

**A Correlation of**



to the

**Kansas**  
**Curricular Standards for Mathematics**  
Grade One



G/M-219\_Gr 1

## 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 One**

**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, and money using concrete objects in a variety of situations.

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>The student...</b></p> <p><b>1. knows, explains, and represents whole numbers from 0 through 100 using concrete objects (2.4.K1a) (\$).</b></p>	<p>Mathematical Thinking at Grade 1 Investigation 2: Sessions 4-6 Investigation 4: Sessions 4-6</p> <p>Building Number Sense Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-9 Investigation 3: Sessions 1-9 Investigation 4: Sessions 1-10</p> <p>Quilt Squares and Block Towns Investigation 3: Sessions 6-7</p> <p>Number Games and Story Problems Investigation 2: Sessions 1-8, 10-12</p>
<p><b>2. compares and orders (\$):</b></p> <p><b>a. whole numbers from 0 through 100 using concrete objects (2.4.K1a),</b></p>	<p>Mathematical Thinking at Grade 1 Investigation 2: Sessions 1-3</p> <p>Building Number Sense Investigation 1: Session 2 Investigation 2: Session 3 Investigation 3: Sessions 1-7, 9</p> <p><i>All Units: Appendix: About Classroom Routines: Counting</i></p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>b. fractions with like denominators (halves and fourths) using concrete objects, pictures, diagrams, fraction strips, or pattern blocks (2.3.K1a, c) (\$)</b></p>	<p>Bigger, Taller, Heavier, Smaller Investigation 2: Sessions 2-4 Investigation 3: Session 2</p>
<p><b>3. recognizes a whole, a half, and a fourth and represents equal parts of a whole (halves, fourths) using concrete objects, pictures, diagrams, fraction strips, or pattern blocks (2.4.K1a,c) (\$).</b></p>	<p>Building Number Sense Investigation 1: Session 2 Teacher Note, page 12 Bigger, Taller, Heavier, Smaller Investigation 2: Sessions 2-4 Investigation 3: Session 2</p>
<p><b>4. identifies and uses ordinal numbers first (1<sup>st</sup>) through tenth (10<sup>th</sup>) (2.4.K1a).</b></p>	<p>Students order numbers by building staircases of interlocking cubes. <b>References:</b> Mathematical Thinking at Grade 1 Investigation 2: Sessions 2-3</p>
<p><b>5. identifies coins (pennies, nickels, dimes, quarters) and currency (\$1, \$5, \$10) and states the value of each coin and each type of currency using money models (2.4.K1d) (\$)</b></p>	<p>Number Games and Story Problems Investigation 2 Session 3 Sessions 4-8: Choice Time: Collect 25¢ Together</p>
<p><b>6. recognizes and counts a like group of coins (pennies, nickels, dimes) (2.4.K1d) (\$).</b></p>	<p>Number Games and Story Problems Investigation 2 Session 3 Sessions 4-8: Choice Time: Collect 25¢ Together</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, applies, and explains the concept of properties as they relate to whole numbers in a variety of situations.

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>The student...</b></p> <p><b>1. reads and writes whole numbers from 0 through 100 in numerical form (\$).</b></p>	<p>Mathematical Thinking in Grade 1            Investigation 2: Sessions 1-6            Investigation 4: Sessions 2-6            Investigation 5: Sessions 2-4</p> <p>Building Number Sense            Investigation 1: Sessions 5-6, 9            Investigation 2: Sessions 1-9            Investigation 3: Sessions 1-7, 9            Investigation 4: Sessions 1-10</p> <p>Number Games and Story Problems            Investigation 1: Sessions 1-10            Investigation 2: Sessions 1-13            Investigation 3: Sessions 1-13</p> <p><i>All Units: Appendix: About Classroom Routines: Counting</i></p>
<p><b>2. represents whole numbers from 0 through 100 using various groupings and place value models (place value mats, hundred charts, or base ten blocks) emphasizing ones, tens, and hundreds (2.4.K1b) (\$), e.g., how many groups of tens are there in 32 or how many groups of tens and ones in 62?</b></p>	<p>Students are introduced to place value concepts as they explore the 100 Chart and find combinations of ten.</p> <p><b>References:</b></p> <p>Building Number Sense            Investigation 2: Session 2            Investigation 3: Sessions 1-2, 9</p> <p>Number Games and Story Problems            Investigation 2: Sessions 6-12</p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>3. counts subsets of whole numbers from 0 through 100 both forwards and backwards (2.4.K1a) (\$).</b></p>	<p>Mathematical Thinking at Grade 1            Investigation 2: Sessions 1-6            Investigation 4: Sessions 1-6            Investigation 5: Sessions 1-4            Building Number Sense            Investigation 1: Sessions 1-9            Investigation 2: Sessions 1-9            Investigation 3: Sessions 1-9            Investigation 4: Sessions 1-10            Number Games and Story Problems            Investigation 2: Sessions 1-13  <i>All Units: About Classroom Routines: Counting</i></p>
<p><b>4. writes in words whole numbers from 0 through 10.</b></p>	<p>The use of number words could be incorporated into lessons involving reading math literature and writing story problems.  <b>References:</b>            Building Number Sense            Investigation 3: Session 9            Investigation 4: Session 10  <i>All Units: Appendix: About Classroom Routines: Counting</i></p>
<p><b>5. identifies the place value of the digits in whole numbers from 0 through 100 (2.4.K1b) (\$).</b></p>	<p>Students are introduced to place value concepts as they explore the 100 Chart and find combinations of ten.  <b>References:</b>            Building Number Sense            Investigation 2: Session 2            Investigation 3: Sessions 1-2, 9            Number Games and Story Problems            Investigation 2: Sessions 6-12</p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>6. identifies any whole number from 0 through 30 as even or odd (2.4.K1a).</b></p>	<p>Although students do not use the specific terms “even” and “odd,” they gain experience with even numbers as they count by twos.</p> <p><b>References:</b>            Building Number Sense                Investigation 1: Session 2: Teacher Note, page 11            Number Games and Story Problems                Investigation 2: Sessions 1-2, 4-8, 10-12</p>
<p><b>7. uses the concepts of these properties with whole numbers from 0 through 100 and demonstrates their meaning using concrete objects (2.4.K1a) (\$):</b></p> <p><b>a. commutative property of addition, e.g., <math>3 + 2 = 2 + 3</math>,</b></p>	<p><b>References:</b>            Mathematical Thinking at Grade 1                Investigation 2: Session 4: Teacher Note, page 50            Building Number Sense                Investigation 2: Sessions 1-2, 4-9            Number Games and Story Problems                Investigation 1: Sessions 4-5, page 21</p>
<p><b>b. zero property of addition (additive identity), e.g., <math>4 + 0 = 4</math>.</b></p>	<p><b>Sample References:</b>            Building Number Sense                Investigation 1: Sessions 5-6, page 20            Number Games and Story Problems                Investigation 3: Sessions 3-5, page 118</p>

