A Correlation of

to the

Orange County Public Schools

Curriculum, Instruction, Assessment Alignment

GRADES K – 5

T/M-137

INTRODUCTION

This document demonstrates how well ***Investigations in Number, Data, and Space®*** integrates with the Orange County Public Schools Curriculum, Instruction, Assessment Alignment. The citations within this correlation provide Investigation Curriculum Unit titles, and the number of each Investigation and Session or the title of the Focus Time or Choice Time activity correlated to the standards of the OCPS Curriculum, Instruction, Assessment Alignment.

Investigations in Number, Data, and Space® is a Kindergarten through Grade 5 curriculum consisting of a series of Teacher's Editions that focus on major mathematical ideas, content, and pedagogy. Each book emphasizes depth of mathematical thinking over fragmented topics. Students invent strategies and approaches to solving problems and rely less on rote learning stressed in traditional textbooks. The program blends concrete materials with appropriate technology, including calculators in everyday mathematical lessons.

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 cultural, ethnic and 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.

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to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Number Sense, Concepts, and Operations**
Grade Cluster: **K-2**

Benchmark

MA.A.1.1.1: The student associates verbal names, written word names, and standard numerals with the whole numbers less than 1000.

Grade	TASK ANALYSIS The student…
	WHOLE NUMBERS
K	• **counts orally to 100.** **References:** Mathematical Thinking in Kindergarten Investigations 1, 2, 3 Collecting, Counting, and Measuring Investigations 1, 2, 3, 4, 5 Counting Ourselves and Others Investigations 1, 4 How Many in All? Investigations 1, 2, 3, 4 *All units: Appendix: About Classroom Routines: The Counting Jar*
	• **counts to 30 objects, using verbal names and one-to-one correspondence.** **References:** Mathematical Thinking in Kindergarten Investigations 1, 2, 3 Collecting, Counting, and Measuring Investigations 1, 2, 3, 4, 5 Counting Ourselves and Others Investigations 1, 3, 4 How Many in All? Investigations 1, 2, 3, 4 *All units: Appendix: About Classroom Routines: The Counting Jar*

Grade	TASK ANALYSIS The student…
	• **matches numbers presented orally to written numerals to 30.** **References:** Mathematical Thinking in Kindergarten Investigations 1, 2, 3 Collecting, Counting, and Measuring Investigations 1, 2, 3, 4, 5 Counting Ourselves and Others Investigations 1, 3, 4 How Many in All? Investigations 1, 2, 3, 4 *All units: Appendix: About Classroom Routines: The Counting Jar*
	• **reads and writes numerals to 10 or more.** **References:** Mathematical Thinking in Kindergarten Investigations 1, 2, 3 Collecting, Counting, and Measuring Investigations 1, 2, 3, 4, 5 Counting Ourselves and Others Investigations 1, 3, 4 How Many in All? Investigations 1, 2, 3, 4 *All units: Appendix: About Classroom Routines: The Counting Jar*
	• **identifies the number of elements in a set having up to 30 elements.** **References:** Mathematical Thinking in Kindergarten Investigations 1, 2, 3 Collecting, Counting, and Measuring Investigations 1, 2, 3, 4, 5 Counting Ourselves and Others Investigations 1, 3, 4 How Many in All? Investigations 1, 2, 3, 4 *All units: Appendix: About Classroom Routines: The Counting Jar*

Grade	TASK ANALYSIS The student…
	• **identifies number words to 10.** **References:** Mathematical Thinking in Kindergarten Investigation 2: Teacher Notes, pages 36-37
	• **knows that cardinal numbers indicate quantity and ordinal numbers indicate position.** **References:** Mathematical Thinking in Kindergarten Investigation 2: Teacher Note, page 36 Investigation 3: page 45 Collecting, Counting, and Measuring Investigation 1: Teacher Note, page 16 Counting Ourselves and Others Investigation 1: Teacher Note, page 12
1	• **counts, reads, and writes numerals to 100 or more.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 1-6 Investigation 4: Sessions 1-6 Investigation 5: Sessions 1-4 Building Number Sense Investigation 1: Sessions 1-9 Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-9 Investigation 4: Sessions 1-10 Number Games and Story Problems Investigation 2: Sessions 1-13 *All Units: Appendix: About Classroom Routines: Counting*
	• **reads number words to 10.** Grade 1 students using *Investigations in Number, Data, and Space* are encouraged to use a variety of representations of numbers, including objects, pictures, numbers, and words. **References:** Mathematical Thinking in Grade 1 Investigation 2: Sessions 1-6 Investigation 4: Sessions 2-6 Investigation 5: Sessions 2-4

Grade	TASK ANALYSIS **The student…**
	(continued) Building Number Sense Investigation 1: Sessions 5-6, 9 Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-7, 9 Investigation 4: Sessions 1-10 Number Games and Story Problems Investigation 1: Sessions 1-10 Investigation 2: Sessions 1-13 Investigation 3: Sessions 1-13
	• **writes number words to 10.** Grade 1 students using *Investigations in Number, Data, and Space* are encouraged to use a variety of representations of numbers, including objects, pictures, numbers, and words. **References:** Mathematical Thinking in Grade 1 Investigation 2: Sessions 1-6 Investigation 4: Sessions 2-6 Investigation 5: Sessions 2-4 Building Number Sense Investigation 1: Sessions 5-6, 9 Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-7, 9 Investigation 4: Sessions 1-10 Number Games and Story Problems Investigation 1: Sessions 1-10 Investigation 2: Sessions 1-13 Investigation 3: Sessions 1-13
	• **identifies ordinal numbers 1st - 10th or higher.** Grade 1 students using *Investigations in Number, Data, and Space* order numbers by building staircases of interlocking cubes. **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 2-3

Grade	TASK ANALYSIS The student…
	• **uses ordinal numbers to describe the position of an object.** Grade 1 students using *Investigations in Number, Data, and Space* order numbers by building staircases of interlocking cubes. **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 2-3
2	• **reads numerals to 1000.** **References:** Mathematical Thinking at Grade 2 Investigation 1: Session 1 Investigation 2: Sessions 1-6, 8 Investigation 4: Sessions 1, 5 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Sessions 1-11 Investigation 2: Session 10 Investigation 3: Sessions 1-5 Investigation 4: Sessions 2-4 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8 Timelines and Rhythm Patterns Investigation 1: Sessions 1-5
	• **writes numerals to 1000.** **References:** Mathematical Thinking at Grade 2 Investigation 1: Session 1 Investigation 2: Sessions 1-6, 8 Investigation 4: Sessions 1, 5 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Sessions 1-11 Investigation 2: Session 10 Investigation 3: Sessions 1-5 Investigation 4: Sessions 2-4

Grade	TASK ANALYSIS **The student…**
	(continued) Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8 Timelines and Rhythm Patterns Investigation 1: Sessions 1-5
	• **reads number words to 20 or more.** **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 1: Teacher Note, page 83 Coins, Coupons, and Combinations Investigation 1: Session 1: Activity, page 7 Investigation 1: Sessions 4-5: Activity, pages 24-25
	• **writes number words to 20 or more.** **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 1: Teacher Note, page 83 Coins, Coupons, and Combinations Investigation 1: Session 1: Activity, page 7 Investigation 1: Sessions 4-5: Activity, pages 24-25
	• **identifies and uses ordinal numbers 1^{st} - 100^{th}.** While Grade 2 students are not explicitly instructed in the use of ordinal numbers, they are exposed to these expressions as part of the natural course of communication in a mathematics class. They explore the concepts of order and sequence on the Hundred Number Wall Chart and on timelines. **References:** Putting Together and Taking Apart Investigation 2: Sessions 1-4 Investigation 5: Sessions 2-3, 6, 8 Timelines and Rhythm Patterns Investigation 1: Sessions 1-5

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Number Sense, Concepts, and Operations**
Grade Cluster: **K-2**

Benchmark

MA.A.1.1.2: The student understands the relative size of whole numbers between 0 and 1000.

Grade	TASK ANALYSIS **The student…**
	RELATIVE SIZE OF WHOLE NUMBERS
K	• **uses numbers and pictures to describe how many objects are in a set to 10 or more.** **References:** Mathematical Thinking in Kindergarten Investigations 1, 2, 3 Collecting, Counting, and Measuring Investigations 1, 2, 3, 4, 5 Counting Ourselves and Others Investigations 1, 3, 4 How Many in All? Investigations 1, 2, 3, 4 *All units: Appendix: About Classroom Routines: The Counting Jar*
	• **uses language such as *before* or *after* to describe relative position in a sequence of whole numbers on a number line to 10 or more (e.g., 4 is before 5, 5 is after 4).** **References:** Mathematical Thinking in Kindergarten Investigation 2: Teacher Note, page 36 Pattern Trains and Hopscotch Paths Investigation 4: Choice Time: Staircase Patterns Collecting, Counting, and Measuring Investigation 1: Teacher Note, page 16 Counting Ourselves and Others Investigation 1: Teacher Note, page 12 *All units: Appendix: About Classroom Routines: Calendar*

Grade	TASK ANALYSIS The student…
	• **compares two or more sets (to 10 objects in each set) and identifies which is equal to, more than, less than, one more than, or one less than the other.** **References:** Mathematical Thinking in Kindergarten Investigation 4: page 57 Collecting, Counting, and Measuring Investigations 3, 4, 5, 6 How Many in All? Investigation 2: Choice Time: Grab Two Handfuls
	• **orders numbers to 30.** **References:** Collecting, Counting, and Measuring Investigation 5
1	• **orders numbers to 100.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 2-3
	• **compares, identifies, and explains which of two or more sets (up to 100 objects in each set) is equal to, greater than, or less than the other.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 1-3 Building Number Sense Investigation 1: Session 2 Investigation 2: Session 3 Investigation 3: Sessions 1-7
	• **selects symbols to identify a number (0-100) as more than, equal to, or less than (<, =, >) another number.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 1-3 Building Number Sense Investigation 1: Session 2 Investigation 2: Session 3 Investigation 3: Sessions 1-7

Grade	TASK ANALYSIS The student…
2	• **creates a set which contains fewer or more elements than a given set.** **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 1 Investigation 5: Session 3
	• **compares and orders whole numbers to 1000, using concrete materials (e.g., base 10 blocks) or drawings.** **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 1 Investigation 5: Session 3
	• **compares and orders whole numbers to 1000, using number lines.** Grade 2 students using *Investigations in Number, Data, and Space* compare data and sets of objects using words, pictures, and concrete manipulatives. **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 1 Investigation 5: Session 3
	• **selects symbols to identify a number (0-1000) as more than, equal to, or less than (<, =, >) another number.** Grade 2 students using *Investigations in Number, Data, and Space* compare data and sets of objects using words, pictures, and concrete manipulatives. **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 1 Investigation 5: Session 3

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Grade Cluster: **K-2**

Benchmark

MA.A.1.1.3: The student uses objects to represent whole numbers or commonly used fractions and relates these numbers to real-world situations.

Grade	TASK ANALYSIS The student…
	FRACTIONS
K	• **uses sets of concrete materials to represent quantities to 10 or more, given in verbal or written form.** **References:** Mathematical Thinking in Kindergarten Investigations 1, 2, 3 Collecting, Counting, and Measuring Investigations 1, 2, 3, 4, 5 Counting Ourselves and Others Investigations 1, 3, 4 How Many in All? Investigations 1, 2, 3, 4 *All units: Appendix: About Classroom Routines: The Counting Jar*
	• **uses concrete materials to represent fractional parts of a whole (one- half, one-fourth).** **References:** How Many in All? Investigation 1
1	• **determines if models are divided into equal parts.** **References:** Bigger, Taller, Heavier, Smaller Investigation 2: Sessions 2-4: Block Puzzles Building Number Sense Investigation 1: Session 2: Teacher Note, pages 11-12
	• **investigates fractions in real-life situations, using concrete materials (e.g., pies, oranges).** **References:** Bigger, Taller, Heavier, Smaller Investigation 2: Sessions 2-4 Investigation 3: Session 2

Grade	TASK ANALYSIS The student…
	• **uses concrete materials and drawings to represent and explain fractions (one-half, one-fourth, three-fourths) as part of a whole.** **References:** Bigger, Taller, Heavier, Smaller Investigation 2: Sessions 2-4 Investigation 3: Session 2
	• **uses concrete materials and drawings to represent and explain fractions (one-half, one-fourth, three-fourths) as part of a set.** **References:** Building Number Sense Investigation 1: Session 2 Teacher Note, page2 11-12
2	• **compares, illustrates, and explains halves, thirds, fourths, and eighths as part of a whole, using concrete materials or drawings.** **References:** Shapes, Halves, and Symmetry Investigation 3: Sessions 1-8
	• **identifies a fraction that is part of a whole.** **References:** Shapes, Halves, and Symmetry Investigation 3: Sessions 1-8
	• **compares fractions in real-life situations, using concrete materials.** **References:** Shapes, Halves, and Symmetry Investigation 3: Sessions 1-8
	• **explains, orally and in writing, that the total of equivalent fractional parts equals one whole (e.g., 8/8 = 1).** **References:** Shapes, Halves, and Symmetry Investigation 3: Sessions 1-8
	• **compares, illustrates, and explains halves, thirds, fourths, and eighths as part of a set/group, using concrete materials or drawings.** **References:** Shapes, Halves, and Symmetry Investigation 3: Sessions 1-8
	• **identifies a fraction as part of a set/group.** **References:** Shapes, Halves, and Symmetry Investigation 3: Sessions 1-8

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Benchmark

MA.A.1.1.4: The student understands that whole numbers can be represented in a variety of equivalent forms.

Grade	TASK ANALYSIS **The student…**
	EQUIVALENT FORMS
K	• **represents equivalent forms of the same number to 10 or more through the use of concrete materials (e.g., using unifix cubes, 5 can be represented as 1 + 4, 2 + 3, 0 + 5 or 5 pennies equals 1 nickel).** **References:** Mathematical Thinking in Kindergarten Investigations 1, 2, 3 Collecting, Counting, and Measuring Investigations 1, 2, 3, 4, 5 Counting Ourselves and Others Investigations 1, 3, 4 How Many in All? Investigations 1, 2, 3, 4 *All units: Appendix: About Classroom Routines: The Counting Jar*
1	• **uses concrete materials (including coins) to construct equivalent forms of the same number to 20 or more.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 2-6 Investigation 4: Sessions 1-4, 6 Investigation 5: Sessions 1-6 Building Number Sense Investigation 1: Sessions 3-6, 9 Investigation 2: Sessions 1-2, 4-9 Investigation 3: Sessions 1-9 Investigation 4: Sessions 1-5, 7-9 Quilt Squares and Block Towns Investigation 1: Sessions 2-10

Grade	TASK ANALYSIS The student…
	(continued) Bigger, Taller, Heavier, Smaller Investigation 2: Sessions 1-7 Number Games and Story Problems Investigation 1: Sessions 6-9 Investigation 2: Sessions 3-5, 9-12 Investigation 3: Sessions 3-5, 9
	• **develops pictorial representations (diagrams) to express equivalent forms of the same number to 20 or more.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 1, 4-6 Investigation 4: Sessions 4-6 Investigation 5: Sessions 3-6 Building Number Sense Investigation 1: Sessions 1-9 Investigation 2: Sessions 1-3, 6-9 Investigation 3: Sessions 1-9 Investigation 4: Sessions 1-10 Quilt Squares and Block Towns Investigation 1: Sessions 2-10 Investigation 3: Sessions 6-7 Number Games and Story Problems Investigation 1: Sessions 1-10 Investigation 2: Sessions 1-2. 6-8. 10-13 Investigation 3: Sessions 1-13
	• **creates and records number expressions to represent equivalent forms of the same number to 20 or more (e.g., 16 can be represented as** **4 + 4 + 4 + 4, 10 + 6, 20 - 4).** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 4-6 Investigation 4: Sessions 4, 6 Investigation 5: Sessions 2-6 Building Number Sense Investigation 2: Sessions 1-3, 6-8 Investigation 4: Sessions 1-10 Number Games and Story Problems Investigation 1: Sessions 1-10 Investigation 2: Sessions 1-2, 10-12 Investigation 3: Sessions 1-13

Grade	TASK ANALYSIS The student…
2	• **represents equivalent forms for the same number through the use of concrete materials (including coins), diagrams, and expanded notation (e.g., 25 can be expressed as 2 dimes and 1 nickel or as 2 tens and 5 ones or as 2 ten sticks and 5 single cubes).** **References:** Mathematical Thinking at Grade 2 Investigation 1: Session 1 Investigation 2: Sessions 1-8 Investigation 4: Sessions 1-2, 5 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Sessions 1-11 Investigation 2: Sessions 3, 6-9 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8 How Many Pockets? How Many Teeth? Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-2 *All Units: Appendix: About Classroom Routines: Today's Number*

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Subject Area: **Mathematics**
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Grade Cluster: **K-2**

Benchmark

MA.A.2.1.1: The student understands and applies the concepts of counting (by 2s, 3s, 5s, 10s, 25s, 50s), grouping, and place value with whole numbers between 0 and 100.

Grade	TASK ANALYSIS The student…
	COUNTING AND PLACE VALUE
K	• **counts orally, with teacher direction, to 100 by 2s, 5s, and 10s, using a hundred chart or concrete materials.** **References:** Mathematical Thinking in Kindergarten Investigation 2: Teacher Note, page 36 Collecting, Counting, and Measuring Investigation 1: Teacher Note, page 16 Counting Ourselves and Others Investigation 1 Teacher Note, page 12 Activity, pages 19-23 Teacher Note, page 34 Dialogue Box, page 35 How Many in All? Investigation 1: Teacher Note, page 26
	• **forms sets to count by 2s, 5s, and 10s, using concrete materials or pictures.** **References:** Mathematical Thinking in Kindergarten Investigation 2: Teacher Note, page 36 Collecting, Counting, and Measuring Investigation 1: Teacher Note, page 16

Grade	TASK ANALYSIS The student…
	Counting Ourselves and Others Investigation 1 Teacher Note, page 12 Activity, pages 19-23 Teacher Note, page 34 Dialogue Box, page 35 How Many in All? Investigation 1: Teacher Note, page 26
	• **counts backward from 10 to one.** Kindergarten students using *Investigations in Number, Data, and Space* may count down to solve story problems involving separating. **References:** How Many in All? Investigation 3 *All units: Appendix: About Classroom Routines: Attendance*
1	• **counts orally to 100 by 2s, 5s, and 10s with or without a hundred chart.** **References:** Building Number Sense Investigation 1 Session 2: Teacher Note, page 11 Investigation 3: Session 9 Number Games and Story Problems Investigation 2: Sessions 1-12 *All Units: Appendix: About Classroom Routines: Counting*
	• **counts forward or backward by one, beginning with any number less than 100.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 1-6 Investigation 4: Sessions 1-6 Investigation 5: Sessions 1-4 Building Number Sense Investigation 1: Sessions 1-9 Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-9 Investigation 4: Sessions 1-10 Number Games and Story Problems Investigation 2: Sessions 1-5 *All Units: Appendix: About Classroom Routines: Counting*

Grade	TASK ANALYSIS The student…
	• **counts forward by tens from any number less than 10 using a hundred chart.** **References:** Building Number Sense Investigation 3: Session 9 Number Games and Story Problems Investigation 2: Sessions 9-12 *All Units: Appendix: About Classroom Routines: Counting*
	• **uses concrete materials, pictures, and symbols to show the place-value groupings of numbers to 100.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 4-6 Investigation 4: Sessions 4-6 Building Number Sense Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-9 Investigation 4: Sessions 1-10 Quilt Squares and Block Towns Investigation 1: Sessions 2-10 Investigation 3: Sessions 6-7 Number Games and Story Problems Investigation 2: Sessions 1-8, 10-12 Bigger, Taller, Heavier, Smaller Investigation 2: Sessions 1-7
	• **matches place-value models (e.g., base ten blocks representation) to numerals.** Grade 1 students using *Investigations in Number, Data, and Space* are introduced to place-value concepts as they explore patterns on the Hundred Chart. **References:** Building Number Sense Investigation 2: Session 2 Investigation 3: Sessions 1-2, 9 Number Games and Story Problems Investigation 2: Sessions 6-12

Grade	TASK ANALYSIS The student…
	• **matches a numeral to a place-value description (e.g., what numeral in 59 is in the tens place?).** Grade 1 students using *Investigations in Number, Data, and Space* are introduced to place-value concepts as they explore patterns on the Hundred Chart. **References:** Building Number Sense Investigation 3: Sessions 1-2, 9 Number Games and Story Problems Investigation 2: Sessions 6-9
	• **determines the value of a number written in expanded notation (e.g., 50 + 9 = 59).** Grade 1 students using *Investigations in Number, Data, and Space* are introduced to place-value concepts as they explore patterns on the Hundred Chart. **References:** Building Number Sense Investigation 3: Sessions 1-2, 9 Number Games and Story Problems Investigation 2: Sessions 6-9
	• **finds the place value to 100 (e.g., in 59, what is the place value of 9?).** Grade 1 students using *Investigations in Number, Data, and Space* are introduced to place-value concepts as they explore patterns on the Hundred Chart. **References:** Building Number Sense Investigation 3: Sessions 1-2, 9 Number Games and Story Problems Investigation 2: Sessions 6-9
2	• **counts to 1000 by 2s, 3s, 5s, 10s, 25s, 50s, and 100s, using a variety of ways (e.g., hundred chart, calculator, mental mathematics, paper/ pencil).** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 4: Sessions 1-4 Investigation 5: Sessions 4-5 Coins, Coupons, and Combinations Investigation 2: Sessions 1-10

Grade	TASK ANALYSIS The student…
	• **counts by 10s from any given number less than 1000.** **References:** Mathematical Thinking at Grade 2 Investigation 5: Sessions 4-5 : Activity, page 119 Coins, Coupons, and Combinations Investigation 2: Sessions 4-5
	• **identifies a number that is 10 more or 10 less than a given number.** Grade 2 students using *Investigations in Number, Data, and Space* are encouraged to group objects in sets of ten and count by tens. **References:** Mathematical Thinking at Grade 2 Investigation 5: Sessions 4-5 : Activity, page 119 Coins, Coupons, and Combinations Investigation 2: Sessions 4-5
	• **counts forward or backward by one, beginning with any number less than 1000.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 6, 7 Investigation 4: Sessions 1-5 Investigation 5: Sessions 1-5 Coins, Coupons, and Combinations Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-10 Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6
	• **demonstrates the place-value groupings of numbers to 1000, using concrete materials, pictures, and symbols.** **References:** Coins, Coupons, and Combinations Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6

Grade	TASK ANALYSIS The student…
	• **matches a numeral to a place-value description (e.g., what numeral in 432 is in the tens place?).** **References:** Coins, Coupons, and Combinations Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4
	• **determines the value of a number written in expanded notation (e.g., 300 + 50 + 4 = 354).** Grade 2 students using *Investigations in Number, Data, and Space* learn place-value concepts by studying the structure and patterns of the Hundred Chart. **References:** Coins, Coupons, and Combinations Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6
	• **finds the place value of a digit to 1000 (e.g., in 432, what is the place value of 3?).** Grade 2 students using *Investigations in Number, Data, and Space* learn place-value concepts by studying the structure and patterns of the Hundred Chart. **References:** Coins, Coupons, and Combinations Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4

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Subject Area: **Mathematics**
Strand: **Number Sense, Concepts, and Operations**
Grade Cluster: **K-2**

Benchmark

MA.A.2.1.2: The student uses number patterns and the relationships among counting, grouping, and place value strategies to demonstrate an understanding of the whole number system.

Grade	TASK ANALYSIS The student…
	PLACE VALUE
K	• **knows the relationships between larger numbers and smaller numbers (e.g., on a number line, move to the left for smaller numbers, and move to the right for larger numbers).** **References:** Mathematical Thinking in Kindergarten Investigation 4: page 57 Collecting, Counting, and Measuring Investigations 3, 4, 5, 6 How Many in All? Investigation 2: Choice Time: Grab Two Handfuls
1	• **identifies a number that is 10 more or 10 less than a given number.** **References:** Building Number Sense Investigation 3: Session 9: Extension, page 113 Number Games and Story Problems Investigation 2: Sessions 6-12
	• **uses concrete materials to count and group 11 or more objects into tens and ones (e.g., 2 tens and 3 ones = 23 or 20 + 3).** **References:** Building Number Sense Investigation 3: Sessions 1-2, 9 Number Games and Story Problems Investigation 2: Sessions 6-13

Grade	TASK ANALYSIS The student…
	• **writes numbers from 11 to 99 as standard numerals and as tens and ones.** **References:** Building Number Sense Investigation 3: Sessions 1-2, 9 Number Games and Story Problems Investigation 2: Sessions 6-13
	• **knows that one 10 is equivalent to 10 ones.** **References:** Building Number Sense Investigation 2: Session 2 Investigation 3: Sessions 1-2, 9 Number Games and Story Problems Investigation 2: Sessions 6-13
	• **uses concrete materials and standard numerals to show zero as a place holder.** **References:** Building Number Sense Investigation 2: Session 2 Investigation 3: Sessions 1-2, 9 Number Games and Story Problems Investigation 2: Sessions 6-13
	• **knows the place value of a given digit in whole numbers to 100.** Grade 1 students using Investigations in Number, Data, and Space are introduced to place-value concepts as they explore the Hundred Chart. **References:** Building Number Sense Investigation 3: Sessions 1-2, 9 Number Games and Story Problems Investigation 2: Sessions 6-9
2	• **counts and groups objects into hundreds, tens, and ones.** **References:** Coins, Coupons, and Combinations Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6

Grade	TASK ANALYSIS The student…
	• **relates groups of objects to the corresponding written numeral (e.g., 4 groups of 100, 2 groups of 10, and 6 ones = 426).** **References:** Coins, Coupons, and Combinations Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6
	• **models place value to 100 using concrete materials including use of zero as a place holder.** **References:** Coins, Coupons, and Combinations Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6
	• **explains orally and in writing the use of zero as a place holder.** Grade 2 students using *Investigations in Number, Data, and Space* become familiar with the function of zero as a placeholder as they explore the Hundred Chart. **References:** Coins, Coupons, and Combinations Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6
	• **represents trading 10 tens for 100 and 100 for 10 tens, using concrete materials.** **References:** Coins, Coupons, and Combinations Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6

Grade	TASK ANALYSIS The student…
	• **represents a number that is 100 more or 100 less than a given number, using concrete materials.** Grade 2 students using *Investigations in Number, Data, and Space* become familiar with the magnitude of 100 as they explore the Hundred Chart. **References:** Coins, Coupons, and Combinations Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6
	• **identifies a number that is 100 more or 100 less than a given number.** Grade 2 students using *Investigations in Number, Data, and Space* become familiar with the magnitude of 100 as they explore the Hundred Chart. **References:** Coins, Coupons, and Combinations Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6

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Subject Area: **Mathematics**
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Benchmark

MA.A.3.1.1: The student understands and explains the effects of addition and subtraction on whole numbers, including the inverse (opposite) relationship of the two operations.

Grade	TASK ANALYSIS **The student…**
	ADDITION AND SUBTRACTION
K	• **demonstrates and describes the effect of putting together and taking apart sets with up to 10 objects (e.g., 3 cubes and 4 cubes are 7 cubes).** **References:** Collecting, Counting, and Measuring Investigation 4: Choice Time: Collect 10 Together How Many in All? Investigations 2-4
	• **uses a number line to demonstrate how to count up and count back from a given number.** Kindergarten students using *Investigations in Number, Data, and Space* apply the concept of a number line as they use the Racing Bears game board. **Reference:** How Many in All? Investigation 3

Grade	TASK ANALYSIS The student…
1	• **uses manipulatives, drawings, symbols, and story problems to demonstrate knowledge of the meaning of addition (putting together, increasing).** **References:** Mathematical Thinking in Grade 1 Investigation 2: Sessions 1-6 Investigation 4: Sessions 2-6 Investigation 5: Sessions 2-4 Building Number Sense Investigation 1: Sessions 1-6, 9 Investigation 2: Sessions 1-9 Investigation 4: Sessions 1, 3-10 Number Games and Story Problems Investigation 1: Sessions 1-10 Investigation 2: Sessions 1-8, 10-13 Investigation 3: Sessions 1-13
	• **uses manipulatives, drawings, symbols, and story problems to demonstrate knowledge of the meaning of subtraction (taking away, comparing, finding differences).** **References:** Mathematical Thinking in Grade 1 Investigation 2: Sessions 2-3 Building Number Sense Investigation 2: Sessions 4-5 Investigation 4: Session 2 Number Games and Story Problems Investigation 3: Sessions 2-8, 10-13
	• **uses concrete objects and thinking strategies (count on, doubles, doubles plus one, make 10) to solve basic addition facts to 20.** **References:** Mathematical Thinking in Grade 1 Investigation 2: Sessions 1-6 Investigation 4: Sessions 1-4, 6 Investigation 5: Sessions 2-4 Building Number Sense Investigation 1: Sessions 1-6, 9 Investigation 2: Sessions 1-9 Investigation 4: Sessions 1-10 Number Games and Story Problems Investigation 1: Sessions 1-10 Investigation 2: Sessions 1-8, 10-13 Investigation 3: Sessions 1-13

Grade	TASK ANALYSIS The student…
	• **uses concrete objects and thinking strategies (count back, count up) to solve basic subtraction facts based on sums to 20.** **References:** Mathematical Thinking in Grade 1 Investigation 2: Session 4 Building Number Sense Investigation 4: Session 2 Number Games and Story Problems Investigation 3: Sessions 2-8, 10-13
	• **solves addition and subtraction equations in both horizontal and vertical formats.** **References:** Mathematical Thinking in Grade 1 Investigation 2: Sessions 4-6 Building Number Sense Investigation 2: Sessions 1-2, 6-8 Investigation 3: Sessions 3-4: Choice 4: Exploring Calculators Investigation 4: Sessions 1-2, 6-10 Number Games and Story Problems Investigation 1: Sessions 1-10 Investigation 2: Sessions 1-8, 10-13 Investigation 3: Sessions 1-13
	• **identifies the commutative property of addition (e.g., 2 + 7 = 9, 7 + 2 = 9) in solving problems and basic facts.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Session 4:Teacher Note, page 50 Building Number Sense Investigation 2: Sessions 1-2, 4-9 Number Games and Story Problems Investigation 1: Sessions 4-5, page 21
	• **uses models, concrete materials, or algorithms to solve addition and subtraction problems with two-digit numbers without regrouping (sums to 100).** **References:** Mathematical Thinking in Grade 1 Investigation 5: Session 2 Number Games and Story Problems Investigation 3: Sessions 10-13

Grade	TASK ANALYSIS The student…
2	• **solves addition problems using any strategy (e.g., counting on, number lines, concrete materials).** **References:** Mathematical Thinking at Grade 2 Investigation 1: Session 1 Investigation 2: Sessions 1-5 Session 6: Dialogue Box, page 45 Session 8 Investigation 4: Session 1 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 1: Sessions 1-6 Sessions 8-9: Activity, pages 42-44 Sessions 10-11 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8
	• **creates a number sentence that represents the commutative property of addition (4 + 5 = 5 + 4).** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6: Dialogue Box, page 45 Coins, Coupons, and Combinations Investigation 1: Session 1
	• **knows and applies the identity property (zero) for addition (5 + 0 = 5,** **0 + 3 = 3).** **References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 2-3 Session 6: Dialogue Box, page 45 Coins, Coupons, and Combinations Investigation 1: Session 11

Grade	TASK ANALYSIS The student…
	• **predicts the relative size of solutions in addition problems (the sum of 8 + 7 will be in the range of 10 to 20).** **References:** Coins, Coupons, and Combinations Investigation 1 Session 7 Sessions 8-9: Choice 1: Close to 20, p. 41 Investigation 2: Session 10 Investigation 3: Session 1
	• **adds two-digit numbers with regrouping, using pictures and concrete materials.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 1, 6 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 1: Sessions 7, 10 Investigation 2: Sessions 3, 10 Investigation 3: Sessions 1-2, 4-5 Investigation 4: Session 5 Putting Together and Taking Apart Investigation 1: Sessions 1, 3-6 Investigation 2: Sessions 1-4, 7 Investigation 3: Sessions 1, 3-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 2-6, 8
	• **adds two-digit numbers without regrouping, using an algorithm.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 1, 6 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 1: Sessions 7, 10 Investigation 2: Sessions 3, 10 Investigation 3: Sessions 1-2, 4-5 Investigation 4: Session 5 Putting Together and Taking Apart Investigation 1: Sessions 1, 3-6 Investigation 2: Sessions 1-4, 7 Investigation 3: Sessions 1, 3-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 2-6, 8

