

A Correlation of



to the

**Pennsylvania
Mathematics Assessment
Anchors**

Grades 3-5



O/M-165

INTRODUCTION

This document demonstrates how well **Investigations in Number, Data, and Space**[®] integrates with the *Pennsylvania Mathematics Assessment Anchors*. The citations within this correlation provide Investigation Curriculum Unit titles, followed by the Investigation number and Session number or Focus Time/Choice Time title. Additional citations to Classroom Routines may be included.

Investigations in Number, Data, and Space[®], a Kindergarten through Grade 5 program, offers a complete and flexible curriculum that aligns with the NCTM principles and Standards for School Mathematics. The main teaching tool is a single resource book, called the *teacher book*, for each unit in a grade level. Students explore the central topics in depth through a series of investigations, gradually encountering and using many important mathematical ideas. **Investigations** offers activity-based mathematics that encourages students to think creatively, develop their own strategies, and work together. Students practice skills through games, daily routines, activities, and practice pages.

The program blends concrete materials with appropriate technology. The software provided with several **Investigations** units harnesses the power of computers to help students explore mathematical ideas and relationships that cannot be explored in the same way with physical materials. A balanced approach to calculator use is found in the program.

Every unit in the Investigations curriculum offers a list of related children's literature that can be used to support the mathematical ideas presented in the unit. This list of books is found in the materials list located in the front of each unit.

Developed by TERC under a grant from the National Science Foundation, **Investigations in Number, Data, and Space**[®] is comprehensive in its approach to students of diverse learning styles, students from different cultures, and students of different language groups. In an effort to give mathematical lessons a broader spectrum, students are encouraged to explore working in groups, individually and as a whole class. By incorporating these methods into everyday learning, students learn to express mathematical thinking through talking, drawing, and writing.

Investigations in Number, Data and Space[®] was developed after three years of nationwide field-testing and includes teacher's practical suggestions, student dialogues, and teacher notes. Further information can be found on the internet at www.scottforesman.com/investigations.

Table of Contents

Grade Three _____ 1

Grade Four _____ 25

Grade Five _____ 51

**Investigations in Number, Data, and Space
to the
Pennsylvania Mathematics Assessment Anchors
Grade Three**

M3.A Numbers and Operations

ASSESSMENT ANCHOR

M3.A.1 Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M3.A.1.1 Apply place-value concepts and numeration to counting, ordering, grouping and equivalency. <i>Reference: 2.1.3.C, 2.1.3.F, 2.11.3.A</i></p>	<p>3.A.1.1.1 Match the word name with the appropriate whole number (up through 9,999).</p>	<p>Mathematical Thinking at Grade 3 Investigation 4: Session 2, page 76 Session 3: Dialogue Box, page 86 Landmarks in the Hundreds Investigation 1: Sessions 2-3: Teacher Note, page 15 Sessions 6-7, page 23 Investigation 2: Sessions 1-3 Ten-Minute Math: Counting Around the Class Combining and Comparing Investigation 4: Sessions 3-4, page 54</p>
	<p>M3.A.1.1.2 Differentiate between an even and odd number.</p>	<p>Mathematical Thinking at Grade 3 Investigation 2: Sessions 3-4 Investigation 4: Sessions 1-3</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	<p>M3.A.1.1.3 Compare two whole numbers using greater than (>), less than (<) or equal to (=) (up through 9,999).</p>	<p>Mathematical Thinking at Grade 3 Investigation 3: Sessions 3-4 Combining and Comparing Investigation 1: Sessions 1-3 Investigation 4: Sessions 1-2 Investigation 5: Sessions 2-3</p>
	<p>M3.A.1.1.4 Order a set of whole numbers from least to greatest or greatest to least (up through 9,999; limit sets to no more than four numbers).</p>	<p>Mathematical Thinking at Grade 3 Investigation 3: Sessions 3-4 Combining and Comparing Investigation 4: Session 1</p>
	<p>M3.A.1.1.5 Match a symbolic representation of numbers to appropriate whole numbers (e.g., place value blocks, 7 hundreds, 4 tens and 8 ones, etc).</p>	<p>Grade 3 students explore concepts of place value as they construct and investigate patterns on hundred and thousand charts. Counting by tens and hundreds supports students' familiarity with the base-ten system. References: Mathematical Thinking at Grade 3 Investigation 1: Sessions 1-3 Landmarks in the Hundreds Investigation 2: Sessions 1-3</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Investigation 3: Session 1 Ten-Minute Math: Counting Around the Class Combining and Comparing Investigation 4: Sessions 3-4
M3.A.1.2 Use fractions to represent quantities as part of a whole. <i>Reference: 2.1.3.D</i>	M3.A.1.2.1 Match the fraction to the appropriate drawing or part of a set.	Flips, Turns, and Areas Investigation 2: Sessions 1-3 Turtle Paths Investigation 2: Sessions 1-2 Fair Shares Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-3
M3.A.1.3 Count, compare and make change using a collection of coins and one-dollar bills. <i>Reference: 2.1.3.E</i>	M3.A.1.3.1 Count a collection of bills and coins less than \$5.00 (penny, nickel, dime, quarter, dollar).	Mathematical Thinking at Grade 3 Investigation 2: Sessions 5-7 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Session 4 Combining and Comparing Investigation 3: Sessions 1-2

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	M3.A.1.3.2 Compare total values of combinations of coins less than \$5.00 (penny, nickel, dime, quarter, dollar).	Mathematical Thinking at Grade 3 Investigation 2: Sessions 5-7 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Session 4 Combining and Comparing Investigation 3: Sessions 1-2
	M3.A.1.3.3 Make change for an amount up to \$5.00 with no more than \$2.00 change given (penny, nickel, dime, quarter, dollar).	Combining and Comparing Investigation 3: Sessions 1-2, page 33

ASSESSMENT ANCHOR

M3.A.2 Understand the meanings of operations, use operations and understand how they relate to each other.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
M3.A.2.1 Understand various meanings of operations and the relationship between them. <i>Reference: 2.1.3.K, 2.2.3.C, 2.5.3.C</i>	M3.A.2.1.1 Understand the relationship between operations or arrays. Represent multiplication as repeated addition. Demonstrate the inverse relationship between addition and subtraction using fact families.	Things That Come in Groups Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5 Ten-Minute Math: Counting Around the Class

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Landmarks in the Hundreds Ten-Minute Math: Counting Around the Class Up and Down the Number Line Investigation 1: Sessions 1-4 Combining and Comparing Investigation 4: Session 2: Teacher Note, page 52 Turtle Paths Investigation 1: Sessions 3-4
	M3.A.2.1.2 Choose the correct operation(s) to solve a word problem (no more than 2 operations using +, - and/or x).	Mathematical Thinking at Grade 3 Investigation 2: Sessions 5-7 Investigation 3: Sessions 3-4 Ten-Minute Math: Calendar Math Things That Come in Groups Investigation 1: Sessions 1-4 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-4 Ten-Minute Math: Counting Around the Class

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Sessions 4-6 Ten-Minute Math: Counting Around the Class Up and Down the Number Line Investigation 1: Sessions 1-8 Combining and Comparing Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-3

ASSESSMENT ANCHOR

M3.A.3 Compute accurately and fluently and make reasonable estimates.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
M3.A.3.1 Solve problems using addition, subtraction and multiplication (straight computation and word problems). <i>Reference: 2.1.3.L, 2.2.3.B</i>	M3.A.3.1.1 Solve single- and double-digit addition and subtraction problems with regrouping in vertical and horizontal form.	Mathematical Thinking at Grade 3 Investigation 2: Sessions 1-7 Investigation 3: Sessions 3-4 Investigation 4: Session 1 Ten-Minute Math: Calendar Math

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	<p>Up and Down the Number Line Investigation 1: Sessions 1-8</p> <p>Combining and Comparing Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-3 Ten-Minute Math: Estimation and Number Sense</p>
	M3.A.3.1.2 Solve problems involving multiplication through the 9's tables through 9x5.	<p>Things That Come in Groups Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-4 Ten-Minute Math: Counting Around the Class</p> <p>Landmarks in the Hundreds Investigation 1: Sessions 1-7 Investigation 2: Sessions 1-6 Ten-Minute Math: Counting Around the Class</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M3.A.3.2 Use estimation skills to arrive at conclusions. <i>Reference: 2.2.3.E</i></p>	<p>M3.A.3.2.1 Estimate sums and differences of quantities; round 2-digit numbers to the nearest 10, and 3 digit numbers to the nearest 100, before computing (limit to two numbers).</p>	<p>From Paces to Feet Ten-Minute Math: Estimation and Number Sense Up and Down the Number Line Ten-Minute Math: Estimation and Number Sense Combining and Comparing Investigation 3: Sessions 1-2 Ten-Minute Math: Estimation and Number Sense</p>
	<p>M3.A.3.2.2 Round whole numbers to the nearest ten, hundred or thousand (no higher than 9000).</p>	<p>From Paces to Feet Ten-Minute Math: Estimation and Number Sense Up and Down the Number Line Ten-Minute Math: Estimation and Number Sense Combining and Comparing Investigation 3: Sessions 1-2 Ten-Minute Math: Estimation and Number Sense</p>

