

North Dakota Mathematics Content and Achievement Standards

Grade 6

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North Dakota Department of Public Instruction

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Standard 1: Number and Operation

Standard 1: Students understand and use basic and advanced concepts of number and number systems..				
Benchmark Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
Grade 6				
NUMBERS, NUMBER RELATIONSHIPS, AND NUMBER SYSTEMS				
6.1.1. Use a fraction to represent parts of a whole, division, or a ratio	Students use fractions to represent parts of a whole, division, or a ratio with no errors.	Students use fractions to represent parts of a whole, division, or a ratio with no significant errors.	Students use fractions to represent parts of a whole, division, or a ratio with a few significant errors.	Students use fractions to represent parts of a whole, division, or a ratio with many significant errors.
6.1.2. Explain and use whole number percents 1 to 100	Students explain in great detail and use whole number percents 1 to 100 with no errors.	Students explain in adequate detail and use whole number percents 1 to 100 with no significant errors.	Students explain in some detail and/or use whole number percents 1 to 100 with a few significant errors.	Students explain in minimal detail and/or use whole number percents 1 to 100 with many significant errors.
6.1.3. Find the equivalent forms among fractions, decimals, and whole number percents	Students find the equivalent forms among fractions, decimals, and whole number percents with no errors.	Students find the equivalent forms among fractions, decimals, and whole number percents with no significant errors.	Students find the equivalent forms among fractions, decimals, and whole number percents with a few significant errors.	Students find the equivalent forms among fractions, decimals, and whole number percents with many significant errors.
6.1.4. Compare and order fractions, decimals, mixed numbers and integers	Students compare and order fractions, decimals, mixed numbers, and integers with no errors.	Students compare and order fractions, decimals, mixed numbers, and integers with no significant errors.	Students compare and order fractions, decimals, mixed numbers, and integers with a few significant errors.	Students compare and order fractions, decimals, mixed numbers, and integers with many significant errors.
6.1.5. Generate a list of factors, prime factors, and multiples	Students generate a list of factors, prime factors, and multiples with no errors.	Students generate a list of factors, prime factors, and multiples with no significant errors.	Students generate a list of factors, prime factors, and multiples with a few significant errors.	Students generate a list of factors, prime factors, and multiples with many significant errors.
6.1.6. Use rules to determine divisibility by 2, 3, 5, 6, 9, and 10	Students use rules to determine divisibility by 2, 3, 5, 6, 9, and 10 with no errors.	Students use rules to determine divisibility by 2, 3, 5, 6, 9, and 10 with no significant errors.	Students use rules to determine divisibility by 2, 3, 5, 6, 9, and 10 with a few significant errors.	Students use rules to determine divisibility by 2, 3, 5, 6, 9, and 10 with many significant errors.

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

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	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
OPERATIONS AND THEIR PROPERTIES				
6.1.7. Explain the effects of arithmetic operations on fractions and decimals	Students explain in great detail the effects of arithmetic operations on fractions and decimals.	Students explain in adequate detail the effects of arithmetic operations on fractions and decimals.	Students explain in some detail the effects of arithmetic operations on fractions and decimals.	Students explain in minimal detail the effects of arithmetic operations on fractions and decimals.
6.1.8. Identify the uses of the commutative and associative properties of addition and multiplication; e.g., grouping numbers to make addition or multiplication easier	Students identify the uses of the commutative and associative properties of addition and multiplication with no errors.	Students identify the uses of the commutative and associative properties of addition and multiplication with no significant errors.	Students identify the uses of the commutative and associative properties of addition and multiplication with a few significant errors.	Students identify the uses of the commutative and associative properties of addition and multiplication with many significant errors.
6.1.9. Use order of operations; i.e., multiplication, division, addition and subtraction, to simplify numeric expressions	Students use order of operations to simplify numeric expressions with no errors.	Students use order of operations to simplify numeric expressions with no significant errors.	Students use order of operations to simplify numeric expressions with a few significant errors.	Students use order of operations to simplify numeric expressions with many significant errors.
COMPUTATIONAL FLUENCY AND ESTIMATION				
6.1.10. Multiply and divide decimals	Students multiply and divide decimals with no errors.	Students multiply and divide decimals with no significant errors.	Students multiply and divide decimals with a few significant errors.	Students multiply and divide decimals with many significant errors.
6.1.11. Add, subtract, multiply, and divide fractions	Students add, subtract, multiply, and divide fractions with no errors.	Students add, subtract, multiply, and divide fractions with no significant errors.	Students add, subtract, multiply, and divide fractions with a few significant errors.	Students add, subtract, multiply, and divide fractions with many significant errors.
6.1.12. Express an exponent in standard form	Students express an exponent in standard form with no errors.	Students express an exponent in standard form with no significant errors.	Students express an exponent in standard form with a few significant errors.	Students express an exponent in standard form with many significant errors.
6.1.13. Use problem solving strategies to solve and verify the results of problems	Students use problem solving strategies to solve and verify the results of problems with no errors.	Students use problem solving strategies to solve and verify the results of problems with no significant errors.	Students use problem solving strategies to solve and verify the results of problems with a few significant errors.	Students use problem solving strategies to solve and verify the results of problems with many significant errors.

