Illinois ABE/ASE Curriculum Guide Template for Mathematics

Curriculum Guide Template for Mathematics

NRS Levels 1-6

NRS Level 1 – Beginning ABE Literacy
(Grade Levels 0 – 1.9)

Content Area: Math	**NRS Level: 1**
COUNTING AND CARDINALITY / NUMERACY (CC)	
1.CC.1 / 1.CC.2 / 1.CC.3 / 1.CC.4 / 1.CC.5 / 1.CC.6 / 1.CC.7	
Essential Understandings: • Counting determines how many or how much a quantity/number represents. • When counting, the last number spoken is the total number of objects. • Counting one more will be the next larger number. • Each successive number name refers to a quantity that is one larger. • Knowledge of numbers 0-10 can be applied to predict order and sequence in higher numbers (10-20, 20-30, etc.) • Quantities of numbers can be compared, ordered, and described as less than, greater than, or equal to one another. • A written number represents an amount/quantity/order and each number represents a different amount/quantity/order.	
Essential Questions: • Why/when are objects counted? What objects are/can be counted? • How is number order helpful to us? • What can numerals represent? • How would you describe a teen number? • How can you use 0-10 to predict other counting sequences?	
Student will be able to… *(what does mastery look like)*	
Evidence for Assessing Learning	

Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	NRS Level: 1
OPERATIONS AND ALGEBRAIC THINKING (OA)	
1.OA.1 / 1.OA.2 / 1.OA.3 /1.OA.4 / 1.OA.5 / 1.OA.6 / 1.OA.7 / 1.OA.8 / 1.OA.9 / 1.OA.10 / 1.OA.11 / 1.OA.12 / 1.OA.13	

Essential Understandings:

- Addition and subtraction can be represented by objects, drawings, manipulatives, and other modalities.
- Expressions and equations can be used to decompose numbers in more than one way.
- Quantities can be used to create a variety of individual groupings.
- Numbers less than or equal to 20 can be decomposed by adding, subtracting, or re-grouping.
- The whole is equal to the sum of its parts; conversely, the whole minus a part is equal to the other part.
- Strategies (for example, properties of addition) can be used to decompose complex problems to make an easier problem (counting on, make a ten, near ten, doubles, plus one, plus two, etc.)
- Problem solving structures reinforce part/whole and number combinations within 20
- Word problems have basic problem solving structures: adding to, taking from, putting together, taking apart, comparing and can be represented using different modalities.
- Unknowns can be in various locations (start, change, result) in equations and develop from combinations of numbers.
- Addition and subtraction are related/inverse operations.
- Various strategies can be used to quickly add numbers.
- The equal sign is used to represent quantities that have the same value.

Essential Questions:

- Why should numbers be decomposed to form different combinations of a specific number?
- What is the connection of a number to an equation or expression?
- How are word problems connected to an equation or expression?
- Why is it important to know multiple strategies in solving addition/subtraction problems?
- How are problem solving strategies and/or properties connected to number relationships?
- What is the relationship between addition and subtraction?
- How can word problems be decoded into equations or expressions to solve it?
- Does a solution make the equation true or false? How is a solution evaluated and does it make sense?

Student will be able to… *(what does mastery look like)*
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*

List of Technology Resources:

Content Area: Math	NRS Level: 1

NUMBER AND OPERATIONS IN BASE TEN (NBT)

1.NBT.1 / 1.NBT.2 / 1.NBT.3 / 1.NBT.4 / 1.NBT.5 / 1.NBT.6

Essential Understandings:

- Two digit numbers are composed of groups of tens and ones and can be compared with symbols (<, >, =) in terms of their relationship.
- Various models can be used to build individual numbers with tens/ones while counting.
- Counting sequences can be used to understand counting by 10s, identifying 10 more, 10 less.
- Counting can be connected to adding and subtracting.
- Addition can be used to solve and/or evaluate subtraction and vice versa.
- Mental math can be used to check and/or perform calculations in base 10.

Essential Questions:

- How do addition and subtraction relate to counting sequences?
- How does understanding properties of operations help with strategies when performing written and mental calculations?
- How does using objects and drawings help represent problems in multiple ways?
- What is significant about 10?
- What is significant about the teen numbers and how do these numbers relate to 10? (e.g., 10 + 3 = 13).

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

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

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

List of Instructional Materials:
(core and supplemental)

Content Area: Math	**NRS Level: 1**

MEASUREMENT AND DATA (MD)

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

Essential Understandings:

- Some attributes are measurable; both numbers and words can be used to describe and compare the measurements.
- Objects can be classified, ordered, and compared by attributes and/or measurement.
- Time is measured in hours and half-hours using analog and digital clocks.
- Data can be organized and classified by comparing attributes (height, width and depth).

Essential Questions:

- How are measurable attributes determined and why are these attributes of objects important to comparing quantities?
- How are dividing a circle and telling time related?
- What is the purpose of categorizing data?
- What strategies can be used to organize data?

Student will be able to… *(what does mastery look like)*
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*

List of Technology Resources:	
Content Area: Math	**NRS Level: 1**
GEOMETRY (G)	
1.G.1 / 1.G.2 / 1.G.3 / 1.G.4 / 1.G.5 / 1.G.6 / 1.G.7 / 1.G.8 / 1.G.9	

Essential Understandings:

- Objects have position relative to other objects using terms such as “above,” “below,” “beside,” “in front of,” “behind,” and “next to.”
- Two-dimensional shapes are flat and can be built from components.
- Three-dimensional shapes have unique attributes and specific names regardless of their orientations or overall size.
- Attributes are used to compare and analyze two- and three-dimensional shapes.
- Circles and rectangles can be used to create more complex shapes; circles and rectangles can be partitioned into equal shares.
- Shapes can be used to build pictures, designs and other shapes.
- Understanding of shapes and components to recognize and represent shapes in the world.

Essential Questions:

- Why are positional words important in math?
- How can shapes be partitioned into halves and quarters?
- Why is mathematical language critical when describing two-dimensional and three-dimensional shapes?
- How can two-dimensional shapes be decomposed or combined to form two- or three-dimensional shapes and vice versa?

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

Evidence for Assessing Learning

Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

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

Content Area: Math	NRS Level: 2
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?

Student will be able to… *(what does mastery look like)*
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*

List of Technology Resources:

Content Area: Math	NRS Level: 2
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)

Evidence for Assessing Learning

Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*

List of Technology Resources:

Content Area: Math	**NRS Level: 2**
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 = $\frac{3}{1}$ or any fraction whose numerator and denominator are the same is equal to 1, such as $\frac{4}{4}$ = 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)

Evidence for Assessing Learning

Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*

List of Technology Resources:

Content Area: Math	**NRS Level: 2**
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)? • 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)*
Evidence for Assessing Learning

Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*

List of Technology Resources:	
Content Area: Math	**NRS Level: 2**
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).

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)

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
Student will be able to… *(what does mastery look like)*

NRS Level 3 – Low Intermediate Basic Education (Grade Levels 4.0 – 5.9)

Content Area: Math	**NRS Level: 3**
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)*
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 3**
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. • 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 $\frac{1}{10}$ 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)*
Evidence for Assessing Learning

Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 3**
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.NF13 / 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. • 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 results in a product greater than the given number and multiplying a given number by a fraction less than 1 results 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)*
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*

List of Technology Resources:	
Content Area: Math	NRS Level: 3

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)

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 3**
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?
- 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)

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

NRS Level 4 – High Intermediate Basic Education
(Grade Levels 6.0-8.9)

Content Area: Math	**NRS Level: 4**
RATIOS AND PROPORTIONAL RELATIONSHIPS (RP)	
4.RP.1 / 4.RP.2 / 4.RP.3 / 4.RP.4 / 4.RP.5 / 4.RP.6	
Essential Understandings: • A ratio expresses the comparison between two quantities. Special types of ratios are rates, unit rates, measurement conversions, and percent. • A ratio or a rate expresses the relationship between two quantities. Ratio and rate language are used to describe a relationship between two quantities (including unit rates). • A rate is a type of ratio that represents a measure, quantity, or frequency, typically one measured against a different type of measure, quantity, or frequency. • Ratio and rate reasoning can be applied to many different types of mathematical and real-life problems (rate and unit rate problems, scaling, unit pricing, statistical analysis, etc.). • Rates, ratios, percentages and proportional relationships express how quantities change in relationship to each other and can be represented in multiple ways. • Rates, ratios, percentages and proportional relationships can be applied to multi-step ratio and percent problems along with other problem solving situations such as interest, tax, discount, etc.	
Essential Questions: • When is it useful to be able to relate one quantity to another? • How are ratios and rates similar and different? • What is the connection between a ratio/rate and a fraction? • How do rates, ratios, percentages and proportional relationships apply to our world? • When and why is it appropriate to use proportional comparisons? • How does comparing quantities describe the relationship between them? • How can models illustrate proportional relationships? • How can proportional relationships be used to solve ratio and percent problems? • How can scale drawings be used to compute actual lengths and area?	

Student will be able to… *(what does mastery look like)*
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	NRS Level: 4
THE NUMBER SYSTEM (NS)	
4.NS.1 / 4.NS.2 / 4.NS.3 / 4.NS.4 / 4.NS.5 / 4.NS.6 / 4.NS.7 / 4.NS.8 / 4.NS.9 / 4.NS.10 / 4.NS.11 / 4.NS.12 / 4.NS.13	

Essential Understandings:

- Rational numbers use the same attributes as whole numbers.
- The quotatative (making groups of a certain size) and partitative (sharing equally or dealing out) types of division and measurement are applied to numbers within the real number system (fractions, decimals, integers and rational and irrational numbers).
- The relationship of the location of the digits and the value of the digits is part of understanding multi-digit operations.
- Various operations can be performed and represented using multiple formats (manipulatives, diagrams, real-life situations, equations).
- Quantities having more or less than zero are described using positive and negative numbers.
- Number lines are visual models used to represent the density principle: between any two whole numbers are many rational numbers, including decimals and fractions.
- The rational numbers can extend to the left or to the right on the number line, with negative numbers going to the left of zero, and positive numbers going to the right of zero.
- The coordinate plane is a tool for modeling real-world and mathematical situations and for solving problems.
- Graphing objects in a four quadrant graph can provide ways to measure distances
- Rational numbers can be represented with visuals (including distance models), language, and real-life contexts.
- There are precise terms and sequence to describe operations with rational numbers.
- Every number has a decimal expansion.
- Properties of operations with whole and rational numbers also apply to all real numbers.
- Absolute value is a number's distance from zero (e.g., $|-3| = 3$).
- The greatest common factor (GCF) and the least common multiple (LCM) among whole numbers can be determined.
- The sum of two whole numbers between 1 and 100 can be expressed as a multiple of a sum of two whole numbers (e.g., the distributive property).

