Illinois Community College Board
Adult Education & Literacy

Illinois ABE/ASE Mathematics Model Curriculum

NRS Level 2

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NRS Level 2 Math
Beginning Basic ABE (Grade Levels 2.0 – 3.9)

OPERATIONS AND ALGEBRAIC THINKING (OA)

2.OA.1 / 2.OA.2 / 2.OA.3 / 2.OA.4 / 2.OA.5 / 2.OA.6 / 2.OA.7 / 2.OA.8 / 2.OA.9 / 2.OA.10 / 2.OA.11 / 2.OA.12 / 2.OA.13

Essential Understandings:

- There are different problem solving structures that can be used to solve problems in multiple ways.
- Unknown quantities can be represented in different places in an equation/number model.
- Addition and subtraction can be represented on various models such as number lines, picture graphs, algebra tiles, and bar graphs.
- Word problems can be structured to require multi-step solutions.
- Fluency with all sums, differences, products, and quotients of two numbers (0-12).
- Even numbered objects can be modeled using pairs or rectangular arrays.
- The difference between even and odd numbers.
- Visual images and numerical patterns of multiplication and division can be used in problem-solving situations.
- The Properties of Operations will help in performing computations as well as in problem-solving situations (Distributive, Associative, Commutative, Identity, and Zero.)

Essential Questions:

- How does an equation represent an unknown quantity?
- How do visual representations depict and help solve addition, subtraction, multiplication, and division problems?
- How does fluency with basic sums, differences, products, and quotients help in problem solving situations?
- What are efficient methods for finding sums and differences using even and odd properties of numbers?
- How do multiples and factors relate to multiplication and division?
- How can inverse operations be used to solve problems?
- How can the reasonableness of a solution be evaluated?
- How can arithmetic patterns be used to help find solutions to problems?
- What are some of the rules or properties of whole numbers?

NRS Level 2 Math
Beginning Basic ABE (Grade Levels 2.0 – 3.9)

Student will be able to:
(What does mastery look like)

- Solve one- and two-step word problems by adding and subtracting within 100 involving situations of adding to, taking from, putting together, taking apart, and comparing, and solve these problems with unknowns in the start, change, and results positions.
- Use mental strategies to add and subtract fluently within 20, having memorized all sums of two one-digit numbers.
- Decide if a group of objects up to 20 is odd or even, and show an equation in which equal addends result in even number sums.
- Find the total number of objects arranged in rectangular arrays (up to 5 by 5) by using repeated addition, and write an equation to represent the repeated addition.
- Interpret products of whole numbers as the total number of objects in “so many” groups of “so many” objects each.
- Demonstrate understanding of whole-number quotients of whole numbers by describing the number of objects in each share or as a number of equal shares.
- Multiply and divide for word problems within 100 using equal groups, arrays, and measurement quantities.
- Solve for the unknown whole numbers in all positions (start, change, result) for multiplication and division problems.
- Apply commutative, associative and distributive properties of operations to multiply and divide, though students need not use formal terms for these properties.
- Relate multiplication to division by solving division problems as unknown factor multiplication problems.
- Apply a variety of strategies to multiply and divide fluently within 100, having memorized all sums of two one-digit numbers.
- Solve two-step word problems (limited to whole numbers) using the four operations and represent the word problems as equations with letters representing unknowns, determining reasonableness of answers using mental computation and estimations such as rounding.
- Identify and explain arithmetic patterns using the properties within all four operations.

Evidence for Assessing Learning

Performance Tasks:
Demonstrate mastery of objectives through the assessment of graded homework, worksheets, quantitative (numerically graded) rubrics, quizzes, tests, and other formal assessments. Including but not limited to:

- Using manipulatives such as number beads and chains to demonstrate solving for operations formally assessed by teacher using rubric
- Project-based group work with teacher rubric assessment of process and product.

