.NSO.1a.5** Plot, order and compare decimals up to the hundredths.
MA.L3.NSO.1b Understand the place value of multi-digit numbers with decimals to the thousandths place.	**MA.L3.NSO.1b.1** Express how the value of a digit in a multi-digit number with decimals to the thousandths changes if the digit moves one or more places to the left or right. **MA.L3.NSO.1b.2** Read and write multi-digit numbers with decimals to the thousandths using standard form, word form and expanded form. **MA.L3.NSO.1b.3** Compose and decompose multi-digit numbers with decimals to the thousandths in multiple ways using the values of the digits in each place. Demonstrate the compositions or decompositions using objects, drawings and expressions or equations.
MA.L3.NSO.1c Rewrite numbers in equivalent forms.	**MA.L3.NSO.1c.1** Know and apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions, limited to whole-number exponents.
MA.L3.NSO.2a Build understanding of operations with multi-digit numbers including decimals.	**MA.L3.NSO.2a.1** Recall multiplication facts with factors up to 12 and related division facts with automaticity. **MA.L3.NSO.2a.2** Multiply two whole numbers, up to three digits by up to two digits, with procedural reliability. **MA.L3.NSO.2a.3** Multiply two whole numbers, each up to two digits, including using a standard algorithm with procedural fluency. **MA.L3.NSO.2a.4** Divide a whole number up to four digits by a one-digit whole number with procedural reliability. Represent remainders as fractional parts of the divisor. **MA.L3.NSO.2a.5** Explore the multiplication and division of multi-digit whole numbers using estimation, rounding and place value.

	MA.L3.NSO.2a.6 Identify the number that is one-tenth more, one-tenth less, one-hundredth more and one-hundredth less than a given number. **MA.L3.NSO.2a.7** Explore the addition and subtraction of multi-digit numbers with decimals to the hundredths.
MA.L3.NSO.2b Add, subtract, multiply and divide multi-digit numbers.	**MA.L3.NSO.2b.1** Multiply multi-digit whole numbers, including using a standard algorithm with procedural fluency. **MA.L3.NSO.2b.2** Divide multi-digit whole numbers, up to five digits by two digits, including using a standard algorithm with procedural fluency. Represent remainders as fractions. **MA.L3.NSO.2b.3** Add and subtract multi-digit numbers with decimals to the thousandths, including using a standard algorithm with procedural fluency. **MA.L3.NSO.2b.4** Explore the multiplication and division of multi-digit numbers with decimals to the hundredths using estimation, rounding and place value. **MA.L3.NSO.2b.5** Multiply and divide a multi-digit number with decimals to the tenths by one tenth and one-hundredth with procedural reliability.
MA.L3.NSO.3 Apply properties of operations to rewrite numbers in equivalent forms.	**MA.L3.NSO.3.1** Given a mathematical or real-world context, find the greatest common factor and least common multiple of two whole numbers. **MA.L3.NSO.3.2** Rewrite the sum of two composite whole numbers having a common factor as a common factor multiplied by the sum of two whole numbers. **MA.L3.NSO.3.3** Express composite whole numbers as a product of prime factors with natural number exponents.
Number Sense and Operations **MA.L4.NSO (GE: 6.0 – 8.9)**	
MA.L4.NSO.1a Extend knowledge of numbers to negative numbers and develop an understanding of absolute value.	**MA.L4.NSO.1a.1** Extend previous understanding of numbers to define rational numbers. Plot, order and compare rational numbers. **MA.L4.NSO.1a.2** Given a mathematical or real-world context, represent quantities that have opposite directions using rational numbers. Compare them on a number line and explain the meaning of zero within its context. **MA.L4.NSO.1a.3** Given a mathematical or real-world context, interpret the absolute value of a number as the distance from zero on a number line. Find the absolute value of rational numbers. **MA.L4.NSO.1a.4** Solve mathematical and real-world problems involving absolute value, including the comparison of absolute value.
MA.L4.NSO.1b Rewrite rational numbers in different but equivalent forms including fractions, mixed numbers, repeating decimals and percentages to solve mathematical and real-world problems.	**MA.L4.NSO.1b.1** Rewrite rational numbers in different but equivalent forms including fractions, mixed numbers, repeating decimals and percentages to solve mathematical and real-world problems

MA.L4.NSO.1c Solve problems involving rational numbers, including numbers in scientific notation and extend the understanding of rational numbers to irrational numbers.	**MA.L4.NSO.1c.1** Extend previous understanding of rational numbers to define irrational numbers within the real number system. Locate an approximate value of a numerical expression involving irrational numbers on a number line. **MA.L4.NSO.1c.2** Plot, order and compare rational and irrational numbers, represented in various forms. **MA.L4.NSO.1c.3** Extend previous understanding of the Laws of Exponents to include integer exponents. Apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions, limited to integer exponents and rational number bases, with procedural fluency with variables on both sides. **MA.L4.NSO.1c.4** Add, subtract, multiply and divide numbers expressed in scientific notation with procedural fluency. **MA.L4.NSO.1c.5** Solve real-world problems involving operations with numbers expressed in scientific notation. **MA.L4.NSO.1c.6** Solve multi-step mathematical and real-world problems involving the order of operations with rational numbers, including exponents and radicals.
