

Northpoint Horizons

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

Grade 5

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	<i>CAVS Math Grades 3-5 Teacher's Guide</i> Examples/Lessons
4.1 Number and Numerical Operations All students will develop number sense and will perform standard numerical operations and estimations on all types of numbers in a variety of ways.	
Number Sense	
1. Use real-life experiences, physical materials, and technology to construct meanings for numbers (unless otherwise noted, all indicators for grade 5 pertain to these sets of numbers as well). <ul style="list-style-type: none"> • All fractions as part of a whole, as subset of a set, as a location on a number line, and as divisions of whole numbers • All decimals 	<i>How can you put numbers in order?</i> Lesson 1 – TG p. 1 Weather Report - Activity Placemat 1 Reader Card – Lesson 1 <i>How do numbers tell a story?</i> Lesson 2 – TG p. 7 Reader Card – Lesson 2 Concept Poster 1
2. Recognize the decimal nature of United States currency and compute with money.	<i>How else can you show less than one whole?</i> Lesson 6 – TG p. 31 Comparing Coins - Activity Placemat 6 Reader Card – Lesson 6
3. Demonstrate a sense of the relative magnitudes of numbers.	<i>How do we count large amounts?</i> Lesson 3 – TG p. 13 Reader Card – Lesson 1, 3 Concept Poster 1
4. Use whole numbers, fractions, and decimals to represent	<i>How do you show that a number is not a whole?</i> Lesson 5 – TG p. 25

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equivalent forms of the same number.	Reader Card – Lesson 5
5. Develop and apply number theory concepts in problem solving situations. <ul style="list-style-type: none"> • Primes, factors, multiples 	<i>How do we count large amounts?</i> Lesson 3 – TG p. 13 Arranging Chairs – Activity Placemat 3 Reader Card – Lesson 1, 3
6. Compare and order numbers.	<i>How can you put numbers in order?</i> Lesson 1 – TG p. 1 Weather Report - Activity Placemat 1 Reader Card – Lesson 1 Concept Poster 1
Numerical Operations	
1. Recognize the appropriate use of each arithmetic operation in problem situations.	<i>How do numbers tell a story?</i> Lesson 2 – TG p. 7 Reader Card – Lesson 2 <i>How do we count large amounts?</i> Lesson 3 – TG p. 13 <i>How do we make equal groups?</i> Lesson 4 – TG p. 19 Concept Posters 1–3
2. Construct, use, and explain procedures for performing addition and subtraction with fractions and decimals with: <ul style="list-style-type: none"> • Pencil-and-paper • Mental math • Calculator 	<i>How do you show that a number is not a whole?</i> Lesson 5 – TG p. 25 Reader Card – Lesson 5 <i>How else can you show less than one whole?</i> Lesson 6 – TG p. 31 Reader Card – Lesson 6
3. Use an efficient and accurate pencil-and-paper procedure for division of a 3-digit number by a 2-digit number.	<i>How do we make equal groups?</i> Lesson 4 – TG p. 19 Vacation Plans – Activity Placemat 4 Concept Poster 1 The concepts learned in this lesson, including the hands-on activity, are the necessary launch for two-digit divisor division.
4. Select pencil-and-paper, mental math, or a calculator as the appropriate computational method in a given situation depending on the context and numbers.	<i>How do numbers tell a story?</i> Lesson 2 – TG p. 7 Reader Card – Lesson 2

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	<i>How do we count large amounts?</i> Lesson 3 – TG p. 13 <i>How do we make equal groups?</i> Lesson 4 – TG p. 19 Concept Poster 1–2
5. Check the reasonableness of results of computations.	<i>How can you solve problems?</i> Lesson 24 – TG p. 139 See Record Sheet 24 Reader Card – Lesson 24 See Make Connections
6. Understand and use the various relationships among operations and properties of operations.	<i>How can math rules help you solve equations?</i> Lesson 9 – TG p. 49 Reader Card – Lesson 9
Estimation	
1. Use a variety of estimation strategies for both number and computation.	<i>How can you put numbers in order?</i> Lesson 1 – TG p. 1 Weather Report - Activity Placemat 1 Reader Card – Lesson 1 See Make Connections <i>How do numbers tell a story?</i> Lesson 2 – TG p. 7 Reader Card – Lesson 2 See Make Connections
2. Recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer.	Concept Posters 1–3
3. Determine the reasonableness of an answer by estimating the result of operations.	Each lesson in the CAVS program invites student inquiry in the Explore and Learn small group activity section (see TG). Under <i>Discuss the Activity</i> , the teacher is able to have students compare and share their findings and to determine reasonableness of their solutions.
4. Determine whether a given estimate is an overestimate or an underestimate.	Each lesson in the CAVS program invites student inquiry in the Explore and Learn small group activity section (see TG). Under <i>Discuss the Activity</i> , the teacher is able to have students compare and share their findings and to determine whether their solutions were overestimates or underestimates.
<p style="text-align: center;">4.2 Geometry and Measurement</p> <p style="text-align: center;">All students will develop spatial sense and the ability to use geometric properties, relationships and measurement to model, describe and analyze phenomena.</p>	

