

North Dakota Mathematics Content and Achievement Standards

Grade 7

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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 Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
Grade 7				
NUMBERS, NUMBER RELATIONSHIPS, AND NUMBER SYSTEMS				
7.1.1. Use ratios and proportions to represent relationships	Students use ratios and proportions to represent relationships with no errors.	Students use ratios and proportions to represent relationships with no significant errors.	Students use ratios and proportions to represent relationships with a few significant errors.	Students use ratios and proportions to represent relationships with many significant errors.
7.1.2. Explain and use percents greater than 100	Students explain in great detail and use percents greater than 100 with no errors.	Students explain in adequate detail and use percents greater than 100 with no significant errors.	Students explain in some detail and/or use percents greater than 100 with a few significant errors.	Students explain in minimal detail and/or use percents greater than 100 with many significant errors.
7.1.3. Use prime factorization to determine the greatest common factor and least common multiple	Students use prime factorization to determine the greatest common factor and least common multiple with no errors.	Students use prime factorization to determine the greatest common factor and least common multiple with no significant errors.	Students use prime factorization to determine the greatest common factor and/or least common multiple with a few significant errors.	Students use prime factorization to determine the greatest common factor and/or least common multiple with many significant errors.
7.1.4. Use integers to represent and compare quantities	Students use integers to represent and compare quantities with no errors.	Students use integers to represent and compare quantities with no significant errors.	Students use integers to represent and compare quantities with a few significant errors.	Students use integers to represent and compare quantities with many significant errors.
OPERATIONS AND THEIR PROPERTIES				
7.1.5. Explain the effects of arithmetic operations on fractions, decimals, and integers	Students explain in great detail the effects of arithmetic operations on fractions, decimals, and integers.	Students explain in adequate detail the effects of arithmetic operations on fractions, decimals, and integers.	Students explain in some detail the effects of arithmetic operations on fractions, decimals, and integers.	Students explain in minimal detail the effects of arithmetic operations on fractions, decimals, and integers.

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
7.1.6. Use order of operations (i.e., parentheses and operations) 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				
7.1.7. Add, subtract, multiply, and divide fractions and terminating decimals	Students add, subtract, multiply, and divide fractions and terminating decimals with no errors.	Students add, subtract, multiply, and divide fractions and terminating decimals with no significant errors.	Students add, subtract, multiply, and divide fractions and terminating decimals with a few significant errors.	Students add, subtract, multiply, and divide fractions and terminating decimals with many significant errors.
7.1.8. Solve real-world problems using integers, fractions, decimals, and percents	Students solve real-world problems using integers, fractions, decimals, and percents with no errors.	Students solve real-world problems using integers, fractions, decimals, and percents with no significant errors.	Students solve real-world problems using integers, fractions, decimals, and percents with a few significant errors.	Students solve real-world problems using integers, fractions, decimals, and percents with many significant errors.
7.1.9. Estimate the results of problems involving fractions, decimals, and percents	Students estimate the results of problems involving fractions, decimals, and percents with no errors.	Students estimate the results of problems involving fractions, decimals, and percents with no significant errors.	Students estimate the results of problems involving fractions, decimals, and percents with a few significant errors.	Students estimate the results of problems involving fractions, decimals, and percents with many significant errors.
7.1.10. Use proportions to solve problems	Students use proportions to solve problems with no errors.	Students use proportions to solve problems with no significant errors.	Students use proportions to solve problems with a few significant errors.	Students use proportions to solve problems 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.				
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Grade 7				
TWO- AND THREE-DIMENSIONAL SHAPES, GEOMETRIC PROPERTIES AND RELATIONSHIPS 7.2.1. Make observations about relationships between two- and three-dimensional figures; e.g., a cube is made with six squares	Students make insightful observations about the relationships between two- and three-dimensional figures.	Students make relevant observations about the relationships between two- and three-dimensional figures.	Students make obvious observations about the relationships between two- and three-dimensional figures.	Students make irrelevant observations about the relationships between two- and three-dimensional figures.
7.2.2. Classify triangles based on side and angle measurements; i.e., scalene, isosceles, equilateral, acute, obtuse, and right	Students classify triangles based on side and angle measurement. with no errors.	Students classify triangles based on side and angle measurement with no significant errors.	Students classify triangles based on side and angle measurement with a few significant errors.	Students classify triangles based on side and angle measurement with many significant errors.
COORDINATE GEOMETRY				
7.2.3. Draw and label the components of the coordinate plane; i.e., coordinates, quadrants, origin, x- and y-axes	Students draw and label the components of the coordinate plane with no errors.	Students draw and label the components of the coordinate plane with no significant errors.	Students draw and label the components of the coordinate plane with a few significant errors.	Students draw and label the components of the coordinate plane with many significant errors.
TRANSFORMATION AND SYMMETRY				
7.2.4. Identify relationships between congruent figures and similar figures	Students always identify relationships between congruent figures and similar figures.	Students consistently identify relationships between congruent figures and similar figures.	Students sometimes identify relationships between congruent figures and similar figures.	Students rarely identify relationships between congruent figures and similar figures.

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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<p>7.2.5. Draw the result of a transformation in the coordinate plane; i.e., translation, reflection, and rotation</p> <p>VISUALIZATION, SPATIAL REASONING, AND GEOMETRIC MODELING</p>	Students draw the result of a transformation in the coordinate plane with no errors.	Students draw the result of a transformation in the coordinate plane with no significant errors.	Students draw the result of a transformation in the coordinate plane with a few significant errors.	Students draw the result of a transformation in the coordinate plane with many significant errors.
<p>7.2.6. Build and sketch three-dimensional solids; e.g., using nets, manipulatives</p>	Students build and sketch three-dimensional solids with no errors.	Students build and sketch three-dimensional solids with no significant errors.	Students build and sketch three-dimensional solids with a few significant errors.	Students build and sketch three-dimensional solids 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 7				
DATA COLLECTION, DISPLAY, AND INTERPRETATION				
7.3.1. Formulate a question; collect, organize, and display data using a bar, line, and circle graph	Students formulate a question and collect, organize, and display data using a bar, line and circle graph with no errors.	Students formulate a question and collect, organize, and display data using a bar, line or circle graph with no significant errors.	Students formulate a question and collect, organize, and/or display data using a bar, line or circle graph with a few significant errors.	Students formulate a question and collect, organize, and/or display data using a bar, line or circle graph with many significant errors.
PROBABILITY				
7.3.2. Determine possible outcomes using organized lists, tree diagrams, or Venn diagrams	Students determine possible outcomes using organized lists, tree diagrams, or Venn diagrams with no errors.	Students determine possible outcomes using organized lists, tree diagrams, or Venn diagrams with no significant errors.	Students determine possible outcomes using organized lists, tree diagrams, or Venn diagrams with a few significant errors.	Students determine possible outcomes using organized lists, tree diagrams, or Venn diagrams with many significant errors.
7.3.3. Formulate hypotheses, conduct probability experiments, and draw conclusions from results	Students formulate hypotheses, conduct probability experiments, and draw conclusions from results with no errors.	Students formulate hypotheses, conduct probability experiments, and draw conclusions from results with no significant errors.	Students formulate hypotheses, conduct probability experiments, and/or draw conclusions from results with a few significant errors.	Students formulate hypotheses, conduct probability experiments, and/or draw conclusions from results with many significant errors.
7.3.4. Compute probabilities for simple events	Students compute probabilities for simple events with no errors.	Students compute probabilities for simple events with no significant errors.	Students compute probabilities for simple events with a few significant errors.	Students compute probabilities for simple events with many significant errors.

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

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<p>STATISTICAL METHODS</p> <p>7.3.5. Calculate and compare information provided by the mean, median, mode, and range of a set of data</p>	<p>Students calculate and compare information provided by the mean, median, mode, and range of a set of data with no errors.</p>	<p>Students calculate and compare information provided by the mean, median, mode, and range of a set of data with no significant errors.</p>	<p>Students calculate and compare information provided by the mean, median, mode, and range of a set of data with a few significant errors.</p>	<p>Students calculate and compare information provided by the mean, median, mode, and range of a set of data with many significant errors.</p>
<p>PREDICTIONS, DATA ANALYSIS, AND INFERENCES</p> <p>7.3.6. Describe how scale can make graphs, tables, and charts appear misleading</p>	<p>Students describe in great detail how scale can make graphs, tables, and charts appear misleading.</p>	<p>Students describe in adequate detail how scale can make graphs, tables, and charts appear misleading.</p>	<p>Students describe in some detail how scale can make graphs, tables, and charts appear misleading.</p>	<p>Students describe in minimal detail how scale can make graphs, tables, and charts appear misleading.</p>
<p>7.3.7. Explain inferences made from statistical information</p>	<p>Students explain in great detail inferences made from statistical information.</p>	<p>Students explain in adequate detail inferences made from statistical information.</p>	<p>Students explain in some detail inferences made from statistical information.</p>	<p>Students explain in minimal detail inferences made from statistical information.</p>

Standard 4: Measurement

Standard 4: Students use concepts and tools of measurement to describe and quantify the world..				
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Grade 7				
MEASURABLE ATTRIBUTES, MEASUREMENT SYSTEMS AND UNITS				
7.4.1. Estimate a measurement to the degree of precision that the tool provides	Students estimate a measurement to the degree of precision that the tool provides with no errors.	Students estimate a measurement to the degree of precision that the tool provides with no significant errors.	Students estimate a measurement to the degree of precision that the tool provides with a few significant errors.	Students estimate a measurement to the degree of precision that the tool provides with many significant errors.
7.4.2. Convert unit measurements within the same system (metric and standard) when solving problems	Students convert unit measurements within the same system when solving problems with no errors.	Students convert unit measurements within the same system when solving problems with no significant errors.	Students convert unit measurements within the same system when solving problems with a few significant errors.	Students convert unit measurements within the same system when solving problems with many significant errors.
7.4.3. Select the appropriate measure of perimeter, area, surface area, or volume to solve a problem	Students select, with no errors, a unit of measure for perimeter, area, surface area, or volume to solve a problem.	Students select, with no significant errors, a unit of measure for perimeter, area, surface area, or volume to solve a problem.	Students select, with a few significant errors, a unit of measure for perimeter, area, surface area, or volume to solve a problem.	Students select, with many significant errors, a unit of measure for perimeter, area, surface area, or volume to solve a problem.

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

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MEASUREMENT TOOLS, TECHNIQUES, AND FORMULAS				
7.4.4. Select and use appropriate tools and units to determine the measurements needed for calculating perimeter, circumference, area, surface area, and volume	Students select and use, with no errors, appropriate tools and units to determine the measurements needed for calculating perimeter, circumference, area, surface area, and volume.	Students select and use, with no significant errors, appropriate tools and units to determine the measurements needed for calculating perimeter, circumference, area, surface area, and volume.	Students select and use, 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 and use, with many significant errors, appropriate tools and units to determine the measurements needed for calculating perimeter, circumference, area, surface area, and volume.
7.4.5. Solve problems involving scale factors, using ratio and proportion	Students solve problems involving scale factors using ratio and proportion with no errors.	Students solve problems involving scale factors using ratio and proportion with no significant errors.	Students solve problems involving scale factors using ratio and proportion with a few significant errors.	Students solve problems involving scale factors using ratio and proportion with many significant errors.
7.4.6. Use formulas to determine the perimeter and area of trapezoids	Students use formulas to determine the perimeter and area of trapezoids with no errors.	Students use formulas to determine the perimeter and area of trapezoids with no significant errors.	Students use formulas to determine the perimeter and area of trapezoids with a few significant errors.	Students use formulas to determine the perimeter and area of trapezoids with many significant errors.
7.4.7. Use area formulas to determine the surface area of right cylinders	Students use area formulas to determine the surface area and volume of right cylinders with no errors.	Students use area formulas to determine the surface area and volume of right cylinders with no significant errors.	Students use area formulas to determine the surface area and volume of right cylinders with a few significant errors.	Students use area formulas to determine the surface area and volume of right cylinders with many significant errors.
7.4.8. Use formulas to determine the volume of right cylinders	Students use formulas to determine the volume of right cylinders with no errors.	Students use formulas to determine the volume of right cylinders with no significant errors.	Students use formulas to determine the volume of right cylinders with a few significant errors.	Students use formulas to determine the volume of right cylinders with many significant errors.

Standard 4: Students use concepts and tools of measurement to describe and quantify the world..				
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7.4.9. Determine the area of irregularly shaped objects	Students determine the area of irregularly-shaped objects with no errors.	Students determine the area of irregularly-shaped objects with no significant errors.	Students determine the area of irregularly-shaped objects with a few significant errors.	Students determine the area of irregularly-shaped objects 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 7				
PATTERNS, RELATIONS, AND FUNCTIONS				
7.5.1. Create tables and graphs to analyze and describe patterns	Students create tables and graphs with no errors and use them to analyze and describe patterns in great detail.	Students create tables and graphs with no significant errors and use them to analyze and describe patterns in adequate detail.	Students create tables and graphs with a few significant errors and use them to analyze and describe patterns in some detail.	Students create tables and graphs with many significant errors and use them to analyze and describe patterns in minimal detail.
NUMERIC AND ALGEBRAIC REPRESENTATIONS				
7.5.2. Create algebraic expressions and equations to represent word phrases and sentences	Students create algebraic expressions and equations to represent word phrases and sentences with no errors.	Students create algebraic expressions and equations to represent word phrases and sentences with no significant errors.	Students create algebraic expressions and equations to represent word phrases and sentences with a few significant errors.	Students create algebraic expressions and equations to represent word phrases and sentences with many significant errors.
7.5.3. Apply the order of operations and the commutative, associative, and distributive properties to evaluate numeric expressions	Students apply the order of operations, and the commutative, associative, and distributive properties to evaluate numeric expressions with no errors.	Students apply the order of operations, and the commutative, associative, and distributive properties to evaluate numeric expressions with no significant errors.	Students use the order of operations, and the commutative, associative, and distributive properties to evaluate numeric expressions with a few significant errors.	Students use the order of operations, and the commutative, associative, and distributive properties to evaluate numeric expressions with many significant errors.
7.5.4. Use inverse operations and properties of equality to solve one-step equations and inequalities in one variable	Students use inverse operations and the properties of equality to solve one-step equations and inequalities in one variable with no errors.	Students use inverse operations and the properties of equality to solve one-step equations and inequalities in one variable with no significant errors.	Students use inverse operations and the properties of equality to solve one-step equations and inequalities in one variable with a few significant errors.	Students use inverse operations and/or properties of equality to solve one-step equations and inequalities in one variable with many significant errors.

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

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MATHEMATICAL MODELING				
7.5.5. Write one-step equations and inequalities to represent problem situations	Students write one-step equations and inequalities to represent problem situations with no errors.	Students write one-step equations and inequalities to represent problem situations with no significant errors.	Students write one-step equations and inequalities to represent problem situations with a few significant errors.	Students write one-step equations and inequalities to represent problem situations with many significant errors.
RATES OF CHANGE				
7.5.6. Graph change over time; e.g., growth, distance, population	Students graph change over time with no errors.	Students graph change over time with no significant errors.	Students graph change over time with a few significant errors.	Students graph change over time with many significant errors.