North Carolina Tutorials are designed specifically for the Common Core State Standards for English language arts, the North Carolina Standard Course of Study for Math, and the North Carolina Essential Standards, to prepare students for the READY End-of-Course Assessments.

Math Tutorials offer targeted instruction, practice and review designed to develop computational fluency, deepen conceptual understanding, and apply mathematical practices. They automatically identify and address learning gaps down to elementary-level content, using adaptive remediation to bring students to grade-level no matter where they start. Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By constantly honing the ability to apply their knowledge in abstract and real world scenarios, students build the depth of knowledge and higher order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible to students through focused content, modeled logic and process, multi-modal representations, and personalized feedback as students reason through increasingly challenging problems. The Review It offers a high impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

1. RATE, RATIO, AND PROPORTION

- **UNIT RATES**
  - **NC.7.RP.1** *Compute unit rates associated with ratios of fractions to solve real-world and mathematical problems.*
  - **NC.7.RP.2.a.1** *Represent proportional relationships using tables and graphs.*
  - **NC.7.RP.2.a.2** *Recognize whether ratios are in a proportional relationship using tables and graphs.*
  - **NC.7.RP.2.a.3** *Compare two different proportional relationships using tables, graphs, equations, and verbal descriptions.*

- **IDENTIFYING PROPORTIONAL RELATIONSHIPS**
  - **NC.7.RP.2.c** *Create equations and graphs to represent proportional relationships.*
  - **NC.7.RP.2.a.1** *Represent proportional relationships using tables and graphs.*
  - **NC.7.RP.2.a.2** *Recognize whether ratios are in a proportional relationship using tables and graphs.*

2. PROBLEM SOLVING USING PROPORTIONS

- **ANALYZING PROPORTIONAL RELATIONSHIPS**
  - **NC.7.RP.2.b** *Identify the unit rate (constant of proportionality) within two quantities in a proportional relationship using tables, graphs, equations, and verbal descriptions.*
  - **NC.7.RP.1** *Compute unit rates associated with ratios of fractions to solve real-world and mathematical problems.*
  - **NC.7.RP.2.a.1** *Represent proportional relationships using tables and graphs.*
  - **NC.7.RP.2.a.2** *Recognize whether ratios are in a proportional relationship using tables and graphs.*
  - **NC.7.RP.2.a.3** *Compare two different proportional relationships using tables, graphs, equations, and verbal descriptions.*

- **REPRESENTING PROPORTIONAL RELATIONSHIPS**
  - **NC.7.RP.2.c** *Create equations and graphs to represent proportional relationships.*
  - **NC.7.RP.2.a.2** *Recognize whether ratios are in a proportional relationship using tables and graphs.*
  - **NC.7.RP.2.d.1** *Explain the meaning of any point (x, y).*
  - **NC.7.RP.2.d.2** *Explain the meaning of (0, 0) and why it is included.*
  - **NC.7.RP.2.d.3** *Understand that the y-coordinate of the ordered pair (1, r) corresponds to the unit rate and explain its*

meaning.

- **NC.7.RP.3** *Use scale factors and unit rates in proportional relationships to solve ratio and percent problems.*

- **USING PROPORTIONS TO SOLVE PROBLEMS**
  - **NC.7.RP.3** *Use scale factors and unit rates in proportional relationships to solve ratio and percent problems.*

3. ADDITION AND SUBTRACTION OF RATIONAL NUMBERS

- **ADDING RATIONAL NUMBERS**
  - **NC.7.NS.3** *Solve real-world and mathematical problems involving numerical expressions with rational numbers using the four operations.*
  - **NC.7.NS.1** *Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers, using the properties of operations, and describing real-world contexts using sums and differences.*

- **SUBTRACTING RATIONAL NUMBERS**
  - **NC.7.NS.3** *Solve real-world and mathematical problems involving numerical expressions with rational numbers using the four operations.*
  - **NC.7.NS.1** *Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers, using the properties of operations, and describing real-world contexts using sums and differences.*
  - **NC.7.EE.3.i** *Apply properties of operations to calculate with positive and negative numbers in any form.*
  - **NC.7.EE.3.ii** *Convert between different forms of a number and equivalent forms of the expression as appropriate.*

- **USING PROPERTIES TO ADD AND SUBTRACT RATIONAL NUMBERS**
  - **NC.7.NS.1** *Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers, using the properties of operations, and describing real-world contexts using sums and differences.*
  - **NC.7.NS.3** *Solve real-world and mathematical problems involving numerical expressions with rational numbers using the four operations.*
  - **NC.7.EE.3.i** *Apply properties of operations to calculate with positive and negative numbers in any form.*
  - **NC.7.EE.3.ii** *Convert between different forms of a number and equivalent forms of the expression as appropriate.*

