

# APPENDIX C: ESSENTIAL MIDDLE GRADES CONCEPTS

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### Ratios and Proportional Relationships

- Grade 6: Understand ratio concepts and use ratio reasoning to solve problems.
- Grade 7: Analyze proportional relationships and use them to solve real-world and mathematical problems.

### The Number System

- Grade 6: Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
- Grade 6: Compute fluently with multidigit numbers and find common factors and multiples.
- Grade 6: Apply and extend previous understandings of numbers to the system of rational numbers.
- Grade 7: Apply and extend previous understandings of operations with fractions.
- Grade 8: Know that there are numbers that are not rational, and approximate them by rational numbers.

### Expressions and Equations

- Grade 6: Apply and extend previous understandings of arithmetic to algebraic expressions.
- Grade 6: Reason about and solve one-variable equations and inequalities.
- Grade 6: Represent and analyze quantitative relationships between dependent and independent variables.
- Grade 7: Use properties of operations to generate equivalent expressions.
- Grade 7: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
- Grade 8: Work with radicals and integer exponents.

- Grade 8: Understand the connections between proportional relationships, lines, and linear equations.
- Grade 8: Analyze and solve linear equations and pairs of simultaneous linear equations.

## **Functions**

- Grade 8: Define, evaluate, and compare functions.
- Grade 8: Use functions to model relationships between quantities.

## **Geometry**

- Grade 6: Solve real-world and mathematical problems involving area, surface area, and volume.
- Grade 7: Draw, construct, and describe geometrical figures, and describe the relationships between them.
- Grade 7: Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
- Grade 8: Understand congruence and similarity using physical models, transparencies, or geometry software.
- Grade 8: Understand and apply the Pythagorean Theorem.
- Grade 8: Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

## **Statistics and Probability**

- Grade 6: Develop understanding of statistical variability.
- Grade 6: Summarize and describe distributions.
- Grade 7: Use random sampling to draw inferences about a population.
- Grade 7: Draw informal comparative inferences about two populations.
- Grade 7: Investigate chance processes and develop, use, and evaluate probability models.
- Grade 8: Investigate patterns of association in bivariate data.