

**A Correlation of**



to the

**Kansas**  
**Curricular Standards for Mathematics**  
**Grade Three**



G/M-219\_ Gr 3

## INTRODUCTION

This document demonstrates how well **Investigations in Number, Data, and Space®** integrates with the Kansas Curricular Standards for Mathematics. The citations within this correlation provide Investigation Curriculum Unit titles, Investigation numbers and Session numbers or Focus Time/Choice Time titles correlated to the Kansas Curricular Standards for Mathematics.

***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](http://www.scottforesman.com/investigations).


**Investigations in Number, Data, and Space  
to the  
Kansas Curricular Standards for Mathematics  
Grade Three**

**Standard 1: Number and Computation** – The student uses numerical and computational concepts and procedures in a variety of situations.

**Benchmark 1: Number Sense** – The student demonstrates number sense for whole numbers, fractions, decimals, and money using concrete objects in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>The student...</b></p> <p><b>1. knows, explains, and represents (\$):</b></p> <p><b>a. whole numbers from 0 through 10,000 (2.4.K1a-b)</b></p>	<p>Mathematical Thinking at Grade 3              Investigation 1: Sessions 1-3              Investigation 4: Session 2</p> <p>Landmarks in the Hundreds              Investigation 2: Sessions 1-3              Investigation 3: Session 1              Ten-Minute Math: Counting Around the Class</p> <p>Flips, Turns, and Area              Ten-Minute Math: Broken Calculator</p> <p>Combining and Comparing              Investigation 4: Sessions 3-4</p> <p>Fair Shares              Investigation 3: Sessions 1-2              Ten-Minute Math: Broken Calculator</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>b. fractions greater than or equal to zero (halves, fourths, thirds, eighths, tenths, sixteenths) (2.4.K1c) (\$);</b></p>	<p>Mathematical Thinking at Grade 3            Investigation 2: Sessions 3-4            Investigation 4: Session 2            Flips, Turns, and Areas            Investigation 2: Sessions 1-5            Up and Down the Number Line            Investigation 3: Session 1            Turtle Paths            Investigation 2: Sessions 1-2            Fair Shares            Investigation 1: Sessions 1-4            Investigation 2: Sessions 1-7            Investigation 3: Sessions 1-3</p>
<p><b>c. decimals greater than or equal to zero through tenths place (2.4.K1c).</b></p>	<p>Mathematical Thinking at Grade 3            Investigation 4: Session 2            Landmarks in the Hundreds            Investigation 2: Session 4            Combining and Comparing            Investigation 3: Sessions 1-2            Fair Shares            Investigation 3: Sessions 1-3</p>
<p><b>2. compares and orders:</b></p> <p><b>a. ▲ ■ whole numbers from 0 through 10,000 with and without the use of concrete objects (2.4.K1a-b) (\$);</b></p>	<p>Mathematical Thinking at Grade 3            Investigation 3: Sessions 3-4            Combining and Comparing            Investigation 1: Sessions 1-2            Investigation 4: Sessions 1-2</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space												
<p>b. fractions greater than or equal to zero with like denominators (halves, fourths, thirds, eighths, tenths, sixteenths) using concrete objects (2.4.K1a,c);</p>	<p>Fair Shares            Investigation 1: Sessions 1-4            Investigation 2: Sessions 1-4            Investigation 3: Sessions 1-2</p>												
<p>c. decimals greater than or equal to zero through tenths place using concrete objects (2.4.K1a-c).</p>	<p>Combining and Comparing            Investigation 3: Sessions 1-2: Activity, pages 33-34            Fair Shares            Investigation 3: Sessions 1-2, page 51</p>												
<p>3. ▲ knows, explains, and uses equivalent representations including the use of mathematical models for:</p> <p>a. addition and subtraction of whole numbers from 0 through 1,000 (2.4.K1a-b) (\$), e.g., <math>144 + 236 = 300 + 80</math></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>■    ■■                          ....   ...</p> </div> <div style="text-align: center;"> <table border="1" style="border-collapse: collapse;"> <tr><td>\$100</td></tr> <tr><td>\$100</td></tr> <tr><td>\$100</td></tr> </table> </div> <div style="text-align: center;"> <table border="1" style="border-collapse: collapse;"> <tr><td>\$10</td></tr> <tr><td>\$10</td></tr> <tr><td>\$10</td></tr> <tr><td>\$10</td></tr> <tr><td>\$10</td></tr> </table> </div> <div style="text-align: center;"> <table border="1" style="border-collapse: collapse;"> <tr><td>\$10</td></tr> <tr><td>\$10</td></tr> <tr><td>\$10</td></tr> <tr><td>\$10</td></tr> </table> </div> </div>	\$100	\$100	\$100	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10	<p>Mathematical Thinking at Grade 3            Investigation 2: Sessions 1-7            Investigation 3: Sessions 3-4            Investigation 4: Session 1            Ten-Minute Math: Calendar Math</p> <p>Up and Down the Number Line            Investigation 1: Sessions 1-8</p> <p>Combining and Comparing            Investigation 1: Sessions 1-3            Investigation 2: Sessions 1-2            Investigation 3: Sessions 1-3            Investigation 4: Sessions 1-4            Investigation 5: Sessions 1-3            Ten-Minute Math: Estimation and Number Sense</p>
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Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>b. multiplication using the basic facts through the 5s and the multiplication facts of the 10s (2.4.K1a), e.g., <math>3 \times 2</math> can be represented as <math>4 + 2</math> or as an array, <math>X \times X \times X \times X</math>;</b></p>	<p>Things That Come in Groups  Investigation 1: Sessions 1-4  Investigation 2: Sessions 1-6  Investigation 3: Sessions 1-5  Investigation 4: Sessions 1-4  Investigation 5: Sessions 1-4  Ten-Minute Math: Counting Around the Class</p> <p>Landmarks in the Hundreds  Investigation 1: Sessions 1-7  Investigation 2: Sessions 1-6  Ten-Minute Math: Counting Around the Class</p>
<p><b>c. addition and subtraction of money (2.4.K1d) (\$), e.g., three half dollars equals <math>50\text{¢} + 50\text{¢} + 50\text{¢}</math> or <math>50\text{¢} + 100\text{¢}</math>.</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 2: Sessions 5-7</p> <p>Landmarks in the Hundreds  Investigation 2: Session 4</p> <p>Combining and Comparing  Investigation 3, Sessions 1-2</p>
<p><b>4. ▲ N determines the value of mixed coins and bills with a total value of \$50 or less (2.1.K1d) (\$).</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 2: Sessions 5-7</p> <p>Landmarks in the Hundreds  Investigation 2: Session 4</p> <p>Combining and Comparing  Investigation 3, Sessions 1-2</p>

