# MATH 7

## Course Overview Documents


*A Program of the A+ Education Partnership*
*In partnership with the Alabama State Dept. of Education*

# MATH 7

*Course Overview*

## 1ST 9-WEEKS

Unit 1: Operations with Rational Numbers

Unit 2: Operations on Expressions

Unit 3: Equations & Inequalities

**Unit 3 may be started at the end of the 1st 9-Weeks**

## 2ND 9-WEEKS

Unit 3: Equations & Inequalities

Unit 4: Ratios and Proportions

Unit 5: Percent Applications

## 3RD 9-WEEKS

Unit 6: Statistics

Unit 7: Probability

Unit 8 2D Figures

**Unit 8 may be started at the end of the 3rd 9-Weeks**

## 4TH 9-WEEKS

Unit 8: 2D Figures

Unit 9: Angle and Triangle Relationships

Unit 10: 3D Applications

Extension Unit

| STANDARDS CHECKLIST | | | | | |
|---|---|---|---|---|---|
| **ALCOS** | **1ST 9-WEEKS** | **2ND 9-WEEKS** | **3RD 9-WEEKS** | **4TH 9-WEEKS** | **UNITS** |
| 1 | | X | | | 4 |
| 2 | | X | | | 4 |
| 3 | | X | X | | 5 |
| 4 | X | | | | 1 |
| 5 | X | | | | 1 |
| 6 | X | | | | 2 |
| 7 | X | | | | 2 |
| 8 | X | | X | | 1, 5 |
| 9 | X | X | | | 2, 3, 4 |
| 10 | | | X | | 6 |
| 11 | | | X | | 6 |
| 12 | | | X | | 6 |
| 13 | | | X | | 7 |
| 14 | | | X | | 7 |
| 15 | | | X | | 7 |
| 16 | | | X | | 7 |
| 17 | | | X | X | 8 |
| 18 | | | | X | 9 |
| 19 | | | | X | 10 |
| 20 | | | X | | 8 |
| 21 | | | | X | 9 |
| 22 | | | X | X | 8, 10 |

# MATH 7

*Scope and Sequence – 1st 9 Weeks*

| UNIT 1: Operations with Rational Numbers | UNIT 2: Operations on Expressions | UNIT 3: Equations and Inequalities |
|---|---|---|

| | DAY 1 | DAY 2 | DAY 3 | DAY 4 | DAY 5 |
|---|---|---|---|---|---|
| **WEEK 1** | Course Introduction and Expectations | Lonesome Llama & Group Norms | [1] Understanding Additive Inverse | [1] Understanding Additive Inverse | [2] Adding & Subtracting Integers |
| **WEEK 2** | [2] Adding & Subtracting Integers | [2] Adding & Subtracting Integers | [2] Adding & Subtracting Integers | [2] Adding & Subtracting Integers | [3] Adding & Subtracting Rational Numbers |
| **WEEK 3** | [3] Adding & Subtracting Rational Numbers | [3] Adding & Subtracting Rational Numbers | | [4] Multiplying & Dividing Rational Numbers | [4] Multiplying & Dividing Rational Numbers |
| **WEEK 4** | [4] Multiplying & Dividing Rational Numbers | [4] Multiplying & Dividing Rational Numbers | [4] Multiplying & Dividing Rational Numbers | [5] Four Operations with Rational Numbers | [5] Four Operations with Rational Numbers |
| **WEEK 5** | [5] Four Operations with Rational Numbers | [6] Decimal Expansions of Fractions | | | [1] Identify & Combine Like Terms |
| **WEEK 6** | [2] Equivalent Expressions Using Properties & Manipulatives | [2] Equivalent Expressions Using Properties & Manipulatives | [2] Equivalent Expressions Using Properties & Manipulatives | [2] Equivalent Expressions Using Properties & Manipulatives | [3] Equivalent Expressions Practice |
| **WEEK 7** | [3] Equivalent Expressions Practice | [3] Equivalent Expressions Practice | [3] Equivalent Expressions Practice | [4] Applications of Equivalent Expressions | |
| **WEEK 8** | | [1] Solving Equations Using Manipulatives & Models | [1] Solving Equations Using Manipulatives & Models | [2] Solving Equations Algebraically | [2] Solving Equations Algebraically |
| **WEEK 9** | [2] Solving Equations Algebraically | [2] Solving Equations Algebraically | | | |

