

Illinois Community College Board  
Adult Education & Literacy

**Illinois ABE/ASE  
Mathematics  
Curriculum  
Components  
NRS Level 3**

April 2017

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## NRS Math Level 3

### Low-Intermediate Basic Education (Grade Levels 4.0-5.9)

#### OPERATIONS AND ALGEBRAIC THINKING (OA)

3. OA.1 / 3.OA.2 / 3.OA.3 / 3.OA.4 / 3.OA.5 / 3.OA.6 / 3.OA.7 / 3.OA.8

#### Essential Understandings:

- Flexible methods of computation involve grouping numbers in strategic ways.
- The distributive property is connected to the area model and/or partial products method of multiplication.
- Some division situations will produce a remainder, but the remainder should always be less than the divisor. If the remainder is greater than the divisor, that means at least one more can be given to each group (fair sharing) or at least one more group of the given size (the dividend) may be created. When using division to solve word problems, how the remainder is interpreted depends on the problem situation.
- Number or shape patterns are generated by following a given rule.
- The four operations (addition, subtraction, multiplication, and division) are interconnected.
- Parentheses, brackets, and braces are used to guide the order of operations when simplifying expressions.
- A standard algorithm is used to fluently multiply multi-digit whole numbers.
- A variety of different strategies can be used to multiply and divide multi-digit numbers including: visual models (rectangular array, equations, and/or area model).
- Strategies for multiplication and division are based on place value, the properties of operations, and/or the relationship between multiplication and division (approaching problems with unknown product of quotient, group size unknown and number of groups unknown).

#### Essential Questions:

- How do I determine the factors of a number?
- What is the difference between a prime and composite number?
- How are multiplication and division related to each other?
- What are efficient methods for finding products and quotients, and how can place value properties aid computation?
- How are dividends, divisors, quotients, and remainders related?
- How are the four operations of addition, subtraction, multiplication and division used in multi-step word problems? (How can these operations be used to assess the reasonableness of a solution?)
- How can a remainder be interpreted with respect to the answer in a division word problem? (Is the solution reasonable?)
- How do parentheses, brackets, and braces affect the way expressions are simplified or evaluated?
- When are different strategies appropriate to use when multiplying and/or dividing multi-digit numbers?
- What strategies can be used to find rules for patterns and what predictions can the pattern support?

#### Student will be able to:

*(What does mastery look like?)*

- Interpret and represent verbal statements of multiplicative comparisons as equations.

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- Solve multiplicative comparison word problems, choosing the operations of division and multiplication (as distinguished from additive comparison), using pictures or variables for the unknown.
- Answer multi-step problems with whole numbers using the four operations to solve for a variable (unknown quantity) and assessing the reasonableness of the solution obtained.
- Identify and find all factor pairs for a whole number, recognize multiples of whole numbers, and identify a given whole number as prime or composite in the range 1-100.
- Outline a number or shape pattern, analyze and explain features of the pattern, and identify features of the pattern that are not apparent in the rule itself.
- Write numerical expressions that contain parentheses, brackets, or braces and solve expressions containing them.
- Construct basic numerical expressions with the four operations and interpret them without evaluating them.
- Write two different basic numerical patterns using two different rules.
- Create ordered pairs using corresponding terms from the number patterns, identify the relationship between the corresponding terms, and graph the ordered pairs on a coordinate plane.

#### **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 teacher made worksheets-graded.
- Use teacher made quizzes/exams.
- Steck-Vaughn and McGraw-Hill's Unit Reviews and/or exercises as quizzes and chapter tests. (see below)
- Math journals-graded entries
- Discuss a variety of ways to solve multistep problems.

##### **Other Evidence:**

- Question and answer sessions.
- Facilitate group work with teacher monitoring.

#### **Building the Learning Plan**

##### **Sample Classroom Activities and/or Lesson Plans:**

- Demonstrate and practice partitioning strategies for multiplication.
- Discuss and discover invented strategies for solving multiplication and finding reasonable solutions.
- The Frayer Model (visual organizer) Demonstrate and practice.
- Artistic illustrations of different shape patterns
- Creating cue cards for various types of math problems
- Practice factoring whole numbers
- Practice using parenthesis, brackets and braces in mathematical expressions and solving expressions containing them with teacher-generated examples.