4. MULTIPLICATION AND DIVISION OF RATIONAL NUMBERS

- **MULTIPLYING RATIONAL NUMBERS**
  - **NC.7.NS.2.b** *Apply properties of operations as strategies, including the standard algorithms, to multiply and divide rational numbers and describe the product and quotient in real-world contexts.*
  - **NC.7.NS.3** *Solve real-world and mathematical problems involving numerical expressions with rational numbers using the four operations.*
  - **NC.7.EE.3.i** *Apply properties of operations to calculate with positive and negative numbers in any form.*
  - **NC.7.EE.3.ii** *Convert between different forms of a number and equivalent forms of the expression as appropriate.*

- **DIVIDING RATIONAL NUMBERS**
  - **NC.7.NS.2.a** *Understand that a rational number is any number that can be written as a quotient of integers with a non-zero divisor.*
  - **NC.7.NS.2.b** *Apply properties of operations as strategies, including the standard algorithms, to multiply and divide rational numbers and describe the product and quotient in real-world contexts.*
  - **NC.7.NS.3** *Solve real-world and mathematical problems involving numerical expressions with rational numbers using the four operations.*
  - **NC.7.EE.3.i** *Apply properties of operations to calculate with positive and negative numbers in any form.*
  - **NC.7.EE.3.ii** *Convert between different forms of a number and equivalent forms of the expression as appropriate.*

- **USING PROPERTIES TO MULTIPLY AND DIVIDE RATIONAL NUMBERS**
  - **NC.7.NS.2.b** *Apply properties of operations as strategies, including the standard algorithms, to multiply and divide rational*

numbers and describe the product and quotient in real-world contexts.

- **NC.7.NS.3** *Solve real-world and mathematical problems involving numerical expressions with rational numbers using the four operations.*
- **NC.7.EE.3.i** *Apply properties of operations to calculate with positive and negative numbers in any form.*
- **NC.7.EE.3.ii** *Convert between different forms of a number and equivalent forms of the expression as appropriate.*

5. PROBLEM SOLVING USING RATIONAL NUMBERS

EXPRESSING RATIONAL NUMBERS IN DECIMAL FORM

- **NC.7.NS.2.c.1** *Convert a fraction to a decimal using long division.*
- **NC.7.NS.2.c.2** *Understand that the decimal form of a rational number terminates in 0s or eventually repeats.*
- **NC.7.EE.3.ii** *Convert between different forms of a number and equivalent forms of the expression as appropriate.*

USING OPERATIONS ON RATIONAL NUMBERS TO SOLVE PROBLEMS

- **NC.7.NS.1** *Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers, using the properties of operations, and describing real-world contexts using sums and differences.*
- **NC.7.NS.2.b** *Apply properties of operations as strategies, including the standard algorithms, to multiply and divide rational numbers and describe the product and quotient in real-world contexts.*
- **NC.7.NS.3** *Solve real-world and mathematical problems involving numerical expressions with rational numbers using the four operations.*
- **NC.7.EE.3.i** *Apply properties of operations to calculate with positive and negative numbers in any form.*
- **NC.7.EE.3.ii** *Convert between different forms of a number and equivalent forms of the expression as appropriate.*

SOLVING MULTI-STEP PROBLEMS WITH RATIONAL NUMBERS

- **NC.7.NS.1** *Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers, using the properties of operations, and describing real-world contexts using sums and differences.*
- **NC.7.NS.2.b** *Apply properties of operations as strategies, including the standard algorithms, to multiply and divide rational numbers and describe the product and quotient in real-world contexts.*
- **NC.7.NS.3** *Solve real-world and mathematical problems involving numerical expressions with rational numbers using the four operations.*
- **NC.7.EE.3.i** *Apply properties of operations to calculate with positive and negative numbers in any form.*
- **NC.7.EE.2** *Understand that equivalent expressions can reveal real-world and mathematical relationships. Interpret the meaning of the parts of each expression in context.*
- **NC.7.EE.3.ii** *Convert between different forms of a number and equivalent forms of the expression as appropriate.*
- **NC.7.EE.4.a.1** *Fluently solve multistep equations with the variable on one side, including those generated by word problems.*
- **NC.7.EE.4.a.2** *Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.*
- **NC.7.EE.4.a.3** *Interpret the solution in context.*

6. ALGEBRAIC EXPRESSIONS, EQUATIONS, AND INEQUALITIES

SIMPLIFYING AND REWRITING ALGEBRAIC EXPRESSIONS

- **NC.7.EE.1.i** *Add, subtract, and expand linear expressions with rational coefficients.*
- **NC.7.EE.2** *Understand that equivalent expressions can reveal real-world and mathematical relationships. Interpret the meaning of the parts of each expression in context.*
- **NC.7.EE.3.ii** *Convert between different forms of a number and equivalent forms of the expression as appropriate.*

SOLVING TWO-STEP EQUATIONS

- **NC.7.EE.4.a.1** *Fluently solve multistep equations with the variable on one side, including those generated by word problems.*
- **NC.7.EE.4.a.2** *Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.*

