

A Correlation of



to the

**Tennessee Mathematics
Curriculum Standards
Learning Expectations, and
Performance Indicators**

(Student and Teacher
Performance Indicators)

Grades K-5



T/M-144

Introduction

This document demonstrates how ***Investigations in Number, Data, and Space®*** supports the Tennessee Mathematics Curriculum Standards—Learning Expectations, and Performance Indicators. The citations within this correlation provide Investigation Curriculum Unit titles, followed by the Investigation number and Session number or Focus Time/Choice Time title. Additional citations to other features may be included.

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

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

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

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

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

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**Investigations in Number, Data, & Space
to the
Tennessee Mathematics Curriculum Standards,
Learning Expectations, and Performance Indicators**

Kindergarten – Grade Three

NUMBER AND OPERATIONS

Content Standard 1.0 The student will develop number and operation sense needed to represent numbers and number relationships verbally, symbolically, and graphically and to compute fluently and make reasonable estimates in problem solving.

Learning Expectations:

1.1 Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

Kindergarten

Mathematical Thinking in Kindergarten

Investigations 1, 2, 3, 4

Patterns, Trains, and Hopscotch Paths

Investigation 4: Choice Time: 12 Chips; Choice Time: Staircase Patterns

Collecting, Counting, and Measuring

Investigations 1, 2, 3, 4, 5, 6

Counting Ourselves and Others

Investigations 1, 2, 3, 4

How Many in All?

Investigations 1, 2, 3, 4

Classroom Routines: Attendance, The Counting Jar, Calendar

Grade 1

Mathematical Thinking at Grade 1

Investigation 1: Sessions 1–6

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–6

Investigation 4: Sessions 1–6

Investigation 5: Sessions 1–6

Building Number Sense

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–6, 8–9

Investigation 3: Sessions 1–7, 9

Investigation 4: Sessions 1–10

Quilt Squares and Block Towns
Investigation 1: Sessions 1–7, 9
Investigation 3: Sessions 6–7

Number Games and Story Problems
Investigation 1: Sessions 1–10
Investigation 2: Sessions 1–12

Bigger, Taller, Heavier, Smaller
Investigation 2: Sessions 1–7

Classroom Routines: Counting

Grade 2

Mathematical Thinking at Grade 2
Investigation 1: Session 1
Investigation 2: Sessions 1–8
Investigation 3: Sessions 3–4, 6
Investigation 4: Sessions 1–4
Investigation 5: Sessions 4–5

Coins, Coupons, and Combinations
Investigation 1: Sessions 10, 11
Investigation 2: Sessions 1–5, 6–9, 10
Investigation 3: Session 3
Investigation 4: Sessions 1–5

Shapes, Halves, and Symmetry
Investigation 3: Sessions 1–8

Putting Together and Taking Apart
Investigation 2: Sessions 1, 3–7
Investigation 4: Sessions 1, 3–4

Classroom Routines: Today’s Number, How Many Pockets?

Grade 3

Mathematical Thinking at Grade 3
Investigation 1: Session 1
Investigation 2: Sessions 2, 5–7
Investigation 3: Sessions 2–7
Investigation 4: Sessions 1, 2, 3

Things that Come in Groups
Investigation 2: Sessions 2–4

Flips, Turns, and Areas
Investigation 2: Sessions 1–5

Landmarks in the Hundreds
Investigation 1: Sessions 1–7
Investigation 2: Session 4
Investigation 3: Sessions 1–3

Up and Down the Number Line
Investigation 1: Sessions 1, 2, 5, 8
Investigation 2: Sessions 1, 2, 3, 4
Investigation 3: Sessions 1, 2

Combining and Comparing

Investigation 1: Sessions 1–3

Investigation 2: Sessions 1–2

Investigation 3: Sessions 1–2

Investigation 4: Sessions 1–4

Investigation 5: Sessions 1–3

Fair Shares

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–7

Investigation 3: Sessions 1–3

1.2 Understand meanings of operations and how they relate to one another.**Kindergarten**

Mathematical Thinking in Kindergarten

Investigations 3, 4

How Many in All?

Investigation 1: Choice Time: Collect 15 Together, Inventory Bags

Investigations 2, 3, 4

Counting Ourselves and Others

Investigations 2, 3, 4

Collecting, Counting, and Measuring

Investigation 4: Choice Time: Collect 10 Together

Investigation 5: Choice Time: Racing Bears

Investigation 6

Grade 1

Building Number Sense

Investigation 2: Session 2

Investigation 3: Sessions 5–7, 9

Investigation 4: Sessions 3, 4, 5, 10

Quilt Squares and Block Towns

Investigation 3: Sessions 6–7

Number Games and Story Problems

Investigation 1: Session 10

Investigation 3: Sessions 3–8, 10–12, 13

Bigger, Taller, Heavier, Smaller

Investigation 2: Session 1

Grade 2

Mathematical Thinking at Grade 2

Investigation 2: Session 1

Investigation 4: Sessions 3 and 4

Coins, Coupons, and Combinations

Investigation 2: Session 1

Investigation 3: Sessions 3, 4, 5 (Follow-Up)

Putting Together and Taking Apart
Investigation 1: Sessions 1–2, 5–6
Investigation 3: Sessions 2–5
Investigation 4: Sessions 2–4
Investigation 5: Sessions 1–3
Classroom Routines: Writing Equations

Grade 3

Mathematical Thinking at Grade 3
Investigation 2: Sessions 3–4
Investigation 3: Sessions 3 and 4
Things That Come in Groups
Investigation 1: Session 1–4
Investigation 2: Session 1–4
Investigation 3: Sessions 3–5
Investigation 4: Sessions 1–4
Investigation 5: Sessions 1–4
Landmarks in the Hundreds
Investigation 1: Sessions 1–7
Investigation 2: Sessions 1–6
Combining and Comparing
Investigation 1: Sessions 1 and 2
Investigation 3: Sessions 1–3
Investigation 4: Session 2
Investigation 5: Sessions 1–3

1.3 Solve problems, compute fluently, and make reasonable estimates.**Kindergarten**

Mathematical Thinking in Kindergarten
Investigations 1, 2, 3
Pattern Trains and Hopscotch Paths
Investigations 1, 2, 3, 4
Collecting, Counting, and Measuring
Investigations 1, 3, 4, 6
Counting Ourselves and Others
Investigations 1, 2, 4
Making Shapes and Building Blocks
Appendix: Shapes Teacher Tutorial, pages 143–144
How Many in All?
Investigations 1, 2, 3, 4
Classroom Routines: Calendar; Patterns on the Pocket Chart

Grade 1

- Mathematical Thinking in Grade 1
 - Investigation 2: Sessions 1–6
 - Investigation 4: Sessions 2–4, 6
- Building Number Sense
 - Investigation 1: Sessions 1–2, 5–6, 9
 - Investigation 2: Sessions 1, 4–9
 - 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 1–8, 10–13
 - Investigation 3: Sessions 1–13

Grade 2

- Mathematical Thinking at Grade 2
 - Investigation 4: Sessions 1, 5
 - Investigation 5: Sessions 3
- Putting Together and Taking Apart
 - Investigation 1: Sessions 1–6
 - Investigation 2: Sessions 3–4, 7
 - Investigation 3: Session 2, 3–5
 - Investigation 4: Sessions 1, 2, 3–4
 - Investigation 5: Sessions 1, 2–3, 4–5, 7
- Coins, Coupons, and Combinations
 - Investigation 2: Session 7–11
 - Investigation 3: Sessions 1–5
 - Investigation 4: Sessions 2–4, 5
- Shapes, Halves, and Symmetry
 - Investigation 1: Sessions 2–6
 - Investigation 2: Sessions 4–5
- How Long? How Far?
 - Investigation 1: Sessions 1–7
 - Investigation 2: Session 2

Grade 3

- Mathematical Thinking at Grade 3
 - Investigation 1: Sessions 1–3
 - Investigation 2: Sessions 1–7
 - Investigation 3: Sessions 3–4
 - Investigation 4: Session 1

- Things That Come in Groups
 - Investigation 1: Session 1–4
 - Investigation 2: Session 1–6
 - Investigation 3: Sessions 2–3
 - Investigation 4: Sessions 1–4
 - Investigation 5: Session 3–4
 - Ten-Minute Math: Counting Around the Class
- Flips, Turns, and Area
 - Ten-Minute Math: Broken Calculator
- From Paces to Feet
 - Investigation 1 Sessions 1–4
 - Ten Minute Math: Estimation and Number Sense
- Landmarks in the Hundreds
 - Investigation 1: Sessions 1–7
 - Investigation 2: Sessions 1–6
 - Investigation 3: Sessions 2–3
- Up and Down the Number Line
 - Investigation 1: Sessions 1–4, 6–8
 - Investigation 2: Sessions 1–3
 - Investigation 3: Session 1
- 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
- Turtle Paths
 - Investigation 2: Sessions 1–2
- Fair Shares
 - Investigation 1: Sessions 3–4

Third Grade Benchmarks

Performance Indicators State:

As documented through state assessment –

at Level 1, the student is able to

3.1.spi.1. count by 10’s, 100’s, and 1000’s;

Grade 1

Building Number Sense

Investigation 3: Sessions 1–2, 8

Grade 2

Coins, Coupons, and Combinations
Investigation 2: Sessions 2–5

Grade 3

Things that Come in Groups
Investigation 2: Sessions 2–4
Landmarks in the Hundreds
Investigation 1 : Sessions 4–5
Investigation 3: Sessions 1–3

3.1.spi.2. identify whole numbers as odd or even;**Grade 1**

These investigations provide opportunities to introduce this indicator.

Mathematical Thinking at Grade 1
Investigation 2 : Sessions 1–6
Investigation 4: Session 4
Building Number Sense
Investigation 1: Sessions 1–9
Investigation 2 : Sessions 1–8
Investigation 3 : Sessions 1–2
Number Games and Story Problems
Investigation 1 : Sessions 1–9
Classroom Routines : Counting

Grade 2

Students gain experience with even numbers when counting by twos in these investigations.

Mathematical Thinking at Grade 2
Investigation 4: Session 2 (See Teacher Note, page 91.)
Coins, Coupons, and Combinations
Investigation 2: Sessions 1–5

Grade 3

Mathematical Thinking at Grade 3
Investigation 4: Sessions 1, 2, 3

3.1.spi.3. add and subtract efficiently and accurately with single-digit whole numbers.**Kindergarten**

How Many in All?
Investigation 1: Choice Time: Collect 15 Together, Inventory Bags
Investigations 2, 3, 4
Investigation 3
Counting Ourselves and Others
Investigation 4

Collecting, Counting, and Measuring
Investigation 4: Choice Time: Collect 10 Together
Investigation 5: Choice Time: Racing Bears
Investigation 6

Grade 1

Mathematical Thinking at Grade 1
Investigation 2: Sessions 4–6
Investigation 4: Session 4
Building Number Sense
Investigation 1: Sessions 1–9
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
Investigation 3: Sessions 3–8, 10–12

Grade 2

Mathematical Thinking at Grade 2
Investigation 2: Sessions 2–3, 8
Coins, Coupons, and Combinations
Investigation 1: Sessions 1–6

Grade 3

Mathematical Thinking at Grade 3
Investigation 2: Sessions 1, 2, 3–4
Ten-Minute Math
Combining and Comparing
Investigation 1: Sessions 1, 2
Investigation 2: Session 2
Investigation 3: Sessions 1–2
Investigation 4: Sessions 3–4
Ten-Minute Math

at Level 2, the student is able to

**3.1.spi.4. represent whole numbers to 9999 with models;
Kindergarten**

Mathematical Thinking in Kindergarten
Investigation 1: Focus Time: Attendance
Investigation 2
Investigation 3: Focus Time: Calendar
Investigation 4
Collecting, Counting, and Measuring
Investigations 1, 2, 6

Counting Ourselves and Others
Investigations 1, 3, 4
How Many In All?
Investigations 2, 3, 4
Classroom Routines: Attendance, Calendar

Grade 1

Mathematical Thinking at Grade 1
Investigation 1: Sessions 2–4
Investigation 2: Sessions 1–6
Investigation 4: Sessions 1–6
Investigation 5: Sessions 1–6
Building Number Sense
Investigation 1: Sessions 7–9
Investigation 2: Sessions 1–2, 9
Investigation 3: Session 9
Investigation 4: Sessions 1–5, 7–10

Grade 2

Mathematical Thinking at Grade 2
Investigation 1: Sessions 1–3
Investigation 3: Sessions 1–4

Grade 3

Mathematical Thinking at Grade 3
Investigation 1: Session 1
Investigation 2: Sessions 2, 5–7
Investigation 3: Sessions 3–4
Investigation 4: Session 1
Combining and Comparing
Investigation 1: Sessions 1, 2
Investigation 2: Session 2
Investigation 3: Session 1
Investigation 4: Sessions 2, 3–4

3.1.spi.5. identify the place value of a given digit up to thousands;

Grade 1

Mathematical Thinking at Grade 1
Investigation 1: Sessions 2–4
Investigation 2: Sessions 1–6
Investigation 4: Sessions 1–6
Investigation 5: Sessions 1–6

Grade 2

Coins, Coupons, and Combinations
Investigation 1: Sessions 1–3
Putting Together and Taking Apart
Investigation 2: Sessions 1–6
Investigation 5: Sessions 2–3, 6

Grade 3

- Mathematical Thinking at Grade 3
 - Investigation 1: Session 1
 - Investigation 2: Sessions 2, 5–7
 - Investigation 3: Sessions 3–4
 - Investigation 4: Session 1
- Combining and Comparing
 - Investigation 1: Sessions 1, 2
 - Investigation 2: Session 2
 - Investigation 3: Session 1
 - Investigation 4: Sessions 2, 3–4

**3.1.spi.6. recognize the value of combinations of coins and bills up to \$5;
Kindergarten**

- Counting Ourselves and Others
 - Investigation 2: Choice Time: The Grocery Store

Grade 1

- Number Games and Story Problems
 - Investigation 2: Sessions 2–8

Grade 2

- Mathematical Thinking at Grade 2
 - Investigation 4: Sessions 2–4
- Coins, Coupons, and Combinations
 - Investigation 2: Sessions 2–5, 6–9, 10
- Putting Together and Taking Apart
 - Investigation 2: Sessions 5–6
 - Investigation 4: Sessions 3–4

Grade 3

- 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

3.1.spi.7. compare and order whole numbers to 9999 using the appropriate symbol (i.e., $<$, $>$, $=$);**Kindergarten***Related content:*

Mathematical Thinking in Kindergarten

Investigation 1: Focus Time: Attendance

Investigations 2, 3, 4

Patterns, Trains, and Hopscotch Paths

Investigation 4: Choice Time: 12 Chips; Choice Time: Staircase Patterns

Counting Ourselves and Others

Investigations 3, 4

How Many In All?

Investigation 2: Choice Time: Grab Two Handfuls

Investigation 3: Choice Time: Double Compare

Investigation 4: Focus Time: Blue and Red Crayons

Collecting, Counting, and Measuring

Investigations 3, 4, 5, 6

Grade 1*Using symbols to compare numbers can be introduced during these investigations.*

Mathematical Thinking at Grade 1

Investigation 2: Sessions 2, 3, 5–6

Number Games and Story Problems

Investigation 1: Sessions 7–9

Grade 2*Using symbols to compare numbers can be introduced during these investigations.*

Coins, Coupons, and Combinations

Investigation 4: Sessions 1–4

Putting Together and Taking Apart

Investigation 2: Sessions 3–7

Investigation 4: Session 1

Grade 3*These investigations provide opportunities to use symbols when comparing whole numbers.*

Mathematical Thinking at Grade 3

Investigation 3: Sessions 3–4

Combining and Comparing

Investigation 1: Sessions 1–3

Investigation 2: Sessions 1–2

Investigation 3: Session 1

Investigation 4: Sessions 1–2

Investigation 5: Sessions 1–3

Fair Shares

Investigation 2: Session 3

3.1.spi.8. add two- and/or three-digit whole numbers;**Grade 1**

Number Games and Story Problems
Investigation 2: Session 13

Grade 2

Mathematical Thinking at Grade 2
Investigation 4: Sessions 1, 5
Investigation 5: Sessions 3
Putting Together and Taking Apart
Investigation 1: Sessions 1–6
Investigation 2: Sessions 3–4, 7
Investigation 3: Session 2, 3–5
Investigation 4: Sessions 1, 2, 3–4
Investigation 5: Sessions 1, 2–3, 4–5, 7
Coins, Coupons, and Combinations
Investigation 2: Session 7–9
Investigation 3: Sessions 1–2
Investigation 4: Sessions 2–4, 5

Grade 3

Mathematical Thinking at Grade 3
Investigation 2: Sessions 1–7
Investigation 3: Sessions 3–4
Investigation 4: Session 1
Ten-Minute Math: Calendar Math
Flips, Turns, and Area
Ten-Minute Math: Broken Calculator
From Paces to Feet
Ten-Minute Math: Broken Calculator
Landmarks in the Hundreds
Ten-Minute Math: Calendar Math
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

3.1.spi.9. connect written and pictorial representations of fractions with denominators up to ten;**Grade 2**

Shapes, Halves, and Symmetry
Investigation 3: Sessions 1–8

Grade 3

Flips, Turns, and Area
Investigation 2: Sessions 2–3, 4–5

Fair Shares
Investigation 1: Sessions 1, 2, 3, 4
Investigation 2: Sessions 1–2, 4, 5–6, 7
Ten-Minute Math

3.1.spi.10. solve real-world problems using addition or subtraction of whole numbers;**Kindergarten**

Mathematical Thinking in Kindergarten
Investigations 3, 4

Counting Ourselves and Others
Investigations 2, 3, 4

How Many in All?
Investigation 3

Grade 1

Mathematical Thinking at Grade 1
Investigation 1: Sessions 1–4
Investigation 4: Sessions 1–4, 6
Investigation 5: Sessions 2–4

Building Number Sense
Investigation 1: Sessions 1–9
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, 10–12
Investigation 3: Sessions 1–8, 10–13

Grade 2

Mathematical Thinking at Grade 2
Investigation 2: Session 1, 4–6
Investigation 3: Sessions 1–5
Investigation 4: Sessions 1–5

Coins, Coupons, and Combinations
Investigation 1: Sessions 2–11
Investigation 2: Session 7–9
Investigation 3: Sessions 1–5
Investigation 4: Sessions 2–5

- Putting Together and Taking Apart
 - Investigation 1: Sessions 1–4
 - Investigation 2: Sessions 1–4, 7
 - Investigation 3: Sessions 1–5
 - Investigation 4: Sessions 1–5
 - Investigation 5: Sessions 5–4, 7
- How Long? How Far?
 - Investigation 1: Sessions 5–7
 - Classroom Routines: Today’s Number

Grade 3

- Combining and Comparing
 - Investigation 1: Sessions 1, 2
 - Investigation 2: Session 2
 - Investigation 3: Sessions 1–2
 - Investigation 4: Sessions 3–4
 - Ten-Minute Math

3.1.spi.11. determine the correct change from a transaction that is less than \$1.00;

This indicator is introduced in Grade 4.

3.1.spi.12. use estimation to select a reasonable solution in problem solving (addition and subtraction only).

Grade 1

- Mathematical Thinking at Grade 1
 - Investigation 4: Session 5
- Number Games and Story Problems
 - Investigation 1: Sessions 7–9

Grade 2

- How Long? How Far?
 - Investigation 1: Sessions 1–7

Grade 3

- Up and Down the Number Line
 - Ten-Minute Math
- Combining and Comparing
 - Investigation 3: Session 1
 - Ten-Minute Math

at Level 3, the student is able to

3.1.spi.13. represent whole numbers up to 10,000 in expanded form (e.g, 1000's + 100's + 10's + 1's);

Grade 1

Related content:

Building Number Sense

Investigation 3: Sessions 1–7, 9

Grade 2

Related content:

Coins, Coupons, and Combinations

Investigation 1: Sessions 1, 6, 10

Investigation 2: Sessions 1, 4–6

Grade 3

Related content:

Mathematical Thinking at Grade 3

Investigation 2: Sessions 1, 2, 3, 4

3.1.spi.14. compare unit fractions with denominators up to ten;

Grade 2

Shapes, Halves, and Symmetry

Investigation 3: Sessions 3–5, 7–8

Grade 3

Fair Shares

Investigation 1: Sessions 3, 4

Investigation 2: Session 3

3.1.spi.15. subtract two- and/or three-digit whole numbers;

Grade 1

Number Games and Story Problems

Investigation 3: Session 2

Grade 2

Mathematical Thinking at Grade 1

Investigation 3: Session 3–5

Putting Together and Taking Apart

Investigation 1: Sessions 2–6

Investigation 2: Sessions 3–4

Investigation 3: Sessions 1–5

Investigation 5: Sessions 1–3, 6–7

Grade 3

Mathematical Thinking at Grade 3

Investigation 2: Sessions 1–7

Investigation 3: Sessions 3–4

Investigation 4: Session 1

Ten-Minute Math: Calendar Math

Flips, Turns, and Area
Ten-Minute Math: Broken Calculator

From Paces to Feet
Ten-Minute Math: Broken Calculator

Landmarks in the Hundreds
Ten-Minute Math: Calendar Math

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

3.1.spi.16. use the multiplication facts 0, 1, 2, 5, and 10 efficiently and accurately.

Grade 2

Related content:

Mathematical Thinking at Grade 2
Investigation 4: Session 1

Coins, Coupons, and Combinations
Investigation 2: Sessions 2–5

Shapes, Halves, and Symmetry
Investigation 1 Sessions 6–8
Investigation 2: Sessions 2–6

Grade 3

Things That Come in Groups
Investigation 1: Sessions 1, 2
Investigation 2: Sessions 1, 2, 3–4
Investigation 5: Session 1
Ten-Minute Math

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to

3.1.tpi.1. read and represent whole numbers to 9999;

Kindergarten

Mathematical Thinking in Kindergarten
Investigations 2, 3, 4

Counting Ourselves and Others
Investigation 1

How Many in All?
Investigation 2
Investigation 3: Choice Time: Counters in a Cup
Investigation 4: Choice Time: Six Crayons in All
Collecting, Counting, and Measuring
Investigation 1
Investigation 2: Focus Time: Taking Inventory

Grade 1

Building Number Sense
Investigation 1: Sessions 1–8
Investigation 2: Sessions 1–6, 8–9
Investigation 3: Sessions 1–7, 9
Investigation 4: Sessions 1–10
Number Games and Story Problems
Investigation 2: Sessions 6–9

Grade 2

Coins, Coupons, and Combinations
Investigation 4: Sessions 1–4

Grade 3

Landmarks in the Hundreds
Investigation 1: Sessions 3–4, 6–7
Investigation 3: Sessions 1, 2–3
Ten-Minute Math
Up and Down the Number Line
Investigation 1: Sessions 1, 2, 5, 8
Investigation 2: Sessions 1, 2, 3, 4
Investigation 3: Sessions 1, 2
Ten-Minute Math
Combining and Comparing
Investigation 4: Sessions 3–4

3.1.tpi.2. create number sentences that describe real-world situations involving addition and subtraction.**Kindergarten****Grade 1**

Number Games and Story Problems
Investigation 1: Sessions 1–3

Grade 2

Coins, Coupons, and Combinations
Investigation 2: Session 3
Investigation 3: Sessions 1–5
Investigation 4: Sessions 2–4
Putting Together and Taking Apart
Investigation 3: Sessions 2, 3–5
Investigation 5: Sessions 1–3

Grade 3

Up and Down the Number Line
Investigation 1: Sessions 6–7

at Level 2, the student is able to

3.1.tpi.3. skip count by tens from any whole number less than 1000;**Grade 1**

Building Number Sense
Investigation 3: Sessions 1–2

Grade 2

Coins, Coupons, and Combinations
Investigation 2: Sessions 2–5

Grade 3

Things That Come in Groups
Investigation 2: Sessions 2–4
Landmarks in the Hundreds
Investigation 1 : Sessions 4–5
Investigation 3 : Session 1–3

3.1.tpi.4. use concrete materials and pictorial and symbolic representations to show numbers to 9999;**Kindergarten**

Mathematical Thinking in Kindergarten
Investigations 1, 2, 3, 4
Patterns, Trains, and Hopscotch Paths
Investigation 4: Choice Time: 12 Chips; Choice Time: Staircase Patterns
Collecting, Counting, and Measuring
Investigations 1, 2, 3, 4, 5, 6
Counting Ourselves and Others
Investigations 1, 2, 3, 4
How Many in All?
Investigations 1, 2, 3, 4
Classroom Routines: Attendance, The Counting Jar, Calendar

Grade 1

Mathematical Thinking at Grade 1
Investigation 1: Sessions 2–4
Investigation 2: Sessions 1–6
Investigation 4: Sessions 1–6
Investigation 5: Sessions 1–6

Building Number Sense

- Investigation 1: Sessions 7–9
- Investigation 2: Sessions 1–2, 9
- Investigation 3: Session 9
- Investigation 4: Sessions 1–5, 7–10

Grade 2

- Mathematical Thinking at Grade 2
 - Investigation 2: Sessions 1, 6, 8
- Coins, Coupons, and Combinations
 - Investigation 1: Sessions 10, 11
 - Investigation 2: Session 10
 - Investigation 4: Sessions 1–4

Grade 3

- Mathematical Thinking at Grade 3
 - Investigation 1: Session 1
 - Investigation 3: Sessions 3–4
- Landmarks in the Hundreds
 - Investigation 1: Sessions 1, 2–3
 - Investigation 2: Sessions 1–3
- Combining and Comparing
 - Investigation 4: Sessions 3–4

3.1.tpi.5. connect the spoken, written, concrete, and pictorial representations of fractions with denominators up to ten;**Grade 2**

- Shapes, Halves, and Symmetry
 - Investigation 3: Sessions 1–8

Grade 3

- Mathematical Thinking at Grade 3
 - Investigation 2: Sessions 3–4
 - Investigation 4: Session 2
- Flips, Turns, and Areas
 - Investigation 2: Sessions 1–5
- Fair Shares
 - Investigation 1: Sessions 1–4
 - Investigation 2: Sessions 1–7
 - Investigation 3: Sessions 1–3

3.1.tpi.6. relate adding doubles to multiplying by two;**Grade 3**

- Mathematical Thinking at Grade 3
 - Investigation 2: Sessions 1
- Things That Come in Groups
 - Investigation 1: Session 2
 - Investigation 2: Session 2

3.1.tpi.7. use calculators in problem-solving situations.**Grade 1**

- Mathematical Thinking at Grade 1
 - Investigation 1: Sessions 2, 3, and 4
- Building Number Sense
 - Investigation 3: Sessions 3–7
- Number Games and Story Problems
 - Investigation 2: Sessions 10–12

Grade 2

- Coins, Coupons, and Combinations
 - Investigation 1: Session 7, 8–9

Grade 3

- Mathematical Thinking at Grade 3
 - Investigation 4: Session 2
- Landmarks in the Hundreds
 - Investigation 2: Sessions 1–3
- Combining and Comparing
 - Investigation 3: Sessions 1–2

at Level 3, the student is able to

3.1.tpi.8. select an appropriate rounding strategy in problem-solving situations;**Grade 3**

- These activities prepare students for selecting rounding strategies.*
- Comparing and Combining
 - Investigation 1: Session 1
 - Investigation 2: Sessions 1, 2
 - Investigation 3: Session 1

3.1.tpi.9. develop and apply a variety of thinking strategies for computation.**Kindergarten**

- How Many in All?
 - Investigation 1: Choice Time: Collect 15 Together, Inventory Bags
 - Investigations 2, 3, 4
- Counting Ourselves and Others
 - Investigation 4
- Collecting, Counting, and Measuring
 - Investigation 4: Choice Time: Collect 10 Together
 - Investigation 5: Choice Time: Racing Bears
 - Investigation 6

Grade 1

Mathematical Thinking in Grade 1

Investigation 2: Sessions 1–6

Investigation 4: Sessions 2–4, 6

Building Number Sense

Investigation 1: Sessions 1–2, 5–6, 9

Investigation 2: Sessions 1, 4–9

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 1–8, 10–13

Investigation 3: Sessions 1–13

Grade 2

Mathematical Thinking at Grade 2

Investigation 2: Session 1

Investigation 4: Sessions 3 and 4

Coins, Coupons, and Combinations

Investigation 2: Session 1

Investigation 3: Sessions 3, 4, 5 (Follow-Up)

Putting Together and Taking Apart

Investigation 1: Sessions 1–2, 5–6

Investigation 3: Sessions 2–5

Investigation 4: Sessions 2–4

Investigation 5: Sessions 1–3

Classroom Routines: Writing Equations

Grade 3

Mathematical Thinking at Grade 3

Investigation 2: Sessions 1–7

Investigation 3: Sessions 3–4

Investigation 4: Session 1

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

ALGEBRA

Content Standard 2.0 The student will understand and generalize patterns as they represent and analyze quantitative relationships and change in a variety of contexts and problems using graphs, tables, and equations.

Learning Expectations:**2.1 Sort and classify objects by size, number, and other properties.****Kindergarten**

Counting Ourselves and Others

Investigation 1: Focus Time, Choice Time

Investigation 2: Focus Time, Choice Time

Investigation 3: Focus Time, Choice Time

Grade 1

Mathematical Thinking at Grade 1

Investigation 5: Sessions 3–6

Survey Questions and Secret Rules

Investigation 1: Sessions 2–6

Investigation 2: Sessions 3–4

Investigation 4: Sessions 2–3

Quilt Squares and Block Towers

Investigation 1: Sessions 11–12

Investigation 2: Sessions 1–3

Grade 2

Mathematical Thinking at Grade 2

Investigation 5: Sessions 1–2, 4–5

Does It Walk, Crawl, or Swim?

Investigation 1: Sessions 1–6

Investigation 2: Sessions 1–4

Investigation 3: Sessions 1–4

Investigation 4: Sessions 1–3

Grade 3

Mathematical Thinking at Grade 3

Investigation 3: Sessions 1–2

Exploring Solids and Boxes

Investigation 1: Session 1

2.2 Represent and analyze patterns and functions.

Kindergarten

Mathematical Thinking in Kindergarten

Investigation 1: Choice Time

Pattern Trains and Hopscotch Paths

Investigation 1: Focus Time, Choice Time

Investigation 2: Choice Time

Investigation 3: Focus Time, Choice Time

Investigation 4: Focus Time, Choice Time

Grade 1

Mathematical Thinking at Grade 1

Investigation 3: Sessions 1–6

Investigation 4: Session 2–3, 4–6

Quilt Squares and Block Towns

Investigation 1: Sessions 13–15

Building Number Sense

Investigation 3: Sessions 1–8

Investigation 4: Session 10

Number Games and Story Problems

Investigation 2: Sessions 1–12

Grade 2

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 1–5

Timelines and Rhythm Patterns

Investigation 2: Session 1–5

Grade 3

Mathematical Thinking at Grade 3

Investigation 1: Sessions 2–3

Things That Come in Groups

Investigation 2: Sessions 1–6

Investigation 3: Session 3

Investigation 4: Sessions 1–2

Investigation 5: Sessions 1–4

Flips, Turns, and Area

Investigation 1: Sessions 1–3

From Paces to Feet:

Investigation 1: Session 2

- Landmarks in the Hundreds
 - Ten-Minute Math: Counting Around the Class
- Up and Down the Number Line
 - Investigation 2: Sessions 2 and 3
- Fair Shares
 - Investigation 2: Sessions 5–6

2.3 Use concrete, pictorial, and verbal representations to develop an understanding of the language and symbols of mathematics.

Kindergarten

- Collecting, Counting, and Measuring
 - Investigation 4: Choice Time: Collect 10 together
 - Investigation 5: Choice Time: Racing Bears
 - Investigation 6
- How Many in All?
 - Investigations 2, 3, 4

Grade 1

- Mathematical Thinking at Grade 1
 - Investigation 4: Sessions 1–3
 - Investigation 5: Sessions 1–5
- Building Number Sense
 - Investigation 1: Sessions 2–4, 7–9
 - 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 1–8, 10–13
 - Investigation 3: Sessions 1–13

Grade 2

- Mathematical Thinking at Grade 2
 - Investigation 1: Session 1
 - Investigation 2: Session 6
- Coin, Coupons, and Combinations
 - Investigation 1: Sessions 1–3, 6, 10–11
 - Investigation 2: Session 1
 - Investigation 3: Session 2
- Putting Together and Taking Apart
 - Investigation 1: Sessions 1–6
 - Investigation 2: Sessions 1–7
 - Investigation 3: Sessions 1–5 (See Teacher Note, page 85.)
 - Investigation 4: Sessions 1–4
 - Investigation 5: Sessions 1–8

Grade 3

Things That Come in Groups

Investigation 1: Sessions 1–4

Investigation 2: Sessions 3–4

Investigation 4: Sessions 1–4

Investigation 5: Sessions 1–4

Landmarks in the Hundreds

Investigation 1: Sessions 6–7

Investigation 2: Sessions 1–6

Up and Down the Number Line

Investigation 1: Sessions 6–7

Combining and Comparing

Investigation 1: Session 1

Investigation 4: Sessions 2–4

2.4 Illustrate general properties of operations.**Grade 1***This expectation can be introduced during this investigation.*

Number Games and Story Problems

Investigation 1: Sessions 2–3

Related content:

Building Number Sense

Investigation 1: Sessions 7–8 (See page 27.)

Investigation 2: Sessions 4–5, 6–8 (See pages 65, 71.)

Grade 2

Mathematical Thinking at Grade 2

Investigation 2: Session 6

Investigation 5: Session 3

Classroom Routines: Today's Number

Grade 3

Mathematical Thinking at Grade 3

Investigation 2: Sessions 1–2

Ten-Minute Math: Calendar Math

Things That Come in Groups

Investigation 3: Sessions 1–2, 3–4

Up and Down the Number Line

Investigation 1: Sessions 3–5

Ten-Minute Math: Estimation and Number Sense

2.5 Analyze change in various contexts.**Grade 2**

How Long? How Far?

Investigation 1: Sessions 2–4, 5–7

How Many Pockets? How Many Teeth?

Investigation 1: Sessions 1, 4–5

Investigation 2: Sessions 1–5

Grade 3See Grade 4, *Changes Over Time*.**Third Grade Benchmarks****Performance Indicators State:**

As documented through state assessment –

at Level 1, the student is able to**3.2.spi.1. sort objects by two attributes.****Kindergarten***Related content:*

Counting Ourselves and Others

Investigation 1: Focus Time, Choice Time

Investigation 2: Focus Time, Choice Time

Investigation 3: Focus Time, Choice Time

Grade 1

Mathematical Thinking at Grade 1

Investigation 5: Sessions 3–6

Survey Questions and Secret Rules

Investigation 1: Sessions 2–6

Investigation 2: Sessions 3–4

Investigation 4: Sessions 2–3

Quilt Squares and Block Towers

Investigation 1: Sessions 11–12

Investigation 2: Sessions 1–3

Grade 2

Mathematical Thinking at Grade 2

Investigation 5: Sessions 1–2, 4–5, 6

Does It Walk, Crawl, or Swim?

Investigation 1: Sessions 1–6

Investigation 2: Sessions 1–4

Investigation 3: Sessions 1–4

Investigation 4: Sessions 1–3

Grade 3

- Mathematical Thinking at Grade 3
 - Investigation 3: Sessions 1–2, 3–4
- Exploring Solids and Boxes
 - Investigation 1: Session 1

at Level 2, the student is able to

**3.2.spi.2. extend repeating and growing numerical or geometric patterns;
Kindergarten**

- Mathematical Thinking in Kindergarten
 - Investigation 1: Choice Time
- Pattern Trains and Hopscotch Paths
 - Investigation 1: Focus Time, Choice Time
 - Investigation 2: Choice Time
 - Investigation 3: Focus Time, Choice Time
 - Investigation 4: Focus Time, Choice Time

Grade 1

- Mathematical Thinking at Grade 1
 - Investigation 3: Sessions 1–6
 - Investigation 4: Session 2–3, 4–6
- Quilt Squares and Block Towns
 - Investigation 1: Sessions 13–15
- Building Number Sense
 - Investigation 3: Sessions 1–8
 - Investigation 4: Session 10
- Number Games and Story Problems
 - Investigation 2: Sessions 1–12

Grade 2

- 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 1–5

Grade 3

- Mathematical Thinking at Grade 3
 - Investigation 1: Sessions 2–3
- Things That Come in Groups
 - Investigation 2: Sessions 1–6
 - Investigation 3: Session 3
 - Investigation 5: Sessions 1, 4

Flips, Turns, and Area
Investigation 1: Sessions 1–3
From Paces to Feet:
Investigation 1: Session 2
Landmarks in the Hundreds
Ten-Minute Math: Counting Around the Class
Fair Shares
Investigation 2: Sessions 5–6

3.2.spi.3. represent repeating geometric patterns as repeating numerical patterns;

Grade 3

Related content:

Flips, Turns, and Area
Investigation 1: Sessions 2–3
Exploring Solids and Boxes
Investigation 3: Session 2

3.2.spi.4. determine the output for a particular input given the one operation function rule (i.e., addition, subtraction);

Grade 2

Coins, Coupons, and Combinations
Investigation 2: Sessions 1, 4–5
Timelines and Rhythm Patterns
Investigation 2: Sessions 1–5

Grade 3

Things That Come in Groups
Investigation 4: Sessions 1–2
Investigation 5: Sessions 1, 2, 3

3.2.spi.5. solve open sentences that involve addition and subtraction of whole numbers zero to twenty.

Grade 2

Putting Together and Taking Apart
Investigation 1: Sessions 3–4
Investigation 2: Session 2–5

Grade 3

Things That Come in Groups
Investigation 1: Session 3 (See Teacher Note, page 15.)
Investigation 4: Sessions 1–2
Combining and Comparing
Investigation 4: Session 2

at Level 3, the student is able to

3.2.spi.6. identify the rules by which objects or numbers have been sorted;

Grade 2

Mathematical Thinking at Grade 2

Investigation 5: Sessions 1–2, 4–5, 6

Does It Walk, Crawl, or Swim?

Investigation 1: Sessions 1–3

Investigation 2: Sessions 1–2

Grade 3

Mathematical Thinking at Grade 3

Investigation 3: Sessions 1–2

Exploring Solids and Boxes

Investigation 1: Session 1

3.2.spi.7. connect open sentences to real-world situations.

Grade 2

Putting Together and Taking Apart

Investigation 1: Sessions 3–4

Investigation 2: Session 2–5

Grade 3

Things That Come in Groups

Investigation 1: Session 3 (See Teacher Note, page 15.)

Investigation 4: Sessions 1–2

Combining and Comparing

Investigation 4: Session 2

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to

3.2.tpi.1. use manipulatives to demonstrate the commutative property of addition;

Grade 1

This indicator can be introduced during this investigation.

Number Games and Story Problems

Investigation 1: Sessions 2–3

Grade 2

Mathematical Thinking at Grade 2

Investigation 2: Session 6

Investigation 5: Session 3

Classroom Routines: Today's Number

Grade 3*Related content:*

Things That Come in Groups
Investigation 3: Sessions 1–5

3.2.tpi.2. demonstrate that subtraction is not commutative.**Grade 2***The idea that subtraction is not commutative can be introduced during this investigation.*

Putting Together and Taking Apart
Investigation 1: Session 2

Grade 3*The idea that subtraction is not commutative can be introduced during this activity.*

Up and Down the Number Line
Ten-Minute Math: Estimation and Number Sense

at Level 2, the student is able to

3.2.tpi.3. describe a growing pattern;**Kindergarten**

Pattern Trains and Hopscotch Paths
Investigation 4: Choice Time

Grade 1

Mathematical Thinking at Grade 1
Investigation 3: Sessions 1–6
Investigation 4: Session 5
Building Number Sense
Investigation 3: Sessions 1–8
Investigation 4: Session 10
Number Games and Story Problems
Investigation 2: Sessions 1–12

Grade 2

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 1–5

Grade 3

Things That Come in Groups
Investigation 5: Session 1
Up and Down the Number Line
Investigation 2: Sessions 2 and 3

3.2.tpi.4. determine the input for a particular output given the one operation function rule (i.e., addition, subtraction);**Grade 2**

- Coins, Coupons, and Combinations
Investigation 2: Sessions 1, 4–5
- Timelines and Rhythm Patterns
Investigation 2: Sessions 1–5

Grade 3

- Things That Come in Groups
Investigation 4: Sessions 1–2
Investigation 5: Sessions 1, 2, 3

3.2.tpi.5. create a function rule involving one operation;**Grade 2**

- Coins, Coupons, and Combinations
Investigation 2: Sessions 1, 4–5
- Timelines and Rhythm Patterns
Investigation 2: Sessions 1–5

Grade 3

- Things That Come in Groups
Investigation 4: Sessions 1–2
Investigation 5: Sessions 1, 2, 3

3.2.tpi.6. use arrays to represent the commutative property of multiplication;**Grade 3**

- Things That Come in Groups
Investigation 3: Sessions 1–5

3.2.tpi.7. describe qualitative change (e.g., a student growing taller);**Grade 2**

- How Long? How Far?
Investigation 1: Sessions 2–4, 5–7

Grade 3

- See Grade 4, *Changes Over Time*.

3.2.tpi.8. describe quantitative change (e.g., a student growing two inches in one year).**Grade 2**

- How Many Pockets? How Many Teeth?
Investigation 1: Sessions 1, 4–5
Investigation 2: Sessions 1–5

Grade 3

- See Grade 4, *Changes Over Time*.

at Level 3, the student is able to

**3.2.tpi.9. devise, carry out, and explain a sorting scheme for a group of objects;
Grade 3**

Mathematical Thinking at Grade 3
Investigation 3: Sessions 1–2
Exploring Solids and Boxes
Investigation 1: Session 1

3.2.tpi.10. describe, translate, and create patterns;

Mathematical Thinking in Kindergarten
Investigation 1: Choice Time
Pattern Trains and Hopscotch Paths
Investigation 1: Focus Time, Choice Time
Investigation 2: Choice Time
Investigation 3: Focus Time, Choice Time
Investigation 4: Focus Time, Choice Time

Grade 1

Mathematical Thinking at Grade 1
Investigation 3: Sessions 1–6
Investigation 4: Session 2–3, 4–6
Quilt Squares and Block Towns
Investigation 1: Sessions 13–15
Building Number Sense
Investigation 3: Sessions 1–8
Investigation 4: Session 10
Number Games and Story Problems
Investigation 2: Sessions 1–12

Grade 2

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 1–5

Grade 3

Mathematical Thinking at Grade 3
Investigation 1: Sessions 2–3
Things That Come in Groups
Investigation 2: Sessions 1–6
Investigation 3: Session 3
Investigation 5: Sessions 1, 4

- Flips, Turns, and Area
 - Investigation 1: Sessions 1–3
- From Paces to Feet:
 - Investigation 1: Session 2
- Landmarks in the Hundreds
 - Ten-Minute Math: Counting Around the Class
- Fair Shares
 - Investigation 2: Sessions 5–6

3.2.tpi.11. demonstrate understanding that an equation is a number sentence stating that two quantities are equal.

Grade 2

Related content:

- Coins, Coupons, and Combinations
 - Investigation 2: Session 1
 - Investigation 3: Sessions 3–5 (Follow-Up)
- Putting Together and Taking Apart
 - Investigation 1: Sessions 1–2, 5–6
 - Investigation 3: Sessions 3–5
 - Investigation 4: Sessions 2–4
 - Investigation 5: Sessions 2 and 3

Grade 3

- Things That Come in Groups
 - Investigation 1: Sessions 3, 4
 - Investigation 2: Sessions 3–4
 - Investigation 4: Sessions 1–2, 3–4
- Landmarks in the Hundreds
 - Investigation 1: Sessions 6–7
 - Investigation 2: Sessions 5–6
- Combining and Comparing
 - Investigation 1: Session 1
 - Investigation 4: Session 2

GEOMETRY

Content Standard 3.0 The student will develop an understanding of geometric concepts and relationships as the basis for geometric modeling and reasoning to solve problems involving one-, two-, and three-dimensional figures.

Learning Expectations:

3.1 Analyze characteristics and properties of geometric shapes.**Kindergarten**

Mathematical Thinking in Kindergarten

Investigation 1: Choice Time: Exploring Pattern Blocks

Investigation 1: Choice Time: Exploring Geoblocks

Making Shapes and Building Blocks

Investigations 1, 2, 3, 4, 5

Grade 1

Mathematical Thinking at Grade 1

Investigation 1: Sessions 1–4

Quilt Squares and Block Towns

Investigation 1: Sessions 1, 3–15

Investigation 2: Sessions 7–10

Investigation 3: Sessions 3–4

Grade 2

Mathematical Thinking at Grade 2

Investigation 3: Sessions 1–5

Shapes, Halves, and Symmetry

Investigation 1: Session 1–8

Investigation 2: Sessions 1–6

Investigation 4: Sessions 1–8

Grade 3

Flips, Turns, and Area

Investigation 1: Sessions 1–5

Investigation 2: Sessions 1–5

Fair Shares

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–7

Exploring Solids and Boxes

Investigation 2: Sessions 1–5

Investigation 5: Sessions 1–4

Ten-Minute Math: Quick Images

Turtle Paths

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–7

3.2 Specify locations and describe spatial relationships.**Kindergarten**

Patterns, Trains, and Hopscotch Paths

Investigation 4: Choice Time: Staircase Patterns

Making Shapes and Building Blocks

Investigations 2, 3, 4

Grade 1

Quilt Squares and Block Towns

Investigation 1: Sessions 1, 3–6, 8–10

Investigation 3: Sessions 6–7

Grade 2

Shapes, Halves, and Symmetry

Investigation 1: Sessions 4–8

Investigation 4: Sessions 1–6

How Long? How Far?

Investigation 2: Sessions 1–3, 6–8

Grade 3

Turtle Paths

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–7

Fair Shares

Investigation 1: Sessions 1–2

3.3 Recognize and apply flips, slides, and turns.**Grade 2**

Shapes, Halves, and Symmetry

Investigation 1: Sessions 4–8

Investigation 4: Sessions 1–6

Grade 3

Flip, Turns, and Area

Investigation 1: Sessions 1, 2–3, 5

Investigation 2: Sessions 2–3

Turtle Paths

Investigation 1: Sessions 1, 3–4

Investigation 2: Sessions 1–2

Performance Indicators State:

As documented through state assessment –

at Level 1, the student is able to**3.3.spi.1. name two-dimensional geometric figures (i.e., rectangle, square, triangle, circle).****Kindergarten**

Mathematical Thinking in Kindergarten

Investigation 1: Choice Time: Exploring Color Tiles, Exploring Pattern Blocks

Making Shapes and Building Blocks

Investigations 1, 2

Grade 1

Quilt Squares and Block Towns
Investigation 1: Sessions 1, 3–6, 8–15

Grade 2

Mathematical Thinking at Grade 2
Investigation 3: Sessions 1–5
Shapes, Halves, and Symmetry
Investigation 4: Sessions 1–7

Grade 3

Flips, Turns, and Area
Investigation 2: Sessions 2–3, 4–5
Turtle Paths
Investigation 2: Sessions 3, 4, 5–6
Investigation 3: Sessions 1–2, 3–5
Ten-Minute Math

at Level 2, the student is able to

3.3.spi.2. name three-dimensional geometric figures (i.e., cube, cylinder, sphere, cone);

Kindergarten

Making Shapes and Building Blocks
Investigations 3, 4, 5

Grade 1

Quilt Squares and Block Towns
Investigation 1: Session 1
Investigation 2: Sessions 1–10
Investigation 3: Sessions 1–5

Grade 2

Mathematical Thinking at Grade 2
Investigation 3: Sessions 1–5
Shapes, Halves, and Symmetry
Investigation 4: Sessions 1–6

Grade 3

Exploring Solids and Boxes
Investigation 1: Session 1
Investigation 2: Sessions 1, 2, 3

3.3.spi.3. recognize geometric figures that are the same size and shape;

Grade 2

Shapes, Halves, and Symmetry
Investigation 3: Sessions 1–8
Investigation 4: Sessions 5–6

Grade 3

Flips, Turns, and Area

Investigation 1: Session 1

Investigation 2: Sessions 2–3, 4–5

Turtle Paths

Investigation 3: Sessions 1–2, 3–5

3.3.spi.4. use appropriate mathematical language to find a point on a grid using whole number coordinates.**Grade 3**

Turtle Paths

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–7

at Level 3, the student is able to**3.3.spi.5. identify the result of a transformation that has been applied to a simple two-dimensional geometric shape (i.e., flips or slides);****Grade 1**

Quilt Squares and Block Towns

Investigation 1: Sessions 3–10, 13–15

Grade 2

Shapes, Halves, and Symmetry

Investigation 1: Sessions 4–8

Investigation 4: Sessions 1–6

Grade 3

Flip, Turns, and Area

Investigation 1: Sessions 1, 2–3, 5

Investigation 2: Sessions 2–3

Turtle Paths

Investigation 1: Sessions 1, 3–4

Investigation 2: Sessions 1–2

3.3.spi.6. identify the line of symmetry in a two-dimensional design or shape.**Grade 2**

Shapes, Halves, and Symmetry

Investigation 4: Sessions 1–7

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to**3.3.tpi.1. draw two-dimensional geometric figures;****Kindergarten**

Making Shapes and Building Blocks

Investigation 1: Focus Time; Choice Time

Grade 1

Quilt Squares and Block Towns

Investigation 1: Sessions 1, 3–6, 8–10

Grade 2

Mathematical Thinking at Grade 2

Investigation 3: Sessions 1–5

Shapes, Halves, and Symmetry

Investigation 4: Sessions 1–7

Grade 3

Turtle Paths

Investigation 2: Sessions 3, 4, 5

Investigation 3: Sessions 1–2, 3–5

Ten-Minute Math

3.3.tpi.2. identify and draw horizontal and vertical lines.**Grade 3**

Turtle Paths

Investigation 1: Session 1

Investigation 2: Sessions 1–2, 5–6

at Level 2, the student is able to**3.3.tpi.3. construct three-dimensional geometric figures;****Kindergarten**

Making Shapes and Building Blocks

Investigation 5: Choice Time: Build a Block

Grade 1

Quilt Squares and Block Towns

Investigation 2: Session 7, 8–10

Investigation 3: Session 5

Grade 3

Exploring Solids and Boxes

Investigation 2: Sessions 3, 4–5

Investigation 3: Sessions 1

Investigation 5: Sessions 1–4

3.3.tpi.4. draw diagonal lines of geometric figures;**Grade 3**

Flips, Turns, and Area

Investigation 2: Session 1–3

3.3.tpi.5. draw two-dimensional shapes showing lines of symmetry;**Grade 2**

Shapes, Halves, and Symmetry

Investigation 4: Sessions 1–7

3.3.tpi.6. compare and contrast two- and three-dimensional geometric figures;**Kindergarten****Grade 1**

Quilt Squares and Block Towns

Investigation 1: Sessions 2–10, 13–15

Investigation 2: Sessions 1–2, 4–10

Investigation 3: Sessions 1–5

Grade 2

Mathematical Thinking at Grade 2

Investigation 3: Sessions 1–5

Shapes, Halves, and Symmetry

Investigation 1: Session 1

Investigation 2: Sessions 1, 2

Grade 3

Exploring Solids and Boxes

Investigation 1: Session 1

Investigation 2: Sessions 1, 2, 3

Flips, Turns, and Area

Investigation 2: Sessions 2–3, 4–5

Turtle Paths

Investigation 2: Sessions 3, 4, 5–6

Investigation 3: Sessions 1–2, 3–5

Ten-Minute Math

3.3.tpi.7. use a variety of methods to show that two geometric figures are congruent.**Grade 2**

Shapes, Halves, and Symmetry

Investigation 3: Sessions 1–8

Investigation 4: Sessions 5–6

Grade 3

Flips, Turns, and Area

Investigation 1: Session 1

Investigation 2: Sessions 2–3, 4–5

Turtle Paths

Investigation 3: Sessions 1–2, 3–5

*at Level 3, the student is able to***3.3.tpi.8. predict and describe the results of sliding, flipping, and turning in two-dimensional shapes;****Grade 1**

Quilt Squares and Block Towns

Investigation 1: Sessions 3–10, 13–15

Grade 2

Shapes, Halves, and Symmetry

Investigation 1: Sessions 4–8

Investigation 4: Sessions 1–6

Grade 3

Flip, Turns, and Area

Investigation 1: Sessions 1, 2–3, 5

Investigation 2: Sessions 2–3

Turtle Paths

Investigation 1: Sessions 1, 3–4

Investigation 2: Sessions 1–2

3.3.tpi.9. describe shapes that have more than one line of symmetry.**Grade 2**

Shapes, Halves, and Symmetry

Investigation 4: Session 7 (See Extension on Student Sheet 27.)