MA.L4.NSO.2 Add, subtract, multiply and divide rational numbers.	**MA.L4.NSO.2.1** Solve mathematical problems using multi-step order of operations with rational numbers including grouping symbols, whole-number exponents and absolute value. **MA.L4.NSO.2.2** Add, subtract, multiply and divide rational numbers with procedural fluency. **MA.L4.NSO.2.3** Solve real-world problems involving any of the four operations with rational numbers.
MA.L4.NSO.3 Apply properties of operations to rewrite numbers in equivalent forms.	**MA.L4.NSO.3.1** Evaluate positive rational numbers and integers with natural number exponents. **MA.L4.NSO.3.2** Rewrite positive rational numbers in different but equivalent forms including fractions, terminating decimals and percentages.
Fractions **MA.L1.FR (GE: 0.0 – 1.9)**	
Not a focus standard at this level	
Fractions **MA.L2.FR (GE: 2.0 – 3.9)**	
MA.L2.FR.1 Understand fractions as numbers and represent fractions.	**MA.L2.FR.1.1** Partition circles and rectangles into two, three or four equal-sized parts. Name the parts using appropriate language and describe the whole as two halves, three thirds or four fourths. **MA.L2.FR.1.2** Partition rectangles into two, three or four equal-sized parts in two different ways showing that equal-sized parts of the same whole may have different shapes. **MA.L2.FR.1.3** Represent and interpret unit fractions in the form 1 / n as the quantity formed by one part when a whole is partitioned into n equal parts. **MA.L2.FR.1.4** Represent and interpret fractions, including fractions greater than one, in the form of m / n as the result of adding the unit fraction 1 / n to itself m times. **MA.L2.FR.1.5** Read and write fractions, including fractions greater than one, using standard form, numeral-word form and word form.
MA.L2.FR.2 Order and compare fractions and identify equivalent fractions.	**MA.L2.FR.2.1** Plot, order and compare fractional numbers with the same numerator or the same denominator. **MA.L2.FR.2.2** Identify equivalent fractions and explain why they are equivalent.
Fractions	

MA.L3.FR (GE: 4.0 – 5.9)	
MA.L3.FR.1a Develop an understanding of the relationship between different fractions and the relationship between fractions and decimals.	**MA.L3.FR.1a.1** Model and express a fraction, including mixed numbers and fractions greater than one, with the denominator 10 as an equivalent fraction with the denominator 100. **MA.L3.FR.1a.2** Use decimal notation to represent fractions with denominators of 10 or 100, including mixed numbers and fractions greater than 1 and use fractional notation with denominators of 10 or 100 to represent decimals. **MA.L3.FR.1a.3** Identify and generate equivalent fractions, including fractions greater than one. Describe how the numerator and denominator are affected when the equivalent fraction is created. **MA.L3.FR.1a.4** Plot, order and compare fractions, including mixed numbers and fractions greater than one, with different numerators and different denominators.
MA.L3.FR.1b Interpret a fraction as an answer to a division problem.	**MA.L3.FR.1b.1** Given a mathematical or real-world problem, represent the division of two whole numbers as a fraction.
MA.L3.FR.2a Build a foundation of addition, subtraction and multiplication operations with fractions.	**MA.L3.FR.2a.1** Decompose a fraction, including mixed numbers and fractions greater than one, into a sum of fractions with the same denominator in multiple ways. Demonstrate each decomposition with objects, drawings and equations. **MA.L3.FR.2a.2** Add and subtract fractions with like denominators, including mixed numbers and fractions greater than one, with procedural reliability. **MA.L3.FR.2a.3** Explore the addition of a fraction with denominator of 10 to a fraction with denominator of 100 using equivalent fractions. **MA.L3.FR.2a.4** Extend previous understanding of multiplication to explore the multiplication of a fraction by a whole number or a whole number by a fraction.
MA.L3.FR.2b Perform operations with fractions.	**MA.L3.FR.2b.1** Extend previous understanding of multiplication to multiply a fraction by a fraction, including mixed numbers and fractions greater than 1, with procedural reliability. **MA.L3.FR.2b.2** When multiplying a given number by a fraction less than 1 or a fraction greater than 1, predict and explain the relative size of the product to the given number without calculating. **MA.L3.FR.2b.3** Extend previous understanding of division to explore the division of a unit fraction by a whole number and a whole number by a unit fraction.
