A Correlation of

to the

Kansas
Curricular Standards for Mathematics
Grade Two

G/M-219_ Gr 2

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.

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

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 Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student... **1. ■ knows, explains, and represents whole numbers from 0 through 1,000 using concrete objects (2.4.K1a) ($).**	Mathematical Thinking at Grade 2 Investigation 1: Session 1 Investigation 2: Sessions 1-6 Investigation 4: Sessions 1, 5 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Sessions 1-6, 8-11 Investigation 2: Sessions 1-10 Investigation 3: Sessions 1-5 Investigation 4: Sessions 2-4 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
2. compares and orders: **a. whole numbers from 0 through 1,000 using concrete objects (2.4.K1a) ($);**	Mathematical Thinking at Grade 2 Investigation 4: Sessions 1, 5 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 2: Session 10: Activity, pages 83-84 Investigation 3: Session 1: Activity, page 89 Investigation 3: Session 3: Activity, page 100 Investigation 3: Sessions 4-5: Teacher Note, page 107 Putting Together and Taking Apart Investigation 1: Session 1: Teacher Note, page 11 Investigation 5: Session 1
b. fractions greater than or equal to zero with like denominators (halves, fourths, thirds, eighths) using concrete objects (2.4.K1a,c).	Shapes, Halves, and Symmetry Investigation 3: Sessions 1-8

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
3. uses addition and subtraction to show equivalent representations for whole numbers from 0 through 100 (2.4.K1a-b), e.g., 8 – 5 = 2 + 1 or 20 + 40 = 70 – 10.	Mathematical Thinking at Grade 2 Investigation 1: Session 1 Investigation 2: Sessions 1-3, 6-8 Investigation 4: Session 1 Coins, Coupons, and Combinations Investigation 1: Sessions 1-6, 8-10 Investigation 2: Sessions 3, 6-9 Investigation 3: Sessions 1-5 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8 *All Units: Appendix: About Classroom Routines: Today's Number*
4. identifies and uses ordinal positions from first (1st) through twentieth (20th) (2.4.K1a).	While Grade 2 students are not explicitly instructed in the use of ordinal numbers, they are exposed to these expressions as part of the natural course of communication in a mathematics class. They explore the concepts of order and sequence on the Hundred Number Wall Chart and on timelines. **References:** Putting Together and Taking Apart Investigation 2: Sessions 1-4 Investigation 5: Sessions 2-3, 6, 8 Timelines and Rhythm Patterns Investigation 1: Sessions 1-5

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
5. ▲identifies coins, states their values, and determines the total value to $1.00 of a mixed group of coins using pennies, nickels, dimes, quarters, and half-dollars (2.4.K1d) ($).	Mathematical Thinking at Grade 2 Investigation 4, Session 2 Coins, Coupons, and Combinations Investigation 2, Sessions 6-9 Putting Together and Taking Apart Investigation 2, Sessions 5-6 Investigation 4, Sessions 3-4
6. counts a like combination of currency ($1, $5, $10, $20) to $100 (2.4.K1d) ($).	Mathematical Thinking at Grade 2 Investigation 4, Session 2 Coins, Coupons, and Combinations Investigation 2, Sessions 6-9 Putting Together and Taking Apart Investigation 2, Sessions 5-6 Investigation 4, Sessions 3-4

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 in a variety of situations.

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student... **1. reads and writes** ($)**:** **a. whole numbers from 0 through 1,000 in numerical form, e.g., 942 is read as nine hundred forty-two and is written in numerical form as 942;**	Mathematical Thinking at Grade 2 Investigation 1: Session 1 Investigation 2: Sessions 1-6, 8 Investigation 4: Sessions 1, 5 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Sessions 1-11 Investigation 2: Session 10 Investigation 3: Sessions 1-5 Investigation 4: Sessions 2-4 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8 Timelines and Rhythm Patterns Investigation 1: Sessions 1-5