MEASUREMENT

Content Standard 4.0 The student will become familiar with the units and processes of measurement in order to use a variety of tools, techniques, and formulas to determine and to estimate measurements in mathematical and real-world problems.

Learning Expectations:**4.1 Demonstrate understanding of units of measure and measurable attributes of objects.****Kindergarten**

Mathematical Thinking in Kindergarten

Investigation 3

Patterns, Trains and Hopscotch Paths

Investigation 1: Focus Time: Cubes What Do You Notice?

Collecting, Counting, and Measuring

Investigations 3, 4, 5

Counting Ourselves and Others

Investigation 2

How Many in All?

Investigation 1

Investigation 2: Choice Time: Towers of Six

Making Shapes and Building Blocks:

Investigations 4, 5

Classroom Routines: Calendar

Grade 1

Bigger, Taller, Heavier, Smaller

Investigation 1: Sessions 1–7

Investigation 2: Sessions 1–7

Investigation 3: Session 2

Grade 2

Shapes, Halves, and Symmetry

Investigation 2: Session 2

How Long? How Far?

Investigation 1: Sessions 1–8

Investigation 2: Sessions 4–8

Grade 3

From Paces to Feet

Investigation 1: Session 2–4

Investigation 2: Session 1

Turtle Paths

Investigation 3: Sessions 1–2, 6–7

Ten-Minute Math: Lengths and Perimeters

Flips, Turns, and Area

Investigation 1: Sessions 1, 2–3, 4–5

Investigation 2: Sessions 2–3, 4–5

4.2 Apply appropriate techniques and tools to determine measurements.

Kindergarten

How Many in All?

Investigation 1

Collecting, Counting and Measuring

Investigation 3

Mathematical Thinking in Kindergarten

Investigation 3: Focus Time: Calendar

Classroom Routines: Calendar

Grade 1

Bigger, Taller, Heavier, Smaller

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–5

Classroom Routines: Counting; Understanding Time and Changes

Grade 2

Shapes, Halves, and Symmetry

Investigation 2: Session 2

How Long? How Far?

Investigation 1: Sessions 1, 2–4, 5–8

Timelines and Rhythm Patterns

Investigation 1: Sessions 1–5

Investigation 2: Sessions 1–4

About Classroom Routines: Time and Time Again

Grade 3

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 2: Sessions 1–2

Investigation 3: Session 2

Investigation 5: Sessions 1–3

Turtle Paths

Investigation 3: Sessions 1–2, 6–7

Ten-Minute Math: Lengths and Perimeters

Third Grade Benchmarks**Performance Indicators State:**

As documented through state assessment –

at Level 1, the student is able to**3.4.spi.1. read and write time to the nearest hour, half-hour, and quarter-hour;
Grade 2**

Timelines and Rhythm Patterns

Investigation 1: Sessions 4–5 (See Teacher Note, page 29.)

**3.4.spi.2. measure length to the nearest centimeter and inch;
Grade 3**

From Paces to Feet

Investigation 1: Sessions 5–6

Investigation 2: Sessions 1, 2, 3–4, 5, 6–7

Investigation 4: Sessions 1–3

**3.4.spi.3. solve real-world problems using a calendar.
Kindergarten**

Mathematical Thinking in Kindergarten

Investigation 3: Focus Time: Calendar

Classroom Routines: Calendar

Grade 1

Survey Questions and Secret Rules

Investigation 3: Sessions 1–3

Classroom Routines: Counting; Understanding Time and Changes

Grade 2

Timelines and Rhythm Patterns

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–4

Grade 3

Combining and Comparing

Investigation 5: Session 1

at Level 2, the student is able to**3.4.spi.4. solve real-world problems involving addition and subtraction of one-
or two- digit measurements;****Grade 2**

How Long? How Far?

Investigation 1: Session 8

Investigation 2: Sessions 4-8

Grade 3

Combining and Comparing

Investigation 3: Sessions 1–2

Turtle Paths

Investigation 2: Sessions 5–6

Investigation 3: Sessions 1–2, 6–7

Ten-Minute Math: Lengths and Perimeters

3.4.spi.5. select an appropriate standard unit to measure length;**Grade 3**

From Paces to Feet

Investigation 1: Sessions 5–6

Investigation 2: Sessions 1, 2, 3–4, 5, 6–7

Investigation 4: Sessions 1–3

3.4.spi.6. use estimation to determine if a length measurement is reasonable;**Grade 1***Related content:*

Bigger, Taller, Heavier, Smaller

Investigation 3: Sessions 2, 4–5

Grade 2*Related content:*

How Long? How Far?

Investigation 1: Choice Time: Inventory Bags

Grade 3*Related content:*

From Paces to Feet

Investigation 2: Sessions 1, 2, 3–4, 5, 6–7

Investigation 3: Sessions, 2–3,

Investigation 4: Sessions 1, 2, 3

3.4.spi.7. read thermometers with Fahrenheit and Celsius scales (positive whole number temperatures);**Grade 1***These activities provide opportunities to introduce this indicator.*

Survey Questions and Secret Rules

Classroom Routines: Understanding Time and Changes (Weather)

Grade 3*Related content:*

Up and Down the Number Line

Investigation 1: Session 1–2, 8

3.4.spi.8. read and write time at five-minute intervals.**Grade 2**

Timelines and Rhythm Patterns

Investigation 1: Sessions 4–5 (See Teacher Note, page 29.)

*at Level 3, the student is able to***3.4.spi.9. find the perimeter of a rectangle on a grid;****Grade 2**

Shapes, Halves, and Symmetry

Investigation 2: Session 2

Grade 3

Turtle Paths

Investigation 3: Sessions 1–2, 6–7

Ten-Minute Math: Lengths and Perimeters

3.4.spi.10. solve real-world problems involving elapsed time to the half-hour.**Grade 2**

Timelines and Rhythm Patterns

Investigation 1: Sessions 4–5

Grade 3

Combining and Comparing

Investigation 3: Session 3

Performance Indicators Teacher:

As documented through teacher observation –

*at Level 1, the student is able to:***3.4.tpi.1. measure length to the nearest foot;****Grade 3**

From Paces to Feet

Investigation 1: Sessions 5–6

Investigation 2: Sessions 1, 2, 3–4, 5, 6–7

Investigation 4: Sessions 1–3

3.4.tpi.2. use a variety of non-standard units to estimate and/or measure length, area, and capacity.**Kindergarten**

Counting Ourselves and Others

Investigation 3: Focus Time, Choice Time

Grade 1

Bigger, Taller, Heavier, Smaller

Investigation 2: Sessions 1–7

Investigation 3: Sessions 2, 4–5

Grade 2

How Long? How Far?

Investigation 1: Sessions 2–4, 5–7

Grade 3

From Paces to Feet

Investigation 1: Sessions 1, 2, 3–4

at Level 2, the student is able to:**3.4.tpi.3. explain when an estimate of a measurement is sufficient;****Grade 3**

From Paces to Feet

Investigation 1: Session 2–4

Investigation 2: Session 1

3.4.tpi.4. estimate the capacity of a container;**Grade 1**

Bigger, Taller, Heavier, Smaller

Investigation 2: Sessions 1–7

3.4.tpi.5. estimate the weight of an object;**Grade 3**

Combining and Comparing

Investigation 2: Sessions 1, 2

3.4.tpi.6. measure the capacity of a container in liters, cups, pints, quarts, and gallons;**Grade 3***Related content:*

Combining and Comparing

Investigation 4: Session 1

3.4.tpi.7. measure to the nearest ounce, pound, kilogram, and gram.**Grade 3**

Pounds and kilograms are introduced in grade 5. The following investigation involves the concept of weight with a pan balance.

Combining and Comparing

Investigation 2: Sessions 1, 2

at Level 3, the student is able to:

3.4.tpi.8. develop the formula for finding the area of a rectangle;**Grade 3**

Flip, Turns, and Area

Investigation 2: Sessions 1–5

See also, Grade 4.

3.4.tpi.9. explain the relationships among inches, feet, and yards.**Grade 3**

From Paces to Feet

Investigation 2: Sessions 1–4

DATA ANALYSIS AND PROBABILITY

Content Standard 5.0 The student will understand and apply basic statistical and probability concepts in order to organize and analyze data and to make predictions and conjectures.

Learning Expectations:**5.1 Develop, select, and use appropriate methods to collect, organize, display, and analyze data.****Kindergarten**

Counting Ourselves and Others

Investigation 1: Choice Time: Counting Chairs

Investigation 2: Focus Time: What Did You Eat for Lunch?; Choice Time: Boxes, Bottles, and Cans; Clothing Sort

Investigation 3

Grade 1

Mathematical Thinking at Grade 1

Investigation 5: Sessions 5–6

Survey Questions and Secret Rules

Investigation 3: Sessions 1–3

Investigation 4: Sessions 2–5

Grade 2

- Mathematical Thinking at Grade 2
 - Investigation 2: Session 6
 - Investigation 5: Sessions 1–6
- Does It Walk, Crawl, or Swim?
 - Investigation 1: Sessions 1–3
 - Investigation 2: Sessions 3–4
 - Investigation 3: Sessions 1–3
- How Many Pockets? How Many Teeth?
 - Investigation 1: Sessions 1–5
 - Investigation 2: Sessions 1–6
 - Investigation 3: Sessions 1–4
- Classroom Routines: How Many Pockets?

Grade 3

- Mathematical Thinking at Grade 3
 - Investigation 2: Sessions 3–4
 - Investigation 3: Sessions 1–4
 - Ten-Minute Math
- Things That Come in Groups
 - Investigation 5: Sessions 1, 3, 4
- From Paces to Feet
 - Investigation 1: Sessions 1–2, 5–6
 - Investigation 2: Sessions 2–4
 - Investigation 3: Sessions 1–3
- Up and Down the Number Line
 - Investigation 2: Sessions 1, 2, 3
- Combining and Comparing
 - Investigation 4: Session 1
 - Investigation 5: Sessions 2–3
- Ten-Minute Math: Exploring Data

5.2 Apply basic concepts of probability.**Kindergarten**

Probability is introduced in Grade 3.

Grade 1

Probability is introduced in Grade 3.

Grade 2

Probability is introduced in Grade 3.

Grade 3

- Things That Come In Groups
 - Ten-Minute Math: Likely or Unlikely
- From Paces to Feet
 - Investigation 3: Sessions 2 and 3

Combining and Comparing
Investigation 2: Session 1
Exploring Solids and Boxes
Ten-Minute Math: Likely or Unlikely

Third Grade Benchmarks

Performance Indicators State:

As documented through state assessment –

at Level 1, the student is able to

3.5.spi.1. interpret pictographs.

Kindergarten

Counting Ourselves and Others
Investigation 2: Focus Time: What Did You Eat for Lunch?

Related content:

Counting Ourselves and Others
Investigation 3

See also, Teacher Note, page 54.

Grade 1

Mathematical Thinking at Grade 1
Investigation 5: Sessions 5–6
Survey Questions and Secret Rules
Investigation 3: Sessions 1–3
Investigation 4: Sessions 2–5

Grade 2

Does It Walk, Crawl, or Swim?
Investigation 1: Sessions 1–2
How Many Pockets? How Many Teeth?
Investigation 1: Sessions 1, 4–5
Investigation 2: Sessions 1–2, 4–6

at Level 2, the student is able to:

3.5.spi.2. interpret bar graphs;

Grade 3

Mathematical Thinking at Grade 3
Investigation 3: Sessions 1–2

3.5.spi.3. solve real-world problems in which data is represented in tables;

Grade 2

Mathematical Thinking at Grade 2
Investigation 2: Session 6
Investigation 5: Sessions 1–2

Does it Walk, Crawl, or Swim?

Investigation 1: Sessions 1–3

Investigation 2: Sessions 3–4

Investigation 3: Sessions 1–3

How Many Pockets? How Many Teeth

Investigation 1: Sessions 1–5

Investigation 2: Sessions 1–5

Investigation 3: Sessions 1–5

Grade 3

Mathematical Thinking at Grade 3

Investigation 3: Sessions 1–2, 3, 4

Things That Come in Groups

Investigation 5: Sessions 1, 3

3.5.spi.4. determine whether an event is certain, possible, or impossible.

Grade 3

Related content:

Things That Come In Groups

Ten-Minute Math: Likely or Unlikely

Exploring Solids and Boxes

Ten-Minute Math: Likely or Unlikely

at Level 3, the student is able to:

3.5.spi.5. determine the most likely, least likely, or equally likely outcomes in simple experiments (i.e., spinner, number or color cube);

Grade 3

Related content:

Things That Come In Groups

Ten-Minute Math: Likely or Unlikely

Exploring Solids and Boxes

Ten-Minute Math: Likely or Unlikely

3.5.spi.6. select all possible outcomes of a simple experiment (i.e., spinner, coin toss, number or color cube).

Grade 3

Related content:

Things That Come In Groups

Ten-Minute Math: Likely or Unlikely

Exploring Solids and Boxes

Ten-Minute Math: Likely or Unlikely

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to:

3.5.tpi.1. create bar graphs and pictographs;**Kindergarten**

Counting Ourselves and Others

Investigation 2: Focus Time: What Did You Eat for Lunch?

Investigation 3

See also, Teacher Note, page 54.

Grade 1

Mathematical Thinking at Grade 1

Investigation 5: Sessions 5–6

Survey Questions and Secret Rules

Investigation 3: Sessions 1–2

Investigation 4: Sessions 2–5

Grade 2

Mathematical Thinking at Grade 2

Investigation 5: Sessions 1–6

Does It Walk, Crawl, or Swim?

Investigation 1: Sessions 1–2

How Many Pockets? How Many Teeth?

Investigation 1: Sessions 1–5

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–4

Classroom Routines: How Many Pockets?

Grade 3

Mathematical Thinking at Grade 3

Investigation 3: Sessions 3–4

Ten-Minute Math

Things That Come in Groups

Investigation 5: Sessions 1, 3

Up and Down the Number Line

Investigation 2: Sessions 1, 2, 3

Combining and Comparing

Investigation 4: Session 1

Investigation 5: Sessions 2–3

Ten-Minute Math

3.5.tpi.2. create tables using tally marks.**Kindergarten**

Counting Ourselves and Others

Investigation 1: Choice Time: Counting Chairs

Investigation 3

Grade 1

Mathematical Thinking at Grade 1

Investigation 5: Sessions 5–6

Survey Questions and Secret Rules

Investigation 2: Sessions 1–6

Investigation 4: Sessions 1–5

Grade 2

Mathematical Thinking at Grade 2

Investigation 5: Sessions 1–2

Does It Walk, Crawl, or Swim?

Investigation 1: Sessions 1–2

Grade 3

Mathematical Thinking at Grade 3

Investigation 3: Sessions 1–2

at Level 2, the student is able to:**3.5.tpi.3. pose questions and gather data to answer questions;****Grade 2**

Mathematical Thinking at Grade 2

Investigation 2: Session 6

Investigation 5: Sessions 1–6

Does It Walk, Crawl, or Swim?

Investigation 1: Sessions 1–3

Investigation 2: Sessions 3–4

Investigation 3: Sessions 1–3

How Many Pockets? How Many Teeth

Investigation 3: Session 1

Grade 3

Mathematical Thinking at Grade 3

Investigation 3: Sessions 3–4

Combining and Comparing

Investigation 5: Sessions 2–3

Ten-Minute Math

3.5.tpi.4. develop an appropriate method to collect data;**Kindergarten**

Counting Ourselves and Others

Investigation 1: Choice Time: Counting Chairs

Investigation 2: Focus Time: What Did You Eat for Lunch?; Choice Time:
Boxes, Bottles, and Cans; Clothing Sort

Investigation 3

Grade 1

Mathematical Thinking at Grade 1

Investigation 5: Sessions 5–6

Survey Questions and Secret Rules

Investigation 3: Sessions 1–3

Investigation 4: Sessions 2–5

Grade 2

Mathematical Thinking at Grade 2

Investigation 2: Session 6

Investigation 5: Sessions 1–6

Does It Walk, Crawl, or Swim?

Investigation 1: Sessions 1–3

Investigation 2: Sessions 3–4

Investigation 3: Sessions 1–3

How Many Pockets? How Many Teeth?

Investigation 1: Sessions 1–5

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–4

Classroom Routines: How Many Pockets?

Grade 3

Mathematical Thinking at Grade 3

Investigation 2: Sessions 3–4

Investigation 3: Sessions 1–4

Ten-Minute Math

Things That Come in Groups

Investigation 5: Sessions 1, 3, 4

From Paces to Feet

Investigation 1: Sessions 1–2, 5–6

Investigation 2: Sessions 2–4

Investigation 3: Sessions 1–3

Up and Down the Number Line

Investigation 2: Sessions 1, 2, 3

Combining and Comparing

Investigation 4: Session 1

Investigation 5: Sessions 2–3

Ten-Minute Math: Exploring Data

3.5.tpi.5. select an appropriate method to display data;**Kindergarten**

Counting Ourselves and Others

Investigation 1: Choice Time: Counting Chairs

Investigation 2: Focus Time: What Did You Eat for Lunch?; Choice Time:
Boxes, Bottles, and Cans; Clothing Sort

Investigation 3

Grade 1

Mathematical Thinking at Grade 1

Investigation 5: Sessions 5–6

Survey Questions and Secret Rules

Investigation 3: Sessions 1–3

Investigation 4: Sessions 2–5

Grade 2

Mathematical Thinking at Grade 2

Investigation 2: Session 6

Investigation 5: Sessions 1–6

Does It Walk, Crawl, or Swim?

Investigation 1: Sessions 1–3

Investigation 2: Sessions 3–4

Investigation 3: Sessions 1–3

How Many Pockets? How Many Teeth?

Investigation 1: Sessions 1–5

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–4

Classroom Routines: How Many Pockets?

Grade 3

Mathematical Thinking at Grade 3

Investigation 2: Sessions 3–4

Investigation 3: Sessions 1–4

Ten-Minute Math

Things That Come in Groups

Investigation 5: Sessions 1, 3, 4

From Paces to Feet

Investigation 1: Sessions 1–2, 5–6

Investigation 2: Sessions 2–4

Investigation 3: Sessions 1–3

Up and Down the Number Line

Investigation 2: Sessions 1, 2, 3

Combining and Comparing

Investigation 4: Session 1

Investigation 5: Sessions 2–3

Ten-Minute Math: Exploring Data

3.5.tpi.6. explain whether an event is certain, possible, or impossible;**Grade 3***Related content:*

Things That Come In Groups

Ten-Minute Math: Likely or Unlikely

Exploring Solids and Boxes

Ten-Minute Math: Likely or Unlikely

3.5.tpi.7. explain whether an event is likely or unlikely.**Grade 3***Related content:*

Things That Come In Groups

Ten-Minute Math: Likely or Unlikely

Exploring Solids and Boxes

Ten-Minute Math: Likely or Unlikely

at Level 3, the student is able to:**3.5.tpi.8. make conjectures based on data gathered and displayed;****Grade 2**

The Shape of the Data

Investigation 1: Sessions 2–3

Investigation 2: Sessions 2–3, 4

Grade 3

From Paces to Feet

Investigation 3: Sessions 2 and 3

Combining and Comparing

Investigation 2: Session 1

3.5.tpi.9. predict outcomes of events based on data gathered and displayed.**Grade 3**

From Paces to Feet

Investigation 3: Sessions 2 and 3

Combining and Comparing

Investigation 2: Session 1

**Investigations in Number, Data, & Space
to the
Tennessee Mathematics Curriculum Standards,
Learning Expectations, and Performance Indicators
Grade Four**

NUMBER AND OPERATIONS

Content Standard 1.0 The student will develop number and operation sense needed to represent numbers and number relationships verbally, symbolically, and graphically and to compute fluently and make reasonable estimates in problem solving.

Learning Expectations:

1.1 Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

Mathematical Thinking at Grade 4

Investigation 1: Session 1–3

Investigation 2: Sessions 1

Investigation 3: Sessions 4–5

Arrays and Shares

Investigation 1: Sessions 1–3

Investigation 2: Sessions 1–8

Investigation 3: Sessions 1–5

Landmarks in the Thousands

Investigation 2: Sessions 1, 5

Investigation 3: Sessions 1–2

Investigation 4: Sessions 1–3

Different Shapes, Equal Pieces

Investigation 1: Sessions 1–5

Investigation 2: Sessions 1–4

Investigation 3: Sessions 1–3

The Shape of the Data

Investigation 2: Session 5–7

Money, Miles, and Large Numbers

Investigation 1: Sessions 1–2, 4–6, 7–8

Investigation 2: Sessions 1–2, 4

Investigation 3: Sessions 2–4

Changes Over Time

Investigation 1: Sessions 5–6

Packages and Groups

Investigation 1: Sessions 1–2

Investigation 2: Sessions 1–3

Investigation 3: Sessions 1–6

Sunken Ships and Grid Patterns

Investigation 1: Sessions 2–4

Three of the Four, Like Spaghetti
Investigation 1: Sessions 2–4
Investigation 2: Sessions 5–7

1.2 Understand meanings of operations and how they relate to one another.

Mathematical Thinking at Grade 4
Investigation 2: Session 1
Investigation 3: Session 3–5
Landmarks in the Thousands
Investigation 2: Sessions 1,5
Money, Miles, and Large Numbers
Investigation 1 : Session 6
Packages and Groups
Investigation 1: Sessions 4–5
Investigation 3: Sessions 1–2, 4–6
Different Shapes, Equal Pieces
Investigation 3: Session 1–2
Arrays and Shares
Investigation 2: Sessions 2–3

1.3 Solve problems, compute fluently, and make reasonable estimates.

Mathematical Thinking at Grade 4
Investigation 1: Sessions 1–4
Investigation 2: Sessions 1–4
Investigation 3: Session 4
Ten-Minute Math: Estimation and Number Sense
Arrays and Shares
Investigation 1: Session 3
Investigation 2: Session 7–8
Investigation 3: Session 2–4
Landmarks in the Thousands
Investigation 2: Session 1
Investigation 3: Sessions 3–5
Different Shapes, Equal Pieces
Investigation 1: Session 1–5
Investigation 2: Session 1–4
The Shape of the Data
Ten-Minute Math: Estimation and Number Sense
Money, Miles, and Large Numbers
Investigation 1: Sessions 1–8
Investigation 2: Sessions 1–4
Investigation 3: Session 1–4
Changes Over Time
Investigation 1: Sessions 1–2, 5–6
Investigation 3: Sessions 1–8
Packages and Groups

Investigation 1: Sessions 4–5
Investigation 2: Sessions 2–3
Investigation 3: Session 1–6, 10
Three Out of Four Like Spaghetti
Investigation 1 : Sessions 1–4
Investigation 2 : Sessions 5–7

Fourth Grade Benchmarks

Performance Indicators State:

As documented through state assessment –

at Level 1, the student is able to

4.1.spi.1. represent whole numbers to 9999;

Mathematical Thinking at Grade 4

Investigation 1: Session 1–3

Landmarks in the Thousands

Investigation 3: Sessions 1–2

Investigation 4: Sessions 1–3

4.1.spi.2. compare and order whole numbers to 9999 using the appropriate symbol (<, >, =);

These investigations provide opportunities for students to compare and order whole numbers.

Landmarks in the Thousands

Investigation 3: Sessions 1, 2

Investigation 4: Sessions 1–3

4.1.spi.3. solve one-step real-world problems involving addition or subtraction of whole numbers.

Mathematical Thinking at Grade 4

Blackline Masters: Practice Pages E–G

Different Shapes, Equal Pieces

Blackline Masters: Practice Pages A–F

Money, Miles, and Large Numbers

Investigation 1: Sessions 1–3, 6

Investigation 2: Session 4

Investigation 3: Sessions 2–4

Three Out of Four Like Spaghetti

Investigation 1: Session 4

at Level 2, the student is able to

4.1.spi.4. read and write numbers from hundred-thousands to hundredths;

- Mathematical Thinking at Grade 4
 - Investigation 1: Session 1–3
- 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: Session 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

4.1.spi.5. identify the place value of a given digit from hundred-thousands to hundredths;

- Mathematical Thinking at Grade 4
 - Investigation 1: Session 1
 - Investigation 2: Sessions 1
- Landmarks in the Thousands
 - Investigation 3: Sessions 1–2
 - Investigation 4: Sessions 1–3
- Money, Miles, and Larger Numbers
 - Investigation 1 : Sessions 1–2, 4–6
 - Investigation 2 : Sessions 1–2, 4

4.1.spi.6. identify fractions as parts of whole units, as parts of sets, as locations on number lines, and as divisions of whole numbers;

- Different Shapes, Equal Pieces
 - Investigation 1: Sessions 1–5
 - Investigation 2: Sessions 1–4
 - Investigation 3: Sessions 1–2

4.1.spi.7. multiply efficiently and accurately with single-digit whole numbers;

Arrays and Shares

Investigation 1: Session 3

Investigation 2: Session 7–8

Investigation 3: Session 2–4

Packages and Groups

Investigation 3: Session 4–6

4.1.spi.8. use estimation to select a reasonable solution to a whole number computation involving addition, subtraction, or multiplication;

Landmarks in the Thousands

Investigation 3: Sessions 3–5

Money, Miles, and Large Numbers

Investigation 3: Session 1

4.1.spi.9. add and subtract decimals (includes monetary units);

Mathematical Thinking at Grade 4

Investigation 2: Sessions 1–2, 3–4

Money, Miles, and Large Numbers

Investigation 1: Sessions 1–2

4.1.spi.10. represent whole numbers up to 10,000 in expanded form (1000's + 100's + 10's + 1's);

Mathematical Thinking at Grade 4

Investigation 1: Sessions 2–3

Landmarks in the Thousands

Investigation 4: Sessions 1–3

4.1.spi.11. add and subtract fractions with like denominators.

Different Shapes, Equal Pieces

Investigation 1: Session 1–5

Investigation 2: Session 1–4

at Level 3, the student is able to**4.1.spi.12. represent numbers as both improper fractions and mixed numbers;**

Different Shapes, Equal Pieces

Investigation 3: Sessions 1–2

4.1.spi.13. generate equivalent forms of whole numbers, commonly used fractions, and decimals;

- Different Shapes, Equal Pieces
 - Investigation 1: Session 5
 - Investigation 2: Sessions 1–4
- Three Out of Four Like Spaghetti
 - Investigation 1: Sessions 2–3

4.1.spi.14. solve one-step real-world problems involving addition, subtraction, or multiplication of whole numbers and/or decimals.

- Arrays and Shapes
 - Investigation 2: Sessions 7–8
 - Investigation 3: Sessions 2–4
- Different Shapes, Equal Pieces
 - Investigation 1: Sessions 1–5
 - Investigation 2: Sessions 1–4
- Money, Miles, and Large Numbers
 - Investigation 2: Sessions 1–4
- Packages and Groups
 - Investigation 3 : Sessions 1–6, 10
- Three of the Four Like Spaghetti
 - Investigation 1 : Sessions 1–4
 - Investigation 2 : Sessions 5–7

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to**4.1.tpi.1. explain the relationship between of addition and subtraction;**

- Mathematical Thinking at Grade 4
 - Investigation 3: Session 3–5
- Money, Miles, and Large Numbers
 - Investigation 1 : Session 6

4.1.tpi.2. explain the relationship between multiplication and addition;

- Arrays and Shares
 - Investigation 1: Session 3

4.1.tpi.3. explain the relationship between multiplication and division.

- Landmarks in the Thousands
 - Investigation 2: Sessions 1,5
- Packages and Groups
 - Investigation 3: Sessions 1–2

at Level 2, the student is able to

4.1.tpi.4. use concrete and pictorial representations to compare decimals;

Money, Miles, and Large Numbers

Investigation 1: Sessions 6, 7–8

Investigation 2: Sessions 1–2, 4

4.1.tpi.5. use various models to represent, order, and compare whole numbers and commonly used fractions and mixed numbers;

Different Shapes, Equal Pieces

Investigation 1: Sessions 2–4

Investigation 2: Sessions 1–2

Investigation 3: Session 3

Three Out of Four Like Spaghetti

Investigation 1: Session 3

Investigation 2: Sessions 5–7

These investigations provide opportunities for students to compare and order whole numbers.

Landmarks in the Thousands

Investigation 3: Sessions 1, 2

Investigation 4: Sessions 1–3

4.1.tpi.6 identify missing information or too much information in real-world problems

Changes Over Time

Investigation 1: Sessions 5–6

4.1.tpi.7. communicate and use mathematical symbols correctly.

Mathematical Thinking at Grade 4

Investigation 3: Sessions 4–5

Arrays and Shares

Investigation 2: Sessions 1–8

Investigation 3: Sessions 1–5

Landmarks in the Thousands

Investigation 2: Sessions 1, 5

Money, Miles, and Large Numbers

Investigation 1: Sessions 1–2, 7–8

Investigation 2: Sessions 1–2, 4

Investigation 3: Sessions 2–4

Packages and Groups

Investigation 1: Sessions 1–2

Investigation 3: Sessions 1–6

Three of the Four, Like Spaghetti

Investigation 1: Sessions 3–4

at Level 3, the student is able to

4.1.tpi.8. select appropriate methods and tools for computing with whole numbers;

- Mathematical Thinking at Grade 4
 - Investigation 1: Sessions 1–4
 - Investigation 2: Sessions 1–4
 - Ten-Minute Math: Estimation and Number Sense
- Landmarks in the Thousands
 - Investigation 2: Session 1
 - Investigation 3: Sessions 3–5
- Money, Miles, and Large Numbers
 - Investigation 1: Sessions 1–2, 4–5, 7–8
 - Investigation 2: Session 3
 - Investigation 3: Sessions 1–4
- Packages and Groups
 - Investigation 1: Sessions 4–5
 - Investigation 2: Sessions 2–3
 - Investigation 3: Sessions 4–6

4.1.tpi.9. communicate the effects of addition, subtraction, multiplication, and division;

- These are a few of the many examples of this indicator.*
- Mathematical Thinking at Grade 4
 - Investigation 2: Session 1
 - Packages and Groups
 - Investigation 1: Sessions 4–5
 - Investigation 3: Sessions 4–6
 - Different Shapes, Equal Pieces
 - Investigation 3: Session 1–2
 - Arrays and Shares
 - Investigation 2: Sessions 2–3

4.1.tpi.10. select the appropriate computational and operational methods to solve problems.

- Mathematical Thinking at Grade 4
 - Investigation 1: Sessions 1–4
 - Investigation 2: Sessions 1–4
 - Ten-Minute Math: Estimation and Number Sense
- Landmarks in the Thousands
 - Investigation 2: Session 1
 - Investigation 3: Sessions 3–5

- Money, Miles, and Large Numbers
 - Investigation 1: Sessions 1–2, 4–5, 7–8
 - Investigation 2: Session 3
 - Investigation 3: Sessions 1–4
- Packages and Groups
 - Investigation 1: Sessions 4–5
 - Investigation 2: Sessions 2–3
 - Investigation 3: Sessions 4–6

ALGEBRA

Content Standard 2.0 The student will understand and generalize patterns as they represent and analyze quantitative relationships and change in a variety of contexts and problems using graphs, tables, and equations.

Learning Expectations:

2.1 Understand patterns, relations, and functions.

- Mathematical Thinking at Grade 4
 - Investigation 4: Sessions 1, 2, 3–4
- Packages and Groups
 - Investigation 1: Sessions 1–2
 - Investigation 3: Sessions 4–6
- Sunken Ships and Grid Patterns
 - Investigation 1: Sessions 3–4, 5–6
 - Investigation 2: Sessions 2–3, 8–9
- Changes Over Time
 - Investigation 1: Sessions 5–6
- Arrays and Shares
 - Investigation 1: Sessions 1–2, 3
 - Investigation 3: Sessions 2–4
- Ten-Minute Math

2.2 Represent and analyze mathematical situations and structures using algebraic symbols.

- Mathematical Thinking at Grade 4
 - Investigation 1: Session 4
 - Investigation 2: Sessions 1, 3–4
- Arrays and Shares
 - Investigation 2: Sessions 1, 2–3, 7–8
 - Investigation 3: Sessions 2–4
- Landmarks in the Thousands
 - Investigation 2: Session 5

Money, Miles, and Large Numbers
Investigation 1: Session 3
Changes Over Time
Investigation 1: Sessions 5–6
Packages and Groups
Investigation 3: Sessions 1–2, 4–6

2.3 Illustrate general properties of operations.

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

2.4 Analyze change in various contexts.

Changes Over Time
Investigation 1: Sessions 1–2, 3–4
Investigation 3: Sessions 1–2, 6–7

Fourth Grade Benchmarks**Performance Indicators State:**

As documented through state assessment –

at Level 1, the student is able to**4.2.spi.1. solve open sentences involving addition and subtraction.**

Mathematical Thinking at Grade 4
Investigation 1: Session 4
Money, Miles, and Large Numbers
Investigation 1: Session 3

at Level 2, the student is able to**4.2.spi.2. extend numerical and geometric patterns;**

Arrays and Shares
Investigation 1: Sessions 1–2, 3
Investigation 3: Sessions 2–4
Ten-Minute Math

Packages and Groups

Investigation 1: Sessions 1–2

Investigation 3: Sessions 4–6

Sunken Ships and Grid Patterns

Investigation 1: Sessions 3–4, 5–6

4.2.spi.3. determine the function rule for data in a function table

Mathematical Thinking at Grade 4

Investigation 4: Sessions 1, 2, 3–4

Packages and Groups

Investigation 1: Sessions 1–2

Investigation 3: Sessions 4–6

Sunken Ships and Grid Patterns

Investigation 1: Sessions 3–4, 5–6

Investigation 2: Sessions 2–3, 8–9

Changes Over Time

Investigation 1: Sessions 5–6

4.2.spi.4. connect open sentences to real-world situations;

Mathematical Thinking at Grade 4

Investigation 1: Session 4

Arrays and Shares

Investigation 2: Sessions 1, 2–3, 7–8

Investigation 3: Sessions 2–4

Landmarks in the Thousands

Investigation 2: Session 5

Money, Miles, and Large Numbers

Investigation 1: Session 3

Packages and Groups

Investigation 3: Sessions 1–2, 4–6

4.2.spi.5. solve open sentences involving multiplication and division.

Arrays and Shares

Investigation 2: Sessions 1, 2–3, 7–8

Investigation 3: Sessions 2–4

Landmarks in the Thousands

Investigation 2: Session 5

Packages and Groups

Investigation 3: Sessions 1–2, 4–6

at Level 3, the student is able to

4.2.spi.6. apply basic function rules.

Mathematical Thinking at Grade 4

Investigation 4: Sessions 1, 2, 3–4

Packages and Groups

Investigation 1: Sessions 1–2

Investigation 3: Sessions 4–6

Sunken Ships and Grid Patterns

Investigation 1: Sessions 3–4, 5–6

Investigation 2: Sessions 2–3, 8–9

Changes Over Time

Investigation 1: Sessions 5–6

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to

4.2.tpi.1. apply commutative, associate, zero, and identify properties

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

at Level 2, the student is able to

4.2.tpi.2. generalize geometric and numerical patterns.

Arrays and Shares

Investigation 1: Sessions 1–2, 3

Investigation 3: Sessions 2–4

Ten-Minute Math

Packages and Groups

Investigation 1: Sessions 1–2

Investigation 3: Sessions 4–6

Sunken Ships and Grid Patterns

Investigation 1: Sessions 3–4, 5–6

4.2.tpi.3. demonstrate an understanding that an equation is a number sentence stating two quantities are equal;

- Mathematical Thinking at Grade 4
 - Investigation 1: Session 4
 - Investigation 2: Sessions 1, 3–4
- Changes Over Time
 - Investigation 1: Sessions 5–6

4.2.tpi.4 identify and describe a function rule;

- Mathematical Thinking at Grade 4
 - Investigation 4: Sessions 1, 2, 3–4
- Packages and Groups
 - Investigation 1: Sessions 1–2
 - Investigation 3: Sessions 4–6
- Sunken Ships and Grid Patterns
 - Investigation 1: Sessions 3–4, 5–6
 - Investigation 2: Sessions 2–3, 8–9
- Changes Over Time
 - Investigation 1: Sessions 5–6

4.2.tpi.5 investigate how a change in one variable relates to a change in a second variable.

- Changes Over Time
 - Investigation 1: Sessions 1–2, 3–4
 - Investigation 3: Sessions 1–2, 6–7

at Level 3, the student is able to**4.2.tpi.6. demonstrate understanding that an equation is a number sentence stating two quantities are equal;**

- Mathematical Thinking at Grade 4
 - Investigation 1: Session 4
 - Investigation 2: Sessions 1, 3–4
- Changes Over Time
 - Investigation 1: Sessions 5–6

4.2.tpi.7. represent the idea of a variable as an unknown quantity using a letter or a symbol.

- Changes Over Time
 - Investigation 1: Sessions 5–6

GEOMETRY

Content Standard 3.0 The student will develop an understanding of geometric concepts and relationships as the basis for geometric modeling and reasoning to solve problems involving one-, two-, and three-dimensional figures.

Learning Expectations:**3.1 Analyze characteristics and properties of two- and three-dimensional shapes.**

Mathematical Thinking at Grade 4

Investigation 4: Sessions 1, 2, 3–4, 5–6

Sunken Ships and Grid Patterns

Investigation 1: Sessions 3–4, 5–6

Investigation 2: Sessions 1–9

Seeing Solids and Silhouettes

Investigation 1: Sessions 1, 2

Investigation 2: Sessions 1–2, 3–4, 5

Investigation 3: Session 1

Different Shapes, Equal Pieces

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–3

3.2 Specify locations and describe spatial relationships using coordinate geometry.

Sunken Ships and Grid Patterns

Investigation 1: Sessions 1–6

Investigation 2: Sessions 1–9

Ten-Minute Math: Lengths and Perimeters

3.3 Apply transformations and use symmetry to analyze mathematical situations.

Mathematical Thinking at Grade 4

Investigation 4: Sessions 1–2, 5–6

Sunken Ships and Grid Patterns

Investigation 2: Sessions 1–9

Different Shapes, Equal Pieces

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–2

3.4 Use visualization, spatial reasoning, and geometric modeling to solve problems.

- Mathematical Thinking at Grade 4
 - Investigation 1–6
- Seeing Solids and Silhouettes
 - Investigation 1: Sessions 1, 2
 - Investigation 2: Sessions 1–2, 3–4, 5
 - Investigation 3: Session 1
 - Investigation 4: Sessions 1–4
- Sunken Ships and Grid Patterns
 - Investigation 2: Sessions 1–4, 6–9
 - Investigation 1: Sessions 3–4, 5–6

Fourth Grade Benchmarks**Performance Indicators State:**

As documented through state assessment –

at Level 1, the student is able to

4.3.spi.1. identify points, lines, and rays.

- Sunken Ships and Grid Patterns
 - Investigation 1: Sessions 3–4, 5–6

at Level 2, the student is able to

4.3.spi.2. recognize congruent geometric figures;

- Different Shapes, Equal Pieces
 - Investigation 1: Sessions 1, 2–4
 - Investigation 2: Sessions 1–2

4.3.spi.3. identify lines of symmetry for two-dimensional geometric figures;

- Mathematical Thinking at Grade 4
 - Investigation 4: Sessions 1, 2, 3–4, 5–6
- Sunken Ships and Grid Patterns
 - Investigation 2: Sessions 2–3, 6–7, 8–9

4.3.spi.4. identify the result of a transformation (flip or slide) that has been applied to a simple two-dimensional geometric shape.

- Mathematical Thinking at Grade 4
 - Investigation 4: Sessions 1–2, 5–6
- Sunken Ships and Grid Patterns
 - Investigation 2: Sessions 1–9

at Level 3, the student is able to

4.3.spi.5. identify two- or three-dimensional shapes given defining attributes;

Sunken Ships and Grid Patterns

Investigation 2: Sessions 1, 6–7

Seeing Solids and Silhouettes

Investigation 1: Sessions 1, 2

Investigation 2: Sessions 1–2, 3–4, 5

Investigation 3: Session 1

4.3.spi.6. locate and specify points in Quadrant I of a coordinate system.

Sunken Ships and Grid Patterns

Investigation 1: Sessions 1–6

Investigation 2: Sessions 1–9

Ten-Minute Math: Lengths and Perimeters

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to

4.3.tpi.1. draw and describe lines, line segments, rays, and angles;

Sunken Ships and Grid Patterns

Investigation 1: Sessions 3–4, 5–6

Investigation 2: Sessions 1, 2–3, 5, 6–7

4.3.tpi.2. draw lines of symmetry for two-dimensional geometric figures.

Mathematical Thinking at Grade 4

Investigation 4: Sessions 1, 2, 3–4, 5–6

Sunken Ships and Grid Patterns

Investigation 2: Sessions 2–3, 6–7, 8–9

at Level 2, the student is able to

4.3.tpi.3. develop and use mathematical language to describe the attributes of geometric figures;

Sunken Ships and Grid Patterns

Investigation 2: Sessions 1, 6–7

Seeing Solids and Silhouettes

Investigation 1: Sessions 1, 2

Investigation 2: Sessions 1–2, 3–4, 5

Investigation 3: Session 1

4.3.tpi.4. describe characteristics of lines, rays, and angles;

Sunken Ships and Grid Patterns

Investigation 1: Sessions 3–4, 5–6

Investigation 2: Sessions 1, 2–3, 5, 6–7

4.3.tpi.5. describe and compare properties of two- and three-dimensional geometric figures;

Sunken Ships and Grid Patterns

Investigation 2: Sessions 1, 6–7

Seeing Solids and Silhouettes

Investigation 1: Sessions 1, 2

Investigation 2: Sessions 1–2, 3–4, 5

Investigation 3: Session 1

4.3.tpi.6. construct or draw the mirror image of a two-dimensional geometric figure or pattern.

Mathematical Thinking at Grade 4

Investigation 4: Sessions 1, 3–4

at Level 3, the student is able to**4.3.tpi.7. investigate and describe the results of subdividing and combining two-dimensional geometric figures;**

Different Shapes, Equal Pieces

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–3

4.3.tpi.8. identify, compare, and analyze attributes of two- and three-dimensional shapes;

Sunken Ships and Grid Patterns

Investigation 2: Sessions 1, 6–7

Seeing Solids and Silhouettes

Investigation 1: Sessions 1, 2

Investigation 2: Sessions 1–2, 3–4, 5

Investigation 3: Session 1

4.3.tpi.9. describe a motion that will show that two shapes are congruent.

Different Shapes, Equal Pieces

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–2

Sunken Ships and Grid Patterns

Investigation 2: Sessions 6–9

MEASUREMENT

Content Standard 4.0 The student will become familiar with the units and processes of measurement in order to use a variety of tools, techniques, and formulas to determine and to estimate measurements in mathematical and real-world problems.

Learning Expectations:**4.1 Understand measurable attributes of objects and the units, systems, and processes of measurement.**

Arrays and Shares

Investigation 2: Sessions 1–6

Different Shapes, Equal Pieces

Investigation 1: Sessions 1–5

Investigation 2: Sessions 1–4

Sunken Ships and Grid Patterns

Investigation 2: Session 4

Ten-Minute Math: Lengths and Perimeters

Seeing Solids and Silhouettes

Investigation 1: Session 1

The Shape of Data

Investigation 2: Sessions 2–3

Changes Over Time

Unit Preparation: Preparation Session 3

4.2 Apply appropriate techniques, tools, and formulas to determine measurements.

Different Shapes, Equal Pieces

Investigation 1: Session 1

Investigation 2: Sessions 1–4

The Shape of Data

Investigation 2: Sessions 1–3

Money, Miles, and Large Numbers

Investigation 2: Session 4

Investigation 3: Sessions 2–4

Changes Over Time

Unit Preparation Session 3

Investigation 3: Session 3

Sunken Ships and Grid Patterns

Ten-Minute Math: Lengths and Perimeters

Fourth Grade Benchmarks**Performance Indicators State:**

As documented through state assessment –

at Level 1, the student is able to**4.4.spi.1. read temperature using Fahrenheit and Celsius scales.**

See Grade 3

Related content:

Up and Down the Number Line

Investigation 1: Session 1–2, 8

See Grade 5

Related content:

Measurement Benchmarks

Investigation 1: Session 1

Investigation 2: Sessions 1–2, 4

at Level 2, the student is able to**4.4.spi.2. find the perimeter of rectangles;**

Sunken Ships and Grid Patterns

Ten-Minute Math: Lengths and Perimeters

4.4.spi.3. tell time on the minute;

Time-related topics are covered in Grade 2.

4.4.spi.4. measure length to the nearest $\frac{1}{4}$ inch or nearest centimeter;

The Shape of Data

Investigation 2: Sessions 2–3

Changes Over Time

Unit Preparation: Preparation Session 3

4.4.spi.5. use estimation to determine if a length or volume measurement is reasonable;

The Shape of the Data

Investigation 2: Session 4

4.4.spi.6. solve real-world problems involving addition and subtraction of measurements;

The Shape of Data

Investigation 2: Sessions 2–3

4.4.spi.7. solve real-world problems involving elapsed time to the quarter-hour.

See Grade 5, *Patterns of Change*.

at Level 3, the student is able to

4.4.spi.8. apply the formula for finding area of a rectangle;

Different Shapes, Equal Pieces

Investigation 1: Sessions 1, 2–4

4.4.spi.9. select the appropriate standard units to measure length, perimeter, area, capacity, volume, weight, time, temperature, and angles.

The Shape of Data

Investigation 2: Sessions 2–3

In these investigations, students use standard measurements on geoboards:

Different Shapes, Equal Pieces

Investigation 1: Sessions 1, 2–4

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to

4.4.tpi.1. select and use appropriate benchmarks to estimate length measurements.

The Shape of the Data

Investigation 2: Session 4

at Level 2, the student is able to

4.4.tpi.2. demonstrate understanding of the concepts of length, perimeter, area, weight, capacity, volume, time, and angle measure;

Arrays and Shares

Investigation 2: Sessions 1–6

Different Shapes, Equal Pieces

Investigation 1: Sessions 1–5

Investigation 2: Sessions 1–4

Sunken Ships and Grid Patterns

Investigation 2: Session 4

Ten-Minute Math: Lengths and Perimeters

Seeing Solids and Silhouettes

Investigation 1: Session 1

The Shape of Data

Investigation 2: Sessions 2–3

Money, Miles, and Large Numbers
Investigation 2: Session 4
Investigation 3: Sessions 2–4
Changes Over Time
Unit Preparation: Preparation Session 3

4.4.tpi.3. develop strategies for estimating the perimeters and areas of geometric figures;

Different Shapes, Equal Pieces
Investigation 1: Session 1
Investigation 2: Sessions 1–4
Sunken Ships and Grid Patterns
Ten-Minute Math: Lengths and Perimeters

4.4.tpi.4. communicate an understanding of the relationships among the units within a system of linear measurement.

This indicator is introduced in Grade 5.

at Level 3, the student is able to

4.4.tpi.5. explore how perimeter and area of a rectangle change when its dimensions change.

Different Shapes, Equal Pieces
Investigation 2: Sessions 1–2

DATA ANALYSIS AND PROBABILITY

Content Standard 5.0 The student will understand and apply basic statistical and probability concepts in order to organize and analyze data and to make predictions and conjectures.

Learning Expectations:

5.1 Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer questions.

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

- Sunken Ships and Grid Patterns
 - Investigation 1: Sessions 1–6
 - Investigation 2: Sessions 1–9
- Three Out of Four Like Spaghetti
 - Investigation 1: Sessions 1–3
 - Investigation 2: Sessions 1–7

5.2 Select and use appropriate statistical methods to analyze data.

- The Shape of the Data
 - Investigation 2: Sessions 4, 5, 6–7
 - Investigation 3: Session 1–3

5.3 Develop and evaluate inferences and predictions that are based on data.

- The Shape of Data
 - Investigation 1: Sessions 1–3
 - Investigation 2: Sessions 1–3, 4
- Three Out of Four Like Spaghetti
 - Investigation 2: Sessions 2, 3

5.4 Understand and apply basic concepts of probability.

- Landmarks in the Thousands
 - Investigation 3: Sessions 3–5
 - Investigation 4: Sessions 1–3
- Ten-Minute Math
- Money, Miles, and Large Numbers
 - Investigation 1: Session 3
 - Investigation 2: Sessions 7–8
 - Investigation 3: Session 1
- Ten-Minute Math
- Three Out of Four Like Spaghetti
 - Investigation 1: Session 3
 - Investigation 2: Session 2
- Ten-Minute Math

Fourth Grade Benchmarks**Performance Indicators State:**

As documented through state assessment –

at Level 1, the student is able to

4.5.spi.1. interpret data displayed in bar graphs and pictographs.

The Shape of Data

Investigation 1: Sessions 1

Investigation 2: Sessions 1, 4

Investigation 3: Sessions 1–2, 3–5

Changes Over Time

Investigation 1: Sessions 1–2, 3–4

Three Out of Four Like Spaghetti

Investigation 2: Sessions 5–7

at Level 2, the student is able to**4.5.spi.2. connect data in tables to pictographs, line graphs, or bar graphs;**

The Shape of the Data

Investigation 2: Sessions 2–7

Investigation 3: Sessions 3–5

Changes Over Time

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 1: Session 2

4.5.spi.3. determine the most likely, least likely, or equally likely outcomes in simple experiments;*Related content:*

Landmarks in the Thousands

Investigation 3: Sessions 3–5

Investigation 4: Sessions 1–3

Ten-Minute Math

Money, Miles, and Large Numbers

Investigation 1: Session 3

Investigation 2: Sessions 7–8

Investigation 3: Session 1

Ten-Minute Math

4.5.spi.4. select all possible outcomes of a simple experiment (i.e., spinner, coin toss, number or color cube).*Related content:*

Three Out of Four Like Spaghetti

Investigation 1: Session 4

Investigation 2: Sessions 1, 2, 5–7

at Level 3, the student is able to

4.5.spi.5. determine the median of a data set;

The Shape of the Data

Investigation 2: Sessions 4, 5, 6–7

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to

4.5.tpi.1. collect data using observations, surveys, and experiments;

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

Three Out of Four Like Spaghetti

Investigation 1: Sessions 1, 3

Investigation 2: Sessions 1–7

at Level 2, the student is able to

4.5.tpi.2. construct bar graphs and line graphs from data in a table;

The Shape of the Data

Investigation 2: Sessions 2–7

Investigation 3: Sessions 3–5

Changes Over Time

Investigation 1: Sessions 1–4

Investigation 3: Sessions 1–8

4.5.tpi.3. evaluate how well various representations show the collected data.

Changes Over Time

Investigation 1, Sessions 1–2, 3–4

Three Out of Four Like Spaghetti

Investigation 2: Sessions 2–3

Investigation 3, Sessions 1–5

at Level 3, the student is able to

4.5.tpi.4. understand how data collection methods affect the nature of the data set;

The Shape of the Data

Investigation 2: Sessions 1–3

Investigation 3: Sessions 1–2

Changes Over Time

Unit Preparation: Preparation Session 3

Three Out of Four Like Spaghetti

Investigation 2: Session 3

4.5.tpi.5. design investigations to address a question;

The Shape of Data

Investigation 1: Sessions 1–3

Investigation 2: Sessions 1–3

Three Out of Four Like Spaghetti

Investigation 2: Sessions 2, 3

4.5.tpi.6. explain differences in measures of center (mean, median, mode).

The Shape of the Data

Investigation 2: Sessions 4, 5, 6–7

Investigation 3: Session 1–3

**Investigations in Number, Data, & Space
to the
Tennessee Mathematics Curriculum Standards,
Learning Expectations, and Performance Indicators
Grade Five**

NUMBER AND OPERATIONS

Content Standard 1.0 The student will develop number and operation sense needed to represent numbers and number relationships verbally, symbolically, and graphically and to compute fluently and make reasonable estimates in problem solving.

Learning Expectations:

1.1 Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1–6

Investigation 2: Sessions 5

Investigation 3: Session 1, 4–5

Investigation 4: Sessions 5–6

Name That Portion

Investigation 1: Sessions 1–7

Investigation 2: Sessions 1–9

Investigation 3: Sessions 1–8

Investigation 4: Sessions 1–7

Between Never and Always

Investigation 1: Sessions 1–2

Building on Numbers You Know

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–3, 5–6

Investigation 3: Sessions 4–10

Investigation 4: Sessions 1–2

Investigation 5: Sessions 1–8

Patterns of Change

Investigation 2: Sessions 2–5

Investigation 3: Sessions 2–6

Data: Kids, Cats, and Ads

Investigation 3: Sessions 1–4

Investigation 4: Session 2–3

Investigation 5: Sessions 3–5

1.2 Understand meanings of operations and how they relate to one another.

Mathematical Thinking at Grade 5

Investigation 2: Sessions 1–4

Investigation 3: Sessions 2–5

Investigation 4: Sessions 1, 5–6

Building on Numbers You Know

Investigation 1: Sessions 1, 3–4, 6–8

Investigation 2: Sessions 1–2, 5–6

Investigation 3: Sessions 1–3

Investigation 4: Session 2

Investigation 5: Sessions 4–6

Measurement Benchmarks

Ten-Minute Math: Estimation and Number Sense

1.3 Solve problems, compute fluently, and make reasonable estimates.

Mathematical Thinking at Grade 5

Investigation 2: Sessions 1–5

Investigation 3: Sessions 2–4, 5

Investigation 4: Sessions 2–4, 5–6

Building on Numbers You Know

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–2, 3, 4, 5–6

Investigation 3: Sessions 1–10

Investigation 4: Sessions 1–7

Investigation 5: Sessions 1–8

Name That Portion

Investigation 2: Session 1–9

Investigation 3: Sessions 2, 3–4, 7–8

Measurement Benchmarks

Investigation 1: Sessions 5–8

Investigation 2: Sessions 7–8

Investigation 3: Session 2

Ten-Minute Math: Estimation and Number Sense

Patterns of Change

Investigation 3: Session 2

Containers and Cubes

Investigation 2: Sessions 3–4

Data: Kids, Cats and Ads

Investigation 5: Sessions 1–5

Ten-Minute Math: The Digits Game

Fifth Grade Benchmarks**Performance Indicators State:**

As documented through state assessment –

at Level 1, the student is able to

5.1.spi.1. read and write numbers from millions to thousandths;

Mathematical thinking at Grade 5

Investigation 1: Sessions 1–3

Investigation 2: Sessions 5

Name that Portion

Investigation 1: Sessions 1, 2

Investigation 2: Sessions 1–8

Investigation 3: Sessions 1–4, 7–8

Investigation 4: Sessions 1, 5–7

Ten-Minute Math: Seeing Numbers

Between Never and Always

Investigation 1: Sessions 1–2

Building on Numbers You Know

Investigation 2: Session 7

Investigation 4: Sessions 1–2

Data: Kids, Cats, and Ads

Investigation 3: Sessions 1, 4

Investigation 4: Session 2

5.1.spi.2. connect symbolic representations of proper and improper fractions to models of proper and improper fractions;

Related content:

Name That Portion

Investigation 2: Session 6

5.1.spi.3. represent whole numbers and two-place decimals in expanded form.

Related content involving decimals:

Name That Portion

Investigation 3: Sessions 5–6

at Level 2, the student is able to

5.1.spi.4. add, subtract, multiply, and divide whole numbers (multipliers and divisors no more than two-digits).

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–7

Investigation 3: Sessions 2–4, 5

Investigation 4: Sessions 5–6

Building on Numbers You Know

Investigation 2: Sessions 1–2, 3, 4

Investigation 3: Sessions 1–10

5.1.spi.5. identify the place value of a given digit from millions to thousandths;

Mathematical Thinking at Grade 5

Investigation 2: Session 2–4

Investigation 3: Sessions 1, 5

Investigation 4: Sessions 5–6

Name that Portion

Investigation 3: Session 2–4, 7

5.1.spi.6. represent, compare, and order whole numbers and decimals to thousandths;

Mathematical Thinking at Grade 5

Investigation 2: Session 5

Investigation 4: Session 2–4

Building on Number You Know

Investigation 1: Sessions 1–2, 5

Investigation 5: Sessions 4–6

Name That Portion

Investigation 3 : Sessions 3–6

Patterns of Change

Ten-Minute Math: Nearest Answer

Data; Kids, Cats, and Ads

Investigation 1: Session 1–3

Investigation 3: Session 1–3

Investigation 4: Session 1, 3

Investigation 5: Session 3–5

5.1.spi.7. use estimation to select a reasonable solution to a whole number computation;

Mathematical Thinking at Grade 5

Investigation 4: Sessions 5–6

Name That Portion

Investigation 2: Sessions 6–8

Investigation 3: Sessions 2–4, 7

Building on Numbers You Know

Investigation 1: Sessions 6–8

Investigation 3: Sessions 1–3

Investigation 5: Sessions 1–2

5.1.spi.8. add, subtract, and multiply decimals;

Name That Portion

Investigation 3: Sessions 2, 3–4, 7

Measurement Benchmarks

Investigation 1: Sessions 5–6

Data: Kids, Cats and Ads

Ten-Minute Math: The Digits Game

5.1.spi.9. solve one- or two-step real-world problems involving addition, subtraction, and/or multiplication of whole numbers and decimals;

Mathematical Thinking at Grade 5

Investigation 2: Sessions 2–5

Investigation 3: Sessions 2–4, 5

Investigation 4: Sessions 5–6

Building on Numbers You Know

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–2, 3, 4, 5–6

Investigation 3: Sessions 1–10

Investigation 4: Sessions 1–2

Investigation 5: Sessions 1–8

Name That Portion

Investigation 3: Sessions 2, 3–4, 7

Measurement Benchmarks

Investigation 1: Sessions 5–8

Ten-Minute Math: Estimation and Number Sense

Data: Kids, Cats and Ads

Ten-Minute Math: The Digits Game

5.1.spi.10. represent numbers as both improper fractions and mixed numbers;

Name That Portion

Investigation 2: Sessions 6–8

Investigation 3: Sessions 7–8

5.1.spi.11. compare and order fractions using the appropriate symbol (<,>=);

Name That Portion

Investigation 1: Sessions 2–7

Investigation 2: Sessions 1–9

Investigation 3: Sessions 1–8

Investigation 4: Sessions 1–7

5.1.spi.12. add and subtract commonly used fractions.

Name That Portion

Investigation 2: Sessions 1–9

Investigation 3: Sessions 7–8

Measurement Benchmarks

Investigation 1: Sessions 5–6

Investigation 2: Sessions 7–8

Ten-Minute Math: Estimation and Number Sense

*at Level 3, the student is able to***5.1.spi.13. generate equivalent forms of commonly used fractions, decimals, and percents (e.g., 1/10, 1/4, 1/2, 3/4);**

Between Never and Always

Investigation 1: Sessions 1–2

Name That Portion

Investigation 1: Sessions 1–7

Investigation 2: Sessions 1–9

Investigation 3: Sessions 1, 3–8

Investigation 4: Sessions 1–7

Data: Kids, cats, and Ads

Investigation 3: Sessions 1–4

Investigation 4: Session 3

Investigation 5: Sessions 3–5

5.1.spi.14. multiply a fraction by a multiple of its denominator (denominator less than or equal to 10) (3)

Name That Portion

Investigation 2: Session 9

Investigation 3: Session 7

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to**5.1.tpi.1. explain and demonstrate the inverse nature of addition and subtraction;**

Building on Numbers You Know

Investigation 5: Sessions 4–6

5.1.tpi.2. select appropriate methods and tools for computation (i.e., mental computation, estimation, calculators, paper and pencil).

Mathematical Thinking at Grade 5

Investigation 2: Session 1

Investigation 3: Sessions 2–4

Investigation 4: Sessions 2–4

Building on Numbers You Know

Investigation 1: Sessions 1–4, 6–8

Investigation 2: Sessions 1–3

Investigation 3: Sessions 1–10

Investigation 4: Sessions 3–7

Name That Portion

Investigation 2: Session 3

Investigation 3: Sessions 2–4, 7

at Level 2, the student is able to**5.1.tpi.3. use various models to show relationships among fractions and decimals (e.g., number lines, base ten blocks, Venn diagrams, hundreds boards);**

Mathematical Thinking at Grade 5

Investigation 1: Session 1–3

Name That Portion

Investigation 1: Sessions 2–7

Investigation 2: Sessions 1–6

Investigation 3: Session 2, 8

5.1.tpi.4. explain and demonstrate the inverse nature of multiplication and division;

Building on Numbers You Know

Investigation 2: Sessions 5–6

Investigation 5: Sessions 4–6

5.1.tpi.5. communicate using mathematical terms and symbols;

These are some of the many investigations that require students to communicate using mathematical language and symbols.

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1–2, 4–6

Investigation 3: Session 4

Investigation 4: Sessions 5–6

Name That Portion

Investigation 4: Sessions 1–7

Building on Numbers You Know

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–3, 5–6

Investigation 3: Sessions 4–10

Investigation 4: Sessions 1–2

Investigation 5: Sessions 1–8

Patterns of Change

Investigation 2: Sessions 2–5

Investigation 3: Sessions 2–6

5.1.tpi.6. solve problems in more than one way and explain why one process may be more efficient than another;

Mathematical Thinking at Grade 5

Investigation 1: Sessions 5–7

Investigation 2 : Session 1

Investigation 4: Sessions 2–4, 5–6

5.1.tpi.7. use models and benchmarks to add and subtract commonly used fractions.

Name That Portion

Investigation 2: Sessions 1–9

Investigation 3: Sessions 7–8

Measurement Benchmarks

Investigation 1: Sessions 5–6

Investigation 2: Sessions 7–8

Ten-Minute Math: Estimation and Number Sense

at Level 3, the student is able to

5.1.tpi.8. apply commutative, zero, associative, distributive, and identity properties;

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 (See Teacher Note pages.)

Investigation 2: Sessions 5–6

Investigation 3: Sessions 1–3

Measurement Benchmarks

Ten-Minute Math: Estimation and Number Sense

5.1.tpi.9. explain relationships among commonly used fractions and decimals;

Name That Portion

Investigation 3: Sessions 1, 5–6, 8

Between Never and Always

Investigation 1: Sessions 1–2

5.1.tpi.10. identify missing information and/or too much information in real-world problems

See Grade 4.

5.1.tpi.11. solve real-world problems using fractions, decimals, and percents.

Name that Portion

Investigation 1: Session 7

Investigation 2: Session 9

Investigation 3: Session 7

Investigation 4: Sessions 1–7

Measurement Benchmark

Investigation 2: Sessions 1–2

Data: Kids, Cats, and Ads

Investigation 3: Session 1

Investigation 4: Session 1

ALGEBRA

Content Standard 2.0 The student will understand and generalize patterns as they represent and analyze quantitative relationships and change in a variety of contexts and problems using graphs, tables, and equations.

Learning Expectations:**2.1 Understand patterns, relations, and functions.**

Mathematical Thinking at Grade 5

Investigation 2: Sessions 1, 2–4

Investigation 3: Session 1

Investigation 4: Sessions 5–6

Picturing Polygons

Investigation 1: Sessions 3–4

Investigation 2: Sessions 4–7

Investigation 3: Sessions 1–7

Name That Portion

Investigation 2: Sessions 4–5

Investigation 3: Sessions 5–6

Patterns of Change

Investigation 1: Sessions 1–4

Investigation 2: Session 2

Investigation 3: Session 1

Ten-Minute Math

2.1 Represent and analyze patterns, relations, and functions.

Mathematical Thinking at Grade 5

Investigation 2: Sessions 1, 2–4

Investigation 3: Session 1

Investigation 4: Sessions 5–6

Picturing Polygons

Investigation 1: Sessions 3–4

Investigation 2: Sessions 4–7

Investigation 3: Sessions 1–7

Name That Portion

Investigation 2: Sessions 4–5

Investigation 3: Sessions 5–6

Patterns of Change

Investigation 1: Sessions 1–4

Investigation 2: Session 2

Investigation 3: Session 1

Ten-Minute Math

2.2 Represent and analyze mathematical situations and structures using algebraic symbols.

Mathematical Thinking at Grade 5

Investigation 4: Sessions 2–4

Name That Portion

Investigation 1: Sessions 3–4

Investigation 2: Sessions 3, 6

Ten-Minute Math

Building on Numbers You Know

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–3, 5–6

Investigation 3: Sessions 4–10

Investigation 4: Sessions 1–2

Investigation 5: Sessions 1–8

Patterns of Change

Investigation 1: Sessions 3–4 (See Teacher Note pages.)

2.3 Illustrate general properties of operations.

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 (See Teacher Note pages.)

Investigation 2: Sessions 5–6

Investigation 3: Sessions 1–3

Measurement Benchmarks

Ten-Minute Math: Estimation and Number Sense

2.4 Analyze change in various contexts.

Patterns of Change

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–5

Investigation 3: Sessions 1–7

Fifth Grade Benchmarks**Performance Indicators State:**

As documented through state assessment –

at Level 1, the student is able to

5.2.spi.1. extend numerical patterns;

Mathematical Thinking at Grade 5

Investigation 2: Sessions 1, 2–4

Investigation 3: Session 1

Investigation 4: Sessions 5–6

Picturing Polygons

Investigation 3: Sessions 1–7

Name That Portion

Investigation 2: Sessions 4–5

Investigation 3: Sessions 5–6

Patterns of Change

Investigation 1: Sessions 1–4

5.2.spi.2. extend geometric patterns.

Picturing Polygons

Investigation 3: Sessions 1–7

Name That Portion

Investigation 2: Sessions 4–5

Investigation 3: Sessions 5–6

Patterns of Change

Investigation 1: Sessions 1–4

at Level 2, the student is able to**5.2.spi.3. apply basic function rules;**

Picturing Polygons

Investigation 1: Sessions 3–4

Investigation 2: Sessions 4–7

Investigation 3: Sessions 1–2, 4–7

Patterns of Change

Investigation 2: Session 2

Investigation 3: Session 1

Ten-Minute Math

5.2.spi.4. connect open sentences to real-world situations;

Mathematical Thinking at Grade 5

Investigation 4: Sessions 2–4

5.2.spi.5. solve open sentences involving addition, subtraction, multiplication, and division.

Mathematical Thinking at Grade 5

Investigation 4: Sessions 2–4

at Level 3, the student is able to

5.2.spi.6. generalize numerical patterns using a variable;

Patterns of Change

Investigation 1: Sessions 3–4 (See Teacher Note pages.)

5.2.spi.7. select an equation that represents a given mathematical relationship;

Related content:

Building on Numbers You Know

Investigation 1: Sessions 3–4

Patterns of Change

Investigation 1: Sessions 3–4 (See Teacher Note pages.)

Investigation 3: Sessions 5–6

5.2.spi.8. extend rate charts to solve real-world problems.

Patterns of Change

Investigation 1: Sessions 1–4

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to

5.2.tpi.1. apply the zero and identity properties;

This indicator can be introduced during these investigations.

Building on Numbers You Know

Investigation 1: Session 8

Investigation 2: Sessions 1–2

5.2.tpi.2. show that division is not commutative.

This investigation provides the opportunity to show that division is not commutative.

Building on Numbers You Know

Investigation 2: Sessions 5–6

at Level 2, the student is able to

5.2.tpi.3. demonstrate understanding that an equation is a number sentence stating two quantities are equal;

Name That Portion

Investigation 1: Sessions 3–4

Investigation 2: Sessions 3, 6

Ten-Minute Math

Building on Numbers You Know

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–3, 5–6

Investigation 3: Sessions 4–10

Investigation 4: Sessions 1–2

Investigation 5: Sessions 1–8

5.2.tpi.4. use appropriate representations to show properties of whole number operations;

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 (See Teacher Note pages.)

Investigation 2: Sessions 5–6

Investigation 3: Sessions 1–3

Measurement Benchmarks

Ten-Minute Math: Estimation and Number Sense

5.2.tpi.5. represent patterns and functions using words, tables, and graphs;

Mathematical Thinking at Grade 5

Investigation 2: Sessions 1, 2–4

Investigation 3: Session 1

Investigation 4: Sessions 5–6

Picturing Polygons

Investigation 3: Sessions 1–7

Name That Portion

Investigation 2: Sessions 4–5

Investigation 3: Sessions 5–6

Patterns of Change

Investigation 1: Sessions 1–4

5.2.tpi.6. use representations such as graphs, tables, and equations to draw conclusions;

Mathematical Thinking at Grade 5

Investigation 2: Sessions 1, 2–4

Investigation 3: Session 1

Investigation 4: Sessions 5–6

Picturing Polygons

Investigation 3: Sessions 1–7

Name That Portion
Investigation 2: Sessions 4–5
Investigation 3: Sessions 5–6
Patterns of Change
Investigation 1: Sessions 1–4

5.2.tpi.7. generalize geometric patterns.

Picturing Polygons
Investigation 3: Sessions 1–7
Name That Portion
Investigation 2: Sessions 4–5
Investigation 3: Sessions 5–6
Patterns of Change
Investigation 1: Sessions 1–4

at Level 3, the student is able to

5.2.tpi.8. investigate how a change in one variable relates to a change in a second variable;

Patterns of Change
Investigation 2: Session 2
Investigation 3: Session 1
Ten-Minute Math

5.2.tpi.9. represent the idea of a variable as an unknown quantity using a letter or a symbol.

Building on Numbers You Know
Investigation 1: Sessions 3–4
Patterns of Change
Investigation 1: Sessions 3–4 (See Teacher Note pages.)

GEOMETRY

Content Standard 3.0 The student will develop an understanding of geometric concepts and relationships as the basis for geometric modeling and reasoning to solve problems involving one-, two-, and three-dimensional figures.

Learning Expectations:

3.1 Analyze characteristics and properties of two- and three-dimensional shapes.

Measurement Benchmarks

Ten-Minute Math: Quick Images

Picturing Polygons

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–8

Investigation 3: Sessions 1–7

Containers and Cubes

Investigation 4: Sessions 1–9

Name That Portion

Investigation 1: Session 7, page 31

Investigation 2: Sessions 1–2

Investigation 3: Session 8

Investigation 4: Sessions 2–7

3.2 Specify locations and describe spatial relationships using coordinate geometry.

Picturing Polygons

Investigation 1: Sessions 3–4

Investigation 2: Sessions 4–7, 9

Investigation 3: Sessions 1–2, 5–6

Patterns of Change

Investigation 2: Session 2 (Follow-Up), 3, 4, 5

Investigation 3: Sessions 1, 2, 3, 5–6

3.3 Apply transformations and use symmetry to analyze mathematical situations.

Picturing Polygons

Investigation 2: Sessions 6–7, 9

Investigation 3: Sessions 1–6

3.4 Use visualization, spatial reasoning, and geometric modeling to solve problems.

Picturing Polygons

Investigation 2: Sessions 4–5, 6–7

Investigation 3: Sessions 5–6

Containers and Cubes

Investigation 1: Sessions 1–2, 3–4

Investigation 2: Sessions 1–2, 3–4

Investigation 3: Session 3

Investigation 4: Sessions 4–9

Fifth Grade Benchmarks**Performance Indicators State:**

As documented through state assessment –

at Level 1, the student is able to**5.3.spi.1. identify lines, line segments, rays, and angles;**

Picturing Polygons

Investigation 1: Session 3

Investigation 2: Sessions 4–5

5.3.spi.2. identify lines of symmetry in two-dimensional geometric figures.

This indicator is covered in Grade 4. See *Mathematical Thinking at Grade 4* and *Sunken Ships and Grid Patterns*.

at Level 2, the student is able to**5.3.spi.3. identify two- or three-dimensional shapes given defining attributes;**

Measurement Benchmarks

Ten-Minute Math: Quick Images

Picturing Polygons

Investigation 1: Session 2

Investigation 2: Sessions 1–5

Investigation 3: Sessions 1–2

Containers and Cubes

Investigation 4: Sessions 1–9

5.3.spi.4. use spatial reasoning to predict the result of sliding, flipping, or turning a two-dimensional shape;

Picturing Polygons

Investigation 2: Sessions 6–7, 9

Investigation 3: Sessions 1–3, 5–6

5.3.spi.5. locate and specify a point in Quadrant I of a coordinate system.

Picturing Polygons

Investigation 1: Sessions 3–4

Investigation 2: Sessions 4–7, 9

Investigation 3: Sessions 1–2, 5–6

Patterns of Change

Investigation 2: Session 2 (Follow-Up), 3, 4, 5

Investigation 3: Sessions 1, 2, 3, 5–6

at Level 3, the student is able to

5.3.spi.6. classify geometric figures using properties;

Picturing Polygons

Investigation 1: Sessions 1, 2, 3, 4

Investigation 3: Sessions 1–2, 3, 4, 5–6

Containers and Cubes

Investigation 1: Sessions 1–9

5.3.spi.7. use spatial reasoning to identify the three-dimensional figure created from a two-dimensional representation (net) of that figure (i.e., cube, rectangular prism, pyramid, cone, or cylinder).

Containers and Cubes

Investigation 1: Sessions 1–2, 3–4

Investigation 2: Sessions 1–2, 3–4

See also, Grade 4, Seeing Solids and Silhouettes.

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to

5.3.tpi.1. draw and describe lines, line segments, rays, and angles;

Students use Geo-Logo software to draw.

Picturing Polygons

Investigation 1: Session 3

Investigation 2: Sessions 4–5

5.3.tpi.2. draw lines of symmetry for two-dimensional geometric figures.

This indicator is covered in Grade 4. *See Mathematical Thinking at Grade 4 and Sunken Ships and Grid Patterns.*

at Level 2, the student is able to

5.3.tpi.3. construct lines, line segments, rays, and angles;

Picturing Polygons

Investigation 1: Session 3

Investigation 2: Sessions 4–5

5.3.tpi.4. explore similarity;

Picturing Polygons

Investigation 2 Sessions 4–5, 6–7

Investigation 3: Sessions 5–6

5.3.tpi.5. use appropriate mathematical language to describe the attributes of a circle;

Name That Portion

Investigation 1: Session 7, page 31

Investigation 2: Sessions 1–2

Investigation 3: Session 8

Investigation 4: Sessions 2–7

5.3.tpi.6. make coordinate systems to specify locations;

Picturing Polygons

Investigation 1: Sessions 3–4

Investigation 2: Sessions 4–7, 9

Investigation 3: Sessions 1–2, 5–6

Patterns of Change

Investigation 2: Session 2 (Follow-Up), 3, 4, 5

Investigation 3: Sessions 1, 2, 3, 5–6

5.3.tpi.7. analyze attributes of two- and three-dimensional geometric figures;

Measurement Benchmarks

Ten-Minute Math: Quick Images

Picturing Polygons

Investigation 1: Session 2

Investigation 2: Sessions 1–5

Investigation 3: Sessions 1–2

Containers and Cubes

Investigation 4: Sessions 1–9

5.3.tpi.8. construct and draw two- and three-dimensional geometric figures.

Containers and Cubes

Investigation 1: Sessions 1–2, 3–4

Investigation 2: Sessions 1–2, 3–4

Picturing Polygons

Investigation 2: Sessions 1–3, 4–5, 6–7, 8, 9

Investigation 3: Sessions 1–2, 4

at Level 3, the student is able to

5.3.tpi.9. use the attributes of geometric figures to develop definitions;

Picturing Polygons

Investigation 1: Sessions 1, 2–4

Investigation 2: Session 1

Investigation 3: Sessions 1–3

5.3.tpi.10. investigate and describe the results of subdividing and combining geometric figures;

Picturing Polygons

Investigation 1: Session 2

Investigation 2: Session 8

Investigation 3: Session 4–6

5.3.tpi.11. make and test hypotheses about geometric properties and relationships;

Picturing Polygons

Investigation 2: Sessions 1–3

Investigation 3: Sessions 1–6

Containers and Cubes

Investigation 4: Sessions 4–6

5.3.tpi.12. describe location and movement using mathematical language and geometric vocabulary;

Picturing Polygons

Investigation 1: Sessions 3–4

Investigation 2: Sessions 4–7, 9

Investigation 3: Sessions 1–2, 5–6

5.3.tpi.13. describe the results of transformations of two-dimensional geometric figures (i.e., slides, flips, and turns).

Picturing Polygons

Investigation 2: Sessions 6–7, 9

Investigation 3: Sessions 1–3, 5–6

MEASUREMENT

Content Standard 4.0 The student will become familiar with the units and processes of measurement in order to use a variety of tools, techniques, and formulas to determine and to estimate measurements in mathematical and real-world problems.

Learning Expectations:**4.1 Understand measurable attributes of objects and the units, systems, and processes of measurement.**

Picturing Polygons

Investigation 2: Session 8

Investigation 3: Sessions 4–6 (Follow-Up)

Measurement Benchmarks

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–8

Investigation 3: Sessions 1–3

Containers and Cubes

Investigation 1: Sessions 1–2, 3–4

Investigation 2: Sessions 3–4, 5

Investigation 3: Sessions 1–4

Investigation 4: Sessions 1–6

Ten-Minute Math: Volume and Surface Area

4.2 Apply appropriate techniques, tools, and formulas to determine measurements.

Measurement Benchmarks

Investigation 1: Sessions 1, 3, 4, 5–8

Investigation 2: Sessions 1–4, 7–8

Investigation 3: Sessions 1–3

Containers and Cubes

Investigation 1: Sessions 1–2, 3–4

Investigation 2: Sessions 1–2, 3–4, 5

Investigation 3: Sessions 1–2, 3, 4

Investigation 4: Sessions 1, 2–3, 4–5, 7–9

Ten-Minute Math: Volume and Surface Area

Fifth Grade Benchmarks**Performance Indicators State:**

As documented through state assessment –

at Level 1, the student is able to**5.4.spi.1. read temperature using Fahrenheit and Celsius scales;**

Related content:

Measurement Benchmarks

Investigation 1: Session 1

Investigation 2: Sessions 1–2, 4

5.4.spi.2. use a ruler to measure to the nearest centimeter and 1/4 inch;

Measurement Benchmarks

Investigation 1: Sessions 7–8

5.4.spi.3. use estimation to determine if a length or volume measurement is reasonable;

Measurement Benchmarks

Investigation 1: Sessions 5–6

Investigation 2: Session 4

5.4.spi.4. solve real-world problems involving addition and subtraction of measurements.

Measurement Benchmarks

Investigation 1: Sessions 5–8

at Level 2, the student is able to**5.4.spi.5. select appropriate standard units to measure length, perimeter, area, capacity, volume, weight, time, temperature, and angles;**

Measurement Benchmarks

Investigation 1: Sessions 1, 3, 4, 5–6, 7

Investigation 2: Sessions 3, 4

Investigation 3: Session 1

5.4.spi.6. connect simple units of measurement within the same system of measurement;

Measurement Benchmarks

Investigation 1: Sessions 4, 5–6

Investigation 2: Sessions 1–8

5.4.spi.7. use strategies to estimate perimeter and area of rectangles;

Picturing Polygons

Investigation 3: Sessions 5–6 (Follow-Up)

5.4.spi.8. solve real-world problems involving elapsed time.*Related content:*

Measurement Benchmarks

Investigation 3: Session 1

at Level 3, the student is able to**5.4.spi.9. apply formulas to find the area of parallelograms and triangles;***Related content:*

Containers and Cubes

Investigation 1: Sessions 1–2

5.4.spi.10. solve real-world problems involving perimeter and area of rectangles.

Picturing Polygons

Investigation 3: Sessions 5–6 (Follow-Up)

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to**5.4.tpi.1. understanding of the concepts of perimeter, length, area, weight, capacity, volume, elapsed time, angle measure;**

Picturing Polygons

Investigation 2: Session 8

Investigation 3: Sessions 4–6 (Follow-Up)

Measurement Benchmarks

Investigation 2: Sessions 3–8

Investigation 3: Sessions 1–3

Containers and Cubes

Investigation 1: Sessions 1–2, 3–4

Investigation 2: Sessions 3–4, 5

Investigation 3: Sessions 1–2

Ten-Minute Math: Volume and Surface Area

5.4.tpi.2. use a protractor to measure angles.*Students use the Geo-Logo software program to investigate angle measurement.*

at Level 2, the student is able to

5.4.tpi.3. demonstrate understanding of equivalent measures within the same system of measurements;

Measurement Benchmarks

Investigation 1: Sessions 4, 5–6

Investigation 2: Sessions 1–8

5.4.tpi.4. understand that measurements are approximations;

Containers and Cubes

Investigation 3: Sessions 1–4

Investigation 4: Sessions 1–6

Measurement Benchmarks

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–5

5.4.tpi.5. explain how difference in units affect precision;

Measurement Benchmarks

Investigation 1: Sessions 1–4

Investigation 2: Sessions 3–4

5.4.tpi.6. develop and apply strategies for estimating the volume;

Measurement Benchmarks

Investigation 2: Sessions 2, 4, 5

Containers and Cubes

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–5

Investigation 3: Sessions 1–3

Investigation 4: Sessions 1–9

5.4.tpi.7. select and use appropriate tools to measure length, perimeter, circumference, area capacity, volume, weight, time, temperature, and angles.

Measurement Benchmarks

Investigation 1: Sessions 1, 3, 4, 5–6, 7

Investigation 2: Sessions 3, 4

Investigation 3: Session 1

at Level 3, the student is able to

5.4.tpi.8. explore what happens to measurements of a two-dimensional shape such as its perimeter and area when the shape is changed in some way;

Picturing Polygons

Investigation 3: Sessions 4–6

5.4.tpi.9. develop formulas to find area of parallelograms and triangles;*Related content:*

Containers and Cubes

Investigation 1: Sessions 1–2

5.4.tpi.10. develop informal strategies to determine the surface area and volume of rectangular solids.

Measurement Benchmarks

Investigation 2: Session 4

Containers and Cubes

Investigation 1: Sessions 1–2, 3–4

Investigation 2: Sessions 1–2, 3–4, 5

Investigation 3: Sessions 1–2, 3, 4

Investigation 4: Sessions 1, 2–3, 4–5, 7–9

Ten-Minute Math: Volume and Surface Area

DATA ANALYSIS AND PROBABILITY

Content Standard 5.0 The student will understand and apply basic statistical and probability concepts in order to organize and analyze data and to make predictions and conjectures.

Learning Expectations:**5.1 Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer questions.**

Name That Portion

Investigation 3: Sessions 2, 5–6

Investigation 4: Sessions 1–7

Ten-Minute Math

Between Never and Always

Investigation 2: Session 3

Patterns of Change

Investigation 2: Sessions 2–5

Investigation 3: Sessions 2–6

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1–4

Investigation 2: Session 1

Investigation 3: Sessions 1–3

Investigation 4: Session 1, 3

Investigation 5: Sessions 1–5

5.2 Select and use appropriate statistical methods to analyze data.

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–3

Investigation 3: Sessions 1–4

Investigation 5: Sessions 3–5

5.3 Develop and evaluate inferences and predictions that are based on data.

Between Never and Always

Investigation 1: Sessions 3–5

Investigation 2: Session 1–3

Patterns of Change

Investigation 2: Session 1

Data: Kids, Cats, and Ads'

Investigation 1: Session 1

Investigation 2: Session 1, 2

Investigation 3: Sessions 2–4

Investigation 4: Session 2

Investigation 5: Session 1–5

5.4 Understand and apply basic concepts of probability.

Between Never and Always

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–5

Fifth Grade Benchmarks**Performance Indicators State:**

As documented through state assessment –

at Level 1, the student is able to**5.5.spi.1. represent data using bar graphs and pictographs;**

Data: Kids, Cats, and Ads

Investigation 2: Sessions 1–2

Investigation 5: Sessions 3–5

5.5.spi.2. interpret data displayed in bar graphs and pictographs.

Data: Kids, Cats, and Ads

Investigation 2: Sessions 1–2

Investigation 5: Sessions 3–5

at Level 2, the student is able to

5.5.spi.3. determine the median of a data set;

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–3

Investigation 3: Sessions 1–4

Investigation 5: Sessions 3–5

5.5.spi.4. determine the mode of a data set;

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–3

Investigation 3: Sessions 1–4

Investigation 5: Sessions 3–5

5.5.spi.5. determine the most likely, least likely, or equally likely outcomes in simple experiments;

Between Never and Always

Investigation 1: Sessions 1–2, 3–4, 5

Investigation 2: Sessions 1–2

5.5.spi.6. represent the likelihood of an event using a fractional number from zero to one.

Between Never and Always

Investigation 1: Sessions 1–2, 3–4, 5, 6, 7, 8

Investigation 2: Sessions 1–2, 3, 4–5

at Level 3, the student is able to

5.5.spi.7. determine the mean of a data set;

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–3

Investigation 3: Sessions 1–4

Investigation 5: Sessions 3–5

5.5.spi.8. make predictions based on data.

Data: Kids, Cats, and Ads

Investigation 2: Sessions 1, 2

Investigation 3: Sessions 2–3, 4

Investigation 5: Session 1–5

Performance Indicators Teacher:

As documented through teacher observation –

at Level 1, the student is able to**5.5.tpi.1. collect data using observations, surveys, and experiments;**

Data: Kids, Cats, and Ads

Investigation 1: Session 1

Investigation 2: Sessions 1–3

Investigation 5 : Session 1

5.5.tpi.2. organize and display data;

Patterns of Change

Investigation 2: Sessions 2–5

Investigation 3: Sessions 5–6

Data: Kids, Cats, and Ads

Investigation 2: Sessions 1–2

Investigation 5: Sessions 3–5

5.5.tpi.3. design investigations to address questions.

Between Never and Always

Investigation 1: Sessions 3–5

Investigation 2: Session 3

Patterns of Change

Investigation 2: Session 1

Data: Kids, Cats, and Ads'

Investigation 1: Session 1

Investigation 2: Session 2

at Level 2, the student is able to**5.5.tpi.4. represent data using tables;**

Patterns of Change

Investigation 2: Sessions 2–5

Data: Kids, Cats, and Ads

Investigation 2: Sessions 1–2

5.5.tpi.5. relate mean, median, and mode to a visual representation of a data set;

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–3

Investigation 3: Sessions 1–4

Investigation 5: Sessions 3–5

5.5.tpi.6. create a sample space to predict the probability of an event;

Between Never and Always

Investigation 1: Sessions 3–5

Investigation 2: Sessions 1–2

5.5.tpi.7. explain the importance of sample size in investigations;

Data: Kids, Cats, and Ads

Investigation 3: Sessions 2–4

Investigation 4: Session 2

Investigation 5: Session 2

5.5.tpi.8. examine various representations of data and evaluate how accurately the data is depicted by the graph.

Between Never and Always

Investigation 2: Sessions 1–2

Data: Kids, Cats, and Ads

Investigation 5: Sessions 3–5

at Level 3, the student is able to**5.5.tpi.9. understand how data collection methods affect the nature of the data set;**

Data: Kids, Cats, and Ads

Investigation 1: Session 1

Investigation 2: Session 1

Investigation 3: Sessions 2–3

Investigation 4: Session 2

Investigation 5: Sessions 1–2

5.5.tpi.10. explain which measure of central tendency best represents a given data set.

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–3

Investigation 3: Sessions 1–4

Investigation 5: Sessions 3–5