- Creating/solving level-appropriate word problems in meaningful, real-world contexts using word problem prompts and/or authentic real-life materials/situations for formal assessment with rubric.
- Using teacher-made worksheets

Other Evidence:

- Interactive math journals
- Informal teacher observation
- Exit tickets
- Monitoring group work and student discussions
- Student self-assessment
- Student portfolio
- Student demonstrations or presentations
- Project-based learning
- Simulations

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

- Snake Game using beads for addition and subtraction practice and memorization
- Addition, Subtraction, Multiplication and Division manipulative boards and charts to facilitate fact memorization
- Manipulative Bead Bars to show multiples of 1 to 10, to show relationship between multiplication and division, and to use with operation symbols tickets and cut-out parentheses in order to show commutative, associative and distributive properties of multiplication
- Manipulative Racks/Tubes Division Board (for Unit Divisor only) and Math U See Base Ten Materials to show distributive division/sharing out principle
- Manipulative Tiles Game to show group division
- Hundreds Board and Pythagoras/Multiples Boards to facilitate memorization of addition and multiplication facts and to see patterns in addition and multiplication tables.
- paper, pencil, colored pencils to draw out problems and equations
- Textbooks & workbooks (Contemporary/McGraw Hill Materials: *Achieving TABE Success in Math, Level E, Number Power 1, Number Sense 1 & 2*)

- Word problem cards with/without authentic materials for solving real life problems and simulations such as the following:
  - carrying out a stock inventory
  - checking grocery receipt against purchases
  - estimating the bill at a restaurant
  - telling which side of a street a house will be on from its number
  - finding out how many chairs are needed for a meeting
  - determining how many pieces of pie you will have with multiple pies
  - splitting a restaurant bill (check) into equal parts for 2, 3, 4, 5 or more people
  - determining the total amount of money when each person pays an equal fee
  - calculating total number (e.g., three days a week for four weeks)
  - working out how many cars are needed to transport a group of people
  - dividing work time for employees
  - estimating amount of purchase to nearest 10 dollars
  - estimating distances between cities
  - giving ballpark figures for numbers in a crowd
  - laying tile on a floor.

Learning Activities:
(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)

- One-to-one tutors
- Pair up for peer-teaching
- Universal Design for Learning: this is not an activity itself, but all activities can be designed for broader or "universal" access. The 3 components of UDL include:
  - Multiple representations of information such as text and numbers read aloud by a computer, captions on video, text accompanying audio, verbal descriptions of pictures, drawings and models, and using video, animation or other educational technology to convey concepts.
  - Multiple representations of expression such as students being able to record oral speech (to text or not), drawing, dramatic presentations, songs/raps.
  - Varied options of engagement enabling students as well as teachers to select for or reframe elements of content/context/procedures, challenge level, and supports including modifications and accommodations such as additional time, enlarged print, text-to-speech apps, bilingual dictionary, etc.

- Interactive technologies assigned by instructor to support instruction for the purpose of additional and varied practice opportunities on targeted skills

List of Instructional Materials:

- Manipulatives: Bead Box 1-10 along with number tickets, operations tickets, parenthesis tickets
- Manipulative Addition/Subtraction/Multiplication/Division Boards (variations & controls) and charts
- Manipulative Base Ten (Math U See) Material
- Manipulative Racks/Tubes Board
- Hundreds and Pythagoras Boards
- Graph paper and pencil/eraser/colored pencils
- Word problem cards

List of Technology Resources:

- Khan Academy -- http://khanacademy.org/
- CK-12 - https://flexbooks.ck12.org/pages/adult-education/#adult-basic-education

NUMBERS AND OPERATIONS IN BASE TEN (NBT)

2.NBT.1 / 2.NBT.2 / 2.NBT.3 / 2.NBT.4 / 2.NBT.5 / 2.NBT.6 / 2.NBT.7 / 2.NBT.8 / 2.NBT.9 / 2.NBT.10 / 2.NBT.11

Essential Understandings:

- Numbers are composed of other numbers.
- Numbers can represent quantity, position, location and relationships.
- Place value is based on groups of ten.
- Flexible methods of computation involve grouping numbers in strategic ways.
- There are different problem solving structures that can be used to solve problems in multiple ways.
- Strategies based on place value and properties of operations can be used to represent the product of one digit whole numbers by multiples of 10 (in the range of 10-90).