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
b. whole numbers from 0 through 100 in words, e.g., 76 is read as seventy-six and is written in words as seventy-six.	Mathematical Thinking at Grade 2 Investigation 4: Session 1: Teacher Note, page 83 Coins, Coupons, and Combinations Investigation 1: Session 1: Activity, page 7 Investigation 1: Sessions 4-5: Activity, pages 24-25
c. whole numbers from 0 through 1,000 in numerical form when presented in word form, e.g., nine hundred forty-six is read as nine hundred forty-six and is written as 946.	Mathematical Thinking at Grade 2 Investigation 4: Session 1: Teacher Note, page 83 Coins, Coupons, and Combinations Investigation 1: Session 1: Activity, page 7 Investigation 1: Sessions 4-5: Activity, pages 24-25
2. ▲ represents whole numbers from 0 through 1,000 using various groupings and place value models emphasizing 1s, 10s, and 100s; explains the groups; and states the value of the digit in ones place, tens place, and hundreds place (2.4.K1b) ($), e.g., in 385, the 3 represents 3 hundreds, 30 tens, or 300 ones; the 8 represents 8 tens or 80 ones; and the 5 represents 5 ones.	Coins, Coupons, and Combinations Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
3. counts subsets of whole numbers from 0 through 1,000 forwards and backwards (2.4.K1a) ($), e.g., 311, 312, …, 320; or 210, 209, …, 204.	Mathematical Thinking at Grade 2 Investigation 2: Sessions 6, 7 Investigation 4: Sessions 1-5 Investigation 5: Sessions 1-5 Coins, Coupons, and Combinations Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-10 Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6
4. ▲ identifies the place value of the digits in whole numbers from 0 through 1,000 (2.4.K1b) ($).	Coins, Coupons, and Combinations Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 1: Session 1 Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6
5. identifies any whole number from 0 through 100 as even or odd (2.4.K1a).	Students gain experience with even numbers as they count by twos. **References:** Mathematical Thinking at Grade 2 Investigation 4: Session 2: Teacher Note, page 91 Coins, Coupons, and Combinations Investigation 2: Sessions 1-5

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
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) ($): **a. commutative property of addition, e.g., 5 + 6 = 6 + 5;**	Mathematical Thinking at Grade 2 Investigation 2: Session 6: Dialogue Box, page 45 Coins, Coupons, and Combinations Investigation 1: Session 1
b. zero property of addition (additive identity), e.g., 4 + 0 = 4;	**Sample References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6: Dialogue Box, page 45 Coins, Coupons, and Combinations Investigation 1: Session 6: Teacher Note, page 31
c. associative property of addition, e.g., (3 + 2) + 4 = 3 + (2 + 4);	Students implicitly apply the associative property of addition as they develop strategies for combining more than two addends by regrouping and recombining compatible numbers. **References:** Mathematical Thinking at Grade 2 Investigation 1: Session 1, page 5 Investigation 2: Session 1, page 23 Investigation 2: Session 6: Dialogue Box, page 45 Investigation 2: Session 8, page 50 Investigation 4: Session 1 Investigation 5: Sessions 1-2: Follow-Up, page 109 Investigation 5: Session 3, page 115

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
(continued)	Coins, Coupons, and Combinations Investigation 1: Sessions 1, 6, 10, 11 Putting Together and Taking Apart Investigation 1: Session 1: Teacher Note, page 15 Investigation 2: Session 1 Investigation 4: Sessions 1-4 Investigation 5: Session 6 *All Units: Appendix: About Classroom Routines: Today's Number*
d. symmetric property of equality applied to basic addition and subtraction facts, e.g., 10 = 2 + 8 is the same as 2 + 8 = 10 or 7 = 10 – 3 is the same as 10 – 3 = 7.	Students learn basic number combinations both by combining given addends and also by the symmetric approach of finding different combinations of addends for a given sum. **Sample References:** Coins, Coupons, and Combinations Investigation 1: Sessions 1, 6