##### **Learning Activities:**

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***(Interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)***

- (interactive technology) Plato Learning Technology
- One-to-one intervention
- Peer tutoring
- Think out loud (demonstrate how to think about a problem)
- Additional practice with concepts and procedures in different contexts
- Universal Design for Learning protocols such as additional time, modified lesson for disabilities (i.e., enlarged print, drills, flashcards and games)

#### **List of Instructional Materials:**

- Algebra Tiles
- Grid paper
- Math blocks
- Area models, such as rectangles filled with base-ten pieces
- Flash cards
- Pictorial representations
- Teacher-generated worksheets
- *Number Sense: Fractions -The Meaning of Fractions.* (2003). McGraw-Hill/Contemporary.
- *Math Skills for the Workforce: Fractions.* (1997). Steck Vaughn.
- *Math Skills for the Workforce: Whole Numbers.* (1997). Steck Vaughn.
- *Achieving TABE Success in Mathematics Level M.* (2005). McGraw Hill.

#### **List of Technology Resources:**

- Khan Academy— <http://khanacademy.org>
- Live Binders— <http://www.livebinders.com/shelf/my>
- Super Teacher— <https://superteachertools.net/>
- Cool Math – [www.coolmath.com/](http://www.coolmath.com/)
- Blank Frayer Model for math journals--- <http://3.bp.blogspot.com/>
- Plato Learning Technology
- Test Prep Review- TABE Online Course
- [http://www.testprepreview.com/tabe\\_practice.htm](http://www.testprepreview.com/tabe_practice.htm) (practice questions-printable)
- <http://www.testprepreview.com/tabelinks.htm> (Skill improvement Links)

### **NUMBER AND OPERATIONS IN BASE TEN (NBT)**

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

#### **Essential Understandings:**

- The place value of whole and decimal numbers is based on groups of ten and the value of a number is determined by the place of its digits.
- The standard algorithm for addition and subtraction relies on adding or subtracting like base-ten units.
- Whole numbers are read from left to right using the name of the period; commas are used to separate periods.
- A whole or decimal number can be written using its name, standard, or expanded form and can be compared to other whole or decimal numbers using greater than, less than or equal to symbols.

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### Low-Intermediate Basic Education (Grade Levels 4.0-5.9)

- Flexible methods of computation involve grouping numbers in strategic ways.
- Multiplication and division are inverse operations.
- The four operations are interconnected.
- In a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and  $1/10$  of what it represents in the place to its left.
- Multiplying by a power of 10 shifts the digits of a whole number or decimal that many places to the left. The exponent not only indicates how many places the decimal point is moving but also that you are multiplying or making the number 10 times greater, three times when you multiply by  $10^3$  (e.g.  $3.4 \times 10^3 = 3.4 \times (10 \times 10 \times 10) = 3.4 \times 1,000 = 3,400$ .)

#### Essential Questions:

- How does the position of a digit in a number affect its value, and how can the value of digits be used to compare two numbers?
- In what ways can numbers be composed and decomposed?
- How are the four basic operations related to one another?
- How does understanding place value help you solve multi-digit addition and subtraction problems and how can rounding be used to estimate answers to problems?
- What occurs when whole numbers and decimals are multiplied by 10 or powers of 10?
- Using less than, greater than, or equal to symbols, how can whole and decimal numbers (with like or unlike forms) be compared?