Fractions **MA.L4.FR (GE: 6.0 – 8.9)**	
Not a focus standard at this level	
Algebraic Reasoning **MA.L1.AR (GE: 0.0 – 1.9)**	
MA.L1.AR.1a Solve addition problems with sums between 0 and 20 and subtraction problems using related facts.	**MA.L1.AR.1a.1** Apply properties of addition to find a sum of three or more whole numbers. **MA.L1.AR.1a.2** Solve addition and subtraction real-world problems using objects, drawings or equations to represent the problem.
MA.L1.AR.1b Solve addition problems with sums between 0 - 100 and related subtraction problems.	**MA.L1.AR.1ab.1** Solve one- and two-step addition and subtraction real-world problems.

MA.L1.AR.2a Develop an understanding of the equal sign.	**MA.L1.AR.2a.1** Explain why addition or subtraction equations are true using objects or drawings.
MA.L1.AR.2b Develop an understanding of the relationship between addition and subtraction.	**MA.L1.AR.2b.1** Restate a subtraction problem as a missing addend problem using the relationship between addition and subtraction. **MA.L1.AR.2b.2** Determine and explain if equations involving addition or subtraction are true or false. **MA.L1.AR.2b.3** Determine the unknown whole number in an addition or subtraction equation, relating three whole numbers, with the unknown in any position.
Algebraic Reasoning **MA.L2.AR (GE: 2.0 – 3.9)**	
MA.L2.AR.1a Solve addition problems with sums between 0 and 100 and related subtraction problems.	**MA.L2.AR.1a.1** Solve one- and two-step addition and subtraction real-world problems, limited to sums up to 100 and related differences.
MA.L2.AR.1b Solve multiplication and division problems.	**MA.L2.AR.1b.1** Apply the distributive property to multiply a one-digit number and two-digit number. Apply properties of multiplication to find a product of one-digit whole numbers. **MA.3.AR.1.b.2** Solve one- and two-step real-world problems involving any of four operations with whole numbers.
MA.L2.AR.2a Demonstrate an understanding of equality and addition and subtraction.	**MA.L2.AR.2a.1** Determine and explain whether equations involving addition and subtraction are true or false. **MA.L2.AR.2a.2** Determine the unknown whole number in an addition or subtraction equation, relating three or four whole numbers, with the unknown in any position.
MA.L2.AR.2b Develop an understanding of equality and multiplication and division.	**MA.L2.AR.2b.1** Restate a division problem as a missing factor problem using the relationship between multiplication and division. **MA.L2.AR.2b.2** Determine and explain whether an equation involving multiplication or division is true or false. **MA.L2.AR.2b.3** Determine the unknown whole number in a multiplication or division equation, relating three whole numbers, with the unknown in any position.
MA.L2.AR.3 Develop an understanding of multiplication.	**MA.L2.AR.3.1** Represent an even number using two equal groups or two equal addends. Represent an odd number using two equal groups with one left over or two equal addends plus 1. **MA.L2.AR.3.2** Use repeated addition to find the total number of objects in a collection of equal groups. Represent the total number of objects using rectangular arrays and equations.
Algebraic Reasoning **MA.L3.AR (GE: 4.0 – 5.9)**	
MA.L3.AR.1 Represent and solve problems involving the four operations with whole numbers and fractions.	**MA.L3.AR.1.1** Solve real-world problems involving addition and subtraction of fractions with like denominators, including mixed numbers and fractions greater than one. **MA.L3.AR.1.2** Solve real-world problems involving multiplication of a fraction by a whole number or a whole number by a fraction. **MA.L3.AR.1.3** Solve multi-step real-world problems involving any combination of the four operations with whole numbers, including problems in which remainders must be interpreted within the context. **MA.L3.AR.1.4** Solve real-world problems involving the addition, subtraction or

	multiplication of fractions, including mixed numbers and fractions greater than 1. **MA.L3.AR.1.5** Solve real-world problems involving division of a unit fraction by a whole number and a whole number by a unit fraction.
MA.L3.AR.2 Demonstrate an understanding of equality, operations with whole numbers, the order of operations and equivalent numerical expressions.	**MA.L3.AR.2.1** Determine and explain whether an equation involving any of the four operations with whole numbers is true or false. **MA.L3.AR.2.2** Given a mathematical or real-world context, write an equation involving multiplication or division to determine the unknown whole number with the unknown in any position. **MA.L3.AR.2.3** Translate written real-world and mathematical descriptions into numerical expressions and numerical expressions into written mathematical descriptions. **MA.L3.AR.2.4** Evaluate multi-step numerical expressions using order of operations. **MA.L3.AR.2.5** Determine and explain whether an equation involving any of the four operations is true or false. **MA.L3.AR.2.6** Given a mathematical or real-world context, write an equation involving any of the four operations to determine the unknown whole number with the unknown in any position.
