



**Allamuchy Township School District  
Allamuchy, NJ**

**Math  
Grade 6**

**CURRICULUM GUIDE**

**August 2017**

**Mr. Joseph E. Flynn, Superintendent**

**Developed by:  
Sam Greco**

**This curriculum may be modified through varying techniques,  
strategies and materials, as per an individual student's  
Individualized Education Plan (IEP).**

**Approved by the Allamuchy Board of Education  
At the regular meeting held on August 28, 2017  
And  
*Aligned with the New Jersey Core Curriculum Content Standards  
And Common Core Content Standards***

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## **Philosophy and Rationale**

This School Level Math Curriculum was designed to be consistent with the Common Core Standards for Mathematics and the NJDOE Model Curriculum Unit format. The content of each course; Grade 6 Math, Grade 7 Math, Grade 7 Accelerated Math, Grade 8 Math and Algebra 1 was designed in collaboration with representatives from the middle schools within the Hackettstown sending district cluster. The standards included in each course are organized by unit as recommended by the NJDOE. The curriculum provides a correlation between standards, officially adopted textbook resources and sample assessment items for each student learning objective.

## **Mission Statement**

The mission of the Allamuchy Township District, in partnership with the larger community, is to provide a comprehensive, caring program for all of our students which:

- \*Nurtures the unique talents and interests of each individual
- \*Supports social responsibility and a love of learning
- \*Embraces the total development of each student intellectually, morally and physically
- \*Develops confidence, creativity and skills necessary to face the challenges of a technologically advanced and ever-changing society
- \*Promotes a culture of mutual respect with all other community members
- \*Supports the attainment of the New Jersey Core Curriculum Content Standards

The District seeks to exceed objective standards of achievement set by both the State and Federal government and to provide an educational experience beyond the boundaries established by the Core Curriculum Standards.

## **Scope and Sequence**

## **Stage 1: Desired Results**

### **Unit 1:**

**Topic:** Operations and Statistical Variability

**Content Standards :** 6.NS.1-3, 5  
6.SP.1-3, 5c-d

### **Essential Questions:**

1. How do we compute fractions?
2. How do we use patterns to understand fractions?
3. How do we compute mixed numbers?
4. How do we organize data so that it is useful?
5. How do we identify mean, mode, median and range?
6. What is an interquartile range and an absolute deviation?

### **Enduring Understandings**

1. Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
2. Compute fluently with multi-digit numbers and find common factors and multiples.
3. Apply and extend previous understandings of numbers to the system of rational numbers.
4. Apply and extend previous understandings of numbers to the system of rational numbers.
5. Develop understanding of statistical variability.
6. Summarize and describe distributions

### **Knowledge and Skills** (SWBAT embedded course proficiencies)

1. Compute quotients of fractions.
2. Construct visual fraction models to represent quotients and explain the relationship between multiplication and division of fractions.
3. Solve real-world problems involving quotients of fractions and interpret the solutions in the context given.
4. Fluently add, subtract, multiply and divide multi-digit decimals and whole numbers using standard algorithms.
5. Use positive and negative numbers to describe quantities in real-world situations.
6. Calculate, compare, and interpret measures of center and variability in a data set to answer a statistical question. (Including median, mean, interquartile range, mean absolute deviation and overall pattern).

## **Stage 2: Evidence of Understanding, Learning Objectives and Expectations**

### **Benchmarks**

1. Find:  
 $\frac{4}{5} \div 2$   
 $\frac{5}{6} \div \frac{2}{7}$   
 $3 \frac{5}{6} \div 1 \frac{2}{3}$
2. Use a visual model to show  $2 \frac{1}{2}$  divided into fourths.
3. How much chocolate will each person get if three people share  $\frac{1}{2}$  lb. of chocolate equally?

4. Find:
- $$\begin{array}{r} 3.45 - 0.88 \\ 3.14 \times 1.27 \\ 7 \div 22.7 \end{array}$$
5. Write an integer to represent: a debt of \$24 A hiker ascends 900 ft.
6. Summarize a set of data to answer the statistical question: How old are the students in my school? Include median, mean, interquartile range, and mean absolute deviation

Assessment Methods: Assessments may include, but are not limited to homework, class discussions, internet practice utilities (such as IXL.com) and mid unit quizzes as forms of formative assessment. End of unit tests and projects are the primary form of summative assessment.