#### Student will be able to:

*(What does mastery look like?)*

- Classify place values in a multi-digit whole number (e.g., identify multiples of ten in place value).
- Interpret and express multi-digit whole numbers using base-tens, mathematical names, and expanded notation, and identify and use appropriate math symbols such as  $<$ ,  $>$ ,  $=$  to compare two multi-digit numbers.
- Round multi-digit whole numbers to any place.
- Compute addition and subtraction problems with multi-digit numbers using the standard algorithm.
- Use place value understanding and properties of operations to multiply a whole number of four or fewer digits by a one-digit number and to multiply two two-digit numbers, using area models, rectangular arrays, or equations to illustrate and explain the calculation.
- Use place value understanding, properties of operations, and/or the relationship between multiplication and division to find quotients and remainders with up to four digit dividends and one-digit divisors, using area models, rectangular arrays, or equations to illustrate and explain the calculation.
- Demonstrate understanding of place value by recognizing and indicating that a number in one place is ten times greater than it would represent in the place to the right or that the same number is one tenth of the value of place on the left.
- Determine patterns in the number of zeroes in a product as well as the placement of decimals when multiplying or dividing by a power of ten.
- Identify, read, write, and compare decimals to the thousandths.
- Identify, read, and write decimals to thousandths using appropriate base-ten numerals, math names, and expanded forms.

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### **Low-Intermediate Basic Education (Grade Levels 4.0-5.9)**

- Use the symbols  $<$ ,  $>$ , and  $=$  to compare two decimals to thousandths and appropriately express place value.
- Round decimals to any place applying place value understanding.
- Multiply multi-digit whole numbers using the standard algorithm.
- Use strategies based on place value, properties of operations, and the relationship between multiplication and division to find whole number quotients and remainders with up to four-digit dividends and two-digit divisors, using area models, rectangular arrays, or equations to illustrate and explain the calculation.
- Using concrete models or drawings and strategies based on place value, properties of operations, and the relationship between addition and subtraction, add, subtract, multiply, and divide decimals to the hundredths and relate the strategies to a written method to explain the reasoning.

#### **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:**

- Quiz: Match number quantities to names/quantities to written numerals/names to written numbers
- Use teacher made quizzes and tests
- Steck Vaughn and Contemporary's Test Preparation Unit Reviews and/or exercises as quizzes and chapter tests (see below)
- Math Journals-graded
- Facilitate group work/monitoring conversations during group work

##### **Other Evidence:**

- Outside assignments
- Facilitate group work/monitoring conversations during group work
- Facilitate individual monitoring by instructor during independent work

#### **Building the Learning Plan**

##### **Sample Classroom Activities and/or Lesson Plans:**

- Create math grids with plan paper to represent, ones, tenths, hundreds, and thousandths
- Use math games to find products and quotients of whole numbers
- Use "The Frayer Model" to organize concepts of place value and base-ten numbers
- Using number pattern identifications to expand knowledge of number sense, for example, counting by multiples to understand multiplication concepts
- Using money to learn about place value and trading coins
- Use three and four digits for addition and subtraction
- Use three and four digits for multiplication and division

##### **Learning Activities:**

***(Interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)***

- One-to-one tutoring
- (interactive technology)- Plato Learning Technology
- Manipulatives

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### Low-Intermediate Basic Education (Grade Levels 4.0-5.9)

- Peer teaching
- Procedures with different objects and concepts
- Universal Design for Learning protocols such as additional time, modified lesson for disabilities (i.e., enlarged print, drills, flashcards and games)

#### List of Instructional Materials:

- *Math Skills for the Workforce: Whole Numbers.* (1997). Steck Vaughn.
- *Number Power 1 and 2.* (2001). Contemporary.
- Base ten blocks
- Place value charts
- Arrow cards
- Rectangular arrays
- Area models

#### List of Technology Resources:

- Plato Learning Technology
- Khan Academy— <https://www.khanacademy.org/>
- Picket Mill—[picketmill.typepad.com](http://picketmill.typepad.com)
- Super Teacher— <http://www.superteachertools.net/>
- Cool Math--- [www.coolmath.com](http://www.coolmath.com)
- Greg Tang Math— [www.gregtangmath.com](http://www.gregtangmath.com)
- Learn Zillion— <https://learnzillion.com>
- Blank Frayer Model for math journals--- <http://3.bp.blogspot.com/>
- Online Practice Tests: [http://www.testprepreview.com/tabe\\_practice.htm](http://www.testprepreview.com/tabe_practice.htm) (practice questions-printable) and <http://www.testprepreview.com/tabelinks.htm> (Skill improvement Links)