Essential Questions:

- How can numbers be expressed, ordered and compared?

- How does the position of a digit in a number affect its value?
- In what ways can numbers be composed and decomposed using addition, subtraction and multiplication?
- What are efficient methods for finding sums and differences?

Student will be able to:
(what does mastery look like)

- Represent three digit numbers as amounts of hundreds, tens, and in a variety of ways, including representing 100 as a bundle of 10 tens, and representing 100, 200, 300, 400, 500, 600, 700, 800 and 900 as the appropriate number of hundreds.
- Demonstrate comprehension of place value by skip-counting by 5s, 10s, and 100s within 1000.
- In standard, expanded, and number name form, read and write numbers to 1000.
- Compare two three-digit numbers based on place value of each digit, using comparison symbols >, <, and =.
- Using strategies of place value and properties of operations, add up to four two-digit numbers.
- Add and subtract within 1000 using models, drawings, operation properties and/or the relationship between addition and subtraction using base 10 strategies, relating the chosen strategy to a written method.
- Mentally add or subtract 10 or 100 to or from a given number 100-900.
- Demonstrate how addition and subtraction strategies work by applying knowledge of place value and the properties of operations using concrete objects, pictures and words.
- Round whole numbers to the nearest 10 or 100 to demonstrate knowledge of place value.
- Add and subtract fluently within 1000 using strategies related to place value, operations properties, and the relationship between addition and subtraction.
- Apply strategies of place value and operations property by multiplying one-digit whole numbers by multiples of 10 in the 10-90 range.

Evidence for Assessing Learning

Performance Tasks:
Demonstrate mastery of objectives through the assessment of graded homework, worksheets, quantitative (numerically graded) rubrics, quizzes, tests, and other formal assessments. Including but not limited to:

- Using math manipulatives such as Math U See Base Ten materials to demonstrate concept recognition and solving for operations formally assessed by teacher using rubric
- Project-based group work with teacher rubric assessment of process and product

- Creating/solving level-appropriate word problems in meaningful, real-world contexts using word problem prompts and/or authentic real life materials/situations for formal assessment with rubric

Other Evidence:

- Interactive math journals
- Informal teacher observation
- Exit tickets
- Monitoring group work and student discussions
- Student self-assessment
- Student portfolio
- Student demonstrations or presentations
- Project-based learning
- Simulations

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

- Use manipulatives such as Math U See Base Ten materials along with color-coded decimal hierarchy number cards to work on quantities 1-1000, numeric representation of quantities, and association and synthesis of quantity to symbol, to add/subtract, including materials to demonstrate composing/decomposing of numbers by place value in doing operations.
- Manipulative long bead chain up to 1000, used with number tickets to practice skip counting.
- Bead frame/abacus designed for decimal categories along with bead frame paper to work more symbolically on place value in adding, subtracting and multiplying up to thousands place value, including decomposing and exchanging numbers by decimal categories in performing addition, subtraction and multiplication operations.
- Activities and exercises in textbooks: *Achieving TABE Success in Math Level E*, *Number Power 1*, and *Number Sense Whole Numbers: Addition and Subtraction*
- Word problem cards with/without authentic materials for solving real life problems and simulations such as the following:
    - exchanging money into small bills or coins
    - reading graphs accurately
    - writing a rent or tuition check

- balancing a checkbook
- finding amount of money remaining after shopping at different places
- determining the new temperature for baking with recipe changes

Learning Activities*:*
(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)

- One-to-one tutors
- Pair up for peer-teaching
- Universal Design for Learning: this is not an activity itself, but all activities can be designed for broader or "universal" access. The 3 components of UDL include:
  - Multiple representations of information such as text and numbers read aloud by a computer, captions on video, text accompanying audio, verbal descriptions of pictures, drawings and models, and using video, animation or other educational technology to convey concepts.
  - Multiple representations of expression such as students being able to record oral speech (to text or not), drawing, dramatic presentations, songs/raps.
  - Varied options of engagement enabling students as well as teachers to select for or reframe elements of content/context/procedures, challenge level, and supports including modifications and accommodations such as additional time, enlarged print, text-to-speech apps, bilingual dictionary, etc.
- Interactive technologies assigned by instructor to support instruction for the purpose of additional and varied practice opportunities on targeted skills.