### **Stage 3: Learning Plan**

- A. To show evidence students may complete an appropriate assessment.
- B. Instructor will provide differentiated instruction through any and all of the following strategies:
- Readiness/ability
  - Adjusting questions
  - Compacting Curriculum
  - Tiered Assignments
  - Acceleration/Deceleration
  - Peer teaching
- C. Students will reflect, rethink, revise, and refine by:
- Assessment corrections
  - Exit questions

**Time Allotment** 14 class meetings

**Resources**: Big Ideas Math Chapter 1, lesson 1  
Chapter 2, lessons 1-6  
Chapter 9, lessons 1-5  
Chapter 10, lessons 2-4

Teacher created resources • Rulers • Graph paper • Colored pencils • Red and black chips • Timers • Poster paper • NJ ASK reference sheet

Technology: Scientific Calculator

## **Scope and Sequence**

### **Stage 1: Desired Results**

## Unit 2

### Topic: Expressions

Content Standards : 6.EE.1-4  
6.NS.4

#### Essential Questions:

1. What is a variable?
2. What is a coefficient?
3. What is a term?
4. How can I translate a word phrase into a mathematical expression?
5. How can I evaluate an expression?
6. What are equivalent expressions?
7. How can I find out if two expressions are equivalent?

#### Enduring Understandings:

1. A variable is a letter that represents an unknown number: when the value of one variable depends on the value of another, it is called a dependent variable; when the value of one variable does not depend on the value of the other, it is called an independent variable.
2. A table can show the relationship between a dependent and independent variable.
3. The number multiplied by the variable is called the coefficient.
4. A term is a number or a variable; like terms have the same variable raised to the same exponent.
5. I need to identify the operations by their keywords in order to translate a word expression into a mathematical expression.
6. I can evaluate an expression with a variable or symbols by substituting the given number for the variable or symbol; then following the order of operations.
7. Two expressions are equivalent when they look different but represent the same information.
8. I can use the distributive, commutative and associative properties to find out if two expressions are equivalent.

#### Knowledge and Skills (SWBAT embedded course proficiencies)

1. Use mathematical language to identify parts of an expression.
2. Write and evaluate numerical expressions involving whole number exponents.
3. Read, write, and evaluate expressions in which letters stand for numbers (Including formulas that arise from real-world contexts).
4. Apply the properties of operations to generate equivalent expressions (Including the distributive property; for example, *express  $36 + 8$  as  $4(9 + 2)$  and  $y + y + y = 3y$ .*
5. Identify when two expressions are equivalent; for example, *Are the two expressions equal?  $81 + 18$  and  $9(9 + 2)$ .*
6. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two numbers less than or equal to 12.

### **Stage 2: Evidence of Understanding, Learning Objectives and Expectations**

#### Benchmarks:

1. Identify the terms, coefficients and constants of the expression:  $5 + 3w + \frac{1}{2}$
2. Write and evaluate an expression using exponents for  $d \cdot d \cdot d \cdot d$ , when  $d = 4$

3. Use the formula:  $V=s^3$  to find the volume of a cube with sides of length  $s = \frac{1}{2}$
4. Apply the distributive property to factor the expression  $24x + 18y$
5. Are  $16x + 24$  and  $6(3x + 4)$  equivalent expressions for every value of  $x$ ? How do you know?
6. Find the GCF and LCM of 28 and 72.

Assessment Methods : Assessments may include, but are not limited to homework, class discussions, internet practice utilities (such as IXL.com) and mid unit quizzes as forms of formative assessment. End of unit tests and projects are the primary form of summative assessment.

### **Stage 3: Learning Plan**

- A. To show evidence students may complete the following assessment: • Planning a Vacation Project
- B. Instructor will provide differentiated instruction through any and all of the following strategies:
  - Readiness/ability
  - Adjusting questions
  - Compacting Curriculum
  - Tiered Assignments
  - Acceleration/Deceleration
  - Peer teaching
- C. Students will reflect, rethink, revise, and refine by:
  - Assessment corrections
  - Exit questions

**Time Allotment:** 14 class meetings

**Resources:** Big Ideas Math Chapter 1, lesson 2-6  
Chapter 3, lessons 1-4

Teacher created resources • Rulers • Graph paper • Colored pencils • Red and black chips • Timers 31 • Poster paper • NJ ASK reference sheet

Technology: Scientific calculator • SmartBoard • Online textbook

## **Scope and Sequence**

### **Stage 1: Desired Results**

Unit 3

Topic: Equations and Inequalities

Content Standards : 6.EE.5-8

## 6.G.1,2,4

### Essential Questions:

1. How can I solve an equation?
2. What is an inequality?
3. What is area?
4. How can I find the area of a two dimensional figure?
5. How can I find the area of a rectangle?
6. How can I find the area of a triangle?
7. How can I find the area of a parallelogram?
8. How can I find the area of an irregular polygon?
9. What is volume (V)?
10. How can I measure volume?
11. What is a rectangular prism?
12. How can I measure the volume of a rectangular prism?
13. What is a net?
14. What is a face?
15. What is a vertex?
16. What is surface area?
17. How can I find the surface area of a solid?

### Enduring Understandings:

1. I can solve an equation by isolating the variable on one side of the equal sign by applying inverse operations. The solution can be checked by substituting it into the original equation to see that it makes a true statement.
2. Not every equation has a solution.
3. An inequality is a mathematical sentence that compares two expressions; the symbols  $<$ ,  $<$ ,  $>$  and  $>$  are used.
4. To solve an inequality, I can follow the same rules for solving equations.
5. Area is the measure of the region inside a two dimensional figure.
6. I can find the area of a two dimensional figure by counting the square units inside the figure.
7. I can find the area of a rectangle by multiplying its length by its width.
8. The area of a triangle is one-half the area of a rectangle with the same height and length.
9. The area of a parallelogram can be found by multiplying its base by its height. The base and height intersect at a right angle.
10. I can find the area of an irregular polygon by breaking it into triangles and rectangles and finding the area of those parts, then adding the areas together.
11. Volume is the measure of the space within a solid, a 3 dimensional figure.
12. A rectangular prism is a solid figure that has six faces that are rectangles; it is called a prism because it has the same cross-section along a length.
13. I can measure volume of a rectangular prism in cubic units, using the formula,  $V=lwh$  or  $V=Bh$ .
14. A net is a two dimensional connected representation of a solid that shows all of the faces, edges and vertices of the solid.
15. The faces are the plane figures that make up the sides and base(s) of a solid.
16. Faces intersect to form the edges of a figure.
17. The vertex is the corner of a figure; it is the point where three or more edges intersect.
18. Surface area is the area of all of the faces of a three-dimensional figure.
19. I can find the surface area of a solid by finding the sum of the areas for all of the faces in the solid's net.



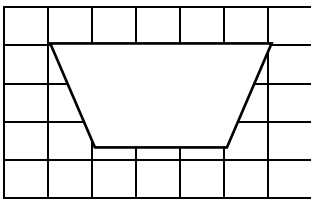
### Knowledge and Skills (SWBAT embedded course proficiencies)

1. Use variables to represent numbers and write expressions when solving real world or mathematical problems.
2. Solve an equation or inequality to answer the question: which values from a specified set, if any, make the equation or inequality true? and check the solution using substitution to determine whether a given number in a specified set makes an equation or inequality true (including formulas  $V=lwh$  and  $V=bh$ ).
3. Write and solve one step equations that represent real world or mathematical problems.
4. Write an inequality of the form  $x > c$  or  $x < c$  to represent a constraint or condition in a real world or mathematical problem and represent them on a number line diagram.
5. Find the area of right triangles, other triangles, special quadrilaterals and polygons by composing into rectangles or decomposing into triangles and other shapes to solve real world or mathematical problems.
6. Represent three dimensional figures using nets made of rectangles and triangles, and use the nets to find the surface area of the figures in the context of solving real world and mathematical problems.
7. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes. Show that the volume is the same as it would be if found by multiplying the edge lengths.