### NUMBER AND OPERATIONS - FRACTIONS (NF)

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

#### Essential Understandings:

- Fractions can be represented visually and in written form.
- Comparisons are valid only when the fractions or decimal numbers refer to the same whole.
- Fractions and mixed numbers are composed of unit fractions and can be decomposed as a sum of unit fractions.
- Improper fractions and mixed numbers can represent the same value.
- Addition and subtraction of fractions involves joining and separating parts referring to the same whole.
- A product of a fraction times a whole number can be written as a multiple of a unit fraction.
- Fractions with denominators of 10 can be expressed as an equivalent fraction with a denominator of 100.
- Fractions with denominators of 10 and 100 may be expressed using decimal notation.
- Benchmark fractions and other strategies aid in estimating the reasonableness of results of operations with fractions.
- The use of area models, fraction strips, and number lines, are effective strategies to model sums, differences, products, and quotients.

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### Low-Intermediate Basic Education (Grade Levels 4.0-5.9)

- Equivalent fractions are critical when adding and subtracting fractions with unlike denominators.
- Fractions are division models.
- Multiplication can be interpreted as scaling/resizing (multiplying a given number by a fraction greater than 1 result in a product greater than the given number and multiplying a given number by a fraction less than 1 result in a product smaller than the given number).
- The knowledge of fractions and equivalence of fractions can be used to develop algorithms for adding, subtracting, multiplying, and dividing fractions.

#### Essential Questions:

- How are fractions used in problem-solving situations?
- How are fractions composed, decomposed, compared and represented?
- Why is it important to identify, label, and compare fractions as representations of equal parts of a whole or of a set?
- How can multiplying a whole number by a fraction be displayed as repeated addition (as a multiple of a unit fraction)?
- How can visual models be used to determine and compare equivalent fractions and decimals?
- How can decimals through the hundredths place be compared and ordered?
- What is a reasonable estimate for a solution (answers)?
- How do operations with fractions relate to operations with whole numbers?
- What do equivalent fractions represent and why are they useful when solving equations with fractions?
- What models or pictures could aid in understanding a mathematical or real-world problem and the relationships among the quantities?
- When can model(s) or picture(s) be used to solve a mathematical or real-world problem?
- What are the effects of multiplying by quantities greater than one compared to the effects of multiplying by quantities less than one?

#### Student will be able to:

*(What does mastery look like?)*

- Explain, compare, and generate equivalent fractions by using visual fraction models.
- Compare and contrast two fractions with different numerators and different denominators using appropriate math symbols and fraction models, understanding that comparisons are only made if fractions refer to the same whole.
- Explain the addition and subtraction of fractions as joining and separating parts of the same whole.
- Dissect a fraction into a sum of fractions with the same denominator recording each as an equation, explaining the decomposition with a visual model.
- Demonstrate understanding of fractions by adding and subtracting mixed numbers with the same denominators.
- Solve word problems involving addition and subtraction of fractions with the same denominators.
- Utilize and extend previous understanding of multiplication by recognizing that  $\frac{5}{4}$  is the equivalent of the whole number 5 multiplied by the fraction  $\frac{1}{4}$  or that a over  $b$  ( $a/b$ ) is a multiple of 1 over  $b$  ( $1/b$ ).

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### **Low-Intermediate Basic Education (Grade Levels 4.0-5.9)**