SOLVING LINEAR INEQUALITIES

- **NC.7.EE.4.b.1** *Fluently solve multi-step inequalities with the variable on one side, including those generated by word problems.*
- **NC.7.EE.4.b.3** *Graph the solution set of the inequality and interpret in context.*

7. DRAWING, CONSTRUCTING, AND EXPLORING GEOMETRIC FIGURES

- **SCALE DRAWINGS**
  - **NC.7.G.1.i** *Building an understanding that angle measures remain the same and side lengths are proportional.*
  - **NC.7.G.1.ii** *Using a scale factor to compute actual lengths and areas from a scale drawing.*
  - **NC.7.G.1.iii** *Creating a scale drawing.*

- **GEOMETRIC DRAWINGS**
  - **NC.7.G.2** *Understand the characteristics of angles and side lengths that create a unique triangle, more than one triangle or no triangle. Build triangles from three measures of angles and/or sides.*

8. GEOMETRY

- **CIRCLES**
  - **NC.7.G.4.i** *Understand the relationships between the radius, diameter, circumference, and area.*
  - **NC.7.G.4.ii** *Apply the formulas for area and circumference of a circle to solve problems.*

- **ANGLE RELATIONSHIPS**
  - **NC.7.G.5** *Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve equations for an unknown angle in a figure.*

- **AREA, VOLUME, AND SURFACE AREA**
  - **NC.7.G.6.i** *Area and perimeter of two-dimensional objects composed of triangles, quadrilaterals, and polygons.*

9. STATISTICS AND SAMPLING

- **POPULATIONS AND SAMPLES**
  - **NC.7.SP.2** *Generate multiple random samples (or simulated samples) of the same size to gauge the variation in estimates or predictions, and use this data to draw inferences about a population with an unknown characteristic of interest.*
  - **NC.7.SP.1.i** *Recognizing that generalizations about a population from a sample are valid only if the sample is representative of that population.*
  - **NC.7.SP.1.ii** *Using random sampling to produce representative samples to support valid inferences.*
  - **NC.7.SP.4** *Use measures of center and measures of variability for numerical data from random samples to draw comparative inferences about two populations.*

- **COMPARING DATA SETS VISUALLY**
  - **NC.7.SP.4** *Use measures of center and measures of variability for numerical data from random samples to draw comparative inferences about two populations.*
  - **NC.7.SP.3.a.1** *Understand the mean absolute deviation of a data set is a measure of variability that describes the average distance that points within a data set are from the mean of the data set.*
  - **NC.7.SP.3.b** *Informally assess the difference between two data sets by examining the overlap and separation between the graphical representations of two data sets.*

- **USING STATISTICAL MEASURES TO COMPARE DATA SETS**
  - **NC.7.SP.4** *Use measures of center and measures of variability for numerical data from random samples to draw comparative inferences about two populations.*
  - **NC.7.SP.3.a.1** *Understand the mean absolute deviation of a data set is a measure of variability that describes the average distance that points within a data set are from the mean of the data set.*

- **NC.7.SP.3.a.2** *Understand that the range describes the spread of the entire data set.*
- **NC.7.SP.3.a.3** *Understand that the interquartile range describes the spread of the middle 50% of the data.*

10. PROBABILITY I

- **PROBABILITY**
  - **NC.7.SP.5** *Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.*
  - **NC.7.SP.6** *Collect data to calculate the experimental probability of a chance event, observing its long-run relative frequency. Use this experimental probability to predict the approximate relative frequency.*
  - **NC.7.SP.2** *Generate multiple random samples (or simulated samples) of the same size to gauge the variation in estimates or predictions, and use this data to draw inferences about a population with an unknown characteristic of interest.*
  - **NC.7.SP.1.i** *Recognizing that generalizations about a population from a sample are valid only if the sample is representative of that population.*
  - **NC.7.SP.1.ii** *Using random sampling to produce representative samples to support valid inferences.*

- **CALCULATING PROBABILITY**
  - **NC.7.SP.7.a** *Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.*
  - **NC.7.SP.8.a** *Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.*
  - **NC.7.SP.7.b** *Develop a probability model (which may not be uniform) by repeatedly performing a chance process and observing frequencies in the data generated.*
  - **NC.7.SP.7.c** *Compare theoretical and experimental probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.*

11. PROBABILITY II

- **PROBABILITY OF COMPOUND EVENTS**
  - **NC.7.SP.5** *Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.*
  - **NC.7.SP.8.a** *Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.*
  - **NC.7.SP.8.b** *For an event described in everyday language, identify the outcomes in the sample space which compose the event, when the sample space is represented using organized lists, tables, and tree diagrams.*

- **SIMULATIONS**
  - **NC.7.SP.8.a** *Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.*
  - **NC.7.SP.8.c** *Design and use a simulation to generate frequencies for compound events.*
  - **NC.7.SP.5** *Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.*