

**SPRINGFIELD PUBLIC SCHOOLS  
SEVENTH GRADE**

**Course Description**

The seventh grade mathematics program emphasizes problem solving strategies for both routine and non-routine problems. Students will expand upon their ability to use the operations of addition, subtraction, multiplication, and division of positive and negative whole numbers, decimals, and fractions. Students will investigate geometric, data analysis, measurement, and algebraic concepts. Students will apply ratio, proportion, and percent.

**Course Rationale**

Seventh grade mathematics is taught to develop a complete understanding of the positive rational numbers and their relationship to geometric, data analysis, and measurement concepts. Students will be given the opportunity to apply mathematics to real world problems and future careers. Students will be involved in learning how to collect information, communicate information mathematically, solve problems from a real world context and justify the solutions to the problems.

**Major Instructional Goals**

The intent of Springfield R-12 Middle School Mathematics Program is to explore, investigate, and understand the importance of mathematics through real-world experiences. In mathematics, students will acquire the knowledge and skills to problem solve, communicate, reason, create models, and make connections. Students will:

1. Apply concepts of **Number and Operations** including:
  - a. Compare and order integers, positive rationals, and percents, including finding their approximate location on the number line (MA5; 3.3)
  - b. Use fractions, decimals, and percents in problem solving (MA1; 3.4)
  - c. Recognize equivalent representations for the same number and generate them by decomposing and composing numbers, including exponential notation (MA1; 3.6)
  - d. Describe relationships between and among numbers, using factors and multiples (MA5; 1.10)
  - e. Describe the effects of multiplication/division on fractions and addition/subtraction on integers (MA1; 3.4, 4.1)
  - f. Apply order of operations and use mathematical properties on rational numbers (MA5; 1.6, 1.10)
  - g. Approximate square roots (MA5; 3.3)
  - h. Estimate, calculate, and justify the results of multiplication/division of positive rational numbers (MA1; 1.10, 3.3, 4.1)
  - i. Solve problems involving proportions and ratios (MA1; 3.3)

2. Apply the concepts of **Algebraic Relationships** including:
  - a. Analyze patterns, represented graphically or numerically, using words or symbolic rules (MA4; 1.6, 3.6)
  - b. Compare and contrast various forms of representations of patterns (MA4; 1.6)
  - c. Identify functions as linear or nonlinear from tables, graphs, and equations (MA4; 1.6, 3.6)
  - d. Use variables to represent unknown quantities in equations and inequalities (MA4; 1.6, 4.1)
  - e. Generate equivalent forms for simple algebraic expressions (MA4; 3.6)
  - f. Model and solve problems, using multiple representations such as graphs, tables, expressions, equations or inequalities (MA4; 1.6,3.6)
  - g. Compare situations with constant or varying rates of change (MA2; MA4; 1.6, 4.1)
  
3. Apply the concepts of **Geometric and Spatial Relationships** including:
  - a. Classify 2 and 3 dimensional shapes based on their properties (MA2; 3.6)
  - b. Describe relationships between corresponding sides, angles, and perimeters of similar polygons (MA2; 1.6)
  - c. Given ordered pairs, identify geometric shapes in the coordinate plane using their properties. (MA2; 1.6, 1.8)
  - d. Reposition shapes under informal transformations (MA2; 3.6)
  - e. Describe the relationship between the scale factor and the perimeter of the image using a dilation (MA2; 3.6)
  - f. Determine all lines of symmetry of polygons (MA2; 1.6)
  - g. Use spatial visualization to identify various 2 dimensional views of isometric drawings (MA2; 3.3)
  - h. Draw or use visual models to represent and solve problems (MA2; 3.1)
  
4. Apply the concepts of **Measurement** including:
  - a. Identify and justify the unit of measure for volume (MA2; 3.1, 4.1)
  - b. Identify the equivalent area measures within a system of measurement (MA2; 1.6)
  - c. Solve problems involving addition and subtraction of time (hours, minutes, seconds) (MA5; 3.1)
  - d. Use tools to measure angles to the nearest degree (MA2; 1.4, 3.2)
  - e. Describe how to solve problems involving circumference and/or area of a circle (MA2; 3.4, 4.1)
  - f. Analyze precision and accuracy in measurement situations (MA2; 1.7, 3.8)
  - g. Convert from one unit to another within a system of measurement (MA2; 1.6, 1.10)
  
5. Apply the concepts of **Data Analysis and Probability** including:
  - a. Formulate questions, design studies and collect data about a characteristic (MA3; 1.2)
  - b. Select, create and use appropriate graphical representation of data, including circle graphs, histograms, box plots (box and whiskers) (MA3; 1.8, 3.6)
  - c. Find, use and interpret measures of center and spread, including ranges and interquartile ranges (MA3; 3.4)
  - d. Compare different representations of the same data and evaluate how well each representation show important aspects of data (MA3; 3.6)

- e. Use observations about differences between samples to make conjectures about the populations from which the samples were taken (MA3; 3.5)
- f. Use models to compute the probability of an event (MA3; MA6; 3.3)