MA.L3.AR.3a Recognize numerical patterns, including patterns that follow a given rule.	**MA.L3.AR.3a.1** Determine factor pairs for a whole number from 0 to 144. Determine whether a whole number from 0 to 144 is prime, composite or neither. **MA.L3.AR.3a.2** Generate, describe and extend a numerical pattern that follows a given rule.
MA.L3.AR.3b Analyze patterns and relationships between inputs and outputs.	**MA.L3.AR.3b.1** Given a numerical pattern, identify and write a rule that can describe the pattern as an expression. **MA.L3.AR.3b.2** Given a rule for a numerical pattern, use a two-column table to record the inputs and outputs.
Algebraic Reasoning **MA.L4.AR (GE: 6.0 – 8.9)**	
MA.L4.AR.1a Apply previous understanding of arithmetic expressions to algebraic expressions.	**MA.L4.AR.1a.1** Given a mathematical or real-world context, translate written descriptions into algebraic expressions and translate algebraic expressions into written descriptions. **MA.L4.AR.1a.2** Translate a real-world written description into an algebraic inequality in the form of $x > a$, $x < a$, $x \geq a$ or $x \leq a$. Represent the inequality on a number line. **MA.L4.AR.1a.3** Evaluate algebraic expressions using substitution and order of operations. **MA.L4.AR.1a.4** Apply the properties of operations to generate equivalent algebraic expressions with integer coefficients.
MA.L4.AR.1b Rewrite algebraic expressions in equivalent forms.	**MA.L4.AR.1b.1** Apply properties of operations to add and subtract linear expressions with rational coefficients. **MA.L4.AR.1b.2** Determine whether two linear expressions are equivalent.
MA.L4.AR.1c Generate equivalent algebraic expressions.	**MA.L4.AR.1c.1** Apply the Laws of Exponents to generate equivalent algebraic expressions, limited to integer exponents and monomial bases. **MA.L4.AR.1c.2** Apply properties of operations to multiply two linear expressions with rational coefficients. **MA.L4.AR.1c.3** Rewrite the sum of two algebraic expressions having a common monomial factor as a common factor multiplied by the sum of two algebraic expressions.
MA.L4.AR.2a Develop an understanding for solving equations and inequalities.	**MA.L4.AR.2a.1** Given an equation or inequality and a specified set of integer values, determine which values make the equation or inequality true or false. **MA.L4.AR.2a.2** Write and solve one-step equations in one variable within a

Write and solve one-step equations in one variable.	mathematical or real-world context using addition and subtraction, where all terms and solutions are integers. **MA.L4.AR.2a.3** Write and solve one-step equations in one variable within a mathematical or real-world context using multiplication and division, where all terms and solutions are integers. **MA.L4.AR.2a.4** Determine the unknown decimal or fraction in an equation involving any of the four operations, relating three numbers, with the unknown in any position.
MA.L4.AR.2b Write and solve equations and inequalities in one variable.	**MA.L4.AR.2b.1** Write and solve one-step inequalities in one variable within a mathematical context and represent solutions algebraically or graphically. **MA.L4.AR.2b.2** Write and solve two-step equations in one variable within a mathematical or real-world context, where all terms are rational numbers.
MA.L4.AR.2c Solve multi-step one-variable equations and inequalities.	**MA.L4.AR.2c.1** Solve multi-step linear equations in one variable, with rational number coefficients. Include equations with variables on both sides. **MA.L4.AR.2c.2** Solve two-step linear inequalities in one variable and represent solutions algebraically and graphically. **MA.L4.AR.2c.3** Given an equation in the form of x^2 = p and x^3 = q, where p is a whole number and q is an integer, determine the real solutions.
MA.L4.AR.3a Understand ratio and unit rate concepts and use them to solve problems.	**MA.L4.AR.3a.1** Given a real-world context, write and interpret ratios to show the relative sizes of two quantities using appropriate notation: a / b, a to b, or a: b where b ≠ 0. **MA.L4.AR.3a.2** Given a real-world context, determine a rate for a ratio of quantities with different units. Calculate and interpret the corresponding unit rate. **MA.L4.AR.3a.3** Extend previous understanding of fractions and numerical patterns to generate or complete a two- or three-column table to display equivalent part-to-part ratios and part-to-part-to-whole ratios. **MA.L4.AR.3a.4** Apply ratio relationships to solve mathematical and real-world problems involving percentages using the relationship between two quantities. **MA.L4.AR.3a.5** Solve mathematical and real-world problems involving ratios, rates and unit rates, including comparisons, mixtures, ratios of lengths and conversions within the same measurement system.
MA.L4.AR.3b Use percentages and proportional reasoning to solve problems	**MA.L4.AR.3b.1** Apply previous understanding of percentages and ratios to solve multi-step real world percent problems. **MA.L4.AR.3b.2** Apply previous understanding of ratios to solve real-world problems involving proportions. **MA.L4.AR.3b.3** Solve mathematical and real-world problems involving the conversion of units across different measurement systems.
MA.L4.AR.3c Extend understanding of proportional relationships to two-variable linear equations.	**MA.L4.AR.3c.1** Determine if a linear relationship is also a proportional relationship. **MA.L4.AR.3c.2** Given a table, graph or written description of a linear relationship, determine the slope. **MA.L4.AR.3c.3** Given a table, graph or written description of a linear relationship, write an equation in slope-intercept form. **MA.L4.AR.3c.4** Given a mathematical or real-world context, graph a two-variable linear equation from a written description, a table or an equation in slope-intercept form. **MA.L4.AR.3c.5** Given a real-world context, determine and interpret the slope and y-intercept of a two-variable linear equation from a written description, a table, a graph or an equation in slope-intercept form.
MA.L4.AR.4 Develop an understanding of two-	**MA.L4.AR.4.1** Given a system of two linear equations and a specified set of possible solutions, determine which ordered pairs satisfy the system of linear equations.

variable systems of equations.	**MA.L4.AR.4.2** Given a system of two linear equations represented graphically on the same coordinate plane, determine whether there is one solution, no solution or infinitely many solutions. **MA.L4.AR.4.3** Given a mathematical or real-world context, solve systems of two linear equations by graphing.
Functions **MA.L4.F (GE: 6.0 – 8.9)** **Note: Suggested instruction level begins at 7.0 – 8.9**	
MA.L4.F.1 Define, evaluate and compare functions.	**MA.L4.F.1.1** Given a set of ordered pairs, a table, a graph or mapping diagram, determine whether the relationship is a function. Identify the domain and range of the relation. **MA.L4.F.1.2** Given a function defined by a graph or an equation, determine whether the function is a linear function. Given an input-output table, determine whether it could represent a linear function. **MA.L4.F.1.3** Analyze a real-world written description or graphical representation of a functional relationship between two quantities and identify where the function is increasing, decreasing or constant.
Measurement **MA.L1.M (GE: 0.0 – 1.9)**	
MA.L1.M.1 Compare and measure the length of objects.	**MA.L1.M.1.1** Express the length of an object, up to 20 units long, as a whole number of lengths by laying non-standard objects end to end with no gaps or overlaps. **MA.L1.M.1.2** Estimate the length of an object to the nearest inch. Measure the length of an object to the nearest inch or centimeter. **MA.L1.M.1.3** Compare and order the length of up to three objects using direct and indirect comparison.
Measurement **MA.L2.M (GE: 2.0 – 3.9)**	
MA.L2.M.1 Measure attributes of objects and solve problems involving measurement.	**MA.L2.M.1.1** Select and use appropriate tools to measure the length of an object, the volume of liquid within a beaker and temperature. **MA.L2.M.1.2** Solve real-world problems involving any of the four operations with whole number lengths, masses, weights, temperatures or liquid volumes.
MA.L2.M.2 Tell time and solve problems involving time and money.	**MA.L2.M.2.1** Find the value of combinations of pennies, nickels and dimes up to one dollar and the value of combinations of one, five and ten-dollar bills up to $100. Use the ¢ and $ symbols appropriately. **MA.L2.M.2.2** Solve one- and two-step addition and subtraction real-world problems involving either dollar bills within $100 or coins within 100¢ using $ and ¢ symbols appropriately. **MA.L2.M.2.3** Using analog and digital clocks tell and write time to the nearest minute using a.m. and p.m. appropriately. Express portions of an hour using the fractional terms half an hour, half-past, quarter of an hour, quarter after and quarter til. **MA.L2.M.2.4** Solve one- and two-step real-world problems involving elapsed time.
Measurement **MA.L3.M (GE: 4.0 – 5.9)**	
MA.L3.M.1 Measure the length of objects and solve multi-step problems	**MA.L3.M.1.1** Select and use appropriate tools to measure attributes of objects. **MA.L3.M.1.2** Convert within a single system of measurement using the units: yards, feet, inches; kilometers, meters, centimeters, millimeters; pounds, ounces; kilograms,

involving measurement and conversions between units.	grams; gallons, quarts, pints, cups; liter, milliliter; and hours, minutes, seconds. **MA.L3.M.1.3** Solve multi-step real-world problems that involve converting measurement units to equivalent measurements within a single system of measurement.
MA.L3.M.2 Solve problems involving time and money.	**MA.L3.M.2.1** Solve two-step real-world problems involving distances and intervals of time using any combination of the four operations. **MA.L3.M.2.2** Solve one- and two-step addition and subtraction real-world problems involving money using decimal notation. **MA.L3.M.2.3** Solve multi-step real-world problems involving money using decimal notation.