M3.B Measurement

ASSESSMENT ANCHOR

M3.B.1 Demonstrate an understanding of measurable attributes of objects and figures, and the units, systems and processes of measurement.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
M3.B.1.1 Determine or calculate time and elapsed time. <i>Reference: 2.3.3.C, 2.3.3.D</i>	M3.B.1.1.1 Tell time (analog) to the minute.	Grade 3 students plan the activities for a party that will begin at 5:00 PM and end at 7:00 PM. Students give the starting time and duration for each activity. Reference: Combining and Comparing Investigation 3: Session 3
	M3.B.1.1.2 Find elapsed time to increments of 5 minutes (limited to 2 adjacent hours).	Grade 3 students use a calendar to make time comparisons which involve the question, "How much longer?" They find distances between various time periods on the calendar. They also plan the activities and timing for a party that will last exactly two hours: the students are given the starting and ending times of the party, not the duration. References: Combining and Comparing Investigation 3: Session 3 Investigation 5: Sessions 1-3

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	<p>M3.B.1.1.3 Identify times of the day and night as AM and PM.</p>	<p>Grade 3 students plan the activities for a party that will begin at 5:00 PM and end at 7:00 PM. Students give the starting time and duration for each activity. Reference: Combining and Comparing Investigation 3: Session 3</p>
<p>M3.B.1.2 Use the attributes of length, area, volume and weight of objects. <i>Reference: 2.3.3.A, 2.3.3.E</i></p>	<p>M3.B.1.2.1 Select an appropriate unit and/or tool for the attribute being measured.</p>	<p>From Paces to Feet Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3 Combining and Comparing Investigation 3: Sessions 1-2 Turtle Paths Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-2, 6-7 Ten-Minute Math: Lengths and Perimeters</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	<p>M3.B.1.2.2 Compare and/or order objects according to length, area, volume or weight.</p>	<p>Things That Come in Groups Investigation 3: Sessions 1-5</p> <p>Flips, Turns, and Area Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-5</p> <p>From Paces to Feet Investigation 1: Sessions 1-6 Investigation 2: Sessions 2-7 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3</p> <p>Combining and Comparing Investigation 2: Sessions 1-2</p> <p>Turtle Paths Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-2</p> <p>Exploring Solids and Boxes Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4</p>

ASSESSMENT ANCHOR

M3.B.2 Apply appropriate techniques, tools and formulas to determine measurements.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M3.B.2.1 Determine the measurement of objects with non-standard and standard units. <i>Reference: 2.3.3.B, 2.3.3.F</i></p>	<p>M3.B.2.1.1 Use a ruler (provided) to measure to the nearest 1/2 inch or centimeter.</p>	<p>From Paces to Feet Investigation 2: Sessions 1-7 Investigation 3: Session 1 Investigation 4: Sessions 1-3</p>
	<p>M3.B.2.1.2 Find the perimeter of a figure drawn and labeled (with the same units throughout).</p>	<p>Turtle Paths Investigation 3: Sessions 1-2 Ten-Minute Math: Lengths and Perimeters</p>
	<p>M3.B.2.1.3 Find the area of a figure drawn on a grid (only full grid blocks inside the figure).</p>	<p>Things That Come in Groups Investigation 3: Sessions 1-5 Flips, Turns, and Area Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-5</p>
<p>M3.B.2.2 Estimate measurements of familiar objects. <i>Reference: 2.3.3.G</i></p>	<p>M3.B.2.2.1 Match the object with its approximate measurement (all measurements given must be of the same system, e.g., about how tall is a soda pop can? 5 inches, 5 feet, 5 yards, etc.).</p>	<p>From Paces to Feet Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Combining and Comparing Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-2 Exploring Solids and Boxes Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4

M3.C Geometry

ASSESSMENT ANCHOR

M3.C.1 Analyze characteristics and properties of two- and three- dimensional geometric shapes and demonstrate understanding of geometric relationships.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
M3.C.1.1 Identify and/or describe two- and three-dimensional objects. <i>Reference: 2.9.3.A</i>	M3.C.1.1.1 Name/ identify/describe geometric shapes in two dimensions (circle, square, rectangle, triangle, pentagon, hexagon, octagon).	Flips, Turns, and Area Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-5 Turtle Paths Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-7 Exploring Solids and Boxes Ten-Minute Math: Quick Images

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	M3.C.1.1.2 Name/identify geometric shapes in three dimensions (sphere, cube, cylinder, cone, pyramid, rectangular prism).	Exploring Solids and Boxes Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4 Ten-Minute Math: Quick Images
M3.C.1.2 Identify/draw right angles and right triangles. <i>Reference: 2.10.3.A, 2.10.3.B</i>	M3.C.1.2.1 Identify/draw right angles and right triangles formed by line segments, in geometric figures, on a geoboard, and/or in real-world objects.	Turtle Paths Investigation 1: Session 1 Sessions 3-4: Extensions, page 25 Investigation 2 Sessions 1-2 Session 4: Dialogue Box, p. 52 Sessions 5-6 Ten-Minute Math: Lengths and Perimeters

ASSESSMENT ANCHOR**M3.C.2 Identify and/or apply concepts of transformations or symmetry.**

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
M3.C.2.1 Apply the concepts of transformations and symmetry. <i>Reference: 2.9.3.E, 2.9.3.F, 2.9.3.H</i>	M3.C.2.1.1 Recognize a translation (slide), reflection (flip) or rotation (turn) of a simple two-dimensional figure.	Mathematical Thinking at Grade 3 Investigation 2: Session 1 Flips, Turns, and Area Investigation 1: Session 1: Teacher Note, page 8 Sessions 2-3
	M3.C.2.1.2 Identify/draw a line of symmetry in a two-dimensional figure.	Mathematical Thinking at Grade 3 Investigation 2: Session 1 Sessions 3-4: Choice 1, page 33
	M3.C.2.1.3 Identify symmetrical two-dimensional shapes.	Mathematical Thinking at Grade 3 Investigation 2: Session 1 Sessions 3-4: Choice 1, page 33

M3.D Algebraic Concepts

ASSESSMENT ANCHOR

M3.D.1 Demonstrate an understanding of patterns, relations and functions.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M3.D.1.1 Recognize, describe, or extend a variety of patterns. <i>Reference: 2.8.3.A, 2.11.3.D</i></p>	<p>M3.D.1.1.1 Extend or find a missing element in a pattern of numbers or shapes (pattern must show 3 repetitions – if multiples are used, limit to 2, 3 or 5).</p>	<p>Mathematical Thinking at Grade 3 Investigation 1: Sessions 2-3 Investigation 2: Sessions 5-7 Things That Come in Groups Investigation 2: Sessions 1-6 Investigation 5: Session 1 Ten-Minute Math: Counting Around the Class Landmarks in the Hundreds Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-3 Sessions 5-6: Teacher Note, page 49 Ten-Minute Math: Counting Around the Class Flips, Turns, and Area Investigation 1: Sessions 1-3 Fair Shares Investigation 2: Sessions 5-6</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	<p>M3.D.1.1.2 Identify/ describe the rule for a pattern shown (pattern must show 3 repetitions – if multiples are used, limit to 2, 3 or 5).</p>	<p>Mathematical Thinking at Grade 3</p> <ul style="list-style-type: none"> Investigation 1: Sessions 2-3 Investigation 2: Sessions 5-7 <p>Things That Come in Groups</p> <ul style="list-style-type: none"> Investigation 2: Sessions 1-6 Investigation 5: Session 1 <p>Ten-Minute Math: Counting Around the Class</p> <p>Landmarks in the Hundreds</p> <ul style="list-style-type: none"> Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-3 Sessions 5-6: Teacher Note, page 49 <p>Ten-Minute Math: Counting Around the Class</p> <p>Flips, Turns, and Area</p> <ul style="list-style-type: none"> Investigation 1: Sessions 1-3 <p>Fair Shares</p> <ul style="list-style-type: none"> Investigation 2: Sessions 5-6

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
M3.D.1.2 Demonstrate simple function rules. <i>Reference: 2.8.3.I</i>	M3.D.1.2.1 Determine the missing element in a function table (functions may use +, - or x; allowable multiples are 2, 3 or 5; tables must have 3 INs and 3 OUTs listed).	Things That Come in Groups Investigation 5: Sessions 1-4 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Sessions 1-3 Fair Shares Investigation 2: Sessions 5-6