# MATH 7

*Scope and Sequence – 2nd 9 Weeks*

| UNIT 3: Equations and Inequalities | UNIT 4: Ratios and Proportions | UNIT 5: Percent Applications |
|---|---|---|

| | DAY 1 | DAY 2 | DAY 3 | DAY 4 | DAY 5 |
|---|---|---|---|---|---|
| **WEEK 1** | [3] Solving Equations with Real-World Applications | [3] Solving Equations with Real-World Applications | [3] Solving Equations with Real-World Applications | [3] Solving Equations with Real-World Applications | [3] Solving Equations with Real-World Applications |
| **WEEK 2** | [4] Working with Formulas | | [5] Solving Inequalities | [5] Solving Inequalities | [5] Solving Inequalities |
| **WEEK 3** | [5] Solving Inequalities | | | [1] Interpreting Distance Graphs | [2] All Aboard |
| **WEEK 4** | [2] All Aboard | [2] All Aboard | [3] Interpreting Rate Graphs | [4] Match My Run | [4] Match My Run |
| **WEEK 5** | | [5] Unit Rates & Proportional Relationships | [5] Unit Rates & Proportional Relationships | [5] Unit Rates & Proportional Relationships | [5] Unit Rates & Proportional Relationships |
| **WEEK 6** | [5] Unit Rates & Proportional Relationships | [5] Unit Rates & Proportional Relationships | [5] Unit Rates & Proportional Relationships | [6] Metric & Customary Measurements Part 1 | [6] Metric & Customary Measurements Part 1 |
| **WEEK 7** | | | [1] Percents | [2] Multi-Step Ratio Problems | [3] Applications of Percents |
| **WEEK 8** | [3] Applications of Percents | [3] Applications of Percents | [3] Applications of Percents | [3] Applications of Percents | [3] Applications of Percents |
| **WEEK 9** | [4] Minimizing Debt | | | | |

# MATH 7

*Scope and Sequence – 3rd 9 Weeks*

| UNIT 6: Statistics | UNIT 7: Probability | UNIT 8: 2D Figures |
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| | DAY 1 | DAY 2 | DAY 3 | DAY 4 | DAY 5 |
|---|---|---|---|---|---|
| **WEEK 1** | [1] Samples, Population, and Bias | [2] Getting to Know You | [2] Getting to Know You | [3] Mean Absolute Deviation | [3] Mean Absolute Deviation |
| **WEEK 2** | [4] Counting Ursus Arctos Horribilis, the Grizzly Bear | [4] Counting Ursus Arctos Horribilis, the Grizzly Bear | | [5] Stem-and-Leaf Plots | [6] Box and Whisker Plots |
| **WEEK 3** | [6] Box and Whisker Plots | [7] What Percent of the Earth is Covered by Water? | [8] Comparing Data Displays | | |
| **WEEK 4** | [1] Intro to Probability | [1] Intro to Probability | [2] Free French Fries | [3] Sample Space, Tree Diagrams, Fundamental Counting Principal | [4] Family Fun – Binomial Probability |
| **WEEK 5** | [4] Family Fun – Binomial Probability | | [5] The Passing Game | [5] The Passing Game | [6] Bull's Eye! |
| **WEEK 6** | [6] Bull's Eye! | [7] Using Area to Estimate Probability | [7] Using Area to Estimate Probability | | |
| **WEEK 7** | [1] State the Area | [1] State the Area | [2] A Shoe Print, Trapezoids, and Area | [2] A Shoe Print, Trapezoids, and Area | [3] Scale Drawings |
| **WEEK 8** | [3] Scale Drawings | | [4] Finding Pi | [4] Finding Pi | [5] Deriving the Area of a Circle |
| **WEEK 9** | [6] Discovering Area | [7] Circumference and Area of a Circle | | | |

# MATH 7

*Scope and Sequence – 4th 9 Weeks*

| UNIT 8: 2D Figures | UNIT 9: Angle and Triangle Relationships | UNIT 10: 3D Applications | EXTENSION UNIT |
|---|---|---|---|