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

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student... **1. estimates whole number quantities from 0 through 1,000 and monetary amounts through $50 using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology (2.4.Ka-b,d) ($).**	Mathematical Thinking at Grade 2 Investigation 2: Session 6 Coins, Coupons, and Combinations Investigation 1: Session 7 Investigation 1: Sessions 8-9 Choice 1: Close to 20, p. 41 Investigation 2: Session 10 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-3: Choice Time: Predict and Cover, page 18
2. uses various estimation strategies to estimate whole number quantities from 0 through 1,000 (2.4.K1a) ($).	Mathematical Thinking at Grade 2 Investigation 2: Session 6 Coins, Coupons, and Combinations Investigation 1: Session 7 Investigation 1: Sessions 8-9: Choice 1: Close to 20, p. 41 Investigation 2: Session 10 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-3: Choice Time: Predict and Cover, page 18

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

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student... **1. computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology (2.4.K1a) ($).**	Mathematical Thinking at Grade 2 Investigation 1: Session 1 Investigation 2: Sessions 1-6, 8 Investigation 4: Sessions 1, 5 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Sessions 1-11 Investigation 2: Session 10 Investigation 3: Sessions 1-5 Investigation 4: Sessions 2-4 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8 Shapes, Halves, and Symmetry Investigation 2 Session 3: Dialogue Box, page 60 Session 6

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
2. N states and uses with efficiency and accuracy basic addition facts with sums from 0 through 20 and corresponding subtraction facts (2.4.K1a) ($).	Mathematical Thinking at Grade 2 Investigation 1: Session 1 Investigation 2: Sessions 1-6, 8 Investigation 4: Sessions 1, 5 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Sessions 1-11 Investigation 2: Session 10 Investigation 3: Sessions 1-5 Investigation 4: Sessions 2-4 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8
3. skip counts by 2s, 5s, and 10s through 100 and skip counts by 3s through 36 (2.4.K1a).	Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 4: Sessions 1-4 Investigation 5: Sessions 4-5 Coins, Coupons, and Combinations Investigation 2: Sessions 1-10

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
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 (twenty or less) (2.4.K1a) ($), e.g., five classes of 15 students visit the zoo; 15 + 15 + 15 + 15 + 15 = 75.	Mathematical Thinking at Grade 2 Investigation 4: Session 1: Teacher Note, page 82 Shapes, Halves, and Symmetry Investigation 2: Session 3: Dialogue Box, page 60 Coins, Coupons, and Combinations Investigation 2 Session 1: Dialogue Box, page 60 Sessions 3-5, 10
5. uses repeated subtraction (division) with whole numbers when given the total number of concrete objects in each group to find the number of groups (2.4.K1a) ($), e.g., there are 25 cookies. If each student gets 3 cookies, how many students get cookies? 25 – 3 – 3 – 3 – 3 – 3 – 3 – 3 – 3 or 25 minus 3 eight times means eight students get 3 cookies each and there is 1 cookie left over.	As an introduction to multiplication and division, students study, practice, and apply the preliminary concepts of skip counting, grouping, and repeated addition. **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 4: Sessions 1-4 Investigation 5: Sessions 4-5 Coins, Coupons, and Combinations Investigation 2: Sessions 1-10
6. fair shares/measures out (divides) a total amount through 100 concrete objects into equal groups (2.4.K1a-b), e.g., fair sharing 48 eggs into four groups resulting in four groups of 12 eggs or measuring out 48 eggs with 12 eggs in each group resulting in four groups of 12 eggs.	As an introduction to multiplication and division, students study, practice, and apply the preliminary concepts of skip counting, grouping, and repeated addition. **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 4: Sessions 1-4 Investigation 5: Sessions 4-5 Coins, Coupons, and Combinations Investigation 2: Sessions 1-10