- Utilize previous understanding of multiplication to multiply a fraction by a whole number, using a fraction model such as  $3 \times (2/5) = 6 \times (1/5)$  which is a multiple of  $1/b$ .
- Apply and extend comprehension of multiplication to solving word problems which involve the multiplication of a fraction and a whole number.
- State a fraction with a denominator of 10 as an equivalent fraction with a denominator of 100, and utilize this skill to add two fractions with denominators of 10 and 100.
- Apply decimal notation for fractions with denominators of 10 and 100.
- Compare two decimals to the hundredths place by analyzing size using appropriate math symbols and rules of valid comparison.
- Apply the strategy of equivalent fractions to add and subtract fractions with unlike denominators, including mixed numbers, producing equivalent sums or differences with like denominators.
- Apply the strategy of using benchmark fractions and number sense of fractions to solve word problems that include addition and subtraction of fractions referring to the same whole and including cases of unlike denominators, using mental estimation to assess reasonableness of answers.
- Explain that a fraction is a division of its numerator by its denominator and apply this understanding to solve word problems which include division of whole numbers resulting in fraction or mixed number forms.
- Apply and extend previous knowledge of multiplication to multiply a fraction or whole number by a fraction and explain it as a result of a sequence of operations (e.g.,  $(a/b) \times q$  can be explained as  $a \times q / b$ ).
- Apply and extend previous knowledge of multiplication to find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths or by showing that the area could similarly be found by multiplying the side lengths.
- Interpret multiplication as scaling by comparing size of product to size of each factor using estimation.
- Interpret multiplication as scaling by explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number while multiplying a given number by a fraction less than 1 results in a product less than the given number.
- Use visual models or equations to compute real world problems involving multiplication of fractions and mixed numbers.
- Apply and extend previous knowledge of division by interpreting division of a unit fraction by a non-zero whole number and computing quotients using the relationship between multiplication and division to explain the process.
- Interpret division of a whole number by a unit fraction and compute quotients using the relationship between multiplication and division to explain the process.
- Demonstrate previous comprehension of division by solving real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions.

#### **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:**

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### **Low-Intermediate Basic Education (Grade Levels 4.0-5.9)**

- Steck Vaughn and Contemporary's Unit Reviews and/or exercises as quizzes and chapter tests (see below)
- Use teacher made quizzes and tests
- Graded Journal entries

#### **Other Evidence:**

- Use "The Frayer Model" to deepen the understanding process
- Observing math journal entries
- One on one observations of independent work
- Facilitate group work and monitor conversations during group work

#### **Building the Learning Plan**

##### **Sample Classroom Activities and/or Lesson Plans:**

- Re-create a recipe to accommodate double portions and half size portions
- Compare different measurement options, such as cups and quarts, etc.
- Divide cookies in different sizes and determine equivalent portions
- Have students work in groups of three on solving common unit fraction word problems
- Have students do classroom surveys of types of pets that live in their households and record their findings in fraction form
- Compare metric measurements with traditional measurements
- Compare interest rates

#### **Learning Activities:**

***(Interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)***

- Math manipulatives
- Flash cards
- One-to-one tutoring by instructor
- Peer tutoring
- Interactive Technology-Plato Learning Technology
- Universal Design for Learning protocols such as additional time, modified lesson for disabilities (i.e., enlarged print, drills, flashcards and games)

#### **List of Instructional Materials:**

- *Number Power 2: Fractions, Decimals, Percents.* (2001). Contemporary.
- *Number Sense Fractions: The Meaning of Fractions.* (2003). McGraw-Hill/Contemporary.
- *Math Skills for the Workforce: Fractions.* (1997). Steck Vaughn.
- Number lines
- Flash cards
- Fraction game cards
- Dice
- Rectangular arrays
- Area models
- Grid paper
- Math blocks

#### **List of Technology Resources:**

- Teaching Ideas— [www.teachingideas.co.uk](http://www.teachingideas.co.uk)
- Khan Academy— <http://khanacademy.org/>

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- Cool Math— [www.coolmath4kids.com/fractions](http://www.coolmath4kids.com/fractions)
- CIAESC on [Pinterest](http://www.pinterest.com/ciaesc/)— <http://www.pinterest.com/ciaesc/>
- Blank Frayer Model for math journals--- <http://3.bp.blogspot.com/>
- Plato Learning Technology
- Online Practice Tests: [http://www.testprepreview.com/tabe\\_practice.htm](http://www.testprepreview.com/tabe_practice.htm) (practice questions-printable) and <http://www.testprepreview.com/tabelinks.htm> (Skill improvement Links)