ASSESSMENT ANCHOR

M3.D.2 Represent and/or analyze mathematical situations using numbers, symbols, words, tables and/or graphs.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
M3.D.2.1 Create/ model expressions, equations and inequalities to match a problem situation. <i>Reference: 2.8.3.D</i>	M3.D.2.1.1 Create or match a story to a given combination of symbols (+, -, x, <, >, =) and numbers.	Things That Come in Groups Investigation 1: Sessions 2-4 Investigation 2: Sessions 3-4 Investigation 4: Sessions 1-4 Investigation 5: Session 2 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Sessions 5-6

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Up and Down the Number Line Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-4 Combining and Comparing Investigation 4: Session 2
	M3.D.2.1.2 Choose the number sentence that matches a given story (one operation, + or – only).	Things That Come in Groups Investigation 1: Sessions 2-4 Investigation 2: Sessions 3-4 Investigation 4: Sessions 1-4 Investigation 5: Session 2 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Sessions 5-6 Up and Down the Number Line Investigation 1: Sessions 6-7 Combining and Comparing Investigation 4: Session 2

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M3.D.2.2 Determine the missing number or symbol in a number sentence. <i>Reference: 2.8.3.B, 2.8.3.</i></p>	<p>M3.D.2.2.1 Find a missing number that makes a number sentence true (1-digit or 2-digit numbers up to 18 using +, - or x through 9 x 5).</p>	<p>Students identify missing terms and numbers in open number sentences involving multiplication and division number facts. References: Things That Come in Groups Investigation 1 Session 3, page 15 Session 4, page 17 Investigation 4: Sessions 1-4</p>
	<p>M3.D.2.2.2 Identify the missing symbol (+, -, =, <, >) that makes a number sentence true.</p>	<p>Students identify missing terms and numbers in open number sentences involving multiplication and division number facts. Also, students solve “missing information” problems by describing possible operations (addition or subtraction) and amounts of change given a starting point and an ending point. References: Things That Come in Groups Investigation 1 Session 3, page 15 Session 4, page 17 Investigation 4: Sessions 1-4 Up and Down the Number Line Investigation 1: Sessions 6-7</p>

M3.E Data Analysis and Probability

ASSESSMENT ANCHOR

M3.E.1 Formulate or answer questions that can be addressed with data and/or organize, display, interpret or analyze data.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M3.E.1.1 Answer questions based on data shown on tables, charts, bar graphs or pictographs. <i>Reference: 2.6.3.B, 2.7.3.D, 2.11.3.B</i></p>	<p>M3.E.1.1.1 Analyze data shown on tables, charts, bar graphs or pictographs using the concepts of largest, smallest, most often, least often and middle.</p>	<p>From Paces to Feet Investigation 1: Sessions 3-6 Investigation 2: Sessions 2-7</p>
	<p>M3.E.1.1.2 Describe, interpret and/or answer questions based on data shown in tables, charts, bar graphs and pictographs.</p>	<p>Mathematical Thinking at Grade 3 Investigation 3: Sessions 1-2 Ten-Minute Math: Exploring Data From Paces to Feet Investigation 1: Sessions 1-2, 5-6 Investigation 2: Sessions 2-7 Combining and Comparing Ten-Minute Math: Exploring Data</p>
<p>M3.E.1.2 Organize or display data using tables, charts, bar graphs or pictographs. <i>Reference: 2.6.3.A, 2.7.3.C</i></p>	<p>M3.E.1.2.1 Graph data or complete a graph given the data (bar graph or pictograph – grid is provided).</p>	<p>Mathematical Thinking at Grade 3 Investigation 3: Sessions 1-2 Ten-Minute Math: Exploring Data From Paces to Feet Investigation 1: Sessions 1-2, 5-6 Investigation 2: Sessions 2-7 Combining and Comparing Ten-Minute Math: Exploring Data</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	<p>M3.E.1.2.2 Translate information from one type of display to another (e.g., convert tally chart to bar graph). Limit to tally charts, bar graphs, tables and pictographs.</p>	<p>Mathematical Thinking at Grade 3 Investigation 3: Sessions 1-2 Investigation 4: Session 1: Dialogue Box, page 73 Ten-Minute Math: Exploring Data Landmarks in the Hundreds Investigation 1: Sessions 2-3, page 10 Investigation 2: Session 4: Dialogue Box, page 43 From Paces to Feet Investigation 1: Sessions 1-2, 5-6 Investigation 2: Sessions 2-7 Combining and Comparing Ten-Minute Math: Exploring Data</p>

ASSESSMENT ANCHOR

M3.E.3 Understand and/or apply basic concepts of probability or outcomes.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M3.E.3.1 Predict and/or measure the likelihood of events. <i>Reference: 2.7.3.A</i></p>	<p>M3.E.3.1.1 Make a prediction based on data or chance.</p>	<p>Mathematical Thinking at Grade 3 Investigation 3: Sessions 1-2 Investigation 4: Session 1: Dialogue Box, page 73 Ten-Minute Math: Exploring Data Things That Come in Groups Ten-Minute Math: Likely or Unlikely? From Paces to Feet Investigation 1: Sessions 1-2, 5-6 Investigation 2: Sessions 2-7 Up and Down the Number Line Investigation 3: Sessions 1-3 Combining and Comparing Ten-Minute Math: Exploring Data Exploring Solids and Boxes Ten-Minute Math: What Is Likely?</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	M3.E.3.1.2 Determine the likelihood of an event (more/most likely, less/least likely, equally likely or impossible).	Things That Come in Groups Ten-Minute Math: Likely or Unlikely? Up and Down the Number Line Investigation 3: Sessions 1-3 Exploring Solids and Boxes Ten-Minute Math: What Is Likely?

**Investigations in Number, Data, and Space
to the
Pennsylvania Mathematics Assessment Anchors
Grade Four**

4A. Numbers and Operations

ASSESSMENT ANCHOR

4A.1 Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4A.1.1 Use models and/or words to represent quantities as decimals, fractions and mixed numbers	4A.1.1.1 Match/construct drawings, diagrams or models to the correct decimal, fraction or mixed number – no simplification necessary	Different Shapes, Equal Pieces Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-5 Money, Miles, and Large Numbers Investigation 2: Sessions 1-4 Sunken Ships and Grid Patterns Investigation 2: Session 5 Three out of Four Like Spaghetti Investigation 1: Sessions 1-4
	4A.1.1.2 Match the standard number form to the word form of decimal numbers (through the hundredths place)	Money, Miles, and Large Numbers Investigation 1: Sessions 1-2, 4-8 Investigation 2: Sessions 1-2, 4

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	<p>4A.1.1.3 Write whole numbers in expanded, standard and/or word form through 6 digits (example of standard to expanded form: $43,076 = 40,000+3000+70+6$)</p>	<p>Landmarks in the Thousands Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-3 Money, Miles, and Large Numbers Investigation 3: Sessions 1-4</p>
<p>4A.1.2 Compare quantities and magnitudes of numbers</p>	<p>4A.1.2.1 Locate/identify fractions or decimals on a number line (decimals through hundredths place, fraction denominators to 10ths – do not mix fractions and decimals)</p>	<p>Different Shapes, Equal Pieces Investigation 3: Sessions 3-5 Money, Miles, and Large Numbers Investigation 2: Session 4 Three out of Four Like Spaghetti Investigation 1: Session 2</p>
	<p>4A.1.2.2 Compare and/or order whole numbers through 6 digits and amounts of money to \$100 (limit sets for ordering, to no more than 4 numbers)</p>	<p>Mathematical Thinking at Grade 4 Investigation 1: Sessions 2-4 Landmarks in the Thousands Investigation 1: Sessions 1, 3 Investigation 3: Sessions 1, 3-5 Investigation 4: Sessions 1-3 Packages and Groups Investigation 2: Sessions 2-3</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4A.1.3 Develop and/or apply number theory concepts to represent numbers in various ways	4A.1.3.1 Find/identify/list factors of a given number through 10	Arrays and Shares Investigation 2: Sessions 2-3, 5-6 Ten-Minute Math: Multiple BINGO Landmarks in the Thousands Investigation 1: Sessions 1-3 Packages and Groups Investigation 3: Sessions 7-9
	4A.1.3.2 Find/identify/list multiples of a number, where the multiples do not exceed 100	Mathematical Thinking at Grade 4 Investigation 3: Sessions 1-2 Arrays and Shares Investigation 1: Sessions 1-3 Investigation 3: Sessions 2-4 Ten-Minute Math: Multiple BINGO Landmarks in the Thousands Investigation 2: Sessions 1-5 Investigation 4: Sessions 1-3 Packages and Groups Investigation 1: Sessions 3-5 Investigation 3: Sessions 4-6

ASSESSMENT ANCHOR

4A.2. Understand meanings of operations, use operations and understand how they relate to each other