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Geometric Properties	
<p>1. Understand and apply concepts involving lines and angles.</p> <ul style="list-style-type: none"> • Notation for line, ray, angle, line segment • Properties of parallel, perpendicular and intersecting lines • Sum of the measures of the interior angles of a triangle is 180° 	<p><i>How do we describe shapes with straight sides?</i> Lesson 16 – TG p. 91 Making 4-Sided Shapes – Activity Placemat 16 <i>How do we describe shapes with three sides?</i> Lesson 17 – TG p. 97 Making Straw Triangles – Activity Placemat 17 Reader Card – Lesson 17 Make Connections</p>
<p>2. Identify, describe, compare, and classify polygons.</p> <ul style="list-style-type: none"> • Triangles by angles and sides • Quadrilaterals, including squares, rectangles, parallelograms, trapezoids, rhombi • Polygons by number of sides. • Equilateral, equiangular, regular • All points equidistant from a given point form a circle 	<p><i>How do you measure flat shapes?</i> Lesson 12 – TG p. 67 <i>How do we describe shapes with straight sides?</i> Lesson 16 – TG p. 91 Making 4-Sided Shapes – Activity Placemat 16 <i>How do we describe shapes with three sides?</i> Lesson 17 – TG p. 97 Making Straw Triangles – Activity Placemat 17</p>
<p>3. Identify similar figures.</p>	<p><i>How do we draw different shapes?</i> Lesson 18 – TG p. 103 What's the Same? – Activity Placemat 18 Reader Card – Lesson 18</p>
<p>4. Understand and apply the concepts of congruence and symmetry (line and rotational).</p>	<p><i>How do we draw different shapes?</i> Lesson 18 – TG p. 103 Reader Card – Lesson 18</p>
Transforming Shapes	
<p>1. Use a translation, a reflection or a rotation to map one figure onto another congruent figure.</p>	<p><i>How can you change shapes?</i> Lesson 20 – TG p. 115 What's in a Name? – Activity Placemat 20</p>
<p>2. Recognize, identify and describe geometric relationships and properties as they exist in nature, art, and other real-world settings.</p>	<p><i>How do we describe shapes with straight sides?</i> Lesson 16 – TG p. 91 Making 4-Sided Shapes – Activity Placemat 16 <i>How do we describe shapes with three sides?</i> Lesson 17 – TG p. 97 Making Straw Triangles – Activity Placemat 17 <i>How do we draw different shapes?</i></p>

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	Lesson 18 – TG p. 103 Concept Posters 5–6
Coordinate Geometry	
1. Create geometric shapes with specified properties in the first quadrant on a coordinate grid.	<i>How can you use models?</i> Lesson 8 – TG p. 43 Reader Card – Lesson 8 What does it Make? – Activity Placemat 8
Units of Measurement	
1. Select and use appropriate units to measure angles and area.	<i>How do you measure flat shapes?</i> Lesson 12 – TG p. 67 Reader Card – Lesson 12 <i>How do we describe shapes with three sides?</i> Lesson 17 – TG p. 97 Making Straw Triangles – Activity Placemat 17
2. Convert measurement units within a system (e.g., 3 feet = ___ inches).	<i>How do you measure?</i> Lesson 11 – TG p. 61 Reader Card – Lesson 11 Vocabulary Cards – Lesson 11
3. Know approximate equivalents between the standard and metric systems (e.g., one kilometer is approximately 6/10 of a mile).	<i>How do you measure?</i> Lesson 11 – TG p. 61 Reader Card – Lesson 11 <i>What are units of measurement?</i> Lesson 14 – TG p. 79 Reader Card – Lesson 14
4. Use measurements and estimates to describe and compare phenomena.	<i>What do you use to measure things?</i> Lesson 10 – TG p. 55 <i>How do you measure?</i> Lesson 11 – TG p. 61 <i>How do you measure solid shapes?</i> Lesson 13 – TG p. 73 Reader Cards – Lessons 10–13
Measuring Geometric Objects	
1. Use a protractor to measure angles.	Reader Card – Lesson 17 The <i>Make Connections</i> section of this lesson allows the teacher to extend the lesson by introducing the protractor and its use.

