

# North Dakota Mathematics Content and Achievement Standards

Grade 4

April 2005

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 4</b>				
<b>NUMBERS, NUMBER RELATIONSHIPS, AND NUMBER SYSTEMS</b>				
4.1.1. Identify place value from hundred thousands through the hundredths place	Students identify place value from hundred thousands through the hundredths place with no errors.	Students identify place value from hundred thousands through the hundredths place with no significant errors.	Students identify place value from hundred thousands through the hundredths place with a few significant errors.	Students identify place value from hundred thousands through the hundredths place with many significant errors.
4.1.2. Order and compare using symbols; i.e., >, <, =, whole numbers (0 to 100,000) and decimals to hundredths	Students order and compare numbers from hundredths to 100,000 with no errors.	Students order and compare numbers from hundredths to 100,000 with no significant errors.	Students order and compare numbers from hundredths to 100,000 with a few significant errors.	Students order and compare numbers from hundredths to 100,000 with many significant errors.
4.1.3. Read and write numerals to 100,000	Students read and write numerals to 100,000 with no errors.	Students read and write numerals to 100,000 with no significant errors.	Students read and write numerals to 100,000 with a few significant errors.	Students read and write numerals to 100,000 with many significant errors.
4.1.4. Round whole numbers to the nearest tens, hundreds, thousands, ten thousands, and hundred thousands	Students round whole numbers to the nearest designated unit (tens through hundred thousands) with no errors.	Students round whole numbers to the nearest designated unit (tens through hundred thousands) with no significant errors.	Students round whole numbers up to the nearest designated unit (tens through hundred thousands) with a few significant errors.	Students round whole numbers up to the nearest designated unit (tens through hundred thousands) with many significant errors.
4.1.5. Represent numbers up to hundred thousands in standard and expanded forms	Students represent numbers up to hundred thousands in standard and expanded forms with no errors.	Students represent numbers up to hundred thousands in standard and expanded forms with no significant errors.	Students represent numbers up to hundred thousands in standard and expanded forms with a few significant errors.	Students represent numbers up to hundred thousands in standard and expanded forms with many significant errors.
4.1.6. Write tenths and hundredths as decimals and fractions	Students write tenths and hundredths as decimals and fractions with no errors.	Students write tenths and hundredths as decimals and fractions with no significant errors.	Students write tenths and hundredths as decimals and fractions with a few significant errors.	Students write tenths and hundredths as decimals and fractions 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
4.1.7. Compare equivalent decimals and fractions, e.g., $5/10 = .5$	Students compare equivalent decimals and fractions with no errors.	Students compare equivalent decimals and fractions with no significant errors.	Students compare equivalent decimals and fractions with a few significant errors.	Students compare equivalent decimals and fractions with many significant errors.
4.1.8. Use mathematical terms when communicating about computations involving fractions; i.e., numerator and denominator	Students use mathematical terms to communicate about computations involving fractions with no errors.	Students use mathematical terms to communicate about computations involving fractions with no significant errors.	Students use mathematical terms to communicate about computations involving fractions with a few significant errors.	Students use mathematical terms to communicate about computations involving fractions with many significant errors.
4.1.9. Explain the meaning of remainders in real-world situations	Students explain in great detail the meaning of remainders in real-world situations.	Students explain in adequate detail the meaning of remainders in real-world situations.	Students explain in some detail the meaning of remainders in real-world situations.	Students explain in minimal detail the meaning of remainders in real-world situations.
4.1.10. Determine what information is relevant for solving a problem	Students determine what information is relevant for solving a problem with no errors.	Students determine what information is relevant for solving a problem with no significant errors.	Students determine what information is relevant for solving a problem with a few significant errors.	Students determine what information is relevant for solving a problem with many significant errors.
4.1.11. Use a variety of strategies to solve problems; e.g., guess and check, work backwards, draw pictures, use objects	Students use an extensive variety of strategies to solve problems.	Students use many different strategies to solve problems.	Students use some different strategies to solve problems.	Students use a limited number of strategies to solve problems.
<b>OPERATIONS AND THEIR PROPERTIES</b>				
4.1.12. Add and subtract whole numbers between 0 and 100,000	Students add and subtract whole numbers between 0 and 100,000 with no errors.	Students add and subtract whole numbers between 0 and 100,000 with no significant errors.	Students add and subtract whole numbers between 0 and 100,000 with a few significant errors.	Students add and subtract whole numbers between 0 and 100,000 with many significant errors.
4.1.13. Multiply multi-digit numbers by two-digit numbers	Students multiply multi-digit numbers by two-digit numbers and divide multi-digit numbers by single-digit numbers with no errors.	Students multiply multi-digit numbers by two-digit numbers and divide multi-digit numbers by single-digit numbers with no significant errors.	Students multiply multi-digit numbers by two-digit numbers and divide multi-digit numbers by single-digit numbers with a few significant errors.	Students multiply multi-digit numbers by two-digit numbers and divide multi-digit numbers by single-digit numbers with many significant errors.
4.1.14. Divide multi-digit numbers by a single-digit number				

