

Blind Brook School District
Grade 7
Math Standards Curriculum Alignment
August 2006

Pre-March Exam Scope and Sequence

Unit 1: Number Sense

Unit Outline

Integers and Exponents

- Operations on integers
- Order of operations (PEDMAS)
- Exponents (including laws)
- Scientific notation

Prime and Composite Numbers

- Prime factorization
- Greatest common factor
- Least common multiple

Number Systems

- Naturals
- Wholes
- Integers
- Rationals
- Irrationals (including square roots)
- Reals

Content Strands

- 7.N.1 Distinguish between the various subsets of real numbers [counting/natural numbers, whole numbers, integers, rational numbers, and irrational numbers]
- 7.N.2 Recognize the difference between rational and irrational numbers [i.e., explore different approximations of π]
- 7.N.3 Place rational and irrational numbers (approximations) on a number line and justify the placement of the numbers
- 7.N.17 Classify irrational numbers as non-repeating/non-terminating decimals
- 7.N.8 Find the common factors and greatest common factor of two or more numbers
- 7.N.9 Determine multiples and least common multiple of two or more numbers
- 7.N.4 Develop the laws of exponents for multiplication and division
- 7.N.10 Determine the prime factorization of a given number and write in exponential form
- 7.N.5 Write numbers in scientific notation
- 7.N.6 Translate numbers from scientific notation into standard form

- 7.N.7 Compare numbers written in scientific notation
- 7.N.14 Develop a conceptual understanding of negative and zero exponents with a base of ten and relate to fractions and decimals [i.e., $10^{-2} = .01 = 1/100$]
- 7.N.15 Recognize and state the value of the square root of a perfect square [up to 225]
- 7.N.16 Determine the square root of non-perfect squares using a calculator
- 7.N.18 Identify the two consecutive whole numbers between which the square root of a non-perfect square whole number less than 225 lies [with and without the use of a number line]
- 7.N.19 Justify the reasonableness of answers using estimation
- 7.N.11 Simplify expressions using order of operations [*Note: Expressions may include absolute value and/or integral exponents greater than 0*]
- 7.N.13 Add and subtract two integers [with and without the use of a number line]
- 7.N.12 Add, subtract, multiply, and divide integers

Process Strands

- 7.PS.3 Understand and demonstrate how written symbols represent mathematical ideas
- 7.PS.13 Set expectations and limits for possible solutions
- 7.PS.14 Determine information required to solve the problem
- 7.CM.3 Organize and accurately label work
- 7.CM.6 Analyze mathematical solutions shared by others
- 7.CN.9 Recognize and apply mathematics to other disciplines, areas of interest, and societal issues

Vocabulary

approximation	counting numbers
composite	factor
consecutive integers	exponential form
estimate	irrational numbers
exponents	integers
greatest common factor	least common multiple
natural numbers	law of exponents for division
non-repeating decimals	non-perfect squares
number systems	non-terminating decimals
perfect squares	order of operations
pi	prime factorization
prime	rational numbers
real numbers	square root
scientific notation	law of exponents for multiplication
simplify	standard form of a number
whole numbers	

Unit 2: Measurement and Geometry

Unit Outline

Measurement

- Mass
- Capacity/volume
- Units: metric and customary
- Conversion within a system
- Relative error

Two-dimensional Geometry

- Angles of a quadrilateral
- Angles of a polygon
- Central angle of a circle
- Radius and diameter of a circle
- Circumference and area of a circle

Three-dimensional Geometry

- Shapes of solids
- Surface area of prisms and cylinders
- Volume of prisms and cylinders
- Evaluation of a variety of formulas

Content Strands

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|--------|---|
| 7.M.2 | Convert capacities and volumes within a given system |
| 7.M.3 | Identify customary and metric units of mass |
| 7.M.12 | Determine personal references for customary /metric units of mass |
| 7.M.4 | Convert mass within a given system |
| 7.M.13 | Justify the reasonableness of the mass of an object |
| 7.M.9 | Determine the tool and technique to measure with an appropriate level of precision: mass |
| 7.M.10 | Identify the relationships between relative error and magnitude when dealing with large numbers [i.e., money, population] |
| 7.G.3 | Identify the two-dimensional shapes that make up the faces and bases of three-dimensional shapes [prisms, cylinders, cones, and pyramids] |
| 7.G.2 | Calculate the volume of prisms and cylinders, using a given formula and a calculator |
| 7.M.11 | Estimate surface area |
| 7.G.4 | Determine the surface area of prisms and cylinders, using a calculator and a variety of methods |
| 7.A.6 | Evaluate formulas for given input values [surface area, rate, and density problems] |
| 7.G.7 | Find a missing angle when given angles of a quadrilateral |
| 7.A.9 | Build a pattern to develop a rule for determining the sum of the interior angles of polygons |
| 7.M.8 | Draw central angles in a given circle using a protractor [circle graphs] |