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2. Develop and apply strategies and formulas for finding perimeter and area. <ul style="list-style-type: none"> • Square • Rectangle 	<i>How do you measure flat shapes?</i> Lesson 12 – TG p. 67 Reader Card – Lesson 12 Vocabulary Cards 12
3. Recognize that rectangles with the same perimeter do not necessarily have the same area and vice versa.	<i>How do you measure flat shapes?</i> Lesson 12 – TG p. 67 Reader Cards – Lesson 12
4. Develop informal ways of approximating the measures of familiar objects (e.g., use a grid to approximate the area of the bottom of one's foot).	<i>What do you use to measure things?</i> Lesson 10 – TG p. 55 Measure a Jump - Activity Placemat 10 <i>How do you measure flat shapes?</i> Lesson 12 – TG p. 67 Reader Card – Lesson 12 Vocabulary Cards 12
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 involving whole numbers. <ul style="list-style-type: none"> • Descriptions using tables, verbal rules, simple equations and graphs 	<i>What is a pattern?</i> Lesson 7 – TG p. 37 Reader Card – Lesson 7 <i>How can you use models?</i> Lesson 8 – TG p. 43 Reader Card – Lesson 8
Functions and Relationships	
1. Describe arithmetic operations as functions, including combining operations and reversing them.	<i>How can math rules help you solve equations?</i> Lesson 9 – TG p. 49 Reader Card – Lesson 9 Vocabulary Cards – Patterns and Functions – Lessons 7–9
2. Graph points, satisfying a function from T-charts, from verbal rules and from simple equations.	<i>How can you use models?</i> Lesson 8 – TG p. 43 Reader Card – Lesson 8

4.0 Mathematics Core Curriculum Content Standards	CAVS Math Grades 3-5 Teacher's Guide Examples/Lessons
	<i>Why do you need information?</i> Lesson 21 – TG p. 121 Sorting Circles - Activity Placemat 21 Concept Poster 7
Modeling	
1. Use number sentences to model situations. <ul style="list-style-type: none"> • Using variables to represent unknown quantities • Using concrete materials, tables, graphs, verbal rules, algebraic expressions/equations 	<i>What is a pattern?</i> Lesson 7 – TG p. 37 <i>How can you use models?</i> Lesson 8 – TG p. 43 <i>How can math rules help you solve equations?</i> Lesson 9 – TG p. 49 Reader Card – Lesson 9 Vocabulary Cards – Patterns and Functions – Lessons 7–9 The teacher can use all of the above lessons in order to formally introduce the concept of algebraic expressions.
2. Draw freehand sketches of graphs that model real phenomena and use such graphs to predict and interpret events. <ul style="list-style-type: none"> • Changes over time • Rates of change (e.g., when is a plant growing slowly/rapidly, when is temperature dropping most rapidly/slowly) 	<i>How can you use models?</i> Lesson 8 – TG p. 43 Reader Card – Lesson 8 <i>How do you compare facts and information?</i> Lesson 22 – TG p. 127 Reader Card – Lesson 22 Concept Poster 7
Procedures	
1. Solve simple linear equations with manipulatives and informally. <ul style="list-style-type: none"> • Whole-number coefficients only, answers also whole numbers • Variables on one side of equation 	N/A
<p style="text-align: center;">4.4 Data Analysis, Probability, and Discrete Mathematics</p> <p style="text-align: center;">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.</p>	