Essential Questions:

- How are various operations (addition, subtraction, multiplication and division) represented, interpreted and related to realistic situations and to other operations?
- What role does place value play in multi-digit operations?
- How are positive and negative numbers used?
- How do rational numbers relate to integers?
- What can be modeled on the coordinate plane?
- What is the relationship between properties of operations and types of numbers?
- Why are quantities represented in multiple ways?
- How can quantities be represented and what is the rationale for selecting a specific representation?
- How is the universal nature of properties applied to real numbers?
- What does the absolute value of a number represent?
- What is the difference between the GCF and LCM?
- How can the distributive property be used to express the sum of two whole numbers [e.g., 25 + 10 as 5(5 + 2)].

Student will be able to…

(what does mastery look like)

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 4**
EXPRESSIONS AND EQUATIONS (EE)	
4.EE.1 / 4.EE.2 / 4.EE.3 / 4.EE.4 / 4.EE.5 / 4.EE.6 / 4.EE.7 / 4.EE.8 / 4.EE.9 / 4.EE.10 / 4.EE.11 / 4.EE.12 / 4.EE.13 / 4.EE.14 / 4.EE.15 / 4.EE.16 / 4.EE.17 / 4.EE.18 / 4.EE.19 / 4.EE.20 / 4.EE.21	

Essential Understandings:

- Variables within algebraic expressions are a modeling tool to use when solving real-world problems. This process demonstrates a method of describing quantitative relationships – for instance, traveling some distance (d) at a given rate of travel will take a given amount of time (t) with a constant rate.
- The value of any real number can be represented in relation to other real numbers such as with decimals converted to fractions, scientific notation and numbers written with exponents (e.g., $8 = 2^3$).
- Properties of operations are used to determine if expressions are equivalent.
- Solving equations is a reasoning process and follows established procedures based on properties.
- Substitution is used to determine whether a given number in a set makes an equation or inequality true.
- Variables may be used to represent a specific number, or, in some situations, to represent all numbers in a specified set.
- When one expression has a different value than a related expression, an inequality provides a way to show that relationship between the expressions: the value of one expression is greater than (or greater than or equal to) the value of the other expression instead of being equal.
- Solutions of inequalities can be represented on a number line.
- Variables in algebraic equations can be expressed in graphs to represent numbers and generalize mathematical problems in real-world situations.
- Understand the difference between an expression and an equation: expressions are simplified and equations are solved for the variable’s value.
- Properties of operations can be used to add, subtract, factor, and expand linear expressions.
- Expressions can be manipulated to suit a particular purpose to solve problems efficiently.
- Mathematical expressions, equations, inequalities and graphs are used to represent and solve real-world and mathematical problems.
- Properties, order of operations, and inverse operations are used to simplify expressions and solve equations efficiently.
- Unit rates can be explained in graphical representations and algebraic equations.
- The solution to a system of two linear equations in two variables is an ordered pair that satisfies both equations.
- Some equations/inequalities and systems of equations/inequalities have no solutions (parallel lines) and others have infinite solutions (same line).
- Square roots and cube roots of small perfect squares and cubes can be evaluated and/or represent solutions to the equations in the form of $x^2 = y$ and $x^3 = y$ where y is a positive rational number.
- The properties of integer exponents can generate equivalent numerical expressions.

Essential Questions:

- How do we determine if a variable is independent or dependent in an expression or equation?
- What is equivalence?
- How properties of operations used to prove equivalence?
- How are variables defined and used?
- How does the structure of equations and/or inequalities help us solve equations and/or inequalities?
- How does the substitution process help in solving problems?
- Why are variables used in equations?
- What might a variable represent in a given situation?
- How are inequalities represented and solved?
- When and how are expressions, equations, inequalities and graphs applied to real world situations?
- How can the order of operations be applied to evaluating expressions, and solving from one-step to multi-step equations?
- What are some possible real-life situations to which there may be more than one solution?
- How does the ongoing use of fractions and decimals apply to real-life situations?
- How do we express a relationship mathematically?
- How do we determine the value of an unknown quantity?
- What makes a solution strategy both efficient and effective?
- How is it determined if multiple solutions to an equation are valid?
- How does the context of the problem affect the reasonableness of a solution?
- Why can two equations be added together to get another true equation?
- How can the equations in the form of $x^2 = y$ and $x^3 = y$ where y is a positive rational number be evaluated?
- What is the significance of scientific notation for very large or very small numbers within problem solving situations?

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

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 4**
FUNCTIONS (F)	
4.F.1 / 4.F.2 / 4.F.3 / 4.F.4 / 4.F.5	

Essential Understandings: • A function is a specific topic of relationship in which each input has a unique output that can be represented in a table. • A function can be represented graphically using ordered pairs that consist of the input and the output of the function in the form (input, output). • A function can be represented with an algebraic rule. • The equation $y = mx + b$ is a straight line and that slope and y-intercept are critical to solving real problems involving linear relationships. • Changes in varying quantities are often related by patterns that can be used to predict outcomes and solve problems. • Linear functions may be used to represent and generalize real situations.
Essential Questions: • How do ordered pairs on coordinate graphs help define relationships? • What defines a function and how can it be represented? • What makes a function linear? • How can linear relationships be modeled and used in real-life situations? • Why is one variable dependent upon the other(s) in relationships?
Student will be able to… *(what does mastery look like)*
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:

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

List of Instructional Materials:
(core and supplemental)

List of Technology Resources:

Content Area: Math	**NRS Level: 4**
GEOMETRY (G)	
4.G.1 / 4.G.2 / 4.G.3 / 4.G.4 / 4.G.5 / 4.G.6 / 4.G.7 / 4.G.8 / 4.G.9 / 4.G.10 / 4.G.11 / 4.G.12 / 4.G.13 / 4.G.14 / 4.G.15 / 4.G.16 / 4.G.17 / 4.G.18 / 4.G.19	

Essential Understandings:
- Scale drawings can be applied to problem solving situations involving geometric figures.
- Geometrical figures can be used to reproduce a drawing at a different scale
- The coordinate plane is a tool for modeling real-world and mathematical situations and for solving problems.
- Graphing objects in a four quadrant graph can provide ways to measure distances and identify that shapes have specific properties.
- Volume of a rectangular prism can be determined by multiplying the length, width and height dimensions when the dimensions are fractional lengths.
- Algebraic reasoning is applied when solving geometric problems (i.e., circumference and area of a circle).
- Unit rates can be explained in graphical representation, algebraic equations, and in geometry through similar triangles.
- Area, volume and surface area are measurements that relate to each other and apply to objects and events in our real life experiences.

Essential Understandings (continued):

- Properties of two-dimensional shapes are used in solving problems involving three-dimensional shapes.
- Two- and three-dimensional shapes and spaces are defined by their properties; real world and geometric structures are composed of these shapes and spaces.
- Planes that cut polyhedra create related two-dimensional figures. Reflections, translations, and rotations are actions that produce congruent geometric objects.
- Dilations, translations, rotations and reflections can be shown using two-dimensional figures on a coordinate plane.
- A dilation is a transformation that changes the size of a figure but not the shape.
- Two similar figures are related by a scale factor, which is the ratio of the lengths of corresponding sides.
- If the scale factor of a dilation is greater than 1, the image resulting from the dilation is an enlargement, and if the scale factor is less than 1, the image is a reduction; both transformations result in similar figures.
- A two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of transformations.
- Two shapes are similar if the length of all the corresponding sides are proportional and all the corresponding angles are congruent.
- Congruent figures have the same size and shape (a rigid, fixed relationship). If the scale factor of a dilation is equal to 1, the image resulting from the transformation is a congruent figure.
- When parallel lines are cut by a transversal, corresponding angles, alternate interior angles, alternate exterior angles, and vertical angles are congruent.
- Right triangles have a special relationship among the side lengths that can be represented by a model and a formula.
- The Pythagorean Theorem can be used to find the missing side lengths in a coordinate plane and real-world situations.
- The Pythagorean Theorem and its converse can be proven.
- Rounded object volume can be calculated with specific formulas.
- Pi is necessary when calculating volume of rounded objects.

Essential Questions:

- Why is it important to use precise language and mathematical tools in the study of two-dimensional and three-dimensional figures?
- How can describing, classifying and comparing attributes of two-dimensional shapes (nets) be useful in solving problems in our three-dimensional (dot paper drawings) world?
- How do graphs illustrate proportional relationships?
- How are geometric figures used to reproduce a drawing at a different scale?
- Problems of area of polygons can be solved by composing and decomposing the polygons.
- What models on the coordinate plane are helpful for understanding and quantifying the volume of rectangular prisms?
- How does what we measure influence how we measure?
- How can space be defined through numbers and measurement?
- How does investigating figures help us build our understanding of mathematics?
- How can proportional relationships of congruent and similar figures be used to solve ratio problems?
- How are scale drawings used to compute actual lengths and area?
- What are transformations and what effect do they have on an object?
- What does the scale factor of a dilation convey?
- How can transformations be used to determine congruency or similarity?
- What angle relationships are formed by a transversal intersecting with two parallel lines?
- Why does the Pythagorean Theorem apply only to right triangles?
- How does the knowledge of how to use right triangles and the Pythagorean Theorem enable the design and construction of such structures as a properly pitched roof, handicap ramps to meet code, structurally stable bridges, and roads?
- How do indirect measurement strategies (using the Pythagorean Theorem) allow for the measurement of items in the real world such as playground structures, flagpoles, and buildings?
- How is the volume and/or surface area of various three-dimensional geometric objects determined?