Standard 1: Students understand and use basic and advanced concepts of number and number systems..				
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6.1.14. Estimate the results of problems involving whole numbers, fractions, and decimals	Students estimate the results of problems involving whole numbers, fractions, and decimals with no errors.	Students estimate the results of problems involving whole numbers, fractions, and decimals with no significant errors.	Students estimate the results of problems involving whole numbers, fractions, and decimals with a few significant errors.	Students estimate the results of problems involving whole numbers, fractions, and decimals with many significant errors.

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 Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
Grade 6				
TWO- AND THREE-DIMENSIONAL SHAPES, GEOMETRIC PROPERTIES AND RELATIONSHIPS				
6.2.1. Identify relationships between pairs of angles; i.e., adjacent, vertical, complementary, and supplementary	Students identify relationships between pairs of angles with no errors.	Students identify relationships between pairs of angles with no significant errors.	Students identify relationships between pairs of angles with a few significant errors.	Students identify relationships between pairs of angles with many significant errors.
6.2.2. Identify polygons; i.e., triangle, rectangle, square, rhombus, parallelogram, trapezoid, pentagon, hexagon, octagon	Students identify polygons with no errors.	Students identify polygons with no significant errors.	Students identify polygons with a few significant errors.	Students identify polygons with many significant errors.
6.2.3. Describe the characteristics of a right triangle	Students describe in great detail the characteristics of a right triangle.	Students describe in adequate detail the characteristics of a right triangle.	Students describe in some detail the characteristics of a right triangle.	Students describe in minimal detail the characteristics of a right triangle.
COORDINATE GEOMETRY				
6.2.4. Use ordered pairs to locate a point on a coordinate plane	Students use ordered pairs to locate points on a coordinate plane with no errors.	Students use ordered pairs to locate points on a coordinate plane with no significant errors.	Students use ordered pairs to locate points on a coordinate plane with a few significant errors.	Students use ordered pairs to locate points on a coordinate plane with many significant errors.
TRANSFORMATION AND SYMMETRY				
6.2.5. Identify, describe, and model motion geometry; i.e., rotations, reflections, and translations	Students identify and model transformations with no errors and describe transformations in great detail.	Students identify and model transformations with no significant errors and describe transformations in adequate detail.	Students identify and model transformations with a few significant errors or describe transformations in some detail.	Students identify and model transformations with many significant errors and describe transformations in minimal detail.

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

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VISUALIZATION, SPATIAL REASONING, AND GEOMETRIC MODELING 6.2.6. Draw basic geometric figures using appropriate tools; i.e., circle with a compass, triangle and rectangle with a ruler or straight edge	Students select a tool and draw basic geometric figures with no errors.	Students select a tool and draw basic geometric figures with no significant errors.	Students select a tool and draw basic geometric figures with a few significant errors.	Students select a tool and draw basic geometric figures with many significant errors.

Standard 3: Data Analysis, Statistics, and Probability

Standard 3: Students use data collection and analysis techniques, statistical methods, and probability to solve problems.				
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Grade 6				
DATA COLLECTION, DISPLAY, AND INTERPRETATION				
6.3.1. Collect and organize data, select and use an appropriate display; i.e., a frequency table, a line and bar graph	Students collect and organize data and select and use an appropriate display with no errors.	Students collect and organize data and select and use an appropriate display with no significant errors.	Students collect and organize data and/or select and use an appropriate display with a few significant errors.	Students collect and organize data and/or select and use an appropriate display with many significant errors.
PROBABILITY				
6.3.2. Count possible outcomes using lists	Students count possible outcomes using lists with no errors.	Students count possible outcomes using lists with no significant errors.	Students count possible outcomes using lists with a few significant errors.	Students count possible outcomes using lists with many significant errors.
6.3.3. Use experiments or simulations to determine probabilities	Students use experiments or simulations to determine probabilities with no errors.	Students use experiments or simulations to determine probabilities with no significant errors.	Students use experiments or simulations to determine probabilities with a few significant errors.	Students use experiments or simulations to determine probabilities with many significant errors.
6.3.4. Use decimal values and ratios to represent probability	Students use decimal values and ratios to represent probability with no errors.	Students use decimal values and ratios to represent probability with no significant errors.	Students use decimal values and/or ratios to represent probability with a few significant errors.	Students use decimal values and/or ratios to represent probability with many significant errors.
STATISTICAL METHODS				
6.3.5. Calculate the mean, median, mode, and range of a set of data	Students calculate mean, median, mode, and range of a set of data with no errors.	Students calculate mean, median, mode, and range of a set of data with no significant errors.	Students calculate mean, median, mode, and range of a set of data with a few significant errors.	Students calculate mean, median, mode, and range of a set of data with many significant errors.

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

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PREDICTIONS, DATA ANALYSIS, AND INFERENCES 6.3.6. Make predictions based on trends identified in tables and graphs	Students make predictions based on trends identified in tables and graphs with no errors.	Students make predictions based on trends identified in tables and graphs with no significant errors.	Students make predictions based on trends identified in tables and graphs with a few significant errors.	Students make predictions based on trends identified in tables and graphs with many significant errors.