List of Instructional Materials:

- Base Ten Math U See materials (ones/tens/hundreds/thousands)
- Decimal hierarchical number cards (ones/tens/hundreds/thousands) color-coded
- Long Bead Chain (1000) with number tickets for skip counting by 5s, 10s, 100s
- Bead Frame/abacus with ten beads per wire strand representing ones/tens/hundreds/thousands decimal categories along with corresponding Bead Frame paper
- Word problem cards
- authentic materials from real world (e.g., checkbooks, receipts)
- graph paper/pencil (to assist with alignment of categories in operations and in expanded notation of numbers)

List of Technology Resources:

- Khan Academy -- http://khanacademy.org/
- Greg Tang Math -- www.gregtangmath.com
- CK-12 - https://flexbooks.ck12.org/pages/adult-education/#adult-basic-education

NUMBERS AND OPERATIONS IN FRACTIONS (NF)

2.NF.1 / 2.NF.2 / 2.NF.3

Essential Understandings:

- The size of the fractional part is relative to the size of the whole.
- Fractions are quantities where a whole is divided into equal-sized parts and can be represented by models (such as, rulers, manipulatives, words, and/or number lines, etc.)
- Fractions can be used as a tool to understand and model quantities and relationships.
- Fractions are composed of unit fractions.
- Fractions that represent equal-sized quantities are equivalent.
- Two fractions with the same numerator represent the same number of parts.
- Two fractions with the same denominator represent the same number of parts of the whole.
- Whole numbers can be represented as a fraction such as 3 = 3/1. or any fraction whose numerator and denominator are the same is equal to 1, such as, 4/4 = 1.

Essential Questions:

- What do fractions represent?
- What makes fractions equivalent?
- What is the relationship between two fractions with the same numerator or two fractions with the same denominator?

Student will be able to:
(what does mastery look like)

- Demonstrate understanding that a fraction represents a part of a whole.
- Demonstrate understanding of fractions by representing them on a number line.
- Compare fractions with respect to equivalency by reasoning about their size, considering fractions that are on the same point on a number line and fractions with the same numerator or denominator.
- Demonstrate understanding of fractions by writing equivalent fractions and explaining why they are equal with a visual model, and by expressing whole numbers as fractions.

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Evidence for Assessing Learning

Performance Tasks:
Demonstrate mastery of objectives through the assessment of graded homework, worksheets, quantitative (numerically graded) rubrics, quizzes, tests, and other formal assessments. Including but not limited to:

- Create a graphic representation of a fraction
- Use correct mathematical symbols to compare fractions
- group work/monitoring conversations during group work with rubric
- Using manipulatives – watching students as they work and formally assessing with rubric

Other Evidence:

- Interactive math journals
- Informal teacher observation
- Exit tickets
- Monitoring group work and student discussions
- Student self-assessment
- Student portfolio
- Student demonstrations or presentations
- Project-based learning
- Simulations

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

- Fraction packets
- Hershey Bars
- Groups with recipes, mix up the measuring cups & spoons – then mix up the equipment (students have to figure out equivalencies)
- manipulative fraction circles from one whole to tenths, with tickets for labeling
- Textbooks & workbooks (Contemporary/McGraw Hill Materials: *Achieving TABE Success in Math Level E, Number Power 2, Number Sense Fractions: The Meaning of Fractions*)

- Word problem cards with/without authentic materials for solving real life problems and simulations.

