

The North Dakota Standards and Benchmarks

Content Standards – DRAFT

Mathematics Grade 8 – Content Only

January 2004

North Dakota Department of Public Instruction

Dr. Wayne G. Sanstead, State Superintendent

600 E Boulevard Avenue, Dept. 201

Bismarck, North Dakota 58505-0440

www.dpi.state.nd.us



Standard 1: Number and Operation

Standard 1: Students understand and use basic and advanced concepts of number and number systems

BENCHMARK EXPECTATION

Grade 8

NUMBERS, NUMBER RELATIONSHIPS, AND NUMBER SYSTEMS

- 8.1.1. Identify subsets of the real number system; i.e., natural and whole numbers, integers, rational and irrational numbers
- 8.1.2. Solve real-world problems involving ratio, proportion, and percent
- 8.1.3. Identify perfect squares 1 to 144 and approximate square roots
- 8.1.4. Represent large and small numbers using scientific notation

OPERATIONS AND THEIR PROPERTIES

- 8.1.5. Apply operation properties to simplify computations and solve problems; i.e., commutative, associative, and distributive
- 8.1.6. Apply the order of operations to simplify numeric expressions and solve problems

COMPUTATIONAL FLUENCY AND ESTIMATION

- 8.1.7. Add, subtract, multiply, and divide integers
- 8.1.8. Select and use an appropriate computational technique (e.g., mental calculation, paper-and-pencil, or technology) to solve problems
- 8.1.9. Determine when an estimate is sufficient and an exact answer is needed in problem situations

Standard 2: Geometry and Spatial Sense

Standard 2: Student understands and applies geometric concepts and spatial relationships to represent and solve problems in mathematical and nonmathematical situations

BENCHMARK EXPECTATION

Grade 8

TWO- AND THREE-DIMENSIONAL SHAPES, GEOMETRIC PROPERTIES AND RELATIONSHIPS

- 8.2.1. Use nets to represent the relationships between two- and three-dimensional figures
- 8.2.2. Classify quadrilaterals based on side lengths, angle measures, and sets of parallel sides
- 8.2.3. Identify the angles formed and the relationships between the angles when parallel lines are intersected by a transversal
- 8.2.4. Apply the Pythagorean Theorem to problems involving right triangles

COORDINATE GEOMETRY

- 8.2.5. Represent shapes using coordinate geometry

TRANSFORMATION AND SYMMETRY

- 8.2.6. Draw the results of a combination of transformations in the coordinate plane; i.e., reflections, rotations, and translations
- 8.2.7. Use scale, proportion, and congruency to solve problems involving similar figures

VISUALIZATION, SPATIAL REASONING, AND GEOMETRIC MODELING

- 8.2.8. Use two-dimensional representations of three-dimensional objects to visualize and solve problems; e.g., those involving surface area and volume

Standard 3: Data Analysis, Statistics, and Probability

Standard 3: Students use data collection and analysis techniques, statistical methods, and probability to solve problems

BENCHMARK EXPECTATION

Grade 8

DATA COLLECTION, DISPLAY, AND INTERPRETATION

- 8.3.1. Formulate a question and select a random or representative sample
- 8.3.2. Collect, organize, and display data using scatter and stem-and-leaf plot

PROBABILITY

- 8.3.3. Determine possible outcomes using organized lists, tree diagrams, Venn diagrams, factorials, and the basic counting principle
- 8.3.4. Distinguish between experimental and theoretical probability; i.e., the results of an experiment may not match the theoretical probability

STATISTICAL METHODS

- 8.3.5. Calculate and compare the measures of central tendency (i.e., mean, median, mode) and spread (i.e., range)
- 8.3.6. Identify an outlier within a set of data and discuss its effects on the measures of central tendency and spread

PREDICTIONS, DATA ANALYSIS AND INFERENCES

- 8.3.7. Make inferences based on analysis of data and interpretation of graphs

Standard 4: Measurement

Standard 4: Students use concepts and tools of measurement to describe and quantify the world

BENCHMARK EXPECTATION

Grade 8

MEASURABLE ATTRIBUTES, MEASUREMENT SYSTEMS AND UNITS

8.4.1. Select an appropriate degree of precision when using measurements for calculations

8.4.2. Compare unit measurements between systems; e.g., a yard is almost a meter

MEASUREMENT TOOLS, TECHNIQUES, AND FORMULAS

8.4.3. Use formulas to determine the surface area and volume of right cones and spheres

Standard 5: Algebra, Functions, and Patterns

Standard 5: Students use algebraic concepts, functions, patterns, and relationships to solve problems

BENCHMARK EXPECTATION

Grade 8

PATTERNS, RELATIONS, AND FUNCTIONS

8.5.1. Extend numerical patterns; e.g., Pascal's triangle and the Fibonacci sequence

NUMERIC AND ALGEBRAIC REPRESENTATIONS

8.5.2. Use variables, expressions and equations to represent problem situations

8.5.3. Apply the order of operations and the commutative, associative, and distributive properties to simplify algebraic expressions

8.5.4. Apply inverse operations and the properties of equality to solve multi-step equations and inequalities in one variable

MATHEMATICAL MODELING

8.5.5. Write multi-step equations and inequalities to represent problem situations

RATES OF CHANGE

8.5.6. Solve problems involving rates; i.e. speed equals distance divided by time (miles per hour)