

Freetown Lakeville Public Schools

Grade 8 Unit Guide
Mathematics

June 19, 2003

Grade 8 Curriculum Guideline

Purpose of this Curriculum Guide:

Grade 8 Mathematics Mission:

Grade 8 Mathematics Philosophy:

This curriculum was written by:

Grade 8 Curriculum Guideline

Unit: Data Analysis

Topic:

Student Learning Outcomes

Textbook References, Resources and Materials

- 30437** Select, create, interpret, and utilize various tabular and graphical representations of data. (Bar, scatterplot, stem-and-leaf)
- Differentiate between continuous and discrete data and ways to represent them.
- Analyze and represent data using mean, median, mode, and range.
- 30438** Find, describe, and interpret appropriate measures of central tendency (mean, median, and mode) and spread (range) that represent a set of data. Use these notions to compare different sets of data.
- 30436** Understand how data can be collected from a survey.
- Organize collected data.
- Show data on a grid and see trends in data.
- Describe the characteristics and limitations of a data sample. Identify different ways of selecting a sample, e.g., responses to a survey, random sampling.

Suggested Instructional Strategies

Assessment

Grade 8 Curriculum Guideline

Unit: Eight - Percents

Topic:

Student Learning Outcomes

- 30410** Estimate and compute with fractions (including simplification of fractions), integers, decimals, and percents (including those greater than 100 and less than 1).
- Solve percent problems using proportions.
- Solve word problems involving percent increase and/or decrease, tax, discount.
- Use estimation with percent.
- Understand the use of percent decrease.
- Learn how percents can be used, applied and combined.
- Rewrite ratios as decimals, fractions or percents.

Textbook References, Resources and Materials

MSM Volume 2, Chapter 6

Suggested Instructional Strategies

Timeline : 16-18 class periods

Assessment

Grade 8 Curriculum Guideline

Unit: Five - Language of Algebra

Topic:

Student Learning Outcomes

Textbook References, Resources and Materials

- 30414** Translate verbal expressions into algebraic expressions.
- Evaluate simple algebraic expressions for given variable values, e.g., $3a^2 - b$ for $a = 3$ and $b = 7$.
- Solve equations by undoing addition, subtraction, multiplication and division.
- Solve equations by undoing operations in two steps.
- Solve and graph the solution to inequalities.
- 30435** Use formulas to solve simple problems.

MSM, volume 2, Chapter 3
Algebra I (supplemental worksheets)
Practice worksheets and teacher generated
worksheets

Suggested Instructional Strategies

Use technology where appropriate (graphing calculators).

Assessment

3.1 - 3.3 test: 6 class periods
3.1 - 3.5 test: 9 class periods
3.1-3.6 test: 4-5 class periods

Grade 8 Curriculum Guideline

Unit: Four - Integers

Topic:

Student Learning Outcomes

- 30401** Compare, order, estimate, and translate among integers.
- 30404** Represent numbers in scientific notation, and use them in calculations and problem situations, e.g., positive and negative exponents.
- 30406** Demonstrate an understanding of absolute value.
- 30407** Extend the Order of Operations to include positive integer exponents.
- 30408** Demonstrate an understanding of the properties of arithmetic operations by evaluating expressions with integers.
- Demonstrate an understanding of the properties of arithmetic operations on integers, e.g., addition, subtraction, multiplication and division.
- Use the associative, commutative, and distributive properties; properties of the identity and inverse elements (e.g., $-7 + 7 = 0$; $3/4 \times 4/3 = 1$).
- Plot pairs of integers on a coordinate grid.
- Consistently uses appropriate vocabulary, (absolute value) when demonstrating their knowledge of integers.
- Convert between standard form and scientific notation for both large and small numbers.

Textbook References, Resources and Materials

MSM volume 2, chapter 2
Teacher generated worksheets

Grade 8 Curriculum Guideline

Suggested Instructional Strategies

Add, subtract, multiply and divide with Integers.
Solve examples using the appropriate order of operations.
Compare and order integers.
Solve examples using both 'standard' order of operations and distributive property.
Accurately plot points on a coordinate plane.
Evaluate expressions including integers.
Scientific notation with positive and negative exponents.
Evaluate examples involving exponents with positive numbers and/or zero.

Assessment

See attached rubric

2.1 - 2.3 test : 6-8 class periods

2.1 - 2.4 test : 4-5 class periods

2.1 - 2.6 test : 5 class periods

Unit Test : 6 class periods

Grade 8 Curriculum Guideline

Unit: Functions and Relations

Topic:

Student Learning Outcomes

Textbook References, Resources and Materials

- 30416** Understand quadratic functions and create and use symbolic expressions and relate them to verbal, tabular, and graphical representations.
- Recognize a function and find input/output values of a function.
- Understand linear functions and create and use symbolic expressions and relate them to verbal, tabular, and graphical representations.
- 30407** Understand polynomials and apply the rules of powers to the solution of problems. Extend the Order of Operations to include positive integer exponents.
- Apply the rules of roots to the solution of problems.
- 30413** Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions.
- Include arithmetic and geometric progressions (supplement).
- 30404** Represent numbers in scientific notation, and use them in calculations and problem situations.
- 30408** Demonstrate an understanding of the properties of arithmetic operations on rational numbers.
- 30415** Demonstrate an understanding of the identity $(-x)(-y) = xy$. Use this identity to simplify algebraic expressions, e.g., $(-2)(-x+2) = 2x - 4$.