| | DAY 1 | DAY 2 | DAY 3 | DAY 4 | DAY 5 |
|---|---|---|---|---|---|
| **WEEK 1** | [8] Triangle Area Activity | [9] Composite Figures (Hopscotch) | [10] Playground Project Assessment | [10] Playground Project Assessment | |
| **WEEK 2** | | [1] Triangle Inequality Investigation | [1] Triangle Inequality Investigation | [2] Triangle Investigation with Sides and Angles | [2] Triangle Investigation with Sides and Angles |
| **WEEK 3** | [2] Triangle Investigation with Sides and Angles | | [3] Angle Relationships – Complementary, Supplementary, … | [3] Angle Relationships – Complementary, Supplementary, … | [3] Angle Relationships – Complementary, Supplementary, … |
| **WEEK 4** | [4] Using Angle Relationships to Solve Problems | [4] Using Angle Relationships to Solve Problems | [4] Using Angle Relationships to Solve Problems | [4] Using Angle Relationships to Solve Problems | |
| **WEEK 5** | | [1] Slicing Solids | [1] Slicing Solids | [2] Surface Area | [2] Surface Area |
| **WEEK 6** | [3] Volume | [3] Volume | [4] Surface Area & Volume in Real-World Applications | [4] Surface Area & Volume in Real-World Applications | [5] Fill It Up Please – Part 1 |
| **WEEK 7** | [5] Fill It Up Please – Part 1 | [6] Surface Area and Volume | [6] Surface Area and Volume | | |
| **WEEK 8** | [1] Stock Car Racetracks | [2] A New Home for Rami | [3] Discovering the Golden Ratio | [4] Maximizing Area | [5] Measuring Curves |
| **WEEK 9** | | | | | |

# MATH 7

*Unit Overview*

| UNIT 1: Operations with Rational Numbers | RECOMMENDED TIME FRAME: 22 days |
|---|---|

## UNIT OVERVIEW

This unit starts with students learning to add, subtract, multiply, and divide integers. Since this is the first experience students have with this, it is important to build the conceptual understanding before developing the rules. Students then extend their knowledge to include all rational numbers. From there, students explore the conversions between decimals and fractions to understand when fractions will have terminating or repeating decimals.

## STANDARDS

4. Apply and extend knowledge of operations of whole numbers, fractions, and decimals to add, subtract, multiply, and divide rational numbers including integers, signed fractions, and decimals.
   a. Identify and explain situations where the sum of opposite quantities is 0 and opposite quantities are defined as additive inverses.
   b. Interpret the sum of two or more rational numbers, by using a number line and in real-world contexts.
   c. Explain subtraction of rational numbers as addition of additive inverses.
   d. Use a number line to demonstrate that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
   e. Extend strategies of multiplication to rational numbers to develop rules for multiplying signed numbers, showing that the properties of the operations are preserved.
   f. This unit starts with students learning to add, subtract, multiply, and divide integers. Since this is the first experience students have with this, it is important to build the conceptual understanding before developing the rules. Students then extend their knowledge to include all rational numbers. From there, students explore the conversions between decimals and fractions to understand when fractions will have terminating or repeating decimals. Divide integers and explain that division by zero is undefined. Interpret the quotient of integers (with a non-zero divisor) as a rational number.
   g. Convert a rational number to a decimal using long division, explaining that the decimal form of a rational number terminates or eventually repeats.
5. Solve real-world and mathematical problems involving the four operations of rational numbers, including complex fractions. Apply properties of operations as strategies where applicable.
8. Solve multi-step real-world and mathematical problems involving rational numbers (integers, signed fractions and decimals), converting between forms as needed. Assess the reasonableness of answers using mental computation and estimation strategies.

| RESOURCES |
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| Unit 1 Student Progress Monitoring Document |
| Unit 1 Proficiency Scale |
| Unit 1 Sample Summative Assessment |
| Unit 1 Sample Summative Assessment Key |

# MATH 7

*Unit Overview*

| UNIT 2: Operations on Expressions | RECOMMENDED TIME FRAME: 12 days |
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## UNIT OVERVIEW

In 6th grade, students write equivalent expressions using properties of operations and combining like terms. In 7th grade, students will extend this knowledge to include all rational numbers. Students will also be exposed to distributive property and factoring with variable expressions.

## STANDARDS

6. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
7. Generate expressions in equivalent forms based on context and explain how the quantities are related.
9. Use variables to represent quantities in real-world or mathematical problems and construct algebraic expressions, ~~equations, and inequalities~~ to solve problems by reasoning about the quantities.

## RESOURCES

Unit 2 Student Progress Monitoring Document

Unit 2 Proficiency Scale

Unit 2 Sample Summative Assessment

Unit 2 Sample Summative Assessment Key

# MATH 7
*Unit Overview*

| UNIT 3: Equations and Inequalities | RECOMMENDED TIME FRAME: 21 days |
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## UNIT OVERVIEW

In 6th grade, students are only asked to solve 1 step equations and inequalities and only with positive solutions. Any of the Performance Tasks could be used as an assessment during the unit. Depending on your students, you may need more practice on different types of equations or inequalities.