Standard 4: Measurement

Standard 4: Students use concepts and tools of measurement to describe and quantify the world..				
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Grade 6				
MEASURABLE ATTRIBUTES, MEASUREMENT SYSTEMS AND UNITS				
6.4.1. Measure length to the nearest sixteenth of an inch	Students measure to the nearest sixteenth of an inch with no errors.	Students measure to the nearest sixteenth of an inch with no significant errors.	Students measure to the nearest sixteenth of an inch with a few significant errors.	Students measure to the nearest sixteenth of an inch with many significant errors.
6.4.2. Select an appropriate unit of measure; e.g., What unit do you use to measure a person's height?	Students select a unit of measure with no errors.	Students select a unit of measure with no significant errors.	Students select a unit of measure with a few significant errors.	Students select a unit of measure with many significant errors.
6.4.3. Convert unit measurements within the same system (metric and standard)	Students convert unit measurements within the same system with no errors.	Students convert unit measurements within the same system with no significant errors.	Students convert unit measurements within the same system with a few significant errors.	Students convert unit measurements within the same system with many significant errors.
6.4.4. Distinguish among perimeter, area, surface area, and volume	Students distinguish among perimeter, area, surface area, and volume with no errors.	Students distinguish among perimeter, area, surface area, and volume with no significant errors.	Students distinguish among perimeter, area, surface area, and volume with a few significant errors.	Students distinguish among perimeter, area, surface area, and volume with many significant errors.
MEASUREMENT TOOLS, TECHNIQUES, AND FORMULAS				
6.4.5. Select appropriate tools and units to determine the measurements needed for calculating perimeter, circumference, area, surface area, and volume	Students select, with no errors, appropriate tools and units to determine the measurements needed for calculating perimeter, circumference, area, surface area, and volume.	Students select, with no significant errors, appropriate tools and units to determine the measurements needed for calculating perimeter, circumference, area, surface area, and volume.	Students select, with a few significant errors, appropriate tools and units to determine the measurements needed for calculating perimeter, circumference, area, surface area, and volume.	Students select, with many significant errors, appropriate tools and units to determine the measurements needed for calculating perimeter, circumference, area, surface area, and volume.

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

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6.4.6. Use formulas to determine the circumference and area of circles and the perimeter and area of triangles and parallelograms	Students use formulas to determine the circumference and area of circles and the perimeter and area of triangles and parallelograms with no errors.	Students use formulas to determine the circumference and area of circles and the perimeter and area of triangles and parallelograms with no significant errors.	Students use formulas to determine the circumference and area of circles and the perimeter and area of triangles and parallelograms with a few significant errors.	Students use formulas to determine the circumference and area of circles and the perimeter and area of triangles and parallelograms with many significant errors.
6.4.7. Use area formulas to determine the surface area of right prisms and square pyramids	Students use formulas to determine the surface area of right prisms and square pyramids with no errors.	Students use formulas to determine the surface area of right prisms and square pyramids with no significant errors.	Students use formulas to determine the surface area of right prisms and square pyramids with a few significant errors.	Students use formulas to determine the surface area of right prisms and square pyramids with many significant errors.
6.4.8. Use formulas to determine the volume of rectangular prisms	Students use formulas to determine the volume of rectangular prisms with no errors.	Students use formulas to determine the volume of rectangular prisms with no significant errors.	Students use formulas to determine the volume of rectangular prisms with a few significant errors.	Students use formulas to determine the volume of rectangular prisms with many significant errors.

Standard 5: Algebra, Functions and Patterns

Standard 5: Students use algebraic concepts, functions, patterns, and relationships to solve problems.				
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	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
Grade 6				
PATTERNS, RELATIONS, AND FUNCTIONS				
6.5.1. Identify and describe patterns represented by tables, graphs, and sequences	Students identify and describe in great detail the patterns represented by tables, graphs, and sequences.	Students identify and describe in adequate detail the patterns represented by tables, graphs, and sequences.	Students identify and describe in some detail the patterns represented by tables, graphs, and sequences.	Students identify and describe in minimal detail the patterns represented by tables, graphs, and sequences.
NUMERIC AND ALGEBRAIC REPRESENTATIONS				
6.5.2. Use a variable to represent an unknown quantity	Students use a variable to represent an unknown quantity with no errors.	Students use a variable to represent an unknown quantity with no significant errors.	Students use a variable to represent an unknown quantity with a few significant errors.	Students use a variable to represent an unknown quantity with many significant errors.
MATHEMATICAL MODELING				
6.5.3. Use representations to solve problems; i.e., tables and numerical sentences	Students use representations to solve problems with no errors.	Students use representations to solve problems with no significant errors.	Students use representations to solve problems with a few significant errors.	Students use representations to solve problems with many significant errors.
RATES OF CHANGE				
6.5.4. Recognize examples of change over time; e.g., growth of a sixth grader from September to May	Students recognize examples of change over time with no errors.	Students recognize examples of change over time with no significant errors.	Students recognize examples of change over time with a few significant errors.	Students recognize examples of change over time with many significant errors.