### Stage 2: Evidence of Understanding, Learning Objectives and Expectations

#### Benchmarks (embedded student proficiencies)

1. 45 players participate in a tournament. Write and solve an equation to find how many 3 person teams they can form.
2. A roller coaster holds a maximum of 12 people per ride. Write and solve an inequality to find the least number of rides needed for 15,000 people.
- 3.



Find the area of the trapezoid.

4. Sketch the net of a square pyramid with base length 7m and slant height 10m. Find the surface area of the pyramid.
5. Find the volume of a right rectangular prism with dimensions  $2\frac{5}{8}$  inches by 3 inches by  $4\frac{1}{2}$  inches.

Assessment Methods : Assessments may include, but are not limited to homework, class discussions, internet practice utilities (such as IXL.com) and mid unit quizzes as forms of formative assessment. End of unit tests and projects are the primary form of summative assessment.

### Stage 3: Learning Plan

- A. To show evidence students may complete the following assessment: • Planning a Vacation Project

B. Instructor will provide differentiated instruction through any and all of the following strategies:

- Readiness/ability
- Adjusting questions
- Compacting Curriculum
- Tiered Assignments
- Acceleration/Deceleration
- Peer teaching

C. Students will reflect, rethink, revise, and refine by:

- Assessment corrections
- Exit questions

**Time Allotment:** 12 class meetings

**Resources:** Big Ideas Math Chapter 3, lesson 2-4  
Chapter 4, lessons 1-3  
Chapter 7, lessons 1-3, 5-7  
Chapter 8, lessons 1-4

Teacher created resources • Rulers • Graph paper • Colored pencils • Red and black chips • Timers • Poster paper • NJ ASK reference sheet

Technology: Scientific Calculator • SmartBoard • Online textbook

## **Scope and Sequence**

### **Stage 1: Desired Results**

Unit 4

Topic: Rational Numbers

Content Standards : 6.NS.6-8  
6.G.3  
6.SP.4, 5a-b

Essential Questions:

1. What are integers?
2. What are negative numbers?
3. How can I use a number line to determine a number's opposite?

4. In a real life situation, how can I tell if positive or negative numbers are involved when I am figuring out a problem?
5. What is a rational number?
6. What is a coordinate plane?
7. How can I find, identify or place a point on the coordinate plane?
8. What is a quadrant on the coordinate plane?
9. What is coordinate geometry?
10. What is absolute value?
11. How can I draw a polygon?
12. How can data be plotted?
13. What is a dot plot?
14. What is a box plot?
15. What is a histogram?

#### Enduring Understandings:

1. Coordinate geometry gives me a way to describe exactly where a point on a coordinate plane is located.
2. I can use coordinate geometry to determine the distance between two points.
3. Absolute value is the distance of a number from zero.
4. I can use absolute value to determine the distance between two points.
5. I can draw a polygon using a coordinate plane.
6. Integers are whole number, their opposites and zero.
7. Negative numbers are numbers less than zero.
8. I can find the opposite of a number by using a number line to determine the distance from zero to the original number and then from zero on the opposite side to the same number.
9. The opposite of a positive number is its negative, and the opposite of a negative number is its positive.
10. Some keywords for recognizing positive integers are: gain, increase, rise, above, more and up.
11. Some keywords for negative integers are loss, decrease, drop, below, less and down.
12. I can plot data on a number line, dot plots, box plots and histogram.
13. A dot plot shows the number of times each value in a data set occurs.
14. A box plot shows the range of values and how they are distributed in a data set, including the minimum and maximum value.
15. A histogram shows continuous data in a set.