**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
4.1.15. Add and subtract fractions and mixed numbers with like denominators	Students add and subtract fractions and mixed numbers with like denominators with no errors.	Students add and subtract fractions and mixed numbers with like denominators with no significant errors.	Students add and subtract fractions and mixed numbers with like denominators with a few significant errors.	Students add and subtract fractions and mixed numbers with like denominators with many significant errors.
4.1.16. Add and subtract decimals	Students add and subtract decimals with no errors.	Students add and subtract decimals with no significant errors.	Students add and subtract decimals with a few significant errors.	Students add and subtract decimals with many significant errors.
4.1.17. Use the distributive property to simplify and perform computations	Students use the distributive property to simplify and perform computations with no errors.	Students use the distributive property to simplify and perform computations with no significant errors.	Students use the distributive property to simplify and perform computations with a few significant errors.	Students use the distributive property to simplify and perform computations with many significant errors.
<b>COMPUTATIONAL FLUENCY AND ESTIMATION</b>				
4.1.18. Determine when a rounded solution is appropriate	Students determine when a rounded solution is appropriate with no errors.	Students determine when a rounded solution is appropriate with no significant errors.	Students determine when a rounded solution is appropriate with a few significant errors.	Students determine when a rounded solution is appropriate with many significant errors.
4.1.19. Estimate computations of whole numbers, fractions, and decimals	Students estimate computations of whole numbers, fractions, and decimals with no errors.	Students estimate computations of whole numbers, fractions, and decimals with no significant errors.	Students estimate computations of whole numbers, fractions, and decimals with a few significant errors.	Students estimate computations of whole numbers, fractions, and decimals with many significant errors.

## Standard 2: Geometry and Spatial Sense

Standard 2: Student understands and applies gometric concepts and spatial relationships to represent and solve problems in mathemtaical and nonmathematical situations.				
Benchmark Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
<b>Grade 4</b>				
<b>TWO- AND THREE-DIMENSIONAL SHAPES, GEOMETRIC PROPERTIES AND RELATIONSHIPS</b>				
4.2.1. Analyze and describe the attributes of two- and three-dimensional shapes (i.e., circle, squares, trapezoid, rhombus)	Students analyze and describe in great detail the significant attributes, as well as less obvious but relevant attributes, of two- and three-dimensional shapes.	Students analyze and describe in adequate detail the significant attributes of two- and three-dimensional shapes.	Students analyze and describe in some detail the significant attributes of two- and three-dimensional shapes.	Students analyze and describe in minimal detail the significant attributes of two- and three-dimensional shapes or describe only insignificant attributes.
4.2.2. Identify, describe, and model (e.g., using straws or other materials) parallel, perpendicular, and intersecting lines and line segments	Students identify, describe, and model parallel, perpendicular, and intersecting lines and line segments with no errors.	Students identify, describe, and model parallel, perpendicular, and intersecting lines and line segments with no significant errors.	Students identify, describe, and model parallel, perpendicular, and intersecting lines and line segments with a few significant errors.	Students identify, describe, and model parallel, perpendicular, and intersecting lines and line segments with many significant errors.
<b>COORDINATE GEOMETRY</b>				
<i>No benchmark expectations at this level</i>				
<b>TRANSFORMATION AND SYMMETRY</b>				
4.2.3. Recognize the changes in position and orientation of two-dimensional figures after transformations; i.e., flips (reflections), turns (rotations), and slides (translations)	Students recognize the changes in position and orientation of two-dimensional figures after transformations with no errors.	Students recognize the changes in position and orientation of two-dimensional figures after transformations with no significant errors.	Students recognize the changes in position and orientation of two-dimensional figures after transformations with a few significant errors.	Students recognize the changes in position and orientation of two-dimensional figures after transformations with many significant errors.
4.2.4. Use motion geometry to show that shapes are congruent or similar	Students use motion geometry to show that shapes are congruent or similar with no errors.	Students use motion geometry to show that shapes are congruent or similar with no significant errors.	Students use motion geometry to show that shapes are congruent or similar with a few significant errors.	Students use motion geometry to show that shapes are congruent or similar with many significant errors.

**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
VISUALIZATION, SPATIAL REASONING, AND GEOMETRIC MODELING  <i>No benchmark expectations at this level</i>				

## 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 4</b>				
<b>DATA COLLECTION, DISPLAY, AND INTERPRETATION</b>				
4.3.1. Determine a sample group to survey	Students determine a representative sample group to survey with ease.	Students determine a representative sample group to survey with minimal difficulty.	Students determine a representative sample group to survey with some difficulty.	Students determine a representative sample group to survey with great difficulty.
4.3.2. Collect and record data	Students collect, record, organize and display data in line graphs and circle graphs with no errors.	Students collect, record, organize and display data in line graphs and circle graphs with no significant errors.	Students collect, record, organize and display data in line graphs and circle graphs with a few significant errors.	Students collect, record, organize and display data in line graphs and circle graphs with many significant errors.
4.3.3. Organize and display data in line graphs and circle graphs	Students read and interpret data with no errors and generate insightful questions from data displayed in graphs.	Students read and interpret data with no significant errors and generate relevant questions from data displayed in graphs.	Students read and interpret data with a few significant errors and generate obvious questions from data displayed in graphs.	Students read and interpret data with many significant errors and generate inappropriate questions from data displayed in graphs.
4.3.4. Read, interpret, and generate questions from data displayed in graphs; i.e., line graphs and circle graphs	Students use computers and spread sheets to organize and display data with no errors.	Students use computers and spread sheets to organize and display data with no significant errors.	Students use computers and spread sheets to organize and display data with a few significant errors.	Students use computers and spread sheets to organize and display data with many significant errors.
4.3.5. Use computers and spreadsheets to organize and display data	Students use number lines and coordinate graphs to represent data with no errors.	Students use number lines and coordinate graphs to represent data with no significant errors.	Students use number lines and coordinate graphs to represent data with a few significant errors.	Students use number lines and coordinate graphs to represent data with many significant errors.
4.3.6. Use number lines and coordinate graphs to represent data				
<b>PROBABILITY</b>				
4.3.7. Conduct simple probability experiments	Students conduct simple probability experiments with no errors.	Students conduct simple probability experiments with no significant errors.	Students conduct simple probability experiments with a few significant errors.	Students conduct simple probability experiments 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>STATISTICAL METHODS</p> <p>4.3.8. Determine or calculate the mode, mean/average, and range for a data set</p>	<p>Students determine or calculate the mode, mean/ average, and range for a data set with no errors.</p>	<p>Students determine or calculate the mode, mean/ average, and range for a data set with no significant errors.</p>	<p>Students determine or calculate the mode, mean,/ average, and range for a data set with a few significant errors.</p>	<p>Students determine or calculate the mode, mean/ average, and range for a data set with many significant errors.</p>
<p>PREDICTIONS, DATA ANALYSIS, AND INFERENCES</p> <p>4.3.9. Make predictions and draw conclusions from simple probability experiments</p>	<p>Students make predictions and draw conclusions from simple probability experiments with no errors.</p>	<p>Students make predictions and draw conclusions from simple probability experiments with no significant errors.</p>	<p>Students make predictions and draw conclusions from simple probability experiments with a few significant errors.</p>	<p>Students make predictions and draw conclusions from simple probability experiments 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 4</b>				
<b>MEASURABLE ATTRIBUTES, MEASUREMENT SYSTEMS AND UNITS</b>				
4.4.1. State specific relationships between units within the same measuring system; e.g., feet to yards, minutes to hours, milliliters to liters	Students state specific relationships between units within the same measuring systems with no errors.	Students state specific relationships between units within the same measuring systems with no significant errors.	Students state specific relationships between units within the same measuring systems with a few significant errors.	Students state specific relationships between units within the same measuring systems with many significant errors.
4.4.2. Estimate and measure length to the nearest quarter inch	Students estimate and measure length to the nearest quarter inch with no errors.	Students estimate and measure length to the nearest quarter inch with no significant errors.	Students estimate and/or measure length to the nearest quarter inch with a few significant errors.	Students estimate and/or measure length to the nearest quarter inch with many significant errors.
4.4.3. Analyze relationships between perimeter and area	Students analyze, in great detail, relationships between perimeter and area.	Students analyze, in adequate detail, relationships between perimeter and area.	Students analyze, in some detail, relationships between perimeter and area.	Students analyze, in minimal detail, relationships between perimeter and area.
4.4.4. Make change up to \$20.00	Students make change up to \$20 with no errors.	Students make change up to \$20 with no significant errors.	Students make change up to \$20 with a few significant errors.	Students make change up to \$20 with many significant errors.
4.4.5. Apply the concept of elapsed time; i.e., schedules and calendars	Students apply the concept of elapsed time to schedules and calendars with no errors.	Students apply the concept of elapsed time to schedules and calendars with no significant errors.	Students apply the concept of elapsed time to schedules and calendars with a few significant errors.	Students apply the concept of elapsed time to schedules and calendars with many significant errors.
<b>MEASUREMENT TOOLS, TECHNIQUES, AND FORMULAS</b>				
4.4.6. Select appropriate units for measuring perimeter, area, and volume	Students select units for measuring perimeter, area, and volume with no errors.	Students select units for measuring perimeter, area, and volume with no significant errors.	Students select units for measuring perimeter, area, and volume with a few significant errors.	Students select units for measuring perimeter, area, and volume 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 4</b>				
<b>PATTERNS, RELATIONS, AND FUNCTIONS</b>				
4.5.1. Determine the missing elements of complex repeating patterns	Students determine the missing elements of complex repeating patterns with no errors.	Students determine the missing elements of complex repeating patterns with no significant errors.	Students determine the missing elements of complex repeating patterns with a few significant errors.	Students determine the missing elements of complex repeating patterns with many significant errors.
<b>NUMERIC AND ALGEBRAIC REPRESENTATIONS</b>				
4.5.2. Explain that variables represent unknowns	Students explain, with great detail, that variables represent unknowns.	Students explain, with adequate detail, that variables represent unknowns.	Students explain, with some detail, that variables represent unknowns.	Students explain, with minimal detail, that variables represent unknowns.
<b>MATHEMATICAL MODELING</b>				
4.5.3. Solve problems with variables	Students solve problems with variables with no errors.	Students solve problems with variables with no significant errors.	Students solve problems with variables with a few significant errors.	Students solve problems with variables with many significant errors.
4.5.4. Use parentheses in solving simple equations	Students use parentheses in solving simple equations with no errors.	Students use parentheses in solving simple equations with no significant errors.	Students use parentheses in solving simple equations with a few significant errors.	Students use parentheses in solving simple equations with many significant errors.
<b>RATES OF CHANGE</b>				
<i>No benchmark expectations at this level</i>				