Measurement **MA.L4.M (GE: 6.0 – 8.9)**	
Not a focus standard at this level	
Geometric Reasoning **MA.L1.GR (GE: 0.0 – 1.9)**	
MA.L1.GR.1 Identify and analyze two- and three-dimensional figures based on their defining attributes.	**MA.L1.GR.1.1** Identify, compare and sort two- and three-dimensional figures based on their attributes. Figures are limited to circles, semi-circles, triangles, rectangles, squares, trapezoids, hexagons, spheres, cubes, rectangular prisms, cones and cylinders. **MA.L1.GR.1.2** Sketch two-dimensional figures when given defining attributes. Figures are limited to triangles, rectangles, squares and hexagons. **MA.L1.GR.1.3** Compose and decompose two- and three-dimensional figures. Figures are limited to semi-circles, triangles, rectangles, squares, trapezoids, hexagons, cubes, rectangular prisms, cones and cylinders. **MA.L1.GR.1.4** Given a real-world object, identify parts that are modeled by two- and three-dimensional figures. Figures are limited to semi-circles, triangles, rectangles, squares and hexagons, spheres, cubes, rectangular prisms, cones and cylinders.
Geometric Reasoning **MA.L2.GR (GE: 2.0 – 3.9)**	
MA.L2.GR.1 Describe and identify relationships between lines and classify quadrilaterals.	**MA.L2.GR.1.1** Describe and draw points, lines, line segments, rays, intersecting lines, perpendicular lines and parallel lines. Identify these in two-dimensional figures. **MA.L2.GR.1.2** Informally explore angles as an attribute of two-dimensional figures. Figures are limited to triangles, rectangles, squares, pentagons, hexagons and octagons. **MA.L2.GR.1.3** Categorize two-dimensional figures based on the number and length of sides, number of vertices, whether they are closed or not and whether the edges are curved or straight. **MA.L2.GR.1.4** Identify and draw quadrilaterals based on their defining attributes. Quadrilaterals include parallelograms, rhombi, rectangles, squares and trapezoids. Draw line(s) of symmetry in a two-dimensional figure and identify line symmetric two-dimensional figures. Identify and draw quadrilaterals based on their defining attributes. Quadrilaterals include parallelograms, rhombi, rectangles, squares and trapezoids. **MA.L2.GR.1.5** Draw line(s) of symmetry in a two-dimensional figure and identify line symmetric two-dimensional figures.
MA.L2.GR.2 Solve problems involving the perimeter and	**MA.L2.GR.2.1** Explore perimeter as an attribute of a figure by placing unit segments along the boundary without gaps or overlaps. Find perimeters of rectangles by

area of rectangles.	counting unit segments. **MA.L2.GR.2.2** Find the perimeter of a polygon with whole-number side lengths. Polygons are limited to triangles, rectangles, squares and pentagons. **MA.L2.GR.2.3** Explore area as an attribute of a two-dimensional figure by covering the figure with unit squares without gaps or overlaps. Find areas of rectangles by counting unit squares. **MA.L2.GR.2.4** Find the area of a rectangle with whole-number side lengths using a visual model and a multiplication formula. **MA.L2.GR.2.5** Solve mathematical and real-world problems involving the perimeter and the area of rectangles with whole-number side lengths using a visual model and a formula. **MA.L2.GR.2.6** Solve mathematical and real-world problems involving the perimeter and area of composite figures composed of non-overlapping rectangles with whole number side lengths.
Geometric Reasoning **MA.L3.GR (GE: 4.0 – 5.9)**	
MA.L3.GR.1a Draw, classify and measure angles.	**MA.L3.GR.1a.1** Identify and classify angles as acute, right, obtuse, straight or reflex. **MA.L3.GR.1a.2** Estimate angle measures. Using a protractor, measure angles in whole-number degrees and draw angles of specified measure in whole-number degrees. Demonstrate that angle measure is additive. **MA.L3.GR.1a.3** Solve real-world and mathematical problems involving unknown whole number angle measures. Write an equation to represent the unknown.
MA.L3.GR.1b Classify two-dimensional figures and three-dimensional figures based on defining attributes.	**MA.L3.GR.1b.1** Classify triangles or quadrilaterals into different categories based on shared defining attributes. Explain why a triangle or quadrilateral would or would not belong to a category. **MA.L3.GR.1b.2** Identify and classify three-dimensional figures into categories based on their defining attributes. Figures are limited to right pyramids, right prisms, right circular cylinders, right circular cones and spheres.
MA.L3.GR.2 Solve problems involving the perimeter and area of rectangles.	**MA.L3.GR.2.1** Solve perimeter and area mathematical and real-world problems, including problems with unknown sides, for rectangles with whole-number side lengths. **MA.L3.GR.2.2** Solve problems involving rectangles with the same perimeter and different areas or with the same area and different perimeters. **MA.L3.GR.2.3** Find the perimeter and area of a rectangle with fractional or decimal side lengths using visual models and formulas.
