

Sanborn Regional School District

Math Curriculum Learning Strategy Worksheets

Sanborn Regional School District Math Curriculum Grade 6

Strand: Number Sense and Numeration

**NUMBERS, NUMERATION, OPERATIONS, and
NUMBER THEORY**

Learning Strategies	Essential Questions	Math Skills
<ul style="list-style-type: none"> • Students should use physical models to represent integers [positive and negative], fractions, and decimals. • Students should read and write integers and positive rational numbers. • Express simple ratios as percents and percents as ratios with denominator 100. • Have students order a set of positive and negative numbers. • Students should have many experiences where they round numbers to a specified place value; students should round numbers for practical purposes such as estimation and mental computation. • Given a whole number less than 100, a student should be able to identify the number as prime or composite. • Students should use rules of divisibility, together with calculators, to test to see if larger numbers are prime. • Have students identify the square root of a perfect square. • Students are able to read and name numbers using whole number exponents. • Children should explore divisibility: by 2, 3, 5, 6, 9, and 10. • Have children explore ancient numeration systems and the use of different bases, such as 2 and 5. • Have children write about ancient numeration systems or the use of the Roman system in today's world. 		

**Sanborn Regional School District Math Curriculum
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Strand: Concepts of Number Operations

**NUMBERS, NUMERATION, OPERATIONS, and
NUMBER THEORY**

Learning Strategies	Essential Questions	Math Skills
<ul style="list-style-type: none">• Have children apply the commutative, associative, and distributive properties to simplify computations.• Students should demonstrate that they understand and can use the properties of zero and one in addition and multiplication.• Have students demonstrate understanding of multiplication as repeated addition and of division as repeated subtraction.• Have students explore the product of two numbers less than one, two numbers greater than one, and two numbers where one is less than one and the other is greater; students should formulate conjectures about the product and defend their conjectures.• Have students similarly explore division and formulate conjectures about the quotient.• Students should demonstrate a sound understanding of the operations on fractions.• Have students relate multiplication by a fraction or decimal to finding a percent of a number.		

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Strand: Computation

**NUMBERS, NUMERATION, OPERATIONS, and
NUMBER THEORY**

Learning Strategies	Essential Questions	Math Skills
<ul style="list-style-type: none">• Have students select appropriate computational techniques in the solution of problems and check the reasonableness of results using mental computation and estimation techniques.• Students should use calculators in appropriate problem solving situations.• Have students add and subtract integers using models such as the red-black chip model.• Have students demonstrate mastery of multiplying three-digit whole numbers by two-digit numbers.• Students can divide three-digit numbers by two-digit numbers.• Have students explore multiplication and division of larger numbers and generalize the algorithms.• Have students use physical models and illustrations to find the sum and difference of fractions with like and unlike denominators, with emphasis on fractions with denominators of 2, 3, 4, 5, 6, 8, and 10.• Have students use models and manipulatives to demonstrate an understanding of the multiplication and division of fractions.• Have students use physical models, illustrations, and calculators to determine the sum, difference, quotient, and product of decimals.• Students should continue to use calculators to explore patterns and sequences.• Have students express simple fractions as decimals and percents.• Have students use various models to demonstrate how to find a percent of a number.• Have students identify real-world applications of computation, including finding simple interest and/or discount.		

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Strand: Estimation

**NUMBERS, NUMERATION, OPERATIONS, and
NUMBER THEORY**

Learning Strategies	Essential Questions	Math Skills
<ul style="list-style-type: none">• Have students estimate the results of computation with whole numbers and decimals.• Have students estimate the sum or difference of a problem involving addition and subtraction of simple fractions.• Children should estimate to find a percent of a number.• Children should estimate what fraction and percent of a region is shaded.• Children should estimate what percent one number is of another.• Given a problem, encourage students to make appropriate estimations relating to size, quantity, temperature, capacity, and passage of time.• Encourage students to estimate measures of length and area before they perform or calculate the measurement.• Encourage students to recognize when to use estimation and mental computation to solve problems where exact answers are not required.		

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Strand: DESCRIBE, MODEL, AND CLASSIFY GEOMETRIC FIGURES

GEOMETRY, MEASUREMENT and TRIGONOMETRY

Learning Strategies	Essential Questions	Math Skills
<ul style="list-style-type: none">• Have students sort and/or classify a selection of plane figures.• Provide opportunities for students to explore similar figures using concrete materials.• Have students discuss the properties of common two- and three-dimensional figures.• Encourage students to explain how and why figures are the same and/or different. (E.g., "This parallelogram is not a rectangle, because it does not have right angles.")• Have students use MIRAs and paper-folding to explore properties of common two-dimensional figures.		

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Strand: SPACIAL SENSE

GEOMETRY, MEASUREMENT and TRIGONOMETRY

Learning Strategies	Essential Questions	Math Skills
<ul style="list-style-type: none">• Provide students opportunities to make shapes "twice as large" or "three times smaller" than a given shape on a geoboard or on graph paper. Explore the relationship between length and area or length and volume; e.g.: doubling the length multiplies the area by four and the volume by 8. What does "twice as large" mean?• Have students make shapes that can be created from a set of shapes.• Students should use manipulatives like Pattern Blocks to create tessellations.• Have students use computer software such as <i>Factory</i>, <i>Super Factory</i> and <i>TesselMania</i> to explore rotations and reflections of two- and three-dimensional objects.• Provide students opportunities to explore classifying figures based upon their properties.• Have students draw pictures of objects from different perspectives and draw a picture of the shadow of an object with the light source from different angles.		

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Strand: MEASUREMENT

GEOMETRY, MEASUREMENT and TRIGONOMETRY

Learning Strategies	Essential Questions	Math Skills
<ul style="list-style-type: none">• Have students select an appropriate metric or English unit to measure length, area, or volume.• Guide students as they discover formulas for the area of rectangles, squares, and triangles.• Provide opportunities to estimate the perimeter and area of common figures.• Explore the relationship between the areas of similar figures.• Students should do conversions of units within the metric system , within the English system, and between the metric and English system.• Provide opportunities for students to use standard and non-standard units of measure for volume, capacity, weight, and temperature.• Have students estimate volume, capacity, weight and temperature using metric and English units.• Have students determine the amount of change to be received from a purchase.		

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Strand: DATA ANALYSIS, STATISTICS, AND PROBABILITY

DATA ANALYSIS, STATISTICS, AND PROBABILITY

Learning Strategies	Essential Questions	Math Skills
<ul style="list-style-type: none"> • Have students interpret and analyze bar, picture, circle, and line graphs. • Provide students problems in which they decide what information needs to be collected, organized, and analyzed to solve the problem. • Provide opportunities for students to investigate the notion of probability with computer software, such as <i>Taking Chances</i>. • Given two sets of data, have students compare the data with a double stem-and-leaf plot or two box-and-whisker plots. • Have students identify a bar, line, circle, or picture graph which represents a set of given data given as a table, chart or another graph. • Given a set of data, students should find its mean, median, or mode. • Students should be given opportunities to select an unbiased sample from a given population in order to collect the appropriate data to solve a problem. • Students will construct simple sample spaces to solve problems involving the likelihood of an event. • Have students make organized lists for quantifying the empirical probability of simple events. • Provide opportunities for students to investigate and explore problems that require the 	<p>use of counting techniques such as combinations and permutations</p>	

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Strand: FUNCTIONS AND RELATIONS

FUNCTIONS, RELATIONS, AND ALGEBRA

Learning Strategies	Essential Questions	Math Skills
<ul style="list-style-type: none">• Continue to have students recognize, describe, analyze, extend, and create a wide variety of patterns using models, tables, graphs, simple rules, and manipulatives such as pattern blocks.• Have students describe a pattern orally or in writing.• Have students explore functional relationships to describe how a change in one quantity results in a change in another.• Students should explore functions in geometry: how a change in length or width affects perimeter and area.• Have students explore and analyze properties and relationships related to prime and composite numbers, rational numbers, multiples, factors, and exponents		

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Strand: ALGEBRA

FUNCTIONS, RELATIONS, AND ALGEBRA

Learning Strategies	Essential Questions	Math Skills
<ul style="list-style-type: none">• Have students represent situations and number patterns with concrete materials, tables, graphs, verbal rules, and equations; have students translate from one to another.• Have students write and solve open sentences that describe everyday situations: how far to Manchester if it is 38 miles to Nashua and 20 miles from Manchester to Nashua?• Explore the use of literal variables, expressions, equations, and inequalities.• Have students analyze tables and graphs to identify algebraic relationships.• Have students plot points on a number line and on a rectangular coordinate system.• Have students play games like "Battleship" to build skill with use of ordered pairs.• Students should investigate the field properties: the commutative, associative, and distributive properties, and identity and inverse elements.• Use computers and calculators to explore graphs and linear relationships.• Have students explore simple linear equations.• Have students solve a simple linear equation using informal, intuitive ideas.• Provide opportunities for students to use an equation to represent and solve simple percent problems.		

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Strand: MATHEMATICS OF CHANGE

MATHEMATICS OF CHANGE

Learning Strategies	Essential Questions	Math Skills
<ul style="list-style-type: none">• Students should investigate sequences involving number and geometric patterns which ask them to verbally describe how the sequence is changing. Students should describe and compare rates of change from analysis of a graph, table, or chart.• Have students calculate the average (mean) and describe what it means for the given data.• Students should find simple ratios for given sets of real-life data such as the ratio of soft drink consumption, hourly wages, or paint mixing.• Provide students the opportunity to find the probability of simple events and to represent it as a ratio or percent.• Students should find rates of change expressed as ratios with unlike units such as cost per unit, miles per hour, or height per age and interpret what these ratios mean.		

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Strand : DISCRETE MATHEMATICS

DISCRETE MATHEMATICS

Learning Strategies	Essential Questions	Math Skills
<ul style="list-style-type: none">• Have students solve simple counting problems using different schemes. Discuss the different strategies students use and the efficiency of the various ways• Have students explore and explain strategies in more complex game situations.• Explore ways to represent data in an organized fashion so the number of items in a set can be determined: e.g., stem-and-leaf plots.• Encourage students to create simple algorithms as a way to solve problems; have them defend the algorithm.• Have students compare different algorithms for solving problems.• Encourage students to use simple logic and inductive reasoning to make predictions related to real-life situations. Apply this to science activities.• Have students investigate the benefits of various alternatives in simple networks, such as efficient ways to deliver mail or plow streets in a in small village (with a small number of streets).• Students should use logic and simple inductive reasoning to order a series of statements.• Have students use simple computer games and software such as <i>Gertrude's Secret</i> and <i>Rocky's Boots</i>. Discuss the strategies they use.		