## STANDARDS

8. Solve multi-step real-world and mathematical problems involving rational numbers (integers, signed fractions
9. Use variables to represent quantities in real-world or mathematical problems and construct algebraic expressions, equations, and inequalities to solve problems by reasoning about the quantities.
   a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where $p$, $q$, and $r$ are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.
   b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where $p$, $q$, and $r$ are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

## RESOURCES

Unit 3 Student Progress Monitoring Document

Unit 3 Proficiency Scale

Unit 3 Sample Summative Assessment

Unit 3 Sample Summative Assessment Key

# MATH 7

*Unit Overview*

| UNIT 4: Ratios and Proportions | RECOMMENDED TIME FRAME: 19 days |
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## UNIT OVERVIEW

Building from the development of rate and unit rate concepts in Grade 6, applications now need to focus on solving unit rate problems with more sophisticated numbers. Proportional relationships are further developed through the analysis of graphs, tables, equations, and diagrams. Students are required to interpret the meanings of values in relation to the graphs, tables, equations, and diagrams. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line.

## STANDARDS

1. Calculate unit rates of length, area, and other quantities measured in like or different units that include ratios or fractions.
2. Represent a relationship between two quantities and determine whether the two quantities are related proportionally.
   a. Use equivalent ratios displayed in a table or in a graph of the relationship in the coordinate plane to determine whether a relationship between two quantities is proportional.
   b. Identify the constant of proportionality (unit rate) and express the proportional relationship using multiple representations including tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
   c. Explain in context the meaning of a point $(x, y)$ on the graph of a proportional relationship, with special attention to the points $(0,0)$ and $(1, r)$ where $r$ is the unit rate.

## RESOURCES

Unit 4 Student Progress Monitoring Document

Unit 4 Proficiency Scale

Unit 4 Sample Summative Assessment

Unit 4 Sample Summative Assessment Key

| UNIT 5: Percent Applications | RECOMMENDED TIME FRAME: 11 days |
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## UNIT OVERVIEW

In 6th grade, students used ratio tables and unit rates to solve problems. Students expand their understanding of proportional reasoning to solve problems that are easier to solve with cross-multiplication. Students should understand the mathematical foundation for cross-multiplication. The use of proportional relationships is also extended to solve percent problems involving tax, markups and markdowns simple interest ($I = prt$, where $I = interest$, $p = principle$, $r = rate$, $and\ t = time$), gratuities and commissions, fees, percent increase and decrease, and percent error.

## STANDARDS

3. Solve multi-step percent problems in context using proportional reasoning, including simple interest, tax, gratuities, commissions, fees, markups and markdowns, percent increase, and percent decrease.
8. Solve multi-step real-world and mathematical problems involving rational numbers (integers, signed fractions and decimals), converting between forms as needed. Assess the reasonableness of answers using mental computation and estimation strategies.

## RESOURCES

Unit 5 Student Progress Monitoring Document

Unit 5 Proficiency Scale

Unit 5 Sample Summative Assessment

Unit 5 Sample Summative Assessment Key

# MATH 7

*Unit Overview*

| UNIT 6: Statistics | RECOMMENDED TIME FRAME: 15 days |
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## UNIT OVERVIEW

In Grade 6, students used measures of center and variability to describe data. Students continue to use this knowledge in Grade 7 as they use random samples to make predictions about an entire population and judge the possible discrepancies of the predictions. Providing opportunities for students to use real-life situations from science and social studies shows the purpose for using random sampling to make inferences about a population. This is the students' first experience comparing two data sets and Mean Absolute Deviation (MAD). Students build on their understanding of graphs, mean, median, and interquartile range from 6th grade. (7 Flipbook Final CCSS 2014)

## STANDARDS

10. Examine a sample of a population to generalize information about the population.
    a. Differentiate between a sample and a population.
    b. Compare sampling techniques to determine whether a sample is random and thus representative of a population, explaining that random sampling tends to produce representative samples and support valid inferences.
    c. Determine whether conclusions and generalizations can be made about a population based on a sample.
    d. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest, generating multiple samples to gauge variation and make predictions or conclusions about the population.
    e. Informally explain situations in which statistical bias may exist.
11. Informally assess the degree of visual overlap of two numerical data distributions with roughly equal variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.
12. Make informal comparative inferences about two populations using measures of center and variability and/or mean absolute deviation (MAD) in context.