Grade	TASK ANALYSIS The student…
	• **adds two-digit numbers with regrouping, using an algorithm.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 1, 6 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 1: Sessions 7, 10 Investigation 2: Sessions 3, 10 Investigation 3: Sessions 1-2, 4-5 Investigation 4: Session 5 Putting Together and Taking Apart Investigation 1: Sessions 1, 3-6 Investigation 2: Sessions 1-4, 7 Investigation 3: Sessions 1, 3-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 2-6, 8
	• **uses estimation strategies to check if a solution is reasonable when solving addition problems. (MA.A. 4.1.1)** **References:** Coins, Coupons, and Combinations Investigation 1 Session 7 Sessions 8-9: Choice 1: Close to 20, p. 41 Investigation 2: Session 10 Investigation 3: Session 1
	• **recalls from memory addition facts to 20.** **References:** Mathematical Thinking at Grade 2 Investigation 1: Session 1 Investigation 2: Sessions 1-5 Session 6: Dialogue Box, page 45 Session 8 Investigation 4: Session 1 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 1: Sessions 1-6 Sessions 8-9: Activity, pages 42-44 Sessions 10-11

Grade	TASK ANALYSIS The student…
	(continued) Putting Together and Taking Apart Investigation 1: Sessions 1, 3-6 Investigation 2: Sessions 1-4, 7 Investigation 3: Sessions 1, 3-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 2-6, 8
	• **demonstrates multiplication as repeated addition, using manipulatives, drawings, and arrays.** Grade 2 students using *Investigations in Number, Data, and Space* study, practice, and apply the preliminary concepts of skip counting and grouping. **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 1: Teacher Note, page 82 Shapes, Halves, and Symmetry Investigation 2: Session 3: Dialogue Box, page 60 Investigation 2: Sessions 4-5: Activity, page63 Investigation 2: Session 6 Coins, Coupons, and Combinations Investigation 2: Sessions 1-5, 10
	• **recognizes multiplication as repeated addition in real-world problems.** Grade 2 students using *Investigations in Number, Data, and Space* study, practice, and apply the preliminary concepts of skip counting and grouping. **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 1: Teacher Note, page 82 Coins, Coupons, and Combinations Investigation 2: Sessions 4-5, 10
	• **solves subtraction problems using any strategy (e.g., number lines, concrete materials, counting on).** **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 1 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 3: Sessions 3-5

Grade	TASK ANALYSIS The student…
	(continued) Putting Together and Taking Apart Investigation 1: Sessions 2-6 Investigation 2: Sessions 3-7 Investigation 3: Sessions 1-5 • Investigation 5: Sessions 1-3, 7-8
	• **predicts the relative size of solution in subtraction problems (e.g., the difference of 20-7 will be in the range of 10 to 20).** **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 1 Coins, Coupons, and Combinations Investigation 1 Session 7 Sessions 8-9: Choice 1: Close to 20, p. 41 Investigation 2: Session 10 Investigation 3: Session 3
	• **identifies a number sentence that represents the inverse operation of a given number sentence (e.g., 4 + 6 = 10; 10 – 6 = 4, fact families).** **References:** Mathematical Thinking at Grade 2 Investigation 5: Session 3, page 115 Putting Together and Taking Apart Investigation 1: Session 1 Teacher Notes, pages 13-14 and 15-16 Dialogue Box, page 18 Investigation 2 Sessions 3-4: Dialogue Box, page 65 Investigation 3: Sessions 1-5 Investigation 5: Sessions 7-8

Grade	TASK ANALYSIS The student…
	• **subtracts two-digit numbers without regrouping, using concrete materials (base ten blocks) and pictures.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 1, 6 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 1: Sessions 7 Investigation 3: Sessions 3-5 Putting Together and Taking Apart Investigation 1: Sessions 2-6 Investigation 3: Sessions 1-5 Investigation 5: Sessions 1, 7
	• **subtracts two-digit numbers with regrouping, using concrete materials and pictures.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 1, 6 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 1: Sessions 7 Investigation 3: Sessions 3-5 Putting Together and Taking Apart Investigation 1: Sessions 2-6 Investigation 3: Sessions 1-5 Investigation 5: Sessions 1, 7
	• **subtracts two-digit numbers without regrouping, using an algorithm.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 1, 6 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 1: Sessions 7 Investigation 3: Sessions 3-5 Putting Together and Taking Apart Investigation 1: Sessions 2-6 Investigation 3: Sessions 1-5 Investigation 5: Sessions 1, 7

Grade	TASK ANALYSIS The student…
	• **subtracts two-digit numbers with regrouping, using an algorithm.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 1, 6 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 1: Sessions 7 Investigation 3: Sessions 3-5 Putting Together and Taking Apart Investigation 1: Sessions 2-6 Investigation 3: Sessions 1-5 Investigation 5: Sessions 1, 7
	• **uses estimation strategies to check if a solution is reasonable when solving subtraction problems. (MA.A. 4.1.1)** **Reference:** Coins, Coupons, and Combinations Investigation 1: Session 7
	• **recalls subtraction facts with a minuend (the quantity from which another number is to be subtracted) no greater than 20.** **References:** Mathematical Thinking at Grade 2 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 3: Sessions 3-5 Putting Together and Taking Apart Investigation 1: Sessions 2-6 Investigation 2: Sessions 3-7 Investigation 3: Sessions 1-5 Investigation 5: Sessions 1-3, 7-8
	• **demonstrates division as repeated subtraction, using manipulatives or drawings.** Students study, practice, and apply the preliminary concepts of skip counting and grouping. **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 1: Teacher Note, page 82 Coins, Coupons, and Combinations Investigation 2: Sessions 1-5, 10

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Number Sense, Concepts, and Operations**
Grade Cluster: **K-2**

Benchmark

MA.A.3.1.2: The student selects the appropriate operation to solve specific problems involving addition and subtraction of whole numbers.

Grade	TASK ANALYSIS **The student…**
	PROBLEM SOLVING WITH ADDITION AND SUBTRACTION
K	• **creates and acts out number stories, using objects.** **References:** How Many in All? Investigations 3-4
	• **explores a variety of strategies for solving number problems (e.g., pictures, tally marks, concrete materials).** **References:** Collecting, Counting, and Measuring Investigation 4: Choice Time: Collect 10 Together How Many in All? Investigations 2-4
1	• **uses concrete objects to solve addition or subtraction number/story problems.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 4-6 Investigation 4: Sessions 4-6 Building Number Sense Investigation 2: Sessions 1-2, 6-9 Investigation 4: Sessions 1-5, 7-10 Number Games and Story Problems Investigation 1: Sessions 1-3, 6, 10 Investigation 2: Sessions 2, 10-13 Investigation 3: Sessions 1-13

Grade	TASK ANALYSIS The student…
	• **explains thinking when solving number/story problems.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 4-6 Investigation 4: Sessions 4-6 Building Number Sense Investigation 2: Sessions 1-2, 6-9 Investigation 4: Sessions 1-5, 7-10 Number Games and Story Problems Investigation 1: Sessions 1-10 Investigation 2: Sessions 1-13 Investigation 3: Sessions 1-13
	• **formulates number sentences related to given addition and subtraction situations.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 4-6 Investigation 4: Sessions 4-6 Building Number Sense Investigation 2: Sessions 1-2, 6-9 Investigation 4: Sessions 1-5, 7-10 Number Games and Story Problems Investigation 1: Sessions 1-10 Investigation 2: Sessions 1-13 Investigation 3: Sessions 1-13

Grade	TASK ANALYSIS The student…
	• **composes, solves, and explains number/story problems.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 4-6 Investigation 4: Sessions 4-6 Building Number Sense Investigation 2: Sessions 1-2, 6-9 Investigation 4: Sessions 1-5, 7-10 Number Games and Story Problems Investigation 1: Sessions 1-10 Investigation 2: Sessions 1-13 Investigation 3: Sessions 1-13
2	• **chooses appropriate operation to solve a problem.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 1-3, 8 Investigation 4: Sessions 1, 5 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Sessions 1-11 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5 Shapes, Halves, and Symmetry Investigation 3: Sessions 7-8 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8
	• **solves problems involving addition and subtraction, using a variety of strategies.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 1-3, 8 Investigation 4: Sessions 1, 5 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Sessions 1-11 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5

Grade	TASK ANALYSIS **The student…**
	(continued) Shapes, Halves, and Symmetry Investigation 3: Sessions 7-8 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8
	• **explains, orally and in writing, solution strategies.** Students using ***Investigations in Number, Data, and Space*** organize and explain mathematical information orally and in writing throughout the curriculum as they perform the activities in the sessions for each investigation. The Dialogue Box is a feature that appears with many investigations and contains the text of discussions between teachers and students in which the teacher encourages students explain mathematical concepts orally. In one activity, students follow descriptions written by other students to build rectangles, and they write their own descriptions for other students to follow. **Sample References:** Mathematical Thinking at Grade 2 Investigation 4: Session 1 Coins, Coupons, and Combinations Investigation 1: Session 7 Does It Walk, Crawl, or Swim? Investigation 2: Sessions 3-4 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-3 Putting Together and Taking Apart Investigation 1: Sessions 1-2 How Long? How Far? Investigation 2: Sessions 4-5 How Many Pockets? How Many Teeth? Investigation 1: Sessions 2-3 Timelines and Rhythm Patterns Investigation 1: Sessions 1-2

Grade	TASK ANALYSIS The student…
	• **determines and writes number sentences associated with addition and subtraction situations.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 1-3, 8 Investigation 4: Sessions 1, 5 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Sessions 1-11 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5 Shapes, Halves, and Symmetry Investigation 3: Sessions 7-8 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8
	• **creates and demonstrates with manipulatives number stories representing multiplication and division situations.** **References:** Mathematical Thinking at Grade 2 Investigation 4: Sessions 1: Teacher Note, page 82 Shapes, Halves, and Symmetry Investigation 2: Session 3: Dialogue Box, page 60 Investigation 2: Sessions 4-5: Activity, page 63 Investigation 2: Session 6 Coins, Coupons, and Combinations Investigation 2: Sessions 1-5, 10

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: Mathematics
Strand: Number Sense, Concepts, and Operations
Grade Cluster: K-2

Benchmark

MA.A.3.1.3: The student adds and subtracts whole numbers to solve real-world problems, using appropriate methods of computing, such as objects, mental mathematics, paper and pencil, calculator.

Grade	TASK ANALYSIS The student…
	REAL-WORLD PROBLEM SOLVING
K	• **demonstrates an awareness of addition and subtraction in everyday activities using concrete objects, models, drawings, and role playing.** **References:** Collecting, Counting, and Measuring Investigation 4: Choice Time: Collect 10 Together How Many in All? Investigations 2-4 *All Units: Appendix: About Classroom Routines: Attendance*
1	• **uses appropriate method (e.g., concrete objects, mental mathematics, paper and pencil) to solve real-world problems involving addition and subtraction.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 4-6 Investigation 4: Sessions 4, 6 Investigation 5: Sessions 2-4 Building Number Sense Investigation 2: Session 1 Investigation 4: Sessions 1-5, 7-10 Quilt Squares and Block Towns Investigation 3: Sessions 6-7 Number Games and Story Problems Investigation 1: Sessions 6-10 Investigation 2: Session 3 Investigation 3: Sessions 1-13

Grade	TASK ANALYSIS The student…
	• **explores addition, subtraction, and skip counting, using a calculator.** **References:** Mathematical Thinking at Grade 1 Investigation 1: Sessions 2-4 Building Number Sense Investigation 3: Sessions 3-4 Number Games and Story Problems Investigation 2: Sessions 10-12
2	• **selects appropriate method (e.g., concrete objects, mental mathematics, calculator, paper and pencil) to solve real-world problems involving addition and subtraction.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 1-3, 8 Investigation 4: Sessions 1, 5 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Sessions 1-11 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5 Shapes, Halves, and Symmetry Investigation 3: Sessions 7-8 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8

Grade	TASK ANALYSIS The student…
	• **chooses and explains the computing method that is most efficient for varied real-world tasks.** **References:** Mathematical Thinking at Grade 2 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 1: Sessions 7, 10 Investigation 3: Sessions 1-5 Investigation 4: Sessions 2-5 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 3-4, 7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: Mathematics
Strand: **Number Sense, Concepts and Operations**
Grade Cluster: **K-2**

Benchmark

MA.A.4.1.1: The student provides and justifies estimates for real-world quantities.

Grade	TASK ANALYSIS **The student…**
	ESTIMATION
K	• **estimates the number in a set and verifies by counting.** **References:** Mathematical Thinking in Kindergarten Investigation 4 Collecting, Counting, and Measuring Investigations 3, 4, 5, 6 How Many in All? Investigation 2: Choice Time: Grab Two Handfuls *All Units: Appendix: About Classroom Routines: Attendance, Counting Jar*
1	• **uses estimation language (e.g., about, near, closer to, between) and approximation to identify and describe numbers in real-world situations.** **References:** Building Number Sense Investigation 3: Sessions 3-4, 9 Bigger, Taller, Heavier, Smaller Investigation 2: Session 1
	• **justifies and verifies the reasonableness of an estimate by counting.** **References:** Building Number Sense Investigation 3: Sessions 3-4, 9 Bigger, Taller, Heavier, Smaller Investigation 2: Session 1

Grade	TASK ANALYSIS The student…
	• **justifies reasonable estimates when comparing larger or smaller quantities.** **References:** Building Number Sense Investigation 3: Sessions 3-4, 9 Bigger, Taller, Heavier, Smaller Investigation 2: Session 1
	• **estimates reasonable answers to basic facts (e.g., will 9 + 3 be more than 10?).** Students generally do not estimate to determine the reasonableness of the results of their computations; rather, they use multiple strategies to perform computations, and verify that the results are the same. They understand that when two amounts are combined, the result is more than the initial amount; and when two amounts are separated, the result is less than the initial amount. **Sample Reference:** Number Games and Story Problems Investigation 3: Sessions 1-2
2	• **estimates quantities of objects to 50 or more.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Coins, Coupons, and Combinations Investigation 1: Session 7 Investigation 1: Sessions 8-9: Choice 1: Close to 20, p. 41 Investigation 2: Session 10 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-3: Choice Time: Predict and Cover, page 18
	• **explains the strategy used to make the estimation.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Coins, Coupons, and Combinations Investigation 1: Session 7 Investigation 1: Sessions 8-9: Choice 1: Close to 20, p. 41 Investigation 2: Session 10

Grade	TASK ANALYSIS The student…
	• **estimates reasonable solutions for two-digit addition and subtraction problems and explains the strategy used.** **References:** Coins, Coupons, and Combinations Investigation 1: Session 7 Investigation 1: Sessions 8-9: Choice 1: Close to 20, p. 41 Investigation 2: Session 10
	• **identifies and explains reasonable and unreasonable estimates.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Coins, Coupons, and Combinations Investigation 1: Session 7 Investigation 1: Sessions 8-9: Choice 1: Close to 20, p. 41 Investigation 2: Session 10

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: Mathematics
Strand: Number Sense, Concepts, and Operations
Grade Cluster: K-2

Benchmark

MA.A.5.1.1: The student classifies and models numbers as even or odd.

Grade	TASK ANALYSIS The student…
	ODD AND EVEN NUMBERS
K	• **uses concrete objects to explore odd and even numbers to 10.** Kindergarten students using *Investigations in Number, Data, and Space* identify objects which occur in pairs and count using a two-to-one correspondence. **References:** Counting Ourselves and Others Investigation 1 Focus Time: Counting Noses, Counting Eyes, pages 16-24
1	• **uses concrete objects or drawings to build models that show the difference between odd and even numbers.** Although students do not use the specific terms “even” and “odd,” they gain experience with even numbers as they count by twos. **References:** Building Number Sense Investigation 1 Session 2: Teacher Note, page 11 Number Games and Story Problems Investigation 2: Sessions 1-2, 4-8, 10-12
2	• **demonstrates and explains the difference between odd and even sets, using concrete objects and drawings.** Students gain experience with even numbers as they count by twos. **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 2: Teacher Note, page 91 Coins, Coupons, and Combinations Investigation 2: Sessions 1-5

Grade	TASK ANALYSIS The student…
	• **identifies and explains odd and even numbers.** Students gain experience with even numbers as they count by twos. **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 2: Teacher Note, page 91 Coins, Coupons, and Combinations Investigation 2: Sessions 1-5

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Measurement**
Grade Cluster: **K-2**

Benchmarks

MA.B.1.1.1: The student uses and describes basic measurement concepts including length, weight, digital and analog time, temperature, and capacity.

MA.B.1.1.2: The student uses standard customary and metric (centimeter, inch) and nonstandard units, such as links or blocks, in measuring real quantities.

MA.B.2.1.1: The student uses direct (measured) and indirect (not measured) comparisons to order objects according to some measurable characteristics (length, weight).

MA.B.2.1.2: The student understands the need for a uniform unit of measure to communicate in real-world situations.

MA.B.3.1.1: The student uses a variety of strategies, estimates length, widths, time intervals, and money and compares them to actual measurements.

MA.B.4.1.1: The student selects and uses an object to serve as a unit of measure, such as a paper clip, eraser, or marble.

MA.B.4.1.2: The student selects and uses appropriate instruments, such as scales, rulers, clocks, and technology to measure within customary or metric systems.

Grade	TASK ANALYSIS The student…
	LENGTH
K	• **uses objects to demonstrate understanding of long, short, tall, and wide.** **References:** Collecting, Counting, and Measuring Investigations 3, 4 Investigation 5: Dialogue Box, pp. 76-77 How Many In All? Investigation 1

Grade	TASK ANALYSIS The student…
	• **locates the starting point and ending point of a measurement.** **References:** Collecting, Counting, and Measuring Investigations 3 Investigation 5: Dialogue Box, pp. 76-77 How Many In All? Investigation 1
	• **arranges a given set of objects from shortest to longest, using side-by- side comparison.** **Reference:** Collecting, Counting, and Measuring Investigation 5
	• **knows nonstandard measuring tools must touch without gaps (e.g., paper clips, feet, hands, unifix cubes, inch cubes).** **References:** Collecting, Counting, and Measuring Investigations 3, 4 Investigation 5 How Many in All? Investigation 1
	• **counts and records the length of objects, using nonstandard measurement.** **References:** Collecting, Counting, and Measuring Investigations 3, 4 Investigation 5 How Many in All? Investigation 1
	• **compares lengths of objects that cannot be physically compared side-by-side, using nonstandard measuring tools (body, string, links).** **References:** How Many In All? Investigation 1
	• **demonstrates and understands that estimation is a judgment based on logical thinking by determining that an object is longer, shorter, taller, or wider than a given object.** **References:** Collecting, Counting, and Measuring Investigation 3 Investigation 5: Dialogue Box, pp. 76-77 How Many In All? Investigation 1

Grade	TASK ANALYSIS The student…
	• **estimates length and width of classroom objects and verifies the estimation by using nonstandard measuring tools.** **References:** Collecting, Counting, and Measuring Investigation 3 How Many In All? Investigation 1
	• **explores standard units of measurement, using rulers.** Kindergarten students using *Investigations in Number, Data, and Space* use nonstandard units of measurement, including interlocking cubes and craft sticks, to measure and compare lengths of objects. **References:** Collecting, Counting, and Measuring Investigations 3 How Many In All? Investigation 1
1	• **differentiates between nonstandard and standard units of measure.** **References:** Building Number Sense Investigation 3: Sessions 3-4 Quilt Squares and Block Towns Investigation 3: Sessions 6-7 Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5
	• **selects appropriate unit of measure (inch, foot, yard, centimeter, meter) and tool (tape measure, ruler, yardstick, meter stick).** **References:** Building Number Sense Investigation 3: Sessions 3-4 Quilt Squares and Block Towns Investigation 3: Sessions 6-7 Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5

Grade	TASK ANALYSIS The student…
	• **demonstrates ability to measure by using appropriate alignment of ruler and object.** Grade 1 students using *Investigations in Number, Data, and Space* measure and compare lengths using nonstandard and standard units, including hands, feet, and interlocking cubes. **References:** Bigger, Taller, Heavier, Smaller Investigation 3: Sessions 1-5
	• **reports and records measurement of an object using appropriate unit of measure (to the nearest inch or centimeter).** Grade 1 students using *Investigations in Number, Data, and Space* measure and compare lengths using nonstandard and standard units, including hands, feet, and interlocking cubes. **References:** Bigger, Taller, Heavier, Smaller Investigation 3: Sessions 1-5
	• **compares measured (nonstandard and standard) and non-measured objects, ordering them according to their length.** **References:** Quilt Squares and Block Towns Investigation 3: Sessions 6-7 Bigger, Taller, Heavier, Smaller Investigation 3: Sessions 1-5
	• **estimates length, using nonstandard and standard units of measure.** Grade 1 students using *Investigations in Number, Data, and Space* measure and compare lengths using nonstandard and standard units, including hands, feet, and interlocking cubes. They estimate lengths which are between whole units. **References:** Bigger, Taller, Heavier, Smaller Investigation 3: Sessions 1-5
2	• **selects and measures objects, using nonstandard units and records.** **References:** Shapes, Halves, and Symmetry Investigation 1 Sessions 2-3: Choice 2, pages 19-21 Sessions 6-8 How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-8

Grade	TASK ANALYSIS The student…
	• **explains the need for a uniform unit of measure in real-world situations.** **References:** Shapes, Halves, and Symmetry Investigation 1 Sessions 2-3: Choice 2, pages 19-21 Sessions 6-8 How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-8 Timelines and Rhythm Patterns Investigation 1: Sessions 4-6 *All Units: Appendix: About Classroom Routines: Time and Time Again*
	• **reads the scale of measurement on measurement tool (to the nearest ½ inch, inch, foot, yard, centimeter, meter).**
	• **measures and records lengths of objects using customary and metric units (inch, foot, centimeter, meter).** Students explore linear measurement using direct and indirect comparison, nonstandard units, and *GeoLogo* software. They construct, compare, and measure simple paths in both on-computer and off-computer activities. **References:** How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 4-5
	• **compares and orders objects according to their lengths, measured in customary and metric units.** Students explore linear measurement using direct and indirect comparison, nonstandard units, and *GeoLogo* software. They construct, compare, and measure simple paths in both on-computer and off-computer activities. **References:** How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 4-5
	• **estimates distances, using nonstandard units.** **References:** How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 4-5

Grade	TASK ANALYSIS The student…
	• **selects and uses an appropriate nonstandard unit for measuring distance (e.g., footsteps, strides, length of jump rope).** **References:** How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 4-5
	• **selects and uses an appropriate standard unit for measuring distance.** Students explore linear measurement using direct and indirect comparison, nonstandard units, and *GeoLogo* software. They construct, compare, and measure simple paths in both on-computer and off-computer activities. **References:** How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 4-5
	• **estimates distances in feet, yards, meters.** Students explore linear measurement using direct and indirect comparison, nonstandard units, and *GeoLogo* software. They construct, compare, and measure simple paths in both on-computer and off-computer activities. **References:** How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 4-5
	• **compares distances, using standard units.** Students explore linear measurement using direct and indirect comparison, nonstandard units, and *GeoLogo* software. They construct, compare, and measure simple paths in both on-computer and off-computer activities. **References:** How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 4-5

Grade	TASK ANALYSIS The student…
	WEIGHT
K	• **understands that a balance and a scale are tools to measure weight.** Students using *Investigations in Number, Data, and Space* explore concepts of weight comparison and measurement beginning in Grade 1, where they lift and balance familiar objects to develop a sense of weight, and use a balance to compare weights. **Grade 1 References:** Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6
	• **uses a balance to define terms such as heavy, light, equal to, or balanced.** Students using *Investigations in Number, Data, and Space* explore concepts of weight comparison and measurement beginning in Grade 1, where they lift and balance familiar objects to develop a sense of weight, and use a balance to compare weights. **Grade 1 References:** Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6
	• **compares weights of different objects, using a balance (heavier or lighter).** Students using *Investigations in Number, Data, and Space* explore concepts of weight comparison and measurement beginning in Grade 1, where they lift and balance familiar objects to develop a sense of weight, and use a balance to compare weights. **Grade 1 References:** Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6
	• **arranges a given set of objects from lightest to heaviest/heaviest to lightest, using a balance.** Students using *Investigations in Number, Data, and Space* explore concepts of weight comparison and measurement beginning in Grade 1, where they lift and balance familiar objects to develop a sense of weight, and use a balance to compare weights. **Grade 1 References:** Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6

Grade	TASK ANALYSIS The student…
1	• **selects appropriate tool (balance or scale) to weigh a given object.** **References:** Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6
	• **explores examples of grams, kilograms, ounces, and pounds.** Grade 1 students using *Investigations in Number, Data, and Space* use nonstandard units to measure and compare weights. **References:** Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6
	• **demonstrates the ability to weigh an object on a scale, using nonstandard (e.g., paper clips, unifix cubes,) and standard units.** **References:** Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6
	• **communicates weight of an object, using appropriate terms (grams, kilograms, ounces, pounds).** Grade 1 students using *Investigations in Number, Data, and Space* use nonstandard units to measure and compare weights. **References:** Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6
	• **compares and orders the weight of objects, using nonstandard and standard units.** **References:** Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6
	• **estimates weight, using nonstandard and standard units.** **References:** Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6
2	• **selects, measures, and records the weight of an object, using nonstandard units.** Grade 2 students using ***Investigations in Number, Data, and Space*** do not specifically study weight. In the Grade 1 curriculum, students lift and balance familiar objects to develop a sense of weight, and use a balance to compare weights. In the Grade 3 curriculum, students learn to weigh objects with a pan balance.

Grade	TASK ANALYSIS The student…
	• **compares and orders objects according to their weight, using nonstandard units.** Grade 2 students using ***Investigations in Number, Data, and Space*** do not specifically study weight. In the Grade 1 curriculum, students lift and balance familiar objects to develop a sense of weight, and use a balance to compare weights. In the Grade 3 curriculum, students learn to weigh objects with a pan balance.
	• **explains the need for a uniform unit to measure weight in real-world situations.** Grade 2 students using ***Investigations in Number, Data, and Space*** do not specifically study weight. In the Grade 1 curriculum, students lift and balance familiar objects to develop a sense of weight, and use a balance to compare weights. In the Grade 3 curriculum, students learn to weigh objects with a pan balance.
	• **weighs objects, using customary and metric units.** Grade 2 students using ***Investigations in Number, Data, and Space*** do not specifically study weight. In the Grade 1 curriculum, students lift and balance familiar objects to develop a sense of weight, and use a balance to compare weights. In the Grade 3 curriculum, students learn to weigh objects with a pan balance.
	• **selects appropriate units of measurement.** Grade 2 students use nonstandard units. **References:** Shapes, Halves, and Symmetry Investigation 1 Sessions 2-3: Choice 2, pages 19-21 Sessions 6-8 How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-8
	• **reads and records measuring units (number scale) on a variety of scales.** Grade 2 students use nonstandard units. **References:** Shapes, Halves, and Symmetry Investigation 1 Sessions 2-3: Choice 2, pages 19-21 Sessions 6-8 How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-8

Grade	TASK ANALYSIS The student…
	TIME
K	• **classifies events, objects, or symbols associated with day and night.** Kindergarten students using *Investigations in Number, Data, and Space* use a calendar to explore concepts of time. **References:** Mathematical Thinking in Kindergarten Investigation 3 *All units: Appendix: About Classroom Routines: Calendar*
	• **sequences events using pictures and verbal or written retellings (vocabulary to include morning, afternoon, evening, yesterday, today, and tomorrow).** **References:** Mathematical Thinking in Kindergarten Investigation 3 *All units: Appendix: About Classroom Routines: Calendar*
	• **compares two daily activities to determine which takes more or less time.** Kindergarten students using *Investigations in Number, Data, and Space* use a calendar to explore concepts of time. **References:** Mathematical Thinking in Kindergarten Investigation 3 *All units: Appendix: About Classroom Routines: Calendar*
	• **understands that a calendar is a tool used to measure days, weeks, and months.** **References:** Mathematical Thinking in Kindergarten Investigation 3 *All units: Appendix: About Classroom Routines: Calendar*
	• **finds a specific day of the week on the calendar.** **References:** Mathematical Thinking in Kindergarten Investigation 3 *All units: Appendix: About Classroom Routines: Calendar*

Grade	TASK ANALYSIS The student…
	• **understands that analog and digital clocks are tools used to measure time.** Kindergarten students using *Investigations in Number, Data, and Space* use a calendar to explore concepts of time. **References:** Mathematical Thinking in Kindergarten Investigation 3 *All units: Appendix: About Classroom Routines: Calendar*
	• **recognizes the placement of numerals on a clock.** Kindergarten students using *Investigations in Number, Data, and Space* use a calendar to explore concepts of time. **References:** Mathematical Thinking in Kindergarten Investigation 3 *All units: Appendix: About Classroom Routines: Calendar*
	• **labels a clock face with numerals.** Kindergarten students using *Investigations in Number, Data, and Space* use a calendar to explore concepts of time. **References:** Mathematical Thinking in Kindergarten Investigation 3 *All units: Appendix: About Classroom Routines: Calendar*
	• **identifies the hour hand on a clock.** Kindergarten students using *Investigations in Number, Data, and Space* use a calendar to explore concepts of time. **References:** Mathematical Thinking in Kindergarten Investigation 3 *All units: Appendix: About Classroom Routines: Calendar*
	• **identifies time to the hour on an analog or digital clock.** Kindergarten students using *Investigations in Number, Data, and Space* use a calendar to explore concepts of time. **References:** Mathematical Thinking in Kindergarten Investigation 3 *All units: Appendix: About Classroom Routines: Calendar*

Grade	TASK ANALYSIS The student…
1	• **lists days of the week and months of the year in order.** **References:** Survey Questions and Secret Rules Investigation 3: Sessions 1-3 *All units: About Classroom Routines: Understanding Time and Changes*
	• **labels calendar with month, days of the week, and dates.** **References:** Survey Questions and Secret Rules Investigation 3: Sessions 1-3 *All units: About Classroom Routines: Understanding Time and Changes*
	• **locates a date on the calendar.** **References:** Survey Questions and Secret Rules Investigation 3: Sessions 1-3 *All units: About Classroom Routines: Understanding Time and Changes*
	• **identifies the minute hand on a clock.** Time concepts taught in the Grade 1 series include calendar features: the cyclical nature of the sequence of months and dates, units of time and relationships among them, birthday data, and problem solving. **References:** Survey Questions and Secret Rules Investigation 3: Sessions 1-3 *All units: About Classroom Routines: Understanding Time and Changes*
	• **knows directional movement of hour and minute hands.** Time concepts taught in the Grade 1 series include calendar features: the cyclical nature of the sequence of months and dates, units of time and relationships among them, birthday data, and problem solving. **References:** Survey Questions and Secret Rules Investigation 3: Sessions 1-3 *All units: About Classroom Routines: Understanding Time and Changes*
	• **counts by 5s.** **References:** Number Games and Story Problems Investigation 2: Sessions 9-12

Grade	TASK ANALYSIS The student…
	• **relates counting by 5s to five-minute intervals on a clock.** Time concepts taught in the Grade 1 series include calendar features: the cyclical nature of the sequence of months and dates, units of time and relationships among them, birthday data, and problem solving. **References:** Survey Questions and Secret Rules Investigation 3: Sessions 1-3 *All units: About Classroom Routines: Understanding Time and Changes*
	• **knows the position of hour and minute hands to show time on the hour and half-hour.** Time concepts taught in the Grade 1 series include calendar features: the cyclical nature of the sequence of months and dates, units of time and relationships among them, birthday data, and problem solving. **References:** Survey Questions and Secret Rules Investigation 3: Sessions 1-3 *All units: About Classroom Routines: Understanding Time and Changes*
	• **observes time to the hour and half-hour shown on a digital clock and represents the same time on an analog clock.** Time concepts taught in the Grade 1 series include calendar features: the cyclical nature of the sequence of months and dates, units of time and relationships among them, birthday data, and problem solving. **References:** Survey Questions and Secret Rules Investigation 3: Sessions 1-3 *All units: About Classroom Routines: Understanding Time and Changes*
	• **reads analog and digital time to the hour and half-hour.** Time concepts taught in the Grade 1 series include calendar features: the cyclical nature of the sequence of months and dates, units of time and relationships among them, birthday data, and problem solving. **References:** Survey Questions and Secret Rules Investigation 3: Sessions 1-3 *All units: About Classroom Routines: Understanding Time and Changes*
	• **writes analog and digital time to the hour and half-hour.** Time concepts taught in the Grade 1 series include calendar features: the cyclical nature of the sequence of months and dates, units of time and relationships among them, birthday data, and problem solving. **References:**