7.G.1 Calculate the radius or diameter, given the circumference or area of a circle

Process Strands

- 7.PS.11 Work in collaboration with others to solve problems
- 7.PS.15 Choose methods for obtaining required information
- 7.PS.14 Determine information required to solve the problem
- 7.PS.16 Justify solution methods through logical arguments
- 7.RP.4 Provide supportive arguments for conjectures
- 7.RP.5 Develop, verify and explain an argument using appropriate mathematical ideas and language
- 7.RP.6 Support an argument by using a systematic approach to test more than one case
- 7.CM.2 Provide an organized argument which explains rationale for strategy selection
- 7.CM.5 Answer clarifying questions from others
- 7.CM.7 Compare strategies used and solutions found by others in relation to their own work
- 7.CM.8 Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others
- 7.CM.9 Increase their use of mathematical vocabulary and language when communicating with others
- 7.CN.2 Recognize connections between subsets of mathematical ideas
- 7.CN.5 Understand how concepts, procedures and mathematical results in one area of mathematics can be used to solve problems in other areas of mathematics
- 7.R.6 Use representations to explore problem situations
- 7.R.5 Use standard and non-standard representations with accuracy and detail

Vocabulary

angles of a quadrilateral	area of a circle
central angle	circle
calculate	dimensions
circumference	diameter
customary units of mass	convert capacity within a given system
density	convert mass within a given system
levels of precision	convert volume within a given system
magnitude	measurement
metric units of mass	personal references for units of mass
polygon	protractor
quadrilateral	radius
rate	relative error
surface area of cylinders	faces and bases (of cones, cylinders, prisms, pyramids)
surface area of prisms	three-dimensional

volume of a cylinder
two-dimensional

volume of a prism
sum of interior angles of polygons

Unit 3: Statistics and Probability

Unit Outline

Statistics

- Data collection
- Graphs: circle, pictograph, bar, double bar, line, double line, histogram
- Measures of central tendency
- Range
- Misleading statistics and graphs

Probability

- Experimental probability
- Outcomes of experiments
- Theoretical probability

Content Strands

- 7.S.1 Identify and collect data using a variety of methods
- 7.S.2 Display data in a circle graph
- 7.S.6 Read and interpret data represented graphically [circle graph, pictograph, bar graph, histogram, line graph, double line/bar graphs]
- 7.S.7 Identify and explain misleading statistics and graphs
- 7.S.3 Convert raw data into double bar graphs and double line graphs
- 7.S.4 Calculate the range for a given set of data
- 7.S.5 Select the appropriate measure of central tendency
- 7.S.8 Interpret data to provide the basis for predictions and to establish experimental probabilities
- 7.S.9 Determine the validity of sampling methods to predict outcomes
- 7.S.10 Predict the outcome of an experiment
- 7.S.11 Design and conduct an experiment to test predictions
- 7.S.12 Compare actual results to predicted results

Process Strands

- 7.PS.5 Make conjectures from generalizations
- 7.PS.12 Interpret solutions within the given constraints of a problem
- 7.PS.1 Use a variety of strategies to understand new mathematical content and to develop more efficient methods
- 7.PS.17 Evaluate the efficiency of different representations of a problem
- 7.RP.8 Apply inductive reasoning in making and supporting mathematical conjectures
- 7.CM.4 Share organized mathematical ideas through the manipulation of objects, numerical tables, drawings, pictures, charts, graphs, tables, diagrams, models and symbols in written and verbal form
- 7.CM.1 Provide a correct, complete, coherent, and clear rationale for thought process used in problem solving

- 7.CN.6 Recognize and provide examples of the presence of mathematics in their daily lives
- 7.CN.8 Investigate the presence of mathematics in careers and areas of interest
- 7.CN.9 Recognize and apply mathematics to other disciplines, areas of interest, and societal issues
- 7.R.4 Explain how different representations express the same relationship
- 7.R.10 Use mathematics to show and understand social phenomena [e.g., determine profit from sale of yearbooks]
- 7.R.11 Use mathematics to show and understand mathematical phenomena [i.e., use tables, graphs, and equations to show a pattern underlying a function]

Vocabulary

bar graph	circle graph
collect data	compound events
conduct	counting principle
dependent events	double bar graph
double line graph	event
experimental probability	frequency table
histogram	independent events
line graph	mean
measures of central tendency	median
misleading	mode
outcome	predict
pictograph	probability
range	statistics
sample space	theoretical probability
tree diagram	validity of sample methods

Unit 4: Algebra

Unit Outline

- Algebraic expressions
- Equations: one and two-step solutions
- Inequalities: one-step solutions
- Graph of solution set on the number line

Content Strands

- 7.A.1 Translate two-step verbal expressions into algebraic expressions
- 7.A.5 Solve one-step inequalities [positive coefficients only]
- 7.G.10 Graph the solution set of an inequality (positive coefficients only) on a number line

Process Strands

- 7.PS.6 Represent problem situations verbally, numerically, algebraically, and graphically
- 7.PS.9 Work backward from a solution
- 7.RP.1 Recognize that mathematical ideas can be supported by a variety of strategies
- 7.RP.2 Use mathematical strategies to reach a conclusion
- 7.RP.7 Devise ways to verify results or use counterexamples to refute a correct statement
- 7.CM.11 Draw conclusions about mathematical ideas through decoding, comprehension and interpretation of mathematical visuals, symbols and technical writing
- 7.CN.3 Connect and apply a variety of strategies to solve a problem
- 7.CN.7 Apply mathematical ideas to problem situations that develop outside of mathematics

Vocabulary

algebra
algebraic expression
inequality
solution set
translate
verbal expression

Post-March Exam Scope and Sequence

Unit 5: Algebra/Geometry/Measurement

Unit Outline

Algebra

- Combining like terms
- Distributive property
- Equations: multi-step solutions

Proportions

- Scale drawings
- Unit price
- Money exchange

Right Triangles

- Definitions: right angle, right triangle, hypotenuse, leg
- Pythagorean Theorem

Patterns and Functions

- Algebraic patterns
- Graphic representation
- Table of values \rightarrow function

Content Strands

- 7.A.7 Draw the graphic representation of a pattern from a table of data
- 7.A.8 Create algebraic patterns using charts/tables, graphs, equations, and expressions
- 7.A.10 Write an equation to represent a function from a table of values
- 7.A.2 Add and subtract monomials with exponents of one
- 7.A.3 Identify a polynomial as an algebraic expression containing one or more terms
- 7.A.4 Solve multi-step equations by combining like terms, using the distributive property, or moving variables to one side of the equation
- 7.G.5 Identify the right angle, hypotenuse, and legs of a right triangle
- 7.G.6 Explore the relationship between the lengths of the three sides of a right triangle to develop the Pythagorean Theorem
- 7.G.8 Use the Pythagorean Theorem to determine the unknown length of a side of a right triangle
- 7.G.9 Determine whether a given triangle is a right triangle by applying the Pythagorean Theorem and using a calculator
- 7.M.1 Calculate distance using a map scale
- 7.M.5 Calculate unit price using proportions
- 7.M.6 Compare unit prices
- 7.M.7 Convert money between different currencies with the use of an exchange rate table and a calculator

Process Strands

- 7.PS.2 Construct appropriate extensions to problem situations
- 7.PS.4 Observe patterns and formulate generalizations
- 7.PS.7 Understand that there is no right way to solve mathematical problems but that different methods have advantages and disadvantages
- 7.PS.8 Understand how to break a complex problem into simpler parts or use a similar problem type to solve a problem
- 7.PS.10 Use proportionality to model problems
- 7.RP.3 Evaluate conjectures by distinguishing relevant from irrelevant information to reach a conclusion or make appropriate estimates
- 7.CM.10 Use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and rationale
- 7.CM.11 Draw conclusions about mathematical ideas through decoding, comprehension and interpretation of mathematical visuals, symbols, and technical writing
- 7.CN.4 Model situations mathematically using representations to draw conclusions and formulate new situations
- 7.R.1 Use physical objects, drawings, charts, tables graphs, symbols, equations, and objects created using technology as representations
- 7.R.2 Explain, describe, and defend mathematical ideas using representations
- 7.R.7 Investigate relationships between different representations and their impact on a given problem
- 7.R.8 Use representation as a tool for exploring and understanding mathematical ideas
- 7.R.9 Use mathematics to show and understand physical phenomena [i.e., make and interpret scale drawings of figures or scale models of objects]

Vocabulary

adjacent	adjacent side of a triangle
algebraic equation	algebraically
algebraic pattern	arithmetic sequence
binomial	coefficient
calculate distance	calculate unit price
compare unit prices	convert money
combine like terms	distributive property
equation	evaluate
exchange rate table	function
geometric sequence	hypotenuse
input values	legs of a right triangle
like terms	monomials
map scale	output values right angle
polynomial	solution
term	trinomial

Pythagorean Theorem
right triangles
table of values

nonadjacent side of a triangle
proportion

Additional Vocabulary

Problem Solving

adapt	collaboration
constraints	evaluate efficiency
generalizations	ideas
interpret	justify
logical argument	make conjectures
model problems	procedures
proportionality	strategies
visualization	

Reasoning and Proof

conclusion	counterexample
defend	evaluate conjectures
explain	indirect
inductive reasoning	informally
investigate conjectures	mathematical argument
refute	supportive arguments
verify results	

Communication

accurately label work	clarifying questions
compare strategies	formulate mathematical questions
mathematical language	organize work
rationale	results
solutions	strategy selection
supportive argument	symbols in verbal form
symbols in written form	

Connections

apply a variety of strategies	interconnect
investigate	model situations
recognize connections	results
social contexts	

Representations

defend	mathematical ideas
mathematical phenomena	multiple representations
physical phenomena	social phenomena