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

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>The student...</b></p> <p><b>1. estimates whole number quantities from 0 through 100 using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology (2.4.K1a) (\$).</b></p>	<p>Building Number Sense Investigation 3 Sessions 3-4 Choice 4: Exploring Calculators, pages 95-97 Session 9, page 110 Bigger, Taller, Heavier, Smaller Investigation 2: Session 1 <i>All Units: Appendix: About Classroom Routines: Counting</i></p>
<p><b>2. estimates to check whether or not results of whole number quantities from 0 through 100 are reasonable (2.4.K1a) (\$).</b></p>	<p>Building Number Sense Investigation 3 Sessions 3-4: Choice 4: Exploring Calculators, pages 95-97 Session 9, page 110 Bigger, Taller, Heavier, Smaller Investigation 2: Session 1 <i>All Units: Appendix: About Classroom Routines: Counting</i></p>



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

Grade One 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 in Grade 1            Investigation 2: Sessions 1, 4-6            Investigation 4: Sessions 1-6            Investigation 5: Session 2</p> <p>Building Number Sense            Investigation 1                Session 2: Teacher Note, pages 11-12                Session 9            Investigation 2: Sessions 1-9            Investigation 3: Sessions 5-7            Investigation 4: Sessions 1-10</p> <p>Quilt Squares and Block Towns            Investigation 3: Sessions 6-7</p> <p>Number Games and Story Problems            Investigation 1: Sessions 1-10            Investigation 2: Sessions 1-5, 10-13            Investigation 3: Sessions 1-13</p> <p><i>All Units: Appendix: About Classroom Routines: Counting</i></p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>2. N states and uses with efficiency and accuracy basic addition facts with sums from 0 through 10 and corresponding subtraction facts (\$).</b></p>	<p>Mathematical Thinking in Grade 1            Investigation 2: Sessions 1-6            Investigation 4: Sessions 1-4, 6            Investigation 5: Session 2</p> <p>Building Number Sense            Investigation 1: Sessions 1-6, 9            Investigation 2: Sessions 1-9            Investigation 4: Sessions 1-10</p> <p>Number Games and Story Problems            Investigation 1: Sessions 1-10            Investigation 2: Sessions 1-8, 10-13            Investigation 3: Sessions 1-13</p>
<p><b>3. skip counts by 2s, 5s, and 10s through 50 (2.4.K1a).</b></p>	<p>Mathematical Thinking at Grade 1            Investigation 3: Session 1: Teacher Note, page 65</p> <p>Building Number Sense            Investigation 1: Session 2: Teacher Note, pages 11-12            Investigation 3                Sessions 1-2                Sessions 5-7, pages 99-100                Session 9: Extension, page 113</p> <p>Number Games and Story Problems            Investigation 2: Sessions 1-13</p> <p><i>All Units: Appendix: About Classroom Routines: Counting</i></p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>4. uses repeated addition (multiplication) with whole numbers to find the sum when given the number of groups (ten or less) and given the same number of concrete objects in each group (ten or less) (2.4.K1a), e.g., three plates of cookies with 10 cookies on each plate means <math>10 + 10 + 10 = 30</math> cookies.</p>	<p>Building Number Sense            Investigation 1: Session 2            Number Games and Story Problems            Investigation 1: Sessions 1-3            Investigation 2: Sessions 1-2, 4-8, 10-12</p>
<p>5. uses repeated subtraction (division) with whole numbers when given the total number of concrete objects in each group to find the number of groups (2.4.K1a), e.g., there are 9 pencils. If each student gets 2 pencils, how many students get pencils? <math>9 - 2 - 2 - 2 - 2</math> or 9 minus 2 four times means four students get 2 pencils each and there is 1 pencil left over. or There are 30 pieces of candy to put equally into five bowls, how many pieces of candy will be in each bowl? <math>30 - 5 - 5 - 5 - 5 - 5 - 5</math> means there are six in each bowl.</p>	<p>Grade 1 students divide shapes and groups into equal parts and equal groups. They also gain experience with repeated addition and skip counting.  <b>References:</b>            Building Number Sense            Investigation 1: Session 2            Number Games and Story Problems            Investigation 1: Sessions 1-3            Investigation 2: Sessions 1-2, 4-8, 10-12</p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>6. performs and explains these computational procedures (2.4.K1a-b):</b></p> <p><b>a. adds whole numbers with sums through 99 without regrouping using concrete objects, e.g., 42 straws (bundled in 10s) + 21 straws (bundled in 10s) = 63 straws (bundled in 10s);</b></p>	<p>Mathematical Thinking in Grade 1  Investigation 2: Sessions 1-6  Investigation 4: Sessions 1-4, 6  Investigation 5: Sessions 2-4</p> <p>Building Number Sense  Investigation 1: Sessions 1-6, 9  Investigation 2: Sessions 1-9  Investigation 4: Sessions 1-10</p> <p>Number Games and Story Problems  Investigation 1: Sessions 1-10  Investigation 2: Sessions 1-8, 10-13  Investigation 3: Sessions 1-13</p>