Learning Activities:
(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)

- One-to-one tutors
- Pair up for peer-teaching
- Universal Design for Learning: this is not an activity itself, but all activities can be designed for broader or "universal" access. The 3 components of UDL include:
  - Multiple representations of information such as text and numbers read aloud by a computer, captions on video, text accompanying audio, verbal descriptions of pictures, drawings and models, and using video, animation or other educational technology to convey concepts.
  - Multiple representations of expression such as students being able to record oral speech (to text or not), drawing, dramatic presentations, songs/raps.
  - Varied options of engagement enabling students as well as teachers to select for or reframe elements of content/context/procedures, challenge level, and supports including modifications and accommodations such as additional time, enlarged print, text-to-speech apps, bilingual dictionary, etc.
- Interactive technologies assigned by instructor to support instruction for the purpose of additional and varied practice opportunities on targeted skills

List of Instructional Materials:

- Manipulative fraction circles with tickets for fraction sections
- Worksheets to use for finding fraction equivalencies
- Other manipulatives such as Hershey bars
- Measuring cups/spoons for use in recipes calling for fraction of 1 cup of ingredients
- Money (quarter is 1/4 a dollar, etc.)

List of Technology Resources:

- Khan Academy -- http://khanacademy.org/
- Greg Tang Math -- www.gregtangmath.com
- CK-12 - https://flexbooks.ck12.org/pages/adult-education/#adult-basic-education

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MEASUREMENT AND DATA (MD)

2.MD.1 / 2.MD.2 / 2.MD.3 / 2.MD.4 / 2.MD.5 / 2.MD.6 / 2.MD.7 / 2.MD.8 / 2.MD.9 / 2.MD.10 / 2.MD.11 / 2.MD.12 / 2.MD.13 / 2.MD.14 / 2.MD.15 / 2.MD.16

Essential Understandings:

- There is a relationship between estimation and measurement.
- Measurement is a way to describe and compare objects or ideas.
- A specific process or tool (i.e., a metric or standard ruler) can be used to measure attributes of unit length.
- Metric measurement units are related to place value concepts/multiples of 10.
- A number line is used to represent measurement attributes such as, distance and quantity.
- Currency has different values and is counted according to its values.
- Standard units provide common language for communicating time.
- Equivalent periods of units are used to measure time.
- Information can be represented in scaled bar and picture graph form. These graphs can be used to help solve one and two- step math problems.
- Elapsed time is the interval of time, given a specific unit, from a starting time to an ending time.
- Perimeter and addition are related.
- A linear unit is used to measure perimeter.
- Everyday objects have a variety of attributes, each of which can be measured in many ways.
- Area can be a function of addition as well as multiplication.
- Perimeter and area are related.
- Modeling (tiling) multiplication and decomposing problems based upon their problem-solving structure can help in finding solutions.
- The mass (two-dimensional figures) and volume (three-dimensional figures) of a substance or solid can be measured and expressed in terms of standard units (square or cubic units).

Essential Questions:

- When is it appropriate to estimate and when is it appropriate to provide an exact answer?
- What properties or attributes can be measured?
- How are attributes measured (unit, tool, and process)?

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- How can accurate measurements solve problems and make sense of the world?
- How does monetary value affect how money is counted?
- How do units within a system relate to each another?
- How are various representations of time related?
- How can understanding the relationship between addition and subtraction aid in problem solving?
- How can data represented in scaled bar and picture graphs be useful in the real world?
- What conclusions can be made about elapsed time and its usefulness?
- How can understanding the relationship between addition and area aid in problem solving?
- How can modeling multiplication and decomposing problems help in finding their solutions?
- What is the relationship between area and addition/multiplication?
- How does metric measurement connect to multiples of 10?
- How does volume or mass of a three-dimensional figure differ from the area of a two-dimensional figure? (Describe in terms of units and/or attributes of each figure.)