Grade	TASK ANALYSIS The student…
	Survey Questions and Secret Rules Investigation 3: Sessions 1-3 *All units: About Classroom Routines: Understanding Time and Changes*
	• **estimates, selects the appropriate instrument (calendar, clock), and measures the passage of time, using before or after; yesterday, today, or tomorrow; day or night; morning, afternoon, or evening; hour or half-hour.** **References:** Survey Questions and Secret Rules Investigation 3: Sessions 1-3 *All units: About Classroom Routines: Understanding Time and Changes*
2	• **explains the need for a uniform unit of measure in real-world situations.** Grade 2 students use nonstandard units. **References:** Shapes, Halves, and Symmetry Investigation 1 Sessions 2-3: Choice 2, pages 19-21 Sessions 6-8 How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-8
	• **estimates how long a task, will take, using minutes, half-hour, and hour.** **References:** Timelines and Rhythm Patterns Investigation 1: Sessions 4-6 *All Units: Appendix: About Classroom Routines: Time and Time Again*
	• **compares estimated time to actual time used to complete a task.** **References:** Timelines and Rhythm Patterns Investigation 1: Sessions 4-6 *All Units: Appendix: About Classroom Routines: Time and Time Again*
	• **knows the position of the hour and minute hands to show time to ¼ hour (15 minute intervals).** **References:** Timelines and Rhythm Patterns Investigation 1: Sessions 4-6 *All Units: Appendix: About Classroom Routines: Time and Time Again*

Grade	TASK ANALYSIS The student…
	• **reads analog and digital time to ¼ hour.** **References:** Timelines and Rhythm Patterns Investigation 1: Sessions 4-6 *All Units: Appendix: About Classroom Routines: Time and Time Again*
	• **writes analog and digital time to ¼ hour.** **References:** Timelines and Rhythm Patterns Investigation 1: Sessions 4-6 *All Units: Appendix: About Classroom Routines: Time and Time Again*
	• **uses terms "quarter after," "half past," "quarter to."** **References:** Timelines and Rhythm Patterns Investigation 1: Sessions 4-6 *All Units: Appendix: About Classroom Routines: Time and Time Again*
	• **knows the position of the hour and minute hands to show time to five- minute intervals.** **References:** Timelines and Rhythm Patterns Investigation 1: Sessions 4-6 *All Units: Appendix: About Classroom Routines: Time and Time Again*
	• **reads analog and digital time to five-minute intervals.** **References:** Timelines and Rhythm Patterns Investigation 1: Sessions 4-6 *All Units: Appendix: About Classroom Routines: Time and Time Again*
	• **determines one hour before and one hour after any hour on a clock.** **References:** Timelines and Rhythm Patterns Investigation 1: Sessions 4-6 *All Units: Appendix: About Classroom Routines: Time and Time Again*

Grade	TASK ANALYSIS The student…
	• **locates a date and identifies the day of the week on a calendar.** The Appendix: About Classroom Routines, which appears in every text in the *Investigations in Number, Data, and Space* series for Grade 2, includes a feature entitled, Time and Time Again. This section describes time-related activities which students can do on a daily basis, including discussion of the daily schedule at school each day, identification of relevant clock times and durations, the setting of a timer to go off at specified intervals, the development of a schedule of important times at home, comparison of important times in different students' days, descriptions of types of clocks students have in their homes, and the creation of a timeline of a student's life, called a Life Line. Time-related topics covered in the investigations in the series include sequencing events in time, comparing durations of time within a day, representing events in time, and interpreting traditional representations of time. **References:** Timelines and Rhythm Patterns Investigation 1: Sessions 1-6
	TEMPERATURE
K	• **understands concepts of hot and cold by touch.** Kindergarten students using *Investigations in Number, Data, and Space* have an opportunity to explore concepts of temperature as they identify seasons of the year by how living things change. **Reference:** Collecting, Counting, and Measuring Investigation 1: Focus Time Follow Up, page 9
	• **recognizes that a thermometer measures temperature.** Kindergarten students using *Investigations in Number, Data, and Space* have an opportunity to explore concepts of temperature as they identify seasons of the year by how living things change. **Reference:** Collecting, Counting, and Measuring Investigation 1: Focus Time Follow Up, page 9
	• **indicates that a long line of red on a thermometer denotes hot and a short line denotes cold.** Kindergarten students using *Investigations in Number, Data, and Space* have an opportunity to explore concepts of temperature as they identify seasons of the year by how living things change. **Reference:** Collecting, Counting, and Measuring Investigation 1: Focus Time Follow Up, page 9

Grade	TASK ANALYSIS The student…
1	• **reads temperature to the nearest number, expressed in degrees on a thermometer.** There are no specific references to measuring temperatures in degrees on a thermometer in the first grade series. In the *Appendix: About Classroom Routines: Understanding Time and Changes*, students collect and display weather data.
	• **investigates various types of thermometers (digital, non-digital) .** There are no specific references to the use of thermometers to measure temperature in the first grade series. In the *Appendix: About Classroom Routines: Understanding Time and Changes*, students collect and display weather data.
2	• **identifies a Fahrenheit thermometer and a Celsius thermometer.** There are no specific references to reading thermometers in either Fahrenheit or Celsius scales in the second grade series.
	• **uses a Fahrenheit thermometer to measure temperature to the nearest number, expressed in degrees.** There are no specific references to reading thermometers in either Fahrenheit or Celsius scales in the second grade series.
	• **uses a Celsius thermometer to measure temperature to the nearest number, expressed in degrees.** There are no specific references to reading thermometers in either Fahrenheit or Celsius scales in the second grade series.
	CAPACITY
K	• **uses containers to demonstrate full, empty, more than, less than, or equal.** Kindergarten students using *Investigations in Number, Data, and Space* begin to explore the concept of volume as they combine smaller three-dimensional shapes to form larger solid objects. **Reference:** Making Shapes and Building Blocks Investigation 4: Choice Time: Build a Block
	• **explores how the same amount of matter (liquid or solid) looks in various shaped containers.** Kindergarten students using *Investigations in Number, Data, and Space* begin to explore the concept of volume as they combine smaller three-dimensional shapes to form larger solid objects. **Reference:** Making Shapes and Building Blocks Investigation 4: Choice Time: Build a Block

Grade	TASK ANALYSIS The student…
1	• **differentiates between standard (e.g., ounce, cup, pint, quart) and nonstandard (e.g., scoops, handfuls) measurements of capacity.** **References:** Building Number Sense Investigation 3: Sessions 3-4 Bigger, Taller, Heavier, Smaller Investigation 2: Sessions 1-7
	• **matches appropriate measuring tool to the task.** **References:** Building Number Sense Investigation 3: Sessions 3-4 Bigger, Taller, Heavier, Smaller Investigation 2: Sessions 1-7
	• **applies appropriate measuring strategies to material (e.g., measure liquid on level surface: fill to line; dry measure: fill to top and level off).** **References:** Building Number Sense Investigation 3: Sessions 3-4 Bigger, Taller, Heavier, Smaller Investigation 2: Sessions 1-7
2	• **understands that ounces, cups, pints, quarts, gallons, milliliters, and liters, are units used to measure capacity.** Students assemble structures with Geoblocks, using multiple arrangements of three-dimensional shapes to make a three-dimensional whole. They explore spatial relationships and use logical reasoning as they use interlocking cubes to construct rectangular prisms with given dimensions. **References:** Shapes, Halves, and Symmetry Investigation 1 Sessions 2-3: Choice 2, pages 19-21 Sessions 6-8

Grade	TASK ANALYSIS The student…
	• **determines whether the capacity of an object is closer to ounces, cups, pints, quarts, gallons, milliliters, or liters.** Students assemble structures with Geoblocks, using multiple arrangements of three-dimensional shapes to make a three-dimensional whole. They explore spatial relationships and use logical reasoning as they use interlocking cubes to construct rectangular prisms with given dimensions. **References:** Shapes, Halves, and Symmetry Investigation 1 Sessions 2-3: Choice 2, pages 19-21 Sessions 6-8
	• **communicates orally and in writing the capacity of an object, using ounces, cups, pints, quarts, gallons, milliliters, or liters.** Students assemble structures with Geoblocks, using multiple arrangements of three-dimensional shapes to make a three-dimensional whole. They explore spatial relationships and use logical reasoning as they use interlocking cubes to construct rectangular prisms with given dimensions. **References:** Shapes, Halves, and Symmetry Investigation 1 Sessions 2-3: Choice 2, pages 19-21 Sessions 6-8
	MONEY
K	• **identifies coins by name (penny, nickel, dime, and quarter).** **Reference:** Counting Ourselves and Others Investigation 2: Choice Time: page 50

Grade	TASK ANALYSIS The student…
	• **knows the value of a penny (1¢), nickel (5¢), dime (10¢), and quarter (25¢).** **Reference:** Counting Ourselves and Others Investigation 2: Choice Time: page 50
	• **compares the value of a penny (1¢), nickel (5¢), dime (10¢), and quarter (25¢).** **Reference:** Counting Ourselves and Others Investigation 2: Choice Time: page 50
1	• **identifies penny, nickel, dime, quarter, and half-dollar.** **References:** Number Games and Story Problems Investigation 2 Session 3 Sessions 4-5: Choice Time: Collect 25¢ Together
	• **knows the value of penny (1¢), nickel (5¢), dime (10¢), quarter (25¢), and half-dollar (50¢).** **References:** Number Games and Story Problems Investigation 2 Session 3 Sessions 4-5: Choice Time: Collect 25¢ Together
	• **compares the values of a penny, nickel, dime, quarter, and half-dollar.** **References:** Number Games and Story Problems Investigation 2 Session 3 Sessions 4-5: Choice Time: Collect 25¢ Together
	• **counts and trades coins to 25¢.** **References:** Number Games and Story Problems Investigation 2 Session 3 Sessions 4-5: Choice Time: Collect 25¢ Together

Grade	TASK ANALYSIS The student…
2	• **counts to 100 by 5s, 10s, and 25s.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 4: Sessions 1-4 Investigation 5: Sessions 4-5 Coins, Coupons, and Combinations Investigation 2: Sessions 1-10
	• **identifies a dollar bill and a dollar coin.** **References:** Mathematical Thinking at Grade 2 Investigation 4, Session 2 Coins, Coupons, and Combinations Investigation 2, Sessions 6-9 Putting Together and Taking Apart Investigation 2, Sessions 5-6 Investigation 4, Sessions 3-4
	• **counts groups of like coins to $1.00.** **References:** Mathematical Thinking at Grade 2 Investigation 4, Session 2 Coins, Coupons, and Combinations Investigation 2, Sessions 6-9 Putting Together and Taking Apart Investigation 2, Sessions 5-6 Investigation 4, Sessions 3-4
	• **counts groups of mixed coins to $1.00.** **References:** Mathematical Thinking at Grade 2 Investigation 4, Session 2 Coins, Coupons, and Combinations Investigation 2, Sessions 6-9 Putting Together and Taking Apart Investigation 2, Sessions 5-6 Investigation 4, Sessions 3-4

Grade	TASK ANALYSIS The student…
	• **counts on to make change to $1.00.** **References:** Mathematical Thinking at Grade 2 Investigation 4, Session 2 Coins, Coupons, and Combinations Investigation 2, Sessions 6-9 Putting Together and Taking Apart Investigation 2, Sessions 5-6 Investigation 4, Sessions 3-4

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: Mathematics
Strand: Geometry and Spatial Sense
Grade Cluster: K-2

Benchmarks

MA.C.1.1.1: The student understands and describes the characteristics of basic two- and three- dimensional shapes.

MA.C.3.1.1: The student uses real-life experiences and physical materials to describe, classify, compare, and sort geometric figures, including squares, rectangles, triangles, circles, cubes, rectangular solids, spheres, pyramids, cylinders, and prisms, according to the number of faces, edges, bases, and corners.

Grade	TASK ANALYSIS The student…
	GEOMETRIC FIGURES
K	• **identifies two-dimensional shapes as circles, triangles, squares, or rectangles.** **References:** Mathematical Thinking in Kindergarten Investigation 1 Choice Time, pages 14-15 Teacher Note, page 22 Dialogue Box, page 23 Making Shapes and Building Blocks Investigations 1, 2, 3, 4, 5 *Shapes* Teacher Tutorial, pages 117-154
	• **describes similarities and differences between two-dimensional shapes (number of sides, straight lines, curves, number of corners).** **References:** Mathematical Thinking in Kindergarten Investigation 1 Choice Time, pages 14-15 Teacher Note, page 22 Dialogue Box, page 23 Making Shapes and Building Blocks Investigations 1, 2, 3, 4, 5 *Shapes* Teacher Tutorial, pages 117-154

Grade	TASK ANALYSIS The student…
	• **explores three-dimensional objects (cylinders, spheres, cones, cubes, or pyramids) to determine which can roll, stack, or slide.** **References:** Mathematical Thinking in Kindergarten Investigation 1 Choice Time, pages 16-17 Teacher Note, page 22 Making Shapes and Building Blocks Investigations 3, 4, 5
	• **sorts two-dimensional and three-dimensional objects according to geometric shapes.** **References:** Mathematical Thinking in Kindergarten Investigation 1 Choice Time, pages 14-15, 16-17 Teacher Note, page 22 Dialogue Box, page 23 Making Shapes and Building Blocks Investigations 1, 2, 3, 4, 5 *Shapes* Teacher Tutorial, pages 117-154
	• **recognizes two-dimensional and three-dimensional real-world objects.** **References:** Making Shapes and Building Blocks Investigations 1, 3
1	• **identifies two-dimensional shapes: circle, square, triangle, rectangle, oval, rhombus (diamond).** **References:** Mathematical Thinking in Grade 1 Investigation 1: Sessions 1-4 Building Number Sense Investigation 1: Sessions 5-6 Survey Questions and Secret Rules Investigation 1: Sessions 1-2 Investigation 2: Sessions 3-4 Quilt Squares and Block Towns Investigation 1: Sessions 1-15 Appendix: *Shapes* Teacher Tutorial

Grade	TASK ANALYSIS The student…
	• **identifies and classifies by name three-dimensional shapes (cone, cube, cylinder, sphere, pyramid, rectangular prism) as being capable of rolling, stacking, or sliding.** **References:** Building Number Sense Investigation 1: Sessions 3-4 Quilt Squares and Block Towns Investigation 2: Sessions 1-10 Investigation 3: Sessions 1-5
	• **sorts two-dimensional and three-dimensional real-world objects.** **References:** Survey Questions and Secret Rules Investigation 1: Sessions 3-6 Investigation 2: Sessions 3-4 Quilt Squares and Block Towns Investigation 1: Session 1 Investigation 2: Session 3 Investigation 3: Sessions 3-5 *All Units: Appendix: About Classroom Routines: Exploring Data: Guess My Rule, Guess My Object*
	• **identifies components of two-dimensional and three-dimensional geometric figures (e.g., edges, bases, curves, corners/vertices, sides, faces).** **References:** Mathematical Thinking in Grade 1 Investigation 1: Sessions 1-4 Building Number Sense Investigation 1: Sessions 3-6 Survey Questions and Secret Rules Investigation 1: Sessions 1-6 Investigation 2: Sessions 3-4 Quilt Squares and Block Towns Investigation 1: Sessions 1-15 Investigation 2: Sessions 1-10 Investigation 3: Sessions 1-5 Appendix: *Shapes* Teacher Tutorial

Grade	TASK ANALYSIS The student…
2	• **describes attributes of two-dimensional shapes, using mathematical language (curves, sides, angles).** **References:** Mathematical Thinking at Grade 2 Investigation 1: Sessions 2-3 Investigation 3: Sessions 1-6 Appendix: *Shapes* Teacher Tutorial Shapes, Halves, and Symmetry Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-8 Investigation 4: Sessions 1-7
	• **classifies and compares two-dimensional figures according to their attributes.** **References:** Mathematical Thinking at Grade 2 Investigation 1: Sessions 2-3 Investigation 3: Sessions 1-6 Appendix: *Shapes* Teacher Tutorial Shapes, Halves, and Symmetry Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-8 Investigation 4: Sessions 1-7
	• **observes two-dimensional real-world objects and classifies them by name according to their attributes (e.g., flag is a rectangle).** **References:** Shapes, Halves, and Symmetry Investigation 1: Session 1 Investigation 2: Session 1: Teacher Note, page 50 Investigation 4: Sessions 1-2, page 97 Investigation 4: Session 7

Grade	TASK ANALYSIS The student…
	• **describes attributes of three-dimensional shapes, using mathematical language (bases, faces, vertices, edges, curves).** **References:** Mathematical Thinking at Grade 2 Investigation 1: Sessions 2-3 Investigation 3: Sessions 1-6 Appendix: *Shapes* Teacher Tutorial Shapes, Halves, and Symmetry Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-8 Investigation 4: Sessions 1-7
	• **classifies and compares three-dimensional figures according to their attributes.** **References:** Mathematical Thinking at Grade 2 Investigation 1: Sessions 2-4 Investigation 3: Sessions 1-5 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-3, 6-8 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-2
	• **observes three-dimensional real-world objects and classifies them by name according to their attributes (e.g., can is a cylinder).** Grade 2 students using *Investigations in Number, Data, and Space* identify and classify two-dimensional objects in their classroom environment. **References:** Shapes, Halves, and Symmetry Investigation 1: Session 1
	• **compares and contrasts two-dimensional and three-dimensional real world objects (square and cube, circle and sphere, triangle and pyramid, rectangle and rectangular solid/prism).** **References:** Shapes, Halves, and Symmetry Investigation 1: Session 1 Investigation 1: Sessions 2-3 : Follow-Up, page 21

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Geometry and Spatial Sense**
Grade Cluster: **K-2**

Benchmark

MA.C.2.1.1: The student understands basic concepts of spatial relationships, symmetry, and reflections.

Grade	TASK ANALYSIS **The student…**
	SPATIAL RELATIONSHIPS
K	• **matches objects to outlines of their shapes.** **References:** Making Shapes and Building Blocks Investigations 1, 2, 3, 4, 5 *Shapes* Teacher Tutorial, pp. 117-154
	• **identifies pictures or objects that are identical.** **References:** Mathematical Thinking in Kindergarten Investigation 1 Choice Time, pages 14-15, 16-17 Teacher Note, page 22 Making Shapes and Building Blocks Investigations 1, 2, 3, 4, 5 *Shapes* Teacher Tutorial, pages 117-154
	• **uses concrete materials to make symmetrical figures (e.g., folds paper, observes paint blots, matches corresponding halves of objects or pictures).** Students using *Investigations in Number, Data, and Space* are not formally introduced to the concept of symmetry until Grade 2. Kindergarten students explore preliminary skills, including the manipulation of shapes through physical manipulation, drawing, and computer technology, as they

Grade	TASK ANALYSIS The student…
	(continued) construct murals and create designs and drawings using basic shapes. They are exposed to symmetry as they examine and manipulate geometric shapes and solids. **References:** Mathematical Thinking in Kindergarten Investigation 1: Teacher Note, page 21 Making Shapes and Building Blocks Investigations 1, 2, 3, 4, 5
	• **recognizes symmetry in the environment.** Students using *Investigations in Number, Data, and Space* are not formally introduced to the concept of symmetry until Grade 2. Kindergarten students explore preliminary skills, including the manipulation of shapes through physical manipulation, drawing, and computer technology, as they construct murals and create designs and drawings using basic shapes. They are exposed to symmetry as they examine and manipulate geometric shapes and solids. **References:** Mathematical Thinking in Kindergarten Investigation 1: Teacher Note, page 21 Making Shapes and Building Blocks Investigations 1, 2, 3, 4, 5
	• **uses manipulatives to demonstrate understanding of spatial relationships (in, out, above, below, top, bottom, middle).** **References:** Making Shapes and Building Blocks Investigations 2, 4 *Shapes* Teacher Tutorial: pages 117-154
	• **identifies left and right hand.** Kindergarten students using *Investigations in Number, Data, and Space* explore parts of the body that come in pairs, including hands. They move shapes left and right on the computer. **References:** Counting Ourselves and Others Investigation 1 Making Shapes and Building Blocks Investigation 2 *Shapes* Teacher Tutorial: pages 117-154

Grade	TASK ANALYSIS The student…
1	• **identifies figures divided symmetrically.** Students using *Investigations in Number, Data, and Space* are not formally introduced to the concept of symmetry until Grade 2. Grade 1 students explore preliminary skills, including the manipulation of shapes through physical manipulation, drawing, and computer technology, as they construct murals and create designs and drawings using basic shapes. They are exposed to symmetry as they examine and manipulate geometric shapes and solids. **References:** Mathematical Thinking at Grade 1 Investigation 1: Sessions 1-4
	• **draws lines of symmetry.** Students using *Investigations in Number, Data, and Space* are not formally introduced to the concept of symmetry until Grade 2. Grade 1 students explore preliminary skills, including the manipulation of shapes through physical manipulation, drawing, and computer technology, as they construct murals and create designs and drawings using basic shapes. They are exposed to symmetry as they examine and manipulate geometric shapes and solids. **References:** Mathematical Thinking at Grade 1 Investigation 1: Sessions 1-4
	• **uses concrete materials to construct the reflection of a given shape.** **References:** Quilt Squares and Block Towns Investigation 1: Sessions 3-6: Teacher Note, page 28 *Shapes* Teacher Tutorial, page 160
	• **knows that congruent figures have the same size and shape.** Grade 1 students using *Investigations in Number, Data, and Space* gain experience with congruent figures as they use pattern blocks to solve Block Puzzles and use *Shapes* software to duplicate shapes and create patterns. **References:** Quilt Squares and Block Towns Investigation 1: Sessions 2-10, 13-15 Appendix: *Shapes* Tutorial Bigger, Taller, Heavier, Smaller Investigation 2: Sessions 2-4, page 45

Grade	TASK ANALYSIS The student…
	• **identifies congruent figures.** Grade 1 students using *Investigations in Number, Data, and Space* gain experience with congruent figures as they use pattern blocks to solve Block Puzzles and use *Shapes* software to duplicate shapes and create patterns. **References:** Quilt Squares and Block Towns Investigation 1: Sessions 2-10, 13-15 Appendix: *Shapes* Tutorial Bigger, Taller, Heavier, Smaller Investigation 2: Sessions 2-4, page 45
2	• **describes and justifies symmetry in two-dimensional shapes.** **References:** Mathematical Thinking at Grade 2 Appendix: *Shapes* Teacher Tutorial Shapes, Halves, and Symmetry Investigation 4: Sessions 1-7
	• **determines lines of symmetry of two-dimensional shapes.** **References:** Shapes, Halves, and Symmetry Investigation 4: Sessions 1-7
	• **identifies two figures as being the same size and shape regardless of position.** **References:** Shapes, Halves, and Symmetry Investigation 3: Sessions 3-5
	• **explains how two figures are congruent (same size and shape).** **References:** Shapes, Halves, and Symmetry Investigation 3: Sessions 3-5
	• **identifies shapes that can be combined or separated (e.g., a rectangle can be separated into two triangles).** **References:** Mathematical Thinking at Grade 2 Investigation 3: Sessions 1-4, 6 Appendix: *Shapes* Teacher Tutorial Shapes, Halves, and Symmetry Investigation 1: Sessions 2-8 Investigation 2: Sessions 3-6 Investigation 3: Sessions 1-8 Investigation 4: Sessions 1-7

Grade	TASK ANALYSIS The student…
	• **predicts, records, and justifies the reflection of a simple two-dimensional shape.** **References:** Mathematical Thinking at Grade 2 Appendix: *Shapes* Teacher Tutorial

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Geometry and Spatial Sense**
Grade Cluster: **K-2**

Benchmark

MA.C.2.1.2: The student uses objects to perform geometric transformations, including flips, slides, and turns.

Grade	TASK ANALYSIS The student…
	TRANSFORMATIONS
K	• **follows directions to move or place an object in relation to another (e.g., next to, to the right of).** **References:** Making Shapes and Building Blocks Investigations 2, 3, 4 *Shapes* Teacher Tutorial: pages 117-154
	• **explores slides, flips, and turns, using two-dimensional and three-dimensional concrete objects.** **References:** Making Shapes and Building Blocks Investigation 2 Investigation 3 Choice Time: The Shape of Things on the Computer Dialogue Box, pages 58-59 Investigation 4 *Shapes* Teacher Tutorial: pages 117-154
1	• **demonstrates slides, flips, and turns through manipulation of two-dimensional and three-dimensional objects.** **References:** Quilt Squares and Block Towns Investigation 1: Sessions 3-6, 8-10, 13-15 Investigation 3: Sessions 6-7 Appendix: *Shapes* Tutorial

Grade	TASK ANALYSIS The student…
2	• **demonstrates and differentiates slides, flips, and turns of figures, using concrete materials.** Students use computer programs, including *Shapes* and *Geo-Logo*, to identify and demonstrate slides, flips, and turns. **References:** Mathematical Thinking at Grade 2 Appendix: *Shapes* Teacher Tutorial How Long? How Far? Investigation 2 Sessions 2-8 Ongoing Excursion: *Geo-Logo*: Shapes and Pictures

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Geometry and Spatial Sense**
Grade Cluster: **K-2**

Benchmark

MA.C.3.1.2: The student plots and identifies positive whole numbers on a number line.

Grade	TASK ANALYSIS The Student…
	NUMBER LINES AND GRIDS
K	• **locates known and unknown numbers on a number line from 0 to 10 (e.g., find what number you are on if you move two numbers forward or three numbers backward).** Kindergarten students using *Investigations in Number, Data, and Space* apply the concept of a number line as they use the Racing Bears game board. **Reference:** How Many in All? Investigation 3
1	• **locates and explains known and unknown numbers on a number line from 0 to 100 or more.** Students use a coordinate grid and specify directions and distances to locate objects on the grid. They create timelines to represent events taking place over the course of a year. They use counting strips and hundred charts. **References**: Building Number Sense Investigation 3: Sessions 1-2, 5-7 Survey Questions and Secret Rules Investigation 3: Session 3 Quilt Squares and Block Towns Investigation 3: Sessions 6-7 Number Games and Story Problems Investigation 2: Sessions 6-8

Grade	TASK ANALYSIS The Student…
2	• **locates and explains written numbers 0 to 1000 or more on a number line.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 1, pages 23-24 Investigation 4: Sessions 3-4 How Many Pockets? How Many Teeth? Investigation 1: Session 1 Investigation 2: Sessions 1-5 Timelines and Rhythm Patterns Investigation 1: Sessions 1-6
	• **names and explains unknown numbers 0 to 1000 or more marked on a number line.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 1, pages 23-24 Investigation 4: Sessions 3-4 How Many Pockets? How Many Teeth? Investigation 1: Session 1 Investigation 2: Sessions 1-5 Timelines and Rhythm Patterns Investigation 1: Sessions 1-6
	• **relates a vertical number line (to 10) to a horizontal number line (to 10).** **References**: Mathematical Thinking at Grade 2 Appendix: *Shapes* Teacher Tutorial How Long? How Far? Investigation 2 Sessions 2-8 Ongoing Excursion: *Geo-Logo*: Shapes and Pictures Investigation 3: Sessions 6-7 Number Games and Story Problems Investigation 2: Sessions 6-8

Grade	TASK ANALYSIS The Student…
	• **identifies the location of an object on a 5x5 coordinate grid by moving over/horizontally and, then, up/vertically.** **References**: Mathematical Thinking at Grade 2 Appendix: *Shapes* Teacher Tutorial How Long? How Far? Investigation 2 Sessions 2-8 Ongoing Excursion: *Geo-Logo*: Shapes and Pictures Investigation 3: Sessions 6-7 Number Games and Story Problems Investigation 2: Sessions 6-8

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Algebraic Thinking**
Grade Cluster: **K-2**

Benchmarks

MA.D.1.1.1: The student describes a wide variety of classification schemes and patterns related to physical characteristics and sensory attributes, such as rhythm, sound, shapes, colors, numbers, similar objects, similar events.

MA.D.1.1.2: The student recognizes, extends, generalizes, and creates a wide variety of patterns and relationships using symbols and objects.

Grade	TASK ANALYSIS The student…
	PATTERNS
K	• **sorts and classifies objects by color, shape, size, or kind.** **References:** Mathematical Thinking in Kindergarten Investigation 1: Teacher Note, page 22 Counting Ourselves and Others Investigation 1: Choice Time: Self-Portraits Investigation 2 Making Shapes and Building Blocks Investigations 1, 2, 3, 4, 5
	• **identifies objects that do not belong to a particular group (e.g., blue lid in set of red lids).** **References:** Counting Ourselves and Others Investigation 1: Choice Time: Self-Portraits Investigation 2 Making Shapes and Building Blocks Investigation 4: Activity, page 66
	• **identifies and extends simple patterns of sounds, physical movement, and concrete objects.** **References:** Pattern Trains and Hopscotch Paths Investigations 1, 2, 3, 4 *All units: Appendix: About Classroom Routines: Patterns on the Pocket Chart*

Grade	TASK ANALYSIS The Student…
	• **creates a pattern using sounds, physical movement, and concrete objects.** **References:** Pattern Trains and Hopscotch Paths Investigations 1, 2, 3, 4 *All units: Appendix: About Classroom Routines: Patterns on the Pocket Chart*
	• **transfers patterns from one medium to another (e.g., actions or sounds to concrete objects or written form).** **References:** Mathematical Thinking in Kindergarten Investigation 3 Pattern Trains and Hopscotch Paths Investigations 1, 2, 3, 4 *All units: Appendix: About Classroom Routines: Calendar and Patterns on the Pocket Chart*
	• **identifies matching patterns made from concrete objects.** **References:** Pattern Trains and Hopscotch Paths Investigations 1, 2, 3, 4 *All units: Appendix: About Classroom Routines: Patterns on the Pocket Chart*
	• **uses skip counting to complete a number pattern.** **References:** Mathematical Thinking in Kindergarten Investigation 2: Teacher Note, page 36 Collecting, Counting, and Measuring Investigation 1: Teacher Note, page 16 Counting Ourselves and Others Investigation 1 Teacher Note, page 12 Activity, pages 19-23 Teacher Note, page 34 Dialogue Box, page 35 How Many in All? Investigation 1: Teacher Note, page 26

Grade	TASK ANALYSIS The Student…
	• **identifies a missing element in a number pattern up to 10.** **References:** *All units: Appendix: About Classroom Routines: Calendar*
	• **identifies the position of a missing element in a number pattern up to 10.** **References:** *All units: Appendix: About Classroom Routines: Calendar*
1	• **creates a pattern with one attribute (e.g., thick or thin, large or small).** **References:** Mathematical Thinking at Grade 1 Investigation 3: Sessions 1-6 Investigation 4: Sessions 2-3, 5 Building Number Sense Investigation 3: Sessions 1-8 Investigation 4: Session 10: Activity, page 163 Survey Questions and Secret Rules Investigation 3: Sessions 2-3 Quilt Squares and Block Towns Investigation 1: Sessions 13-15 Number Games and Story Problems Investigation 2: Sessions 2, 6-9
	• **predicts and extends existing patterns that are concrete or pictorial.** **References:** Mathematical Thinking at Grade 1 Investigation 3: Sessions 1-6 Investigation 4: Sessions 2-3, 5 Building Number Sense Investigation 3: Sessions 1-8 Investigation 4: Session 10: Activity, page 163 Survey Questions and Secret Rules Investigation 3: Sessions 2-3 Quilt Squares and Block Towns Investigation 1: Sessions 13-15 Number Games and Story Problems Investigation 2: Sessions 2, 6-9

Grade	TASK ANALYSIS The Student…
	• **describes a pattern rule.** **References:** Mathematical Thinking at Grade 1 Investigation 3: Sessions 1-6 Investigation 4: Sessions 2-3, 5 Building Number Sense Investigation 3: Sessions 1-8 Investigation 4: Session 10: Activity, page 163 Survey Questions and Secret Rules Investigation 3: Sessions 2-3 Quilt Squares and Block Towns Investigation 1: Sessions 13-15 Number Games and Story Problems Investigation 2: Sessions 2, 6-9
	• **describes and compares patterns, which have been presented, using a wide variety of materials and attributes (e.g., size, color, shape).** **References:** Mathematical Thinking at Grade 1 Investigation 3: Sessions 1-6 Investigation 4: Sessions 2-3, 5 Building Number Sense Investigation 3: Sessions 1-8 Investigation 4: Session 10: Activity, page 163 Survey Questions and Secret Rules Investigation 3: Sessions 2-3 Quilt Squares and Block Towns Investigation 1: Sessions 13-15 Number Games and Story Problems Investigation 2: Sessions 2, 6-9

Grade	TASK ANALYSIS The Student…
	• **transfers patterns from one medium to another (e.g., concrete object to actions or symbols).** **References:** Mathematical Thinking at Grade 1 Investigation 3: Sessions 1-6 Investigation 4: Sessions 2-3, 5 Building Number Sense Investigation 3: Sessions 1-8 Investigation 4: Session 10: Activity, page 163 Survey Questions and Secret Rules Investigation 3: Sessions 2-3 Quilt Squares and Block Towns Investigation 1: Sessions 13-15 Number Games and Story Problems Investigation 2: Sessions 2, 6-9
	• **explores number patterns, using a hundred chart and calculator.** **References:** Mathematical Thinking at Grade 1 Investigation 1: Sessions 2-4: Teacher Note, pages 20-21 Building Number Sense Investigation 3 Sessions 1-2 Sessions 3-4: Exploring Calculators, pages 95-97 Sessions 5-7 Session 8, page 107 Number Games and Story Problems Investigation 2 Sessions 6-9 Sessions 10-12: Exploring Calculators, pages 91-93
	• **locates patterns of 2s, 5s, and 10s on hundred charts.** **References:** Building Number Sense Investigation 3: Sessions 1-2, 5-7 Investigation 3: Session 8, page 107 Number Games and Story Problems Investigation 2: Sessions 6-9

Grade	TASK ANALYSIS The Student…
	• **identifies and generates patterns in a list of related number pairs based on real-life situations (e.g., T-chart with number of children to number of eyes).** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 4-6 Investigation 4: Sessions 4 Investigation 5: Session 2 Building Number Sense Investigation 2: Sessions 1, 4-5 Number Games and Story Problems Investigation 2: Sessions 1-2
2	• **predicts, extends, and creates patterns with two or more attributes that are concrete or pictorial.** **References:** Mathematical Thinking at Grade 2 Investigation 3: Sessions 1-4, 6 Coins, Coupons, and Combinations Investigation 2: Sessions 1-2, 4-5, 10 Investigation 3: Session 1 Investigation 4: Sessions 1-4 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-8 Investigation 2: Sessions 1, 3 Investigation 4: Sessions 1-7 Putting Together and Taking Apart Investigation 2: Sessions 1-2 Timelines and Rhythm Patterns Investigation 2: Sessions 1-5

Grade	TASK ANALYSIS The Student…
	• **transfers patterns with two or more attributes from one medium to another.** **References:** Mathematical Thinking at Grade 2 Investigation 3: Sessions 1-4, 6 Coins, Coupons, and Combinations Investigation 2: Sessions 1-2, 4-5, 10 Investigation 3: Session 1 Investigation 4: Sessions 1-4 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-8 Investigation 2: Sessions 1, 3 Investigation 4: Sessions 1-7 Putting Together and Taking Apart Investigation 2: Sessions 1-2 Timelines and Rhythm Patterns Investigation 2: Sessions 1-5
	• **uses oral and written language to describe a given pattern and explain its rule.** **References:** Mathematical Thinking at Grade 2 Investigation 3: Sessions 1-4, 6 Coins, Coupons, and Combinations Investigation 2: Sessions 1-2, 4-5, 10 Investigation 3: Session 1 Investigation 4: Sessions 1-4 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-8 Investigation 2: Sessions 1, 3 Investigation 4: Sessions 1-7 Putting Together and Taking Apart Investigation 2: Sessions 1-2 Timelines and Rhythm Patterns Investigation 2: Sessions 1-5

Grade	TASK ANALYSIS The Student…
	• **uses oral and written language to explain that a pattern is a result of repeating an operation (+ 3, + 3, + 3), using a transformation (turning or flipping an object), or making a change to an attribute (changing color or thickness of object).** **References:** Mathematical Thinking at Grade 2 Investigation 3: Sessions 1-4, 6 Coins, Coupons, and Combinations Investigation 2: Sessions 1-2, 4-5, 10 Investigation 3: Session 1 Investigation 4: Sessions 1-4 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-8 Investigation 2: Sessions 1, 3 Investigation 4: Sessions 1-7 Putting Together and Taking Apart Investigation 2: Sessions 1-2 Timelines and Rhythm Patterns Investigation 2: Sessions 1-5
	• **identifies patterns in the real world (e.g., tessellation, patchwork).** **References:** Coins, Coupons, and Combinations Investigation 2: Sessions 1, 10 Shapes, Halves, and Symmetry Investigation 1: Session 1 Investigation 4: Sessions 1-2, 7 Timelines and Rhythm Patterns Investigation 2: Session 1
	• **applies concept of patterns to real-world situations (e.g., spelling patterns, schedules).** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Coins, Coupons, and Combinations Investigation 1: Session 11 Investigation 2: Session 1
	• **predicts, extends, and creates numerical patterns.** **References:** Coins, Coupons, and Combinations Investigation 2: Sessions 1-3, 10 Investigation 4: Session 1 Putting Together and Taking Apart Investigation 2: Sessions 1-2

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Algebraic Thinking**
Grade Cluster: **K-2**

Benchmarks

MA.D.2.1.1: The student understands that geometric symbols (o, í) can be used to represent unknown quantities in expressions, equations, and inequalities.

MA.D.2.1.2: The student uses informal methods to solve real-world problems requiring simple equations that contain one variable.

Grade	TASK ANALYSIS The student…
	SYMBOLIC EXPRESSIONS, INEQUALITIES, AND PROBLEM SOLVING
K	• **uses informal methods (e.g., pictures, concrete materials, and role playing) to solve real-world problems.** **References:** Mathematical Thinking in Kindergarten Investigations 1, 2, 3, 4 Pattern Trains and Hopscotch Paths Investigation 3: Teacher Note, page 63 Collecting, Counting, and Measuring Investigations 1, 2, 3, 4 Counting Ourselves and Others Investigations 1, 2, 3, 4 Making Shapes and Building Blocks Investigations 1, 3 How Many in All? Investigations 1, 3 *All units: Appendix: About Classroom Routines: Attendance, Calendar, Today's Question*
	• **uses one-to-one matching to determine if two groups are equal.** **References:** Collecting, Counting, and Measuring Investigations 3, 4, 5 Counting Ourselves and Others Investigation 3 How Many in All? Investigation 2: Choice Time: Grab Two Handfuls

Grade	TASK ANALYSIS The Student…
	• **substitutes numeral to replace symbol used to represent missing or unknown quantities (e.g., fill in the missing number in 5, 6, □, 8).** Kindergarten students using *Investigations in Number, Data, and Space* use pictures and manipulatives to represent known and unknown quantities in numerical problems as they investigate the operations of addition and subtraction of whole numbers and solve combining and separating problems. **References:** Collecting, Counting, and Measuring Investigation 4 How Many in All? Investigations 2-4 Pattern Trains and Hopscotch Paths Investigation 2 *All units: Appendix: About Classroom Routines: Calendar and Patterns on the Pocket Chart*
1	• **uses concrete objects to solve real-world addition and subtraction problems with one unknown (e.g., there are 28 children in the class and 25 are here today, how many are absent?).** **References:** Mathematical Thinking at Grade 1 Investigation 2: Session 4 Investigation 4: Session 4 Investigation 5: Session 2 Building Number Sense Investigation 2: Sessions 1-2 Investigation 4: Sessions 1-5, 7-10 Number Games and Story Problems Investigation 1: Sessions 6-10 Investigation 2: Session 1 Investigation 3: Sessions 1-13

Grade	TASK ANALYSIS The Student…
	• **knows that an equation is a number sentence stating that two quantities are equal.** **References:** Mathematical Thinking at Grade 1 Investigation 2: Sessions 4-6 Investigation 4: Sessions 4-6 Building Number Sense Investigation 2: Sessions 1-2, 6-9 Investigation 4: Sessions 1-5, 7-10 Number Games and Story Problems Investigation 1: Sessions 1-3, 6, 10 Investigation 2: Sessions 2, 10-13 Investigation 3: Sessions 1-13
	• **uses concrete objects to solve number sentences with equalities and inequalities, using the symbols >, =, < .** **References:** Mathematical Thinking at Grade 1 Investigation 2: Session 4 Investigation 4: Session 4 Building Number Sense Investigation 2: Sessions 1-2, 6-8 Investigation 4: Sessions 1-5, 7-10 Number Games and Story Problems Investigation 1: Sessions 6-10 Investigation 2: Session 1 Investigation 3: Sessions 1-13

Grade	TASK ANALYSIS The Student…
	• **solves addition and subtraction sentences where an unknown number is represented by a geometric shape (2 + ڤ = 9).** Students write number sentences to solve problems with an unknown quantity. **References:** Mathematical Thinking at Grade 1 Investigation 2: Session 4 Investigation 4: Session 4 Building Number Sense Investigation 2: Sessions 1-2, 6-8 Investigation 4: Sessions 1-5, 7-10 Number Games and Story Problems Investigation 1: Sessions 6-10 Investigation 2: Session 1 Investigation 3: Sessions 1-13
2	• **solves a variety of number sentences where the missing number is represented by a geometric shape (ڤ,○).** **References:** Coins, Coupons, and Combinations Investigation 1: Session 6 Putting Together and Taking Apart Investigation 1: Sessions 3-4 Investigation 4: Sessions 1: Teacher Note, page 94 Investigation 4: Session 6
	• **solves a variety of number sentences with equalities and inequalities (>, =, <).** **References:** Coins, Coupons, and Combinations Investigation 1: Sessions 4-6 Investigation 3: Sessions 2-5 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 3-4 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1, 3-4 Investigation 5: Sessions 1-8

Grade	TASK ANALYSIS The Student…
	• **solves real-world problems with one unknown using concrete objects, paper and pencil, calculator, or mental mathematics.** **References:** Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 3-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1, 3-4 Investigation 5: Sessions 1-8
	• **solves word problems using concrete materials.** **References:** Mathematical Thinking at Grade 2 Investigation 4: Sessions 1-5 Coins, Coupons, and Combinations Investigation 1: Session 10 Investigation 2: Sessions 1, 4-9 Investigation 3: Sessions 1-5 Investigation 4: Sessions 5 Putting Together and Taking Apart Investigation 1: Sessions 1-4 Investigation 2: Sessions 5-6

Grade	TASK ANALYSIS The Student…
	• **uses oral and written language to explain strategies used to solve problems.** **References:** Grade 2 students using *Investigations in Number, Data, and Space* use oral and written language to explain thinking about strategies and solutions to mathematical problems throughout the course. For example, a Teacher Note points out the difficulties inherent in relying on "key words" to solve story problems. **Sample References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 2-3 Coins, Coupons, and Combinations Investigation 3: Sessions 4-5: Teacher Note, page 107 Does It Walk, Crawl, or Swim? Investigation 2: Sessions 1-2: Teacher Note, pages 46-47 Shapes, Halves, and Symmetry Investigation 2: Sessions 4-5 Putting Together and Taking Apart Investigation 1: Sessions 5-6 How Long? How Far? Investigation 2: Session 1: Teacher Note, page 51 How Many Pockets? How Many Teeth? Investigation 3: Session 1 Timelines and Rhythm Patterns Investigation 1: Session 3

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Data Analysis and Probability**
Grade Cluster: **K-2**

Benchmark

MA.E.1.1.1: The student displays solutions to problems by generating, collecting, organizing, and analyzing data using simple graphs and charts.

Grade	TASK ANALYSIS The student…
	DATA ANALYSIS
K	• **displays answers to simple questions involving two categories or choices using concrete materials or pictures on a graph or chart (e.g., number of boys and girls, students with/without buttons).** **References:** Mathematical Thinking in Kindergarten Investigation 1 Counting Ourselves and Others Investigations 1, 2, 3, 4 *All Units: Appendix: About Classroom Routines: Attendance*
	• **interprets data exhibited in concrete or pictorial graphs.** **References:** Mathematical Thinking in Kindergarten Investigation 1 Counting Ourselves and Others Investigations 1, 2, 3 *All Units: Appendix: About Classroom Routines: Attendance*
1	• **surveys a small group to collect data involving two categories or choices (e.g., students who are left-handed or right-handed).** **References:** Mathematical Thinking at Grade 1 Investigation 5: Sessions 1-6 Survey Questions and Secret Rules Investigation 1: Session 6 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-5 *All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes*

Grade	TASK ANALYSIS The Student…
	• **records data using concrete materials or pictures.** **References:** Mathematical Thinking at Grade 1 Investigation 5: Sessions 3-6 Survey Questions and Secret Rules Investigation 2: Sessions 1-2, 5-6 Investigation 3: Sessions 1-3 Investigation 4: Sessions 2-5 *All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes*
	• **uses data to construct a simple pictograph or concrete graph.** **References:** Mathematical Thinking at Grade 1 Investigation 5: Sessions 3-6 Survey Questions and Secret Rules Investigation 2: Sessions 1-2, 5-6 Investigation 3: Sessions 1-3 Investigation 4: Sessions 2-5 *All Units: About Classroom Routines: Exploring Data, Understanding Time and Change*
	• **uses mathematical language to read and interpret data on a simple concrete graph, pictograph, or chart.** **References:** Mathematical Thinking at Grade 1 Investigation 5: Sessions 1-6 Survey Questions and Secret Rules Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-5 Bigger, Taller, Heavier, Smaller Investigation 2: Session 1 *All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes*

Grade	TASK ANALYSIS The Student…
2	• **poses questions and collects data to answer questions with two or more categories or choices.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 5: Sessions 1-6 Coins, Coupons, and Combinations Investigation 1: Session 11 Investigation 2: Sessions 2, 4-5, 10 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3 How Many Pockets? How Many Teeth? Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5 Timelines and Rhythm Patterns Investigation 1: Sessions 1-6 *All Units: Appendix: About Classroom Routines: How Many Pockets?*

Grade	TASK ANALYSIS The Student…
	• **records data using pictures, concrete materials, or tally marks.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 5: Sessions 1-6 Coins, Coupons, and Combinations Investigation 1: Session 11 Investigation 2: Sessions 2, 4-5, 10 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3 How Many Pockets? How Many Teeth? Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5 Timelines and Rhythm Patterns Investigation 1: Sessions 1-6
	• **organizes survey information into a simple pictograph, concrete graph, or chart.** **References:** Mathematical Thinking at Grade 2 Investigation 5: Sessions 1-2 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-2 Investigation 4: Sessions 2-3 How Long? How Far? Investigation 2: Sessions 6-8 How Many Pockets? How Many Teeth? Investigation 1: Sessions 2-3 Investigation 2: Sessions 3-6 Investigation 3: Session 5

Grade	TASK ANALYSIS The Student…
	• **uses mathematical language to read and interpret data on a concrete graph, pictograph, or chart.** **References:** Mathematical Thinking at Grade 2 Investigation 5: Sessions 1-2 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-2 Investigation 4: Sessions 2-3 How Long? How Far? Investigation 2: Sessions 6-8 How Many Pockets? How Many Teeth? Investigation 1: Sessions 2-3 Investigation 2: Sessions 3-6 Investigation 3: Session 5

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Data Analysis and Probability**
Grade Cluster: **K-2**

Benchmark

MA.E.1.1.2: The student displays data in a simple model to use the concepts of range, median, and mode.

Grade	TASK ANALYSIS The student…
	RANGE, MEDIAN, AND MODE
K	• **with teacher direction, displays data using concrete materials, pictures, or graphs to show range (lowest to highest or least to most) and mode (most repeated response).** **References:** Mathematical Thinking in Kindergarten Investigation 1 Counting Ourselves and Others Investigations 1, 2, 3 *All Units: Appendix: About Classroom Routines: Attendance*
1	• **uses concrete materials, pictures, or graphs to display data and identify range (lowest to highest or least to most) and mode (most repeated response).** **References:** Mathematical Thinking at Grade 1 Investigation 5: Sessions 1-6 Survey Questions and Secret Rules Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-5 Bigger, Taller, Heavier, Smaller Investigation 2: Session 1 *All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes*

Grade	TASK ANALYSIS The Student…
2	• **identifies range (lowest to highest or least to most), mode (most repeated response), and median (middle number), using concrete materials, pictures, or graphs.** **References:** Students draw conclusions about "typical" tooth-loss data for children of a certain age and apply these conclusions to determine the origin of "mystery" data. **References:** How Many Pockets? How Many Teeth? Investigation 2: Sessions 1-6

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Data Analysis and Probability**
Grade Cluster: **K-2**

Benchmark

MA.E.1.1.3: The student analyzes real-world data by surveying a sample space and predicting the generalization onto a larger population through the use of appropriate technology, including calculators and computers.

Grade	TASK ANALYSIS The student…
	DATA ANALYSIS AND TECHNOLOGY
K	• **makes generalizations from class-collected data (e.g., determines number of pockets on 2 children; predicts how many pockets 4 students will have).** **References:** Mathematical Thinking in Kindergarten Investigation 1 Counting Ourselves and Others Investigations 1, 2, 3, 4 *All Units: Appendix: About Classroom Routines: Attendance*
1	• **using data from a small group, discusses a reasonable prediction for a larger group.** **References:** Mathematical Thinking at Grade 1 Investigation 5: Sessions 3-6 Survey Questions and Secret Rules Investigation 2: Sessions 1-2, 5-6 Investigation 3: Sessions 1-3 Investigation 4: Sessions 2-5 *All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes*

Grade	TASK ANALYSIS The Student…
	• **compares graphing data using appropriate technology.** Students use *Shapes*, a software program which allows students to construct and manipulate geometric shapes, see objects move according to rules they specify, and explore rotation and reflection. **References:** Quilt Squares and Block Towns Investigation 1 Sessions 3-6 Sessions 8-10: Choice 2, pages 36-37 Investigation 1: Sessions 13-15 Investigation 3: Sessions 6-7 Appendix: *Shapes* Teacher Tutorial
2	• **predicts the outcome for a larger population by analyzing data from a smaller group.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Session 11 Investigation 2: Sessions 4-5, 10
	• **uses a calculator to compare data.** **References:** Coins, Coupons, and Combinations Investigation 1: Sessions 7-9 Investigation 2: Sessions 1-3, 10 Putting Together and Taking Apart Investigation 2: Sessions 1-2
	• **constructs a graph, using computer software.** Students use computer software to construct, manipulate, and explore properties of geometric shapes. **References:** Mathematical Thinking at Grade 2 Investigation 3: Sessions 1-2, 6 Appendix: *Shapes* Teacher Tutorial How Long? How Far? Investigation 1: Sessions 2-7 Investigation 2 Sessions 2-8 Ongoing Excursion: *Geo-Logo* Shapes and Pictures Appendix: *Geo-Logo* Tutorial

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Data Analysis and Probability**
Grade Cluster: **K-2**

Benchmarks

MA.E. 2.1.1: The student understands basic concepts of chance and probability.

MA.E. 2.1.2: The student predicts which simple event is more likely, equally likely, or less likely to occur.

Grade	TASK ANALYSIS The student…
	PROBABILITY
K	• **knows if a given event is more likely, or less likely to occur (e.g., could a lion come visit you, will we have school today?).** Students using *Investigations in Number, Data, and Space* are introduced to the concepts of probability in Grade 3. Kindergarten students may predict future events based on collected data, e.g., whether or not all of their sunflower seeds will germinate. **References:** Counting Ourselves and Others Investigation 3: Dialogue Box, pages 74-75
	• **knows if a given event is more likely, less likely, or equally likely to occur (e.g., will we have chicken nuggets or pizza for lunch today?).** Students using *Investigations in Number, Data, and Space* are introduced to the concepts of probability in Grade 3. Kindergarten students may predict future events based on collected data, e.g., whether or not all of their sunflower seeds will germinate. **References:** Counting Ourselves and Others Investigation 3: Dialogue Box, pages 74-75

Grade	TASK ANALYSIS The student…
	• **participates in games or activities dependent upon chance (e.g., using spinners or number cubes).** Students using *Investigations in Number, Data, and Space* are introduced to the concepts of probability in Grade 3. Some Choice Time Activities involve the use of dot or number cubes as a precursor to introducing concepts of probability later in the series. **References:** Pattern Trains and Hopscotch Paths Investigation 2: Choice Time: Add On, pages 36-37 Collecting, Counting, and Measuring Investigation 4: Choice Time: Collect 10 Together, pages 64-65 How Many In All? Investigation 1: Choice Time: Collect 15 Together, pages 17-19
1	• **discusses if a given event is more likely, equally likely, or less likely to occur.** Students are introduced to the concepts of probability in Grade 3. Grade 1 students hypothesize about attendance data on "a most unusual day." **References:** Survey Questions and Secret Rules Investigation 4: Sessions 4-5
2	• **tells if an event is certain or impossible.** **References:** Students are introduced to the concepts of probability in Grade 3. Students in Grade 2 may predict future events based on collected data. For example, they make a hypothesis based on sampling and the representation of a set of "mystery" data. **Reference:** How Many Pockets? How Many Teeth? Investigation 2: Session 6
	• **records results of activities involving chance and makes predictions based upon data (coin flips, spinners).** Students are introduced to the concepts of probability in Grade 3. Students in Grade 2 may predict future events based on collected data. For example, they make a hypothesis based on sampling and the representation of a set of "mystery" data. **Reference:** How Many Pockets? How Many Teeth? Investigation 2: Session 6

Grade	TASK ANALYSIS The student…
	• **predicts if a given event is equally likely, most likely, or least likely to occur (e.g., 1 green, 5 blue, and 8 red tiles in a bag).** **References:** Students are introduced to the concepts of probability in Grade 3. Students in Grade 2 may predict future events based on collected data. For example, they make a hypothesis based on sampling and the representation of a set of "mystery" data. **Reference:** How Many Pockets? How Many Teeth? Investigation 2: Session 6

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Data Analysis and Probability**
Grade Cluster: **K-2**

Benchmarks

MA.E.3.1.1: The student designs a simple experiment to answer a class question, collects appropriate information, and interprets the results using graphical displays of information, such as line graphs, pictographs, and charts.

MA.E.3.1.2: The student decides what information is appropriate and how data can be collected, displayed, and interpreted to answer relevant questions.

Grade	TASK ANALYSIS The student…
	COLLECTING, DISPLAYING AND INTERPRETING DATA
K	• **determines, through class discussions, questions for a simple two-choice survey.** **References:** Mathematical Thinking in Kindergarten Investigation 1 Counting Ourselves and Others Investigations 1, 2, 3
	• **displays information concretely or pictorially.** **References:** Mathematical Thinking in Kindergarten Investigation 1 Counting Ourselves and Others Investigations 1, 2, 3, 4 *All Units: Appendix: About Classroom Routines: Attendance*
1	• **formulates appropriate questions to conduct a class survey with two or more categories or choices.** **References:** Mathematical Thinking at Grade 1 Investigation 5: Sessions 1-6 Survey Questions and Secret Rules Investigation 1: Session 6 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-5 *All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes*

Grade	TASK ANALYSIS The student…
	• **collects, graphically displays, and interprets resulting data (tally charts, pictographs, bar graphs, and tables).** **References:** Mathematical Thinking at Grade 1 Investigation 5: Sessions 1-6 Survey Questions and Secret Rules Investigation 1: Session 6 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-5 *All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes*
2	• **constructs appropriate questions for a survey with two or more categories or choices.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Session 11 Investigation 2: Sessions 4-5, 10 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-3 Investigation 4: Sessions 1-3 How Many Pockets? How Many Teeth? Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-2, 4-5 Investigation 3: Sessions 1-5

Grade	TASK ANALYSIS The student…
	• **collects data for two or more categories and creates a line graph, pictograph, bar graph, or chart.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 5: Sessions 1-6 Coins, Coupons, and Combinations Investigation 1: Session 11 Investigation 2: Sessions 2, 4-5, 10 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3 How Many Pockets? How Many Teeth? Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5 Timelines and Rhythm Patterns Investigation 1: Sessions 1-6
	• **selects appropriate methods to display and interpret information.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 5: Sessions 1-6 Coins, Coupons, and Combinations Investigation 1: Session 11 Investigation 2: Sessions 2, 4-5, 10 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3 How Many Pockets? How Many Teeth? Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5 Timelines and Rhythm Patterns Investigation 1: Sessions 1-6

Grade	TASK ANALYSIS The student…
	• **analyzes and explains, orally or in writing, the results of a survey.** **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Session 11 Investigation 2: Sessions 4-5, 10 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-3 Investigation 4: Sessions 1-3 How Many Pockets? How Many Teeth? Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-2, 4-5 Investigation 3: Sessions 1-5

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment
GRADES 3 – 5

Subject Area: **Mathematics**
Strand: **Number Sense, Concepts, and Operations**
Grade Cluster: **3-5**

Benchmarks

MA.A.1.2.1: The student names whole numbers combining 3-digit numeration (hundreds, tens, ones) and the use of number periods, such as ones, thousands, and millions and associates verbal names, written word names, and standard numerals with whole numbers, commonly used fractions, decimals, and percents.

MA.A.1.2.2: The student understands the relative size of whole numbers, commonly used fractions, decimals, and percents.

MA.A.1.2.3: The student understands concrete and symbolic representations of whole numbers, fractions, decimals, and percents in real-world situations.

MA.A.1.2.4: The student understands that numbers can be represented in a variety of equivalent forms using whole numbers, decimals, fractions, and percents.

MA.A.2.2.1: The student uses place-value concepts of grouping based upon powers of ten (thousandths, hundredths, tenths, ones, tens, hundreds, thousands) within the decimal system.

MA.A.2.2.2: The student recognizes and compares the decimal number system to the structure of other number systems such as the Roman numeral system or bases other than ten.

MA.A.3.2.1: The student understands and explains the effects of addition, subtraction, and multiplication on whole numbers, decimals, and fractions, including mixed numbers, and the effects of division on whole numbers, including the inverse relationship of multiplication and division.

MA.A.3.2.2: The student selects the appropriate operation to solve specific problems involving addition, subtraction, and multiplication of whole numbers, decimals, and fractions, and division of whole numbers.

MA.A.3.2.3: The student adds, subtracts, and multiplies whole numbers, decimals, and fractions, including mixed numbers, and divides whole numbers to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.

MA.A.4.2.1: The student uses and justifies different estimation strategies in a real-world problem situation and determines the reasonableness of results of calculations in a given problem situation.

MA.A.5.2.1: The student understands and applies basic number theory concepts, including primes, composites, factors, and multiples.

MA.D.2.2.2: The student uses informal methods, such as physical models and graphs, to solve real-world problems involving equations and inequalities.

Grade	TASK ANALYSIS The student…
	WHOLE NUMBERS AND ESTIMATION
3	• **reads, writes, and identifies numbers through at least 100,000.** **References:** Mathematical Thinking at Grade 3 Investigation 1: Sessions 1-3 Investigation 4: Session 2 Landmarks in the Hundreds Investigation 2: Sessions 1-3 Investigation 3: Session 1 Ten-Minute Math: Counting Around the Class Flips, Turns, and Area Ten-Minute Math: Broken Calculator Combining and Comparing Investigation 4: Sessions 3-4 Fair Shares Investigation 3: Sessions 1-2 Ten-Minute Math: Broken Calculator
	• **uses language and symbols (>, <, =) to compare the relative size of numbers through at least 100,000.** **References:** Mathematical Thinking at Grade 3 Investigation 3: Sessions 3-4 Flips, Turns, and Area Investigation 1: Session 4 Combining and Comparing Investigation 1: Sessions 1-3 Investigation 4: Sessions 1-2 Investigation 5: Sessions 1-3

Grade	TASK ANALYSIS The student…
	• **compares and orders whole numbers through at least hundred thousands using materials (e.g., base ten blocks, number lines, drawings, numerals).** **References:** Mathematical Thinking at Grade 3 Investigation 3: Sessions 3-4 Flips, Turns, and Area Investigation 1: Session 4 Combining and Comparing Investigation 1: Sessions 1-3 Investigation 4: Sessions 1-2
	• **translates real-world problems into diagrams and models, using whole numbers.** This standard expresses one of the focal points of the *Investigations* series, and is exhibited throughout the course. **Sample References:** Mathematical Thinking at Grade 3 Investigation 3: Sessions 3-4 Things That Come in Groups Investigation 3: Sessions 1-2 Flips, Turns, and Area Ten-Minute Math: Broken Calculator From Paces to Feet Investigation 1: Session 2 Landmarks in the Hundreds Investigation 1: Sessions 1-3 Up and Down the Number Line Investigation 2: Sessions 1-3 Combining and Comparing Investigation 4: Session 1 Turtle Paths Investigation 1: Sessions 3-4 Fair Shares Investigation 3: Session 3 Exploring Solids and Boxes Investigation 4: Session 1

Grade	TASK ANALYSIS The student…
	• **demonstrates understanding of the value of a number through expanded form (e.g., 439 = 400 + 30 + 9).** Grade 3 students using *Investigations in Number, Data, and Space* explore concepts of place value as they construct models using interlocking cubes and investigate patterns on hundred and thousand charts. **References:** Mathematical Thinking at Grade 3 Investigation 1: Sessions 1-3 Landmarks in the Hundreds Investigation 2: Sessions 1-3 Investigation 3: Session 1 Ten-Minute Math: Counting Around the Class Combining and Comparing Investigation 4: Sessions 3-4
	• **identifies the place value of digits in the thousands, ten thousand, and hundred thousands place.** Grade 3 students using *Investigations in Number, Data, and Space* explore concepts of place value as they construct models using interlocking cubes and investigate patterns on hundred and thousand charts. They learn the significance of the decimal point and examine decimal place value in relation to the calculator and problems involving money. 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 Investigation 3: Session 1 Ten-Minute Math: Counting Around the Class Combining and Comparing Investigation 4: Sessions 3-4

Grade	TASK ANALYSIS The student…
	• **adds and subtracts (up to three digits or more) using concrete materials, drawings, symbols, and algorithms.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 1-7 Investigation 3: Sessions 3-4 Investigation 4: Session 1 Ten-Minute Math: Calendar Math 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 Ten-Minute Math: Estimation and Number Sense
	• **demonstrates the inverse relationship of addition and subtraction by writing related fact families.** **References:** 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
	• **writes number sentences for given situations and story problems involving the addition, subtraction, multiplication, and division of whole numbers.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 1-7 Investigation 3: Sessions 3-4 Investigation 4: Sessions 1-2 Things That Come in Groups Investigation 1: Sessions 2-4 Investigation 2: Sessions 3-4 Investigation 4: Sessions 1-4 Investigation 5: Session 2

Grade	TASK ANALYSIS The student…
	(continued) Landmarks in the Hundreds Investigation 1: Sessions 2-3, 6-7 Investigation 2: Sessions 5-6 Up and Down the Number Line Investigation 1: Sessions 6-7 Combining and Comparing Investigation 1: Sessions 1-3 Investigation 3: Session 3 Investigation 4: Session 2
	• **uses tables, charts, and patterns (e.g., hundreds chart, calendar) to determine multiples of whole numbers 1-10.** **References:** Mathematical Thinking at Grade 3 Investigation 1: Sessions 2-3 Investigation 2: Sessions 3-4 Investigation 4: Sessions 1-3 Things That Come in Groups Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5 Investigation 5: Session 1 Ten-Minute Math: Counting Around the Class Landmarks in the Hundreds Investigation 1: Sessions 1-7 Investigation 2: Sessions 1-6 Investigation 3: Session 1 Ten-Minute Math: Counting Around the Class Fair Shares Investigation 2: Sessions 5-6
	• **uses a model (e.g. an array) to determine factors of whole numbers through 100.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 3-4 Investigation 4: Sessions 1-3 Things That Come in Groups Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5 Ten-Minute Math: Counting Around the Class

Grade	TASK ANALYSIS The student…
	(continued) Landmarks in the Hundreds Investigation 1: Sessions 1-7 Investigation 2: Sessions 1-6 Investigation 3: Session 1 Ten-Minute Math: Counting Around the Class
	• **explains and demonstrates the meaning of multiplication using manipulatives, drawings, number sentences, story problems, repeated addition, arrays, and area models.** **References:** 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 Landmarks in the Hundreds Investigation 1: Sessions 1-7 Investigation 2: Sessions 1-6 Ten-Minute Math: Counting Around the Class
	• **solves multiplication facts using various strategies, including the following:** o **modeling with concrete objects or drawings** o **skip counting (e.g., to find 4 x 5, count 5, 10, 15, 20)** o **using doubles and near doubles (e.g., 3 x 8 = (2 x 8) + 8)** o **applying the commutative property of multiplication (e.g., 3 x 7 = 7 x 3)** o **noting and applying patterns in the "fact tables" (e.g., the regularity in the "nines")** o **using the zero property (any number times 0 equals 0) and identity property (any number times one equals that number)** **References:** 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

Grade	TASK ANALYSIS The student…
	(continued) Landmarks in the Hundreds Investigation 1: Sessions 1-7 Investigation 2: Sessions 1-6 Ten-Minute Math: Counting Around the Class
	• **computes fluently (with accuracy and efficiency) basic multiplication facts with products to 100.** **References:** 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 Landmarks in the Hundreds Investigation 1: Sessions 1-7 Investigation 2: Sessions 1-6 Ten-Minute Math: Counting Around the Class
	• **demonstrates the inverse relationship of multiplication and division by writing related fact families.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 3-4 Things That Come in Groups Investigation 1: Session 3: Dialogue Box, page 15 Investigation 4: Sessions 1-4
	• **justifies if a solution is reasonable for the operation implied by the problem (e.g., in an addition problem, the sum is greater than the addends).** **References:** Mathematical Thinking at Grade 3 Investigation 3: Sessions 3-4, page 60 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

Grade	TASK ANALYSIS The student…
	• **uses problem-solving strategies to determine the operation needed to solve one-step problems involving addition and subtraction of whole numbers.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 1-7 Investigation 3: Sessions 3-4 Investigation 4: Sessions 1-2 Ten-Minute Math: Calendar Math 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
	• **solves real-world problems involving addition, subtraction, multiplication, and division of whole numbers using an appropriate method (e.g., concrete materials, paper and pencil, mental mathematics, calculator).** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 5-7 Investigation 4: Session 2 Ten-Minute Math: Calendar Math Things That Come in Groups Investigation 1: Sessions 1-4 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-4 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Sessions 4-6 Up and Down the Number Line Investigation 1: Sessions 1-8 Combining and Comparing Investigation 1: Sessions 1-3 Investigation 3: Sessions 1-3 Investigation 5: Sessions 2-3

Grade	TASK ANALYSIS The student…
	• **chooses the operation that results in a given outcome (e.g., 30 □ 2 □ 2 = 13).** **References:** Up and Down the Number Line Investigation 1: Sessions 3-4, 6-7
	• **explains the reasons for choosing a particular computing method for a particular problem.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 1-7 Investigation 3: Sessions 3-4 Investigation 4: Sessions 1-2 Ten-Minute Math: Calendar Math 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 Landmarks in the Hundreds Investigation 1: Sessions 1-7 Investigation 2: Sessions 1-6 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

Grade	TASK ANALYSIS The student…
	• **computes fluently (with accuracy and efficiency) basic number combinations for multiplication and division.** **References:** 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 Landmarks in the Hundreds Investigation 1: Sessions 1-7 Investigation 2: Sessions 1-6 Ten-Minute Math: Counting Around the Class
	• **solves real-world multiplication problems with whole numbers (two digits by one digit) using concrete materials, drawings, and paper and pencil.** **References:** Things That Come in Groups Investigation 1: Sessions 2-4 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-4 Landmarks in the Hundreds Investigation 2: Sessions 4-6
	• **solves real-world division problems having divisors of one digit and dividends not exceeding two digits, with and without remainders using concrete materials, drawings, and paper and pencil.** **References:** Things That Come in Groups Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-4 Investigation 5: Session 4 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Sessions 4-6

Grade	TASK ANALYSIS The student…
	• **solves problems using non-routine methods (e.g., make a list, act it out).** Grade 3 students using *Investigations in Number, Data, and Space* are given a great deal of freedom to explore mathematical concepts and, in so doing, formulate their own problems and use various approaches to investigate and solve problems. For example, students write their own story problems and number riddles to solve and share. **Sample References:** Mathematical Thinking at Grade 3 Investigation 4: Session 1 Things That Come in Groups Investigation 4: Sessions 3-4 Flips, Turns, and Area Investigation 2: Sessions 2-3 From Paces to Feet Investigation 4: Sessions 1-3 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Up and Down the Number Line Investigation 3: Sessions 1-3 Combining and Comparing Investigation 3: Session 3 Turtle Paths Investigation 3: Sessions 6-7 Fair Shares Investigation 3: Session 3 Exploring Solids and Boxes Investigation 5: Sessions 1-4
	• **uses estimation strategies (e.g., compatible numbers, front-end estimation) to determine a reasonable estimate of a quantity.** **References:** Mathematical Thinking at Grade 3 Investigation 3: Sessions 3-4: Activity, page 60 From Paces to Feet Investigation 1: Sessions 1-6 Ten-Minute Math: Estimation and Number Sense Landmarks in the Hundreds Investigation 2: Sessions 5-6: Extension, page 49 Investigation 3: Sessions 2-3 Up and Down the Number Line Ten-Minute Math: Estimation and Number Sense

Grade	TASK ANALYSIS The student…
	Combining and Comparing Investigation 3: Sessions 1-2 Ten-Minute Math: Estimation and Number Sense Turtle Paths Investigation 2: Sessions 1-2, 4 Exploring Solids and Boxes Investigation 4: Session 1
	• **estimates quantities of objects to 250 or more (e.g., using benchmark/ reference set of fewer objects).** **References:** Mathematical Thinking at Grade 3 Investigation 3: Sessions 3-4: Activity, page 60 From Paces to Feet Ten-Minute Math: Estimation and Number Sense Landmarks in the Hundreds Investigation 2: Sessions 5-6: Extension, page 49 Investigation 3: Sessions 2-3 Exploring Solids and Boxes Investigation 4: Session 1
	• **justifies the choice of estimation strategies in real-world problems.** **References:** Mathematical Thinking at Grade 3 Investigation 3: Sessions 3-4: Activity, page 60 From Paces to Feet Investigation 1: Sessions 1-6 Ten-Minute Math: Estimation and Number Sense Landmarks in the Hundreds Investigation 2: Sessions 5-6: Extension, page 49 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
	• **recognizes numbers and bases other than ten (e.g., Mayan Number System, Roman Numerals).** There are no references to bases other than ten or to other number systems in the Grade 3 course of the *Investigations* series.

Grade	TASK ANALYSIS The student…
	• **compares the symbolic difference between Roman Numerals and the decimal (base ten) number system (e.g., I = 1, V = 5, X = 10, L = 50, C = 100).** There are no references to Roman numerals in the Grade 3 course of the *Investigations* series.
4	• **reads, writes, and identifies whole numbers through millions or more.** Students explore hundreds and thousands, including landmark numbers; they devise and practice grouping and ordering strategies; and they compare, combine, and perform operations on whole numbers through the thousands. **Sample References:** Mathematical Thinking at Grade 4 Investigation 1: Session 1 Arrays and Shares Investigation 1: Sessions 1-3 Landmarks in the Thousands Investigation 4: Sessions 1-3 Different Shapes, Equal Pieces Investigation 1: Sessions 2-4 The Shape of the Data Investigation 2: 5-7 Money, Miles, and Large Numbers Investigation 1: Sessions 1-2 Changes Over Time Investigation 1: Sessions 5-6 Packages and Groups Investigation 2: Sessions 1-3 Sunken Ships and Grid Patterns Investigation 1: Sessions 2-4 Three Out of Four Like Spaghetti Practice Pages 69-81
	• **locates whole numbers on a number line.** Students name and locate points, determine distances, and graph rectangles and patterns on a coordinate grid. **References:** Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9

Grade	TASK ANALYSIS The student…
	• **uses language and symbols (>, <, =) to compare and order whole numbers through millions or more, using concrete materials, number lines, drawings, and numerals.** **References:** Mathematical Thinking at Grade 4 Investigation 1: Session 4 Packages and Groups Investigation 2: Sessions 2-3
	• **translates problems involving whole numbers into diagrams and models.** Problem solving is one of the fundamental components of the *Investigations in Number, Data, and Space* series. Every session of every investigation involves students identifying problems to be solved, and planning, carrying out, and evaluating solution strategies. Many of the investigations are conducted in groups, with students and teacher discussing and evaluating strategies and solutions every step of the way. Both in groups and also independently, students in Grade 4 use diagrams and models to solve problems throughout the course. **Sample References:** Mathematical Thinking at Grade 4 Investigation 1: Session 4 Arrays and Shares Investigation 3: Session 1 Seeing Solids and Silhouettes Investigation 3: Session 1 Landmarks in the Thousands Investigation 2: Sessions 2-4 Different Shapes, Equal Pieces Investigation 2: Session 4 The Shape of the Data Investigation 2: Sessions 6-7 Money, Miles, and Large Numbers Investigation 3: Sessions 2-4 Changes Over Time Investigation 1: Sessions 5-6 Packages and Groups Investigation 2: Sessions 2-3 Sunken Ships and Grid Patterns Investigation 2: Sessions 6-7 Three out of Four Like Spaghetti Investigation 2: Session 1

Grade	TASK ANALYSIS The student…
	• **identifies the place value of a given digit in a whole number to millions.** **References:** 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 1, Sessions 1-8 Investigation 2, Sessions 1-2 Investigation 3, Sessions 1-4
	• **interprets and writes whole numbers expressed in expanded notation.** Grade 4 students using *Investigations in Number, Data, and Space* explore concepts of place value by adding and subtracting tens and hundreds from a given number, and by investigating landmark numbers up to 10,000. **References:** 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
	• **demonstrates the inverse relationship of multiplication and division by writing related fact families.** **References:** Arrays and Shares Investigation 1: Session 3 Investigation 2: Sessions 2-3 Ten-Minute Math: Counting Around the Class Ten-Minute Math: Multiple BINGO Landmarks in the Thousands Investigation 2: Session 1 Ten-Minute Math: Counting Around the Class Packages and Groups Investigation 3: Sessions 1-3

Grade	TASK ANALYSIS The student…
	• **recalls from memory basic multiplication facts and related division facts.** **References:** Mathematical Thinking at Grade 4 Investigation 1: Sessions 2-3 Arrays and Shares Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-8 Investigation 3: Sessions 1-5 Ten-Minute Math: Counting Around the Class Ten-Minute Math: Multiple BINGO Landmarks in the Thousands Investigation 2: Session 1 Ten-Minute Math: Counting Around the Class Packages and Groups Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-3 Investigation 3: Sessions 1-10
	• **demonstrates an understanding of the properties of numbers, including the identity and commutative properties of addition, the zero and identity properties of multiplication, and the commutative and distributive properties of multiplication.** **References:** Mathematical Thinking at Grade 4 Ten-Minute Math: Estimation and Number Sense Arrays and Shares Investigation 2: Sessions 2-6 Investigation 3: Sessions 1-5 Changes Over Time Investigation 1: Sessions 5-6 Packages and Groups Investigation 2: Sessions 1-3 Investigation 3: Sessions 3-8

Grade	TASK ANALYSIS The student…
	• **identifies and applies the associative properties of addition and multiplication [e.g., 6 x (4 X 2) = (6 x 4) x 2].** **References:** Mathematical Thinking at Grade 4 Ten-Minute Math: Estimation and Number Sense Arrays and Shares Investigation 2: Sessions 2-6 Investigation 3: Sessions 1-5 Changes Over Time Investigation 1: Sessions 5-6 Packages and Groups Investigation 2: Sessions 1-3 Investigation 3: Sessions 3-8
	• **calculates and explains the multiplication and division of whole numbers (three digits by one digit) using manipulatives, drawings, and algorithms.** **References:** Mathematical Thinking at Grade 4 Investigation 1: Sessions 2-3 Arrays and Shares Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-8 Investigation 3: Sessions 1-5 Ten-Minute Math: Counting Around the Class Ten-Minute Math: Multiple BINGO Landmarks in the Thousands Investigation 2: Session 1 Ten-Minute Math: Counting Around the Class Packages and Groups Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-3 Investigation 3: Sessions 1-10

Grade	TASK ANALYSIS The student…
	• **predicts the relative size of solutions in the addition, subtraction, multiplication, and division of whole numbers.** **References:** Mathematical Thinking at Grade 4 Investigation 1: Sessions 2-4 Investigation 2: Sessions 3-4: Close to 100, 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
	• **uses problem solving strategies to identify the operation(s) needed to solve one-step or two-step problems involving addition, subtraction, multiplication, and division of whole numbers.** **References:** Arrays and Shares Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-8 Investigation 3: Sessions 1-5 Ten-Minute Math: Counting Around the Class Ten-Minute Math: Multiple BINGO Landmarks in the Thousands Investigation 1: Sessions 1-2 Investigation 2: Sessions 1, 5 Investigation 3: Session 2 Packages and Groups Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-3 Investigation 3: Sessions 1-10 Ten-Minute Math: Guess My Number

Grade	TASK ANALYSIS The student…
	• **solves real-world problems using non-routine strategies (e.g., uses simpler numbers, works backwards).** **References:** Mathematical Thinking at Grade 4 Investigation 2: Sessions 1-4 Arrays and Shares Investigation 2: Session 1 Seeing Solids and Silhouettes Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-4 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 Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-4 Changes Over Time Unit Preparation: Sessions 1-3 Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-8 Sunken Ships and Grid Patterns Investigation 1: Sessions 3-4 Three out of Four Like Spaghetti Investigation 2: Sessions 1-7
	• **solves real-world multiplication problems with whole numbers (three digits by one digit), using concrete materials, drawings, and pencil and paper.** **References:** Arrays and Shares Investigation 2: Sessions 2-3 Investigation 3: Sessions 2-4

Grade	TASK ANALYSIS The student…
	• **solves real-world problems involving addition, subtraction, multiplication, and division of whole numbers using an appropriate method (e.g., mental mathematics, paper and pencil, calculator) and explains reasoning for choosing that method.** **References** Arrays and Shares Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-8 Investigation 3: Sessions 1-5 Ten-Minute Math: Counting Around the Class Ten-Minute Math: Multiple BINGO Landmarks in the Thousands Investigation 1: Sessions 1-2 Investigation 2: Sessions 1, 5 Investigation 3: Session 2 Packages and Groups Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-3 Investigation 3: Sessions 1-10 Ten-Minute Math: Guess My Number
	• **chooses and explains estimation strategies used to determine the reasonableness of solutions to real-world problems.** **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

Grade	TASK ANALYSIS The student…
	• **estimates quantities of objects to 500 or more and justifies the reasoning (e.g., compatible numbers, benchmark numbers, front-end estimation).** **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
	• **knows factors and multiples of numbers to 100.** **References:** Mathematical Thinking at Grade 4 Investigation 3: Sessions 1-2 Arrays and Shares Investigation 1: Sessions 1-3 Investigation 2: Sessions 2-3, 5-6 Investigation 3: Sessions 2-4 Ten-Minute Math: Multiple BINGO Landmarks in the Thousands Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-5 Investigation 4: Sessions 1-3 Packages and Groups Investigation 1: Sessions 3-5 Investigation 3: Sessions 4-9

Grade	TASK ANALYSIS The student…
	• **computes fluently (with accuracy and efficiency) basic number combinations for multiplication and division.** **References:** Mathematical Thinking at Grade 4 Investigation 1: Sessions 2-3 Arrays and Shares Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-8 Investigation 3: Sessions 1-5 Ten-Minute Math: Counting Around the Class Ten-Minute Math: Multiple BINGO Landmarks in the Thousands Investigation 2: Session 1 Ten-Minute Math: Counting Around the Class Packages and Groups Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-3 Investigation 3: Sessions 1-10
	• **multiplies by 10, 100, and 1000; recognizes and demonstrates related patterns.** **References:** Mathematical Thinking at Grade 4 Investigation 1: Sessions 2-3 Arrays and Shares Investigation 2: Session 1 Investigation 3: Session 1 Sessions 2-4: Teacher Note, page 54 Session 5 Packages and Groups Investigation 2: Session 1
	• **knows and applies rules of divisibility for 2, 3, 5, 9, and 10.** **References:** Arrays and Shares Investigation 2: Sessions 2-3, 5-6 Ten-Minute Math: Multiple BINGO Landmarks in the Thousands Investigation 1: Sessions 1-3 Investigation 2: Session 1 Packages and Groups Investigation 3: Sessions 4-9

Grade	TASK ANALYSIS The student…
	• **uses models to identify perfect squares to 100.** **References:** Arrays and Shares Investigation 2: Session 1
	• **compares the symbolic differences between Roman Numerals and the decimal (base ten) number system (e.g., D = 500, M = 1000).** There are no references to Roman numerals in the Grade 4 course of *Investigations in Number, Data, and Space*.
5	• **demonstrates knowledge of reading, identifying, and writing numbers through millions and more.** **References:** Mathematical Thinking at Grade 5 Investigation 2: Session 5 Investigation 3: Session 1 Investigation 4: Sessions 1-6 Building on Numbers You Know Investigation 4: Sessions 1-2 Investigation 5: Sessions 4-7
	• **knows the value of a digit in a whole number up to millions.** **References:** Mathematical Thinking at Grade 5 Investigation 2: Session 5 Investigation 3: Session 1 Investigation 4: Sessions 1-6 Building on Numbers You Know Investigation 4: Sessions 1-2 Investigation 5: Sessions 4-7
	• **indicates place value as a power of 10 (e.g., $10^2 = 100$).** **References:** Mathematical Thinking at Grade 5 Investigation 2: Session 5 Investigation 3: Session 1 Investigation 4: Sessions 1-6 Building on Numbers You Know Investigation 4: Sessions 1-2 Investigation 5: Sessions 4-7

Grade	TASK ANALYSIS The student…
	• **expresses numbers to millions or more in expanded form using powers of ten with or without exponential notation.** Students break down numbers into multiplication clusters. **References:** Mathematical Thinking at Grade 5 Investigation 2: Session 5 Investigation 3: Sessions 1-5 Building on Numbers You Know Investigation 1: Sessions 6-8 Investigation 5: Sessions 4-7
	• **predicts a reasonable solution in addition, subtraction, multiplication, and division of whole numbers.** **References:** 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 Between Never and Always Investigation 1: Session 7 Building on Numbers You Know Investigation 1: Sessions 1, 3-5 Investigation 2: Session 3: Teacher Note Investigation 4: Session 1 Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense Containers and Cubes Ten-Minute Math: Counting Around the Class
	• **chooses, describes, and explains estimation strategies used to determine the reasonableness of solutions to real-world problems (e.g., 48 + 51 is about 100).** **References:** Between Never and Always Ten-Minute Math: Nearest Answer Building on Numbers You Know Investigation 3: Sessions 1-6 Investigation 5: Sessions 1-2 Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense Patterns of Change Ten-Minute Math: Nearest Answer

Grade	TASK ANALYSIS The student…
	• **uses the properties of addition, subtraction, multiplication, and division to create number sentences to solve real-world problems.** **References:** Name That Portion Investigation 2: Sessions 1-2, 9 Investigation 3: Sessions 7-8 Building on Numbers You Know Investigation 2: Sessions 1-6 Data, Kids, Cats, and Ads Investigation 3: Sessions 1-4 Investigation 4: Sessions 1-3
	• **determines if numbers up to 100 are prime or composite by finding factors.** **References:** 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 4: Session 1
	• **writes a whole number as a product of its prime factors (e.g., 1 x 2 x 2 x 3 = 12).** **References:** 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 4: Session 1

Grade	TASK ANALYSIS The student…
	• **identifies the greatest common factor of at least two numbers.** **References:** 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 4: Session 1
	• **identifies the least common multiple of two or more numbers up to at least 100.** **References:** 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
	• **multiplies by powers of 10 (100, 1000, and 10,000) demonstrating patterns.** **References:** Mathematical Thinking at Grade 5 Investigation 2: Sessions 2-4 Investigation 3: Sessions 1-5 Building on Numbers You Know Investigation 1: Sessions 3-4 Investigation 2: Sessions 1-3 Investigation 3: Sessions 1-10 Investigation 5: Sessions 4-6 Containers and Cubes Investigation 1: Sessions 3-4

Grade	TASK ANALYSIS The student…
	• **identifies and applies rules of divisibility for 2, 3, 4, 5, 6, 9, and 10.** **References:** 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 4: Session 1
	• **solves division problems with 2-digit divisors and 4-digit dividends.** **References:** Mathematical Thinking at Grade 5 Investigation 2: Session 1, page 33 Building on Numbers You Know Investigation 1: Sessions 3-4 Investigation 5: Sessions 4-6
	• **computes fluently (with accuracy and efficiency) basic number combinations for multiplication and division.** **References:** Mathematical Thinking at Grade 5 Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-5 Picturing Polygons Ten-Minute Math: Multiple and Factor BINGO Building on Numbers You Know Investigation 1: Sessions 3-4 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-10 Investigation 5: Sessions 3-4 Containers and Cubes Investigation 1: Sessions 1-5 Investigation 4: Sessions 7-9 Ten-Minute Math: Counting Around the Class

Grade	TASK ANALYSIS The student…
	• **creates models (e.g., snap cubes, grid paper) to identify perfect squares up to 144 or more.** **References:** Mathematical Thinking at Grade 5 Investigation 1: Sessions 1-3 Picturing Polygons Investigation 3: Session 4, pages 97-98 Containers and Cubes Investigation 4: Sessions 7-9, pages 8
	• **determines and uses an appropriate estimation strategy (e.g., front-end rounding, compatible numbers).** **References:** Between Never and Always Ten-Minute Math: Nearest Answer Building on Numbers You Know Investigation 3: Sessions 1-6 Investigation 5: Sessions 1-2 Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense Patterns of Change Ten-Minute Math: Nearest Answer
	• **chooses, describes, and explains orally or in writing estimation strategies (e.g., benchmark numbers) used to determine the reasonableness of solutions to real-world problems (e.g., estimation jar, number of pizza slices sold in a day).** **References:** Between Never and Always Ten-Minute Math: Nearest Answer Building on Numbers You Know Investigation 3: Sessions 1-6 Investigation 5: Sessions 1-2 Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense Patterns of Change Ten-Minute Math: Nearest Answer

Grade	TASK ANALYSIS The student…
	• **determines solutions to a set using a number line (e.g., for n ≤ 5, the solution is 0, 1, 2, 3, 4, 5).** **References:** Grade 5 students using *Investigations in Number, Data, and Space* solve equations of the form 3 x ___ = 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 1: Sessions 1-4, 6-8 Investigation 2: Sessions 5-6 Investigation 3: Session 10
	• **arranges a set of digits to create the least or greatest number (e.g., the digits 4, 7, 1, 2 may be arranged as least = 1,247 or greatest = 7,421).** **References:** Building on Numbers You Know Investigation 1: Sessions 6-7
	• **explains in writing and demonstrates the commutative, associative, identity, and distributive properties of multiplication for whole numbers.** **References:** Mathematical Thinking at Grade 5 Investigation 2: Sessions 1-4 Investigation 3: Sessions 2-5 Building on Numbers You Know Investigation 1: Sessions 3-4, 6-7 Investigation 2: Sessions 5-6 Investigation 3: Sessions 1-3 Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense
	• **examines numbers and bases other than ten (e.g., base five).** **References:** Grade 5 students using *Investigations in Number, Data, and Space* gain experience with the base-ten system of numeration, as referenced in the objectives on place value.

Grade	TASK ANALYSIS The student…
	FRACTIONS
3	• **reads, writes, and identifies proper fractions with denominators including 2, 3, 4, 5, 6, 8, 10, and 100.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 3-4 Investigation 4: Session 2 Flips, Turns, and Areas Investigation 2: Sessions 1-5 Up and Down the Number Line Investigation 3: Session 1 Turtle Paths Investigation 2: Sessions 1-2 Fair Shares Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-3
	• **defines the numerator as the number above the line in a fraction, telling how many equal parts are described by the fraction.** **References:** Fair Shares Investigation 1: Sessions 1-4
	• **defines the denominator as the number below the line in a fraction, telling how many equal parts are in the set or whole.** **References:** Fair Shares Investigation 1: Sessions 1-4
	• **recognizes and writes fractions correctly (e.g., ○○● = 1/3 not 3/1).** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 3-4 Investigation 4: Session 2 Flips, Turns, and Areas Investigation 2: Sessions 1-5 Up and Down the Number Line Investigation 3: Session 1 Turtle Paths Investigation 2: Sessions 1-2 Fair Shares Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-3

Grade	TASK ANALYSIS The student…
	• **uses language and symbols (<, >, =) to compare the relative size of commonly used fractions.** **References:** Fair Shares Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-2
	• **compares and orders commonly used fractions, including halves, thirds, fourths, sixths, and eighths, using concrete materials.** **References:** Fair Shares Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-2
	• **Identifies a fraction using a model that is part of a whole.** **References:** Mathematical Thinking at Grade 3 Investigation 4: Session 2 Flips, Turns, and Areas Investigation 2: Sessions 1-5 Up and Down the Number Line Ten-Minute Math: Estimation and Number Sense Turtle Paths Investigation 2: Sessions 1-2 Fair Shares Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-2
	• **identifies a fraction using a model that is part of a group/set (e.g., ○○●, 1 out of 3 is shaded).** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 3-4 Fair Shares Investigation 3: Session 3

Grade	TASK ANALYSIS The student…
	• **translates real-world problems into diagrams and appropriate models (e.g., parts of a group/set, parts of a whole) using fractions (e.g., 5 out of 25 students brought lunch).** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 3-4 Investigation 4: Session 2 Flips, Turns, and Areas Investigation 2: Sessions 1-5 Up and Down the Number Line Investigation 3: Session 1 Turtle Paths Investigation 2: Sessions 1-2 Fair Shares Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-3
4	• **reads, writes, and identifies fractions and mixed numbers with denominators including 2, 3, 4, 5, 6, 8, 10, 12, 20, 25, 100, and 1000.** **References:** 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 1-3 Sunken Ships and Grid Patterns Investigation 2: Session 5 Three out of Four Like Spaghetti Investigation 1: Sessions 1-4
	• **locates fractions and mixed numbers on a number line.** Students name and locate points, determine distances, and graph rectangles and patterns on a coordinate grid. **References:** Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9

Grade	TASK ANALYSIS The student…
	• **uses language and symbols (<, >, =) to compare and order fractions.** **References:** Different Shapes, Equal Pieces Investigation 1: Session 5 Investigation 2: Sessions 1-4 Investigation 3: Sessions 3-5 Three Out of Four Like Spaghetti Investigation 1: Sessions 2-3 Money, Miles, and Large Numbers Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-2
	• **translates problem situations involving fractions into diagrams and models.** **References:** 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 1-3 Sunken Ships and Grid Patterns Investigation 2: Session 5 Three out of Four Like Spaghetti Investigation 1: Sessions 1-4
	• **identifies and represents fractions using models that are parts of a whole or parts of a group.** **References:** 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 1-3 Sunken Ships and Grid Patterns Investigation 2: Session 5 Three out of Four Like Spaghetti Investigation 1: Sessions 1-4

Grade	TASK ANALYSIS The student…
	• **uses concrete materials (e.g., pattern blocks, fraction bars) to model equivalent forms of whole numbers and fractions.** **References:** Arrays and Shares Investigation 1: Session 3 Investigation 2: Sessions 2-3, 7-8 Landmarks in the Thousands Investigation 1: Session 2 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 1: Sessions 4-5 Investigation 2: Sessions 1-4
	Changes Over Time Ten-Minute Math: Broken Calculator Packages and Groups Investigation 2: Sessions 1-3 Investigation 3: Sessions 1-2 Sunken Ships and Grid Patterns Investigation 2: Session 5 Three out of Four Like Spaghetti Investigation 1: Sessions 1-4
	• **identifies equivalent forms of fractions (e.g., 2/8 = 1/4).** **References:** Different Shapes, Equal Pieces Investigation 1: Session 5 Investigation 2: Session 3 Investigation 3: Sessions 1-2

Grade	TASK ANALYSIS The student…
	• **recognizes that two numbers in different forms (e.g., whole numbers and fractions) are equivalent or non-equivalent (e.g., 8/8 = 1).** **References:** Arrays and Shares Investigation 1: Session 3 Investigation 2: Sessions 2-3, 7-8 Landmarks in the Thousands Investigation 1: Session 2 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 1: Sessions 4-5 Investigation 2: Sessions 1-4 Changes Over Time Ten-Minute Math: Broken Calculator Packages and Groups Investigation 2: Sessions 1-3 Investigation 3: Sessions 1-2 Sunken Ships and Grid Patterns Investigation 2: Session 5 Three out of Four Like Spaghetti Investigation 1: Sessions 1-4
	• **calculates and explains the addition and subtraction of common fractions using concrete materials, drawings, story problems, and algorithms.** **References:** Different Shares, Equal Pieces Investigation 1: Session 5 Investigation 2: Session 3
	• **predicts the relative size of solutions when adding and subtracting common fractions.** **References:** Different Shares, Equal Pieces Investigation 1: Session 5 Investigation 2: Session 3

Grade	TASK ANALYSIS The student…
	• **uses problem-solving strategies to identify the operation(s) needed to solve one-and two-step problems involving addition and subtraction of fractions.** **References:** Different Shares, Equal Pieces Investigation 1: Session 5 Investigation 2: Session 3
	• **solves real-world problems involving fractions by using non-routine strategies (e.g., act it out, represent it pictorially).** **References:** 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 1-3 Sunken Ships and Grid Patterns Investigation 2: Session 5 Three out of Four Like Spaghetti Investigation 1: Sessions 1-4
	• **selects an appropriate method (mental mathematics, paper and pencil, or calculator) to solve real-world problems involving the addition and subtraction of fractions and explains the reasons for choosing that particular method.** **References:** Different Shares, Equal Pieces Investigation 1: Session 5 Investigation 2: Session 3
	• **solves real-world problems involving the addition and subtraction of common fractions with like or unlike denominators.** **References:** Different Shares, Equal Pieces Investigation 1: Session 5 Investigation 2: Session 3

Grade	TASK ANALYSIS The student…
5	• **constructs pictorial representations of fractions and mixed numbers.** **References:** Name That Portion Investigation 1: Sessions 1-7 Investigation 2: Sessions 1-9 Investigation 3: Sessions 5-8 Investigation 4: Sessions 1, 3-6 Ten-Minute Math: Seeing Numbers Between Never and Always Investigation 1: Sessions 1-4 Building on Numbers You Know Investigation 2: Session 3: Teacher Note, page 54 Data: Kids, Cats, and Ads Investigation 3: Sessions 1-4 Investigation 4: Sessions 1-3
	• **compares and orders fractions with unlike denominators using concrete materials, number lines, drawings, and numerals (e.g., 1/6, 1/3, 2/4).** **References:** Name That Portion Investigation 1: Sessions 5-7 Investigation 2: Sessions 4-8 Investigation 3: Sessions 2-6
	• **compares fractions to decimals and percents (e.g., 3/100 = 0.03 = 3%).** **References:** Name That Portion Investigation 1: Sessions 1-7 Investigation 3: Sessions 1-8 Ten-Minute Math: Seeing Numbers Between Never and Always Investigation 1: Sessions 1-4 Building on Numbers You Know Investigation 2: Session 3: Teacher Note, page 54 Data, Kids, Cats, and Ads Investigation 3: Session 1

Grade	TASK ANALYSIS The student…
	• **identifies fractions as ratios in three forms (e.g., 1/3, 1 to 3, 1:3).** **References:** Name That Portion Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9 Investigation 3: Sessions 6-8 Investigation 4: Sessions 1-7 Ten-Minute Math: Seeing Numbers Containers and Cubes Investigation 4: Sessions 2-3 Data, Kids, Cats, and Ads Investigation 3: Sessions 1-4
	• **arranges fractions and mixed numbers on a number line.** **References:** Name That Portion Investigation 1: Sessions 5-6 Investigation 2: Sessions 4-6
	• **uses models (drawings or manipulatives) to show the relationship between mixed numbers and improper fractions.** **References:** Name That Portion Investigation 2: Sessions 1-9 Investigation 3: Sessions 5-6: Dialogue Box, page 91 Building on Numbers You Know Investigation 2: Session 3: Teacher Note, page 54 Investigation 2: Sessions 4-6
	• **applies knowledge of the relationship of mixed numbers and improper fractions to solve mathematical and real-world problems.** **References:** Name That Portion Investigation 2: Sessions 1-9 Investigation 3: Sessions 5-6: Dialogue Box, page 91 Building on Numbers You Know Investigation 2: Session 3: Teacher Note, page 54 Investigation 2: Sessions 4-6

Grade	TASK ANALYSIS The student…
	• **identifies and calculates equivalent fractions (e.g., simplest form:** **3/6 = 1/2 or 6/10 = 3/5).** **References:** Name That Portion Investigation 1: Sessions 2-6 Investigation 2: Sessions 3-8 Investigation 3: Sessions 1 Between Never and Always Investigation 1: Sessions 1-2 Data: Kids, Cats, and Ads Investigation 3: Session 1
	• **determines the sum and difference of fractions and mixed numbers with unlike denominators and expresses in simplest form.** **References:** Name That Portion Investigation 2: Sessions 1-3, 6-9 Investigation 3: Session 7 Data: Kids, Cats, and Ads Investigation 4: Session 3
	• **determines the product of fractions and expresses in simplest form.** **References:** Name That Portion Ten-Minute Math: Seeing Numbers
	• **predicts the relative size of the sum, difference, and product of fractions (e.g., product of two fractions is less than either factor).** **References:** Name That Portion Investigation 2: Sessions 1-3, 6-9 Investigation 3: Session 7 Ten-Minute Math: Seeing Numbers Data: Kids, Cats, and Ads Investigation 4: Session 3

Grade	TASK ANALYSIS The student…
	• **explains and demonstrates the inverse of multiplication and division of fractions (e.g., multiplying by 1/2 is the same as dividing by 2).** Grade 5 students using *Investigations in Number, Data, and Space* demonstrate the inverse relationship between the operations of multiplication and division. **References:** Building on Numbers You Know Investigation 1: Sessions 3-4 Investigation 2: Sessions 1-3, 5-6 Investigation 3: Sessions 4-6 Investigation 5: Sessions 1-2, 4-7
	• **selects and uses the appropriate operation up to two steps to solve real-world problems involving addition, subtraction, and multiplication of fractions.** **References:** Name That Portion Investigation 2: Sessions 1-3, 6-9 Investigation 3: Session 7 Ten-Minute Math: Seeing Numbers Data: Kids, Cats, and Ads Investigation 4: Session 3
	• **selects and uses the appropriate method (mental mathematics, paper and pencil, or calculator) and strategy (routine or non-routine) to solve real-world problems with fractions.** **References:** Name That Portion Investigation 2: Sessions 1-3, 6-9 Investigation 3: Session 7 Ten-Minute Math: Seeing Numbers Data: Kids, Cats, and Ads Investigation 4: Session 3

Grade	TASK ANALYSIS The student…
	DECIMALS
3	• **reads, writes, and identifies decimal notation in the context of money.** **References:** Landmarks in the Hundreds Investigation 2: Session 4 Combining and Comparing Investigation 3: Sessions 1-2
	• **uses language and symbols (>, <, =) to compare the relative size of decimals in the context of money.** **References:** Landmarks in the Hundreds Investigation 2: Session 4 Combining and Comparing Investigation 3: Sessions 1-2
	• **translates real-world problems into diagrams and models using decimal notation in the context of money.** **References:** Landmarks in the Hundreds Investigation 2: Session 4 Combining and Comparing Investigation 3: Sessions 1-2
	• **relates decimal money notation to fractions and common percents** **(e.g., $0.50 = 1/2 of a dollar = 50%).** **References:** Landmarks in the Hundreds Investigation 2: Session 4 Combining and Comparing Investigation 3: Sessions 1-2
4	• **reads, writes, and identifies decimals through hundredths.** **References:** Money, Miles, and Large Numbers Investigation 1: Sessions 1-2, 4-8 Investigation 2: Sessions 1-2, 4

Grade	TASK ANALYSIS The student…
	• **locates decimals on a number line.** **References:** Students name and locate points, determine distances, and graph rectangles and patterns on a coordinate grid. **References:** Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9
	• **uses language and symbols (>, <, =) to compare and order decimals to hundredths using concrete materials, number lines, drawings, and numerals.** **References:** Money, Miles, and Large Numbers Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-2
	• **translates problem situations into diagrams and models using decimals to hundredths, including money notation.** **References:** Money, Miles, and Large Numbers Investigation 1: Sessions 1-2, 4-8 Investigation 2: Sessions 1-2, 4
	• **relates decimal money notation to fractions and common percents** **(e.g., $0.25 = 1/4 of a dollar = 25%).** Students using *Investigations in Number, Data, and Space* are introduced to the concept of percent in a Grade 5. **References:** Money, Miles, and Large Numbers Investigation 2: Sessions 1-3
	• **identifies pictorial representations of decimal fractions.** **References:** Money, Miles, and Large Numbers Investigation 1: Sessions 1-2, 4-8 Investigation 2: Sessions 1-2, 4

Grade	TASK ANALYSIS The student…
	• **uses concrete materials to model equivalent forms of whole numbers, fractions, and decimals.** **References:** Arrays and Shares Investigation 1: Session 3 Investigation 2: Sessions 2-3, 7-8 Landmarks in the Thousands Investigation 1: Session 2 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 1: Sessions 4-5 Investigation 2: Sessions 1-4 Changes Over Time Ten-Minute Math: Broken Calculator Packages and Groups Investigation 2: Sessions 1-3 Investigation 3: Sessions 1-2 Sunken Ships and Grid Patterns Investigation 2: Session 5 Three out of Four Like Spaghetti Investigation 1: Sessions 1-4
	• **identifies equivalent forms of numbers.** **References:** Arrays and Shares Investigation 1: Session 3 Investigation 2: Sessions 2-3, 7-8 Landmarks in the Thousands Investigation 1: Session 2 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 1: Sessions 4-5 Investigation 2: Sessions 1-4 Changes Over Time Ten-Minute Math: Broken Calculator

Grade	TASK ANALYSIS The student…
	Packages and Groups Investigation 2: Sessions 1-3 Investigation 3: Sessions 1-2 Sunken Ships and Grid Patterns Investigation 2: Session 5 Three out of Four Like Spaghetti Investigation 1: Sessions 1-4
	• **recognizes that two numbers in different forms (whole numbers, decimals, fractions, mixed numbers) are equivalent or non-equivalent.** **References:** Arrays and Shares Investigation 1: Session 3 Investigation 2: Sessions 2-3, 7-8 Landmarks in the Thousands Investigation 1: Session 2 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 1: Sessions 4-5 Investigation 2: Sessions 1-4 Changes Over Time Ten-Minute Math: Broken Calculator Packages and Groups Investigation 2: Sessions 1-3 Investigation 3: Sessions 1-2 Sunken Ships and Grid Patterns Investigation 2: Session 5 Three out of Four Like Spaghetti Investigation 1: Sessions 1-4
	• **identifies the place value of a digit in a decimal fraction to hundredths.** **References:** Money, Miles, and Large Numbers Investigation 1: Sessions 1-2, 4-8 Investigation 2: Sessions 1-2, 4

Grade	TASK ANALYSIS The student…
	• **calculates and explains the addition and subtraction of decimals (to hundredths) using concrete materials, drawings, story problems, and algorithms.** **References:** Money, Miles, and Large Numbers Investigation 1: Sessions 1-2, 4-8 Investigation 2: Sessions 1-2, 4
	• **predicts the relative size of solutions in the addition and subtraction of decimals to hundredths.** **References:** Money, Miles, and Large Numbers Investigation 1: Sessions 1-2, 4-8 Investigation 2: Sessions 1-2, 4
	• **uses problem-solving strategies to identify the operation(s) needed to solve one- and two-step problems involving the addition and subtraction of decimals.** **References:** Money, Miles, and Large Numbers Investigation 1: Sessions 1-2, 4-8 Investigation 2: Sessions 1-2, 4
	• **solves real-world problems using non-routine strategies (e.g., pictorially).** **References:** Money, Miles, and Large Numbers Investigation 1: Sessions 1-2, 4-8 Investigation 2: Sessions 1-2, 4
	• **solves real-world problems involving addition and subtraction of decimals using an appropriate method (mental math, paper and pencil, or calculator) and explains reasons for choosing that method.** **References:** Money, Miles, and Large Numbers Investigation 1: Sessions 1-2, 4-8 Investigation 2: Sessions 1-2, 4

Grade	TASK ANALYSIS The student…
5	• **names decimals less than one with a leading zero in the ones place (e.g., 0.03).** **References:** 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 Containers and Cubes Ten-Minute Math: Counting Around the Class: Fractions and Decimals Data: Kids, Cats, and Ads Investigation 3: Session 1, page 50
	• **identifies the value of a digit in a decimal to ten thousandths.** **References:** 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 Containers and Cubes Ten-Minute Math: Counting Around the Class: Fractions and Decimals Data: Kids, Cats, and Ads Investigation 3: Session 1, page 50
	• **investigates decimals through the use of graphic organizers (e.g., number line, circle graph, place-value chart, hundred chart) and calculations.** **References:** 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 Containers and Cubes Ten-Minute Math: Counting Around the Class: Fractions and Decimals Data: Kids, Cats, and Ads Investigation 3: Session 1, page 50

Grade	TASK ANALYSIS The student…
	• **compares and orders decimals to the thousandths place using numerals and concrete materials (e.g., number lines, drawings).** **References:** Name That Portion Investigation 3: Sessions 1-8
	• **compares and orders decimals using different forms (e.g., 0.03 = 3% = 3/100).** Name That Portion Investigation 1: Session 1 Investigation 3: Sessions 1-8
	• **determines the sum and difference of decimals in real-world settings.** **References:** Name That Portion Investigation 3: Sessions 2-4, 7 Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense
	• **predicts the relative size of the sum, difference, product, or quotient of decimals.** **References:** Between Never and Always Ten-Minute Math: Nearest Answer Building on Numbers You Know Investigation 3: Sessions 1-6 Investigation 5: Sessions 1-2 Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense Patterns of Change Ten-Minute Math: Nearest Answer Name That Portion Investigation 1: Sessions 1-2 Investigation 4: Sessions 1-7
	• **determines the product of decimals in real-world settings ($2.50 x 3 =?).** **References:** Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense
	• **determines the quotient of a decimal with the divisor being a whole number in real-world settings (e.g., 2.5 ÷ 5 = 0.5).** **References:** Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense

Grade	TASK ANALYSIS The student…
	• **selects and uses the appropriate operation up to two steps to solve a real- world problem involving addition, subtraction, multiplication, and division of decimals.** **References:** **References:** Name That Portion Investigation 3: Sessions 2-4, 7 Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense
	• **selects and uses the appropriate method (mental math, paper and pencil, or calculator) and strategy (routine or non-routine) to solve real-world problems with fractions.** **References:** **References:** Name That Portion Investigation 2: Sessions 1-3, 6-9 Investigation 3: Session 7 Ten-Minute Math: Seeing Numbers Data: Kids, Cats, and Ads Investigation 4: Session 3
	• **uses estimation strategies to justify the reasonableness of a solution to real-world problems involving decimals or money (e.g., round to the nearest dollar/whole number, tenth, hundredth).** **References:** Name That Portion Investigation 3: Sessions 5-7 Between Never and Always Ten-Minute Math: Nearest Answer Building on Numbers You Know Investigation 2: Session 3, page 51 Measurement Benchmarks Ten-Minute Math: Estimation and Number Sense Data: Kids, Cats, and Ads Investigation 3: Session 4, page 65

Grade	TASK ANALYSIS The student…
	PERCENTS
3	• **relates decimal money notation to fractions and common percents (e.g., $0.50, 1/2 of a dollar, 50%).** Students using *Investigations in Number, Data, and Space* are introduced to the concept of percent in Grade 5. **References:** Landmarks in the Hundreds Investigation 2: Session 4 Combining and Comparing Investigation 3: Sessions 1-2
4	• **relates decimal money notation to fractions and common percents (e.g., $0.75, 3/4 of a dollar, 75%).** Students using *Investigations in Number, Data, and Space* are introduced to the concept of percent in Grade 5. **References:** Money, Miles, and Large Numbers Investigation 2: Sessions 1-3
5	• **represents percent as a part of a hundred, using a model (e.g., circle graph, 10 x 10 grid).** **References:** Name That Portion Investigation 1: Sessions 1-7 Investigation 3 Session 1: Extension, page 71 Session 7 Investigation 4: Sessions 1-7 Data, Kids, Cats, and Ads Investigation 3: Sessions 1-4

Grade	TASK ANALYSIS The student…
	• **draws a model demonstrating common percents as multiples of five for a real-world problem (e.g., 10%, 15%, 20%).** **References:** **References:** Name That Portion Investigation 1: Sessions 1-7 Investigation 3 Session 1: Extension, page 71 Session 7 Investigation 4: Sessions 1-7 Data, Kids, Cats, and Ads Investigation 3: Sessions 1-4
	• **expresses a percent as a fraction and/or decimal.** **References:** Name That Portion Investigation 1: Sessions 1-7 Investigation 3: Sessions 1-8 Ten-Minute Math: Seeing Numbers Between Never and Always Investigation 1: Sessions 1-4 Building on Numbers You Know Investigation 2: Session 3: Teacher Note, page 54 Data, Kids, Cats, and Ads Investigation 3: Session 1
	• **compares and orders whole numbers, decimals, fractions, and percents (e.g., 80%, 64, 0.50, 1/4).** **References:** Name That Portion Investigation 1: Sessions 1-7 Investigation 3: Sessions 1-8 Ten-Minute Math: Seeing Numbers Between Never and Always Investigation 1: Sessions 1-4 Building on Numbers You Know Investigation 2: Session 3: Teacher Note, page 54 Data, Kids, Cats, and Ads Investigation 3: Session 1

Grade	TASK ANALYSIS The student…
	• **uses benchmark percents (commonly used percents) to get close to an amount to be estimated.** **References:** Name That Portion Investigation 1: Sessions 1-7 Investigation 3 Session 1: Extension, page 71 Session 7 Investigation 4: Sessions 1-7 Data, Kids, Cats, and Ads Investigation 3: Sessions 1-4
	• **computes the cost of an item including sales tax.** Grade 5 students relate percents to models and to decimals and fractions. They encounter the use of percents in the real world on nutritional labels. They construct circle graphs. **References:** Name That Portion Investigation 1: Sessions 1-7 Investigation 3 Session 1: Extension, page 71 Session 7 Investigation 4: Sessions 1-7 Data, Kids, Cats, and Ads Investigation 3: Sessions 1-4
	• **computes the cost of an item at a discounted rate (e.g., 10% off).** Grade 5 students relate percents to models and to decimals and fractions. They encounter the use of percents in the real world on nutritional labels. They construct circle graphs. **References:** Name That Portion Investigation 1: Sessions 1-7 Investigation 3 Session 1: Extension, page 71 Session 7 Investigation 4: Sessions 1-7 Data, Kids, Cats, and Ads Investigation 3: Sessions 1-4

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Measurement**
Grade Cluster: **3-5**

Benchmarks

MA.B.1.2.1: The student uses concrete and graphic models to develop procedures for solving problems related to measurement including length, weight, time, temperature, perimeter, area, volume, and angle.

MA.B.1.2.2: The student solves real-world problems involving length, weight, perimeter, area, capacity, volume, time temperature, and angles.

MA.B.2.2.1: The student uses direct (measured) and indirect (not measured) measures to calculate and compare measurable characteristics.

MA.B.2.2.2: The student selects and uses appropriate standard and nonstandard units of measurement, according to type and size.

MA.B.3.2.1: The student solves real-world problems involving estimates of measurements, including length, time, weight, temperature, money, perimeter, area, and volume.

MA.B.4.2.1: The student determines which units of measurement, such as seconds, square inches, dollars per tankful, to use with answers to real world problems.

MA.B.4.2.2: The student selects and uses appropriate instruments and technology, including scales, rulers, thermometers, measuring cups, protractors, and gauges, to measure in real-world situations.

MA.A.3.2.2: The student selects the appropriate operation to solve specific problems involving addition, subtraction, and multiplication of whole numbers, decimals, and fractions, and division of whole numbers.

MA.C.1.2.1: The student given a verbal description, draws and/or models two- and three-dimensional shapes and uses appropriate geometric vocabulary to write a description of a figure or a picture composed of geometric figures.

MA.C.3.2.1: The student represents and applies a variety of strategies and geometric properties and formulas for two- and three-dimensional shapes to solve real-world and mathematical problems.

Grade	TASK ANALYSIS The student…
	LENGTH
3	• **uses non-standard units to measure and compare objects.** **References:** Things That Come in Groups Investigation 3: Sessions 1-5 Flips, Turns, and Area Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-5 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 Exploring Solids and Boxes Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4
	• **demonstrates an understanding of customary and metric terms and tools involving length and distance.** **References:** From Paces to Feet Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3
	• **measures, reads, and records the length of items on a measurement tool to the nearest scale of measurement (½ inch, inch, foot, yard, centimeter, meter).** **References:** From Paces to Feet Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3

Grade	TASK ANALYSIS The student…
	• **determines measurement in real-world problems using customary (e.g., ruler, tape measure, yardstick) and metric tools (meter stick).** **References:** From Paces to Feet Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3
	• **estimates the measurement of an object in a pictorial representation by using the known measure of another object (e.g., determine length of a pencil if a paper clip shown is 2 inches).** **References:** From Paces to Feet Investigation 1: Session 1-4 Combining and Comparing Investigation 3: Sessions 1-2, p. 32 Turtle Paths Investigation 2: Sessions 1-2, 4
	• **converts measurement units within a single system (e.g., 12 inches = 1 foot).** **References:** Landmarks in the Hundreds Investigation 1: Sessions 6-7 From Paces to Feet Investigation 2: Sessions 3-7
	• **uses oral and written language to justify estimation strategies.** **References:** From Paces to Feet Investigation 1: Session 1-4 Combining and Comparing Investigation 3: Sessions 1-2, p. 32 Turtle Paths Investigation 2: Sessions 1-2, 4

Grade	TASK ANALYSIS The student…
4	• **selects and uses appropriate units of measurement, standard and nonstandard.** **References:** 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
	• **identifies standard measurement units on a measurement tool to the nearest scale of measurement (¼ inch, foot, yard, mile, millimeter, centimeter, meter, kilometer).** **References:** 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
	• **develops strategies for estimating measurement in real-world situations.** **References:** 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
	• **selects and uses the appropriate measurement tools (ruler, meter stick, tape measure, yard stick, trundle wheel) and units of measure in real-world situations.** **References:** 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

Grade	TASK ANALYSIS The student…
	• **obtains the measurement of an object by using the known measure of another object (indirect measure).** **References:** 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
	• **uses direct measure (customary and metric) to determine and compare length.** **References:** 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
	• **uses multiplication or division to convert units of measure within the customary or metric system (e.g., 100 cm = 1 m).** **References:** The Shape of the Data Investigation 2: Session 4 Money, Miles, and Large Numbers Investigation 2: Sessions 3-4 Investigation 3: Sessions 2-4
	• **uses words and/or pictures to describe strategies used to solve linear problems.** **References:** 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

Grade	TASK ANALYSIS The student…
5	• **applies the appropriate unit of measure (to the nearest ⅛, ¼, ½ inch, foot, yard, mile, mm, cm, m, or km) using real-world examples.** **References:** Measurement Benchmarks Investigation 1: Sessions 1-8
	• **estimates measurements using real-world examples.** **References:** Picturing Polygons Investigation 2: Sessions 8-9 Measurement Benchmarks Investigation 1: Sessions 1-3 Investigation 3: Session 1
	• **converts within the same system using two conversions per multiple- step problems (e.g., 18 inches = 1 ½ feet or 150 cm = 1.5 m).** **References:** Measurement Benchmarks Investigation 1: Sessions 4, 7-8
	• **determines measurement indirectly from drawings (e.g., scale drawings).** **References:** Picturing Polygons Investigation 1: Sessions 3-4 Investigation 2: Sessions 4-7 Investigation 3: Sessions 1-2, 5-6 Measurement Benchmarks Investigation 1: Sessions 1-8
	• **explains through oral and written language the relationship of units within the same system (e.g., inches to feet).** **References:** Measurement Benchmarks Investigation 1: Sessions 4, 7-8

Grade	TASK ANALYSIS The student…
	WEIGHT
3	• **uses various tools (e.g., balance, spring scale, bathroom scale) to find the weight of objects.** **References:** Combining and Comparing Investigation 2: Sessions 1-2
	• **demonstrates an understanding of customary and metric terms (ounce, pound, gram, kilogram).** Grade 3 students using *Investigations in Number, Data, and Space* use nonstandard units with a pan balance to weigh and compare objects. **References:** Combining and Comparing Investigation 2: Sessions 1-2
	• **compares metric/customary unit to pictorial representations (e.g., when shown pictures of an object, choose the appropriate unit).** Grade 3 students using *Investigations in Number, Data, and Space* use nonstandard units with a pan balance to weigh and compare objects. **References:** Combining and Comparing Investigation 2: Sessions 1-2
	• **converts customary/metric units within a single system (e.g., 16 oz. = 1 lb., 1000 g = 1 kg).** Grade 3 students using *Investigations in Number, Data, and Space* use nonstandard units with a pan balance to weigh and compare objects. **References:** Combining and Comparing Investigation 2: Sessions 1-2
	• **justifies selection of the appropriate units and tools for measuring weight to solve real-world problems.** **References:** Combining and Comparing Investigation 2: Sessions 1-2

Grade	TASK ANALYSIS The student…
	• **estimates various weights to the nearest pound and kilogram.** Grade 3 students using *Investigations in Number, Data, and Space* use nonstandard units with a pan balance to weigh and compare objects. **References:** Combining and Comparing Investigation 2: Sessions 1-2
4	• **uses the appropriate tool (e.g., balance, spring scale, bathroom scale) and unit (customary/metric) to determine and compare weight.** Grade 4 students using *Investigations in Number, Data, and Space* do not measure or compare weights of objects. Third grade students use nonstandard units with a pan balance to weigh and compare the weights of objects.
	• **develops strategies for estimating weight to the nearest ounce and gram in real-world problems.** Grade 4 students using *Investigations in Number, Data, and Space* do not measure or compare weights of objects. Third grade students use nonstandard units with a pan balance to weigh and compare the weights of objects.
	• **estimates the weight of an object by using the known measure of another object.** Grade 4 students using *Investigations in Number, Data, and Space* do not measure or compare weights of objects. Third grade students use nonstandard units with a pan balance to weigh and compare the weights of objects.
	• **uses multiplication and division to convert units of measure within the customary or metric system (1000 grams = 1 kilogram).** Grade 4 students using *Investigations in Number, Data, and Space* do not use customary or metric units of weight or mass.
5	• **applies the appropriate unit to pictorial models (ounces, pounds, tons; milligrams, grams, kilograms).** **References:** Measurement Benchmarks Investigation 2: Sessions 1-8
	• **estimates measurements to solve real-world problems (e.g., estimate in grams the weight of a large paper clip).** **References:** Measurement Benchmarks Investigation 2: Sessions 1-8

Grade	TASK ANALYSIS The student…
	• **calculates to convert within the same system, using up to two conversions (e.g., milligrams to grams to kilograms).** **References:** Measurement Benchmarks Investigation 2: Sessions 1-8
	• **cites examples of everyday objects that would weigh a given amount.** **References:** Measurement Benchmarks Investigation 2: Sessions 1-8
	TIME
3	• **tells time, using analog and digital clocks, and understands the components of a calendar (days, weeks, months, years).** **References:** Landmarks in the Hundreds Ten-Minute Math: Calendar Math Combining and Comparing Investigation 3: Session 3 Investigation 5: Sessions 1-3
	• **knows that a.m. begins at midnight.** Grade 3 students using *Investigations in Number, Data, and Space* 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
	• **knows that p.m. begins at noon.** Grade 3 students using *Investigations in Number, Data, and Space* 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
	• **tells time to one-minute intervals.** Grade 3 students using *Investigations in Number, Data, and Space* 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

Grade	TASK ANALYSIS The student…
	• **illustrates knowledge of telling time using different terminology (e.g., 1:15, one-fifteen, quarter past one, quarter after one, fifteen minutes after one).** Grade 3 students using *Investigations in Number, Data, and Space* 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
	• **counts an hour later or an hour before from any point on a clock.** Grade 3 students using *Investigations in Number, Data, and Space* 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
	• **determines elapsed time in one-hour intervals from any point on a clock.** Grade 3 students using *Investigations in Number, Data, and Space* 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
	• **converts hours to minutes when calculating elapsed time on an analog clock (e.g., 11:15 to 12:30 is 1 hour and 15 minutes or 75 minutes).** Grade 3 students using *Investigations in Number, Data, and Space* 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
	• **determines elapsed time from any point on a calendar.** **References:** Landmarks in the Hundreds Ten-Minute Math: Calendar Math

Grade	TASK ANALYSIS The student…
	• **solves problems involving estimated measurement of time to the nearest ½ hour.** Grade 3 students using *Investigations in Number, Data, and Space* 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
4	• **converts units of time (e.g., minutes to hours).** **References:** Changes Over Time Unit Preparation: Sessions 1-3 Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-8
	• **compares time intervals, including decades, years, months, days, hours, minutes, and seconds.** **References:** Changes Over Time Unit Preparation: Sessions 1-3 Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-8
	• **calculates elapsed time using clocks to the nearest ¼ and ½ hour.** **References:** Changes Over Time Unit Preparation: Sessions 1-3 Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-8

Grade	TASK ANALYSIS The student…
	• **solves real-world problems using schedules and calendars and explains reasoning.** **References:** Changes Over Time Unit Preparation: Sessions 1-3 Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-8
	• **solves problems involving estimated measurement of time to the nearest five-minute interval.** **References:** Changes Over Time Unit Preparation: Sessions 1-3 Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-2 Investigation 3: Sessions 1-8
5	• **compares varied time intervals including centuries, decades, hours, minutes, and seconds.** Grade 5 students using *Investigations in Number, Data, and Space* construct "lifetime strips" to represent and compare ages; they use stories, graphs, and tables to represent changes in speed and position over time. **References:** Measurement Benchmarks Investigation 3: Sessions 1-3 Patterns of Change Investigation 2: Sessions 1-5 Ten-Minute Math: Graph Stories
	• **estimates time to the nearest one-minute interval.** Grade 5 students using *Investigations in Number, Data, and Space* construct "lifetime strips" to represent and compare ages; they use stories, graphs, and tables to represent changes in speed and position over time. **References:** Measurement Benchmarks Investigation 3: Sessions 1-3 Patterns of Change Investigation 2: Sessions 1-5 Ten-Minute Math: Graph Stories
	• **calculates elapsed time using calendars, schedules, and clocks (to the nearest minute).** Grade 5 students using *Investigations in Number, Data, and Space* construct "lifetime strips" to represent and compare ages; they use

Grade	TASK ANALYSIS The student…
	stories, graphs, and tables to represent changes in speed and position over time. **References:** Measurement Benchmarks Investigation 3: Sessions 1-3 Patterns of Change Investigation 2: Sessions 1-5 Ten-Minute Math: Graph Stories
	• **calculates units of elapsed time using digital and analog clocks.** Grade 5 students using *Investigations in Number, Data, and Space* construct "lifetime strips" to represent and compare ages; they use stories, graphs, and tables to represent changes in speed and position over time. **References:** Measurement Benchmarks Investigation 3: Sessions 1-3 Patterns of Change Investigation 2: Sessions 1-5 Ten-Minute Math: Graph Stories
	• **determines time utilizing time zone maps.** Grade 5 students using *Investigations in Number, Data, and Space* construct "lifetime strips" to represent and compare ages; they use stories, graphs, and tables to represent changes in speed and position over time. **References:** Measurement Benchmarks Investigation 3: Sessions 1-3 Patterns of Change Investigation 2: Sessions 1-5 Ten-Minute Math: Graph Stories
	• **creates and analyzes schedules/tables using elapsed time in real-world applications.** Grade 5 students using *Investigations in Number, Data, and Space* construct "lifetime strips" to represent and compare ages; they use stories, graphs, and tables to represent changes in speed and position over time. **References:** Measurement Benchmarks Investigation 3: Sessions 1-3 Patterns of Change Investigation 2: Sessions 1-5 Ten-Minute Math: Graph Stories

Grade	TASK ANALYSIS The student…
	• **justifies through oral and written mathematical language the use of time schedules and tables in real-world situations.** Grade 5 students using *Investigations in Number, Data, and Space* construct "lifetime strips" to represent and compare ages; they use stories, graphs, and tables to represent changes in speed and position over time. **References:** Measurement Benchmarks Investigation 3: Sessions 1-3 Patterns of Change Investigation 2: Sessions 1-5 Ten-Minute Math: Graph Stories
	TEMPERATURE
3	• **demonstrates an understanding of Celsius and Fahrenheit scales on thermometers.** There are no specific references to temperature scales or thermometers in the third grade series.
	• **reads thermometer scales (Celsius and Fahrenheit) accurately, including temperatures between interval markings.** There are no specific references to temperature scales or thermometers in the third grade series.
	• **estimates Celsius and Fahrenheit temperatures in real-life situations and from pictorial representations.** There are no specific references to temperature scales or thermometers in the third grade series.
	• **justifies implications of temperature to real-life situations. (e.g., What would you wear if the temperature were 38° F? 38° C?)** There are no specific references to temperature scales or thermometers in the third grade series.
	• **calculates the difference in temperatures (e.g., 78° - 43° = 35°).** There are no specific references to temperature scales or thermometers in the third grade series.
4	• **solves real-world problems involving estimation of temperatures to the nearest five degrees.** **Grade 4 students discuss weather changes, and changes in temperature, as examples of data which changes over time.** **Reference:** Changes Over Time Investigation 2: Sessions 1-2, page 33

Grade	TASK ANALYSIS The student…
	• **describes the procedures used to determine temperatures using Celsius and Fahrenheit scales.** **Grade 4 students discuss weather changes, and changes in temperature, as examples of data which changes over time.** **Reference:** Changes Over Time Investigation 2: Sessions 1-2, page 33
5	• **compares temperature change within the same scale using Celsius or Fahrenheit, including readings below zero.** There are no specific references to the measurement of temperature, or change in temperature, in the Grade 5 series.
	• **explains in writing how to calculate a change in temperature, including below zero.** There are no specific references to the measurement of temperature, or change in temperature, in the Grade 5 series.
	MONEY
3	• **demonstrates an understanding of equivalent sets of coins.** Grade 3 students using *Investigations in Number, Data, and Space* recognize the value of coins and find the value of a collection of coins, they divide one dollar among different numbers of people, and they solve a variety of problems involving the addition, subtraction, multiplication, and/or division of amounts of money. **References:** 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
	• **counts money using a combination of coins and bills up to $10.00.** **References:** 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

Grade	TASK ANALYSIS The student…
	• **reads and records money amounts using the dollar sign and decimal point.** **References:** 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
	• **adds and subtracts money amounts using mental math and/or paper and pencil.** **References:** 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
	• **estimates and/or solves real-world problems (e.g., making change using a variety of combinations of coins and currency).** **References:** 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
4	• **selects appropriate method (e.g., mental math, estimation, calculators, paper and pencil) for calculating amounts of money based on the given situation.** **References:** Mathematical Thinking at Grade 4 Investigation 2: Sessions 1-4 Investigation 3: Sessions 4-5 Money, Miles, and Large Numbers Investigation 1: Sessions 1-8

Grade	TASK ANALYSIS The student…
	• **calculates correct change and counts it back.** **References:** Mathematical Thinking at Grade 4 Investigation 2: Sessions 1-4 Investigation 3: Sessions 4-5 Money, Miles, and Large Numbers Investigation 1: Sessions 1-8
	• **solves real-world problems involving money and evaluates the reasonableness of the results.** **References:** Mathematical Thinking at Grade 4 Investigation 2: Sessions 1-4 Investigation 3: Sessions 4-5 Money, Miles, and Large Numbers Investigation 1: Sessions 1-8
5	• **uses appropriate strategies for counting back change.** Grade 5 students using *Investigations in Number, Data, and Space* relate decimals in money to decimals used in other situations. **Reference:** Name That Portion Investigation 3: Session 1, page 67
	• **applies operations related to real-world money problems (e.g., balances a checkbook).** Grade 5 students using *Investigations in Number, Data, and Space* relate decimals in money to decimals used in other situations. **Reference:** Name That Portion Investigation 3: Session 1, page 67
	• **produces an organized list to illustrate equivalent amounts of money.** Grade 5 students using *Investigations in Number, Data, and Space* relate decimals in money to decimals used in other situations. **Reference:** Name That Portion Investigation 3: Session 1, page 67
	• **computes cost per item related to real-world situations.** Grade 5 students using *Investigations in Number, Data, and Space* relate decimals in money to decimals used in other situations. **Reference:** Name That Portion Investigation 3: Session 1, page 67

Grade	TASK ANALYSIS The student…
	• **uses cost per item to determine the better buy.** Grade 5 students using *Investigations in Number, Data, and Space* relate decimals in money to decimals used in other situations. **Reference:** Name That Portion Investigation 3: Session 1, page 67
	• **finds the price of an item on sale (percent of a number).** Grade 5 students using *Investigations in Number, Data, and Space* relate decimals in money to decimals used in other situations. **Reference:** Name That Portion Investigation 3: Session 1, page 67
	• **computes the total sale price including sales tax.** Grade 5 students using *Investigations in Number, Data, and Space* relate decimals in money to decimals used in other situations. **Reference:** Name That Portion Investigation 3: Session 1, page 67
	PERIMETER
3	• **defines perimeter as the distance around the outside of a plane figure.** **References:** Turtle Paths Investigation 3: Sessions 1-5 Ten-Minute Math: Lengths and Perimeters
	• **uses a wide variety of concrete objects (e.g., grid paper, string, geoboard, tiles, cubes) to explore perimeter.** **References:** Turtle Paths Investigation 3: Sessions 1-5 Ten-Minute Math: Lengths and Perimeters
	• **uses addition as the basic mathematical operation to calculate perimeter.** **References:** Turtle Paths Investigation 3: Sessions 1-5 Ten-Minute Math: Lengths and Perimeters

Grade	TASK ANALYSIS The student…
	• **calculates perimeter by identifying the length of a missing side when given a pictorial model.** **References:** Turtle Paths Investigation 3: Sessions 1-5 Ten-Minute Math: Lengths and Perimeters
	• **estimates and solves real-world problems involving perimeter.** **References:** Turtle Paths Investigation 3: Sessions 1-5 Ten-Minute Math: Lengths and Perimeters
4	• **uses a wide variety of concrete objects (e.g., cubes, grid paper, string, tiles, geoboards) to determine the perimeter.** **References:** Sunken Ships and Grid Patterns Investigation 1: Sessions 5-6 Investigation 2: Session 4 Ten-Minute Math: Lengths and Perimeter
	• **discovers strategies (counting, addition, multiplication) to determine the measurement of a perimeter.** **References:** Sunken Ships and Grid Patterns Investigation 1: Sessions 5-6 Investigation 2: Session 4 Ten-Minute Math: Lengths and Perimeter
	• **selects the appropriate strategy and unit for labeling the perimeter in real- world problems.** **References:** Sunken Ships and Grid Patterns Investigation 1: Sessions 5-6 Investigation 2: Session 4 Ten-Minute Math: Lengths and Perimeter
	• **estimates the perimeter of regular and irregular polygons.** **References:** Sunken Ships and Grid Patterns Investigation 1: Sessions 5-6 Investigation 2: Session 4 Ten-Minute Math: Lengths and Perimeter

Grade	TASK ANALYSIS The student…
	• **communicates an understanding of perimeter through the creation of a real-world problem.** **References:** Sunken Ships and Grid Patterns Investigation 1: Sessions 5-6 Investigation 2: Session 4 Ten-Minute Math: Lengths and Perimeter
5	• **discovers and applies the formula (2 x L) + (2 x W) = P for finding the perimeter of squares and rectangles.** Students find perimeters of similar polygons and the distance along a path. **References:** Picturing Polygons Investigation 3: Sessions 5-6: Extension, page 108 Measurement Benchmarks Investigation 1: Sessions 5-6
	• **determines the length of a side when the perimeter is known in a named polygon.** Students find perimeters of similar polygons and the distance along a path. **References:** Picturing Polygons Investigation 3: Sessions 5-6: Extension, page 108 Measurement Benchmarks Investigation 1: Sessions 5-6
	• **knows how to determine whether an accurate or estimated measurement of perimeter is needed for a solution.** Students find perimeters of similar polygons and the distance along a path. **References:** Picturing Polygons Investigation 3: Sessions 5-6: Extension, page 108 Measurement Benchmarks Investigation 1: Sessions 5-6
	• **solves real-world problems involving perimeter.** Students find perimeters of similar polygons and the distance along a path. **References:** Picturing Polygons Investigation 3: Sessions 5-6: Extension, page 108 Measurement Benchmarks Investigation 1: Sessions 5-6

Grade	TASK ANALYSIS The student…
	• **writes a number sentence to express how perimeter was found, using counting or multiplication.** Students find perimeters of similar polygons and the distance along a path. **References:** Picturing Polygons Investigation 3: Sessions 5-6: Extension, page 108 Measurement Benchmarks Investigation 1: Sessions 5-6
	• **investigates measures of circumference using concrete measurement (e.g., string, tape measure).** Students find perimeters of similar polygons and the distance along a path. **References:** Picturing Polygons Investigation 3: Sessions 5-6: Extension, page 108 Measurement Benchmarks Investigation 1: Sessions 5-6
	AREA
3	• **uses a variety of concrete objects (e.g., tiles, cubes) to explore area.** **References:** Things That Come in Groups Investigation 3: Sessions 1-5 Flips, Turns, and Area Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-5
	• **charts square units on grid paper as a graphic representation of area.** **References:** Things That Come in Groups Investigation 3: Sessions 1-5 Flips, Turns, and Area Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-5

Grade	TASK ANALYSIS The student…
	• **uses counting, addition, multiplication, and arrays as the basic mathematical strategies to calculate area.** **References:** Things That Come in Groups Investigation 3: Sessions 1-5 Flips, Turns, and Area Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-5
	• **labels area as "square units."** **References:** Things That Come in Groups Investigation 3: Sessions 1-5 Flips, Turns, and Area Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-5
	• **solves real-world problems involving area.** **References:** Things That Come in Groups Investigation 3: Sessions 1-5 Flips, Turns, and Area Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-5
	• **explains the procedures used to solve real-world problems involving estimates of area.** **References:** Things That Come in Groups Investigation 3: Sessions 1-5 Flips, Turns, and Area Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-5
4	• **investigates and compares the concepts of area and perimeter through the use of manipulatives, including pentominoes, tiles, grid paper, and geoboards.** **References:** Arrays and Shares Investigation 2: Sessions 1-6 Landmarks in the Thousands Investigation 1: Session 2 Sunken Ships and Grid Patterns Investigation 1, Sessions 5-6 Investigation 2, Session 4 Ten-Minute Math: Lengths and Perimeter

Grade	TASK ANALYSIS The student…
	• **applies strategies (e.g., counting, addition, multiplication, formula [A = L x W]) to determine the measurement of area.** **References:** Arrays and Shares Investigation 2: Sessions 1-6 Landmarks in the Thousands Investigation 1: Session 2
	• **estimates the area of regular and irregular polygons using graph paper, geoboards, and other tools.** **References:** Arrays and Shares Investigation 2: Sessions 1-6 Landmarks in the Thousands Investigation 1: Session 2
	• **applies the concept of area and perimeter to solve real-world problems.** **References:** Arrays and Shares Investigation 2: Sessions 1-6 Landmarks in the Thousands Investigation 1: Session 2
	• **communicates understanding through the creation of a real-world problem relating to area.** **References:** Arrays and Shares Investigation 2: Sessions 1-6 Landmarks in the Thousands Investigation 1: Session 2
5	• **applies known formula for finding area of rectangles and squares (A = L x W).** **References:** 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

Grade	TASK ANALYSIS The student…
	• **names area as square units including exponent notations (e.g., square inches).** **References:** 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
	• **constructs a model demonstrating area of rectangles and squares.** **References:** 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
	• **determines the length of a side when the area is known.** **References:** Mathematical Thinking at Grade 5 Investigation 1: Sessions 1-3
	• **calculates the area of a region excluding a portion of the region (e.g., area of a lot, excluding the house on it).** **References:** Name That Portion Investigation 1: Sessions 2-4 Investigation 3: Sessions 2, 8
	• **calculates the area of regular and irregular regions on a grid.** **References:** 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

Grade	TASK ANALYSIS The student…
	• **formulates strategies through oral and written language to determine the area of regular and irregular figures on a grid.** **References:** 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
	• **creates graphic organizers (chart, model, or table) to demonstrate the relationship between area and perimeter, using manipulatives (e.g., pentominoes, tiles, grid paper).** **References:** 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
	CAPACITY/VOLUME
3	• **defines capacity as the amount of space to be filled (e.g., liquid in a cup, students on a school bus).** Grade 3 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of rectangular prisms. **References:** Exploring Solids and Boxes Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4
	• **demonstrates knowledge of customary (oz., cup, pt., qt., gal.) and metric (milliliters, liters) units of capacity.** Grade 3 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of rectangular prisms. **References:** Exploring Solids and Boxes Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4

Grade	TASK ANALYSIS The student…
	• **compares customary (e.g., cups/gallon) and metric (e.g., milliliters/liter) units of capacity within a single system.** Grade 3 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of rectangular prisms. **References:** Exploring Solids and Boxes Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4
	• **estimates and/or solves real-world problems involving capacity.** Grade 3 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of rectangular prisms. **References:** Exploring Solids and Boxes Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4
	• **defines volume as the amount of space occupied in the three dimensions (length, width, and height) and expressed in cubic units.** **References:** Exploring Solids and Boxes Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4
	• **investigates volume through the use of cube layering.** **References:** Exploring Solids and Boxes Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4
	• **uses manipulatives to solve real-world problems involving volume.** **References:** Exploring Solids and Boxes Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4
	• **solves real-world problems involving estimates of the volume of a rectangular prism.** **References:** Exploring Solids and Boxes Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4

Grade	TASK ANALYSIS The student…
4	• **understands the definition of capacity as the maximum amount that can be held by a container.** Grade 4 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of cube configurations and rectangular solids. **References:** Seeing Solids and Silhouettes Investigation 1: Sessions 1-2 Landmarks in the Thousands Investigation 1: Session 2
	• **uses customary (ounce., ¼ cup, ½ cup, cup, pint, quart, gallon) and metric (milliliters, liters) units of capacity.** Grade 4 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of cube configurations and rectangular solids. **References:** Seeing Solids and Silhouettes Investigation 1: Sessions 1-2 Landmarks in the Thousands Investigation 1: Session 2
	• **converts units of capacity within the same system using one conversion (e.g., pints to gallons).** Grade 4 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of cube configurations and rectangular solids. **References:** Seeing Solids and Silhouettes Investigation 1: Sessions 1-2 Landmarks in the Thousands Investigation 1: Session 2
	• **solves real-world problems involving measurement of capacity, labels appropriately, and explains strategies used.** Grade 4 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of cube configurations and rectangular solids. **References:** Seeing Solids and Silhouettes Investigation 1: Sessions 1-2 Landmarks in the Thousands Investigation 1: Session 2

Grade	TASK ANALYSIS The student…
	• **understands volume as the amount of space occupied in three dimensions (length, width, and height) and expressed in cubic units.** **References:** Seeing Solids and Silhouettes Investigation 1: Sessions 1-2 Landmarks in the Thousands Investigation 1: Session 2
	• **uses concrete objects (e.g., cubes) and pictorial representations to determine the measurement of volume.** **References:** Seeing Solids and Silhouettes Investigation 1: Sessions 1-2 Landmarks in the Thousands Investigation 1: Session 2
	• **applies formula (L x W x H = V) or counting procedures to investigate measurement of volume in real-world problems.** **References:** Seeing Solids and Silhouettes Investigation 1: Sessions 1-2 Landmarks in the Thousands Investigation 1: Session 2
	• **estimates the volume of a rectangular prism using manipulatives or a graphic representation and explains reasoning.** **References:** Seeing Solids and Silhouettes Investigation 1: Sessions 1-2 Landmarks in the Thousands Investigation 1: Session 2
5	• **selects the appropriate units of measure (ounces, cups, pints, quarts, gallons, milliliters, liters, kiloliters) to solve real-world problems.** **References:** Measurement Benchmarks Investigation 2: Sessions 1-2, 4, 6 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

Grade	TASK ANALYSIS The student…
	• **knows that when changing from smaller units to larger units, division is used (e.g., to convert quarts to gallons, divide by 4).** **References:** Measurement Benchmarks Investigation 2: Sessions 1-2, 4
	• **knows that when changing from larger units to smaller units, multiplication is used (e.g., to convert gallons to quarts multiply by 4).** **References:** Measurement Benchmarks Investigation 2: Sessions 1-2, 4
	• **converts within the same system, using up to two conversions (e.g., gallons to quarts to pints).** **References:** Measurement Benchmarks Investigation 2: Sessions 1-2, 4
	• **estimates capacity to the nearest unit.** **References:** Measurement Benchmarks Investigation 2: Sessions 1-2, 4, 6 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
	• **demonstrates through the use of three-dimensional pictorial models how to find the volume of rectangular prisms.** **References:** 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

Grade	TASK ANALYSIS The student…
	• **names volume as cubic units, using words or exponents (e.g., cubic feet, ft³).** **References:** 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
	• **derives and applies formula (L x W x H = V) to solve real-world problems.** **References:** 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
	• **creates a model that represents a given volume of a rectangular prism.** **References:** 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
	ANGLES
3	• **recognizes an angle as a shape made by two rays extending from a common endpoint named the vertex.** **References:** Turtle Paths Investigation 2 Sessions 1-2 Session 4: Dialogue Box, p. 52 Sessions 5-6 Ten-Minute Math: Lengths and Perimeters

Grade	TASK ANALYSIS The student…
	• **identifies the degree system as a measurement of an angle.** **References:** Turtle Paths Investigation 2 Sessions 1-2 Session 4: Dialogue Box, p. 52 Sessions 5-6 Ten-Minute Math: Lengths and Perimeters
	• **knows that degrees can be presented in symbol (°) or word (degrees).** **References:** Turtle Paths Investigation 2 Sessions 1-2 Session 4: Dialogue Box, p. 52 Sessions 5-6 Ten-Minute Math: Lengths and Perimeters
	• **recognizes that a square corner forms an angle that is called a right angle, or a 90° angle.** **References:** Turtle Paths Investigation 2 Sessions 1-2 Session 4: Dialogue Box, p. 52 Sessions 5-6 Ten-Minute Math: Lengths and Perimeters
4	• **investigates common angles of 45°, 90°, 120°, and 180° (acute, right, obtuse, straight) using models and manipulatives.** **References:** Sunken Ships and Grid Patterns Investigation 2: Sessions 1, 5 Ten-Minute Math: Lengths and Perimeters Appendix: *Geo-Logo* Tutorial
	• **selects and uses the appropriate tool (protractor) to measure common angles.** **References:** Sunken Ships and Grid Patterns Investigation 2: Sessions 1, 5 Ten-Minute Math: Lengths and Perimeters Appendix: *Geo-Logo* Tutorial

Grade	TASK ANALYSIS The student…
	• **applies 45°, 90°, and 180° angles as reference points for measure of other angles and justifies reasoning.** **References:** Sunken Ships and Grid Patterns Investigation 2: Sessions 1, 5 Ten-Minute Math: Lengths and Perimeters Appendix: *Geo-Logo* Tutorial
5	• **identifies, measures, or constructs angles in degrees, using a protractor.** **References:** Picturing Polygons Investigation 2: Sessions 1-3, 6-9 Investigation 3: Sessions 1-3
	• **identifies angles by name (e.g., acute) or their measurement (e.g., 45°) in real-world measurement settings.** **References:** Picturing Polygons Investigation 2: Sessions 1-3, 6-9 Investigation 3: Sessions 1-3
	• **explains how an angle is classified as acute, right, or obtuse.** **References:** Picturing Polygons Investigation 2: Sessions 1-3, 6-9 Investigation 3: Sessions 1-3

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Geometry**
Grade Cluster: **3-5**

Benchmark

MA.C.3.2.2: The student identifies and plots positive ordered pairs (whole numbers) in a rectangular coordinate system (graph).

Grade	TASK ANALYSIS The student…
	COORDINATE SYSTEMS
3	• **defines horizontal and vertical directions.** **References:** Turtle Paths Investigation 1: Sessions 1-4 Investigation 2: Sessions 3-6 Investigation 3: Sessions 1-7 Ten-Minute Math: Lengths and Perimeters
	• **knows that when locating ordered pairs on a grid, the rule is to locate the horizontal position first, then the vertical position.** **References:** Turtle Paths Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-7
	• **locates, identifies, and records ordered pairs of whole numbers on a grid of at least 6 x 6.** **References:** Turtle Paths Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-7
	• **plots ordered pairs of numbers on a coordinate grid of at least 6 x 6** **[(e.g. (3,2); (4,1); (4,5)].** **References:** Turtle Paths Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-7

Grade	TASK ANALYSIS The student…
4	• **plots ordered pairs of whole numbers on the first quadrant of a coordinate system using a 10 x 10 grid.** **References:** Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9 Ten-Minute Math: Lengths and Perimeters
	• **applies understanding of coordinate systems to locating places on a street map.** **References:** Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9 Ten-Minute Math: Lengths and Perimeters
5	• **plots ordered pairs on the first quadrant of a coordinate system using at least a 10 x 10 grid.** **References:** Picturing Polygons Investigation 1: Sessions 3-4 Investigation 2: Sessions 4-7, 9 Investigation 3: Sessions 1-2, 5-6
	• **describes the shortest path between two ordered pairs.** **References:** Picturing Polygons Investigation 1: Sessions 3-4 Investigation 2: Sessions 4-7, 9 Investigation 3: Sessions 1-2, 5-6

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Geometry**
Grade Cluster: **3-5**

Benchmarks

MA.C.1.2.1: The student given a verbal description, draws and/or models two- and three-dimensional shapes and uses appropriate geometric vocabulary to write a description of a figure or a picture composed of geometric figures.

MA.C.3.2.1: The student represents and applies a variety of strategies and geometric properties and formulas for two- and three-dimensional shapes to solve real-world and mathematical problems.

MA.B.1.2.1: The student uses concrete and graphic models to develop procedures for solving problems related to measurement including length, weight, time, temperature, perimeter, area, volume, and angle.

MA.B.1.2.2: The student solves real-world problems involving length, weight, perimeter, area, capacity, volume, time, temperature, and angles.

MA.B.3.2.1: The student solves real-world problems involving estimates of measurements, including length, time, weight, temperature, money, perimeter, area, and volume.

Grade	TASK ANALYSIS The student…
	GEOMETRY
3	• **demonstrates an understanding of the names (circle, square, triangle, rectangle) and attributes (curves, vertices, sides, angles) of two- dimensional shapes.** **References:** 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

Grade	TASK ANALYSIS The student…
	• **demonstrates an understanding of the names (sphere, cube, pyramid, rectangular solid/prism, cone, cylinder) and attributes (edges, bases, faces, vertices) of three-dimensional shapes.** **References:** 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
	• **identifies geometric vocabulary including points, lines, line segments, intersecting lines, parallel and perpendicular lines, right angles, and sides.** Students use *Geo-Logo* software to construct paths and describe their properties. They make turns and use intersecting paths to construct closed figures. **References:** Turtle Paths Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-7
	• **identifies polygons (triangle; pentagon; hexagon; quadrilaterals, including square, rectangle, parallelogram, rhombus) as closed figures whose sides are line segments.** **References:** 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

Grade	TASK ANALYSIS The student…
	• **recognizes a two-dimensional (plane) shape or three-dimensional (solid) shape when given a verbal description.** **References:** 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 Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4
	• **builds spatial visualization of two- or three-dimensional shapes through the use of manipulatives and models.** **References:** 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 Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4

Grade	TASK ANALYSIS The student…
	• **draws or models a two- or three-dimensional shape when given a verbal description.** **References:** 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 Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4
	• **compares and applies the concepts of area and perimeter of rectangles, using concrete and graphic materials to include grids and pictures.** **References:** Things That Come in Groups Investigation 3: Sessions 1-5 Flips, Turns, and Area Investigation 1: Sessions 4-5 Investigation 2: Sessions 1-5 Turtle Paths Investigation 3: Sessions 1-2, 6-7 Ten-Minute Math: Lengths and Perimeters
	• **writes a description of a two- or three-dimensional figure, using appropriate geometric vocabulary.** **References:** 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

Grade	TASK ANALYSIS The student…
	(continued) Exploring Solids and Boxes Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-3 **Investigation 5: Sessions 1-4**
4	• **knows geometric vocabulary including parallel and perpendicular lines, sides, vertices, bases, points, lines, line segments, and circles.** Grade 4 students using the *Investigations in Number, Data, and Space* series gain experience with parallel lines and perpendicular lines as they use the computer to construct and manipulate points, segments, and rectangles on coordinate grids. **References:** Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9 Ten-Minute Math: Lengths and Perimeters
	• **defines and uses appropriate geometric vocabulary (regular polygons; irregular polygons; diameter; rays; planes; and acute, obtuse, and straight angles) to describe properties and attributes of two- and three-dimensional figures.** **References:** Seeing Solids and Silhouettes Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-4 Ten-Minute Math: Quick Images Different Shapes, Equal Pieces Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-2 Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9 Ten-Minute Math: Lengths and Perimeters Changes Over Time Ten-Minute Math: Quick Images

Grade	TASK ANALYSIS The student…
	• **draws and classifies two-dimensional figures (regular and irregular polygons) having at least eight sides.** **References:** 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
	• **compares and applies the concepts of area and perimeter to solve mathematical and real-world problems.** **References:** Arrays and Shares Investigation 2: Sessions 1-6 Landmarks in the Thousands Investigation 1: Session 2 Sunken Ships and Grid Patterns Investigation 1, Sessions 5-6 Investigation 2, Session 4 Ten-Minute Math: Lengths and Perimeters
5	• **demonstrates a knowledge of geometric terms including circles; diameter; acute, right, obtuse, and straight angles; sides; bases; vertices; points; lines and line segments; parallel and perpendicular lines; rays and planes.** **References:** Mathematical Thinking at Grade 5 Ten-Minute Math: Quick Images Picturing Polygons Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-6 Building on Numbers You Know Ten-Minute Math: Quick Images

Grade	TASK ANALYSIS The student…
	(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
	• **identifies, describes, and draws regular polygons (equal length of sides and equal measure of angles) and irregular polygons with at least 10 sides.** **References:** Mathematical Thinking at Grade 5 Ten-Minute Math: Quick Images Picturing Polygons Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-6 Building on Numbers You Know Ten-Minute Math: Quick Images
	• **names and classifies triangles according to the lengths of their sides (isosceles, scalene, equilateral) and/or according to the measure of their angles (acute, right, obtuse).** **References:** Picturing Polygons Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-6
	• **names and classifies quadrilaterals (trapezoid, parallelogram, rectangle, rhombus, square) by the characteristics of their sides and angles.** **References:** Picturing Polygons Investigation 2: Sessions 1-5, 8 Investigation 3: Sessions 1-6

Grade	TASK ANALYSIS The student…
	• **identifies, constructs, and analyzes two- and three-dimensional figures (e.g., radius of a circle, faces and edges of a solid figure, intersecting lines on a plane, diagonals of polygons).** **References:** Mathematical Thinking at Grade 5 Ten-Minute Math: Quick Images Picturing Polygons Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-6 Building on Numbers You Know Ten-Minute Math: Quick Images 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
	• **identifies a given net (a flat pattern that can be folded into a solid figure) for a solid figure.** **References:** Containers and Cubes Investigation 1: Sessions 1-2
	• **constructs two- and three-dimensional figures as a strategy to solve real-world problems.** **References:** Picturing Polygons Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-6 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

Grade	TASK ANALYSIS The student…
	• **explores how the area and perimeter are affected when a geometric figure is enlarged or reduced (e.g., the effect on the area of a square when the sides are doubled).** **References:** Mathematical Thinking at Grade 5 Investigation 1: Sessions 1-3 Picturing Polygons Investigation 3: Sessions 4-6 Measurement Benchmarks Investigation 1: Sessions 5-6 Name That Portion Investigation 1: Sessions 2-4 Investigation 3: Sessions 2, 8
	• **sorts and describes in writing the attributes (e.g., line relationship, congruency, measure of angles, measure of sides) of geometric figures.** **References:** Mathematical Thinking at Grade 5 Ten-Minute Math: Quick Images Picturing Polygons Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-6 Building on Numbers You Know Ten-Minute Math: Quick Images 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

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Geometry**
Grade Cluster: **3-5**

Benchmarks

MA.C.2.2.1: The student understands the concepts of spatial relationships, symmetry, reflections, congruency, and similarity.

MA.C.2.2.2: The student predicts, illustrates, and verifies which figures could result from a flip, slide, or turn of a given figure.

MA.C.3.2.1: The student represents and applies a variety of strategies and geometric properties and formulas for two- and three-dimensional shapes to solve real-world and mathematical problems.

Grade	TASK ANALYSIS The student…
	SPATIAL RELATIONSHIPS
3	• **demonstrates an understanding of symmetry and reflection.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 1, 3-4 Flips, Turns, and Area Investigation 1: Sessions 1-3 Investigation 2: Sessions 2-3
	• **describes congruency as two- or three-dimensional figures that are the same shape and size.** **References:** Flips, Turns, and Area Investigation 2: Sessions 2-5 Turtle Paths Investigation 3: Sessions 3-5
	• **distinguishes between congruency and similarity (e.g., similar figures are the same shape but are not the same size).** **References:** Flips, Turns, and Area Investigation 2: Sessions 2-5 Turtle Paths Investigation 3: Sessions 3-5

Grade	TASK ANALYSIS The student…
	• **develops an understanding of spatial relationships through the use of manipulatives and models.** **References:** 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 Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4
4	• **builds an understanding of geometric spatial relationships through experiences with drawing, measuring, and constructing.** **References:** Seeing Solids and Silhouettes Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-4 Ten-Minute Math: Quick Images Different Shapes, Equal Pieces Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-2 Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9 Ten-Minute Math: Lengths and Perimeters Changes Over Time Ten-Minute Math: Quick Images

Grade	TASK ANALYSIS The student…
	• **determines symmetry, congruency, and reflections in geometric figures using drawings and concrete materials (e.g., pattern blocks, mirrors).** **References:** Mathematical Thinking at Grade 4 Investigation 4: Sessions 1-6 Different Shapes, Equal Pieces Investigation 1: Session 1 Money, Miles, and Large Numbers Investigation 2: Session 4 Investigation 3: Sessions 2-4 Sunken Ships and Grid Patterns Investigation 2: Sessions 1-9
	• **creates congruent, similar, and symmetrical figures.** **References:** Mathematical Thinking at Grade 4 Investigation 4: Sessions 1-6 Different Shapes, Equal Pieces Investigation 1: Session 1 Money, Miles, and Large Numbers Investigation 2: Session 4 Investigation 3: Sessions 2-4 Sunken Ships and Grid Patterns Investigation 2: Sessions 2-3, 6-9
	• **identifies and draws lines of symmetry in two-dimensional figures.** **References:** Mathematical Thinking at Grade 4 Investigation 4: Sessions 1-6 Sunken Ships and Grid Patterns Investigation 2: Sessions 2-3, 6-9
5	• **identifies, draws, and describes similar figures, recognizing the proportional relationship between the figures.** **References:** Picturing Polygons Investigation 3: Sessions 4-6 Measurement Benchmarks Investigation 1: Sessions 7-8

Grade	TASK ANALYSIS The student…
	• **classifies two figures as symmetrical, congruent, or similar when one is rotated.** **References:** Picturing Polygons Investigation 2: Sessions 4-7 Investigation 3: Sessions 4-6 Measurement Benchmarks Investigation 1: Sessions 7-8
	• **constructs a figure with multiple lines of symmetry.** **References:** Picturing Polygons Investigation 3: Session 4
	• **deduces the area and/or perimeter of a complete figure when given a portion of a symmetrical figure on grid paper.** **Grade 5 students expand geometric patterns, build similar figures, and explore the relationships between the lengths of sides and areas of similar shapes.** **References:** Picturing Polygons Investigation 3: Session 4
	• **justifies, using oral and written language, whether a figure is similar or congruent.** **References:** Picturing Polygons Investigation 2: Sessions 4-7 Investigation 3: Sessions 4-6 Measurement Benchmarks Investigation 1: Sessions 7-8

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Geometry**
Grade Cluster: **3-5**

Benchmark

MA.C.2.2.2: The student predicts, illustrates, and verifies which figures could result from a flip, slide, or turn of a given figure.

Grade	TASK ANALYSIS The student…
	TRANSFORMATIONS
3	• **uses concrete materials to demonstrate an understanding of slides, flips, and turns.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Session 1 Flips, Turns, and Area Investigation 1: Sessions 1-3 Investigation 2: Sessions 2-3
	• **knows that slides are called translations, flips are called reflections, and turns are called rotations.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Session 1 Flips, Turns, and Area Investigation 1: Sessions 1-3 Investigation 2: Sessions 2-3
	• **explores tessellations by using the same shape to cover a surface leaving no gaps.** **References:** Flips, Turns, and Area Investigation 1: Sessions 1-5

Grade	TASK ANALYSIS The student…
	• **demonstrates that turns are clockwise or counterclockwise rotations that are measured in degrees (must recognize up to 180°).** **References:** Flips, Turns, and Area Investigation 1: Sessions 2-3 Investigation 2: Sessions 2-3 Turtle Paths Investigation 2: Sessions 1-6
4	• **predicts and describes the results of flips (reflections), slides (translations), turns (rotations of 90° or 180°) and the direction (clockwise or counterclockwise) of turns using concrete and graphic materials (e.g., pattern blocks, geoboards, grids).** **References:** Mathematical Thinking at Grade 4 Investigation 4: Sessions 5-6 Money, Miles, and Large Numbers Investigation 2: Session 4 Investigation 3: Sessions 2-4 Sunken Ships and Grid Patterns Investigation 2: Sessions 1-9
	• **describes the effect of a flip, slide, or turn of a geometric figure (regular or irregular polygon with at least eight sides).** **References:** Mathematical Thinking at Grade 4 Investigation 4: Sessions 5-6 Different Shapes, Equal Pieces Investigation 1: Session 1 Money, Miles, and Large Numbers Investigation 2: Session 4 Investigation 3: Sessions 2-4 Sunken Ships and Grid Patterns Investigation 2: Sessions 1-9

Grade	TASK ANALYSIS The student…
	• **creates tessellations by using the same shape to cover a surface leaving no gaps.** Students use *Geo-Logo* software to turn and repeat drawings of rectangles and design rectangle patterns. They create geometric patterns based on reflective and rotational symmetric designs. They construct halves of "crazy cakes" resembling tessellating units. **References:** Mathematical Thinking at Grade 4 Investigation 4: Sessions 1-6 Different Shapes, Equal Pieces Investigation 1: Session 1 Sunken Ships and Grid Patterns Investigation 2: Sessions 6-9
5	• **demonstrates a knowledge of the effect of a single flip, slide, or turn of 90° and 180°.** **References:** Picturing Polygons Investigation 2: Sessions 1-7 Investigation 3: Sessions 4-6
	• **knows that a transformation is a change in the spatial position of a geometric figure.** **References:** Picturing Polygons Investigation 2: Sessions 1-7 Investigation 3: Sessions 4-6 Measurement Benchmarks Investigation 1: Sessions 7-8
	• **restates that a flip is a reflection, a slide is a translation, and a turn is a rotation.** **References:** Picturing Polygons Investigation 2: Sessions 1-7 Investigation 3: Sessions 4-6
	• **predicts and illustrates the effect of up to two transformations (e.g., a reflection and a rotation of 90°, 180°, or 270° turning clockwise or counterclockwise).** **References:** Picturing Polygons Investigation 2: Sessions 1-7 Investigation 3: Sessions 4-6

Grade	TASK ANALYSIS The student…
	• **explores transformations on a coordinate grid in the first quadrant by plotting ordered pairs.** **References:** Picturing Polygons Investigation 1: Sessions 3-4 Investigation 2: Sessions 4-7, 9 Investigation 3: Sessions 1-2, 5-6
	• **determines and verifies which shapes will or will not tessellate.** **References:** Picturing Polygons Investigation 2: Session 8 Investigation 3: Session 4 Name That Portion Investigation 1: Session 2
	• **describes in writing the location and movement of geometric figures using common language and geometric vocabulary.** **References:** Picturing Polygons Investigation 2: Sessions 1-7 Investigation 3: Sessions 4-6

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Algebraic Thinking**
Grade Cluster: **3-5**

Benchmarks

MA.D.1.2.1: The student describes a wide variety of patterns and relationships through models, such as manipulatives, tables, graphs, rules using algebraic symbols.

MA.D.1.2.2: The student generalizes a pattern, relations, or function to explain how a change in one quantity results in a change in another.

Grade	TASK ANALYSIS The student…
	PATTERNS
3	• **demonstrates an understanding of geometric and numerical patterns.** **References:** 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 Flips, Turns, and Area Investigation 1: Sessions 1-3 Landmarks in the Hundreds Investigation 1: Sessions 1-5 Investigation 2: Sessions 5-6: Teacher Note, page 49 Ten-Minute Math: Counting Around the Class Fair Shares Investigation 2: Sessions 5-6

Grade	TASK ANALYSIS The student…
	• **identifies the missing element in a pattern.** **References:** Mathematical Thinking at Grade 3 Investigation 1: Sessions 2-3 Things That Come in Groups Investigation 2: Sessions 1-6 Investigation 5: Session 1 Flips, Turns, and Area Investigation 1: Sessions 1-3 Fair Shares Investigation 2: Sessions 5-6
	• **discovers the rule of a geometric or numerical pattern.** **References:** 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 Flips, Turns, and Area Investigation 1: Sessions 1-3 Landmarks in the Hundreds Investigation 1: Sessions 1-5 Investigation 2: Sessions 5-6: Teacher Note, page 49 Ten-Minute Math: Counting Around the Class Fair Shares Investigation 2: Sessions 5-6
	• **extends the rule of a geometric or numerical pattern up to four elements** **(e.g., ◊ □ ∇ • , ◊ □ ∇ • , ◊ □, ?, ?) and explains the rule.** **References:** 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 Flips, Turns, and Area Investigation 1: Sessions 1-3

Grade	TASK ANALYSIS The student…
	Landmarks in the Hundreds Investigation 1: Sessions 1-5 Investigation 2: Sessions 5-6: Teacher Note, page 49 Ten-Minute Math: Counting Around the Class Fair Shares **Investigation 2: Sessions 5-6**
	• **uses one operation (addition or subtraction) to extend a numerical pattern or provide a missing element (e.g., n + 3).** **References:** 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 5-6: Teacher Note, page 49 Ten-Minute Math: Counting Around the Class Fair Shares Investigation 2: Sessions 5-6
	• **solves problems by identifying numerical patterns on tables, graphs, and charts.** **References:** Mathematical Thinking at Grade 3 Investigation 1: Sessions 2-3 Things That Come in Groups Investigation 2: Session 1 Investigation 5: Session 1 Landmarks in the Hundreds Investigation 1: Sessions 2-3, 6-7 Fair Shares Investigation 2: Sessions 5-6

Grade	TASK ANALYSIS The student…
4	• **demonstrates proficiency describing, extending, and creating geometric and numerical patterns with one operation (addition and subtraction) and one missing element.** **References:** 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: Session 3 Investigation 4: Sessions 1-3 Packages and Groups Investigation 1: Sessions 1-3 Sunken Ships and Grid Patterns Investigation 2: Sessions 8-9
	• **describes, extends, and creates geometric and numerical patterns with one operation (addition, subtraction, or multiplication [6n or 6 x n]) and two or more missing elements.** **References:** 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: Session 3 Investigation 4: Sessions 1-3 Packages and Groups Investigation 1: Sessions 1-3 Sunken Ships and Grid Patterns Investigation 2: Sessions 8-9
	• **applies the appropriate rule to complete a table or chart.** **References:** Mathematical Thinking at Grade 4 Investigation 3: Sessions 1-2 Landmarks in the Thousands Investigation 1: Session 3 Investigation 4: Sessions 1-3 Packages and Groups Investigation 1: Sessions 1-3

Grade	TASK ANALYSIS The student…
	• **creates and solves problems by identifying a predictable visual or numerical pattern (see example) and justifies reasoning.** **Input 1 2 3 7** **Output $3 $6 $9 ?** **References:** 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: Session 3 Investigation 4: Sessions 1-3 Packages and Groups Investigation 1: Sessions 1-3 Sunken Ships and Grid Patterns Investigation 2: Sessions 8-9
	• **recognizes the mathematical relationships in patterns.** **References:** 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: Session 3 Investigation 4: Sessions 1-3 Packages and Groups Investigation 1: Sessions 1-3 Sunken Ships and Grid Patterns Investigation 2: Sessions 8-9

Grade	TASK ANALYSIS The student…
	• **analyzes number patterns and states rules for relationships (e.g., given 1, 3, 7, 9, 13, the rule is + 2, + 4, + 2, + 4).** **References:** Mathematical Thinking at Grade 4 Investigation 3: Sessions 1-5 Arrays and Shares Investigation 1: Sessions 1-3 Landmarks in the Thousands Investigation 1: Session 3 Investigation 4: Sessions 1-3 Packages and Groups Investigation 1: Sessions 1-3
	• **discusses and analyzes the rule that applies to the pattern and justifies reasoning.** **References:** 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: Session 3 Investigation 4: Sessions 1-3 Packages and Groups Investigation 1: Sessions 1-3 Sunken Ships and Grid Patterns Investigation 2: Sessions 8-9

Grade	TASK ANALYSIS The student…
5	• **determines the missing elements (three or more) in a pattern or continues a pattern with three or more steps. (e.g., *, +, !, *, +, ?, ?, ?) references:** 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 Investigation 3: Sessions 1-7 Containers and Cubes Investigation 1: Sessions 3-4 Ten-Minute Math: Counting Around the Class
	• **defines an expression as a mathematical combination of numbers, variables, and operations (e.g., 5 + a).** **References:** Students use variables in Geo-Logo and in data analysis. **References:** Mathematical Thinking at Grade 5 Investigation 3: Sessions 2-4 Picturing Polygons Investigation 1: Sessions 3-4 Investigation 2: Sessions 4-7 Investigation 3: Sessions 1-2, 4-6 Building on Numbers You Know Investigation 2: Sessions 5-6 Investigation 5: Sessions 1-2 Data: Kids, Cats, and Ads Investigation 2: Session 1

Grade	TASK ANALYSIS The student…
	• **analyzes patterns on various models (e.g., graphs, T-charts, diagrams, and calendars).** **References:** 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 Investigation 3: Sessions 1-7 Containers and Cubes Investigation 1: Sessions 3-4 Ten-Minute Math: Counting Around the Class
	• **derives a function/rule (the relationship between two sets) using the data collected on various models.** **References:** Mathematical Thinking at Grade 5 Investigation 2: Sessions 1-4 Investigation 3: Session 1 Name That Portion Investigation 3: Sessions 5-6: Activity, pages 86-88 Building on Numbers You Know Investigation 1: Sessions 1-5 Patterns of Change Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-7 Ten-Minute Math: Graph Stories Containers and Cubes Ten-Minute Math: Counting Around the Class

Grade	TASK ANALYSIS The student…
	• **explains numerical and pattern generalizations using an algebraic expression (e.g., 3n + 1).** **References:** Mathematical Thinking at Grade 5 Investigation 2: Sessions 1-4 Investigation 3: Session 1 Name That Portion Investigation 3: Sessions 5-6: Activity, pages 86-88 Building on Numbers You Know Investigation 1: Sessions 1-5 Patterns of Change Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-7 Ten-Minute Math: Graph Stories Containers and Cubes Ten-Minute Math: Counting Around the Class
	• **discovers mathematical relationships in patterns and numbers (e.g., Fibonacci numbers, multiples, squared numbers).** **References:** Mathematical Thinking at Grade 5 Investigation 2: Sessions 1-4 Investigation 3: Session 1 Name That Portion Investigation 3: Sessions 5-6: Activity, pages 86-88 Building on Numbers You Know Investigation 1: Sessions 1-5 Patterns of Change Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-7 Ten-Minute Math: Graph Stories Containers and Cubes Ten-Minute Math: Counting Around the Class

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Algebraic Thinking**
Grade Cluster: **3-5**

Benchmarks

MA.D.2.2.1: The student represents a given simple problem situation using diagrams, models, and symbolic expressions translated from verbal phrases, or verbal phrases translated from symbolic expressions, etc.

MA.D.2.2.2: The student uses informal methods, such as physical models and graphs to solve real-world problems involving equations and inequalities.

MA.A.3.2.1: The student understands and explains the effects of addition, subtraction, and multiplication on whole numbers, decimals, and fractions, including mixed numbers, and the effects of division on whole numbers, including the inverse relationship of multiplication and division.

Grade	TASK ANALYSIS The student…
	SYMBOLIC EXPRESSION, INEQUALITIES AND PROBLEM SOLVING
3	• **demonstrates that an equation is a number sentence stating that two quantities are equal.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 1-7 Investigation 3: Sessions 3-4 Investigation 4: Sessions 1-2 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 2-3, 6-7 Investigation 2: Sessions 5-6 Up and Down the Number Line Investigation 1: Sessions 6-7 Combining and Comparing Investigation 1: Sessions 1-3 Investigation 3: Session 3

Grade	TASK ANALYSIS The student…
	• **solves word problems by writing a number sentence using symbols to represent missing elements.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 1-7 Investigation 3: Sessions 3-4 Investigation 4: Sessions 1-2 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 2-3, 6-7 Investigation 2: Sessions 5-6 Up and Down the Number Line Investigation 1: Sessions 6-7 Combining and Comparing Investigation 1: Sessions 1-3 Investigation 3: Session 3
	• **substitutes numbers for symbols to discover unknown values using the strategy of guess and check (? + 2 = 5).** **References:** Up and Down the Number Line Investigation 1: Sessions 6-7
	• **creates a simple word problem for a given number sentence, diagram, or model.** **References:** Things That Come in Groups Investigation 1: Sessions 2-4 Investigation 4: Sessions 1-4 Up and Down the Number Line Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-4

Grade	TASK ANALYSIS The student…
	• **uses models and graphs (e.g., cubes, number lines) to solve real-world problems involving equations (=) and inequalities: less than (<), greater than (>), not equal (≠).** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 5-7 Investigation 4: Session 2 Ten-Minute Math: Calendar Math Things That Come in Groups Investigation 1: Sessions 1-4 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-4 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Sessions 4-6 Up and Down the Number Line Investigation 1: Sessions 1-8 Combining and Comparing Investigation 1: Sessions 1-3 Investigation 3: Sessions 1-3
4	• **uses simple equations or simple inequalities (<, >, =, or ≠) to solve problems involving whole numbers less than or equal to 100 and decimal numbers presented as money.** **References:** Arrays and Shares Investigation 2: Sessions 2-3 Investigation 3: Session 1 Landmarks in the Thousands Investigation 2: Sessions 2-4 Changes Over Time Investigation 1: Sessions 5-6 Packages and Groups Investigation 3: Sessions 1-2

Grade	TASK ANALYSIS The student…
	• **uses a variable to represent a number in a given verbal expression (e.g., seven times a number is 7n or 7 x n).** Students gain experience and practice in solving problems involving missing information, including on-computer and off-computer activities to find missing lengths and turns. **References:** Landmarks in the Thousands Investigation 2: Sessions 2-4 Changes Over Time Investigation 1: Sessions 5-6
	• **uses variables to represent the unknown in problem solving situations.** **References:** 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
	• **uses physical or pictorial models and graphs (cubes, number lines) to solve equations or inequalities: greater than or equal to (≥), less than or equal to (≤), equal to (=), or not equal to (≠).** **References:** Arrays and Shares Investigation 2: Sessions 2-3 Investigation 3: Session 1 Landmarks in the Thousands Investigation 2: Sessions 2-4 Changes Over Time Investigation 1: Sessions 5-6 Packages and Groups Investigation 1: Sessions 4-5 Investigation 3: Sessions 1-2

Grade	TASK ANALYSIS The student…
	• **solves problems using information from physical models, graphs, or tables and justifies reasoning.** **References:** 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 Three out of Four Like Spaghetti Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-7
5	• **explores and applies the order of operations to solve numerical expressions (e.g., 3 + 4 (7-3) x 8 = ?).** **References:** Name That Portion Ten-Minute Math: Seeing Numbers Building on Numbers You Know Investigation 1: Sessions 3-4: Teacher Note, pages 23-24 Sessions 6-8: Teacher Note, page 34; Dialogue Box, page 35 Investigation 3: Sessions 1-3, 7-10 Investigation 4: Session 1

Grade	TASK ANALYSIS The student…
	• **applies the symbolic representations for greater than (>), less than (<), greater than or equal (≥), less than or equal (≤), equal (=), not equal (≠).** **References:** Mathematical Thinking at Grade 5 Investigation 2: Session 5 Name That Portion Investigation 1: Sessions 5-7 Investigation 2: Sessions 4-8 Investigation 3: Sessions 2-6 Building on Numbers You Know Investigation 1: Session 2
	• **compares inequalities including decimals and fractions using appropriate symbolic representations (e.g., 0.5 ≠ 1/3).** **References:** Mathematical Thinking at Grade 5 Investigation 2: Session 5 Name That Portion Investigation 1: Sessions 5-7 Investigation 2: Sessions 4-8 Investigation 3: Sessions 2-6 Building on Numbers You Know Investigation 1: Session 2
	• **produces a solution set using a number line (e.g., n ≤ 5, solutions 0, 1, 2, 3, 4, 5 plotted on a number line).** **References:** Name That Portion Investigation 1: Sessions 5-6 Investigation 2: Sessions 4-6 Patterns of Change Ten-Minute Math: Nearest Answer: Number Line Problems

Grade	TASK ANALYSIS The student…
	• **writes an equation using up to two operations and two variables for verbal or written problems (e.g., x + 5 – y = 15).** **References:** Mathematical Thinking at Grade 5 Investigation 2: Session 1 Investigation 3: Sessions 2-5 Investigation 4: Session 1 Name That Portion Ten-Minute Math: Seeing Numbers Building on Numbers You Know Investigation 1: Sessions 1, 3-4, 6-8 Investigation 2: Sessions 1-2, 5-6 Investigation 3: Sessions 1-10 Investigation 5: Sessions 4-7
	• **solves real-world equations or inequalities using informal methods** **(e.g., guess and check, concrete or pictorial models, and graphs).** **References:** Mathematical Thinking at Grade 5 Investigation 2: Session 1 Investigation 3: Sessions 2-5 Investigation 4: Session 1 Name That Portion Ten-Minute Math: Seeing Numbers Building on Numbers You Know Investigation 1: Sessions 1, 3-4, 6-8 Investigation 2: Sessions 1-2, 5-6 Investigation 3: Sessions 1-10 Investigation 5: Sessions 4-7

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Data Analysis & Probability**
Grade Cluster: **3-5**

Benchmarks

MA.E.1.2.1: The student solves problems by generating, collecting, organizing, displaying, and analyzing data using histograms, bar graphs, circle graphs, line graphs, pictographs, and charts.

MA.E.1.2.3: The student analyzes real-world data to recognize patterns and relationships of the measures of central tendency using tables, charts, histograms, bar graphs, line graphs, pictographs, and circle graphs generated by appropriate technology, including calculators and computers.

Grade	TASK ANALYSIS The student…
	DATA ANALYSIS AND TECHNOLOGY
3	• **demonstrates an understanding of pictographs, bar graphs, and line graphs.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 5-7 Investigation 4: Session 2 Ten-Minute Math: Calendar Math Things That Come in Groups Investigation 1: Sessions 1-4 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-4 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Sessions 4-6 Up and Down the Number Line Investigation 1: Sessions 1-8 Combining and Comparing Investigation 1: Sessions 1-3 Investigation 3: Sessions 1-3

Grade	TASK ANALYSIS The student…
	• **identifies parts of a graph including title, labels, scales, and key.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 5-7 Investigation 4: Session 2 Ten-Minute Math: Calendar Math Things That Come in Groups Investigation 1: Sessions 1-4 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-4 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Sessions 4-6 Up and Down the Number Line Investigation 1: Sessions 1-8 Combining and Comparing Investigation 1: Sessions 1-3 Investigation 3: Sessions 1-3
	• **recognizes intervals of a scale on graphs.** **References:** Mathematical Thinking at Grade 3 Investigation 2: Sessions 5-7 Investigation 4: Session 2 Ten-Minute Math: Calendar Math Things That Come in Groups Investigation 1: Sessions 1-4 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-4 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Sessions 4-6 Up and Down the Number Line Investigation 1: Sessions 1-8 Combining and Comparing Investigation 1: Sessions 1-3 Investigation 3: Sessions 1-3

Grade	TASK ANALYSIS The student…
	• **uses the key of a pictograph to interpret that the pictures may represent more than a one-to-one correspondence (e.g., 1 book = 5 books).** **References:** Things That Come in Groups Investigation 1: Sessions 2-3 Investigation 3: Sessions 1-2
	• **interprets and compares information on bar graphs.** **References:** Mathematical Thinking at Grade 3 Ten-Minute Math: Exploring Data Things That Come in Groups Investigation 5: Sessions 3
	• **interprets and compares information on a line graph with five or more categories.** **References:** Up and Down the Number Line Investigation 1: Sessions 1-8
	• **applies understanding of graphs to other content areas (e.g., science and social studies) and media examples.** **References:** Mathematical Thinking at Grade 3 Ten-Minute Math: Exploring Data Things That Come in Groups Investigation 1: Sessions 2-3 Investigation 3: Sessions 1-2 Investigation 5: Session 3 Up and Down the Number Line Investigation 1: Sessions 1-8
	• **generates questions, records responses (e.g., tally marks), and chooses correct intervals to display data on a bar graph.** **References:** Mathematical Thinking at Grade 3 Ten-Minute Math: Exploring Data Things That Come in Groups Investigation 5: Sessions 3

Grade	TASK ANALYSIS The student…
	• **designs graphs, using appropriate spacing.** **References:** Mathematical Thinking at Grade 3 Ten-Minute Math: Exploring Data Things That Come in Groups Investigation 1: Sessions 2-3 Investigation 3: Sessions 1-2 Investigation 5: Session 3 Up and Down the Number Line Investigation 1: Sessions 1-8
	• **draws conclusions and explains results shown on a graph; writes about conclusions and results.** **References:** Mathematical Thinking at Grade 3 Ten-Minute Math: Exploring Data Things That Come in Groups Investigation 1: Sessions 2-3 Investigation 3: Sessions 1-2 Investigation 5: Session 3 Up and Down the Number Line Investigation 1: Sessions 1-8
	• **analyzes real-world data on various graphs generated by technology.** Students use computers to explore and apply properties of geometric shapes. **References:** Flips, Turns, and Area Investigation 1: Session 5 Turtle Paths Investigation 1: Sessions 2-4 Investigation 2: Sessions 1-2, 4-6 Investigation 3: Sessions 1-7 Appendix: *Geo-Logo* Tutorial

Grade	TASK ANALYSIS The student…
	• **uses a calculator to analyze data.** **References:** Mathematical Thinking at Grade 3 Investigation 3: Sessions 3-4 Investigation 4: Session 2 Things that Come in Groups Investigation 1: Session 4 Investigation 2: Sessions 2-4 Investigation 4: Sessions 3-4 Landmarks in the Hundreds Investigation 2: Sessions 5-6 Investigation 3: Session 1 Up and Down the Number Line Investigation 1: Sessions 3-5 Investigation 3: Sessions 1-3 Combining and Comparing Investigation 4: Sessions 3-4 Investigation 5: Sessions 2-3 Turtle Paths Investigation 3: Sessions 1-2 Fair Shares Investigation 3: Sessions 1-2 Exploring Solids and Boxes Investigation 5: Sessions 1-4
	• **analyzes data using computer-generated graphs with real-world problems (e.g., most popular pizza topping).** **References:** Students use computers to explore and apply properties of geometric shapes. **References:** Flips, Turns, and Area Investigation 1: Session 5 Turtle Paths Investigation 1: Sessions 2-4 Investigation 2: Sessions 1-2, 4-6 Investigation 3: Sessions 1-7 Appendix: *Geo-Logo* Tutorial

Grade	TASK ANALYSIS The student…
4	• **identifies and explains the purpose of different parts of a graph (title, labels, intervals, key).** **References:** 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 Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9 Three Out of Four Like Spaghetti Investigation 2: Sessions 1-2, 5-7
	• **selects appropriate title and labels for graphs.** **References:** 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 Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9 Three Out of Four Like Spaghetti Investigation 2: Sessions 1-2, 5-7
	• **analyzes data from different types of graphs, including those from content area materials and periodicals, and writes comparative statements.** **References:** 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

Grade	TASK ANALYSIS The student…
	Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9 Three Out of Four Like Spaghetti Investigation 2: Sessions 1-2, 5-7
	• **generates a class survey to collect data and creates an appropriate graph to display data (pictograph, circle graph, single bar graph, double bar graph, line graph).** **References:** 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 Sunken Ships and Grid Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-9 Three Out of Four Like Spaghetti Investigation 2: Sessions 1-2, 5-7
	• **interprets and completes circle graphs, using common fractions.** Students interpret and construct bar graphs, line graphs, and line plots. **References:** 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

Grade	TASK ANALYSIS The student…
	• **analyzes and develops logical arguments to justify conclusions about data displays.** **References:** 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 Three out of Four Like Spaghetti Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-7
	• **uses a calculator to verify the range and mean from a set of data.** **References:** The Shape of the Data Investigation 2: Sessions 6-7
	• **uses computer applications to examine and evaluate data.** **References:** Sunken Ships and Grid Patterns Investigation 1: Sessions 3-6 Investigation 2: Sessions 1-9 Appendix: *Geo-Logo* Tutorial
	• **uses computer applications to construct graphs.** **References:** Sunken Ships and Grid Patterns Investigation 1: Sessions 3-6 Investigation 2: Sessions 1-9 Appendix: *Geo-Logo* Tutorial

Grade	TASK ANALYSIS The student…
5	• **demonstrates a knowledge of graphs and models used to accurately display data.** **References:** Picturing Polygons Investigation 1: Session 4 Investigation 2: Sessions 4-5 Investigation 3: Sessions 1-2, 4-6 Between Never and Always Investigation 2: Sessions 1-3 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 1-3 Investigation 2: Sessions 1-3
	• **chooses the appropriate model or graph in real-life settings (e.g., single line graph, single bar graph, double bar graph, stem-and-leaf plot, Venn diagram, circle graph, pictograph, histogram) for displaying data.** **References:** Picturing Polygons Investigation 1: Session 4 Investigation 2: Sessions 4-5 Investigation 3: Sessions 1-2, 4-6 Between Never and Always Investigation 2: Sessions 1-3 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 1-3 Investigation 2: Sessions 1-3

Grade	TASK ANALYSIS The student…
	• **illustrates a circle graph as parts equaling a whole (e.g., 100%, 1.0, 100/100).** **References:** Name That Portion Investigation 4: Sessions 1-7
	• **interprets and completes a circle graph using common fractions, decimals, and percents.** **References:** Name That Portion Investigation 4: Sessions 1-7
	• **develops from data a model or a graph including titles, labels, scales, and intervals accurately displayed.** **References:** Picturing Polygons Investigation 1: Session 4 Investigation 2: Sessions 4-5 Investigation 3: Sessions 1-2, 4-6 Between Never and Always Investigation 2: Sessions 1-3 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 1-3 Investigation 2: Sessions 1-3
	• **formulates and writes comparative statements derived from a model or graph.** **References:** Picturing Polygons Investigation 1: Session 4 Investigation 2: Sessions 4-5 Investigation 3: Sessions 1-2, 4-6 Between Never and Always Investigation 2: Sessions 1-3

Grade	TASK ANALYSIS The student…
	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 1-3 Investigation 2: Sessions 1-3
	• **demonstrates the knowledge of using a calculator and/or computer to determine and examine the range and mean.** **References:** Between Never and Always Investigation 1: Sessions 3-6 Data: Kids, Cats, and Ads Investigation 1: Sessions 1-4 Investigation 2: Session 1
	• **constructs labeled graphs on a computer.** **References:** Patterns of Change Investigation 2: Session 5 Investigation 3: Sessions 1-3 Containers and Cubes Investigation 4: Sessions 7-9, page 89 Data: Kids, Cats, and Ads Investigation 2: Session 3
	• **uses computer-generated spreadsheets to record and display real-world data.** **References:** Patterns of Change Investigation 3: Sessions 1-3 Containers and Cubes Investigation 4: Sessions 7-9, page 89 Data: Kids, Cats, and Ads Investigation 2: Session 3

Investigations in Number, Data, & Space
to the
OCPS Curriculum, Instruction, Assessment Alignment

Subject Area: **Mathematics**
Strand: **Data Analysis & Probability**
Grade Cluster: **3-5**

Benchmarks

MA.E.1.2.2: The student determines range, mean, median, and mode from sets of data.

MA.E.3.2.1: The student designs experiments to answer class or personal questions, collects information, and interprets the results using statistics (range, mean, median, and mode) and pictographs, charts, bar graphs, circle graphs, and line graphs.

Grade	TASK ANALYSIS The student…
	DATA ANALYSIS
3	• **uses concrete materials to display data and identify range, median, mean, and mode.** Students work together to decide on a "middle-sized pace," based on an analysis of data collected in the classroom. **References:** From Paces to Feet Investigation 1: Sessions 5-6 Investigation 2: Sessions 2-7
	• **defines range as the difference between the greatest and least numbers in a group of numbers (e.g., from data set of 2, 3, 4, 4, 7, the range is 2 to 7, with a difference of 5).** Students note the least and greatest values in a set of graphed data. **References:** From Paces to Feet Investigation 1: Sessions 5-6 Investigation 2: Sessions 2-7
	• **defines median as the middle number in a group of numbers, when the numbers are arranged from least to greatest (e.g., 2, 3, 4, 4, 7).** Students work together to decide on a "middle-sized pace," based on an analysis of data collected in the classroom. **References:** From Paces to Feet Investigation 1: Sessions 5-6 Investigation 2: Sessions 2-7

Grade	TASK ANALYSIS The student…
	• **uses manipulatives to explore the definition of mean (an average found by adding all the elements in a set of data and then dividing that sum by the number of elements).** Students work together to decide on a "middle-sized pace," based on an analysis of data collected in the classroom. **References:** From Paces to Feet Investigation 1: Sessions 5-6 Investigation 2: Sessions 2-7
	• **defines mode as the most frequently occurring element in a set of data (e.g., mode = 4 from set 2, 3, 4, 4, 7).** Students work together to decide on a "middle-sized pace," based on an analysis of data collected in the classroom. **References:** From Paces to Feet Investigation 1: Sessions 5-6 Investigation 2: Sessions 2-7
	• **determines range, mean, median, and mode from sets of data.** Students work together to decide on a "middle-sized pace," based on an analysis of data collected in the classroom. **References:** From Paces to Feet Investigation 1: Sessions 5-6 Investigation 2: Sessions 2-7
4	• **demonstrates an understanding of mean, median, and mode from a set of data.** **References:** The Shape of the Data Investigation 2: Sessions 4-7
	• **defines mean as an average found by adding all the elements in a set of data and then dividing that sum by the number of elements (e.g., 2 + 3 + 4 + 4 + 7 = 20 ÷ 5 = 4).** Grade 4 students using *Investigations in Number, Data, and Space* find and use the median of a set of data. **References:** The Shape of the Data Investigation 2: Sessions 4-7

Grade	TASK ANALYSIS The student…
	• **determines the range on a line graph and from a set of numerical data.** **References:** The Shape of the Data Investigation 2: Sessions 4-7
5	• **displays range, median, and mode on a stem-and-leaf plot.** 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
	• **calculates the mean using the data from a stem-and-leaf plot.** 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
	• **analyzes range, mean, median, and mode to predict outcomes in real- world situations.** **References:** Between Never and Always Investigation 1: Sessions 3-6 Data: Kids, Cats, and Ads Investigation 1: Sessions 1-4 Investigation 2: Session 1
	• **justifies in writing the use of the data to make predictions.** **References:** 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?

Investigations in Number, Data, & Space
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Subject Area: **Mathematics**
Strand: **Data Analysis & Probability**
Grade Cluster: **3-5**

Benchmarks

MA.E.2.2.1: The student uses models, such as tree diagrams, to display possible outcomes and to predict events.

MA.E.2.2.2: The student predicts the likelihood of simple events occurring.

Grade	TASK ANALYSIS The student…
	PROBABILITY
3	• **determines the number of possible combinations up to eight or more given items and displays them in an organized way (e.g., list possible combinations of three shirts and two pairs of pants).** **References:** Flips, Turns, and Area Investigation 1: Sessions 1, 4-5 Up and Down the Number Line Investigation 1: Sessions 3-4, 6-7 Turtle Paths Investigation 1: Sessions 3-4 Exploring Solids and Boxes Investigation 3: Sessions 1-2 Investigation 4: Session 2
	• **represents all possible outcomes for a particular probability or event using models such as organized charts or lists.** **References:** Flips, Turns, and Area Investigation 1: Sessions 1, 4-5 Up and Down the Number Line Investigation 1: Sessions 3-4, 6-7 Turtle Paths Investigation 1: Sessions 3-4 Exploring Solids and Boxes Investigation 3: Sessions 1-2 Investigation 4: Session 2

Grade	TASK ANALYSIS The student…
	• **identifies and records the possible outcome of simple experiments using concrete materials (e.g., spinners, marbles in a bag, coin toss).** **References:** Things That Come in Groups Ten-Minute Math: Likely or Unlikely? Exploring Solids and Boxes Ten-Minute Math: What Is Likely?
	• **calculates the probability of a particular event occurring from a set of all possible outcomes.** **References:** Things That Come in Groups Ten-Minute Math: Likely or Unlikely? Exploring Solids and Boxes Ten-Minute Math: What Is Likely?
	• **determines which outcomes are impossible, least likely, equally likely, most likely, or certain in situations (e.g., spinning red is equally likely to occur when a spinner is divided equally among red, blue, and green).** **References:** Things That Come in Groups Ten-Minute Math: Likely or Unlikely? Exploring Solids and Boxes Ten-Minute Math: What Is Likely?
4	• **determines the number of possible outcomes of given items (up to 10) and displays them using organized lists, charts, or tree diagrams (e.g., list all possible combinations of three types of ice cream and three toppings).** **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 3-4

Grade	TASK ANALYSIS The student…
	• **calculates from a set of all possible outcomes the probability of a particular event occurring.** **References:** 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?
	• **predicts and determines which outcomes are most likely and/or least likely to occur and expresses those outcomes as fractions (e.g., on a spinner numbered 1-5, an odd number is the most likely to occur 3 out of 5 times or 3/5).** **References:** 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?
	• **conducts simple experiments with manipulatives (e.g., spinners, number cubes, coins) to test predictions.** **References:** 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?
5	• **demonstrates the knowledge of predicting and explaining at least 10 possible outcomes.** **References:** 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?

Grade	TASK ANALYSIS The student…
	• **represents up to 12 possible outcomes on a tree diagram or organized list.** **References:** 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?
	• **uses a tree diagram or organized list to show a combination as a selection of elements from a larger set in which the order does not matter.** **References:** 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?
	• **uses a tree diagram or organized list to show a permutation as a possible arrangement of a group of objects in which the order does matter.** **References:** 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?
	• **calculates the probability (likelihood) of a particular event occurring.** **References:** 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?
	• **explains and predicts likely outcomes expressed as ratios (e.g., 4/5, 4:5).** **References:** 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?

Grade	TASK ANALYSIS The student…
	• **categorizes outcomes based on an activity as impossible, unlikely, equally likely, likely, and certain.** **References:** 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?
	• **draws conclusions in writing based on outcome models.** **References:** 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?

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Subject Area: **Mathematics**
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Benchmarks

MA.E.3.2.1: The student designs experiments to answer class or personal questions, collects information, and interprets the results using statistics (range, mean, median, and mode) and pictographs, charts, bar graphs, circle graphs, and line graphs.

MA.E.3.2.2: The student uses statistical data about life situations to make predictions and justifies reasoning.

Grade	TASK ANALYSIS The student…
	RANGE, MEAN, MEDIAN, AND MODE
3	• **designs a survey, collects data, and displays data on appropriate graph (e.g., pictograph, single bar graph, line graph).** **References:** Mathematical Thinking at Grade 3 Investigation 3: Sessions 1-4 Things that Come in Groups Investigation 5: Session 3 From Paces to Feet Investigation 1: Session 2 Investigation 1: Sessions 5-6: Dialogue Box, page 25 Investigation 2: Session 2 Investigation 3: Sessions 1-3 Combining and Comparing Investigation 1: Sessions 1-3 Investigation 4: Session 1 Ten-Minute Math: Exploring Data
	• **explains results of graphs, using mean, mode, median, and range.** Students work together to decide on a "middle-sized pace," based on an analysis of data collected in the classroom. **References:** From Paces to Feet Investigation 1: Sessions 5-6 Investigation 2: Sessions 2-7

Grade	TASK ANALYSIS The student…
	• **uses statistical data (mean, median, mode) to make predictions and generalizations.** Students work together to decide on a "middle-sized pace," based on an analysis of data collected in the classroom. **References:** From Paces to Feet Investigation 1: Sessions 5-6 Investigation 2: Sessions 2-7
4	• **generates a class survey to collect data and creates an appropriate graph to display data (e.g., pictograph, single bar graph, double bar graph, line graph, circle graph).** **References:** Three out of Four Like Spaghetti Investigation 2: Sessions 1-7
	• **determines appropriate statistical data (range, mean, median, mode) from data display and justifies reasoning.** **References:** The Shape of the Data Investigation 2: Sessions 4-7
	• **formulates and explains generalizations and makes predictions from a data sampling based on real-world situations.** **References:** 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 Three out of Four Like Spaghetti Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-7

Grade	TASK ANALYSIS The student…
5	• **demonstrates the ability to explain the statistical results of a small targeted population.** **References:** Mathematical Thinking at Grade 5 Ten-Minute Math: Exploring Data Name That Portion Investigation 4: Sessions 1-7 Ten-Minute Math: Exploring Data 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
	• **describes why a sample group was chosen to represent a larger population.** **References:** Mathematical Thinking at Grade 5 Ten-Minute Math: Exploring Data Name That Portion Investigation 4: Sessions 1-7 Ten-Minute Math: Exploring Data 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
	• **interprets results, using statistical 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

Grade	TASK ANALYSIS The student…
	• **predicts in writing the trends, using statistical data.** **References:** Mathematical Thinking at Grade 5 Ten-Minute Math: Exploring Data Name That Portion Investigation 4: Sessions 1-7 Ten-Minute Math: Exploring Data Between Never and Always Investigation 1: Sessions 3-5 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