<p><b>b. subtracts two-digit whole numbers without regrouping using concrete objects, e.g., 63 cubes – 21 cubes = 42 cubes.</b></p>	<p>Building Number Sense  Investigation 3: Sessions 3-4: Choice 4: Exploring Calculators  Investigation 4: Session 2</p> <p>Number Games and Story Problems  Investigation 3: Sessions 2-8, 10-13</p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>7. <b>shows that addition and subtraction are inverse operation using concrete objects (2.4.K1a) (\$).</b></p>	<p>Mathematical Thinking in Grade 1            Investigation 2: Sessions 4-6            Investigation 4: Sessions 1-3            Building Number Sense            Investigation 2: Sessions 1-2, 4-9            Investigation 4: Session 2            Number Games and Story Problems            Investigation 1: Sessions 1-10            Investigation 3: Session 9</p>
<p>8. <b>reads and writes horizontally and vertically the same addition expression, e.g., 5 + 4 is the same as 4</b>  <math display="block">\begin{array}{r} + 5 \\ \hline \end{array}</math></p>	<p>Mathematical Thinking in Grade 1            Investigation 2: Sessions 4-6            Building Number Sense            Investigation 2: Sessions 1-2, 6-8            Investigation 4: Sessions 1, 6-10            Number Games and Story Problems            Investigation 1: Sessions 1-10            Investigation 2: Sessions 1-8, 10-13            Investigation 3: Sessions 1-13</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 One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p>1. uses concrete objects, drawings, and other representations to work with types of patterns (2.4.K1a):</p> <p>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>\Delta</math>-<math>\Delta</math>-O, <math>\Delta</math>-<math>\Delta</math>-O, ...;</p>	<p>Mathematical Thinking at Grade 1 Investigation 3: Sessions 1-6 Investigation 4: Sessions 2-3, 5</p> <p>Building Number Sense Investigation 3: Sessions 1-2, 8 Investigation 4: Session 10: Activity, page 163</p> <p>Quilt Squares and Block Towns Investigation 1: Sessions 13-15</p> <p>Number Games and Story Problems Investigation 2: Sessions 2, 6-9</p>
<p>b. growing (extending) patterns, e.g., 1, 2, 3, ...</p>	<p>Mathematical Thinking at Grade 1 Investigation 4: Session 5</p> <p>Quilt Squares and Block Towns Investigation 1: Sessions 13-15</p> <p>Number Games and Story Problems Investigation 2: Sessions 2, 6-9</p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>2. uses the following attributes to generate patterns:</b></p> <p><b>a. counting numbers related to number theory (2.4.K1.a), e.g., evens, odds, or skip counting by 2s, 5s, or 10s;</b></p>	<p>Mathematical Thinking at Grade 1  Investigation 3: Session 1: Teacher Note, page 65  Investigation 4: Session 5</p> <p>Building Number Sense  Investigation 3  Sessions 1-2  Sessions 5-7, pages 99-100</p> <p>Number Games and Story Problems  Investigation 2: Sessions 1-13</p> <p><i>All Units: Appendix: About Classroom Routines: Counting</i></p>
<p><b>b. whole numbers that increase (2.4.K1a) (\$), e.g., 11, 21, 31, ... or like 2, 4, 6, ...;</b></p>	<p>Mathematical Thinking at Grade 1  Investigation 3: Session 1: Teacher Note, page 65  Investigation 4: Session 5</p> <p>Building Number Sense  Investigation 3  Sessions 1-2  Sessions 5-7, pages 99-100</p> <p>Number Games and Story Problems  Investigation 2: Sessions 1-13</p> <p><i>All Units: Appendix: About Classroom Routines: Counting</i></p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>c. geometric shapes (2.4.K1f), e.g., ▲, ■, ◇, ▲, ■, ◇, ...;</b></p>	<p>Mathematical Thinking at Grade 1            Investigation 3: Sessions 1-6            Investigation 4: Sessions 2-3            Building Number Sense            Investigation 3: Session 8            Quilt Squares and Block Towns            Investigation 1: Sessions 13-15</p>
<p><b>d. measurements (2.4.K1a), e.g., counting by inches or feet;</b></p>	<p>Quilt Squares and Block Towns            Investigation 3: Sessions 6-7            Bigger, Taller, Heavier, Smaller            Investigation 2: Session 1            Investigation 3: Session 2</p>
<p><b>e. the calendar (2.4.K1a), e.g., January, February, March, ...;</b></p>	<p>Survey Questions and Secret Rules            Investigation 3: Sessions 1-3  <i>All units: Appendix: About Classroom Routines: Understanding Time and Changes</i></p>
<p><b>f. money and time (2.4.K1d) (\$), e.g., 10¢, 20¢, 30¢, ... or 1:00, 1:30, 2:00, ...;</b></p>	<p>Number Games and Story Problems            Investigation 2:                Session 3                Sessions 4-8: Choice Time: Collect 25¢ Together            Survey Questions and Secret Rules            Investigation 3: Sessions 1-3  <i>All units: Appendix: About Classroom Routines: Understanding Time and Changes</i></p>



Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>g. things related to daily life (2.4.K1a), e.g., seasons, temperature, or weather;</b></p>	<p>Survey Questions and Secret Rules Investigation 3: Sessions 2-3 Quilt Squares and Block Towns Investigation 1: Sessions 13-15</p>
<p><b>h. things related to size, shape, color, texture, or movement (2.4.K1a); e.g., tall-short, tall-short, tall-short, ...; or snapping fingers, clapping hands, or stomping feet (kinesthetic patterns).</b></p>	<p>Mathematical Thinking at Grade 1 Investigation 3: Sessions 1-6 Investigation 4: Sessions 2-3 Building Number Sense Investigation 3: Session 8 Investigation 4: Session 10: Activity, page 163 Quilt Squares and Block Towns Investigation 1: Sessions 13-15 Number Games and Story Problems Investigation 2: Session 9</p>
<p><b>3. identifies 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 1 Investigation 3: Sessions 1-6 Investigation 4: Sessions 2-3, 5 Building Number Sense Investigation 3: Sessions 1-8 Investigation 4: Session 10: Activity, page 163 Survey Questions and Secret Rules Investigation 3: Sessions 2-3 Quilt Squares and Block Towns Investigation 1: Sessions 13-15 Number Games and Story Problems Investigation 2: Sessions 2, 6-9</p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>4. generates (2.4.K1a):</b></p> <p><b>a. repeating patterns for the AB pattern, the ABC pattern, and the AAB pattern;</b></p>	<p>Mathematical Thinking at Grade 1  Investigation 3: Sessions 1-6  Investigation 4: Sessions 2-3, 5</p> <p>Building Number Sense  Investigation 3: Sessions 1-2, 8  Investigation 4: Session 10: Activity, page 163</p> <p>Quilt Squares and Block Towns  Investigation 1: Sessions 13-15</p> <p>Number Games and Story Problems  Investigation 2: Sessions 2, 6-9</p>
<p><b>b. growing patterns that add 1, 2, 5, or 10.</b></p>	<p>Mathematical Thinking at Grade 1  Investigation 4: Session 5</p> <p>Number Games and Story Problems  Investigation 2: Sessions 2, 6-9</p>

**Benchmark 2: Variable, Equations, and Inequalities** – The student solves addition and subtraction equations using concrete objects in a variety of situations.

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p>1. explains and uses symbols to represent unknown whole number quantities from 0 through 20 (2.4.K1a).</p>	<p>Mathematical Thinking at Grade 1 Investigation 2: Session 4: Teacher Note, page 50</p> <p>Building Number Sense Investigation 2: Sessions 1-2, 4-9</p> <p>Number Games and Story Problems Investigation 3: Session 9</p>
<p>2. finds the unknown sum or difference of the basic facts using concrete objects (2.4.K1a) (\$), e.g., 12 dominoes – 5 dominoes = <math>\Delta</math> dominoes or <math>\Delta</math> cubes = 2 cubes + 4 cubes.</p>	<p>Students write number sentences to solve problems.</p> <p><b>References:</b></p> <p>Mathematical Thinking at Grade 1 Investigation 2: Session 4 Investigation 4: Session 4</p> <p>Building Number Sense Investigation 2: Sessions 1-2, 6-8 Investigation 4: Sessions 1-5, 7-10</p> <p>Number Games and Story Problems Investigation 1: Sessions 6-10 Investigation 2: Session 1 Investigation 3: Sessions 1-13</p>
<p>3. describes and compares two whole numbers from 0 through 100 using the terms: is equal to, is less than, is greater than (2.4.K1a-b) (\$).</p>	<p>Mathematical Thinking at Grade 1 Investigation 2: Sessions 1-3</p> <p>Building Number Sense Investigation 1: Session 2 Investigation 2: Session 3 Investigation 3: Sessions 1-7</p>