MA.L3.GR.3 Solve problems involving the volume of right rectangular prisms.	**MA.L3.GR.3.1** Explore volume as an attribute of three-dimensional figures by packing them with unit cubes without gaps. Find the volume of a right rectangular prism with whole-number side lengths by counting unit cubes. **MA.L3.GR.3.2** Find the volume of a right rectangular prism with whole-number side lengths using a visual model and a formula. **MA.L3.GR.3.3** Solve real-world problems involving the volume of right rectangular prisms, including problems with an unknown edge length, with whole-number edge lengths using a visual model or a formula. Write an equation with a variable for the unknown to represent the problem.
MA.L3.GR.4 Plot points and represent problems on the coordinate plane.	**MA.L3.GR.4.1** Identify the origin and axes in the coordinate system. Plot and label ordered pairs in the first quadrant of the coordinate plane. **MA.L3.GR.4.2** Represent mathematical and real-world problems by plotting points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation.

	MA.L3.GR.4.3 Solve mathematical and real-world problems by plotting points on a coordinate plane, including finding the perimeter or area of a rectangle.
Geometric Reasoning **MA.L4.GR (GE: 6.0 – 8.9)**	
MA.L4.GR.1a Model and solve problems involving two-dimensional figures including applying previous understandings of the coordinate plane.	**MA.L4.GR.1a.1** Extend previous understanding of the coordinate plane to plot rational number ordered pairs in all four quadrants and on both axes. Identify the x- or y-axis as the line of reflection when two ordered pairs have an opposite x- or y-coordinate. **MA.L4.GR.1a.2** Find distances between ordered pairs, limited to the same x-coordinate or the same y-coordinate, represented on the coordinate plane. **MA.L4.GR.1a.3** Derive a formula for the area of a right triangle using a rectangle. Apply a formula to find the area of a triangle. **MA.L4.GR.1a.4** Solve mathematical and real-world problems involving the area of quadrilaterals and composite figures by decomposing them into triangles or rectangles.
MA.L4.GR.1b Solve problems involving two-dimensional figures, including circles.	**MA.L4.GR.1b.1** Apply formulas to find the areas of trapezoids, parallelograms and rhombi. **MA.L4.GR.1b.2** Solve mathematical or real-world problems involving the area of polygons or composite figures by decomposing them into triangles or quadrilaterals. **MA.L4.GR.1b.3** Explore the proportional relationship between circumferences and diameters of circles. Apply a formula for the circumference of a circle to solve mathematical and real-world problems. **MA.L4.GR.1b.4** Explore and apply a formula to find the area of a circle to solve mathematical and real-world problems. **MA.L4.GR.1b.5** Solve mathematical and real-world problems involving dimensions and areas of geometric figures, including scale drawings and scale factors.
MA.L4.GR.1c Develop an understanding of the Pythagorean Theorem and angle relationships involving triangles.	**MA.L4.GR.1c.1** Apply the Pythagorean Theorem to solve mathematical and real-world problems involving unknown side lengths in right triangles. **MA.L4.GR.1c.2** Apply the Pythagorean Theorem to solve mathematical and real-world problems involving the distance between two points in a coordinate plane. **MA.L4.GR.1c.3** Use the Triangle Inequality Theorem to determine if a triangle can be formed from a given set of sides. Use the converse of the Pythagorean Theorem to determine if a right triangle can be formed from a given set of sides. **MA.L4.GR.1c.4** Solve mathematical problems involving the relationships between supplementary, complementary, vertical or adjacent angles. **MA.L4.GR.1c.5** Solve problems involving the relationships of interior and exterior angles of a triangle. **MA.L4.GR.1c.6** Develop and use formulas for the sums of the interior angles of regular polygons by decomposing them into triangles.
MA.L4.GR.2a Model and solve problems involving three dimensional figures.	**MA.L4.GR.2a.1** Solve mathematical and real-world problems involving the volume of right rectangular prisms with positive rational number edge lengths using a visual model and a formula. **MA.L4.GR.2a.2** Given a mathematical or real-world context, find the surface area of right rectangular prisms and right rectangular pyramids using the figure's net.
MA.L4.GR.2b Solve problems involving three-dimensional figures, including right circular cylinders.	**MA.L4.GR.2b.1** Given a mathematical or real-world context, find the surface area of a right circular cylinder using the figure's net. **MA.L4.GR.2b.2** Solve real-world problems involving surface area of right circular cylinders. **MA.L4.GR.2b.3** Solve mathematical and real-world problems involving volume of

	right circular cylinders.
MA.L4.GR.2c Understand similarity and congruence using models and transformations.	**MA.L4.GR.2c.1** Given a preimage and image generated by a single transformation, identify the transformation that describes the relationship. **MA.L4.GR.2c.2** Given a preimage and image generated by a single dilation, identify the scale factor that describes the relationship. **MA.L4.GR.2c.3** Describe and apply the effect of a single transformation on two-dimensional figures using coordinates and the coordinate plane. **MA.L4.GR.2c.4** Solve mathematical and real-world problems involving proportional relationships between similar triangles.