#### Knowledge and Skills (SWBAT embedded course proficiencies)

1. Locate positive and negative rational numbers on the number line and explain the meaning of absolute value of a rational number as indicating locations on opposite sides of zero on the number line.
2. Write and compare rational numbers using inequality signs.
3. Plot ordered pairs in all four quadrants on the coordinate plane and describe their reflections.
4. Interpret and explain absolute value as magnitude for a positive or negative quantity in a real-world situation.
5. Solve real world problems mathematically by graphing points in all four quadrants of the coordinate plane. Use the absolute value of the differences of their coordinates to find distances between points with the same first coordinate or same second coordinate.
6. Draw polygons in the coordinate plane given the coordinates of the vertices and use the coordinates to solve real world distance, perimeter, and area problems.

7. Display numerical data in plots on the number line (including dot plots, histograms, and boxplots) and summarize in relation to their context.

## **Stage 2: Evidence of Understanding, Learning Objectives and Expectations**

### **Benchmarks** (embedded student proficiencies)

1. Label the following values on a number line:  $\frac{4}{5}$ ,  $-\frac{5}{4}$ ,  $-3.25$ ,  $|-3.25|$
2. Complete the statement using  $<$ ,  $>$  or  $=$ :  $\frac{3}{4}$  \_\_\_  $-\frac{2}{5}$
3. Plot  $(-2,4)$  on a coordinate plane. Describe the location of its reflection across the y-axis.
4. If your account balance is  $> -\$25$ , describe the debt this represents as  $>\$25$ ,  $<\$25$  or  $=\$25$ . Explain.
5. An archaeologist divides an area using a coordinate plane in which each unit represents 1 m. The corners of a secret chamber are at  $(-4,5)$ ;  $(-4,1)$ ;  $(2,5)$  and  $(2,1)$  What are the dimensions of the chamber?
6. You design a tree house using a coordinate plane. the vertices are at  $(2,1)$ ;  $(2,8)$ ;  $(9,8)$  and  $(9,1)$ . What is the area and perimeter of the tree house?
7. Construct and summarize a box plot for the following teacher ages: 30, 62, 26, 35, 45, 22, 49, 32, 28, 50, 42, 35

**Assessment Methods** : Assessments may include, but are not limited to homework, class discussions, internet practice utilities (such as IXL.com) and mid unit quizzes as forms of formative assessment. End of unit tests and projects are the primary form of summative assessment.

## **Stage 3: Learning Plan**

- A. To show evidence students may complete the following assessment:
  - My Special Number Project
- B. Instructor will provide differentiated instruction through any and all of the following strategies:
  - Readiness/ability
  - Adjusting questions
  - Compacting Curriculum
  - Tiered Assignments
  - Acceleration/Deceleration
  - Peer teaching
- C. Students will reflect, rethink, revise, and refine by:
  - Assessment corrections
  - Exit questions

**Time Allotment**: 16 class meetings

**Resources**: Big Ideas Math Chapter 4, lessons 4  
Chapter 6, lesson 1-5

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- Teacher created resources • Rulers • Graph paper • Colored pencils
  - Red and black chips • Timers • Poster paper • NJ ASK reference sheet

Technology: • Scientific Calculator • SmartBoard • Online textbook

## Scope and Sequence

### Stage 1: Desired Results

#### Unit 5

Topic : Ratio and Proportion

Content Standards: 6.RP.1-3  
6.EE.9

#### Essential Questions :

1. How can I express a ratio?
2. What is a percent?
3. How is a percent like a ratio?
4. What is the connection between a percent and a fraction?
5. What is a rate and unit rate?
6. How can I use graphs when working with ratios?
7. How can I use graphs to convert from one unit to another in either the US Customary or metric system?

#### Enduring Understandings:

1. Ratios can be written in three ways: 2 to 3, 2:3, 2/3.
2. Percent means out of each hundred and represents the parts of a whole that are divided into 100 equal parts.
3. A percent is a ratio per 100.
4. If I know the percent and the whole, I can find the part of the whole that the percent represents.
5. A rate is a ratio that compares two different units.
6. A unit rate is a ratio that compares two different units where one of the measurements is one.
7. I can use graphs of rate or ratio to show patterns. I can use graphs to convert from one unit to another in either the US Customary or metric system.