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

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p>1. <b>plots whole numbers from 0 through 100 on segments of a number line (2.4.K1a).</b></p>	<p>Students use a coordinate grid and specify directions and distances to locate objects on the grid. They create timelines to represent events taking place over the course of a year. They use counting strips and hundred charts.</p> <p><b>References:</b>            Building Number Sense                Investigation 3: Sessions 1-2, 5-7            Survey Questions and Secret Rules                Investigation 3: Session 3            Quilt Squares and Block Towns                Investigation 3: Sessions 6-7            Number Games and Story Problems                Investigation 2: Sessions 6-8</p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space														
<p>2. states mathematical relationships between whole numbers from 0 through 50 using various methods including mental math, paper and pencil, and concrete objects (2.4.K1a) (\$), e.g., every time a hand is added to the set, five more fingers are added to the total.</p>	<p>Students explore mathematical relationships between whole numbers throughout the course. For example, students explore number patterns and relationships between combinations of a given number.</p> <p><b>Sample References:</b>            Mathematical Thinking at Grade 1                Investigation 3: Sessions 1-6            Building Number Sense                Investigation 2: Sessions 6-8            Survey Questions and Secret Rules                Investigation 1: Session 4            Quilt Squares and Block Towns                Investigation 1: Sessions 11-15            Number Games and Story Problems                Investigation 2: Session 2            Bigger, Taller, Heavier, Smaller                Investigation 1: Sessions 5-6</p>														
<p>3. states numerical relationships for whole numbers from 0 through 50 in a horizontal or vertical function table (input/output machine, T- table) (2.4.K1e) (\$), e.g.,</p> <table border="1" data-bbox="268 1109 1031 1187"> <tr> <td>Number of bicycles</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>...</td> </tr> <tr> <td>Total number of wheels</td> <td>2</td> <td>4</td> <td>6</td> <td>8</td> <td>10</td> <td>...</td> </tr> </table> <p>The student states: For every bicycle added, you add two more wheels.</p>	Number of bicycles	1	2	3	4	5	...	Total number of wheels	2	4	6	8	10	...	<p>Number Games and Story Problems            Investigation 1                Session 6, page 28                Session 10, page 41</p>
Number of bicycles	1	2	3	4	5	...									
Total number of wheels	2	4	6	8	10	...									

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

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <ol style="list-style-type: none"> <li>1. <b>knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include:</b> <ol style="list-style-type: none"> <li>a. <b>process models (concrete objects, pictures, diagrams, number lines, unifix cubes, hundred charts, measurement tools, or calendars) to model computational procedures and mathematical relationships, to compare and order numerical quantities, and to represent fractional parts (1.1.K1-4, 1.2.K3, 1.2.K6-7, 1.3.K1-2, 1.4.K1, 1.4.K2-7, 2.1.K1, 2.1.K1d-h, 2.1.K2a-b, 2.2.K3-4, 2.3.K1-2, 3.2.K1-6, 3.3.K1-3, 3.4.K1-3 4.2.K3-4) (\$);</b></li> </ol> </li> </ol>	<p>Grade 1 students use a variety of models for mathematical concepts, procedures, and relationships throughout the course. Students explore and employ concrete objects, including number cubes, dot cubes, square color tiles, balances, pattern blocks, buttons, coins, counters, attribute logic blocks, geoblocks, tetronimoos, and snap cubes to model numbers, operations, patterns, and problem situations. They use pictorial and graphic models to organize information and to communicate mathematical ideas.</p> <p><b>Sample References:</b>            Mathematical Thinking at Grade 1                Investigation 5: Sessions 3-4            Building Number Sense                Investigation 4: Session 6            Survey Questions and Secret Rules                Investigation 1: Session 6</p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
(continued)	Quilt Squares and Block Towns Investigation 3: Session 5 Number Games and Story Problems Investigation 2: Session 13 Bigger, Taller, Heavier, Smaller Investigation 3: Sessions 4-5
<b>b. place value models (place value mats, hundred charts, or base ten blocks) to compare, order, and represent numerical quantities and to model computational procedures (1.2.K2, 1.2.K5, 1.4.K6, 2.2.K3) (\$);</b>	Building Number Sense Investigation 2: Session 2 Investigation 3: Sessions 1-2, 9 Number Games and Story Problems Investigation 2: Sessions 6-12
<b>c. fraction models (fraction strips or pattern blocks) to compare, order, and represent numerical quantities (1.1.K2-3) (\$);</b>	Building Number Sense Investigation 1: Session 2: Teacher Note, page 12 Bigger, Taller, Heavier, Smaller Investigation 2: Sessions 2-4 Investigation 3: Session 2
<b>d. money models (base ten blocks or coins) to compare, order, and represent numerical quantities (1.1.K5-6, 2.1.K2f) (\$);</b>	Number Games and Story Problems Investigation 2 Session 3 Sessions 4-8: Choice Time: Collect 25¢ Together
<b>e. function tables (input/output machines, T-tables) to model numerical relationships (2.3.K3) (\$);</b>	Number Games and Story Problems Investigation 1 Session 6, page 28 Session 10, page 41

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>f. two-dimensional geometric models (geoboards, dot paper, pattern blocks, tangrams, or attribute blocks), three-dimensional geometric models (solids), and real world objects to compare size and to model attributes of geometric shapes (2.1.K1c, 3.1.K1-3);</b></p>	<p>Mathematical Thinking in Grade 1  Investigation 1: Sessions 1-4</p> <p>Building Number Sense  Investigation 1: Sessions 3-6</p> <p>Survey Questions and Secret Rules  Investigation 1: Sessions 1-2  Investigation 2: Sessions 3-4</p> <p>Quilt Squares and Block Towns  Investigation 1: Sessions 1-15  Investigation 2: Sessions 1-10  Investigation 3: Sessions 1-5  Appendix: <i>Shapes</i> Teacher Tutorial</p>
<p><b>g. two-dimensional geometric models (spinners), three-dimensional geometric models (number cubes), and concrete objects to model probability (4.1.K1-2) (\$);</b></p>	<p>Grade 1 students play games with dot cubes, number cubes, and number cards, including Collect 15 Together, Double Compare, Towers of 10, Ten Turns, Collect 25¢ Together, Rolls Tens, and Tens Go Fish.</p> <p><b>References:</b></p> <p>Mathematical Thinking at Grade 1  Investigation 4: Session 1</p> <p>Building Number Sense  Investigation 2: Sessions 3, 6-8  Investigation 3: Sessions 5-7</p> <p>Number Games and Story Problems  Investigation 2: Sessions 3, 10-12  Investigation 3: Sessions 6-8</p>



Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>h. graphs using concrete objects, pictographs, frequency tables, horizontal and vertical bar graphs, and Venn diagrams or other pictorial displays to organize, display, and explain data (4.1.A1, 4.2.A1-2) (\$);</b></p>	<p>Mathematical Thinking at Grade 1            Investigation 5: Sessions 3-6            Survey Questions and Secret Rules            Investigation 2: Sessions 1-2, 5-6            Investigation 3: Sessions 1-3            Investigation 4: Sessions 2-5  <i>All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes</i></p>
<p><b>i. Venn diagrams to sort data (4.2.K4).</b></p>	<p>Students use and interpret Venn diagrams in Grade 2.</p>
<p><b>2. uses concrete objects, pictures, diagrams, drawings, or dramatizations to show the relationship between two or more things (\$).</b></p>	<p>Students use concrete items, pictures, diagrams, drawings, and dramatizations to represent and describe mathematical relationships throughout the course. For example, students use number cubes, dot cubes, square color tiles, hundred charts, balances, pattern blocks, buttons, coins, counters, attribute logic blocks, geoblocks, tetronimoes, and snap cubes to model patterns and relationships between numbers and operations. They create graphs, charts, drawings, diagrams, tables, and timelines to represent mathematical relationships and solve problems.</p> <p><b>Sample References:</b>            Mathematical Thinking at Grade 1            Investigation 2: Session 4            Building Number Sense            Investigation 1: Sessions 7-8            Survey Questions and Secret Rules            Investigation 3: Session 3</p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
(continued)	Quilt Squares and Block Towns Investigation 3: Sessions 3-4 Number Games and Story Problems Investigation 2: Session 3 Bigger, Taller, Heavier, Smaller Investigation 3: Session 3

**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 describes their attributes using concrete objects in a variety of situations.

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p>1. <b>recognizes and draws circles, squares, rectangles, triangles, and ellipses (ovals) (plane figures/two- dimensional figures) (2.4.K1f).</b></p>	Mathematical Thinking in Grade 1 Investigation 1: Sessions 1-4 Building Number Sense Investigation 1: Sessions 5-6 Survey Questions and Secret Rules Investigation 1: Sessions 1-2 Investigation 2: Sessions 3-4 Quilt Squares and Block Towns Investigation 1: Sessions 1-15 Appendix: <i>Shapes</i> Teacher Tutorial

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>2. recognizes and investigates attributes of circles, squares, rectangles, triangles, and ellipses (plane figures) using concrete objects, drawings, and appropriate technology (2.4.K1f).</p>	<p>Mathematical Thinking in Grade 1 Investigation 1: Sessions 1-4</p> <p>Building Number Sense Investigation 1: Sessions 5-6</p> <p>Survey Questions and Secret Rules Investigation 1: Sessions 1-2 Investigation 2: Sessions 3-4</p> <p>Quilt Squares and Block Towns Investigation 1: Sessions 1-15 Appendix: <i>Shapes</i> Teacher Tutorial</p>
<p>3. recognizes cubes, rectangular prisms, cylinders, cones, and spheres (solids/three-dimensional figures) (2.4.K1f).</p>	<p>Building Number Sense Investigation 1: Sessions 3-4</p> <p>Quilt Squares and Block Towns Investigation 2: Sessions 1-10 Investigation 3: Sessions 1-5</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 One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p>1. uses whole number approximations (estimations) for length and weight using nonstandard units of measure (2.4.K1a) (\$), e.g., the width of the chalkboard is about 10 erasers long or the weight of one encyclopedia is about five picture books.</p>	<p>Quilt Squares and Block Towns Investigation 3: Sessions 6-7</p> <p>Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6 Investigation 3: Sessions 1-5</p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>2. compares two measurements using these attributes (2.4.K1a) (\$):</b></p> <p><b>a. longer, shorter (length);</b></p>	<p>Bigger, Taller, Heavier, Smaller Investigation 3: Sessions 1-5</p>
<p><b>b. taller, shorter (height);</b></p>	<p>Bigger, Taller, Heavier, Smaller Investigation 3: Sessions 1-5</p>
<p><b>c. heavier, lighter (weight);</b></p>	<p>Bigger, Taller, Heavier, Smaller Investigation 1: Sessions 1-6</p>
<p><b>d. hotter, colder (temperature).</b></p>	<p>In the Appendix: <i>About Classroom Routines: Understanding Time and Changes</i>, students collect and display weather data.</p>
<p><b>3. reads and tells time at the hour and half-hour using analog and digital clocks (2.4.K1a).</b></p>	<p>Time concepts taught in the Grade 1 series of <i>Investigations in Number, Data, and Space</i> include calendar features: the cyclical nature of the sequence of months and dates, units of time and relationships among them, birthday data, and problem solving.</p> <p><b>References:</b>  Survey Questions and Secret Rules  Investigation 3: Sessions 1-3  <i>All Units: About Classroom Routines: Understanding Time and Changes</i></p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>4. selects appropriate measuring tools for length, weight, volume, and temperature for a given situation (2.4.K1a) (\$).</b></p>	<p>Building Number Sense            Investigation 3: Sessions 3-4            Quilt Squares and Block Towns            Investigation 3: Sessions 6-7            Bigger, Taller, Heavier, Smaller            Investigation 1: Sessions 1-6            Investigation 2: Sessions 1-7            Investigation 3: Sessions 1-5</p>
<p><b>5. measures length and weight to the nearest whole unit using nonstandard units (2.4.K1a) (\$).</b></p>	<p>Quilt Squares and Block Towns            Investigation 3: Sessions 6-7            Bigger, Taller, Heavier, Smaller            Investigation 1: Sessions 1-6            Investigation 3: Sessions 1-5</p>
<p><b>6. states the number of days in a week and months in a year (2.4.K1a).</b></p>	<p>Survey Questions and Secret Rules            Investigation 3: Sessions 1-3  <i>All units: Appendix: About Classroom Routines:            Understanding Time and Changes</i></p>

**Benchmark 3: Transformational Geometry** – The student develops the foundation for spatial sense using concrete objects in a variety of situations.

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p>1. <b>describes the spatial relationship between two concrete objects using appropriate vocabulary (2.4.K1a), e.g., behind, above, below, on, under, beside, or in front of.</b></p>	<p>Building Number Sense Investigation 1: Sessions 3-4</p> <p>Quilt Squares and Block Towns Investigation 1: Sessions 3-6: Choice 3: Shapes on the Computer Sessions 8-10: Choice 2: Solve Puzzles on the Computer</p> <p>Investigation 3: Sessions 6-7 Appendix: <i>Shapes</i> Teacher Tutorial</p>
<p>2. <b>recognizes that changing an object's position or orientation does not change the name, size, or shape of the object (2.4.K1a).</b></p>	<p>Mathematical Thinking in Grade 1 Investigation 1: Sessions 1-4</p> <p>Building Number Sense Investigation 1: Sessions 5-6</p> <p>Survey Questions and Secret Rules Investigation 1: Sessions 1-2 Investigation 2: Sessions 3-4</p> <p>Quilt Squares and Block Towns Investigation 1: Sessions 1-15 Appendix: <i>Shapes</i> Teacher Tutorial</p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>3. describes movement of concrete objects using appropriate vocabulary (2.4.K1a), e.g., right, left, up, or down.</p>	<p>Building Number Sense Investigation 1: Sessions 3-4</p> <p>Quilt Squares and Block Towns Investigation 1: Sessions 3-6: Choice 3: Shapes on the Computer Sessions 8-10: Choice 2: Solve Puzzles on the Computer</p> <p>Investigation 3: Sessions 6-7 Appendix: <i>Shapes</i> Teacher Tutorial</p>

**Benchmark 4: Geometry From An Algebraic Perspective** – The student identifies one or more points on a number line in a variety of situations.

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p>1. locates and plots whole numbers from 0 through 100 on a segment of a number line (horizontal/vertical) (2.4.K1a), e.g., using a segment of a number line from 45 to 60 to locate the whole number 50.</p>	<p>Students use a coordinate grid and specify directions and distances to locate objects on the grid. They create timelines to represent events taking place over the course of a year. They use counting strips and hundred charts.</p> <p><b>References:</b></p> <p>Building Number Sense Investigation 3: Sessions 1-2, 5-7</p> <p>Survey Questions and Secret Rules Investigation 3: Session 3</p> <p>Quilt Squares and Block Towns Investigation 3: Sessions 6-7</p> <p>Number Games and Story Problems Investigation 2: Sessions 6-8</p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>2. describes a given whole number from 0 to 100 as coming before or after another number on a number line (2.4.K1a).</b></p>	<p>Students use a coordinate grid and specify directions and distances to locate objects on the grid. They create timelines to represent events taking place over the course of a year. They use counting strips and hundred charts.</p> <p><b>References:</b>            Building Number Sense                Investigation 3: Sessions 1-2, 5-7            Survey Questions and Secret Rules                Investigation 3: Session 3            Quilt Squares and Block Towns                Investigation 3: Sessions 6-7            Number Games and Story Problems                Investigation 2: Sessions 6-8</p>
<p><b>3. uses a number line to model addition and counting using whole numbers from 0 to 100 (2.4.K1a).</b></p>	<p>Students use a coordinate grid and specify directions and distances to locate objects on the grid. They create timelines to represent events taking place over the course of a year. They use counting strips and hundred charts.</p> <p><b>References:</b>            Building Number Sense                Investigation 3: Sessions 1-2, 5-7            Survey Questions and Secret Rules                Investigation 3: Session 3            Quilt Squares and Block Towns                Investigation 3: Sessions 6-7            Number Games and Story Problems                Investigation 2: Sessions 6-8</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 using concrete objects in a variety of situations.

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>The student...</b></p> <p><b>1. recognizes whether an outcome of a simple event in an experiment or simulation is impossible, possible, or certain (2.4.K1g) (\$).</b></p>	<p>Students are introduced to the concepts of probability in Grade 3. Grade 1 students hypothesize about attendance data on “a most unusual day.”</p> <p><b>References:</b>            Survey Questions and Secret Rules            Investigation 4: Sessions 4-5</p>
<p><b>2. recognizes and states whether a simple event in an experiment or simulation including the use of concrete objects can have more than one outcome (2.4.K1g).</b></p>	<p>Grade 1 students play games with dot cubes, number cubes, and number cards, including Collect 15 Together, Double Compare, Towers of 10, Ten Turns, Collect 25¢ Together, Rolls Tens, and Tens Go Fish.</p> <p><b>References:</b>            Mathematical Thinking at Grade 1            Investigation 4: Session 1            Building Number Sense            Investigation 2: Sessions 3, 6-8            Investigation 3: Sessions 5-7            Number Games and Story Problems            Investigation 2: Sessions 3, 10-12            Investigation 3: Sessions 6-8</p>

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

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p>The student...</p> <p>1. <b>displays and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, and whole number intervals using these data displays (2.4.K1h) (\$):</b></p> <p><b>a. graphs using concrete objects,</b></p>	<p>Mathematical Thinking at Grade 1            Investigation 5: Sessions 3-6            Survey Questions and Secret Rules            Investigation 2: Sessions 5-6            Investigation 3: Sessions 1-3            Investigation 4: Sessions 2-5  <i>All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes</i></p>
<p><b>b. pictographs with a whole symbol or picture representing one (no partial symbols or pictures),</b></p>	<p>Mathematical Thinking at Grade 1            Investigation 5: Sessions 3-6            Survey Questions and Secret Rules            Investigation 2: Sessions 1-2, 5-6            Investigation 3: Sessions 1-3            Investigation 4: Sessions 2-5  <i>All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes</i></p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>c. frequency tables (tally marks),</b></p>	<p>Mathematical Thinking at Grade 1            Investigation 5: Sessions 3-4            Survey Questions and Secret Rules            Investigation 2: Sessions 1-2            Investigation 4: Session 1  <i>All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes</i></p>
<p><b>d. horizontal and vertical bar graphs,</b></p>	<p>Mathematical Thinking at Grade 1            Investigation 5: Sessions 3-6            Survey Questions and Secret Rules            Investigation 3: Sessions 1-3            Investigation 4: Sessions 2-5  <i>All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes</i></p>
<p><b>e. Venn diagrams or other pictorial displays, e.g., glyphs.</b></p>	<p>Mathematical Thinking at Grade 1            Investigation 5: Sessions 3-6            Survey Questions and Secret Rules            Investigation 2: Sessions 1-2, 5-6            Investigation 3: Sessions 1-3            Investigation 4: Sessions 2-5  <i>All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes</i></p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>2. collects data using different techniques (observations or interviews) and explains the results (2.4.K1h) (\$).</b></p>	<p>Mathematical Thinking at Grade 1            Investigation 4: Session 4            Investigation 5: Sessions 3-6            Building Number Sense            Investigation 1: Sessions 5-6            Investigation 2: Session 1: Teacher Note, page 46            Survey Questions and Secret Rules            Investigation 2: Sessions 1-2, 5-6            Investigation 3: Sessions 1-3            Investigation 4: Sessions 2-5            Number Games and Story Problems            Investigation 1: Session 6  <i>All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes</i></p>
<p><b>3. identifies the minimum (lowest) and maximum (highest) values in a data set (2.4.K1a) (\$).</b></p>	<p>Mathematical Thinking at Grade 1            Investigation 5: Sessions 3-6            Survey Questions and Secret Rules            Investigation 2: Sessions 1-2, 5-6            Investigation 3: Sessions 1-3            Investigation 4: Sessions 2-5  <i>All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes</i></p>

Grade One Knowledge Base Indicators	Investigations in Number, Data, and Space
<p><b>4. determines the mode (most) after sorting by one attribute (2.4.K1a,i) (\$).</b></p>	<p>Mathematical Thinking at Grade 1            Investigation 5: Sessions 3-6            Survey Questions and Secret Rules            Investigation 2: Sessions 1-2, 5-6            Investigation 3: Sessions 1-3            Investigation 4: Sessions 2-5  <i>All Units: About Classroom Routines: Exploring Data, Understanding Time and Changes</i></p>
<p><b>5. sorts and records qualitative (non-numerical, categorical) data sets using one attribute (2.4.K1a) (\$), e.g., color, shape, or size.</b></p>	<p>Mathematical Thinking at Grade 1            Investigation 1: Sessions 1-4            Building Number Sense            Investigation 1: Sessions 3-6            Survey Questions and Secret Rules            Investigation 1: Sessions 1-6            Investigation 2: Sessions 3-4            Quilt Squares and Block Towns            Investigation 1: Sessions 1-15            Investigation 2: Sessions 1-10            Investigation 3: Sessions 1-7            Appendix: <i>Shapes Tutorial</i>  <i>All Units: About Classroom Routines: Exploring Data: Guess My Rule, Guess My Object</i></p>