Data and Probability **MA.L1.DP (GE: 0.0 – 1.9)**	
MA.L1.DP.1 Collect, represent and interpret data using pictographs and tally marks.	**MA.L1.DP.1.1** Collect data into categories and represent the results using tally marks or pictographs. **MA.L1.DP.1.2** Interpret data represented with tally marks or pictographs by calculating the total number of data points and comparing the totals of different categories.
Data and Probability **MA.L2.DP (GE: 2.0 – 3.9)**	
MA.L2.DP.1 Collect, represent and interpret numerical and categorical data.	**MA.L2.DP.1.1** Collect and represent numerical and categorical data with whole-number values using tables, scaled pictographs, scaled bar graphs or line plots. Use appropriate titles, labels and units. **MA.L2.DP.1.2** Interpret data with whole-number values represented with tables, scaled pictographs, circle graphs, scaled bar graphs or line plots by solving one- and two-step problems.
Data and Probability **MA.L3.DP (GE: 4.0 – 5.9)**	
MA.L3.DP.1 Collect and represent data and find the mean, mode, median or range of a data set.	**MA.L3.DP.1.1** Develop an understanding of statistics and determine measures of center and measures of variability. **MA.L3.DP.1.2** Recognize and formulate a statistical question that would generate numerical data. **MA.L3.DP.1 3** Discuss a set of data collected to answer a statistical questions as a distribution which can be described by its center, spread and overall shape **MA.L3.DP.1.4** Collect and represent numerical data, including fractional and decimal values, using tables, stem-and-leaf plots, line plots or line graphs **MA.L3.DP.1.5** Create box plots and histograms to represent sets of numerical data within real world contexts. **MA.L3.DP.1.6** Given a real-world scenario, solve problems involving numerical data and determine and describe how changes in data values impact measures of center and variation.
Data and Probability **MA.L4.DP (GE: 6.0 – 8.9)**	

MA.L4.DP.1a Summarize statistical distributions graphically and numerically.	**MA.L4.DP.1a.1** Given a numerical data set within a real-world context, find and interpret mean, median, mode and range. **MA.L4.DP.1a.2** Given a box plot within a real-world context, determine the minimum, the lower quartile, the median, the upper quartile and the maximum. Use this summary of the data to describe the spread and distribution of the data. **MA.L4.DP.1a.3** Given a histogram or line plot within a real-world context, qualitatively describe and interpret the spread and distribution of the data, including any symmetry, skewness, gaps, clusters, outliers and the range.
MA.L4.DP.1b Represent and interpret numerical and categorical data.	**MA.L4.DP.1b.1** Interpret data and find the mean, mode, median or range of a data set. **MA.L4.DP.1b.2** Interpret numerical data, with whole-number values, represented with tables or line plots by determining the mean, mode, median or range. **MA.L4.DP.1b.3** Determine an appropriate measure of center or measure of variation to summarize numerical data, represented numerically or graphically, taking into consideration the context and any outliers. **MA.L4.DP.1b.4** Given two numerical or graphical representations of data, use the measure(s) of center and measure(s) of variability to make comparisons, interpret results and draw conclusions about the two populations. **MA.L4.DP.1b.5** Given categorical data from a random sample, use proportional relationships to make predictions about a population. **MA.L4.DP.1b.6** Use proportional reasoning to construct, display and interpret data in circle graphs. **MA.L4.DP.1b.6** Given a real-world numerical or categorical data set, choose and create an appropriate graphical representation.
MA.L4.DP.1c Represent and investigate numerical bivariate data.	**MA.L4.DP.1c.1** Given a set of real-world bivariate numerical data, construct a scatter plot or a line graph as appropriate for the context. **MA.L4.DP.1c.2** Given a scatter plot within a real-world context, describe patterns of association. **MA.L4.DP.1c.3** Given a scatter plot with a linear association, informally fit a straight line.
MA.L4.DP.2a Develop an understanding of probability. Find and compare experimental and theoretical probabilities.	**MA.L4.DP.2a.1** Determine the sample space for a simple experiment. **MA.L4.DP.2a.2** Given the probability of a chance event, interpret the likelihood of it occurring. Compare the probabilities of chance events. **MA.L4.DP.2a.3** Find the theoretical probability of an event related to a simple experiment. **MA.L4.DP.2a.4** Use a simulation of a simple experiment to find experimental probabilities and compare them to theoretical probabilities.
MA.L4.DP.2b Represent and find probabilities of repeated experiments.	**MA.L4.DP.2b.1** Determine the sample space for a repeated experiment. **MA.L4.DP.2b.2** Find the theoretical probability of an event related to a repeated experiment. **MA.L4.DP.2b.3** Solve real-world problems involving probabilities related to single or repeated experiments, including making predictions based on theoretical probability.