Student will be able to… *(what does mastery look like)*
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 4**
STATISTICS AND PROBABILITY (SP)	

4.SP.1 / 4.SP.2 / 4.SP.3 / 4.SP.4 / 4.SP.5 / 4.SP.6 / 4.SP.7 / 4.SP.8 / 4.SP.9 / 4.SP.10 / 4.SP.11 / 4.SP.12 / 4.SP.13 / 4.SP.14 / 4.SP.15 / 4.SP.16 / 4.SP.17

Essential Understandings:

- Statistical questions and the answers account for variability in a data set.
- The distribution of a data set is described by its center, spread, and overall shape.
- Measures of central tendency for a numerical set of data are summaries of the values using a single number.
- Bivariate categorical data display frequencies and relative frequencies can be seen in two-way tables.
- Measures of variability describe the variation of the values in the data set using a single number.
- Statistics provide information about a population (data set) by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population.
- Random sampling tends to produce representative samples and support valid inferences.
- Two data distributions can be compared using visual and numerical representations based upon measures of center and measures of variability to draw conclusions.
- The probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.
- The probability of a chance event is approximated by collecting data on the chance process that produces it, observing its long-run relative frequency, and predicting the approximate relative frequency given the probability.
- A probability model, which may or may not be uniform, is used to find probabilities of events.
- Various tools are used to find probabilities of compound events (including organized lists, tables, tree diagrams, and simulations).
- Written descriptions, tables, graphs, and equations are useful in representing and investigating relationships between varying quantities.
- Different representations (written descriptions, tables, scatter plots, histograms, box and whisker plots, graphs, and equations) of the relationships between varying quantities may have different strengths and weaknesses.
- Slope and y-intercept are keys to solving real problems involving linear relationship models of data.
- Some data may be misleading based on representation.

Essential Questions: • What is the value of using different data representations? • Using measures of central tendency, how are data sets interpreted and analyzed? • When is one data display better than another? How can data be displayed strategically? • When is one statistical measure better than another? • What makes a good statistical question? • How can two data distributions be compared? • How can statistics be used to gain information about a sample population? • How can a random sample be used to draw inferences of a larger population? • How are probability and the likelihood of an occurrence related and represented? • How is probability approximated? • How is a probability model used? • How are probabilities of compound events determined? • What relationships can be seen in bivariate categorical data? • What conclusions can be drawn from data displayed on a graph? • What do the slope and y-intercept of a line of best fit signify on a graph? What do outliers signify? • How can graphs, tables, or equations be used to describe patterns and predict subsequent data or outcomes?
Student will be able to… *(what does mastery look like)*
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:

Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

NRS Level 5 – Low Adult Secondary Education
(Grade Levels 9.0 – 10.9)

NUMBER AND QUANTITY (N)	
Content Area: Math	**NRS Level: 5**
The Real Number System (RN)	
5.N.RN.1 / 5.N.RN.2 / 5.N.RN.3	
Essential Understandings: • Rational expressions can be written equivalently using rational exponents. • Properties of integer exponents may be applied to expressions with rational exponents. • Adding and multiplying two rational numbers results in a rational number. • The result of adding a rational number and an irrational number is an irrational number. • The result of multiplying a non-zero rational number to an irrational number is an irrational number.	
Essential Questions: • How can radical and rational exponents be written equivalently? • How do the properties of integer exponents apply to rational exponents? • What type of number results when adding or multiplying two rational numbers? • What type of number results when adding a rational number to an irrational number? • What type of number results when multiplying a non-zero rational number to an irrational number?	
Student will be able to… *(what does mastery look like)* • State or write (using words or examples) the difference between a rational and irrational number • Write equivalent rational expressions using rational exponents. • Apply the properties of integer exponents to expressions involving radicals and rational exponents. • Add and multiply two rational numbers to obtain a rational number. • Add a rational and irrational number to obtain an irrational number. • Multiply a nonzero rational number and an irrational number to obtain an irrational number.	

Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	NRS Level: 5
Quantities (Q)	
5.N.Q.1	

Essential Understandings:

- Relationships between quantities can be represented symbolically, numerically, graphically, and verbally in the exploration of real world situations.
- Arithmetic and algebra can be used together, with the rules of conversion to transform units.
- Scales, graphs, and other data models can be interpreted.

Essential Questions:

- When is it advantageous to represent relationships between quantities symbolically? numerically? graphically?
- How can the units used in a problem help determine a solution strategy?
- How can units, scale, data displays and levels of accuracy be chosen to appropriately represent a situation?

Student will be able to…

(what does mastery look like)

- Express the relationships between quantities symbolically, numerically, graphically and verbally when given a real-world situation or a mathematical context.
- Use appropriate units when obtaining an arithmetic or algebra solution to a real-world multi-step problem.
- Use and interpret appropriate units consistent with a given formula or multi-step problem, i.e., such as area will have square units and volume with cubed units.
- Choose and interpret scales and the origin on various types of graphs and/or data displays.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

ALGEBRA (A)	
Content Area: Math	**NRS Level: 5**
Seeing Structure in Expressions (SSE)	
5.A.SSE.1 / 5.A.SSE.2 / 5.A.SSE.3	

Essential Understandings:

- Identify and interpret the different parts of expressions that represent certain values contextually.
- Exponential expressions represent a quantity in terms of its context.
- Exponential expressions have equivalent forms that can reveal new information to aid in solving problems.
- The factors of a quadratic expression/equation can be used to reveal the zeros of the quadratic.
- There are several ways to solve a quadratic expression (square roots, completing the square, quadratic formula, and factoring), and that the most efficient route to solving can often be determined by the initial form of the equation.
- Quadratic expressions have equivalent forms that can reveal new information to aid in solving problems.

Essential Questions:

- What new information will be revealed if this expression is written in a different but equivalent form?
- What are the different ways to represent an exponential expression?
- What do the factors of a quadratic reveal about the expression?
- How can an appropriate expression be created to model data or situations given within context?

Student will be able to…

(what does mastery look like)

- Identify and interpret a term, its factors and its coefficient within any polynomial expression.
- Interpret expressions having grouping symbols by viewing one of more of the factors or parts as a single entity.
- Write equivalent expressions using either the properties of integer exponents or the sum and different of squares.
- Factor a quadratic expression to reveal its zeros of the function it defines and explain the meaning of the zeros.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities:

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

List of Instructional Materials:
(core and supplemental)

List of Technology Resources:

Content Area: Math	**NRS Level: 5**
Arithmetic with Polynomials and Rational (APR)	
5.A.APR.1	

Essential Understanding:

- Polynomial expressions can be added, subtracted, and multiplied to produce new polynomials.

Essential Question:

- How do the arithmetic operations on numbers extend to polynomials?

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

- Add, subtract and multiple polynomial expressions to produce new polynomials.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	NRS Level: 5
Creating Equations (CED)	
5.A.CED.1 / 5.A.CED.2 / 5.A.CED.3 / 5.A.CED.4	

Essential Understandings:

- Linear models can be created, used, and interpreted for real-life situations.
- Real world situations can be modeled by systems of linear equations.
- A system of equations can have no, one, or infinitely many solutions.
- Solutions of systems of equations are ordered pairs that satisfy all equations as well as inequalities that are often represented by a region.
- Exact or approximate solutions can be found using tables, graphs, and/or algebraic manipulations.
- Multiple methods may be used to solve a system of equation or inequalities.
- Functions can be created to best fit data represented on various models.
- Polynomial functions have key features that can be represented on a graph and can be interpreted to provide information to describe relationships of two quantities. These functions can be compared to each other or other functions to model a situation.
- Systems can be solved graphically, algebraically or from a table.

Essential Questions:

- What real world situations can be modeled by a linear relationship?
- How can technology help to determine whether a linear model is appropriate in a given situation?
- How can systems of linear equations or inequalities be used to model real world situations?
- How can the solution(s) of a system be represented and interpreted?
- What processes may be used to solve a system of equations or inequalities?
- How can a linear function be found that best fits data from various models?
- What are the different methods that can be used to find the solutions of a system of equations?
- When changes are made to an equation, what changes are made to the graph?
- What new information will be revealed if a formula is written in a different but equivalent form?
- How can the solution(s) of a system be represented and interpreted?

Student will be able to… *(what does mastery look like)* • Create and interpret various types of equations and inequalities in one variable; using them to solve problems. • Create and interpret various types of equations in two or more variables; describing the relationship of the two quantities being represented and determining whether the solution(s) are viable or nonviable for the modeling context. • Graph systems of either equations or inequalities on a coordinate axes; properly labeling and scaling the axes. • Graph systems of equations or inequalities on a coordinate axes; properly labeling and scaling the axes. • Rewrite formulas or literal equations to highlight a quantity of interest.
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*

List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 5**
Reasoning with Equations and Inequalities (REI)	
5.A.REI.1 / 5.A.REI.2 / 5.A.REI.3 / 5.A.REI.4 / 5.A.REI.5 / 5.A.REI. 6	

Essential Understandings:

- Algebraic concepts can be proven, and actions taken to arrive at a solution can be justified.
- The relationships between quantities can be explained or justified verbally in the exploration of real world situations.
- The graph of a linear equation in two variables is the set of all its solutions plotted in the coordinate plane, which are points that either lie along a line (discrete) or form a line (continuous).
- Linear functions can be represented by a table, graph, verbal description or equation and that each representation can be transferred to another representation.
- Applied problems using quadratics can be answered by either solving a quadratic equation or re-writing the quadratic in a more useful form (factoring to find the zeros, or completing the square to find the maximum or minimum, for instance).
- There are several ways to solve a quadratic equation (square roots, completing the square, quadratic formula, and factoring), and that the most efficient route to solving can often be determined by the initial form of the equation.
- The quadratic formula is derived from the process of completing the square.
- Complex numbers exist and can arise in the solutions of quadratic equations.
- A quadratic function that does not intersect the x-axis has complex zeros.
- The relationship between the factors of a quadratic and the x -intercepts of the graph of the quadratic.

Essential Questions:

- Why are procedures and properties necessary when manipulating numeric or algebraic expressions?
- How can the structure of an equation or an inequality help determine a solution strategy?
- What are complex numbers, and why do they exist?
- How can a quadratic equation be solved?
- How do the factors of a quadratic determine the x-intercepts of the graph and vice versa?
- How is the quadratic formula derived?