Student will be able to:
(what does mastery look like)

- Choose and use an appropriate tool to measure the length of an object.
- Measure the length of an object twice using two different standard units of measure and describe the relationship between the size of the units and the object.
- Correctly estimate lengths by imperial (inches/feet) and metric systems (centimeters/meters).
- Compare objects side by side and measure the difference, expressing the difference in length in terms of a standard unit.
- Solve addition and subtraction word problems for lengths within 100 given in the same unit measure, using drawings and equations, and solving for an unknown number.
- Demonstrate understanding of length by representing whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to positive numbers and by representing whole-number sums and differences within 100 on a number line.
- Identify and write time using analog and digital clocks to the nearest five minutes, correctly identifying a.m. and p.m.
- Demonstrate knowledge of money by solving word problems involving dollars and cents, using the $ and ¢ symbols correctly.

- Draw and label a scaled picture graph and a scaled bar graph to represent a data set, and use that information to solve one- and two-step "*how many more*" and "*how many less*" problems.
- Measure objects using rulers marked with halves and fourths of an inch to generate a data set, and then represent that data using a line plot marked by wholes, halves and fourths of inches.
- Demonstrate understanding of time by telling and writing time and time intervals to the nearest minute, and solve addition and subtraction word problems regarding time intervals in minutes.
- Demonstrate understanding of volume and mass by measuring and estimating liquid volumes and masses of objects in standard units of grams (g), kilograms (kg), and liters (l), and solving one-step word problems involving masses or volumes given in the same units (e.g., drawings such as a beaker with a measurement scale).
- Identify and describe square units and explain how square units are used to determine the area of a plane figure.
- Count standard square units (square cm, m, in, ft) to find the area.
- Demonstrate understanding of the relationship between area and the operations of multiplication and addition by tiling in square units the area of a rectangle and showing that same units squared can be found by multiplying the side lengths (base x height).
- Demonstrate understanding of the relationship between area and the operations of multiplication and addition by multiplying the side lengths of rectangles to find the area in real world problems.
- Demonstrate understanding of the relationship between area and the operations of multiplication and addition by 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, using area models to represent the distributive property.
- Demonstrate understanding of the relationship between area and the operations of multiplication and addition by finding areas of non-overlapping rectangles by decomposing those figures into rectangles to solve for area.
- Apply understanding of perimeter by solving real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding for an unknown side length, and comparing rectangles with the same perimeters/different areas and different perimeters/same areas.

Evidence for Assessing Learning

Performance Tasks:
Demonstrate mastery of objectives through the assessment of graded homework, worksheets, quantitative (numerically graded) rubrics, quizzes, tests, and other formal assessments. Including but not limited to:

- Create graphic/figure representation of measurement (plotting/operations/conversions)

- Facilitating group work/monitoring conversations during group work
- Using manipulatives – watching students as they work
- Project-based learning--completion of project

Other Evidence:

- Interactive math journals
- Informal teacher observation
- Exit tickets
- Monitoring group work and student discussions
- Student self-assessment
- Student portfolio
- Student demonstrations or presentations
- Project-based learning
- Simulations

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

- Measure aspects of the environment (wall, hallway, table, etc.) with a stick cut to a meter length but unmarked to draw attention to the concept of unit measures and approximation and beginning estimation, and then switch to a standard meter stick with centimeters marked off to as intro to standard measures, including precise measurement to nearest cm, inch, 1/4 inch, etc.
- Use and compare different measures (metric and imperial systems as well as different units of measurement within those systems, such as inches/feet) for measuring the same object. Can create a game, such as, "I'm thinking of an object that is around 2 m. long. How many feet?"
- Use and compare the same unit of measurement to measure for different objects. Can play I Spy game such as, "I'm thinking of an object in this room that is approximately 3 feet long. What is it?"
- Create graphic representations of for plotting/adding/subtracting the measurement for objects.
- Project-based learning (build a table, build a scale model) using measurement.
- Geometric solids/models for measuring volume
- Teacher-made Area Material manipulative made from 1-inch square graph paper cut into rectilinear figures to show the decomposing of rectilinear figures into

rectangles with non-overlapping unit squares to find area, then applying to real world situations (ex: find area of non-rectangular rooms to find area for laying carpet)