### MEASUREMENT AND DATA (MD)

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

#### Essential Understandings:

- Converting from larger to smaller units of measurement in the metric system is done by multiplying by powers of ten.
- Perimeter is a real life application of addition and subtraction.
- Area is a real life application of multiplication and division.
- When converting measurements within one system, the size, length, mass, volume of the object remains the same.
- Measurement problems can be solved by using appropriate tools.
- Volume of three-dimensional figures is measured in cubic units.
- Volume is additive and/or it is the multiplication of three dimensions (length, width and height).
- Multiple rectangular prisms can have the same volume.
- Volume can be used to solve a variety of real life problems.
- The concepts of distances, intervals of time, volume, masses of objects, and money can be expressed as measurements of a larger unit in terms of a smaller unit.
- Angles are measured in the context of a central angle of a circle.
- Angles are composed of smaller angles.

#### Essential Questions:

- How are the units of measure within the metric system related?
- How do you find the area and perimeter of geometric figures and how can using the formulas for perimeter and area help you solve real-world problems?
- Why does the size, length, mass, volume of an object remain the same when converted to another unit of measurement?
- What is volume and how is it used in real life?
- How does the area of rectangles relate to the volume of rectangular prisms?
- What are the types of angles and the relationships?
- How are angles applied in the context of a circle?
- How are protractors used to measure and aid in drawing angles and triangles?
- How can an addition or subtraction equation be used to solve a missing angle measure when the whole angle has been divided into two angles and only one measurement is given?

#### Student will be able to:

*(What does mastery look like?)*

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### Low-Intermediate Basic Education (Grade Levels 4.0-5.9)

- Name sizes of measurement units including km, m, cm, kg, g, lb., oz., L, ml, hr., min, sec., and express measurement equivalents from larger to smaller units within a single measurement system using a two-column table.
- Solve word problems involving measurements and conversions of measurements using the four operations, simple fractions, decimals, number lines, or diagrams to answer problems involving distance, intervals of time, liquid volumes, mass, and money, showing representative quantities.
- Utilize area and perimeter formulas for rectangles to solve real world and mathematical problems.
- Construct a line plot of a data set of measurements in fraction units, and solve problems of addition and subtraction with fractions involving information presented in the line plots.
- Display a set of data by making line plots for measurements, using operations on fractions for this grade to solve problems involving information presented in the line plots.
- Demonstrate understanding of angle concepts by identifying angles as geometric shapes formed wherever two rays share a common endpoint.
- Recognize concepts of angle measurement by understanding that for a circle with its center the common endpoint of two rays, an angle is measured as the fraction of the circular arc between the points where the opposite ends of the rays intercept the circle, and an angle measuring  $\frac{1}{360}$ th of a circle is a one-degree angle and a common unit of measurement.
- Recognize concepts of angle measurement by identifying angles that turn through in one-degree angles as having an angle measure of “ $n$ ” degrees.
- Demonstrate understanding of angle concepts by measuring with a protractor angles in whole-number degrees and sketching angles of a designated measure.
- Find measurement of unknown angles utilizing prior knowledge of angle measurement as an additive in which addition /subtraction operations can be used to solve real world and mathematical problems, as in finding unknown angles on a diagram.
- Solve real world multi-step problems involving conversion among different-sized standard measurements units within a given measurement system.
- Identify volume as an attribute of solid figures and relate concepts of volume measurement to cubes with side length 1 unit, called a “unit cube,” and used to measure volume.
- Identify volume as an attribute of solid figures and relate concepts of volume measurement to solid figures that can be packed without gaps using “ $n$ ” unit cubes to determine volume for a solid figure as measuring a quantity of “ $n$ ” cubic units.
- Count unit cubes to measuring volume by counting unit cubes using cubic cm, cubic in, cubic ft, and other units.
- Apply the operations of multiplication and addition to solve real world and mathematical problems involving volume, by finding the volume of a right rectangular prism by packing it with unit cubes and showing that this value can be found by multiplying the height by area of the base.
- Apply the operations of multiplication and addition to solve real world and mathematical problems involving volume by applying the formulas  $V=lwh$  and  $V=bh$  to rectangular prisms.
- Apply the operations of multiplication and addition to solve real world and mathematical problems involving volume by relating volume to operations of addition to find volumes of solid figures composed of two non-overlapping right rectangular prisms and adding the volumes of the non-overlapping parts.