Student will be able to…

(what does mastery look like)

- Write a viable argument to justify each step used to find a solution in a simple equation.
- Solve linear equations and inequalities in one variable; including equations with coefficients represented by letters.
- Use the method of completing the square to derive the quadratic formula.
- Solve quadratic equations in one variable for its zeros by either factoring, completing the square, using the quadratic formula or using the square root property; recognizing that a solution(s) can be either real, irrational or complex (written in a $\pm$ b*i* form).
- Use either the method of substitution or elimination to solve systems of equations.
- Find either an exact or approximate solution; focusing on systems of linear equations.
- Represent and solve equations and inequalities in two variable in the coordinate plane; explaining the set of all the solutions plotted.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

FUNCTIONS (F)	
Content Area: Math	**NRS Level: 5**
Interpreting Functions (IF)	
5.F.IF.1 / 5.F.IF.2	

Essential Understandings:

- The graph of a linear equation in two variables is the set of all its solutions plotted in the coordinate plane, which are points that either lie along a line (discrete) or form a line (continuous).
- The zeros of each factor of a polynomial determine the x-intercepts of its graph.
- Applied problems using quadratics can be answered by either solving a quadratic equation or re-writing the quadratic in a more useful form (factoring to find the zeros, or completing the square to find the maximum or minimum, for instance).

Essential Questions:

- How can a function and its notation be used, interpreted and defined?
- How can you represent a function and what are the key features of each representation?
- What are the key features of a linear or quadratic function? Slope? Intercepts? Maxima? Minima?
- What type of linear, quadratic or exponential function is best to model a given situation?

Student will be able to…

(what does mastery look like)

- Use paper-and-pencil to graph simple functions and use technology to graph more complicated functions; showing key features of the graph.
- Graph linear functions showing intercepts.
- Graph quadratic functions showing intercepts and either a maxima or a minima.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 5**
Building Functions (BF)	
5.F.BF.1 / 5.F.BF.2	
Essential Understandings: • Arithmetic sequences follow a discrete linear pattern, and the common difference is the slope of the line. • Arithmetic sequences are functions with a domain that is a subset of the integers and can be identified by the constant difference between consecutive terms.	
Essential Questions: • What is an arithmetic sequence and how does it relate to linear functions? • What is the relationship between recursive and explicit equations and how are they represented symbolically? • How can applied problems using quadratics be answered by either solving a quadratic equation or re-writing the quadratic in a more useful form (e.g., factoring to find the zeros, or completing the square to find the maximum or minimum)?	

Student will be able to… *(what does mastery look like)* • Write a function and describe the relationship between the two quantities represented. • Find an explicit expression or a recursive process and describe the steps for calculating an expression from a context. • Create a linear or exponential function or an arithmetic or geometric sequence, given a graph, a verbal description or an input-output table; transferring easily between each of these representations to obtain a correct solution.
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 5**
Linear, Quadratic, and Exponential Models (LE)	
5.F.LE.1	

Essential Understandings:

- Discrete and continuous functions have properties that appear differently when graphed.
- Arithmetic and geometric sequences that have a domain of integers, but arithmetic sequences have equal intervals (common difference) and geometric sequences have equal factors (constant ratio).
- Arithmetic and geometric sequences can be represented by both recursive and explicit formulas.

Essential Questions:

- What type of linear, quadratic or exponential function is best to model a given situation?
- How can you decide what type of sequence or function is represented?
- What are the different ways you can represent an exponential function?
- How do you create an appropriate function to model data or situations given within context?
- What new information will be revealed if this equation is written in a different but equivalent form?

Student will be able to…

(what does mastery look like)

- Create a linear or exponential function or an arithmetic or geometric sequence, given a graph, a verbal description or an input-output table; transferring easily between each of these representations to obtain a correct solution.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

GEOMETRY (G)	
Content Area: Math	**NRS Level: 5**
Congruence (CO)	
5.G.CO.1 / 5.G.CO.2 / 5.G.CO.3 / 5.G.CO.4 / 5.G.CO.5 / 5.G.CO.6 / 5.G.CO.7 / 5.G.CO.8 / 5.G.CO.9 / 5.G.CO.10 / 5.G.CO.11 / 5.G.CO.12 / 5.G.CO.13	

Essential Understandings:

- The geometric relationships that come from proving triangles congruent or from proving triangles similar may be used to prove relationships between geometric objects represented in the coordinate plane.
- Any two geometric figures are congruent if there is a sequence of rigid motions (rotations, reflections, or translations) that carries one onto the other.
- A proof consists of a hypothesis and conclusion connected with a series of logical steps.
- The basic building blocks of geometric objects are formed from the undefined notions of point, line, distance along a line, and distance around a circular arc.
- Two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles of the triangles are congruent.
- It is possible to prove two triangles congruent without proving corresponding pairs of sides and corresponding pairs of angles of the triangle are congruent if certain subsets of these six congruence relationships are known to be true (e.g. SSS, SAS, ASA, but not SSA).
- Different observed relationships between lines, between angles, between triangles, and between parallelograms are provable using basic geometric building blocks and previously proven relationships between these building blocks and between other geometric objects.
- The geometric relationships that come from proving triangles congruent may be used to prove relationships between geometric objects.
- Geometric figures can be constructed using various tools, methods and relationships.

Essential Questions:

- In terms of rigid motions, when are two geometric figures congruent?
- What are the undefined building blocks of geometry and how are they used?
- What are possible conditions that are necessary to prove two triangles congruent?
- What are the roles of hypothesis and conclusion in a proof?
- What criteria are necessary in proving a theorem?
- What is the significance of demonstrating the relationships between geometric figures through constructions?

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

- Write a definition based on the undefined notions of point, line, distance along a line and distance around a circular arc for an angle, a circle, a set of perpendicular or parallel lines and line segments.
- Develop, describe and draw a transformation or a sequence of transformations (translations, rotations and reflections) of a given geometric figure as a function of input and output values or by using the coordinate plane.
- Develop, describe and draw a transformation or a sequence of transformations (translations, rotations and reflections) of a rectangle, parallelogram, trapezoid or regular polygon as it can be carried onto itself by creating an input-output table of values or by using the coordinate plane.
- Compare and contrast a transformation (i.e., a translation versus a horizontal stretch) which preserves and does not preserve the distance and/or angular measure of a geometric figure in the coordinate plane.
- Use geometric descriptions of rigid motions to transform and predict the effect of a given rigid motion onto a given geometric figure.
- Use the definition of congruence in terms of rigid motions to decide if two geometric figures are congruent.
- Explain how the criteria for triangle congruence (i.e., ASA, SAS, SSS) follow the definition of congruence in terms of rigid motion.
- Prove theorems about lines, angles, triangles and parallelograms.
- Use various geometric tools to make formal geometric constructions, such as copying a segment or an angle, bisecting a segment and/or angle, constructing either perpendicular or parallel lines and state the significance of demonstrating relationships between geometric figures through constructions.
- Construct an equilateral triangle, a square or a regular hexagon inscribed in a circle with a compass and straightedge.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan	
Sample Classroom Activities and/or Lesson Plans:	
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*	
List of Instructional Materials: *(core and supplemental)*	
List of Technology Resources:	
Content Area: Math	**NRS Level: 5**
Similarity, Right Triangles, and Trigonometry (SRT)	
5.G.SRT.1 / 5.G.SRT.2 / 5.G.SRT.3 / 5.G.SRT.4 / 5.G.SRT.5	

Essential Understandings:

- The geometric relationships that come from proving triangles congruent or from proving triangles similar may be used to prove relationships between geometric objects represented in the coordinate plane.
- A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged, and that the dilation of a line segment is longer or shorter in the ratio given by the scale factor of the dilation.
- Two geometric figures are similar if there is a sequence of similarity transformations (dilation along with rotations, reflections, or translations) that carries one onto the other.
- Two triangles are similar if and only if corresponding pairs of angles are congruent and corresponding pairs of sides are proportional.
- It is possible to prove two triangles similar by proving that two pairs of corresponding angles of the triangles are congruent.
- Different observed relationships between geometric objects are provable using basic geometric building blocks and previously proven relationships between
- these building blocks and between other geometric objects.
- The geometric relationships that come from proving triangles congruent or from proving triangles similar may be used to prove relationships between
- geometric objects.
- The properties of congruent and of similar triangles can be used to solve problems that either involve or can be modeled with triangles.

Essential Questions:

- What are the properties of dilations?
- In terms of similarity transformations, when are two geometric figures similar?
- What are the necessary conditions to know when two triangles are similar?
- What are the sufficient conditions to know that two triangles are similar?
- How can the Pythagorean Theorem be proven using the geometric relationships that come from proving triangles similar?
- How can the geometric relationships that come from proving triangles congruent or from proving triangles similar be applied in problems solving situations?

Student will be able to…

(what does mastery look like)

- Use proper terminology (i.e., reduction and/or enlargement) to describe how the properties of a dilation can be used on a geometric figure given either a center or a scale factor.
- Determine when two geometric figures are similar in terms of similarity transformations
- Use the properties of similiarity transformations to establish the Angle-Angle (AA) criteria for two similar triangles.
- Prove and apply theorems about triangles using congruence and similarity criteria

Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 5**
Circles (C)	
5.G.C.1 / 5.G.C.2 / 5.G.C.3 / 5.G.C.4 .5.G.C.5	

Essential Understandings:

- Different relationships among inscribed angles, radii, and chords of a circle, and between the angles of a quadrilateral inscribed in a circle are provable using previously proven relationships between geometric objects.

Essential Questions:

- What are the different relationships among inscribed angles, radii, and chords of a circle, and of the angles of a quadrilateral inscribed in a circle?
- What is the relationship between the length of the arc of a circle, the central angle of the circle that intercepts the arc, and the radius of the circle?
- What is the area of a sector of a circle?

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

- Prove that all circles are similar.
- Identify central angles, inscribed angles, radii, and chords within a circle.
- Describe the different relationships amongst inscribed angles, radii, and the chords of a circle
- Construct both inscribed and circumscribed circles of a triangle.
- Construct a quadrilateral inscribed in a circle and prove properties of angles for this quadrilateral.
- Construct a tangent line from a point outside a given circle to the circle.
- Determine that the length of an arc intercepted by an angle is proportional to the radius.
- Define the radian measure of an angle as a constant of proportionality.
- Find the area of a sector of circle.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 5**
Expressing Geometric Properties with Equations (GPE)	
5.G.GPE.1 / 5.G.GPE.2 / 5.G.GPE.3	

Essential Understandings:

- Geometric figures can be represented in the coordinate plane.
- That algebraic properties (including those related to the distance between points in the coordinate plane) may be used to prove geometric relationships.
- The distance formula may be used to determine measurements related to geometric objects represented in the coordinate plane (e.g., the perimeter or area of a polygon.
- The algebraic relationship between the slopes of parallel lines and the slopes of perpendicular lines.