- Manipulative polygon materials to find perimeters and area and relationships/differences
- Personal timelines (day or week) to read write time and measure time intervals in daily/weekly routine
- Use play money for manipulatives in doing operations with dollars and cents
- Textbooks & workbooks (Contemporary/McGraw Hill Materials: *Achieving TABE Success in Math Level E, Number Power 1, 2, 3, 4,*)
- Word problem cards with/without authentic materials for solving real life problems and simulations such as the following:
  - measuring a room for carpet
  - sorting by size
  - hanging a picture or an award on the wall
  - deciding whether a sheet of wall paper is long enough for a wall
  - model drawings
  - computing hours worked or to pay a babysitter
  - checking bus schedules in a.m. and p.m.
  - following a recipe
  - buying carpeting, tiles or wallpaper
  - figuring the amount of molding needed around a window

Learning Activities:
(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)

- One-to-one tutors
- Pair up for peer-teaching
- Universal Design for Learning: this is not an activity itself, but all activities can be designed for broader or "universal" access. The 3 components of UDL include:
  - Multiple representations of information such as text and numbers read aloud by a computer, captions on video, text accompanying audio, verbal descriptions of pictures, drawings and models, and using video, animation or other educational technology to convey concepts.
  - Multiple representations of expression such as students being able to record oral speech (to text or not), drawing, dramatic presentations, songs/raps.

  - Varied options of engagement enabling students as well as teachers to select for or reframe elements of content/context/procedures, challenge level, and supports including modifications and accommodations such as additional time, enlarged print, text-to-speech apps, bilingual dictionary, etc.
- Interactive technologies assigned by instructor to support instruction for the purpose of additional and varied practice opportunities on targeted skills.

List of Instructional Materials:

- Rulers, meter sticks, yard sticks
- Measuring cups and spoons for cooking projects and measuring volume
- Manipulative Area Material made from 1-inch square graph paper
- Polygon Manipulative Material
- Geometric Solids
- Graph paper, pencil
- Authentic/real life materials and objects for project-based learning (make a planter box!)
- Play money
- Adding paper for making personal timelines
- "Judy" clocks with moving gears
- Word problem cards with/without objects/images to solve for real life problems

List of Technology Resources:

- Khan Academy -- http://khanacademy.org/
- CK-12 - https://flexbooks.ck12.org/pages/adult-education/#adult-basic-education

GEOMETRY (G)

2.G.1 / 2.G.2 / 2.G.3 / 2.G.4 / 2.G.5

Essential Understandings:

- Any geometric figure can be composed or decomposed from/into other figures whose areas are the sum of its parts.
- Some objects can be described and compared using their geometric attributes (which may be fractional components).

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Beginning Basic ABE (Grade Levels 2.0 – 3.9)

Essential Questions:

- How can the attributes of any geometric figure be composed or decomposed to represent or model the sum of its parts?
- What is the significance of composing or decomposing a geometric figure into the sum of its parts?
- How can plane (two-dimensional) and solid (three-dimensional) shapes be described?

Student will be able to:
(what does mastery look like)

- Name and draw shapes with specified attributes, such as triangles, quadrilaterals, pentagons, hexagons, and cubes, comparing sizes directly or visually as opposed to measuring.
- Section a rectangle into same size squares creating rows and columns and count the number of tiles to determine the total number of squares in the rectangle.
- Section circles and rectangles into two, three, or four equal parts, describing the parts as halves, thirds, and fourths and identifying the combinations of the whole as two halves, three thirds, etc., recognizing that equal sized sections of identical wholes need not have the same shape.
- Compare and contrast shapes in different categories that share attributes and belong to a larger category (e.g., quadrilaterals), and identify and draw examples of more complex quadrilaterals that do not belong to one of a subcategory such as squares, rectangles, or rhombuses.
- Divide shapes into sections with equal areas and write the area of each part as a unit fraction of the whole.