**Benchmark 2: Number Systems and Their Properties** – The student demonstrates an understanding of whole numbers with a special emphasis on place value and recognizes, uses, and explains the concepts of properties as they relate to whole numbers, fractions, decimals, and money in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p><b>1. identifies, reads, and writes numbers using numerals and words from tenths place through ten thousands place (2.4.K1a-b) (\$), e.g., sixty-four thousand, three hundred eighty and five tenths is written in numerical form as 64,380.5.</b></p>	<p>Mathematical Thinking at Grade 3            Investigation 1: Sessions 1-3            Investigation 4: Session 2</p> <p>Landmarks in the Hundreds            Investigation 2: Sessions 1-4            Investigation 3: Session 1            Ten-Minute Math: Counting Around the Class</p> <p>Flips, Turns, and Area            Ten-Minute Math: Broken Calculator</p> <p>Combining and Comparing            Investigation 3: Sessions 1-2            Investigation 4: Sessions 3-4</p> <p>Fair Shares            Investigation 3: Sessions 1-3            Ten-Minute Math: Broken Calculator</p>
<p><b>2. identifies, models, reads, and writes numbers using expanded form from tenths place through ten thousands place (2.4.K1b), e.g., <math>56,277.3 = (5 \times 10,000) + (6 \times 1,000) + (2 \times 100) + (7 \times 10) + (7 \times 1) + (3 \times .1) = 50,000 + 6,000 + 200 + 70 + 7 + .3</math>.</b></p>	<p>Mathematical Thinking at Grade 3            Investigation 1: Sessions 1-3</p> <p>Landmarks in the Hundreds            Investigation 2: Sessions 1-3            Investigation 3: Session 1            Ten-Minute Math: Counting Around the Class</p> <p>Combining and Comparing            Investigation 4: Sessions 3-4</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>3. classifies various subsets of numbers as whole numbers, fractions (including mixed numbers), or decimals (2.4.K1a-c, 2.4.K1i)</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 2: Sessions 1-2  Investigation 3: Sessions 3-4  Investigation 4: Session 2  Ten-Minute Math: Calendar Math</p> <p>Things That Come in Groups  Investigation 1: Session 2  Investigation 3: Sessions 1-5  Investigation 4: Sessions 1-2</p> <p>Flips, Turns, and Area  Investigation 2: Sessions 1-5  Ten-Minute Math: Broken Calculator</p> <p>Fair Shares  Investigation 1: Sessions 1-4  Investigation 2: Sessions 1-7  Investigation 3: Sessions 1-3</p> <p>Landmarks in the Hundreds  Investigation 1: Sessions 1-7  Investigation 2: Sessions 1-6  Investigation 3: Session 1  Ten-Minute Math: Calendar Math</p> <p>Up and Down the Number Line  Investigation 1: Sessions 3-4, 6-7</p>



Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>4. identifies the place value of various digits from tenths to one hundred thousands place (2.4.K1b) (\$).</b></p>	<p>Students explore concepts of place value as they construct and investigate patterns on hundred and thousand charts. They learn the significance of the decimal point and examine decimal place value in relation to the calculator and problems involving money. Counting by tens and hundreds supports students' familiarity with the base-ten system.</p> <p><b>References:</b>  Mathematical Thinking at Grade 3      Investigation 1: Sessions 1-3      Investigation 4: Session 2  Landmarks in the Hundreds      Investigation 2: Sessions 1-3      Investigation 3: Session 1  Ten-Minute Math: Counting Around the Class  Combining and Comparing      Investigation 4: Sessions 3-4</p>
<p><b>5. identifies any whole number through 1,000 as even or odd (2.4.K1a).</b></p>	<p>Mathematical Thinking at Grade 3      Investigation 2: Sessions 3-4      Investigation 4: Sessions 1-3</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>6. uses the concepts of these properties with whole numbers from 0 through 100 and demonstrates their meaning including the use of concrete objects (2.4.K1a) (\$):</b></p> <p><b>a. commutative properties of addition and multiplication, e.g., <math>7 + 8 = 8 + 7</math> or <math>3 \times 6 = 6 \times 3</math>;</b></p>	<p>Mathematical Thinking in Grade 3  Investigation 2: Session 1: Teacher Note, pages 22-23  Investigation 2: Session 2  Things That Come in Groups  Investigation 3: Sessions 1-2  Flips, Turns, and Area  Investigation 1: Sessions 4-5  Up and Down the Number Line  Investigation 1: Sessions 1-8</p>
<p><b>b. zero property of addition (additive identity), e.g., <math>4 + 0 = 4</math>;</b></p>	<p>Mathematical Thinking in Grade 3  Investigation 2: Session 1: Teacher Note, pages 22-23  Investigation 2: Session 2  Up and Down the Number Line  Investigation 1: Sessions 1-8</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>c. <b>property of one for multiplication (multiplicative identity), <math>1 \times 3 = 3</math>;</b></p>	<p>Things That Come in Groups Investigation 1: Sessions 1-2 Landmarks in the Hundreds Investigation 1 Sessions 2-3: Dialogue Box, page 16 Sessions 6-7, page 23</p>
<p>d. <b>associative property of addition, e.g., <math>(3 + 2) + 4 = 3 + (2 + 4)</math>;</b></p>	<p>Mathematical Thinking in Grade 3 Investigation 2: Session 1: Teacher Note, page 23 Up and Down the Number Line Investigation 1: Sessions 3-8</p>
<p>e. <b>symmetric property of equality applied to addition and multiplication, e.g., <math>100 = 20 + 80</math> is the same as <math>20 + 80 = 100</math> and <math>3 \times 4 = 12</math> is the same as <math>12 = 3 \times 4</math>;</b></p>	<p>The symmetric property of equality is not taught explicitly, but it can be incorporated into the concept of equality and operations. For example, students use multiplication and addition to determine the total number of legs represented by a group of animals which includes creatures with 0, 2, 4, 6, and 8 legs. Then students approach the problem symmetrically by solving the Riddle of 22 Legs, where they determine how many cats, people, and spiders might be in a house where there are 22 legs. <b>Sample References:</b> Things That Come in Groups Investigation 5: Sessions 2, 4</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>f. zero property of multiplication, e.g., <math>9 \times 0 = 0</math> or <math>0 \times 32 = 0</math>.</p>	<p><b>Sample References:</b>  Landmarks in the Hundreds  Investigation 1: Sessions 2-3: Dialogue Box, page 16   Ten-Minute Math: Calendar Math</p>
<p>7. divides whole numbers from 0 through 99,999 into groups of 10,000s; 1,000s; 100s; 10s, and 1s using base ten models (2.4.K1b).</p>	<p>Grade 3 students explore concepts of place value as they construct and investigate patterns on hundred and thousand charts. They learn the significance of the decimal point and examine decimal place value in relation to the calculator and problems involving money. Counting by tens and hundreds supports students' familiarity with the base-ten system.</p> <p><b>References:</b>  Mathematical Thinking at Grade 3  Investigation 1: Sessions 1-3  Investigation 4: Session 2  Landmarks in the Hundreds  Investigation 2: Sessions 1-3  Investigation 3: Session 1  Ten-Minute Math: Counting Around the Class  Combining and Comparing  Investigation 4: Sessions 3-4</p>

**Benchmark 3: Estimation** – The student uses computational estimation with whole numbers, fractions, and money in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p><b>1. estimates whole numbers quantities from 0 through 1,000; fractions (halves, fourths); and monetary amounts through \$500 using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology (2.4.K1a-d) (\$).</b></p>	<p>From Paces to Feet            Ten-Minute Math: Estimation and Number Sense            Up and Down the Number Line            Ten-Minute Math: Estimation and Number Sense            Combining and Comparing            Investigation 3: Sessions 1-2            Ten-Minute Math: Estimation and Number Sense</p>
<p><b>2. uses various estimation strategies to estimate using whole number quantities from 0 through 1,000 and explains the process used (2.4.K1a) (\$) e.g., 362 rounded to the nearest ten is 360 and 362 rounded to the nearest hundred is 400. Using front-end estimation, 362 is about 300 or 400 depending on the context of the problem. Using a “nice” number, 362 is about 350 because of the benchmark number – 350, since 350 is the halfway point between 300 and 400.</b></p>	<p>From Paces to Feet            Ten-Minute Math: Estimation and Number Sense            Up and Down the Number Line            Ten-Minute Math: Estimation and Number Sense            Combining and Comparing            Investigation 3: Sessions 1-2            Ten-Minute Math: Estimation and Number Sense</p>
<p><b>3. recognizes and explains the difference between an exact and an approximate answer (2.4.K1a), e.g., when asked how many students are in a classroom, an exact answer could be 24. Whereas, an approximate answer could be 20 since 24 could be rounded down to the nearest ten (underestimated) or rounded up to 30 (overestimated).</b></p>	<p>From Paces to Feet            Ten-Minute Math: Estimation and Number Sense            Up and Down the Number Line            Ten-Minute Math: Estimation and Number Sense            Combining and Comparing            Investigation 3: Sessions 1-2            Ten-Minute Math: Estimation and Number Sense</p>

**Benchmark 4: Computation** – The student models, performs, and explains computation with whole numbers and money including the use of concrete objects in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p><b>1. computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology (2.4.K1a) (\$).</b></p>	<p>Mathematical Thinking at Grade 3            Investigation 2: Sessions 1-7            Investigation 3: Sessions 3-4            Investigation 4: Sessions 1-2</p> <p>Things That Come in Groups            Investigation 1: Sessions 1-4            Investigation 2: Sessions 1-6            Investigation 3: Sessions 1-5            Investigation 4: Sessions 1-4            Investigation 5: Sessions 1-4</p> <p>Landmarks in the Hundreds            Investigation 1: Sessions 1-7            Investigation 2: Sessions 1-6</p> <p>Up and Down the Number Line            Investigation 1: Sessions 1-8</p> <p>Combining and Comparing            Investigation 1: Sessions 1-3            Investigation 2: Sessions 1-2            Investigation 3: Sessions 1-3            Investigation 4: Sessions 1-4            Investigation 5: Sessions 1-3</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>2. N states and uses with efficiency and accuracy the multiplication facts through the 5s and the multiplication facts of the 10s and corresponding division facts (2.4.K1a) (\$).</b></p>	<p>Things That Come in Groups  Investigation 1: Sessions 1-4  Investigation 2: Sessions 1-6  Investigation 3: Sessions 1-5  Investigation 4: Sessions 1-4  Investigation 5: Sessions 1-4  Ten-Minute Math: Counting Around the Class</p> <p>Landmarks in the Hundreds  Investigation 1: Sessions 1-7  Investigation 2: Sessions 1-6  Ten-Minute Math: Counting Around the Class</p>
<p><b>3. skip counts (multiples) by 2s, 3s, 4s, 5s, and 10s (2.4.K1a).</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 1: Sessions 2-3  Investigation 2: Sessions 5-7</p> <p>Things That Come in Groups  Investigation 2: Sessions 1-6  Investigation 5: Session 1  Ten-Minute Math: Counting Around the Class</p> <p>Landmarks in the Hundreds  Investigation 1: Sessions 1-5  Investigation 2: Sessions 5-6: Teacher Note, page 49  Ten-Minute Math: Counting Around the Class</p> <p>Fair Shares  Investigation 2: Sessions 5-6</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>4. N performs and explains these computational procedures:</b></p> <p><b>a. adds and subtracts whole numbers from 0 through 10,000 (2.4.K1a-b);</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 2: Sessions 1-7  Investigation 3: Sessions 3-4  Investigation 4: Session 1  Ten-Minute Math: Calendar Math</p> <p>Up and Down the Number Line  Investigation 1: Sessions 1-8</p> <p>Combining and Comparing  Investigation 1: Sessions 1-3  Investigation 2: Sessions 1-2  Investigation 3: Sessions 1-3  Investigation 4: Sessions 1-4  Investigation 5: Sessions 1-3  Ten-Minute Math: Estimation and Number Sense</p>
<p><b>b. multiplies whole numbers when one factor is 5 or less and the other factor is a multiple of 10 through 1,000 with or without the use of concrete objects (2.4.K1a-b), e.g., <math>400 \times 3 = 120</math> or <math>70 \times 5 = 350</math>;</b></p>	<p>Things That Come in Groups  Investigation 1: Sessions 1-4  Investigation 2: Sessions 1-6  Investigation 3: Sessions 1-5  Investigation 4: Sessions 1-4  Investigation 5: Sessions 1-4  Ten-Minute Math: Counting Around the Class</p> <p>Landmarks in the Hundreds  Investigation 1: Sessions 1-7  Investigation 2: Sessions 1-6  Ten-Minute Math: Counting Around the Class</p>



Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>c. adds and subtracts monetary amounts using dollar and cents notation through \$500.00 (2.4.K1d) (\$), e.g., <math>\\$47.07 + \\$356.96 = \\$404.03</math>.</b></p>	<p>Grade 3 students recognize the value of coins and find the value of a collection of coins, they divide one dollar among different numbers of people, and they solve a variety of problems involving the addition, subtraction, multiplication, and/or division of amounts of money.</p> <p><b>References:</b>            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</p>
<p><b>5. fair shares/measures out (divides) a total amount through 100 concrete objects into equal groups (2.4.K1a-b), e.g., fair sharing 52 pieces of candy with 8 friends resulting in eight groups of 6 with four pieces left over or measuring out into groups of eight 52 pieces of candy with four pieces left over.</b></p>	<p>Things That Come in Groups                Investigation 1: Session 3: Teacher Note, page 15                Investigation 4: Sessions 1-4            Landmarks in the Hundreds                Investigation 1: Sessions 6-7                Investigation 2: Sessions 5-6</p>
<p><b>6. explains the relationship between addition and subtraction (2.4.K1a-b) (\$).</b></p>	<p>Up and Down the Number Line                Investigation 1: Sessions 1-4            Combining and Comparing                Investigation 4: Session 2: Teacher Note, page 52            Turtle Paths                Investigation 1: Sessions 3-4</p>


Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>7. <b>▲■ N identifies multiplication and division fact families through the 5s and the multiplication and division fact families of the 10s (2.4.K1a), e.g., when given <math>6 \times \square = 18</math>, the student recognizes the remaining members of the fact family.</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 2: Sessions 3-4  Things That Come in Groups  Investigation 1: Session 3: Dialogue Box, page 15  Investigation 4: Sessions 1-4</p>
<p>8. <b>reads and writes horizontally, vertically, and with different operational symbols the same addition, subtraction, multiplication, or division expression, e.g., <math>4 \cdot 6</math> is the same as <math>4 \times 6</math> or <math>4(6)</math> or <math>6</math> and <math>10 \underline{\times} 4</math> divided by 2 is the same as <math>10 \div 2</math> or <math>\underline{10}</math> 2.</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 2: Sessions 5-7: Teacher Note, page 45  Things That Come in Groups  Investigation 1: Session 1: Teacher Note, page 11  Investigation 4: Sessions 1-2  Landmarks in the Hundreds  Investigation 1: Sessions 4-5: Teacher Note, page 21  Investigation 2: Sessions 5-6</p>

**Standard 2: Algebra** – The student uses algebraic concepts and procedures in a variety of situations.

**Benchmark 1: Patterns** – The student recognizes, describes, extends, develops, and explains relationships in patterns using concrete objects in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p><b>1. uses concrete objects, drawings, and other representations to work with types of patterns (2.4.K1a):</b></p> <p><b>a. repeating patterns, e.g., an AB pattern is like 1-2, 1-2, ...; an ABC pattern is like dog-horse-pig, dog-horse-pig, ...; an AAB pattern is like <math>\uparrow\uparrow\rightarrow</math>, <math>\uparrow\uparrow\rightarrow</math>, ...;</b></p>	<p>Flips, Turns, and Area Investigation 1: Sessions 2-3</p>
<p><b>b. growing patterns, e.g., 1, 4, 7, 10, ...</b></p>	<p>Mathematical Thinking at Grade 3 Investigation 1: Sessions 2-3 Investigation 2: Sessions 5-7</p> <p>Things That Come in Groups Investigation 2: Sessions 1-6 Investigation 5: Session 1 Ten-Minute Math: Counting Around the Class</p> <p>Landmarks in the Hundreds Investigation 1: Sessions 1-5 Investigation 2: Sessions 5-6: Teacher Note, page 49 Ten-Minute Math: Counting Around the Class</p> <p>Fair Shares Investigation 2: Sessions 5-6</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>2. uses these attributes to generate patterns:</b></p> <p><b>a. counting numbers related to number theory (2.4.K1a), e.g., evens, odds, or multiples through the 5s;</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 1: Sessions 2-3  Investigation 2: Sessions 5-7</p> <p>Things That Come in Groups  Investigation 2: Sessions 1-6  Investigation 5: Session 1  Ten-Minute Math: Counting Around the Class</p> <p>Landmarks in the Hundreds  Investigation 1: Sessions 1-5  Investigation 2: Sessions 1-3, 5-6:  Teacher Note, page 49  Ten-Minute Math: Counting Around the Class</p> <p>Fair Shares  Investigation 2: Sessions 5-6</p>
<p><b>b. whole numbers that increase or decrease (2.4.K1a) (\$),e.g., 3, 6, 9, ...; 20, 15, 10, ...;</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 1: Sessions 2-3  Investigation 2: Sessions 5-7</p> <p>Things That Come in Groups  Investigation 2: Sessions 1-6  Investigation 5: Session 1  Ten-Minute Math: Counting Around the Class</p> <p>Landmarks in the Hundreds  Investigation 1: Sessions 1-5  Investigation 2: Sessions 1-3, 5-6:  Teacher Note, page 49  Ten-Minute Math: Counting Around the Class</p> <p>Fair Shares  Investigation 2: Sessions 5-6</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>c. <b>geometric shapes including one attribute change (2.4.K1f), e.g., ■-□-△-▲, ■-□-△-▲, ■-□-△-▲,...</b> where the pattern is filled-in square, square, triangle, filled-in triangle, ...; or when using attribute blocks the change is size only, then shape only, ... such as</p> 	<p>Flips, Turns, and Area Investigation 1: Sessions 1-3</p>
<p>d. <b>measurements (2.4.K1a), e.g., 1 ft, 2 ft, 3 ft, ...; 3 lbs, 6 lbs, 9 lbs; or 2 cups, 4 cups, 6 cups, ...;</b></p>	<p>From Paces to Feet Investigation 1: Sessions 1-4 Investigation 2: Sessions 3-4</p>
<p>e. <b>money and time (2.4.K1a,d) (\$), e.g., \$.25, \$.50, \$.75, ... or 1:05 p.m., 1:10 p.m., 1:15 p.m., ...;</b></p>	<p>Mathematical Thinking at Grade 3 Investigation 2: Sessions 5-7 Things That Come in Groups Investigation 5: Session 1 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Session 4 Ten-Minute Math: Calendar Math Combining and Comparing Investigation 5: Sessions 1-3</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>f. things related to daily life (2.4.K1a), e.g., water cycle, food cycle, or life cycle;</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 2: Sessions 5-7</p> <p>Things That Come in Groups  Investigation 1: Session 4  Investigation 3: Sessions 1-2  Investigation 5: Sessions 1-4</p> <p>Landmarks in the Hundreds  Investigation 1: Sessions 6-7  Investigation 2  Session 4  Sessions 5-6: Teacher Note, page 49</p> <p>Combining and Comparing  Investigation 5: Sessions 1-3</p> <p>Fair Shares  Investigation 2: Sessions 5-6</p>
<p><b>g. things related to size, shape, color, texture, or movement (2.4.K1a), e.g., red-green, red-green, red-green, ...; snapping fingers; clapping hands; stomping feet; or tossing a bean bag over the head, under the leg, and behind the back (kinesthetic patterns).</b></p>	<p>Flips, Turns, and Area  Investigation 1: Sessions 1-3</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>3. identifies, states, and continues a pattern presented in various formats including numeric (list or table), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written (2.4.K1a) (\$).</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 1: Sessions 2-3  Investigation 2: Sessions 5-7  Things That Come in Groups  Investigation 2: Sessions 1-6  Investigation 5: Session 1  Ten-Minute Math: Counting Around the Class  Landmarks in the Hundreds  Investigation 1: Sessions 1-5  Investigation 2: Sessions 5-6: Teacher Note, page 49  Ten-Minute Math: Counting Around the Class  Flips, Turns, and Area  Investigation 1: Sessions 1-3  Fair Shares  Investigation 2: Sessions 5-6</p>
<p><b>4. generates:</b>  <b>a. repeating patterns (2.4.K1a),</b></p>	<p>Flips, Turns, and Area  Investigation 1: Sessions 2-3</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>b. growing (extending) patterns (2.4.K1a),</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 1: Sessions 2-3  Investigation 2: Sessions 5-7  Things That Come in Groups  Investigation 2: Sessions 1-6  Investigation 5: Session 1  Ten-Minute Math: Counting Around the Class  Landmarks in the Hundreds  Investigation 1: Sessions 1-5  Investigation 2: Sessions 5-6: Teacher Note, page 49  Ten-Minute Math: Counting Around the Class  Fair Shares  Investigation 2: Sessions 5-6</p>
<p><b>c. patterns using function tables (input/output machines, T-tables) (2.4.K1e).</b></p>	<p>Things That Come in Groups  Investigation 5: Sessions 1-4  Landmarks in the Hundreds  Investigation 1: Sessions 6-7  Investigation 2: Sessions 1-3  Fair Shares  Investigation 2: Sessions 5-6</p>



**Benchmark 2: Variables, Equations, and Inequalities** – The student uses symbols and whole numbers to solve equations including the use of concrete objects in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p>1. <b>explains and uses symbols to represent unknown whole number quantities from 0 through 1,000 (2.4.K1a)</b></p>	<p>Students gain experience and practice in solving problems involving missing information, including on-computer and off-computer activities to find missing lengths and turns.</p> <p><b>References:</b>            Up and Down the Number Line                Investigation 1: Sessions 6-7            Turtle Paths                Investigation 2: Sessions 5-6</p>
<p>2. <b>finds the sum or difference in one-step equations with (\$):</b></p> <p>a. <b>whole numbers from 0 through 99 (2.4.K1a) e.g., <math>89 = 76 + y</math> or <math>y - 23 = 32</math>;</b></p>	<p>Students identify missing terms and numbers in open number sentences involving multiplication and division number facts. Also, students solve “missing information” problems by describing possible operations (addition or subtraction) and amounts of change given a starting point and an ending point.</p> <p><b>References:</b>            Things That Come in Groups                Investigation 1                    Session 2                    Session 3, page 15                    Session 4, page 17                Investigation 4: Sessions 1-4            Up and Down the Number Line                Investigation 1: Sessions 6-7</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>b. monetary values through a dollar (2.4.K1d), e.g., <math>25¢ + 10¢ + 5¢ = n</math>.</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 2: Sessions 5-7  Landmarks in the Hundreds  Investigation 2: Session 4  Combining and Comparing  Investigation 3: Sessions 1-2</p>
<p><b>3. finds the unknown in the multiplication and division fact families through the 5s and the 10s (2.4.K1a), e.g., <math>3 \cdot \square = 4 \cdot 6</math>.</b></p>	<p>Students identify missing terms and numbers in open number sentences involving multiplication and division number facts.  <b>References:</b>  Things That Come in Groups  Investigation 1  Session 2  Session 3, page 15  Session 4, page 17  Investigation 4: Sessions 1-4</p>
<p><b>4. compares two whole numbers from 0 through 1,000 using the equality and inequality symbols (<math>=</math>, <math>&lt;</math>, <math>&gt;</math>) and their corresponding meanings (is equal to, is less than, is greater than) (2.4.K1a-b) (\$).</b></p>	<p>Mathematical Thinking at Grade 3  Investigation 3: Sessions 3-4  Combining and Comparing  Investigation 1: Sessions 1-2  Investigation 4: Session 2</p>

**Benchmark 3: Functions** – The student recognizes and describes whole number relationships using concrete objects in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>The student...</b></p> <p><b>1. states mathematical relationships between whole numbers from 0 through 200 using various methods including mental math, paper and pencil, concrete objects, and appropriate technology (2.4.K1a) (\$), e.g., every time a quarter is added to the amount; 25¢ is added to the total.</b></p>	<p>Students state mathematical relationships between whole numbers throughout the course. For example, students use Hundred Charts, Thousand Charts, arrays, and interlocking cubes to explore number patterns and relationships.</p> <p><b>Sample References:</b></p> <p>Mathematical Thinking at Grade 3 Investigation 1: Sessions 2-3</p> <p>Things That Come in Groups Investigation 2: Sessions 5-6</p> <p>Flips, Turns, and Area Investigation 1: Session 1</p> <p>From Paces to Feet Investigation 1: Session 1</p> <p>Landmarks in the Hundreds Investigation 3: Sessions 1-3</p> <p>Turtle Paths Investigation 2: Sessions 5-6</p> <p>Fair Shares Investigation 2: Session 3</p> <p>Exploring Solids and Boxes Investigation 4: Session 2</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space																		
<p>2. finds the values and determines the rule with one operation (addition, subtraction) of whole numbers from 0 through 200 using a horizontal or vertical function table (input/output machine, T-table) (2.4.K1e), e.g., using this input/output machine, different student responses might be that the rule is Input minus 10 equals Output, the rule is <math>N - 10</math>, or the rule is subtract 10.</p> <table border="1" data-bbox="795 548 1058 816"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>92</td> <td>82</td> </tr> <tr> <td>156</td> <td>146</td> </tr> <tr> <td>13</td> <td>3</td> </tr> <tr> <td>113</td> <td>103</td> </tr> <tr> <td>?</td> <td>59</td> </tr> <tr> <td>106</td> <td>?</td> </tr> <tr> <td>?</td> <td>?</td> </tr> <tr> <td>N</td> <td>?</td> </tr> </tbody> </table>	Input	Output	92	82	156	146	13	3	113	103	?	59	106	?	?	?	N	?	<p>Things That Come in Groups Investigation 5: Sessions 1-4</p> <p>Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Sessions 1-3</p> <p>Fair Shares Investigation 2: Sessions 5-6</p>
Input	Output																		
92	82																		
156	146																		
13	3																		
113	103																		
?	59																		
106	?																		
?	?																		
N	?																		
<p>3. ▲ generalizes numerical patterns using whole numbers from 0 through 200 with one operation (addition, subtraction) by stating the rule using words, e.g., if the sequence is 30, 50, 70, 90, ...; in words, the rule is add twenty to the number before.</p>	<p>Mathematical Thinking at Grade 3 Investigation 1: Sessions 2-3 Investigation 2: Sessions 5-7</p> <p>Things That Come in Groups Investigation 2: Sessions 1-6 Investigation 5: Session 1 Ten-Minute Math: Counting Around the Class</p> <p>Landmarks in the Hundreds Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-3, 5-6: Teacher Note, page 49 Ten-Minute Math: Counting Around the Class</p>																		

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>4. uses a function table (input/output machine, T-table) to identify and plot ordered pairs in the first quadrant of a coordinate plane (2.4.K1a,e).</b></p>	<p>Turtle Paths            Investigation 1: Sessions 1-4            Investigation 2: Sessions 1-6            Investigation 3: Sessions 1-7</p>

**Benchmark 4: Models** – The student develops and uses mathematical models including the use of concrete objects to represent and show mathematical relationships in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p><b>1. knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include:</b></p> <p><b>a. process models (concrete objects, pictures, number lines, coordinate planes/grids, hundred charts, measurement tools, multiplication arrays, or division sets) to model computational procedures and mathematical relationships (1.2.K1, 1.2.K.1a, 1.2.K2 1.2.K3, 1.2.K5-6, 1.3.K1-3, 1.4.K1-3, 1.4.K1a-b, 1.4.K5-7, 2.1.K1, 2.1.K2a, 2.1.K2d-g, 2.1.K3, 2.1.K4a-b, 2.2.K1, 2.2.K2, 2.2.K3-4, 2.3.K1, 2.3.K4, 3.2.K1-4, 3.3.K1, 3.4.K1-3, K.2.K3) (\$);</b></p>	<p>Grade 3 model processes with objects or drawings throughout the course. Students use a wide variety of manipulatives, including cubes, tiles, balances, pattern blocks, geoblocks, tetronimoos, and snap cubes to model mathematical and real-world problem situations. They use beans, cubes, and tiles to model strategies for counting, combining, and comparing quantities. They use square and triangle pieces to model different shapes with equal areas. They find factors by making equal groups of interlocking cubes, and then use drawings to record their work. They</p>

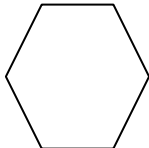

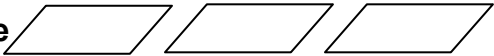
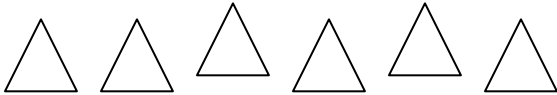
Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
(continued)	<p>prepare “Changes Cards” to model trips up and down in an elevator. They choose coupons that add up to a given amount of savings. They use paper rectangles to model brownies that must be cut into equal shares.</p> <p><b>Sample References:</b></p> <ul style="list-style-type: none"> <li>Mathematical Thinking at Grade 3 <ul style="list-style-type: none"> <li>Investigation 3: Sessions 3-4</li> </ul> </li> <li>Things That Come in Groups <ul style="list-style-type: none"> <li>Investigation 1: Session 2</li> </ul> </li> <li>Flips, Turns, and Area <ul style="list-style-type: none"> <li>Investigation 2: Sessions 2-3</li> </ul> </li> <li>From Paces to Feet <ul style="list-style-type: none"> <li>Investigation 4: Sessions 1-3</li> </ul> </li> <li>Landmarks in the Hundreds <ul style="list-style-type: none"> <li>Investigation 1: Session 1</li> </ul> </li> <li>Up and Down the Number Line <ul style="list-style-type: none"> <li>Investigation 1: Sessions 3-4</li> </ul> </li> <li>Combining and Comparing <ul style="list-style-type: none"> <li>Investigation 3: Sessions 1-2</li> </ul> </li> <li>Turtle Paths <ul style="list-style-type: none"> <li>Investigation 3: Sessions 1-2</li> </ul> </li> <li>Fair Shares <ul style="list-style-type: none"> <li>Investigation 1: Sessions 1-4</li> </ul> </li> <li>Exploring Solids and Boxes <ul style="list-style-type: none"> <li>Investigation 2: Sessions 4-5</li> </ul> </li> </ul>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>b. place value models (place value mats, hundred charts, base ten blocks or unifix cubes) to compare, order, and represent numerical quantities and to model computational procedures (1.1.K1c, 1.1.K2a, 1.1.K2c, 1.1.K3a, 1.2.K1-4, 1.2.K7, 1.3.K1, 1.4.K4a-b, 1.4.K5-6, 2.2.K4) (\$);</b></p>	<p>Grade 3 students explore concepts of place value as they construct and investigate patterns on hundred and thousand charts. They learn the significance of the decimal point and examine decimal place value in relation to the calculator and problems involving money. Counting by tens and hundreds supports students' familiarity with the base-ten system.</p> <p><b>References:</b>  Mathematical Thinking at Grade 3      Investigation 1: Sessions 1-3      Investigation 4: Session 2  Landmarks in the Hundreds      Investigation 2: Sessions 1-3      Investigation 3: Session 1      Ten-Minute Math: Counting Around the Class  Combining and Comparing      Investigation 4: Sessions 3-4</p>
<p><b>c. fraction models (fraction strips or pattern blocks) and decimal models (base ten blocks or coins) to compare, order, and represent numerical quantities (1.1.K1b, 1.1.K2b-c, 1.2.K3, 1.3.K1) (\$);</b></p>	<p>Mathematical Thinking at Grade 3      Investigation 2: Sessions 3-4      Investigation 4: Session 2  Flips, Turns, and Areas      Investigation 2: Sessions 1-5  Up and Down the Number Line      Investigation 3: Session 1  Fair Shares      Investigation 1: Sessions 1-4      Investigation 2: Sessions 1-7      Investigation 3: Sessions 1-3</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>d. money models (base ten blocks or coins) to compare, order, and represent numerical quantities (1.1K3c, 1.1.K4, 1.3.K1, 1.4.K4c, 2.1.K2e, 2.2.K2b) (\$);</b></p>	<p>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</p>
<p><b>e. function tables (input/output machines, T-tables) to find numerical relationships (2.1.K4c, 2.3.K2, 2.3.K4) (\$);</b></p>	<p>Things That Come in Groups Investigation 5: Sessions 1-4 Landmarks in the Hundreds Investigation 1: Sessions 6-7 Investigation 2: Sessions 1-3 Fair Shares Investigation 2: Sessions 5-6</p>
<p><b>f. two-dimensional geometric models (geoboards, dot paper, pattern blocks, or tangrams) to model perimeter, area, and properties of geometric shapes and three-dimensional geometric models (solids) and real-world objects to compare size and to model attributes of geometric shapes (2.1.K2c, 3.1.K1-6, 3.2.K5, 3.3.K2);</b></p>	<p>Flips, Turns, and Area Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-5 Turtle Paths Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-7 Exploring Solids and Boxes Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-5 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4</p>



Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>g. two-dimensional geometric models (spinners), three-dimensional models (number cubes), and process models (concrete objects) to model probability (4.1.K1-2) (\$);</b></p>	<p>Things That Come in Groups            Ten-Minute Math: Likely or Unlikely?            Exploring Solids and Boxes            Ten-Minute Math: What Is Likely?</p>
<p><b>h. graphs using concrete objects, representational objects, or abstract representations, pictographs, frequency tables, horizontal and vertical bar graphs, Venn diagrams or other pictorial displays, line plots, charts, and tables to organize and display data (2.3.K4, 4.1.K2, 4.2.K1a-d, 4.2.K1f-g, 4.2.K2) (\$);</b></p>	<p>Mathematical Thinking at Grade 3            Investigation 3: Sessions 1-2            From Paces to Feet            Investigation 2: Session 2            Combining and Comparing            Ten-Minute Math: Exploring Data</p>
<p><b>i. Venn diagrams to sort data and show relationships (1.2.K3).</b></p>	<p>Grade 3 students are encouraged to organize and represent data using a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables may be provided to the students, or created by the students in various problem situations. Students are asked to choose an appropriate means to display their data, and are asked to explain or justify their choices.</p> <p><b>References:</b>            Mathematical Thinking at Grade 3            Investigation 3: Sessions 1-2            Combining and Comparing            Ten-Minute Math: Exploring Data</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>2. creates a mathematical model to show the relationship between two or more things, e.g., using pattern blocks, a whole (1) can be represented as</b></p> <p>a  <b>(1/1) or</b></p> <p><b>two</b>  <b>(2/2) or</b></p> <p><b>three</b>  <b>(3/3) or</b></p> <p><b>six</b>  <b>(6/6).</b></p>	<p>Grade 3 students model a variety of mathematical relationships, including geometric relationships in symmetric figures; number relationships on the 100 chart; relationships between rectangles with the same area but different dimensions; relationships between units of linear measure, including paces and steps; and relationships between factors of numbers.</p> <p><b>Sample References:</b></p> <p>Mathematical Thinking at Grade 3 Investigation 2: Session 1</p> <p>Things That Come in Groups Investigation 2: Session 1</p> <p>Flips, Turns, and Area Investigation 1: Session 4</p> <p>From Paces to Feet Investigation 1: Sessions 1-6</p> <p>Landmarks in the Hundreds Investigation 1: Sessions 1-7</p> <p>Up and Down the Number Line Investigation 2: Session 1</p> <p>Combining and Comparing Investigation 2: Sessions 1-2</p> <p>Turtle Paths Investigation 3: Sessions 1-2</p> <p>Fair Shares Investigation 1: Sessions 1-4</p> <p>Exploring Solids and Boxes Investigation 1: Session 1</p>

**Standard 3: Geometry** – The student uses geometric concepts and procedures in a variety of situations.

**Benchmark 1: Geometric Figures and Their Properties** – The student recognizes geometric shapes and investigates their properties using concrete objects in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p><b>1. recognizes and investigates properties of plane figures (circles, squares, rectangles, triangles, ellipses, rhombi, octagons) using concrete objects, drawings, and appropriate technology (2.4.K1f).</b></p>	<p>Flips, Turns, and Area Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-5</p> <p>Turtle Paths Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-7</p>
<p><b>2. recognizes, draws, and describes plane figures (circles, squares, rectangles, triangles, ellipses, rhombi, octagons) (2.4.K1f).</b></p>	<p>Flips, Turns, and Area Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-5</p> <p>Turtle Paths Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-7</p>
<p><b>3. ■ recognizes the solids (cubes, rectangular prisms, cylinders, cones, spheres) (2.4.K1f).</b></p>	<p>Exploring Solids and Boxes Investigation 1: Sessions 1-2 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>4. ▲ recognizes and describes the square, triangle, rhombus, hexagon, parallelogram, and trapezoid from a pattern block set (2.4.K1f).</b></p>	<p>Flips, Turns, and Area            Investigation 1: Sessions 1-5            Investigation 2: Sessions 1-5</p> <p>Turtle Paths            Investigation 1: Sessions 1-4            Investigation 2: Sessions 1-6            Investigation 3: Sessions 1-7</p>
<p><b>5. recognizes and describes a quadrilateral as any four-sided figure (2.4.K1f).</b></p>	<p>Flips, Turns, and Area            Investigation 1: Sessions 4-5            Investigation 2: Sessions 1-5</p> <p>Turtle Paths            Investigation 2: Sessions 5-6: Extensions:            Largest Rectangle, page 59</p>
<p><b>6. determines if geometric shapes and real-world objects contain line(s) of symmetry and draws the line(s) of symmetry if the line(s) exist(s) (2.4.K1f).</b></p>	<p>Mathematical Thinking at Grade 3            Investigation 2:            Session 1            Sessions 3-4: Choice 1, page 33</p>

**Benchmark 2: Measurement and Estimation** – The student estimates and measures using standard and nonstandard units of measure with concrete objects in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p>1. <b>uses whole number approximations (estimations) for length, width, weight, volume, temperature, time, and perimeter using standard and nonstandard units of measure (2.4.K1a) (\$).</b></p>	<p>From Paces to Feet            Investigation 1: Sessions 1-6            Investigation 2: Sessions 1-7            Investigation 3: Sessions 1-3            Investigation 4: Sessions 1-3</p> <p>Combining and Comparing            Investigation 2: Sessions 1-2            Investigation 3: Sessions 1-2</p> <p>Turtle Paths            Investigation 2: Sessions 5-6            Investigation 3: Sessions 1-2            Ten-Minute Math: Lengths and Perimeters</p> <p>Exploring Solids and Boxes            Investigation 4: Sessions 1-3            Investigation 5: Sessions 1-4</p>
<p>2. <b>▲ reads and tells time to the minute using analog and digital clocks (2.4.K1a).</b></p>	<p>Grade 3 students plan the activities for a party that will begin at 5:00 PM and end at 7:00 PM. Students give the starting time and duration for each activity.</p> <p><b>Reference:</b>            Combining and Comparing            Investigation 3: Session 3</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>3. selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure (2.4.K1a) (\$):</b></p> <p><b>a. length width, and height to the nearest half inch, inch, foot, and yard; and to the nearest whole unit of nonstandard unit;</b></p>	<p>From Paces to Feet Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-3</p>
<p><b>b. length, width, and height to the nearest centimeter and meter;</b></p>	<p>From Paces to Feet Investigation 2: Sessions 5-7 Investigation 4: Sessions 1-3</p>
<p><b>c. weight to the nearest whole unit of a nonstandard unit;</b></p>	<p>Combining and Comparing Investigation 2: Sessions 1-2</p>
<p><b>d. volume to the nearest cup, pint, quart, and gallon;</b></p>	<p>Grade 3 students explore volume concepts by finding the volumes of rectangular prisms. <b>References:</b> Exploring Solids and Boxes Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4</p>
<p><b>e. volume to the nearest liter;</b></p>	<p>Grade 3 students explore volume concepts by finding the volumes of rectangular prisms. <b>References:</b> Exploring Solids and Boxes Investigation 4: Sessions 1-3 Investigation 5: Sessions 1-4</p>
<p><b>f. temperature to the nearest degree.</b></p>	<p>There are no specific references to temperature scales or thermometers in the third grade series.</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
4. states (2.4.K1a):	
a. the number of hours in a day and days in a year;	<p>Grade 3 students use a calendar to make time comparisons which involve the question, “How much longer?” They find distances between various time periods on the calendar. They also plan the activities and timing for a party that will last exactly two hours: the students are given the starting and ending times of the party, not the duration.</p> <p><b>References:</b>  Landmarks in the Hundreds  Ten-Minute Math: Calendar Math  Combining and Comparing  Investigation 3: Session 3  Investigation 5: Sessions 1-3</p>
b. the number of inches in a foot, inches in a yard, and feet in a yard;	<p>From Paces to Feet  Investigation 2: Sessions 1-4  Investigation 3: Sessions 1-3</p>
c. the number of centimeters in a meter;	<p>From Paces to Feet  Investigation 2: Sessions 5-7  Investigation 4: Sessions 1-3</p>
d. the number of cups in a pint, pints in a quart, and quarts in a gallon.	<p>Grade 3 students explore volume concepts and units by finding the volumes of rectangular prisms.</p> <p><b>References:</b>  Exploring Solids and Boxes  Investigation 4: Sessions 1-3  Investigation 5: Sessions 1-4</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>5. finds the perimeter of squares, rectangles, and triangles given the measures of all the sides (2.4.K1f).</b></p>	<p>Turtle Paths Investigation 3: Sessions 1-2 Ten-Minute Math: Lengths and Perimeters</p>

**Benchmark 3: Transformational Geometry** – The student recognizes and performs one transformation on simple shapes or concrete objects in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>The student...</b></p> <p><b>1. knows and uses cardinal points (north, south, east, west) and intermediate points (northeast, southeast, northwest, southwest) (2.4.K1a).</b></p>	<p>Turtle Paths Investigation 1: Sessions 1-4 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-7 Ten-Minute Math: Lengths and Perimeters</p>
<p><b>2. recognizes and performs one transformation (reflection/flip, rotation/turn, and translation/slide) on a two-dimensional figure (2.4.K1f).</b></p>	<p>Mathematical Thinking at Grade 3 Investigation 2: Session 1 Flips, Turns, and Area Investigation 1: Sessions 2-3</p>



**Benchmark 4: Geometry From An Algebraic Perspective** – The student relates geometric concepts to a number line and the first quadrant of a coordinate plane in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p><b>1. uses a number line (horizontal/vertical) to model the basic multiplication facts through the 5s and the multiplication facts of the 10s (2.4.K1a).</b></p>	<p>Grade 3 students use real-world objects, skip counting, a hundred chart, arrays, money, and story problems to model multiplication facts.</p> <p><b>References:</b>            Things That Come in Groups                Investigation 1: Sessions 1-4                Investigation 2: Sessions 1-6                Investigation 3: Sessions 1-5                Investigation 4: Sessions 1-4                Investigation 5: Sessions 1-4                Ten-Minute Math: Counting Around the Class            Landmarks in the Hundreds                Investigation 1: Sessions 1-7                Investigation 2: Sessions 1-6                Ten-Minute Math: Counting Around the Class</p>
<p><b>2. identifies points on a coordinate plane (coordinate grid) using (2.4.K1a):</b></p> <p><b>a. two positive whole numbers,</b></p>	<p>Turtle Paths                Investigation 1: Sessions 1-4                Investigation 2: Sessions 1-6                Investigation 3: Sessions 1-7                Ten-Minute Math: Lengths and Perimeters</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>b. a letter and a positive whole number.</b></p>	<p>Turtle Paths            Investigation 1: Sessions 1-4            Investigation 2: Sessions 1-6            Investigation 3: Sessions 1-7            Ten-Minute Math: Lengths and Perimeters</p>
<p><b>3. identifies points as ordered pairs in the first quadrant of a coordinate plane (coordinate grid) (2.4.K1a).</b></p>	<p>Turtle Paths            Investigation 1: Sessions 1-4            Investigation 2: Sessions 1-6            Investigation 3: Sessions 1-7            Ten-Minute Math: Lengths and Perimeters</p>

**Standard 4: Data** – The student uses concepts and procedures of data analysis in a variety of situations.

**Benchmark 1: Probability** – The student applies the concepts of probability to draw conclusions and to make predictions and decisions including the use of concrete objects in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>The student...</b></p> <p><b>1. recognizes any outcome of a simple event in an experiment or simulation as impossible, possible, certain, likely, unlikely, or equally likely (2.4.K1g) (\$).</b></p>	<p>Things That Come in Groups            Ten-Minute Math: Likely or Unlikely?            Exploring Solids and Boxes            Ten-Minute Math: What Is Likely?</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>2. ▲ ■ lists some of the possible outcomes of a simple event in an experiment or simulation including the use of concrete objects (2.4.K1g-h).</p>	<p>Grade 3 students simulate elevator trips to model sums of integers and find net change.  <b>References:</b>  Up and Down the Number Line  Investigation 1: Sessions 1-8  Investigation 2: Sessions 1-4  Investigation 3: Sessions 1-3</p>

**Benchmark 2: Statistics** – The student collects, organizes, displays, explains, and interprets numerical (whole numbers) and non-numerical data sets including the use of concrete objects in a variety of situations.

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p>1. organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays (2.4.K1h) (\$):</p> <p>a. graphs using concrete objects;</p>	<p>Mathematical Thinking at Grade 3  Investigation 3: Sessions 1-2  From Paces to Feet  Investigation 2: Session 2</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>b. pictographs with a whole symbol or picture representing one, two, five, ten, twenty-five, or one-hundred (no partial symbols or pictures);</b></p>	<p>Mathematical Thinking at Grade 3 Investigation 3: Sessions 1-2 From Paces to Feet Investigation 2: Session 2</p>
<p><b>c. frequency tables (tally marks);</b></p>	<p>Mathematical Thinking at Grade 3 Investigation 4: Session 1: Dialogue Box, page 73 Landmarks in the Hundreds Investigation 1: Sessions 2-3, page 10 Investigation 2: Session 4: Dialogue Box, page 43</p>
<p><b>d. horizontal and vertical bar graphs;</b></p>	<p>Mathematical Thinking at Grade 3 Investigation 3: Sessions 1-2 Ten-Minute Math: Exploring Data From Paces to Feet Investigation 2: Session 2 Combining and Comparing Ten-Minute Math: Exploring Data</p>
<p><b>e. Venn diagrams or other pictorial displays, e.g., glyphs;</b></p>	<p>Grade 3 students are encouraged to organize and represent data using a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables may be provided to the students, or created by the students in various problem situations. Students are asked to choose an appropriate means to display their data, and are asked to explain or justify their choices.</p> <p><b>References:</b> Mathematical Thinking at Grade 3 Investigation 3: Sessions 1-2 Combining and Comparing Ten-Minute Math: Exploring Data</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>f. line plots;</b></p>	<p>Mathematical Thinking at Grade 3            Investigation 3: Sessions 3-4            Ten-Minute Math: Exploring Data            Things That Come in Groups            Investigation 5: Session 3            From Paces to Feet            Investigation 1: Sessions 1-2, 5-6            Investigation 2: Session 2            Combining and Comparing            Ten-Minute Math: Exploring Data</p>
<p><b>g. charts and tables.</b></p>	<p>Things That Come in Groups            Investigation 5: Sessions 1-4            Landmarks in the Hundreds            Investigation 1: Sessions 6-7            Investigation 2: Sessions 1-3            Fair Shares            Investigation 2: Sessions 5-6</p>
<p><b>2. collects data using different techniques (observations, polls, surveys, or interviews) and explains the results (2.4.K1h) (\$).</b></p>	<p>Mathematical Thinking at Grade 3            Investigation 3: Sessions 1-4            From Paces to Feet            Investigation 1: Session 2            Investigation 3: Sessions 1-3            Combining and Comparing            Investigation 1: Sessions 1-3            Ten-Minute Math: Exploring Data</p>

Grade Three Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>3. ▲ finds these statistical measures of a data set with less than ten data points using whole numbers from 0 through 1,000 (2.4.K1a) (\$):</p> <p>a. minimum and maximum data values,</p>	<p>Grade 3 students find the largest and smallest as well as the average (or “middle-sized”) data values and describe their significance relative to the data set.</p> <p><b>References:</b>  From Paces to Feet  Investigation 1: Sessions 3-6  Investigation 2: Sessions 2-7</p>
<p>b. range,</p>	<p>Grade 3 students find the largest and smallest as well as the average (or “middle-sized”) data values and describe their significance relative to the data set.</p> <p><b>References:</b>  From Paces to Feet  Investigation 1: Sessions 3-6  Investigation 2: Sessions 2-7</p>
<p>c. mode (uni-modal only),</p>	<p>Grade 3 students find the largest and smallest as well as the average (or “middle-sized”) data values and describe their significance relative to the data set.</p> <p><b>References:</b>  From Paces to Feet  Investigation 1: Sessions 3-6  Investigation 2: Sessions 2-7</p>
<p>d. median when data set has an odd number of data points.</p>	<p>From Paces to Feet  Investigation 1: Sessions 3-6  Investigation 2: Sessions 2-7</p>