

Standards and Benchmarks
Mathematics Grade 7

MATHEMATICAL PROCESSES:

A1: Understand a broad body of mathematical knowledge and apply a variety of mathematical skills and strategies, including reasoning, oral and written communication, and the use of appropriate technology, when solving mathematical, real-world and non-routine problems.

A1.7.1 Use reasoning abilities to

- Evaluate information
- Perceive patterns
- Identify relationships
- Formulate questions for further exploration
- Evaluate strategies
- Justify statements
- Test reasonableness of results
- Defend work

A1.7.2 Communicate logical arguments clearly to show why a result makes sense.

A1.7.3 Apply the following techniques to solve non-routine problems: modeling, illustrating, guessing, simplifying, generalizing, shifting to another point of view, etc.

A1.7.4 Apply the following to effective oral and written presentations:

- Appropriate use of technology
- The conventions of mathematical discourse (e.g., symbols, definitions, labeled drawings)
- Mathematical language
- Clear organization of ideas and procedures
- Understanding of purpose and audience

A1.7.5 Explain mathematical concepts, procedures, and ideas to others who may not be familiar with them.

A1.7.6 Share mathematical ideas as they appear in other areas of the curriculum (e.g. measurement in science, map skills in social studies).

NUMERICAL OPERATIONS AND RELATIONSHIPS:

B1: Know how to use numbers effectively for various purposes, such as counting, measuring, estimating and problem solving.

B1.7.1 Read, represent, and interpret various rational numbers (whole numbers, integers, decimals, fractions, and percents) with verbal descriptions, geometric models, and mathematical notation (e.g., expanded, scientific, exponential).

B1.7.2 Perform and explain operations on rational numbers (add, subtract, multiply, divide, raise to a power, take opposites, determine absolute value).

B1.7.3 Generate and explain equivalencies among fraction, decimals and percents.

B1.7.4 Express order relationships among rational numbers using appropriate symbols ($>$, $<$)

B1.7.5 Apply proportional thinking in a variety of problem situations that include, but are not limited to

- Ratios and proportions (e.g., rates, scale drawings, similarity)
- Percents, including those greater than one-hundred and less than one (e.g., discounts, rate of increase or decrease, sales tax)

B1.7.6 Model and solve problems involving number-theory concepts such as

- Greatest common factors

B1.7.7 Select and use appropriate computational procedures with rational numbers in problem-solving situations, including:

- Calculating mentally
- Estimating
- Creating, using and explaining algorithms using technology (e.g. scientific calculators, spreadsheets)

GEOMETRY:

C1: Know how to use geometric concepts, relationships and procedures to interpret, represent, and solve problems.

C1.7.1 Describe special and complex two- and three- dimensional figures (e.g., rhombus, polyhedron, cylinder) and their component parts (e.g., base, altitude, and slant height) by

- Naming, defining, and giving examples
- Comparing, sorting and classifying them
- Identifying and contrasting their properties (e.g., symmetrical, isosceles, regular)
- Drawing and constructing physical models to specifications
- Explaining how these figures are related to objects in the environment

C1.7.2 Identify and apply relationships among the component parts of special and complex two- and three- dimensional figures (e.g. parallel sides, congruent faces)

C1.7.3 Distinguish three-dimensional shapes from two-dimensional perspectives and draw two-dimensional sketches of three-dimensional objects preserving their significant features.

C1.7.4 Perform transformations on two-dimensional figures and describe and analyze the effects of the transformations on the figures.

C1.7.5 Locate objects using the rectangular coordinate grid.

MEASUREMENT and REFERENCE FRAMES:

D1: Select and use appropriate tools (including technology) and techniques to measure things to a specific degree of accuracy. Use measurements in problem-solving situations.

D1.7.1 Identify and describe attributes in situations where they are not directly or easily measurable (e.g., distance, area of an irregular figure, likelihood of occurrence)

D1.7.2 Explain basic measurement facts, principles, and techniques including the following:

- Knowledge that direct measurement produces approximate, not exact, results
- The use of smaller units produces more precise results.

D1.7.3 Apply standard units of measurement (metric and US customary) with given degrees of accuracy

- Lengths to the nearest cm or 1/16 of an inch
- Elapsed time to the nearest second

D1.7.4 Use measurement indirectly through

- Estimation
- Ratio and proportion (e.g.; similarity, scale drawings)
- Geometric formulas to derive lengths, areas, volumes of common figures (e.g., perimeter, circumference, surface area)

DATA AND CHANCE

E1: Know how to use data collection and analysis, statistics and probability in problem-solving, employing technology where appropriate

E1.7.1 Apply data in the context of real-world situations by

- Formulating questions that lead to data collection and analysis
- Designing and constructing a statistical investigation

E1.7.2 Organize and display data from statistical investigations using

- Appropriate tables and graphs and/or charts (e.g., circle, bar or line for multiple sets of data)
- Appropriate plots (e.g. line, stem-and-leaf, box, scatter)

E1.7.3 Extract, interpret and analyze information from organized and displayed data by using

- Frequency and distribution, including mode and range
- Central tendencies of data (mean and median)
- Indicators of dispersion (e.g. outliers)

E1.7.4 Apply the results of data analysis to

- Make predictions
- Develop convincing arguments
- Draw conclusions

E1.7.5 Compare and share several sets of data to generate, test, and, support or refute hypotheses.

E1.7.6 Evaluate presentations and statistical analyses from a variety of sources for

- Techniques of collection, organization, and presentation of data
- Missing or incorrect data
- Inferences

E1.7.7 Determine the likelihood of occurrence of simple events by

- Using a variety of strategies to identify possible outcomes (e.g., lists, tables, tree diagrams)
- Conducting an experiment
- Designing and conducting simulations
- Applying theoretical notions of probability (e.g., that two equally likely events had a fifty percent chance of happening)

PATTERNS, FUNCTIONS and ALGEBRA

F1: Discover, describe, and generalize simple and complex relationships. In the context of real-world problem situations, use algebraic techniques to define and describe the problem to determine and justify appropriate solutions.

F1.7.1 Work with algebraic expressions in a variety of ways, including

- Using appropriate symbolism, including exponents and variables
- Evaluating expressions through numerical substitution
- Generating equivalent expressions
- Adding and subtracting expressions

F1.7.2 Work with linear and nonlinear patterns and relationships in a variety of ways, including

- Representing linear and nonlinear patterns and relationships with tables, graphs, and with algebraic expressions, equations and inequalities
- Describing and interpreting graphical representations for linear and nonlinear patterns and relationships (e.g. slope, rate of change)
- Using linear and nonlinear patterns and relationships as models of real-world phenomenon
- Describing a real-world phenomenon that a given graph might represent

F1.7.3 Recognize and describe simple functional relationships by generalizing a rule that characterizes the pattern of change among variables. These functional relationships include exponential growth and decay (e.g. cell division, depreciation)

F1.7.4 Represent problem situations with an equation or inequality in a variety of ways including

- Writing equations or inequalities to represent problem situations and to express generalizations
- Solving equations or inequalities by different methods (e.g., informally, graphically, with formal properties, with technology)
- Using equations or inequalities to record and describe solution strategies

F1.7.5 Share and apply generalized properties and relations, including

- Commutative property of addition and multiplication
- Distributive property

Math Resources:

Connected Mathematics 2

Teacher Materials:

- Teacher's Guides
- Assessment Resources
- Additional practice and skills workbook
- Transparency Book
- Parent Guide
- Special needs handbook
- Implementation guide

- Teacher Express Technology (available through Zen works)

Student Materials:

- Student Book
 - Variables and Patterns
 - Stretching and Thinking
 - Comparing and Scaling
 - Accentuate the Negative
 - Moving Straight Ahead
 - Filling and Wrapping
 - What do you Expect?
 - Data Around Us

- Manipulative Kit

Math Assessments:

- Ongoing observations and conversations
- Reflections
- Partner Quizzes
- Question Bank
- Homework Quizzes
- Check ups
- Unit projects
- Unit Tests