Essential Questions:

- What is the relationship between the slopes of parallel lines and of perpendicular lines?
- Given a polygon represented in the coordinate plane, what is its perimeter and area?
- How can geometric relationships be proven through the application of algebraic properties to geometric figures represented in the coordinate plane?

Student will be able to…

(what does mastery look like)

- Use the coordinate plane to describe and prove the relationship between the slopes of parallel and perpendicular lines to solve geometric problems,
- Find a point on a directed line segment that partitions the segment in a given ratio.
- Use the distance formula to determine the length of a segment or side of a polygon; using this information to find either the perimeter or area of this polygon.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities:

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

List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 5**
Geometric Measurement and Dimension (GMD)	
5.G.GMD.1 / 5.G.GMD.2	
Essential Understanding: • The formulas for circumference, area, surface area, and volume of two- and three-dimensional geometric figures can be seen as linear and other functions of the radius.	
Essential Question: • How can familiar formulas for two-and three-dimensional geometric figures be viewed as a function and/or model?	
Student will be able to… *(what does mastery look like)* • Find the circumference and area of a circle using algebra • Find the volume for cylinders, pyramids, cones and spheres. • Describe (in words) how the formulas from various two-dimensional figures can be incorporated into the formulas for the volume of three-dimensional figures, i.e., the area of a circle is the base of the cylinder times the height of the cylinder.	

Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**

Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	NRS Level: 5
Modeling with Geometry (MG)	
5.G.MG.1 / 5.G.MG.2	

Essential Understandings:

- Different geometric objects can be used to model the same or various physical phenomena and the object chosen to model the phenomena will be dependent upon how the model is to be used.
- The concept of density and how it may be applied in modeling problems involving area or volume.

Essential Questions:

- How can geometric properties and relationships be applied to solve problems that are modeled by geometric objects?
- What is density as it relates to area or volume?

Student will be able to…

(what does mastery look like)

- Use geometric properties and relationships in real-world applications that model a geometric object, i.e., school track or field may be created by a rectangle with two half-circles placed at the opposite ends of the rectangle or a silo can be created by a cylinder with half of a sphere atop it.
- Explain (in words) and describe (mathematically) how density relates to area and volume.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

STATISTICS AND PROBABILITY (S)	
Content Area: Math	**NRS Level: 5**
Interpreting Categorical and Quantitative Data (ID)	
5.S.ID.1 / 5.S.ID.2 / 5.S.ID.3 / 5.S.ID.4 / 5.S.ID.5 / 5.S.ID.6 / 5.S.ID.7 / 5.S.ID.8 / 5.S.ID.9	

Essential Understandings:

- Data can be represented and interpreted in a variety of formats (dot plots, histograms, and box plots).
- Extreme data points (outliers) can skew interpretations of a set of data.
- Synthesizing information from multiple sets of data results in evidence-based interpretation.
- Center and spread of a data set may be compared in multiple ways.
- Data in a two-way frequency table can be summarized using relative frequencies in the context of the data.
- A line of best fit can be generated for a set of data to model the relationship between two variables by hand or with technology.
- A line of best fit aims to minimize the vertical distances between the data points and the points on the line and may be used to make predictions within the proximity of the data.
- Making predictions for values within or near the data set is more reliable than for values far beyond the data set.
- Correlation does not imply causation.
- Exponential functions, like linear, can be used to model real-life situations.
- Key features in graphs and tables shed light on relationships between two quantities.
- Differences between linear and exponential functions, thus allowing them to use the appropriate model.
- Units, scale, data displays, and levels of accuracy represented in situations.
- Functions can be created to best fit data represented on a scatter plot.
- Computations and interpretations are used to decide if differences between parameters are significant.
- A scatter plot may be used to represent data with two quantitative variables and determine how the variables are related.
- The mean and standard deviation of a data set is used to fit a normal distribution.
- Statistics is a process of making inferences.
- Different data collection methods are appropriate for different situations and randomization relates to each.
- Functions have key features that can be represented on a graph and can be interpreted to provide information to describe relationships of two quantities. These functions can be compared to each other or other functions to model a situation.
- Exponential functions can be determined from data and used to represent many real-life situations (population growth, compound interest, depreciation, etc.).
- The properties of a situation or data set determine what type of function (e.g., linear, quadratic, exponential, polynomial, rational, or logarithmic) should be used to model it.

Essential Questions:

- What is the role of statistics in real-world situations?
- When is it appropriate to question the results from a model compared to real-life situations?
- Which data collection method is best used for a specific context?
- How does randomization relate to a data collection method?
- How is a population mean estimated from data from a sample survey?
- When is the difference between parameters significant?
- From a scatterplot, how are two quantitative variables related?
- How is a data set fit to a normal curve?
- How do various representations of data lead to different interpretations of the data?
- When and how can extreme data points impact interpretation of data?
- Why are multiple sets of data used?
- How are center and spread of data sets described and compared?
- How is a data set represented in a two-way frequency table summarized?
- When is it appropriate to use causation or correlation?
- How can computations and interpretations help to determine which model is appropriate in a given situation?
- What are the key features of a linear, quadratic, or exponential function in a modeling situation?
- How can a situation best be modeled by a linear, quadratic, or exponential function?
- How are units, scale, data displays, and levels of accuracy selected to appropriately represent a situation?
- How can a function that best fits the data from a scatter plot be determined?
- How can a scatter plot that is created or interpreted from data fit a function?
- What are key characteristics to identify when choosing a function to model a given situation?

Student will be able to…

(what does mastery look like)

- Represent and interpret data using a variety of formats, i.e., dot plots, histograms, box plots; ensuring that units, scales, data displays and levels of accuracy represent the situation appropriately.
- Use statistics appropriately to shape data distributions and to compare the measures of central tendency (the median and mean) and spread (the interquartile range and standard deviation) of two or more different data sets.
- Interpret differences in shape, center and spread in terms of a context; accounting for possible extreme data points (outliers)
- Use the mean and standard deviation of a data set fit to a normal distribution and state whether the data set for which such a procedure is *or* is not appropriate.
- Summarize categorical data for two categories in two-way frequency table.
- Interpret relative frequencies (including joint, marginal and conditional relative frequencies) in the context of the data; recognizing possible associations and trends in the data.
- Scatter plots may be used to represent data with two quantitative variables.
- Fit the best functions to the data in terms of the context of the situation, such as fitting line of best fit that suggests a linear association.
- Use technology to obtain the line of best fit and will aim to minimize the vertical distances between data points and the points on the line.
- Find the rate of change (the slope) and the intercept (a constant term) of a linear model in the context of the data.
- Use technology to find and interpret the correlation coefficient of a linear fit.
- Compare and contrast the characteristics between a correlation and causation.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 5**
Making Inferences and Justifying Conclusions (IC)	
5.S.IC.1 / 5.S.IC.2 / 5.S.IC.3 / 5.S.IC.4 / 5.S.IC.5 / 5.S.IC.6	

Essential Understandings:

- Statistics can be a tool for making inferences about population versus sample parameters.
- Results from a model may or may not be consistent with real-life situations of the process.
- Different data collection methods are appropriate for different situations and randomization relates to each.
- Data from a sample survey are used to estimate a population mean.
- Real-life situations are used to decide if differences between parameters are significant.
- A scatter plot may be used to represent data with two quantitative variables and determine how the variables are related.
- The mean and standard deviation of a data set are used to fit a normal distribution.
- Every day decisions are made based on data collection and interpretation.

Essential Questions:

- How can statistics be used to understand parameters of a population versus the sample population?
- When is it appropriate to question the results from a model compared to real-life situations?
- Which data collection method is best used for a specific context?
- How does randomization relate to a data collection method?
- How is a population mean estimated from data from a sample survey?
- From a scatterplot, how are two quantitative variables related?
- How is a data set fit to a normal curve?
- How can reports or publications be evaluated based on the data presented?

Student will be able to…

(what does mastery look like)

- Uses statistics to understand the parameters of a population versus a sample population; explaining how data from a sample survey can be used to estimate a population mean.
- Use a simulation to decide if a specified model is consistent with results from a given data-generating process.
- Determine the purposes of and differences among sample surveys, experiments, and observational studies; explaining how randomization relates to the data in each.
- Use data from a randomized experiment to compare two treatments; using simulations to decide if differences between the parameters are significant.
- Explain how reports or publications can be evaluated based upon the data being presented.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 5**
Using Probability to Make Decisions (MD)	
5.S.MD.1 / 5.S.MD.2 / 5.S.MD.3 / 5.S.MD.4 / 5.S.MD.5 / 5.S.MD.6 / 5.S.MD.7	
Essential Understanding: • Written descriptions, tables, graphs, and equations are useful in representing and investigating decision-making relationships in everyday life and work.	
Essential Question: • How are written descriptions, tables, graphs, and equations used in representing and investigating decision-making relationships in everyday life and work?	

Student will be able to…

(what does mastery look like)

- Write descriptions with defined variables of interest that are useful in representing and investigating decision-making relationships in everyday life or work and support these descriptions with mathematical data.
- Graph a corresponding probability distribution using the same graphical displays as for data distributions.
- Find the expected value of a random variable; interpreting it as the mean of the probability distribution.
- Create a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; finding an expected value.
- Create a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; finding an expected value.
- Find, evaluate and compare strategies on the basis of an expected payoff for a game of chance.
- Use probabilities to make fair decisions by drawing lots or using a random number generator.
- Use different probability concepts to analyze decisions and strategies within the context of a situation.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities:

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

List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

NRS Level 6 – High Adult Secondary Education
(Grade Levels 11.0 – 12.9)

NUMBER AND QUANTITY (N)	
Content Area: Math	**NRS Level: 6**
Quantities (Q)	
6.N.Q.1 / 6.N.Q.2	
Essential Understandings: • Relationships can be represented quantitatively using appropriate units to solve problems in the exploration of real-world situations. • Quantitative models can be created, used, and interpreted to solve real-life situations by using appropriate units.	
Essential Questions: • When is it advantageous to represent relationships between quantities numerically? • Why are procedures and properties necessary when manipulating numeric expressions? • What real world situations can be modeled by using a numerical quantity and an appropriate unit? • What are complex numbers, and when might they appear in mathematical problems?	
Student will be able to… *(what does mastery look like)* • Define, create, use, interpret and represent quantitative relationships using appropriate units when solving a real-world situation. • Find a level of accuracy appropriate to the limitations on measurement when reporting quantities.	
Evidence for Assessing Learning	
Performance Tasks: **Other Evidence:**	
Building the Learning Plan	

Sample Classroom Activities and/or Lesson Plans:

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

List of Instructional Materials: *(core and supplemental)*

List of Technology Resources:

Content Area: Math	**NRS Level: 6**
The Complex Number System (CN)	
6.N.CN.1 / 6.N.CN.2 / 6.N.CN.3 / 6.N.CN.4 / 6.N.CN.5 / 6.N.CN.6 / 6.N.CN.7 / 6.N.CN.8 / 6.N.CN.9	

Essential Understandings:

- Arithmetic operations can be performed with complex numbers in standard form ($a + bi$)
- Complex numbers exist and can arise in mathematical representations of real-world situations.
- Every complex number has a conjugate and it can be used to solve expressions.
- Complex numbers are subject to the commutative, associative, and distributive properties.
- The relationship between the real and complex factors of a quadratic equation.
- There is at least one complex zero in every polynomial function of a positive degree with complex coefficients.

Essential Questions:

- What are complex numbers, and when might they appear in mathematical expressions?
- Which arithmetic operation can be used to create an appropriate complex number to model a given situation?
- How can complex numbers be represented in the rectangular and polar coordinate systems?
- What changes are made to a complex number to find its conjugate?
- Using the relationship $i^2 = -1$, how can the commutative, associative, and distributive properties be used in the arithmetic operations of complex numbers?
- How can complex numbers be used to solve a quadratic equation with real coefficients?
- What is the relationship between the real and complex factors of a quadratic equation and the x-intercepts of a graph of the quadratic?

Student will be able to…

(what does mastery look like)

- State what a complex number is, when it might appear in a mathematical expression and which arithmetic operations can be used to create a complex number.
- Write a complex number in a + b*i* form and represent this number in the rectangular and polar coordinate system.
- Show how the commutative, associative and distributive properties are used in the arithmetic operations of complex numbers by using the relationship $i^2 = -1$.
- Find the conjugate of a complex number written in a + b*i* form and explain how it can be used to solve expressions
- Explain why the rectangular and polar forms of a given complex number represents the same number.
- Represent addition, subtraction, multiplication and the conjugate of complex numbers geometrically on a complex plane; using properties of the representation for computation.
- Find the distance between numbers in the complex plane as the modulus of the difference.
- Find the midpoint of a segment in the complex plane as the average of numbers at its endpoints.
- Use complex numbers to solve quadratic equations with real coefficients.
- Describe the relationships between the real and complex factors of a quadratic equation in terms of the x-intercepts of a graph or the zeros of the function.
- Use the Fundamental Theorem of Algebra to show that it is true for quadratic polynomials.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 6**
Vectors and Matrix Quantities (VM)	
6.N.VM.1 / 6.N.VM.2 / 6.N.VM.3 / 6.N.VM.4 / 6.N.VM.5 / 6.N.VM.6 / 6.N.VM.7 / 6.N.VM.8 / 6.N.VM.9 / 6.N.VM.10 / 6.N.VM.11 / 6.N.VM.12	

Essential Understandings:

- Directed line segments and appropriate symbols are used to represent and solve velocity and other quantities that represent a vector.
- Vector components are found by subtracting the initial point from the coordinates of a terminal point
- The operations of addition, subtraction and multiplication can be applied to vectors.
- Matrices can be used to represent and manipulate data.
- The operations of addition, subtraction and multiplication can be applied to matrices of appropriate dimensions.
- Knowledge of the zero and identity matrices, as well as the determinant, can be applied in matrix addition and multiplication.
- New matrices can be produced by multiplying matrices by scalars.
- Matrices can be used in the transformation(s) of a vector.

Essential Questions:

- What is the purpose of recognizing and writing vectors quantities, having both a magnitude and direction?
- How can vectors represent vector quantities as directed line segments?
- How can the components of a vector be found?
- How can vectors involving velocity and other quantities be represented?
- What would be the result be if vectors were added, subtracted and/or multiplied?
- How are scalars used in matrix multiplication?
- Based upon what is known about matrices, how would the addition, subtraction and multiplication of two matrices be performed and explained?
- What is the role of the zero and identity matrices in matrix addition and multiplication?
- When is the determinant of a square matrix nonzero?
- How can matrices be used in the transformation of vectors?

Student will be able to…

(what does mastery look like)

- Write vector quantities having both a magnitude and a direction.
- Solve velocity and quantities representing vectors with directed line segments and appropriate symbols.
- Find vector components by subtracting the initial point from the coordinates of a terminal point.
- Use either the end-to-end, component-wise or the parallelogram rule to add and subtract vectors.
- Find the magnitude and direction form to determine the magnitude and direction of the sum of two vectors.
- Represent vector subtraction graphically by connecting tips in the appropriate order; performing vector subtraction component-wise.
- Define vector subtraction of v – w as v + (–w), where –w is the additive inverse of w; having the same magnitude as w, but pointing in the opposite direction.
- Multiply a vector by a scalar.
- Represent scalar multiplication graphically; scaling vectors and possibly reversing the direction.
- Find the magnitude of a scalar multiple of cv using $||cv|| = |c|v$; knowing the direction of cv can be either along v (for $c > 0$) or against v (for $c < 0$).
- Use matrices to represent and manipulate data
- Use scalars in matrix multiplication
- Add, subtract and multiply matrices
- Use scalars in matrix multiplication
- Uses the zero and identity matrix in matrix addition and multiplication.
- Use a determinant of a square matrix, which is zero, if and only if the matrix has a multiplicative inverse.
- Multiply a vector by a one column matrix by a matrix of suitable dimensions to produce another vector; using matrices in the transformation of vectors.
- Use a 2 x 2 matrices as transformations of a plane; interpreting the absolute value of the determinant in terms of area.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

ALGEBRA (A)	
Content Area: Math	**NRS Level: 6**
Seeing Structure in Expressions (SSE)	
6.A.SSE.1 / 6.A.SSE.2	

Essential Understandings:

- The different parts of expressions can represent certain values in the context of a situation and help determine a solution process.
- Relationships between quantities can be represented symbolically, numerically, graphically, and verbally in the exploration of real world situations.
- Rules of arithmetic and algebra can be used together with notions of equivalence to transform expressions.
- Equivalent forms of an expression can be found, dependent on how the expression is used.
- Geometric sequences have a domain of integers with equal factors (constant ratios).
- Arithmetic sequences have equal intervals (common difference).
- Geometric sequences can be represented by both recursive and explicit formulas.
- Expressions represent a quantity in terms of its context.
- Expressions have equivalent forms that can reveal new information to aid in solving problems.
- Exponential expressions, like linear expressions, can be used to model real-life situations.
- Differences between linear and exponential expressions allow students to use the appropriate model.

Essential Questions:

- How are expressions used to solve real world problems?
- When is it advantageous to represent relationships between quantities symbolically? Numerically?
- Why are procedures and properties necessary when manipulating numeric or algebraic expressions?
- How can the structure of expressions help determine a solution strategy?
- What new information will be revealed if an expression is written in a different but equivalent form?
- What do the key features of an exponential or linear expression represent in a modeling situation?
- How is it determined if a situation is best modeled by an exponential or linear expression?
- What does completing the square reveal about a quadratic expression?

Student will be able to…

(what does mastery look like)

- Create an equivalent form of a quadratic expression by completing the square; which will reveal the maximum or minimum of the function it defines.
- Write an expression in a different but equivalent form to obtain new information for an exponential function.
- Use the formula to solve a geometric series to solve real-world situations.
- Derive the formula for the sum of a finite geometric series when the common ration is not 1.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities:

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

List of Instructional Materials: *(core and supplemental)*	
List of Technology Resources:	
Content Area: Math	**NRS Level: 6**
Arithmetic with Polynomials and Rational (APR)	
6.A.APR.1 / 6.A.APR.2 / 6.A.APR.3 / 6.A.APR.4 / 6.A.APR.5 / 6.A.APR.6	

Essential Understandings:

- Applied problems using quadratic expressions can be answered by either solving or re-writing the quadratic expression in a more useful form (factoring to find the zeroes, or completing the square to find the maximum or minimum, for instance).
- There are several ways to solve a quadratic expression (square roots, completing the square, quadratic formula, and factoring), and that the most efficient route to solving can often be determined by the initial form of the expression.
- The quadratic formula is derived from the process of completing the square.
- Quadratic expressions have equivalent forms that can reveal new information to aid in solving problems.
- The Remainder Theorem can be used to determine roots of polynomials
- Polynomial and rational expressions can be added, subtracted, and multiplied to produce new polynomials.
- The factors of a quadratic can be used to reveal the zeroes of the quadratic.
- The process of completing the square can be used to reveal the vertex of the graph of a quadratic expression (and consequently the minimum or maximum of the function).
- The degree of a polynomial helps to determine the end behavior of its graph.
- The zeroes of each other of a polynomial expression determine the x-intercepts of its graph.
- Graphs of rational expressions are often discontinuous, due to values that are not in the domain of the expression.
- The long division algorithm for polynomials can be used to determine horizontal or oblique asymptotes of rational expressions.

Essential Questions:

- How can a quadratic expression be simplified?
- How do the factors of a quadratic determine the x-intercepts of the graph and vice versa?
- When a polynomial $p(x)$ is divided by $x - a$, how can its remainder be found?
- How do the arithmetic operations on numbers extend to polynomials?
- What do the factors of a quadratic reveal about the function?
- What does completing the square reveal about a quadratic function?
- What is the graph of a quadratic function? What are its properties?
- How can a rational expression be simplified?

Student will be able to…

(what does mastery look like)

- Use the Remainder Theorem to determine roots of a polynomial.
- Factor or complete the square to solve a quadratic expression for the zeros (found when factoring), and the maxima or the minima (found when completing the square).
- Find the factors of a quadratic function and determine how these factors relate to the x-intercepts (the zeros) of the graph or vice versa
- Prove polynomial identities and use them to describe numerical relationships, i.e., generate Pythagorean triples.
- Use the Binomial Theorem for expansion of $(x + y)^n$ in powers of x and y for a positive integer n; with coefficients determine by Pascal's Triangle.
- Rewrite simple rational expressions in different forms; using inspection, long division or technology.
- Prove that rational expressions form a system analogous to rational numbers, closed under addition, subtraction, multiplication and division by a nonzero rational expression.
- Add, subtract, multiply and divide rational expressions.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 6**
Reasoning with Equations and Inequalities (REI)	
6.A.REI.1 / 6.A.REI.2 / 6.A.REI.3 / 6.A.REI.4 / 6.A.REI.5 / 6.A.REI.6	

Essential Understandings:

- The different parts of an expression, simple rational and radical equations, inverse matrices (if it exists), and inequalities can represent certain values in the context of a situation and help determine a solution process.
- Relationships between quantities can be represented symbolically, numerically, graphically, and verbally in the exploration of real world situations.
- Rules of arithmetic and algebra can be used together with notions of equivalence to transform equations and inequalities in one and two variables.
- Equivalent forms of an expression can be found, dependent on how the expression is used.
- Real world situations can be modeled by systems of linear equations having no, one, or infinitely many solutions.
- Real world situations of systems of inequalities are ordered pairs that satisfy all inequalities, often represented by a region.
- Exact or approximate solutions can be found using tables, graphs, and/or algebraic manipulations.
- Discrete and continuous functions of the first and second degree have properties that appear differently when graphed.
- Exponential expressions represent a quantity in terms of its context and have equivalent forms that can reveal new information to aid in solving problems.
- Exponential functions can be determined from data and used to represent many real-life situations (e.g., population growth, compound interest, depreciation, etc.) by a table, graph, verbal description, or through the use of technology. Each representation can be transferred to another representation.
- Logarithms can be used to solve the exponential equations modeling and can be useful to represent numbers that are very large or that vary greatly and are used to describe real-world situations (e.g., Richter scale, Decibels, pH scale, etc.).

Essential Questions:

- How are various equations, system, and inequalities used to solve real world problems?
- When is it advantageous to represent relationships between quantities symbolically? Numerically? Graphically?
- How can the structure of linear, polynomial, rational, absolute value, exponential, logarithmic, expressions, equations, inequalities help determine a solution strategy?
- How can the solution(s) of a system be represented and interpreted?
- What is the relationship between recursive and explicit equations and how are they represented symbolically?
- How can technology help to determine whether a linear, polynomial, rational, absolute value, exponential, or logarithmic model is appropriate in a given situation?

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

- Find the solution of a simple rational and radical equation in one variable; giving examples showing how extraneous solutions may arise.
- Find the solution of a simple linear equation and a quadratic equation in two variables algebraically and graphically.
- Write a system of linear equations as a single matrix equation in a vector variable.
- Write and find the inverse of a matrix; using it to solve systems of linear equations. (Note: Technology may be used.)
- Find the x-coordinates of the points where the graphs of equations y = f(x) and y = g(x) intersect and explain why these are the solutions of the equation f(x) = g(x).
- Using technology, tables of values or successive approximations to find the exact and approximate solutions for functions which can be linear, polynomial, rational, absolute value, exponential or logarithmic.
- Graph the solutions of a linear inequality in two variables as a half-plane.
- Graph the solution set of a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

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

List of Instructional Materials:
(core and supplemental)

List of Technology Resources:	
FUNCTIONS (F)	
Content Area: Math	**NRS Level: 6**
Interpreting Functions (IF)	
6.F.IF.1 / 6.F.IF.2 / 6.F.IF.3 / 6.F.IF.4 / 6.F.IF.5 / 6.F.IF.6 / 6.F.IF.7 / 6.F.IF.8 / 6.F.IF.9	

Essential Understandings:

- Functions and its notation have exactly one output for each input and can be defined explicitly or recursively.
- Given a particular representation (such as an equation) of a function, other representations (such as graphs or tables) can be generated and explored.
- Functions (square root, cube root, piecewise, polynomial, rational, exponential, and logarithmic) exhibit key features that can be identified and used to compare functions or to determine solutions to real world experiences.
- Average rate of change can be calculated, estimated and/or interpreted from multiple representations of a function.
- Sequences are functions with a domain that is a subset of the integers and can be identified by the constant difference between consecutive terms.
- Graphs of rational functions are often discontinuous, due to values that are not in the domain of the function.
- That $\log_b y = x$ is another way of expressing $b^x = y$ and that this logarithmic expression can be used to determine the solution of an equation where the unknown is in the exponent.
- The graphs of various functions have key features, including domain, intercepts, where the function is increasing or decreasing (positive or negative) behavior, relative maximums and minimums, symmetries, and end behavior.

Essential Questions:

- What are various representations of a function and how can they be interpreted?
- How are key features of a function identified and explained in relation to the context?
- How are functions and their properties including the increasing or decreasing (positive or negative) behavior, relative maximums and minimums, symmetries, and end behavior compared?
- What determines the type of sequence or function is represented in a real-world situation?
- What are the different ways an exponential function be represented?
- What are the key features of a function or graph and how is it best modeled?
- How is the domain of a rational function related to its graph?
- How can rewriting the equation of a rational function (using long division of polynomials) give further information about its graph?

Student will be able to…

(what does mastery look like)

- Define the domain (from one function set) and range (from another function set); assigning each element of the domain to exactly one element of the range.
- Use f(x) to denote the output of function f corresponding to the input or domain and the graph of function f is the graph of f(x).
- Use appropriate function notation; evaluating functions for inputs in their domains and interpreting statements that use function notation in terms of a context.
- Determine and use the appropriate sequence or function (sometimes recursive) that best models a real world situation.
- Models a relationship between functional quantities; interpreting key features of the function graphs and tables in terms of the quantities.
- Draws a graph expressed symbolically and show key features of the graph, by hand in simple cases and/or using technology for more complicated cases.
- Compare two functions each represented either algebraically, graphically, given tables or by a verbal description in terms of their domains, their intercepts, their increasing and decreasing behavior, their relative maximums and minimums, their symmetries and their end behaviors.
- Calculate, estimate or interrupt the average rate of change from multiple representations of a function.
- Represent , interpret and graph various representations of a function, i.e., the square root function, the cubic function, the piecewise function, the polynomial function, the rational, exponential and logarithmic function by the process of factoring and completing the square to show zeros, extreme values, and symmetry of the graph; interpreting these concepts in terms of a context.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan

Sample Classroom Activities and/or Lesson Plans:

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

List of Instructional Materials:
(core and supplemental)

List of Technology Resources:

Content Area: Math	**NRS Level: 6**
Building Functions (BF)	
6.F.BF.1 / 6.F.BF.2 / 6.F.BF.3 / 6.F.BF.4 / 6.F.BF.5	

Essential Understandings:

- Functions with a domain that are a subset of the integers and can be identified by the constant difference between consecutive terms (arithmetic sequences).
- Arithmetic sequences follow a discrete linear pattern, and the common difference is the slope of the line.
- Geometric sequences can be represented by both recursive and explicit formulas.
- Units, scales, data displays, and levels of accuracy are represented in real-world situations.
- Find, understand, and solve the inverse and composite relationship of functions.

Essential Questions:

- What is an arithmetic or geometric sequence and how does it relate to a function?
- What is the relationship between recursive and explicit equations and how are they represented symbolically?
- Which type of arithmetic or geometric sequence or function models a situation?
- How do you choose units, scale, data displays and levels of accuracy to appropriately represent a situation?
- How can the inverse and composite relationship of a function be used in a real-world situation?

Student will be able to… *(what does mastery look like)* • Use arithmetic operations to combine standard functions to create composite functions. • Write arithmetic or geometric sequences both recursively or with an explicit formula to model a situation; translating between these two forms. • Find the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(k(x)) and f(x + k) for specific values of a positive and negative k. • Find the value of k given the graphs; explaining the effects on the graph using technology. • Find inverse functions; solving an equation of the form f(x) = c for a simple function that has an inverse; rewriting an inverse expression. • Verify the composition that one function is the inverse of another. • Read values of an inverse function from a graph or a table; given that the function has an inverse. • Create an invertible function from a non-invertible function by restricting the domain. • Find the inverse relationship between an exponential and logarithmic function; using their inverse relationship to solve problems.
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*

List of Technology Resources:	
Content Area: Math	**NRS Level: 6**
Linear, Quadratic, and Exponential Models (LE)	
6.F.LE.1 / 6.F.LE.2 / 6.F.LE.3 / 6.F.LE.4	

Essential Understandings:

- Differences between linear and exponential functions allow these functions to be used as an appropriate model.
- Use graphs and tables to recognize a situation where a constant grows or decays by a constant percent rate.
- Interpret the parameters in a linear or exponential function in terms of a real-world context (e.g., compounding returns or investment goals).

Essential Questions:

- What are the different ways an exponential or linear function can be compared?
- How can the parameters of a linear or exponential function be interpreted?
- How is it determined when a situation is best modeled by an exponential or linear function?

Student will be able to…

(what does mastery look like)

- States the differences between a linear and exponential function and determine which function best models a particular situation.
- Prove linear functions grow by an equal difference over equal intervals.
- Prove exponential functions grow by equal factors over equal intervals.
- Creates graphs and tables to determine whether the constant grows or decays and by what constant percentage rate.
- Write a logarithmic equation for exponential models; evaluating the logarithm using technology.
- Interprets and states the parameters of either a linear or exponential function in terms of its real-world context.

Evidence for Assessing Learning

Performance Tasks:

Other Evidence:

Building the Learning Plan	
Sample Classroom Activities and/or Lesson Plans:	
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*	
List of Instructional Materials: *(core and supplemental)*	
List of Technology Resources:	

Content Area: Math	**NRS Level: 6**
Trigonometric Functions (TF)	
6.F.TF.1 / 6.F.TF.2 / 6.F.TF.3 / 6.F.TF.4 / 6.F.TF.5 / 6.F.TF.6 / 6.F.TF.7 / 6.F.TF.8 / 6.F.TF.9	

Essential Understandings:

- The unit circle allows all real numbers to work in trigonometric functions.
- Pythagorean identities can be proven and used to solve problems with specified context.
- Key features in a unit circle shed light on the relationships between two quantities.
- Trigonometric functions can be represented by a table, graph, verbal description or equation, and each representation can be transferred to another representation.
- Specific transformations occur to trigonometric functions based on a value *k* and its manipulation to the function.
- The trigonometric functions $\sin(x)$, $\cos(x)$, or $\tan(x)$ can be used to model real-life situations that exhibit periodic behavior.
- Changing parameters such as amplitude, period, and midline of a function will alter its graph and that these parameters are related to the context or phenomena being modeled.
- The trigonometric functions of sine, cosine, and tangent can be used to solve sum or difference problems.
- Using technology, evaluate and interpret inverse functions to solve trigonometric equations arising in real-world situations.
- Use the unit circle to explain symmetry with odd and even and periodicity of trigonometric functions.