Suggested Instructional Strategies

Assessment

10-1 to 10-3 Test

Grade 8 Curriculum Guideline

Unit: One - Measures of Central Tendency

Topic:

Student Learning Outcomes

- 30438** Find, describe and Interpret appropriate measures of central tendency (mean, median, and mode) and spread (range) that represent a set of data. Use these notions to compare different sets of data.

Textbook References, Resources and Materials

Text: Middle School Math volume 2 Chapter 1

Suggested Instructional Strategies

Find mean, median, mode and range

Timeline: 3-4 class periods

Assessment

Teacher generated test and/or enrichment worksheet 1-2

Grade 8 Curriculum Guideline

Unit: Rational and Irrational Numbers

Topic:

Student Learning Outcomes

Textbook References, Resources and Materials

- 30401** Select and use appropriate operations - addition, multiplication, division, and positive integer exponents - to solve problems with integers (including negatives).
- 30405** Apply number theory concepts, including prime factorization, divisibility and relatively prime numbers to the solution of problems.
- Apply prime factor skills to find the greatest common factor.
- Apply knowledge of multiples to find the Least Common Multiple.
- 30412** Select and use appropriate operations- multiplication and division of rational numbers to solve problems.
- 30402** Define, compare, order, and apply frequently used irrational numbers, such as the square root of 2 and pi.
- Identify square roots that are irrational numbers. Define and apply rational and irrational numbers.
- 30409** Identify perfect squares from square roots.
- 30426** Demonstrate an understanding of the Pythagorean Theorem. Apply the theorem to the solution of problems.

Suggested Instructional Strategies

Assessment

7-1 to 7-3 test
7-1 to 7-6 mid-chapter test
2-1 to 2-9 Unit test
2-1 to 2-6 mid-chapter test

Grade 8 Curriculum Guideline

Unit: Seven - Ratios and Proportions

Topic:

Student Learning Outcomes

- 30403** Use ratios and proportions to explore and estimate ratios and rates.
- Use ratios and proportions in the solution of problems, in particular, problems involving scale factors, scale drawings and models.
- Describe the values of missing numbers in a proportion.
- Describe how two ratios form a proportion.
- Describe the relationship between proportions and graphs.
- 30434** Use ratio and proportion in the solution of problems using unit rates.
- Use ratio and proportion (including scale factors) in the solution of problems, including problems involving similar plane figures and indirect measurement.

Textbook References, Resources and Materials

MSM Volume 2, Chapter 5

Suggested Instructional Strategies

Timeline: 11-12 Class periods

Assessment

Unit Test
See attached Rubric

Grade 8 Curriculum Guideline

Unit: Six - Linear Equations and Inequalities

Topic:

Student Learning Outcomes

- 30417** Identify the slope of a line as a measure of its steepness and as a constant rate of change from its table of values, equation, or graph. Apply the concept of slope to the solution of problems.
- Evaluate expressions using a table format i.e., input/output.
- 30418** Identify the roles of variables within an equation, e.g., $y = mx + b$, expressing y as a function of x with parameters m and b .
- 30419** Set up, solve, and find a single solution for a pair of linear equations using graphs.
- Set up and solve linear inequalities with one or two variables, using algebraic methods and/or graphs.
- Determine whether a pair of values is a solution of a two variable equation.
- 30422** Use tables and graphs to represent and compare linear growth patterns. In particular, compare rates of change and x - and y -intercepts of different linear patterns.

Textbook References, Resources and Materials

MSM volume 2, Chapter 4
Algebra I supplemental work

Suggested Instructional Strategies

Use Technology as appropriate (graphing calculators, computers/software).

Assessment

4-1 to 4-3 test: 9-10 class periods
4-1 to 4-6 test: 9-10 class periods
4-1 to 4-7 test: 5-6 class periods

Grade 8 Curriculum Guideline

Unit: Three - Number Theory

Topic:

Student Learning Outcomes

- 30401** Compare, order, estimate, and translate among fractions and decimals only.
- 30405** Apply number theory concepts including prime factorization, divisibility and relatively prime numbers to the solution of problems.
- Apply prime factor skills to find greatest common factor.
- Identify primes and composites.
- Break down numbers into prime factorization form using exponents.
- Knowledge of Divisibility Rules for [2,3,4,5,6,9,10] .
- Apply knowledge of multiples to find least common multiple.

Textbook References, Resources and Materials

MSM Volume 2, Chapter 7

Suggested Instructional Strategies

Memorize rules for divisibility 2,3,4,5,6,9,10.
Identify primes and composites.
List factors of composite numbers.
Rewrite numbers using prime factorization with exponents.

Timeline: 6-8 Class periods

Assessment

See attached rubric

Grade 8 Curriculum Guideline

Unit: Two - Fraction/Decimal Review

Topic:

Student Learning Outcomes

- 30401** Compare, order, estimate, and translate among fractions and decimals.
- 30405** Convert between fractions and decimals.
- 30410** Arithmetic:add, subtract, multiply, divide using fractions and decimals.

Textbook References, Resources and Materials

not included in Grade 8 text - all teacher created worksheets.

Suggested Instructional Strategies

Add, subtract, multiply and divide with decimals.
Add, subtract, multiply and divide with fractions.
Round quotients.
Rewrite fractions in lowest terms.
Compare and order fractions.
Rewrite improper fraction to mixed.
Rewrite mixed number to improper fraction.
Rewrite decimal to fraction.
Rewrite fraction to decimal.
Rewrite decimals to word format and vice versa.

Timeline 6-8 class periods

Assessment

See attached rubric

Grade 8 Curriculum Guideline

Recommended Resources for Grade 8 Mathematics: