

# North Dakota Mathematics Content and Achievement Standards

Grade 5

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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
<b>Grade 5</b>				
<b>NUMBERS, NUMBER RELATIONSHIPS, AND NUMBER SYSTEMS</b>				
5.1.1. Identify place value from the billions through the thousandths place	Students identify place value from billions to thousandths place with no errors.	Students identify place value from billions to thousandths place with no significant errors.	Students identify place value from billions to thousandths place with a few significant errors.	Students identify place value from billions to thousandths place with many significant errors.
5.1.2. Order and compare whole numbers using symbols	Students order and compare whole numbers using symbols with no errors.	Students order and compare whole numbers using symbols with no significant errors.	Students order and compare whole numbers using symbols with a few significant errors.	Students order and compare whole numbers using symbols with many significant errors.
5.1.3. Round whole numbers to the nearest million	Students round whole numbers to the nearest million with no errors.	Students round whole numbers to the nearest million with no significant errors.	Students round whole numbers to the nearest million with a few significant errors.	Students round whole numbers to the nearest million with many significant errors.
5.1.4. Read and represent numbers to 1,000,000 in standard, expanded, and short word form	Students read and represent numbers up to one million in standard, expanded, and short word form with no errors.	Students read and represent numbers up to one million in standard, expanded, and short word form with no significant errors.	Students read and represent numbers up to one million in standard, expanded, and short word form with a few significant errors.	Students read and represent numbers up to one million in standard, expanded, and short word form with many significant errors.
5.1.5. Place integers on a number line	Students place integers on a number line with no errors.	Students place integers on a number line with no significant errors.	Students place integers on a number line with a few significant errors.	Students place integers on a number line with many significant errors.
5.1.6. Use negative integers in real-world situations; e.g., thermometer reading, yardage in a football game	Students use negative integers in real-world situations with no errors.	Students use negative integers in real-world situations with no significant errors.	Students use negative integers in real-world situations with a few significant errors.	Students use negative integers in real-world situations with many significant errors.
5.1.7. Identify prime and composite numbers	Students identify prime and composite numbers with no errors.	Students identify prime and composite numbers with no significant errors.	Students identify prime and composite numbers with a few significant errors.	Students identify prime and composite numbers with many significant errors.

**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
5.1.8. Round, order, and compare, using symbols, fractions with like and unlike denominators	Students round, order, and compare fractions with like and unlike denominators with no errors.	Students round, order, and compare fractions with like and unlike denominators with no significant errors.	Students round, order, and compare fractions with like and unlike denominators with a few significant errors.	Students round, order, and compare fractions with like and unlike denominators with many significant errors.
5.1.9. Round, order, and compare, using symbols, decimals to the tenths, hundredths, and thousandths place	Students round, order, and compare decimals to the tenths, hundredths, and thousandths place with no errors.	Students round, order, and compare decimals to the tenths, hundredths, and thousandths place with no significant errors.	Students round, order, and compare decimals to the tenths, hundredths, and thousandths place with a few significant errors.	Students round, order, and compare decimals to the tenths, hundredths, and thousandths place with many significant errors.
5.1.10. Explain and demonstrate the concept of a percent	Students explain in great detail and demonstrate the concept of a percent with no errors.	Students explain in adequate detail and demonstrate the concept of a percent with no significant errors.	Students explain in some detail and/or demonstrate the concept of a percent with a few significant errors.	Students explain in minimal detail and/or demonstrate the concept of a percent with many significant errors.
5.1.11. Compare equivalent fractions, decimals, and percents, e.g., $75/100 = .75 = 75\%$	Students compare equivalent fractions, decimals, and percents with no errors.	Students compare equivalent fractions, decimals, and percents with no significant errors.	Students compare equivalent fractions, decimals, and percents with a few significant errors.	Students compare equivalent fractions, decimals with many significant errors.
5.1.12. Represent ratios and percents as parts of a whole using models and pictures	Students represent ratios and percents as parts of a whole with no errors.	Students represent ratios and percents as parts of a whole with no significant errors.	Students represent ratios and percents as parts of a whole with a few significant errors.	Students represent ratios and percents as parts of a whole with many significant errors.
5.1.13. Explain and demonstrate the relationship between exponential notation and repeated multiplication; e.g., $3^2 = 3 \times 3$	Students explain in great detail and demonstrate the relationship between exponential notation and repeated multiplication with no errors.	Students explain in adequate detail and demonstrate the relationship between exponential notation and repeated multiplication with no significant errors.	Students explain in some detail and/or demonstrate the relationship between exponential notation and repeated multiplication with a few significant errors.	Students explain in minimal detail and/or demonstrate the relationship between exponential notation and repeated multiplication with many significant errors.
<b>OPERATIONS AND THEIR PROPERTIES</b>				
5.1.14. Add and subtract whole numbers between 0 and 1,000,000	Students add and subtract whole numbers between 0 and 1,000,000 with no errors.	Students add and subtract whole numbers between 0 and 1,000,000 with no significant errors.	Students add and subtract whole numbers between 0 and 1,000,000 with a few significant errors.	Students add and subtract whole numbers between 0 and 1,000,000 with many significant errors.

**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
5.1.15. Use commutative, associative, and identity properties to solve problems	Students use commutative, associative, and identity properties with no errors.	Students use commutative, associative, and identity properties with no significant errors.	Students use commutative, associative, and identity properties with a few significant errors.	Students use commutative, associative, and identity properties with many significant errors.
5.1.16. Use divisibility rules for 2, 5, and 10	Students use divisibility rules for 2, 5, and 10 with no errors.	Students use divisibility rules for 2, 5, and 10 with no significant errors.	Students use divisibility rules for 2, 5, and 10 with a few significant errors.	Students use divisibility rules for 2, 5, and 10 with many significant errors.
5.1.17. Determine the prime factors for a number using a factor tree	Students determine the prime factors for a number using a factor tree with no errors.	Students determine the prime factors for a number using a factor tree with no significant errors.	Students determine the prime factors for a number using a factor tree with a few significant errors.	Students determine the prime factors for a number using a factor tree with many significant errors.
5.1.18. Determine least common multiple	Students determine the least common multiple and greatest common factor with no errors.	Students determine the least common multiple and greatest common factor with no significant errors.	Students determine the least common multiple and greatest common factor with a few significant errors.	Students determine the least common multiple and greatest common factor with many significant errors.
5.1.19. Determine greatest common factor				
5.1.20. Use order of operations to simplify numeric expressions	Students use the order of operations to simplify numeric expressions with no errors.	Students use the order of operations to simplify numeric expressions with no significant errors.	Students use the order of operations to simplify numeric expressions with a few significant errors.	Students use the order of operations to simplify numeric expressions with many significant errors.
5.1.21. Multiply multi-digit numbers by three-digit numbers	Students multiply multi-digit numbers by three-digit numbers and divide multi-digit numbers by two-digit numbers with or without remainders with no errors.	Students multiply multi-digit numbers by three-digit numbers and divide multi-digit numbers by two-digit numbers with or without remainders with no significant errors.	Students multiply multi-digit numbers by three-digit numbers and divide multi-digit numbers by two-digit numbers with or without remainders with a few significant errors.	Students multiply multi-digit numbers by three-digit numbers and divide multi-digit numbers by two-digit numbers with or without remainders with many significant errors.
5.1.22. Divide multi-digit numbers by two-digit numbers with or without remainders				
5.1.23. Add and subtract improper fractions and mixed numbers with unlike denominators	Students add and subtract improper fractions and mixed numbers with unlike denominators with no errors.	Students add and subtract improper fractions and mixed numbers with unlike denominators with no significant errors.	Students add and subtract improper fractions and mixed numbers with unlike denominators with a few significant errors.	Students add and subtract improper fractions and mixed numbers with unlike denominators with many significant errors.

Standard 1: Students understand and use basic and advanced concepts of number and number systems..				
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5.1.24. Add and subtract multi-digit decimals	Students add, subtract, multiply, and divide multi-digit decimals with no errors.	Students add, subtract, multiply, and divide multi-digit decimals with no significant errors.	Students add, subtract, multiply, and divide multi-digit decimals with a few significant errors.	Students add, subtract, multiply, and divide multi-digit decimals with many significant errors.
5.1.25. Multiply and divide multi-digit decimals				
COMPUTATIONAL FLUENCY AND ESTIMATION				
<i>No new benchmark expectations at this level</i>				

## 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
<b>Grade 5</b>				
<b>TWO- AND THREE-DIMENSIONAL SHAPES, GEOMETRIC PROPERTIES AND RELATIONSHIPS</b>				
5.2.1. Describe properties and attributes of two- and three-dimensional figures; i.e., obtuse angle, acute angle, radius, chord, diagonal, equilateral triangle, isosceles triangle, parallel lines, perpendicular lines	Students describe all significant properties and attributes of two- and three-dimensional figures.	Students describe most significant properties and attributes of two- and three-dimensional figures.	Students describe some significant properties and attributes of two- and three-dimensional figures.	Students describe very few significant properties and attributes of two- and three-dimensional figures.
5.2.2. Draw circles using a compass, and identify the components; i.e., radius, chord, diameter, center, and circumference	Students use a compass and protractor with ease to draw circles and angles.	Students use a compass and protractor with minimal difficulty to draw circles and angles.	Students use a compass and protractor with some difficulty to draw circles and angles.	Students use a compass and protractor with great difficulty to draw circles and angles.
5.2.3. Identify the attributes of an angle and draw angles using protractors	Students identify all components of a circle and attributes of an angle.	Students identify the most significant components of a circle and attributes of an angle.	Students identify some of the significant components of a circle and attributes of an angle.	Students identify very few significant components of a circle and attributes of an angle.
5.2.4. Determine the degrees of the interior angles of triangles and quadrilaterals	Students determine the degrees of the interior angles of triangles and quadrilaterals with no errors.	Students determine the degrees of the interior angles of triangles and quadrilaterals with no significant errors.	Students determine the degrees of the interior angles of triangles and quadrilaterals with a few significant errors.	Students determine the degrees of the interior angles of triangles and quadrilaterals with many significant errors.
5.2.5. Determine the characteristics of, and the relationships among, points, lines, line segments, rays, and planes	Students determine all significant characteristics of, and relationships among, points, lines, line segments, rays, and planes.	Students determine the most significant characteristics of, and relationships among, points, lines, line segments, rays, and planes.	Students determine some significant characteristics of, and relationships among, points, lines, line segments, rays, and planes.	Students determine very few significant characteristics of, and relationships among, points, lines, line segments, rays, and planes.

**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
<p>COORDINATE GEOMETRY</p> <p>5.2.6. Use ordered pairs in quadrant 1 of a coordinate grid</p>	<p>Students use ordered pairs in quadrant 1 of a coordinate grid with no errors.</p>	<p>Students use ordered pairs in quadrant 1 of a coordinate grid with no significant errors.</p>	<p>Students use ordered pairs in quadrant 1 of a coordinate grid with a few significant errors.</p>	<p>Students use ordered pairs in quadrant 1 of a coordinate grid with many significant errors.</p>
<p>TRANSFORMATION AND SYMMETRY</p> <p>5.2.7. Describe properties of congruent figures and use them to solve problems</p>	<p>Students describe in great detail properties of congruent figures and use them to solve problems with no errors.</p>	<p>Students describe in adequate detail properties of congruent figures and use them to solve problems with no significant errors.</p>	<p>Students describe in some detail properties of congruent figures and/or use them to solve problems with a few significant errors.</p>	<p>Students describe in minimal detail properties of congruent figures and/or use them to solve problems with many significant errors.</p>
<p>VISUALIZATION, SPATIAL REASONING, AND GEOMETRIC MODELING</p> <p><i>No benchmark expectations at this level</i></p>				

## Standard 3: Data Analysis, Statistics, and Probability

Standard 3: Students use data collection and analysis techniques, statistical methods, and probability to solve problems.				
Benchmark Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
<b>Grade 5</b>				
<b>DATA COLLECTION, DISPLAY, AND INTERPRETATION</b>				
5.3.1. Read and interpret bar, line, and circle graphs, pictographs, and frequency tables	Students read and interpret bar, line, and circle graphs, pictographs, and frequency tables with no errors.	Students read and interpret bar, line, and circle graphs, pictographs, and frequency tables with no significant errors.	Students read and interpret bar, line, and circle graphs, pictographs, and frequency tables with a few significant errors.	Students read and interpret bar, line, and circle graphs, pictographs, and frequency tables with many significant errors.
<b>PROBABILITY</b>				
5.3.2. Determine the probability of a simple event and express it as a ratio	Students determine the probability of a simple event and express it as a ratio with no errors.	Students determine the probability of a simple event and express it as a ratio with no significant errors.	Students determine the probability of a simple event and express it as a ratio with a few significant errors.	Students determine the probability of a simple event and express it as a ratio with many significant errors.
5.3.3. State possible outcomes for a given situation	Students state possible outcomes for a given situation with no errors.	Students state possible outcomes for a given situation with no significant errors.	Students state possible outcomes for a given situation with a few significant errors.	Students state possible outcomes for a given situation with many significant errors.
5.3.4. Determine possible arrangements of four or fewer items	Students determine possible arrangements of four or fewer items with no errors.	Students determine possible arrangements of four or fewer items with no significant errors.	Students determine possible arrangements of four or fewer items with a few significant errors.	Students determine possible arrangements of four or fewer items with many significant errors.
<b>STATISTICAL METHODS</b>				
5.3.5. Determine or calculate the mode, mean, and range of a set of data	Students determine or calculate the mode, mean, and range of a set of data with no errors.	Students determine or calculate the mode, mean, and range of a set of data with no significant errors.	Students determine or calculate the mode, mean, and range of a set of data with a few significant errors.	Students determine or calculate the mode, mean, 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.**

Benchmark Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
<p>PREDICTIONS, DATA ANALYSIS, AND INFERENCES</p> <p>5.3.6. Make predictions and draw conclusions based on data collected from a sample group</p>	<p>Students make predictions and draw conclusions based on data collected from a sample group with no errors.</p>	<p>Students make predictions and draw conclusions based on data collected from a sample group with no significant errors.</p>	<p>Students make predictions and/or draw conclusions based on data collected from a sample group with a few significant errors.</p>	<p>Students make predictions and/or draw conclusions based on data collected from a sample group with many significant errors.</p>

## Standard 4: Measurement

Standard 4: Students use concepts and tools of measurement to describe and quantify the world..				
Benchmark Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
<b>Grade 5</b>				
<b>MEASURABLE ATTRIBUTES, MEASUREMENT SYSTEMS AND UNITS</b>				
5.4.1. Estimate and measure length to the nearest eighth inch	Students estimate and measure length to the nearest eighth inch with no errors.	Students estimate and measure length to the nearest eighth inch with no significant errors.	Students estimate and/or measure length to the nearest eighth inch with a few significant errors.	Students estimate and/or measure length to the nearest eighth inch with many significant errors.
5.4.2. Measure and apply elapsed time; i.e., time zones, schedules, and calendars	Students measure and apply elapsed time with no errors.	Students measure and apply elapsed time with no significant errors.	Students measure and apply elapsed time with a few significant errors.	Students measure and apply elapsed time with many significant errors.
5.4.3. Measure angles using protractors	Students measure angles using protractors with no errors.	Students measure angles using protractors with no significant errors.	Students measure angles using protractors with a few significant errors.	Students measure angles using protractors with many significant errors.
5.4.4. Estimate angle measures using the benchmark angles 45°, 90°, 180°, 270°, and 360°	Students estimate angle measures using the benchmark angles with no errors.	Students estimate angle measures using the benchmark angles with no significant errors.	Students estimate angle measures using the benchmark angles with a few significant errors.	Students estimate angle measures using the benchmark angles with many significant errors.
<b>MEASUREMENT TOOLS, TECHNIQUES, AND FORMULAS</b>				
5.4.5. Select and use appropriate units when measuring length, area, and volume	Students select and use units when measuring length, area, and volume with no errors.	Students select and use units when measuring length, area, and volume with no significant errors.	Students select and use units when measuring length, area, and volume with a few significant errors.	Students select and use units when measuring length, area, and volume with many significant errors.
5.4.6. Use formulas to calculate the perimeter and area of squares and rectangles	Students use formulas to calculate the perimeter and area of squares and rectangles with no errors.	Students use formulas to calculate the perimeter and area of squares and rectangles with no significant errors.	Students use formulas to calculate the perimeter and area of squares and rectangles with a few significant errors.	Students use formulas to calculate the perimeter and area of squares and rectangles with many significant errors.

Standard 4: Students use concepts and tools of measurement to describe and quantify the world..				
Benchmark Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
5.4.7. Use formulas to calculate the volume of rectangular prisms	Students use formulas to calculate the volume of rectangular prisms with no errors.	Students use formulas to calculate the volume of rectangular prisms with no significant errors.	Students use formulas to calculate the volume of rectangular prisms with a few significant errors.	Students use formulas to calculate 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.				
Benchmark Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
<b>Grade 5</b>				
<b>PATTERNS, RELATIONS, AND FUNCTIONS</b>				
5.5.1. Analyze patterns represented by tables and graphs	Students analyze, in great detail, patterns represented by tables and graphs.	Students analyze, in adequate detail, patterns represented by tables and graphs.	Students analyze, in some detail, patterns represented by tables and graphs.	Students analyze, in minimal detail, patterns represented by tables and graphs.
5.5.2. Identify a rule for a pattern involving addition, subtraction, or multiplication	Students identify a rule for a pattern involving addition, subtraction, or multiplication with no errors.	Students identify a rule for a pattern involving addition, subtraction, or multiplication with no significant errors.	Students identify a rule for a pattern involving addition, subtraction, or multiplication with a few significant errors.	Students identify a rule for a pattern involving addition, subtraction, or multiplication with many significant errors.
5.5.3. Identify the rule for a pattern and then use the rule to solve a problem	Students identify and use a rule for a pattern to solve a problem with no errors.	Students identify and use a rule for a pattern to solve a problem with no significant errors.	Students identify and use a rule for a pattern to solve a problem with a few significant errors.	Students identify and use a rule for a pattern to solve a problem with many significant errors.
<b>NUMERIC AND ALGEBRAIC REPRESENTATIONS</b>				
5.5.4. Identify a variable in an expression	Students identify a variable in an expression with no errors.	Students identify a variable in an expression with no significant errors.	Students identify a variable in an expression with a few significant errors.	Students identify a variable in an expression with many significant errors.
<b>MATHEMATICAL MODELING</b>				
5.5.5. Use equations to solve problems; e.g., $28/x=7$	Students use equations to solve problems with no errors.	Students use equations to solve problems with no significant errors.	Students use equations to solve problems with a few significant errors.	Students use equations to solve problems with many significant errors.
<b>RATES OF CHANGE</b>				
<i>No benchmark expectations at this level</i>				