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>4A.2.1 Use operations to solve problems (may include word problems)</p>	<p>4A.2.1.1 Solve problems involving all operations with whole numbers, and/or explain the solution (limit to two-step problems; e.g., multiply then add – single digit multipliers and divisors)</p>	<p>Arrays and Shares Investigation 2: Sessions 5-6 Investigation 3: Sessions 1-5 Ten-Minute Math: Counting Around the Class Landmarks in the Thousands Investigation 1: Sessions 1-2 Investigation 2: Sessions 1, 5 Investigation 3: Session 2 Packages and Groups Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-3 Investigation 3: Session 3</p>
	<p>4A.2.1.2 Solve problems involving addition, subtraction or multiplication with decimals through the tenths or money to the cent and/or explain the solution (in multiplication, one multiplier must be a single-digit whole number e.g., \$2.75 x 4) Limit to 2-step problems.</p>	<p>Money, Miles, and Large Numbers Investigation 1: Sessions 1-2, 4-8 Investigation 2: Sessions 1-2; Session 3: Dialogue Box, page 39; Session 4</p>

ASSESSMENT ANCHOR

4A.3. Compute accurately and fluently and make reasonable estimates

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>4A.3.1 Apply rounding and/or estimation strategies to solve problems</p>	<p>4A.3.1.1 Round whole numbers (including whole dollar amounts) to the nearest ten, hundred, thousand, ten-thousand or hundred-thousand</p>	<p>The following references are to a variety of estimation techniques, including rounding. References: Mathematical Thinking at Grade 4 Investigation 1: Sessions 2-4 Investigation 2: Sessions 3-4: Choice 2, page 42 Ten-Minute Math: Estimation and Number Sense Landmarks in the Thousands Investigation 3: Sessions 3-5 The Shape of the Data Ten-Minute Math: Estimation and Number Sense Packages and Groups Investigation 2: Sessions 2-3 Money, Miles, and Large Numbers Investigation 3: Session 1</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	<p>4A.3.1.2 Round amounts of money to the nearest dollar</p>	<p>Mathematical Thinking at Grade 4 Ten-Minute Math: Estimation and Number Sense The Shape of the Data Ten-Minute Math: Estimation and Number Sense Money, Miles, and Large Numbers Investigation 1: Sessions 1-2, 7-8</p>
	<p>4A.3.1.3 Estimate the answer to addition, subtraction and multiplication problems using whole numbers through 6 digits. (For multiplication, no more than 2 digits X 1 digit, excluding powers of 10)</p>	<p>Mathematical Thinking at Grade 4 Investigation 1: Sessions 2-4 Investigation 2: Sessions 3-4: Choice 2, page 42 Ten-Minute Math: Estimation and Number Sense Landmarks in the Thousands Investigation 3: Sessions 3-5 The Shape of the Data Ten-Minute Math: Estimation and Number Sense Packages and Groups Investigation 2: Sessions 2-3 Money, Miles, and Large Numbers Investigation 3: Session 1</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4A.3.2 Compute using fractions or decimals (written vertically or horizontally – straight computation only)	4A.3.2.1 Solve addition or subtraction problems involving decimals (through hundredths)	Money, Miles, and Large Numbers Investigation 1: Sessions 1-2, 4-8 Investigation 2: Sessions 1-2, 4
	4A.3.2.2 Solve addition or subtraction problems with fractions with like denominators (denominators to 10, no simplifying necessary)	Different Shares, Equal Pieces Investigation 1: Session 5 Investigation 2: Session 3

4B. Measurement

ASSESSMENT ANCHOR

4B.1. Demonstrate an understanding of measurable attributes of objects and figures, and the units, systems and processes of measurement

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4B.1.1 Determine time and/or calculate elapsed time	4B.1.1.1 Match/construct analog time (a picture of a clock), to the same time written in digital	Grade 4 students measure and record plant growth data over time, and construct and interpret graphs of data which change over time. References: Changes Over Time Unit Preparation: Sessions 1-3 Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-8

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	<p>4B.1.1.2 Identify time (analog or digital) as the amount of minutes before and/or after the hour (e.g., 2:50 is the same as 10 minutes before 3:00; quarter past six is the same as 6:15)</p>	<p>Grade 4 students measure and record plant growth data over time, and construct and interpret graphs of data which change over time.</p> <p>References: Changes Over Time Unit Preparation: Sessions 1-3 Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-8</p>
	<p>4B.1.1.3 Calculate the elapsed time, to the minute, in a given situation (limited to 2 adjacent hours)</p>	<p>Grade 4 students measure and record plant growth data over time, and construct and interpret graphs of data which change over time.</p> <p>References: Changes Over Time Unit Preparation: Sessions 1-3 Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-8</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	<p>4B.1.1.4 Determine the beginning and/or ending time, given the elapsed time (limited to 2 adjacent hours)</p>	<p>Grade 4 students measure and record plant growth data over time, and construct and interpret graphs of data which change over time.</p> <p>References: Changes Over Time Unit Preparation: Sessions 1-3 Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-8</p>
<p>4B.1.2 Convert linear measurements within the same system</p>	<p>4B.1.2.1 Convert linear measurements within the same system to the unit immediately above or below the given unit (using only the units below – no combined units)</p> <ul style="list-style-type: none"> ▪ Metric using mm, cm, m, km ▪ Customary using in, ft, yd 	<p>The Shape of the Data Investigation 2: Sessions 1-4 Money, Miles, and Large Numbers Investigation 3: Sessions 2-4</p>

ASSESSMENT ANCHOR

4B.2. Apply appropriate techniques, tools and formulas to determine measurements

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>4B.2.1 Select and/or use appropriate tools and/or attributes for measuring quantities</p>	<p>4B.2.1.1 Use or read a ruler (provided) to measure to the nearest 1/4 inch or millimeter</p>	<p>The Shape of the Data Investigation 2: Sessions 1-4 Money, Miles, and Large Numbers Investigation 2: Sessions 1-4 Investigation 3: Sessions 2-4 Changes Over Time Unit Preparation: Session 3</p>
	<p>4B.2.1.2 Find the perimeter of a square or rectangle with only two sides labeled (same units)</p>	<p>Sunken Ships and Grid Patterns Ten-Minute Math: Lengths and Perimeters</p>
	<p>4B.2.1.3 Know the difference between perimeter and area and when each is appropriate to use</p>	<p>Arrays and Shares Investigation 2: Sessions 1-6 Landmarks in the Thousands Investigation 1: Session 2 Different Shapes, Equal Pieces Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-4 Sunken Ships and Grid Patterns Ten-Minute Math: Lengths and Perimeters</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4B.2.2 Estimate measurements of figures	4B.2.2.1 Make reasonable estimates of weights, lengths and capacities of familiar objects	The Shape of the Data Investigation 1: Sessions 1-4 Money, Miles, and Large Numbers Investigation 2: Sessions 1-3 Investigation 3: Sessions 2-4 Sunken Ships and Grid Patterns Investigation 2: Session 5
	4B.2.2.2 Estimate the area of an irregular figure shown on a grid	Grade 4 students use arrays as area models for multiplication, and they use areas of regions on geoboards to model fractions. References: Arrays and Shares Investigation 2: Sessions 1-6 Landmarks in the Thousands Investigation 1: Session 2 Different Shapes, Equal Pieces Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-4

4C. Geometry

ASSESSMENT ANCHOR

4C.1 Analyze characteristics and properties of two- and three- dimensional geometric shapes and demonstrate understanding of geometric relationships

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4C.1.1. Identify/describe the basic properties of geometric figures in two or three dimensions	4C.1.1.1 Identify/classify/compare two-dimensional figures (circle, triangle, square, parallelogram, trapezoid, rhombus, rectangle, pentagon, hexagon, octagon)	Mathematical Thinking at Grade 4 Investigation 4: Sessions 2-6 Seeing Solids and Silhouettes Investigation 2: Sessions 1-2 Ten-Minute Math: Quick Images Different Shapes, Equal Pieces Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-4 Changes Over Time Ten-Minute Math: Quick Images Sunken Ships and Grid Patterns Investigation 2: Sessions 1-9
	4C.1.1.2 Classify three-dimensional figures (cube, rectangular prism and pyramid) and/or identify the characteristics (faces, edges and vertices)	Seeing Solids and Silhouettes Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-4

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	4C.1.1.3 Draw/identify right triangles	Mathematical Thinking at Grade 4 Investigation 4: Sessions 5-6 Different Shapes, Equal Pieces Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-3
4C.1.2 Represent and/or use properties or relationships of points, lines, line segments, rays and angles	4C.1.2.1 Identify points, lines, line segments or rays	Mathematical Thinking at Grade 4 Investigation 4: Sessions 2-6 Seeing Solids and Silhouettes Investigation 2: Sessions 1-2 Ten-Minute Math: Quick Images Different Shapes, Equal Pieces Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-4 Changes Over Time Ten-Minute Math: Quick Images Sunken Ships and Grid Patterns Investigation 2: Sessions 1-9