## RESOURCES

Unit 6 Student Progress Monitoring Document

Unit 6 Proficiency Scale

Unit 6 Sample Summative Assessment

Unit 6 Sample Summative Assessment Key

| UNIT 7: Probability | RECOMMENDED TIME FRAME: 15 days |
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## UNIT OVERVIEW

This unit will cover the standards that address simple and compound probability. As this is the first time that students have been exposed to probability, they will need various, repeated exposure to hands-on probability simulations. Be sure to emphasize the differences between theoretical probability and experimental probability.

## STANDARDS

13. Use a number between 0 and 1 to represent the probability of a chance event occurring, explaining that larger numbers indicate greater likelihood of the event occurring, while a number near zero indicates an unlikely event.
14. Define and develop a probability model, including models that may or may not be uniform, where uniform models assign equal probability to all outcomes and non-uniform models involve events that are not equally likely.
    a. Collect and use data to predict probabilities of events.
    b. Compare probabilities from a model to observe frequencies, explaining possible sources of discrepancy.
15. Approximate the probability of an event by using data generated by a simulation (experimental probability) and compare it to theoretical probability.
16. Find probabilities of simple and compound events through experimentation or simulation and by analyzing the sample space, representing the probabilities as percents, decimals, and fractions.
    a. Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams, and determine the probability of an event by finding the fraction of outcomes in the sample space for which the compound event occurred.
    b. Design and use a simulation to generate frequencies for compound events.
    c. Represent events described in everyday language in terms of outcomes in the sample space which composed the event.

## RESOURCES

Unit 7 Student Progress Monitoring Document

Unit 7 Proficiency Scale

Unit 7 Sample Summative Assessment

Unit 7 Sample Summative Assessment Key

# MATH 7

*Unit Overview*

| UNIT 8: 2D Figures | RECOMMENDED TIME FRAME: 18 days |
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## UNIT OVERVIEW

In this unit, students will expand on their understanding of areas of basic shapes from previous grades by applying area formulas to solve problems in real-world contexts. Students will also extend their knowledge of area and proportional reasoning to solve problems involving scale drawings. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. In addition, students will discover the formula for the area of a circle and solve real world problems involving circumference and area.

## STANDARDS

17. Solve problems involving scale drawings of geometric figures including computation of actual lengths and areas from a scale drawing and reproduction of a scale drawing at a different scale.
20. Explain the relationships among circumference, diameter, area, and radius of a circle to demonstrate understanding of formulas for the area and circumference of a circle.
    a. Informally derive the formula for the area of a circle.
    b. Solve area and circumference problems in real-world and mathematical situations involving circles.
22. Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right rectangular prisms.

## RESOURCES

Unit 8 Student Progress Monitoring Document

Unit 8 Proficiency Scale

Unit 8 Sample Summative Assessment

Unit 8 Sample Summative Assessment Key

# MATH 7

*Unit Overview*

| UNIT 9: Angle and Triangle Relationships | RECOMMENDED TIME FRAME: 15 days |
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## UNIT OVERVIEW

This unit is designed to introduce students to angle relationships. This unit also provides students an opportunity to explore applications of what they learned in the expressions and equations unit in the context of finding missing angle measures. Students will use the knowledge gained about angle relationships (properties of supplementary, complementary, vertical, and adjacent angles), along with what they already know about writing and solving equations, to master using angle relationships.

## STANDARDS

18. Construct geometric shapes (freehand, using a ruler and a protractor, and using technology), given a written description or measurement constraints with an emphasis on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
21. Use facts about supplementary, complementary, vertical, and adjacent angles in multi-step problems to write and solve simple equations for an unknown angle in a figure.

## RESOURCES

Unit 9 Student Progress Monitoring Document

Unit 9 Proficiency Scale

Unit 9 Sample Summative Assessment

Unit 9 Sample Summative Assessment Key

# MATH 7

*Unit Overview*

| UNIT 10: 3D Applications | RECOMMENDED TIME FRAME: 14 days |
|---|---|

## UNIT OVERVIEW

In this unit, students will discuss the shapes formed when cross sections parallel and perpendicular to the base are taken from right rectangular prisms and pyramids. Students will then explore mathematical and real-world problems involving surface area and volume.

## STANDARDS

19. Describe the two-dimensional figures created by slicing three-dimensional figures into plane sections.
22. Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right rectangular prisms.

## RESOURCES

Unit 10 Student Progress Monitoring Document

Unit 10 Proficiency Scale

Unit 10 Sample Summative Assessment

Unit 10 Sample Summative Assessment Key