#### Knowledge and Skills (SWBAT embedded course proficiencies)

1. Explain the relationship of two quantities or measures of a given ratio and use ratio language to describe the relationship between the two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." *"For every vote candidate A received, candidate C received nearly three votes."*
2. Use rate language in the context of a ratio relationship to describe a unit rate  $a/b$  associated with a ratio  $a:b$  with  $b \neq 0$ . For example, *"This recipe has a ratio of 3 cups of flour to 4 cups of*

sugar, so there is  $\frac{3}{4}$  cup of flour for each cup of sugar.” “We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.”

3. Use ratio and rate reasoning to solve real world and mathematical problems which include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100.
4. Use ratio and rate reasoning to convert measurement units (manipulate and transform units appropriately when multiplying or dividing quantities).
5. Use variables to represent two quantities that change in relationship to one another in a real world problem and write an equation to express one quantity, thought of as the dependent variable, in terms of another quantity, thought of as the independent variable.
6. Analyze the relationship between the dependent and independent variables in an equation using graphs and tables. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation  $d = 65t$  to represent the relationship between distance and time.

## **Stage 2: Evidence of Understanding, Learning Objectives and Expectations**

Benchmarks (embedded student proficiencies)

1. What does it mean if the ratio of elephant legs to trunks in the zoo is 4:1?
2. Explain why the rate of cost for comic books is \$3.99 per comic if 7 of them cost \$27.96
3. If 2 cookies contain 76 calories how many calories are in 5 cookies? Use a table of equivalent ratios. What is the unit rate of calories per cookie?
4. If 1 in = 2.54 cm, convert 20 cm to inches.
5. A sundae costs \$2. Additional toppings cost \$0.50 each. Write and graph an equation in two variables that represents the total cost of a sundae.
6. It costs \$35 to join a gym. The monthly fee is \$25. Write and graph an equation in two variables that represents the total cost of a gym membership.

Assessment Methods : Assessments may include, but are not limited to homework, class discussions, internet practice utilities (such as IXL.com) and mid unit quizzes as forms of formative assessment. End of unit tests and projects are the primary form of summative assessment.

## **Stage 3: Learning Plan**

- A. To show evidence students may complete the following assessment:
  - Scale drawing of a professional baseball field
- B. Instructor will provide differentiated instruction through any and all of the following strategies:
  - Readiness/ability
  - Adjusting questions
  - Compacting Curriculum
  - Tiered Assignments
  - Acceleration/Deceleration
  - Peer teaching
- C. Students will reflect, rethink, revise, and refine by:
  - Assessment corrections
  - Exit Questions

**Time Allotment:** 14 class meetings

**Resources:** Big Ideas Math Chapter 5, lessons 1-7  
Chapter 7, lesson 4

\_\_\_\_\_ Teacher created resources • Rulers • Graph paper • Colored pencils • Timers  
• Poster paper • NJ ASK reference sheet

Technology: • Texas calculator TI 34 II • SmartBoard • Online textbook

### **New Jersey Core Curriculum and Common Core Content Standards**

<http://www.state.nj.us/education/cccs/>

#### **Integration of 21<sup>st</sup> Century Theme(s)**

The following websites are sources for the following 21<sup>st</sup> Century Themes and Skills:

<http://www.nj.gov/education/code/current/title6a/chap8.pdf>

<http://www.p21.org/about-us/p21-framework> .

<http://www.state.nj.us/education/cccs/standards/9/index.html>

#### **21<sup>st</sup> Century Interdisciplinary Themes (into core subjects)**

- Global Awareness
- Financial, Economic, Business and Entrepreneurial Literacy
- Civic Literacy
- Health Literacy
- Environmental Literacy

#### **Learning and Innovation Skills**

- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication and Collaboration

#### **Information, Media and Technology Skills**

- Information Literacy
- Media Literacy

- **ICT (Information, Communications and Technology) Literacy**

### **Life and Career Skills**

- **Flexibility and Adaptability**
- **Initiative and Self-Direction**
- **Social and Cross-Cultural Skills**
- **Productivity and Accountability**
- **Leadership and Responsibility**

### **Integration of Digital Tools**

- **Classroom computers/laptops/Chromebooks**
- **Technology Lab**
- **Voice amplification device**
- **Other software programs**