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	4C.1.2.2 Identify parallel and perpendicular lines	<p>Grade 4 students gain experience with parallel lines and perpendicular lines as they use the computer to construct and manipulate points, segments, and rectangles on coordinate grids.</p> <p>References: Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9 Ten-Minute Math: Lengths and Perimeters</p>
	4C.1.2.3 Visually classify angles as acute, obtuse or right	<p>Sunken Ships and Grid Patterns Investigation 2: Sessions 1, 5 Ten-Minute Math: Lengths and Perimeters Appendix: <i>Geo-Logo</i> Tutorial</p>

ASSESSMENT ANCHOR**4C.2. Identify and /or apply concepts of transformations and symmetry**

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4C.2.1 Apply the concepts of reflection and symmetry	4C.2.1.1 Identify and/or draw the reflection (flip) of a two-dimensional figure	Mathematical Thinking at Grade 4 Investigation 4: Sessions 1-6 Sunken Ships and Grid Patterns Investigation 2: Sessions 2-3
	4C.2.1.2 Identify or create figures that have one, two or no lines of symmetry	Mathematical Thinking at Grade 4 Investigation 4: Sessions 1-6 Sunken Ships and Grid Patterns Investigation 2: Sessions 2-3, 8-9

ASSESSMENT ANCHOR**4C.3 Locate and describe relationships using the coordinate plane**

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4C.3.1 Locate points on a simple grid	4C.3.1.1 Match or plot the ordered pair with the appropriate point (or object) on a simple grid	Changes Over Time Investigation 1: Sessions 1-2 Investigation 3: Sessions 3-4 Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Investigation 2: Sessions 1-9 Ten-Minute Math: Lengths and Perimeters <i>Geo-Logo</i> Teacher Tutorial

4D. Algebraic Concepts

ASSESSMENT ANCHOR

4D.1. Demonstrate an understanding of patterns, relations and functions

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4D.1.1 Recognize, describe, extend, create and/or replicate a variety of patterns	4D.1.1.1 Extend or find a missing element in a numerical or geometric pattern (+, - or x may be used – numerical patterns must be whole numbers)	Mathematical Thinking at Grade 4 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-6 Arrays and Shares Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-3 Landmarks in the Thousands Investigation 1: Sessions 1, 3 Investigation 2: Session 1 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-3

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Packages and Groups Investigation 1: Sessions 1-3 Investigation 3: Sessions 4-6: Choice 1, page 48 Sunken Ships and Grid Patterns Investigation 2: Sessions 8-9
	4D.1.1.2 Identify/describe the rule for a numerical or geometric pattern shown (+, - or x may be used - numerical patterns must be whole numbers)	Mathematical Thinking at Grade 4 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-6 Arrays and Shares Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-3 Landmarks in the Thousands Investigation 1: Sessions 1, 3 Investigation 2: Session 1 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-3 Packages and Groups Investigation 1: Sessions 1-3 Investigation 3: Sessions 4-6: Choice 1, page 48 Sunken Ships and Grid Patterns Investigation 2: Sessions 8-9

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	<p>4D.1.1.3 Create or replicate a numerical or geometric pattern showing 3 repetitions (+, - or x may be used - numerical patterns must be whole numbers or money)</p>	<p>Mathematical Thinking at Grade 4</p> <ul style="list-style-type: none"> Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-6 <p>Arrays and Shares</p> <ul style="list-style-type: none"> Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-3 <p>Landmarks in the Thousands</p> <ul style="list-style-type: none"> Investigation 1: Sessions 1, 3 Investigation 2: Session 1 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-3 <p>Packages and Groups</p> <ul style="list-style-type: none"> Investigation 1: Sessions 1-3 Investigation 3: Sessions 4-6: Choice 1, page 48 <p>Sunken Ships and Grid Patterns</p> <ul style="list-style-type: none"> Investigation 2: Sessions 8-9

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4D.1.2 Apply simple function rules	4D.1.2.1 Determine the missing elements in a function table given the rule (functions may use +, - or x and whole numbers or money)	Changes Over Time Investigation 3: Session 3, pages 49, 52 Session 5, page 58 Packages and Groups Investigation 3: Sessions 7-8
	4D.1.2.2 Determine the rule for a function given a completed table (functions may use +, - or x and whole numbers)	Packages and Groups Investigation 3: Sessions 7-8

ASSESSMENT ANCHOR

4D.2. Represent and/or analyze mathematical situations and structures using algebraic symbols, words, tables and graphs

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4D.2.1 Use numbers and symbols to model the concepts of expressions and/or equations	4D.2.1.1 Correlate story situations with expressions or equations (may use numbers and one operation +, - or x; no variables)	Arrays and Shares Investigation 2: Sessions 2-3 Changes Over Time Investigation 1: Sessions 5-6 Packages and Groups Investigation 3: Sessions 1-2

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4D.2.2 Determine the missing number or symbol in a number sentence	4D.2.2.1 Solve for a missing number in an equation (using estimation, guess & check, etc) (may use +, - or single digit x or ÷)	Arrays and Shares Investigation 2: Sessions 2-3: Teacher Note, page 23 Landmarks in the Thousands Investigation 2: Sessions 2-4: Dialogue Box, page 32 Changes Over Time Investigation 1: Sessions 5-6 Packages and Groups Investigation 1: Sessions 4-5, page 15 Investigation 3: Sessions 1-2, page 35 Sessions 7-8, page 53
	4D.2.2.2 Identify the missing symbol (+, -, x, ÷, =, <, >) that makes a number sentence true (single digit x or ÷ only)	Changes Over Time Investigation 1: Sessions 5-6 Packages and Groups Investigation 3: Sessions 7-8, page 53

4E. Data Analysis and Probability

ASSESSMENT ANCHOR

4E.1 Formulate questions that can be addressed with data and/or collect, organize, display and analyze data

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>4E.1.1 Interpret data shown on tables, charts, line graphs, bar graphs or pictographs</p>	<p>4E.1.1.1 Describe, interpret and/or answer questions based on data shown in tables, charts, bar graphs, line graphs or pictographs</p>	<p>Mathematical Thinking at Grade 4 Ten-Minute Math: Exploring Data The Shape of the Data Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Changes Over Time Unit Preparation: Sessions 1-3 Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-8 Packages and Groups Ten-Minute Math: Exploring Data Sunken Ships and Grid Patterns Investigation 1: Sessions 5-6 Investigation 2: Sessions 1-9 Ten-Minute Math: Lengths and Perimeters</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Three out of Four Like Spaghetti Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-7
4E.1.2 Organize or display data using tables, bar graphs, line graphs or pictographs	4E.1.2.1 Graph data or complete a graph given the data (bar graph, line graph or pictograph – grid is provided)	The Shape of the Data Investigation 2: Sessions 2-7 Investigation 3: Sessions 3-5 Changes Over Time Preparation Session 3 Investigation 1: Sessions 1-4 Investigation 3: Sessions 1-8 Three Out of Four Like Spaghetti Investigation 2: Sessions 1-2, 5-7
	4E.1.2.2 Translate information from one type of display to another (table, chart, bar graph, line graph or pictograph)	Mathematical Thinking at Grade 4 Ten-Minute Math: Exploring Data The Shape of the Data Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Changes Over Time Unit Preparation: Sessions 1-3 Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-8

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Packages and Groups Ten-Minute Math: Exploring Data Sunken Ships and Grid Patterns Investigation 1: Sessions 5-6 Investigation 2: Sessions 1-9 Ten-Minute Math: Lengths and Perimeters Three out of Four Like Spaghetti Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-7

ASSESSMENT ANCHOR

4E.2 Select and use appropriate statistical methods to analyze data

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4E.2.1 Describe data sets using mean, median or mode	4E.2.1.1 Determine the mean of given data (data must not have more than 6 entries and the mean must be a whole number)	Students gain experience with measures of central tendency and dispersion as they find the median of a set of data and discuss the spread and clustering of data. References: The Shape of the Data Investigation 2: Sessions 4-7

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	4E.2.1.2 Identify the mode and/or median of given data (data must have an odd number of elements and only one mode)	The Shape of the Data Investigation 2: Sessions 4-7

ASSESSMENT ANCHOR

4E.3 Understand and apply basic concepts of probability

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4E.3.1 Predict and/or measure the likelihood of events	4E.3.1.1 Make a prediction based on data or chance (data may be shown in tables, charts, line graphs, bar graphs or pictographs)	Mathematical Thinking at Grade 4 Ten-Minute Math: Exploring Data Landmarks in the Thousands Ten-Minute Math: What Is Likely? The Shape of the Data Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Money, Miles, and Large Numbers Ten-Minute Math: Likely or Unlikely? Changes Over Time Unit Preparation: Sessions 1-3 Investigation 1: Sessions 1-6

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-8 Packages and Groups Ten-Minute Math: Exploring Data Sunken Ships and Grid Patterns Investigation 1: Sessions 5-6 Investigation 2: Sessions 1-9 Ten-Minute Math: Lengths and Perimeters Packages and Groups Ten-Minute Math: Exploring Data Three out of Four Like Spaghetti Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-7 Ten-Minute Math: What Is Likely?
	4E.3.1.2 Determine the likelihood of an event based on probability (more/most likely, less/least likely, equally likely or impossible)	Landmarks in the Thousands Ten-Minute Math: What Is Likely? Money, Miles, and Large Numbers Ten-Minute Math: Likely or Unlikely? Three Out of Four Like Spaghetti Ten-Minute Math: What Is Likely?