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Data Analysis or Statistics	
1. Collect, generate, organize and display data. <ul style="list-style-type: none"> • Data generated from surveys 	<i>Why do you need information?</i> Lesson 21 – TG p. 121 Concept Poster 7
2. Read, interpret, select, construct, analyze, generate questions about and draw inferences from displays of data. <ul style="list-style-type: none"> • Bar graph, line graph, circle graph, table • Range, median, and mean 	<i>Why do you need information?</i> Lesson 21 – TG p. 121 <i>How do you compare facts and information?</i> Lesson 22 – TG p. 127 Reader Card – Lesson 22 Concept Poster 7
3. Respond to questions about data and generate their own questions and hypotheses.	<i>Do you think it will happen?</i> Lesson 23 – TG p. 133 Reader Card – Lesson 23 <i>How can you solve problems?</i> Lesson 24 – TG p. 139 See Record Sheet 24 Reader Card – Lesson 24 See Make Connections
Probability	
1. Determine probabilities of events. <ul style="list-style-type: none"> • Event, probability of an event • Probability of certain event is 1 and of impossible event is 0 	<i>Do you think it will happen?</i> Lesson 23 – TG p. 133 Reader Card – Lesson 23
2. Determine probability using intuitive, experimental and theoretical methods (e.g., using model of picking items of different colors from a bag). <ul style="list-style-type: none"> • Given numbers of various types of items in a bag, what is the probability that an item of one type will be picked • Given data obtained experimentally, what is the likely distribution of items in the bag 	<i>Do you think it will happen?</i> Lesson 23 – TG p. 133 Reader Card – Lesson 23 Making Predictions – Activity Placemat 23
3. Model situations involving probability using simulations (with spinners, dice) and theoretical models.	<i>Do you think it will happen?</i> Lesson 23 – TG p. 133 Reader Card – Lesson 23 Making Predictions – Activity Placemat 23

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Discrete Mathematics—Systematic Listing and Counting	
1. Solve counting problems and justify that all possibilities have been enumerated without duplication. <ul style="list-style-type: none"> • Organized lists, charts, tree diagrams, tables 	N/A
2. Explore the multiplication principle of counting in simple situations by representing all possibilities in an organized way (e.g., you can make $3 \times 4 = 12$ outfits using 3 shirts and 4 skirts).	N/A
Discrete Mathematics—Vertex-Edge Graphs and Algorithms	
1. Devise strategies for winning simple games (e.g., start with two piles of objects, each of two players in turn removes any number of objects from a single pile, and the person to take the last group of objects wins) and express those strategies as sets of directions.	N/A
4.5 Mathematical Processes All students will use mathematical processes of problem solving, communication, connections, reasoning, representations and technology to solve problems and communicate mathematical ideas.	
Problem Solving	
1. Learn mathematics through problem solving, inquiry, and discovery.	The Activity Placemats , lessons 1 through 24, provide for students to engage in problem solving, inquiry and discovery. They are learning mathematical reasoning in both written (Journal and Record) and verbal (Share) forms. All lessons in the Teacher's Guide provide for students to share their findings in the Discuss the Activity section.
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 	The Concept Posters (1 through 8) depict real-life situations allowing students to generate and solve problems that include open-ended problems, problems with multiple solutions, multiples methods of solutions and the possibility of non-routine problems. The teacher-led discussion engages the students to problem solve real-life scenarios that build background knowledge for future workplace readiness.
3. Select and apply a variety of appropriate problem-	<i>How can you solve problems?</i>

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solving strategies (e.g., "try a simpler problem" or "make a diagram") to solve problems.	Lesson 24 – TG p. 139 See Record Sheet 24 Is it Relevant? – Activity Placemat 24 Reader Card – Lesson 24 See Make Connections
4. Pose problems of various types and levels of difficulty.	Concept Posters 1 through 8 The Build Background section of the Teacher's Guide (lessons 1 – 24) helps the teacher review the Concept Posters with some scripted questions (various types and levels) for all students.
5. Monitor their progress and reflect on the process of their problem solving activity.	Step 5 (Evaluate) of the CAVS 5 Easy Steps to Success program allows the teacher to monitor progress of all students through constant evaluation processes (Lesson Review black-line masters). Students are able to reflect on their own progress, by completing the Observe, Record, and Share sections of the Activity Placemats (lessons 1 – 24). Record and Share Sheets are available for every lesson and found in the Teacher's Guide.
Communication	
1. Use communication to organize and clarify their mathematical thinking. <ul style="list-style-type: none"> • Reading and writing • Discussion, listening and questioning 	The Activity Placemats , lessons 1 through 24, provide for students to express their mathematical reasoning in both written (Journal and Record) and verbal (Share) forms. All lessons in the Teacher's Guide provide for students to share their findings in the Discuss the Activity section.
2. Communicate their mathematical thinking coherently and clearly to peers, teachers and others, both orally and in writing.	The CAVS 3 – 5 Concept Posters (1 through 8) allow for whole group discussions pertaining to different mathematical situations. These posters serve as visuals to help the teacher engage the students. The students are encouraged to explore, examine and make verbal observations about each scene.
3. Analyze and evaluate the mathematical thinking and strategies of others.	All Activity Placemats allow students to work with a partner or in a small group for purposes of collaboration. Each placemat has students Record their findings and then Share with each other by answering questions about alternate problem solving strategies and alternate findings.
4. Use the language of mathematics to express mathematical ideas precisely.	Content Academic Vocabulary System (CAVS) stresses vocabulary throughout every lesson with the use of Vocabulary Cards , the Picture Dictionary , the Reader Cards Level B , and the Concept Web pages provide for vocabulary reinforcement with each lesson. Vocabulary words, appropriate