Evidence for Assessing Learning

Performance Tasks:
Demonstrate mastery of objectives through the assessment of graded homework, worksheets, quantitative (numerically graded) rubrics, quizzes, tests, and other formal assessments. Including but not limited to:

- Using manipulatives to demonstrate solving for operations formally assessed by teacher using rubric
- Project-based group work with teacher rubric assessment of process and product.
- Creating/solving level-appropriate word problems in meaningful, real-world contexts using word problem prompts and/or authentic real life materials/situations for formal assessment with rubric.
- Create a graphic/figure representation geometric concepts

Other Evidence:

- Interactive math journals
- Informal teacher observation
- Exit tickets
- Monitoring group work and student discussions
- Student self-assessment
- Student portfolio
- Student demonstrations or presentations
- Project-based learning
- Simulations

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

- Use manipulative Geometry Sticks and Constructive Triangles materials to construct shapes with specific attributes and how shared attributes of different shapes can define a larger category.
- Use Geometry plane figures manipulatives and Geometry Solids (three-dimensional figures such as cubes) to identify shapes with specific attributes.
- Use teacher-made Area Material made from 1-inch graph paper to partition rectangular shapes into equal shares by row/columns (leads to understanding relationship between unit squares and area--see measurement activities above)
- Manipulative Fraction Circles and Equivalency Materials to understand concepts of the whole as two halves, three thirds, etc. and to grasp concept that equal shares of equivalent whole may not have the same shapes.
- Geometry Nomenclature materials to demonstrate and research the varieties of shapes in broader categories such as "quadrilaterals". These include matching image, Tier 3 terminology, and definition, and includes a control of error sheet to check work.
- Graph paper/pencil/colored pencils/protractor/ruler/geometry compass/origami/clay for drawing and forming own figures for exploration of level appropriate geometry concepts.
- Textbooks & workbooks (Contemporary/McGraw Hill Materials: *Achieving TABE Success in Math Level E, Number Power 4: Geometry*)
- Word problem cards with/without authentic materials for solving real life problems and simulations such as the following:

- creating a pattern for laying tiles
- making flash cards
- cutting a pie or cake into equal parts
- drawing and sculpting objects with clay
- splitting a pizza or pie into equal slices

Learning Activities:
(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)

- One-to-one tutors
- Pair up for peer-teaching
- Change the frame of reference (objects, images, art and architecture in classroom or on field trip viewed geometrically)
- Universal Design for Learning: this is not an activity itself, but all activities can be designed for broader or "universal" access. The 3 components of UDL include:
  - Multiple representations of information such as text and numbers read aloud by a computer, captions on video, text accompanying audio, verbal descriptions of pictures, drawings and models, and using video, animation or other educational technology to convey concepts.
  - Multiple representations of expression such as students being able to record oral speech (to text or not), drawing, dramatic presentations, songs/raps.
  - Varied options of engagement enabling students as well as teachers to select for or reframe elements of content/context/procedures, challenge level, and supports including modifications and accommodations such as additional time, enlarged print, text-to-speech apps, bilingual dictionary, etc.
- Interactive technologies assigned by instructor to support instruction for the purpose of additional and varied practice opportunities on targeted skills.

List of Instructional Materials:

- Geometry manipulative materials including Geometry Sticks, Constructive Triangles, Geometry shapes for plane figures (2D) and solid figures (3D) Fraction Circles, Equivalency Materials, Geometry Nomenclature Materials and Geometry Charts.
- Graph paper/pencil/colored pencils/protractor/ruler/geometry compass/origami/clay
- Word problem cards with/without authentic materials for solving real life problems and simulations.

NRS Level 2 Math
Beginning Basic ABE (Grade Levels 2.0 – 3.9)

List of Technology Resources:

- Khan Academy -- http://khanacademy.org/
- Greg Tang Math -- www.gregtangmath.com
- CK-12 - https://flexbooks.ck12.org/pages/adult-education/#adult-basic-education