Essential Questions:

- How can the unit circle be read and interpreted using radians?
- How does the Pythagorean theorem and the unit circle relate to the identity $\sin^2(x) + \cos^2(x) = 1$?
- What do the key features or characteristics of a trigonometric function represent?
- What are the different ways a trigonometric function can be represented?
- What transformations can occur to a trigonometric function/graph?
- How can the graphs of trigonometric functions be modified to best fit the situations being modeled?
- How do factors such as amplitude, period, midline, and horizontal shift affect these functions and relate to the phenomena being modeled?
- How can the trigonometric functions of sine, cosine, and tangent be used to solve sum or difference problems?
- How can technology be used to evaluate and interpret inverse functions to solve trigonometric equations arising in real-world situations?
- How can the unit circle explain symmetry with odd and even and periodicity of trigonometric functions?

Student will be able to… *(what does mastery look like)* • Use the radian measure of an angle as the length of the arc of the unit circle. • Describe the unit circle and the basic trigonometric functions to shed light on the relationships between two quantities; interpreting the radian measure of an angle traverses counterclockwise around the unit circle. • Use special triangles to determine geometrically the values of sine, cosine and tangent for $\frac{\pi}{3,}$ $\frac{\pi}{4,}$ and $\frac{\pi}{6}$. • Use the unit circle to express the values of sine, cosine and tangent for $\pi - x$, $\pi + x$, and $2\pi - x$ in terms of their values for x, where x is any real number. • Explain odd and even symmetry and periodicity of trigonometric functions using the unit circle. • Write trigonometric functions that model periodic phenomena with specified amplitude, frequency and midline. • Restrict the domain of a trigonometric function on which the function is always increasing or always decreasing; allowing its inverse to be created. • Uses inverse trigonometric functions to solve equations that arise in a modeling context; evaluating the solutions with or without technology and interpret the solutions in terms of a context. • Prove the Pythagorean identities and use these identities to solve problems within a specific context. • Use the sum and the difference of sine, cosine and tangent to solve real world situation.
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*

List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

GEOMETRY (G)

Content Area: Math	**NRS Level: 6**
Similarity, Right Triangles, and Trigonometry (SRT)	
6.G.SRT.1 / 6.G.SRT.2 / G.SRT.3 / 6.G.SRT.4 / 6.G.SRT.5 / 6.G.SRT.6	

Essential Understandings:

- The ratios of the sides of right triangles are functions of the acute angles of the triangle.
- The sine of an acute angle in a right triangle is equal to the cosine of that angle's complement (and vice versa).
- The Pythagorean Theorem applies only to right triangles.
- Derive the formula $A = \frac{1}{2}ab\,\sin(\mathrm{C})$ for the area of the triangle.
- Prove the Laws of Sine and Cosine for right triangle trigonometry in real-world situations.
- Prove the Laws of Sine and Cosine for non-right triangle trigonometry in real-world situations.

Essential Questions:

- How does similarity give rise to the trigonometric ratios?
- How do the trigonometric ratios of complementary angles relate to one another?
- How can the Pythagorean Theorem be used to solve problems involving triangles?
- How can the formula $A = \frac{1}{2}ab\,\sin(\mathrm{C})$ for the area of the triangle be derived and used?
- How can the Laws of Sine and Cosine for right triangle trigonometry in real-world situations be proved?
- How can the Laws of Sine and Cosine for non-right triangle trigonometry in real-world situations be proved?

Student will be able to… *(what does mastery look like)* • Use similarity to show that the side ratios in a right triangle are properties of the angles in the triangle. • Use the definitions of trigonometric ratios for acute angle in a right triangle. • Explain and use the relationship between sine and cosine of complementary angles. • Apply and use trigonometric ratios and the Pythagorean theorem to solve right triangles in applied problems. • Derive an area of a triangle formula using the sine trig function. • Prove and use the Law of Sine and Law of Cosine on both right triangle trigonometry and non-right triangle trigonometry in real world situations.
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

Content Area: Math	**NRS Level: 6**

Expressing Geometric Properties with Equations (GPE)
6.G.GPE.1 / 6.G.GPE.2 / 6.G.GPE.3 / 6.G.GPE.4
Essential Understandings: • The equation of a circle can be found given a center and radius length. • The equation of a parabola can be found given a focus and directrix. • The equation of an ellipse and hyperbola can be found given the foci or the sum/difference of distances from the foci. • Use coordinates to prove simple geometric theorems algebraically.
Essential Questions: • How can the equation of a circle be found given a center and radius length? • How can the equation of a parabola be found given a focus and directrix? • How can the equation of an ellipse and hyperbola be found given the foci or the sum/difference of distances from the foci? • Using coordinates, how can simple geometric theorems be proven algebraically?
Student will be able to… *(what does mastery look like)* • Write the equation of a circle given the circle's center and radius length. • Write the equation of a parabola given the parabola's focus and directrix. • Write the equation of an ellipse or hyperbola given the foci and/or the sum/difference of the distances of from the foci. • Use the coordinates in a coordinate place to prove simple geometric theorems algebraically.
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:

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

List of Instructional Materials:
(core and supplemental)

List of Technology Resources:

Content Area: Math	**NRS Level: 6**
Geometric Measurement and Dimension (GMD)	
6.G.GMD.1 / 6.G.GMD.2 / 6.G.GMD.3	

Essential Understandings:

- Given an informal argument, explain the formulas for the circumference, area of a circle, volume of a cylinder, pyramid, and cone can be solved.
- Given an informal argument using Cavalieri's principle, explain the formulas of a sphere and other solid figures can be solved.
- Identify the shapes of two-dimensional cross-sections of three-dimensional objects.
- Identify three-dimensional objects generated by rotations of two-dimensional objects.

Essential Questions:

- How can an informal argument explain the formulas for the circumference, area of a circle, volume of a cylinder, pyramid, and cone?
- How can an informal argument using Cavalieri's principle explain the formulas of a sphere and other solid figures?
- How can shapes of two-dimensional cross-sections of three-dimensional objects be identified?
- How can shapes of three-dimensional objects generated by rotations of two-dimensional objects be identified?

Student will be able to… *(what does mastery look like)* • Use an informal argument to explain the formulas for the circumference and area of a circle, the volume of a cylinder, a pyramid and cone. • Use Cavalieri's principle to explain the formula of a sphere and other solid geometric figures. • Identify and state the two-dimensional cross-section of a three-dimensional object. • Identify the shapes of three-dimensional objects generated by rotations of two-dimensional objects.
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*

List of Technology Resources:	
Content Area: Math	**NRS Level: 6**
Modeling with Geometry (MG)	
6.G.MG.1	
Essential Understanding: • Geometric objects may be used to model various physical phenomena.	
Essential Question: • How can geometric figures be used to model physical phenomena or problem situations?	
Student will be able to… *(what does mastery look like)* • Use and solve various geometric objects to model physical phenomena or problem situations.	
Evidence for Assessing Learning	
Performance Tasks: **Other Evidence:**	
Building the Learning Plan	
Sample Classroom Activities and/or Lesson Plans:	
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*	

List of Instructional Materials: *(core and supplemental)*
List of Technology Resources:

STATISTICS (S)	
Content Area: Math	**NRS Level: 6**
Conditional Probability and the Rules of Probability (CP)	
6.S.CP.1 / 6.C.SP.2 / 6.S.CP.3 / 6.S.CP.4 / 6.S.CP.5 / 6.S.CP.6 / 6.S.CP.7 / 6.S.CP.8 / 6.S.CP.9	

Essential Understandings:

- Events can be described as a subset of a sample space.
- The probability of two events occurring together is the product of their probabilities, if and only if then the events are independent.
- The probability of two events can be conditional on each other and the interpretation of that probability.
- Two-way frequency tables can be used to decide if events are independent and to find conditional probabilities.
- Conditional probability and independence are applied to everyday situations.
- Conditional probability of A given B can be found and interpreted in context.
- The Addition or Multiplication Rule can be applied and the resulting probability can be interpreted in a context or in terms of a given model.
- Permutations and combinations can be used to compute probabilities of compound events in problem-solving situations.

Essential Questions:

- How can an event be described as a subset of outcomes using correct set notation?
- How are probabilities, including joint probabilities, of independent events calculated?
- How are probabilities of independent events compared to their joint probability?
- How does conditional probability apply to real-life events?
- How are two-way frequency tables used to model real-life data?
- How are conditional probabilities and independence interpreted in relation to a situation?
- What is the difference between compound and conditional probabilities?
- How is the probability of event (A or B) found?
- How can the Addition or Multiplication Rule be applied and the resulting probability be interpreted within a context or in terms of a given model?
- How can permutations and combinations be used to compute probabilities of compound events in problem-solving situations?

Student will be able to… *(what does mastery look like)* • Describe events as a subset of a sample space; using characteristics of categories of the outcomes, or as unions, intersections, or complements of other events. • Use the product of two probabilities when the events in a given situation are independent events; using this characterization to determine if they are independent. • Create everyday situations that use conditional probability and independent events • Find that the conditional probability of event A given event B and interpret this probability in the context given. • Recognize, explain and use the concepts of conditional probability and independence in everyday language and in everyday situations. • Use the Addition or Multiplication Rule and interpret the appropriate rule in a context or in terms of a given model. • Use permutations and combinations to compute probabilities of compound events in problem solving situation. • Use and construct two-way frequency tables for independent events are independent and find the conditional probability
Evidence for Assessing Learning
Performance Tasks: **Other Evidence:**
Building the Learning Plan
Sample Classroom Activities and/or Lesson Plans:
Learning Activities: *(interventions for students who are not progressing, instructional strategies, differentiated instruction, re-teaching options)*
List of Instructional Materials: *(core and supplemental)*

List of Technology Resources: