

Northpoint Horizons
CAVS (Content Academic Vocabulary System)
Correlated to the
New Jersey State Mathematics Core Curriculum Content Standards

Grades K-2

This document provides a sampling of the extensive math directives offered throughout the *CAVS* program that meet the New Jersey Mathematics Core Curriculum Content Standards.

4.0 Mathematics Core Curriculum Content Standards	CAVS Math K-2 Teacher's Guide Examples/Lessons
<p>4.1 Number and Numerical Operations</p> <p>All students will develop number sense and will perform standard numerical operations and estimations on all types of numbers in a variety of ways.</p>	
Number Sense	
<p>1. Use real-life experiences, physical materials, and technology to construct meanings for numbers (unless otherwise noted, all indicators for grade 2 pertain to these sets of numbers as well).</p> <ul style="list-style-type: none"> * Whole numbers through hundreds * Ordinals * Proper fractions (denominators of 2, 3, 4, 8, 10) 	<p>Each lesson uses real-life experiences, physical materials, and technology to make learning meaningful to students. For example:</p> <p>Lesson 3 – TG pp. 13-18 <i>How do numbers work together?</i> Radius® Math Vocabulary Cards</p> <p>Lesson 24 – TG pp. 139-144 <i>How do we solve problems?</i> Concept Poster</p>
<p>2. Demonstrate an understanding of whole number place value concepts.</p>	<p>Lesson 2 – TG pp. 7-12 <i>What are some kinds of numbers?</i></p> <p>Lesson 8 – TG pp. 43-48 <i>How do you use money?</i></p> <p>Lesson 9 – TG pp. 49-54 <i>How do you tell time?</i></p>
<p>3. Understand that numbers have a variety of uses.</p>	<p>Lesson 4 – TG pp. 19-24 <i>Why do you add numbers?</i></p> <p>Lesson 10 – TG pp. 55-60 <i>When is your birthday?</i></p> <p>Lesson 22 – TG pp. 127-132 <i>How can you show facts?</i></p>

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4. Count and perform simple computations with coins. * Amounts up to \$1.00 (using cents notation)	Lesson 8 – TG pp. 43-48 <i>How do you use money?</i>
5. Compare and order whole numbers.	Lesson 3 – TG pp. 13-18 <i>How do numbers work together?</i> Lesson 6 – TG pp. 31-36 <i>How are objects the same?</i>
Numerical Operations	
1. Develop the meanings of addition and subtraction by concretely modeling and discussing a large variety of problems. * Joining, separating, and comparing	Lesson 4 – TG pp. 19-24 <i>Why do you add numbers?</i> Lesson 5 – TG pp. 25-30 <i>Why do you subtract numbers?</i>
2. Explore the meanings of multiplication and division by modeling and discussing problems.	CAVS Math TG Grades 3-5 Lesson 3 – TG pp. 13-18 <i>How do we count large amounts?</i> Lesson 4 – TG pp. 19-24 <i>How do we make equal groups?</i>
3. Develop proficiency with basic addition and subtraction number facts using a variety of fact strategies (such as "counting on" and "near doubles") and then commit them to memory.	Lesson 4 – TG pp. 19-24 <i>Why do you add numbers?</i> Lesson 5 – TG pp. 25-30 <i>Why do you subtract numbers?</i>
4. Construct, use, and explain procedures for performing addition and subtraction calculations with: * Pencil-and-paper * Mental math * Calculator	Lesson 4 – TG pp. 19-24 <i>Why do you add numbers?</i> Lesson 5 – TG pp. 25-30 <i>Why do you subtract numbers?</i> Lesson 8 – TG pp. 43-48 <i>How do you use money?</i>
5. Use efficient and accurate pencil-and-paper procedures for computation with whole numbers. * Addition of 2-digit numbers * Subtraction of 2-digit numbers	Lesson 8 – TG pp. 43-48 <i>How do you use money?</i> Lesson 9 – TG pp. 49-54 <i>How do you tell time?</i> Lesson 24 – TG pp. 139-144 <i>How do we solve problems?</i>
6. Select pencil-and-paper, mental math, or a calculator as the appropriate computational method in a given situation depending on the context and numbers.	Lesson 4 – TG pp. 19-24 <i>Why do you add numbers?</i> Lesson 5 – TG pp. 25-30 <i>Why do you subtract numbers?</i>

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7. Check the reasonableness of results of computations.	Lesson 23 – TG pp. 133-138 <i>What do you think will happen?</i> Lesson 24 – TG pp. 139-144 <i>How do we solve problems?</i>
8. Understand and use the inverse relationship between addition and subtraction.	Lesson 4 – TG pp. 19-24 <i>Why do you add numbers?</i> Lesson 5 – TG pp. 25-30 <i>Why do you subtract numbers?</i>
Estimation	
1. Judge without counting whether a set of objects has less than, more than, or the same number of objects as a reference set.	Lesson 23 – TG pp. 133-138 <i>What do you think will happen?</i> Lesson 24 – TG pp. 139-144 <i>How do we solve problems?</i>
2. Determine the reasonableness of an answer by estimating the result of computations (e.g., 15 + 16 is not 211).	Lesson 24 – TG pp. 139-144 <i>How do we solve problems?</i>
3. Explore a variety of strategies for estimating both quantities (e.g., the number of marbles in a jar) and results of computation.	Lesson 23 – TG pp. 133-138 <i>What do you think will happen?</i> Lesson 24 – TG pp. 139-144 <i>How do we solve problems?</i>
4.2 Geometry and Measurement All students will develop spatial sense and the ability to use geometric properties, relationships, and measurement to model, describe and analyze phenomena.	
Geometric Properties	
1. Identify and describe spatial relationships among objects in space and their relative shapes and sizes. * Inside/outside, left/right, above/below, between * Smaller/larger/same size, wider/ narrower, longer/shorter * Congruence (i.e., same size and shape)	Lesson 11 – TG pp. 61-66 <i>How far? How long?</i> Lesson 12 – TG pp. 67-72 <i>How do you tell how far or how long?</i> Lesson 16 – TG pp. 91-96 <i>Where are you?</i> Lesson 17 – TG pp. 97-102 <i>Where are you now?</i> Lesson 18 – TG pp. 103-108 <i>Which way do you go?</i>
2. Use concrete objects, drawings, and computer graphics to identify, classify, and describe standard three-dimensional and two-dimensional shapes. * Vertex, edge, face, side * 3D figures - cube, rectangular prism, sphere,	Lesson 19 – TG pp. 109-114 <i>What are some common shapes?</i> Lesson 20 – TG pp. 115-120 <i>How can you describe shapes?</i> Lesson 21 – TG pp. 121-126

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cone, cylinder, and pyramid * 2D figures - square, rectangle, circle, triangle * Relationships between three- and two-dimensional shapes (i.e., the face of a 3D shape is a 2D shape)	<i>How can you change shapes?</i>
3. Describe, identify and create instances of line symmetry.	CAVS Math TG Grades 3-5 Lesson 18 – TG pp. 103-108 <i>How do we draw different shapes?</i>
4. Recognize, describe, extend and create designs and patterns with geometric objects of different shapes and colors.	Lesson 19 – TG pp. 109-114 <i>What are some common shapes?</i> Lesson 21 – TG pp. 121-126 <i>How can you change shapes?</i>
Transforming Shapes	
1. Use simple shapes to make designs, patterns, and pictures.	Lesson 6 – TG pp. 31-36 <i>How are objects the same?</i> Lesson 7 – TG pp. 37-42 <i>What makes a pattern?</i> Lesson 19 – TG pp. 109-114 <i>What are some common shapes?</i> Lesson 20 – TG pp. 115-120 <i>How can you describe shapes?</i> Lesson 21 – TG pp. 121-126 <i>How can you change shapes?</i>
2. Combine and subdivide simple shapes to make other shapes.	Lesson 19 – TG pp. 109-114 <i>What are some common shapes?</i> Lesson 20 – TG pp. 115-120 <i>How can you describe shapes?</i> Lesson 21 – TG pp. 121-126 <i>How can you change shapes?</i>
Coordinate Geometry	
1. Give and follow directions for getting from one point to another on a map or grid.	Lesson 16 – TG pp. 91-96 <i>Where are you?</i> Lesson 17 – TG pp. 97-102 <i>Where are you now?</i> Lesson 18 – TG pp. 103-108 <i>Which way do you go?</i>
Units of Measurement	
1. Directly compare and order objects according to measurable	Lesson 9 – TG pp. 49-54

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attributes. * Attributes - length, weight, capacity, time, temperature	<i>How do you tell time?</i> Lesson 10 – TG pp. 55-60 <i>When is your birthday?</i> Lesson 11 – TG pp. 61-66 <i>How far? How long?</i> Lesson 12 – TG pp. 67-72 <i>How do you tell how far or how long?</i> Lesson 13 – TG pp. 73-78 <i>How much space does it take up?</i> Lesson 14 – TG pp. 79-84 <i>How much does it weigh?</i> Lesson 15 – TG pp. 85-90 <i>How hot or cold is it?</i>
2. Recognize the need for a uniform unit of measure.	Lesson 11 – TG pp. 61-66 <i>How far? How long?</i> Lesson 12 – TG pp. 67-72 <i>How do you tell how far or how long?</i> Lesson 14 – TG pp. 79-84 <i>How much does it weigh?</i>
3. Select and use appropriate standard and non-standard units of measure and standard measurement tools to solve real-life problems. * Length - inch, foot, yard, centimeter, meter * Weight - pound, gram, kilogram * Capacity - pint, quart, liter * Time - second, minute, hour, day, week, month, year * Temperature - degrees Celsius, degrees Fahrenheit	Lesson 9 – TG pp. 49-54 <i>How do you tell time?</i> Lesson 10 – TG pp. 55-60 <i>When is your birthday?</i> Lesson 11 – TG pp. 61-66 <i>How far? How long?</i> Lesson 12 – TG pp. 67-72 <i>How do you tell how far or how long?</i> Lesson 13 – TG pp. 73-78 <i>How much space does it take up?</i> Lesson 14 – TG pp. 79-84 <i>How much does it weigh?</i> Lesson 15 – TG pp. 85-90 <i>How hot or cold is it?</i>
4. Estimate measures.	Lesson 11 – TG pp. 61-66 <i>How far? How long?</i> Lesson 12 – TG pp. 67-72 <i>How do you tell how far or how long?</i> Lesson 15 – TG pp. 85-90 <i>How hot or cold is it?</i>

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Measuring Geometric Objects	
1. Directly measure the perimeter of simple two-dimensional shapes.	CAVS Math TG Grades 3-5 Lesson 12 – TG pp. 67-72 <i>How do you measure flat shapes?</i> Lesson 16 – TG pp. 91-96 <i>How do we describe shapes with straight sides?</i>
2. Directly measure the area of simple two-dimensional shapes by covering them with squares.	CAVS Math TG Grades 3-5 Lesson 12 – TG pp. 67-72 <i>How do you measure flat shapes?</i> Lesson 16 – TG pp. 91-96 <i>How do we describe shapes with straight sides?</i>
4.3 Patterns and Algebra All students will represent and analyze relationships among variable quantities and solve problems involving patterns, functions, and algebraic concepts and processes.	
Patterns	
1. Recognize, describe, extend, and create patterns. * Using concrete materials (manipulatives), pictures, rhythms, & whole numbers * Descriptions using words and symbols (e.g., "add two" or "+ 2") * Repeating patterns * Whole number patterns that grow or shrink as a result of repeatedly adding or subtracting a fixed number (e.g., skip counting forward or backward)	Lesson 6 – TG pp. 31-36 <i>How are objects the same?</i> Lesson 7 – TG pp. 37-42 <i>What makes a pattern?</i>
Functions and Relationships	
1. Use concrete and pictorial models of function machines to explore the basic concept of a function.	Lesson 2 – TG pp. 7-12 <i>What are some kinds of numbers?</i> Lesson 3 – TG pp. 13-18 <i>How do numbers work together?</i> Lesson 22 – TG pp. 127-132 <i>How can you show facts?</i>
Modeling	
1. Recognize and describe changes over time (e.g., temperature, height).	Lesson 11 – TG pp. 61-66 <i>How far? How long?</i> Lesson 14 – TG pp. 79-84 <i>How much does it weigh?</i> Lesson 15 – TG pp. 85-90

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2. Construct and solve simple open sentences involving addition or subtraction. * Result unknown (e.g., $6 - 2 = \underline{\quad}$ or $n = 3 + 5$) * Part unknown (e.g., $3 + \underline{\quad} = 8$)	<i>How hot or cold is it?</i> Lesson 4 – TG pp. 19-24 <i>Why do you add numbers?</i> Lesson 5 – TG pp. 25-30 <i>Why do you subtract numbers?</i>
Procedures	
1. Understand and apply (but don't name) the following properties of addition: * Commutative (e.g., $5 + 3 = 3 + 5$) * Zero as the identity element (e.g., $7 + 0 = 7$) * Associative (e.g., $7 + 3 + 2$ can be found by first adding either $7 + 3$ or $3 + 2$)	Lesson 3 – TG pp. 13-18 <i>How do numbers work together?</i> Lesson 4 – TG pp. 19-24 <i>Why do you add numbers?</i>
4.4 Data Analysis, Probability, and Discrete Mathematics All students will develop an understanding of the concepts and techniques of data analysis, probability, and discrete mathematics, and will use them to model situations, solve problems, and analyze and draw appropriate inferences from data.	
Data Analysis or Statistics	
1. Collect, generate, record, and organize data in response to questions, claims, or curiosity. * Data collected from students' everyday experiences * Data generated from chance devices, such as spinners and dice	Lesson 22 – TG pp. 127-132 <i>How can you show facts?</i> Lesson 23 – TG pp. 133-138 <i>What do you think will happen?</i>
2. Read, interpret, construct, and analyze displays of data. * Pictures, tally chart, pictograph, bar graph, Venn diagram * Smallest to largest, most frequent (mode)	Lesson 22 – TG pp. 127-132 <i>How can you show facts?</i>
Probability	
1. Use chance devices like spinners and dice to explore concepts of probability. * Certain, impossible * More likely, less likely, equally likely	Lesson 23 – TG pp. 133-138 <i>What do you think will happen?</i> Lesson 24 – TG pp. 139-144 <i>How do we solve problems?</i>

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<p>2. Provide probability of specific outcomes.</p> <ul style="list-style-type: none"> * Probability of getting specific outcome when coin is tossed, when die is rolled, when spinner is spun (e.g., if spinner has five equal sectors, then probability of getting a particular sector is one out of five) * When picking a marble from a bag with three red marbles and four blue marbles, the probability of getting a red marble is three out of seven 	<p>Lesson 23 – TG pp. 133-138 <i>What do you think will happen?</i></p> <p>Lesson 24 – TG pp. 139-144 <i>How do we solve problems?</i></p>
Discrete Mathematics—Systematic Listing and Counting	
<p>1. Sort and classify objects according to attributes.</p> <ul style="list-style-type: none"> * Venn diagrams 	<p>CAVS Math TG Grades 3-5 Lesson 21 – TG pp. 121-126 <i>Why do you need information?</i></p>
<p>2. Generate all possibilities in simple counting situations (e.g., all outfits involving two shirts and three pants).</p>	<p>Lesson 23 – TG pp. 133-138 <i>What do you think will happen?</i></p> <p>Lesson 24 – TG pp. 139-144 <i>How do we solve problems?</i></p>
Discrete Mathematics—Vertex-Edge Graphs and Algorithms	
<p>1. Follow simple sets of directions (e.g., from one location to another, or from a recipe).</p>	<p>Lessons 1-24 <i>Activity Placemats</i></p>
<p>2. Color simple maps with a small number of colors.</p>	<p>Lesson 22 – TG pp. 127-132 <i>How can you show facts?</i></p>
<p>3. Play simple two-person games (e.g., tic-tac-toe) and informally explore the idea of what the outcome should be.</p>	<p>Lesson 23 – TG pp. 133-138 <i>What do you think will happen?</i></p>
<p>4. Explore concrete models of vertex-edge graphs (e.g. vertices are "islands" and edges are "bridges").</p> <ul style="list-style-type: none"> * Paths from one vertex to another 	<p>CAVS Math TG Grades 3-5 Lesson 21 – TG pp. 121-126 <i>Why do you need information?</i></p>
<p>4.5 Mathematical Processes</p> <p>All students will use mathematical processes of problem solving, communication, connections, reasoning, representations, and technology to solve problems and communicate mathematical ideas.</p>	
Problem Solving	
<p>1. Learn mathematics through problem solving, inquiry, and discovery.</p>	<p>Lesson 3 – TG pp. 13-18 <i>How do numbers work together?</i></p> <p>Lesson 24 – TG pp. 139-144 <i>How do we solve problems?</i></p>

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2. Solve problems that arise in mathematics and in other contexts (cf. workplace readiness standard 8.3). <ul style="list-style-type: none"> * Open-ended problems * Non-routine problems * Problems with multiple solutions * Problems that can be solved in several ways 	Lesson 9 – TG pp. 49-54 <i>How do you tell time?</i> Lesson 10 – TG pp. 55-60 <i>When is your birthday?</i>
3. Select and apply a variety of appropriate problem-solving strategies (e.g., "try a simpler problem" or "make a diagram") to solve problems.	Lesson 16 – TG pp. 91-96 <i>Where are you?</i> Lesson 18 – TG pp. 103-108 <i>Which way do you go?</i>
4. Pose problems of various types and levels of difficulty.	Lesson 20 – TG pp. 115-120 <i>How can you describe shapes?</i> Lesson 21 – TG pp. 121-126 <i>How can you change shapes?</i>
5. Monitor their progress and reflect on the process of their problem solving activity.	Lessons 1-24 <i>Lesson Review</i>
Communication	
1. Use communication to organize and clarify their mathematical thinking. <ul style="list-style-type: none"> * Reading and writing * Discussion, listening, and questioning 	Lesson 8 – TG pp. 43-48 <i>How do you use money?</i> Lesson 11 – TG pp. 61-66 <i>How far? How long?</i>
2. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.	Lesson 17 – TG pp. 97-102 <i>Where are you now?</i> Lesson 22 – TG pp. 127-132 <i>How can you show facts?</i>
3. Analyze and evaluate the mathematical thinking and strategies of others.	Lessons 1-24 <i>Small Group and Paired Activities</i>
4. Use the language of mathematics to express mathematical ideas precisely.	Lesson 5 – TG pp. 25-30 <i>Why do you subtract numbers?</i> Lesson 20 –TG pp. 115-120 <i>How can you describe shapes?</i>
Connections	
1. Recognize recurring themes across mathematical domains (e.g., patterns in number, algebra, and geometry).	Lesson 7 – TG pp. 37-42 <i>What makes a pattern?</i>
2. Use connections among mathematical ideas to explain concepts (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).	CAVS Math TG Grades 3-5 Lesson 16 – TG pp. 91-96 <i>How do we describe shapes with straight sides?</i>
3. Recognize that mathematics is used in a variety of contexts outside of mathematics.	Lesson 8 – TG pp. 43-48 <i>How do you use money?</i>

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	Lesson 9 – TG pp. 49-54 <i>How do you tell time?</i>
4. Apply mathematics in practical situations and in other disciplines.	Lesson 10 – TG pp. 55-60 <i>When is your birthday?</i>
5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).	CAVS Math TG Grades 3-5 Lesson 11 – TG pp. 61-66 <i>How do you measure?</i>
6. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	Lesson 19 – TG pp. 109-114 <i>What are some common shapes?</i> Lesson 20 – TG pp. 115-120 <i>How can you describe shapes?</i> Lesson 21 – TG pp. 121-126 <i>How can you change shapes?</i>
Reasoning	
1. Recognize that mathematical facts, procedures, and claims must be justified.	Lesson 24 – TG pp. 139-144 <i>How do we solve problems?</i>
2. Use reasoning to support their mathematical conclusions and problem solutions.	Lesson 24 – TG pp. 139-144 <i>How do we solve problems?</i>
3. Select and use various types of reasoning and methods of proof.	Lesson 23 – TG pp. 133-138 <i>What do you think will happen?</i>
4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.	Lesson 24 – TG pp. 139-144 <i>How do we solve problems?</i>
5. Make and investigate mathematical conjectures. * Counterexamples as a means of disproving conjectures * Verifying conjectures using informal reasoning or proofs.	Lesson 23 – TG pp. 133-138 <i>What do you think will happen?</i>
Representations	
1. Create and use representations to organize, record, and communicate mathematical ideas. * Concrete representations (e.g., base-ten blocks or algebra tiles) * Pictorial representations (e.g., diagrams, charts, or tables) * Symbolic representations (e.g., a formula) * Graphical representations (e.g., a line graph)	Lesson 13 – TG pp. 73-78 <i>How much space does it take up?</i> Lesson 22 – TG pp. 127-132 <i>How can you show facts?</i>

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2. Select, apply, and translate among mathematical representations to solve problems.	Lesson 4 – TG pp. 19-24 <i>Why do you add numbers?</i> Lesson 5 – TG pp. 25-30 <i>Why do you subtract numbers?</i>
3. Use representations to model and interpret physical, social, and mathematical phenomena.	Lesson 6 – TG pp. 31-36 <i>How are objects the same?</i> Lesson 7 – TG pp. 37-42 <i>What makes a pattern?</i>
Technology	
1. Use technology to gather, analyze, and communicate mathematical information.	The skills and practices taught in each lesson of CAVS can easily transition to computer, calculator and technology laboratory. Students transfer learning from the lesson to the technology process after achievement of appropriate skill level. For example: Lesson 21 – TG pp. 121-126 <i>How can you change shapes?</i> Lesson 22 – TG pp. 127-132 <i>How can you show facts?</i>
2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information.	
3. Use graphing calculators and computer software to investigate properties of functions and their graphs.	
4. Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).	
5. Use computer software to make and verify conjectures about geometric objects.	
6. Use computer-based laboratory technology for mathematical applications in the sciences.	