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	for a Word Wall , are also provided with each lesson in the Teacher's Guide. The Lesson Review and Transparency sheets are specific to current vocabulary words and they can be sent home for additional practice.
Connections	
1. Recognize recurring themes across mathematical domains (e.g., patterns in number, algebra and geometry).	Concept Posters 1 through 8
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).	Every Lesson on the Reader Cards provides for students to formally discuss questions with their partners in the Make Connections section. Math Journals are used to record their responses and observations.
3. Recognize that mathematics is used in a variety of contexts outside of mathematics.	Concept Posters 1 through 8
4. Apply mathematics in practical situations and in other disciplines.	Weather Report – Activity Placemat 1 Vacation Plans – Activity Placemat 4 Passing Time – Activity Placemat 15
5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).	N/A
6. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	Every Lesson on the Reader Cards provides for students to formally discuss questions with their partners in the Make Connections section. Math Journals are used to record their responses and observations.
Reasoning	
1. Recognize that mathematical facts, procedures and claims must be justified.	<i>How can math rules help you solve equations?</i> Lesson 9 – TG p. 49 Reader Card – Lesson 9 Vocabulary Cards – Patterns and Functions – Lessons 7–9
2. Use reasoning to support their mathematical conclusions and problem solutions.	<i>How can you solve problems?</i> Lesson 24 – TG p. 139 See Record Sheet 24 Reader Card – Lesson 24 See Make Connections
3. Select and use various types of reasoning and methods of proof.	<i>How can you solve problems?</i> Lesson 24 – TG p. 139 See Record Sheet 24

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	Reader Card – Lesson 24 See Make Connections
4. Rely on reasoning, rather than answer keys, teachers or peers, to check the correctness of their problem solutions.	<i>How can you solve problems?</i> Lesson 24 – TG p. 139 See Record Sheet 24 Reader Card – Lesson 24 See Make Connections Concept Poster 8
5. Make and investigate mathematical conjectures. <ul style="list-style-type: none"> • Counterexamples as a means of disproving conjectures • Verifying conjectures using informal reasoning or proofs 	<i>Do you think it will happen?</i> Lesson 23 – TG p. 133 Reader Card – Lesson 23
6. Evaluate examples of mathematical reasoning and determine whether they are valid.	<i>Do you think it will happen?</i> Lesson 23 – TG p. 133 Reader Card – Lesson 23
Representations	
1. Create and use representations to organize, record and communicate mathematical ideas. <ul style="list-style-type: none"> • 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) 	<i>Why do you need information?</i> Lesson 21 – TG p. 121 <i>How do you compare facts and information?</i> Lesson 22 – TG p. 127 Reader Card – Lesson 22 Students are asked to Record their findings on all Activity Placemats (1 – 24) that accompany the lessons.
2. Select, apply and translate among mathematical representations to solve problems.	<i>Why do you need information?</i> Lesson 21 – TG p. 121 Sorting Circles – Activity Placemat 21
3. Use representations to model and interpret physical, social and mathematical phenomena.	<i>Why do you need information?</i> Lesson 21 – TG p. 121 Sorting Circles – Activity Placemat 21 <i>How do you compare facts and information?</i> Lesson 22 – TG p. 127 City Populations – Activity Placemat 22 Reader Card – Lesson 22
Technology	

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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.
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.	