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
4E.3.2 Find all possible combinations or arrangements involving two variables	4E.3.2.1 Show and/or determine all possible combinations involving two variables and no more than eight total arrangements (e.g., all combinations of 4 different shirts and 2 different trousers)	<p>Arrays and Shares Investigation 2: Sessions 1-6 Landmarks in the Thousands Investigation 1: Sessions 1-2 Different Shapes, Equal Pieces Investigation 1: Session 1</p>

**Investigations in Number, Data, and Space
to the
Pennsylvania Mathematics Assessment Anchors
Grade Five**

M5.A Numbers and Operations

ASSESSMENT ANCHOR

M5.A.1 Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M5.A.1.1 Express numbers in equivalent forms. <i>Reference: 2.1.5.A</i></p>	<p>M5.A.1.1.1 Use expanded notation to represent whole numbers or decimals (whole numbers less than 10,000,000 and decimals to hundredths).</p>	<p>Students break down numbers into multiplication clusters. References: Mathematical Thinking at Grade 5 Investigation 2: Session 5 Investigation 3: Sessions 1-5 Name That Portion Investigation 3: Sessions 1-4 Building on Numbers You Know Investigation 5: Sessions 4-7</p>
<p>M5.A.1.2 Demonstrate understanding of place value of whole numbers and decimals. <i>Reference: 2.1.3.I</i></p>	<p>M5.A.1.2.1 Read and write decimal numbers through the thousandths.</p>	<p>Name That Portion Investigation 3: Sessions 1-8 Between Never and Always Investigation 1: Sessions 1-2 Building on Numbers You Know Investigation 2: Session 3: Teacher Note, page 54</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Containers and Cubes Ten-Minute Math: Counting Around the Class: Fractions and Decimals Data: Kids, Cats, and Ads Investigation 3: Session 1, page 50
	M5.A.1.2.2 Identify the number with its place value (from millions to thousandths).	Mathematical Thinking at Grade 5 Investigation 2: Session 5 Investigation 3: Session 1 Investigation 4: Sessions 1-6 Name That Portion Investigation 3: Sessions 1-4 Building on Numbers You Know Investigation 4: Sessions 1-2 Investigation 5: Sessions 4-7
M5.A.1.3 Compare quantities or magnitudes of numbers. Reference: 2.11.5.A	M5.A.1.3.1 Compare whole numbers through 9 digits using the words more, less, equal, least, most, greater than, less than or the symbols <, >, =.	Mathematical Thinking at Grade 5 Investigation 4: Session 1: Teacher Note, page 79 Picturing Polygons Investigation 1: Sessions 3-4 Investigation 2: Sessions 4-5

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	M5.A.1.3.2 Compare and/or order decimals through the thousandths.	Name That Portion Investigation 3: Sessions 2-6
	M5.A.1.3.3 Compare proper fractions to 16ths with like and unlike denominators.	Name That Portion Investigation 1: Sessions 5-7 Investigation 2: Sessions 4-8 Investigation 3: Sessions 5-8
M5.A.1.4 Use simple applications of negative numbers (number line, counting, temperature). Reference: 2.1.5.F	M5.A.1.4.1 Identify negative numbers on a number line (greater than or equal to -20).	Mathematical Thinking at Grade 5 Investigation 4: Session 1: Teacher Note, page 79 Picturing Polygons Investigation 1: Sessions 2-4 Investigation 2: Sessions 4-5
	M5.A.1.4.2 Identify negative numbers on a thermometer (°C or °F).	There are no specific references to reading thermometers in either Fahrenheit or Celsius scales in the fifth grade series. The following references are to uses of negative numbers for comparison and as coordinates. References: Mathematical Thinking at Grade 5 Investigation 4: Session 1: Teacher Note, page 79

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Picturing Polygons Investigation 1: Sessions 2-4 Investigation 2: Sessions 4-5
M5.A.1.5 Use or develop models to represent fractions and/or mixed numbers. <i>Reference: 2.1.5.D</i>	M5.A.1.5.1 Use or develop regions and/or sets (e.g., circle graph, hundred-blocks) to model fractions and mixed numbers to hundredths (may include reducing the fractions).	Name That Portion Investigation 1: Sessions 1, 3-4, 7 Investigation 2: Sessions 1-9 Investigation 3: Session 7 Between Never and Always Investigation 1: Sessions 1-2 Building on Numbers You Know Investigation 2: Session 3: Teacher Note, page 54 Data: Kids, Cats, and Ads Investigation 3: Session 1 Investigation 4: Sessions 1-3
M5.A.1.6 Apply number theory concepts (i.e., primes, factors, multiples, composites). <i>Reference: 2.1.5.E</i>	M5.A.1.6.1 Name/ identify prime and composite numbers less than or equal to 100.	Mathematical Thinking at Grade 5 Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-5 Investigation 4: Sessions 5-6 Picturing Polygons Ten-Minute Math: Multiple and Factor BINGO

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Building on Numbers You Know Investigation 1: Sessions 1, 3-5 Investigation 4: Session 1
	M5.A.1.6.2 List/identify factors and/or multiples of a given number less than or equal to 50.	Mathematical Thinking at Grade 5 Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-5 Investigation 4: Sessions 5-6 Picturing Polygons Ten-Minute Math: Multiple and Factor BINGO Building on Numbers You Know Investigation 1: Sessions 1, 3-5 Investigation 4: Session 1

ASSESSMENT ANCHOR

M5.A.2 Understand the meanings of operations, use operations and understand how they relate to each other.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M5.A.2.1 Solve problems involving decimals, fractions and/or whole numbers (straight computation or word problems). <i>Reference: 2.2.5.A, 2.2.5.B, 2.2.5.C, 2.2.5.I</i></p>	<p>M5.A.2.1.1 Solve problems involving addition, subtraction, multiplication and division of whole numbers (multipliers up to 2 digits – divisors of one digit) and decimals (answer to hundredths – whole number divisors).</p>	<p>Mathematical Thinking at Grade 5 Investigation 1: Sessions 1-6 Investigation 2: Sessions 2-5 Investigation 3: Sessions 1-5 Investigation 4: Sessions 2-4 Name That Portion Investigation 3: Sessions 2-4, 7 Ten-Minute Math: Seeing Numbers Building on Numbers You Know Investigation 1: Sessions 1, 3-5 Investigation 2: Session 3: Teacher Note, page 55 Investigation 3: Sessions 1-6 Investigation 4: Session 1 Investigation 5: Sessions 1-7 Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	<p>M5.A.2.1.2 Solve problems involving addition and subtraction of fractions (to 16ths – like and unlike denominators – for unlike denominators, the LCD must be one of the given denominators).</p>	<p>Name That Portion Investigation 1: Session 1: Teacher Note, page 9 Investigation 2: Sessions 1-3, 6-9 Investigation 3: Sessions 5-6: Dialogue Box, page 91 Session 8: Extension, page 99</p>
	<p>M5.A.2.1.3 Choose the correct operation(s) to solve a problem (no more than 2 operations).</p>	<p>Mathematical Thinking at Grade 5 Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-5 Investigation 4: Sessions 5-6 Picturing Polygons Investigation 3: Session 4, pages 97-98 Ten-Minute Math: Multiple and Factor BINGO Name That Portion Investigation 2: Sessions 1-3, 7-9 Investigation 3: Sessions 2-4, 7 Building on Numbers You Know Investigation 1: Sessions 1, 3-5</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
		Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-10 Investigation 4: Session 1 Investigation 5: Sessions 1-7 Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense Containers and Cubes Investigation 4: Sessions 7-9, pages 88-89 Data: Kids, Cats, and Ads Investigation 4: Session 3

ASSESSMENT ANCHOR

M5.A.3 Compute accurately and fluently and make reasonable estimates.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
M5.A.3.1 Apply estimation strategies to a variety of problems. <i>Reference: 2.2.5.D, 2.2.5.E, 2.2.5.G</i>	M5.A.3.1.1 Round whole numbers through millions and decimals through hundredths.	Between Never and Always Ten-Minute Math: Nearest Answer Building on Numbers You Know Investigation 1: Session 2 Investigation 3: Sessions 1-6 Investigation 5: Sessions 1-2 Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Data: Kids, Cats, and Ads Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3
	M5.A.3.1.2 Use estimation to solve problems involving whole numbers and/or decimals (up to 2-digit multipliers, single-digit divisors or multiples of 10; whole numbers to thousands and decimals to hundredths).	Between Never and Always Ten-Minute Math: Nearest Answer Building on Numbers You Know Investigation 1: Session 2 Investigation 3: Sessions 1-6 Investigation 5: Sessions 1-2 Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense
M5.A.3.2 Compute accurately without the use of a calculator (straight computation or 1 operation word problems). Reference 2.2.5.A	M5.A.3.2.1 Use addition, subtraction, multiplication and division to compute accurately without a calculator (multipliers up to 2 digits, single-digit whole number divisors or multiples of 10 – whole numbers to thousands and decimals to hundredths).	Mathematical Thinking at Grade 5 Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-5 Investigation 4: Sessions 5-6 Picturing Polygons Investigation 3: Session 4, pages 97-98 Ten-Minute Math: Multiple and Factor BINGO Name That Portion Investigation 2: Sessions 1-3, 7-9

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	<p>Investigation 3: Sessions 2-4, 7 Building on Numbers You Know</p> <p>Investigation 1: Sessions 1, 3-5</p> <p>Investigation 2: Sessions 1-7</p> <p>Investigation 3: Sessions 1-10</p> <p>Investigation 4: Session 1</p> <p>Investigation 5: Sessions 1-7</p> <p>Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense Containers and Cubes</p> <p>Investigation 4: Sessions 7-9, pages 88-89</p> <p>Data: Kids, Cats, and Ads Investigation 4: Session 3</p>

M5.B Measurement

ASSESSMENT ANCHOR

M5.B.1 Demonstrate an understanding of measurable attributes of objects and figures, and the units, systems and processes of measurement.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M5.B.1.1 Select appropriate units (customary or metric) to measure specific attributes of objects. <i>Reference: 2.3.5.A</i></p>	<p>M5.B.1.1.1 Select the appropriate unit for measuring weight (mass), capacity, length, perimeter and area.</p>	<p>Measurement Benchmarks Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-8 Investigation 3: Sessions 1-3 Containers and Cubes Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-4 Investigation 4: Sessions 1-9 Data: Kids, Cats, and Ads Ten-Minute Math: Volume and Surface Area</p>
<p>M5.B.1.2 Solve problems using simple conversions and/or add and subtract measurements. <i>Reference: 2.3.5.D, 2.3.5.E</i></p>	<p>M5.B.1.2.1 Convert using linear measurements, capacity, and weight (mass) within the same system to the unit immediately above or below the given unit (using only the units below).</p> <ul style="list-style-type: none"> ▪ Metric using mm, cm, m and km; mL and L; g and kg ▪ Customary using cup, pint, quart, gallon; in, ft, yd; oz, lb 	<p>Measurement Benchmarks Investigation 1: Sessions 4, 7-8 Investigation 2: Sessions 1-4, 7-8</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	M5.B.1.2.2 Add or subtract linear measurements, (inches and feet) or units of time (hours and minutes), without having to regroup with subtraction (answer should be in simplest form).	Measurement Benchmarks Investigation 1: Sessions 1-8 Investigation 3: Sessions 1-3
M5.B.1.3 Estimate and/or compare the perimeters or areas of 2 figures without computation. Reference: 2.11.5.E, 2.3.5.C	M5.B.1.3.1 Estimate which polygon (shown) has a greater perimeter or area (do not mix perimeter with area).	Mathematical Thinking at Grade 5 Investigation 1: Sessions 1-3 Picturing Polygons Investigation 3: Sessions 4-6: Extension, page 108 Measurement Benchmarks Investigation 1: Sessions 5-6
	M5.B.1.3.2 Estimate and/or compare the area of an irregular figure(s) shown on a grid.	Mathematical Thinking at Grade 5 Investigation 1: Sessions 1-3 Picturing Polygons Investigation 3: Sessions 4-6 Name That Portion Investigation 1: Sessions 2-4 Investigation 3: Sessions 2, 8

ASSESSMENT ANCHOR

M5.B.2 Apply appropriate techniques, tools and formulas to determine measurements.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M5.B.2.1 Use appropriate tools to determine measurements. <i>Reference: 2.3.5.B</i></p>	<p>M5.B.2.1.1 Use a ruler to measure to the nearest 1/8 inch or millimeter.</p>	<p>Measurement Benchmarks Investigation 1: Sessions 1-8</p>
<p>M5.B.2.2 Solve problems involving length, time, weight, mass, capacity, temperature, perimeter, area and/or money. <i>Reference: 2.3.5.A, 2.3.5.B</i></p>	<p>M5.B.2.2.1 Find the perimeter or area of a square or rectangle (same system of measurement – whole numbers only).</p>	<p>Mathematical Thinking at Grade 5 Investigation 1: Sessions 1-3 Picturing Polygons Investigation 3: Sessions 4-6: Extension, page 108 Measurement Benchmarks Investigation 1: Sessions 5-6 Name That Portion Investigation 1: Sessions 2-4 Investigation 3: Sessions 2, 8</p>
	<p>M5.B.2.2.2 Solve problems involving weight, time, temperature, length, capacity, mass (limited to 3 digits) or money.</p>	<p>Name That Portion Investigation 3: Session 1, page 67 Measurement Benchmarks Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-8 Investigation 3: Sessions 1-3 Patterns of Change Investigation 2: Sessions 1-5 Ten-Minute Math: Graph Stories</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Containers and Cubes Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-4 Investigation 4: Sessions 1-9 Data: Kids, Cats, and Ads Ten-Minute Math: Volume and Surface Area

M5.C Geometry

ASSESSMENT ANCHOR

M5.C.1 Analyze characteristics and properties of two- and three- dimensional geometric shapes and demonstrate understanding of geometric relationships.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
M5.C.1.1 Define and/or use basic properties of quadrilaterals (parallelograms, squares, rectangles, trapezoids, rhombi), triangles, circles, pyramids, cubes, and/or prisms. <i>Reference: 2.9.5.B, 2.9.5.C, 2.9.5.F, 2.10.5.A</i>	M5.C.1.1.1 Identify/classify/compare cubes, rectangular prisms and pyramids using faces, vertices and edges.	Containers and Cubes Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-4 Investigation 4: Sessions 1-9 Data: Kids, Cats, and Ads Ten-Minute Math: Volume and Surface Area

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	<p>M5.C.1.1.2 Identify/classify/compare triangles and quadrilaterals according to sides (length, parallel or perpendicular) and angles.</p>	<p>Picturing Polygons Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-6</p>
	<p>M5.C.1.1.3 Identify and/or compare parts of right triangles, including right angles, acute angles, hypotenuse and legs.</p>	<p>Picturing Polygons Investigation 2: Sessions 1-9</p>
	<p>M5.C.1.1.4 Identify and/or determine the measure of the diameter and radii of a circle (when one or the other is given).</p>	<p>Grade 5 students investigate properties and relationships of circles as they explore fractional areas of a clock face and as they construct circle graphs. References: Name That Portion Investigation 1: Session 7, page 31 Investigation 2: Sessions 1-2 Investigation 3: Session 8 Investigation 4: Sessions 2-7</p>
<p>M5.C.1.2 Represent and/or use properties of lines, line segments, rays, points and planes. Reference: 2.9.5.1</p>	<p>M5.C.1.2.1 Identify, draw and/or label points, lines, line segments, rays and planes.</p>	<p>Picturing Polygons Investigation 1: Sessions 3-4 Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-3, 5-6</p>

ASSESSMENT ANCHOR**M5.C.2 Identify and/or apply concepts of transformations or symmetry.**

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
M5.C.2.1 Analyze transformations and/or use symmetry to analyze mathematical situations. <i>Reference: 2.9.5.K, 2.9.5.L</i>	M5.C.2.1.1 Draw or identify a translation (slide), reflection (flip) or rotation (turn) of a 2-dimensional shape.	Picturing Polygons Investigation 2: Sessions 1-9 Investigation 3: Sessions 3-6
	M5.C.2.1.2 Draw or identify a maximum of 2 lines of symmetry in a two-dimensional figure.	Picturing Polygons Investigation 2 Session 8 Session 9, page 79 Investigation 3: Session 4

ASSESSMENT ANCHOR**M5.C.3 Locate points or describe relationships using the coordinate plane.**

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
M5.C.3.1 Identify, plot, or match points given an ordered pair. <i>Reference: 2.8.5.H</i>	M5.C.3.1.1 Locate, plot and/or identify points in Quadrant I and on the x and y axes of a grid (intervals of 1 - up to 20 by 20 grid).	Picturing Polygons Investigation 1: Sessions 3-4 Investigation 2: Sessions 4-7, 9 Investigation 3: Sessions 1-2, 5-6

M5.D Algebraic Concepts

ASSESSMENT ANCHOR

M5.D.1 Demonstrate an understanding of patterns, relations and functions.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M5.D.1.1 Create or extend patterns. <i>Reference: 2.8.5.A</i></p>	<p>M5.D.1.1.1 Extend or find a missing element in a numerical or simple geometric pattern (pattern must show 3 repetitions).</p>	<p>Mathematical Thinking at Grade 5 Investigation 2: Sessions 1-5 Investigation 3: Session 1 Investigation 4: Sessions 5-6 Picturing Polygons Investigation 3: Sessions 1-6 Ten-Minute Math: Multiple and Factor BINGO Name That Portion Investigation 2: Sessions 4-5 Investigation 3: Sessions 1, 5-6 Building on Numbers You Know Investigation 1: Sessions 1-5 Investigation 4: Session 2 Investigation 5: Sessions 4-6 Patterns of Change Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-5</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Investigation 3: Sessions 1-7 Containers and Cubes Investigation 1: Sessions 3-4 Ten-Minute Math: Counting Around the Class
	M5.D.1.1.2 Create a numerical or geometric pattern showing 3 repetitions of that pattern.	Mathematical Thinking at Grade 5 Investigation 2: Sessions 1-5 Investigation 3: Session 1 Investigation 4: Sessions 5-6 Picturing Polygons Investigation 3: Sessions 1-6 Ten-Minute Math: Multiple and Factor BINGO Name That Portion Investigation 2: Sessions 4-5 Investigation 3: Sessions 1, 5-6 Building on Numbers You Know Investigation 1: Sessions 1-5 Investigation 4: Session 2 Investigation 5: Sessions 4-6 Patterns of Change Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-5

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Investigation 3: Sessions 1-7 Containers and Cubes Investigation 1: Sessions 3-4 Ten-Minute Math: Counting Around the Class
M5.D.1.2 Analyze patterns. <i>Reference: 2.8.5.C</i>	M5.D.1.2.1 Form a rule based on a given pattern, or illustrate a pattern based on a given rule (whole numbers up to 100 - patterns must show 3 repetitions).	Mathematical Thinking at Grade 5 Investigation 2: Sessions 1-5 Investigation 3: Session 1 Investigation 4: Sessions 5-6 Picturing Polygons Investigation 3: Sessions 1-6 Ten-Minute Math: Multiple and Factor BINGO Name That Portion Investigation 2: Sessions 4-5 Investigation 3: Sessions 1, 5-6 Building on Numbers You Know Investigation 1: Sessions 1-5 Investigation 4: Session 2 Investigation 5: Sessions 4-6

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Patterns of Change Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-7 Containers and Cubes Investigation 1: Sessions 3-4 Ten-Minute Math: Counting Around the Class

ASSESSMENT ANCHOR

M5.D.2 Represent and/or analyze mathematical situations using numbers, symbols, words, tables and/or graphs.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
M5.D.2.1 Select and/or use appropriate strategies, including concrete materials, to solve number sentences. <i>Reference: 2.8.5.F, 2.8.5.G</i>	M5.D.2.1.1 Solve for a missing number (blank, question mark, variable) in an equation involving a single operation.	Grade 5 students solve equations of the form $3 \times \underline{\quad} = 72$ and complete number sentences. References: Mathematical Thinking at Grade 5 Investigation 3: Sessions 2-5: Teacher Note, page 63 Investigation 4: Session 1

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Building on Numbers You Know Investigation 1: Sessions 1-4, 6-8 Investigation 2: Sessions 5-6 Investigation 3: Session 10
	M5.D.2.1.2 Choose the operation needed to solve for the variable in a one-step equation.	Grade 5 students solve equations of the form $3 \times \underline{\quad} = 72$ and complete number sentences. References: Mathematical Thinking at Grade 5 Investigation 3: Sessions 2-5: Teacher Note, page 63 Investigation 4: Session 1 Building on Numbers You Know Investigation 3: Session 10
	M5.D.2.1.3 Match a realistic situation to an equation, expression, inequality (<, >, =), table or graph (variable must be isolated, e.g., $17 + 39 = n$).	Mathematical Thinking at Grade 5 Investigation 3: Sessions 2-5: Teacher Note, page 63 Building on Numbers You Know Investigation 2: Sessions 5-6, pages 62-63 Session 7 Investigation 3: Session 10

ASSESSMENT ANCHOR**M5.D.3 Analyze change in various contexts.**

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
5.D.3.1 Describe the relationship between rate of change and another variable (e.g., time, temperature). <i>Reference: 2.11.5.D</i>	M5.D.3.1.1 Solve problems involving a constant rate of change (e.g., word problems, graphs or data tables).	In Patterns of Change, students explore geometric and numeric patterns that grow linearly. They explore linear relationships in real-life problem situations, including the mathematical relationships between distance, rate, and time. References: Patterns of Change Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-7 Ten-Minute Math: Graph Stories

ASSESSMENT ANCHOR**M5.E.1 Formulate or answer questions that can be addressed with data and/or organize, display, interpret or analyze data.**

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M5.E.1.1 Organize, display and/or interpret data using pictographs, tallies, tables, charts, line, bar and circle graphs and Venn diagrams. Reference: 2.6.5.A, 2.6.5.C</p>	<p>M5.E.1.1.1 Display and/or interpret data shown in tallies, tables, charts, pictographs, bar graphs, line graphs and circle graphs using a title, appropriate scale, and labels.</p> <ul style="list-style-type: none"> ▪ Circle graphs for open-ended items must show a center point and tic marks (circle graph data must be based on 100 – percents are given). ▪ Venn diagram – interpret data with a maximum of 3 overlapping categories. ▪ Venn diagram – display data with a maximum of 10 elements and 2 overlapping categories (diagram of circles provided for open-ended items). ▪ A grid will be provided to display data on bar graphs or line graphs. 	<p>Mathematical Thinking at Grade 5 Ten-Minute Math: Exploring Data Name That Portion Ten-Minute Math: Exploring Data Between Never and Always Investigation 1: Sessions 3-6 Investigation 2: Session 3 Measurement Benchmarks Investigation 2: Sessions 7-8 Investigation 3: Sessions 1-2 Patterns of Change Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-6 Ten-Minute Math: Graph Stories Data: Kids, Cats, and Ads Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-3 Investigation 3: Sessions 1-4 Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-5</p>

ASSESSMENT ANCHOR

M5.E.2 Select and/or use appropriate statistical methods to analyze data.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M5.E.2.1 Describe data sets using mean, median, mode and/or range. <i>Reference: 2.6.5.B</i></p>	<p>M5.E.2.1.1 Determine the mean/average (answer is a whole number), median (answer is a whole number or average of 2 numbers) and range of data (up to 10 numbers).</p>	<p>Between Never and Always Investigation 1: Sessions 3-6 Data: Kids, Cats, and Ads Investigation 1: Sessions 1-4 Investigation 2: Session 1</p>
	<p>M5.E.2.1.2 Identify the mode in a set of data (up to 10 numbers).</p>	<p>Students gain experience with measures of central tendency and dispersion as they find the median of a set of data and discuss the spread and clustering of data. References: Between Never and Always Investigation 1: Sessions 3-6 Data: Kids, Cats, and Ads Investigation 1: Sessions 1-4 Investigation 2: Session 1</p>

ASSESSMENT ANCHOR

M5.E.3 Understand and/or apply basic concepts of probability or outcomes.

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
<p>M5.E.3.1 Predict or determine all possible combinations, outcomes and/or calculate the probability of a simple event. <i>Reference: 2.7.5.E, 2.7.5.H, 2.7.5.J</i></p>	<p>M5.E.3.1.1 Predict or determine why some outcomes are certain, more likely, less likely, equally likely, or impossible (information should be represented by pictographs, circle graphs, bar graphs, charts and/or tables).</p>	<p>Between Never and Always Investigation 1: Sessions 1-7 Investigation 2: Sessions 1-5 Building on Numbers You Know Ten-Minute Math: What Is Likely?</p>
	<p>M5.E.3.1.2 Determine the probability of an outcome (e.g., a coin toss, a roll of a number cube) and express as a fraction without reduction.</p>	<p>Between Never and Always Investigation 1: Sessions 1-7 Investigation 2: Sessions 1-5 Building on Numbers You Know Ten-Minute Math: What Is Likely?</p>
	<p>M5.E.3.1.3 Find all possible combinations using a maximum of 18 total arrangements.</p>	<p>Students use rectangles and arrays to find combinations of factors for a given product. They develop systematic ways to generate a list that includes all possible outcomes in a game. References: Mathematical Thinking at Grade 5 Investigation 1: Sessions 1-3 Investigation 2: Sessions 2-4</p>

Pennsylvania Assessment Anchors	Eligible Content	Investigations in Number, Data, & Space
	(continued)	Between Never and Always Investigation 2: Sessions 1-2 Building on Numbers You Know Investigation 4: Session 1