# NRS Math Level 3

## Low-Intermediate Basic Education (Grade Levels 4.0-5.9)

### 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 level appropriate quantities
- Contemporary's Unit Reviews and/or exercises as quizzes and chapter tests. (see below)
- Teacher made quizzes and tests
- Math journals-graded entries
- Facilitated group work/ monitoring conversations and work with rubric

#### Other Evidence:

- Use "The Frayer Model" to enhance concepts
- Observation of facilitated independent work
- Facilitated group work/ monitoring conversations and work

### Building the Learning Plan

#### Sample Classroom Activities and/or Lesson Plans:

- Display various measurement tools in different units
- Have student measure different objects in the classroom using various measurement tools
- Record measurement on chart paper
- Introduce math manipulatives that measure mass and volume
- Demonstrate measurement of area vs. volume, vs. perimeter of a specific object
- Students will work in groups on math worksheets involving measurement
- Create line plots that display measurements in fraction units
- Introduce geometric shapes as math manipulatives

#### Learning Activities:

***(Interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)***

- One-to-one tutor
- Peer teaching
- Use different objects and put material in different context-use different measuring tools
- Interactive technology-Plato Learning Technology, websites as assigned (see below)
- Universal Design for Learning protocols such as additional time, modified lesson for disabilities (i.e., enlarged print, drills, flashcards and games)

#### List of Instructional Materials:

- *EMPower Math – Over, Around, and Within: Geometry and Measurement.* (2012). Contemporary.
- *Number Power 4: Geometry.* (2000). Contemporary.
- Rulers in standard measurement units
- Protractors
- String

## NRS Math Level 3

### Low-Intermediate Basic Education (Grade Levels 4.0-5.9)

- Straws
- Geometric math boards with rubber bands
- Graph paper
- Math journal
- Geometric math blocks
- Scales

#### List of Technology Resources:

- Khan Academy— <http://khanacademy.org/>
- Blank Frayer Model for math journals--- <http://3.bp.blogspot.com/>
- Teaching Ideas— [www.teachingideas.co.uk](http://www.teachingideas.co.uk)
- Cool Math— [www.coolmath.com](http://www.coolmath.com)
- Mathdrills— [www.mathdrills.com](http://www.mathdrills.com)
- Kuta Software— <https://www.kutasoftware.com>
- Online Practice Tests: [http://www.testprepreview.com/table\\_practice.htm](http://www.testprepreview.com/table_practice.htm) (practice questions-printable) and <http://www.testprepreview.com/tabelinks.htm> (Skill improvement Links)

### GEOMETRY (G)

3. G.1 / 3.G.2 / 3.G.3 / 3.G.4 / 3.G.5 / 3.G.6 / 3.G.7

#### Essential Understandings:

- Shapes can be classified by properties (or attributes) of their lines and angles.
- Angles are measured in the context of a central angle of a circle.
- Angles are composed of smaller angles.
- Two-dimensional geometric figures are composed of various parts that are described with precise vocabulary and can be classified based upon their properties (attributes).
- In a coordinate plane, the first number indicates how far to travel from the origin in the direction of one axis and the second number indicates how far to travel in the direction of the second axis.
- The coordinate plane can be used to model and compare numerical patterns.
- Figures that can be folded on a center line to produce two matching parts are symmetrical.

#### Essential Questions:

- How are parallel lines and perpendicular lines used in classifying two-dimensional shapes?
- What are the types of angles and the relationships?
- How are angles applied in the context of a circle?
- How are protractors used to measure and aid in drawing angles and triangles?
- Why is it important to use precise language and mathematical tools in the study of two-dimensional figures?
- How can describing, classifying and comparing properties of two-dimensional shapes be useful in solving real-world problems?
- How can an addition or subtraction equation be used to solve a missing angle measure when the whole angle has been divided into two angles and only one measurement is given?
- What is the purpose of a coordinate plane?

## **NRS Math Level 3**

### **Low-Intermediate Basic Education (Grade Levels 4.0-5.9)**

- How can graphing points on the coordinate plane help to solve real world and mathematical problems?
- How can the line of symmetry be identified and drawn in a two-dimensional figure?

#### **Student will be able to:**

*(What does mastery look like?)*

- Plot points and draw line segments, rays, angles, perpendicular lines, and parallel lines, identifying these in two-dimensional figures.
- Categorize two-dimensional figures based on the presence/absence of parallel or perpendicular lines or the presence/absence of angles of a specified size, and identify and categorize right triangles.
- Identify a line of symmetry as a line running across a two-dimensional figure so that the figure can be folded along the line into two matching parts, and identify and draw lines of symmetry.
- Define a coordinate plane, identify the x-axis and y-axis, and demonstrate comprehension of ordered pairs as directional distance on the x and y axis.
- Show a real life or mathematical problem and illustrate it graphically by plotting points in the first quadrant of a coordinate plane, interpreting coordinate values in context.
- Demonstrate comprehension that attributes belonging to a category of two-dimensional figures apply to all subcategories (e.g., all rectangles have four right angles; squares are rectangles; therefore, squares have four right angles).
- Sort and classify two-dimensional figures based on their properties and characteristics.

#### **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:**

- Teacher made assignments and quizzes: for example, given data construct a line plot
- Text: Steck-Vaughn and Contemporary's Test Preparation Unit Reviews and/or exercises as quizzes and chapter tests (see below)
- Assign outside projects that involve measurement and data entry-graded
- Monitor independent assignments-graded

##### **Other Evidence:**

- Math journal entries
- Facilitate group work/ monitoring conversations and work

#### **Building the Learning Plan**

##### **Sample Classroom Activities and/or Lesson Plans:**

- Use folding to test for line symmetry. This is a hands-on activity
- Identify lines of symmetry in a diagnostic resource sheet
- Use computer software to create and identify symmetry in a human face
- Have a class discussion about graphs
- Collect data and construct line plots

## NRS Math Level 3

### Low-Intermediate Basic Education (Grade Levels 4.0-5.9)

- Interpret a line plot
- Work with groups that are experiencing difficulties with measurement data
- Have student sketch a coordinate plane and label each axis
- Plot several points and connect them to reveal a shape or letter
- Define and classify two-dimensional figures, name their similar characteristic.

#### **Learning Activities:**

***(Interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)***

- One-to-one tutor
- Interactive technology such as Plato learning Technology (interactive websites/illustrations, etc.) See below
- Peer teaching
- Use different objects and put material in different context.
- Universal Design for Learning protocols such as additional time, modified lesson for disabilities (i.e., enlarged print, drills, flashcards, and games such as Battleship)

#### **List of Instructional Materials:**

*(Core and supplemental)*

- *EMPower Math – Over, Around, and Within: Geometry and Measurement.* (2012). Contemporary.
- *Number Power 4: Geometry.* (2000). Contemporary.
- Graph paper
- Colored pencils
- Rulers
- Protractors
- Math journal
- Different types of real world math problems drawn from everyday life or job related

#### **List of Technology Resources:**

- Plato Learning Technology
- Khan Academy— <http://khanacademy.org/>
- Blank Frayer Model for math journals--- <http://3.bp.blogspot.com/>
- Teaching Ideas— [www.teachingideas.co.uk](http://www.teachingideas.co.uk)
- Cool Math— [www.coolmath.com](http://www.coolmath.com)
- Mathdrills— [www.mathdrills.com](http://www.mathdrills.com)
- Kuta Software— <https://www.kutasoftware.com>
- Online Practice Tests: [http://www.testprepreview.com/tabe\\_practice.htm](http://www.testprepreview.com/tabe_practice.htm) (practice questions-printable) and <http://www.testprepreview.com/tabelinks.htm> (Skill improvement Links)