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
7. ▲N performs and explains these computational procedures: **a. ■ adds and subtracts three-digit whole numbers with and without regrouping including the use of concrete objects (2.4.K1a-b),**	Grade 2 students do not receive explicit instruction in the addition and subtraction of 3-digit numbers; rather, they are encouraged to explore and investigate strategies for adding and subtracting whole numbers with and without regrouping. The following references are to a discussion between a teacher and students regarding a variety of techniques which could be used to add 2-digit numbers with regrouping, including the use of the 100 chart and breaking apart and recombining addends, and to the introduction of a classroom activity, Today's Number, in which students use arithmetic operations to write expressions which are equivalent to the number of days school has been in session. As the class records data on a 200 chart, expressions may become more complex and include subtraction from a 3-digit number. **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 1 Putting Together and Taking Apart Investigation 1: Session 1: Dialogue Box, pages 18-19
b. adds and subtracts monetary amounts through 99¢ using cent notation (25¢ + 52¢) and money models (2.4.K1a-b,d) ($).	Mathematical Thinking at Grade 2 Investigation 4, Session 2 Coins, Coupons, and Combinations Investigation 2, Sessions 6-9 Putting Together and Taking Apart Investigation 2: Sessions 5-6 Investigation 4: Sessions 3-4

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
8. ▲N identifies basic addition and subtraction fact families (facts with sums from 0 through 20 and corresponding subtraction facts) (2.4.K1a).	Putting Together and Taking Apart Investigation 5: Session 7
9. reads and writes horizontally and vertically the same addition or subtraction expression e.g., 6 – 3 is the same as 6. **-3**	**Sample References:** Mathematical Thinking at Grade 2 Investigation 2: Session 8, page 51 Putting Together and Taking Apart Investigation 5: Session 7, page 129

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 Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student...	
1. uses concrete objects, drawings, and other representations to work with types of patterns (2.4.K1a):	
a. repeating patterns, e.g., an AB pattern is like left-right, left-right, …; an ABC pattern is like dog-horse-pig, dog-horse-pig, …; an AAB pattern is like ↑↑→, ↑↑→, …;	Shapes, Halves, and Symmetry Investigation 1: Sessions 2-8 Investigation 4: Sessions 1-7 Putting Together and Taking Apart Investigation 2: Sessions 1-2 Timelines and Rhythm Patterns Investigation 2: Sessions 1-5

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
a. growing (extending) patterns, e.g., 7, 9, 11, where the rule could be add 2 or the odd numbers beginning with 7.	Mathematical Thinking at Grade 2 Investigation 2: Session 1, pages 23-24 Investigation 4: Sessions 3-4 Coins, Coupons, and Combinations Investigation 2: Sessions 1-2, 4-5 Investigation 3: Session 1 Shapes, Halves, and Symmetry Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 2: Sessions 1-2
2. uses the following attributes to generate patterns: **a. counting numbers related to number theory (2.4.K1a), e.g., evens, odds, or skip counting by 3s, or 4s;**	Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 4: Sessions 1-4 Investigation 5: Sessions 4-5 Coins, Coupons, and Combinations Investigation 2: Sessions 1-5, 10 Investigation 3: Session 1, pages 91 and 93 Investigation 4: Session 1 Investigation 4: Sessions 2-4: Choice 3: 100 Chart, pages 116-117 Shapes, Halves, and Symmetry Investigation 3: Sessions 3-5, page 85 Putting Together and Taking Apart Investigation 2: Sessions 1-2

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
b. whole numbers that increase or decrease (2.4.K1a) ($), e.g., 11, 22, 33, ... or 98, 88, 78, …;	Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 4: Sessions 1-4 Investigation 5: Sessions 4-5 Coins, Coupons, and Combinations Investigation 2: Sessions 1-5, 10 Investigation 3: Session 1, pages 91 and 93 Investigation 4: Session 1 Investigation 4: Sessions 2-4: Choice 3: 100 Chart, pages 116-117 Shapes, Halves, and Symmetry Investigation 3: Sessions 3-5, page 85 Putting Together and Taking Apart Investigation 2: Sessions 1-2
c. geometric shapes (2.4.K1f), e.g., Δ-O-O, Δ-O-O,	Mathematical Thinking at Grade 2 Investigation 3: Sessions 1-4, 6 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-8 Investigation 4: Sessions 1-7 Timelines and Rhythm Patterns Investigation 2: Sessions 2-3
d. measurements (2.4.K1a), e.g., 1”, 3”, 5”, … or 5 lbs, 10 lbs, 15 lbs, …;	How Long? How Far? Investigation 1: Sessions 2-8 Investigation 2: Sessions 4-8 Timelines and Rhythm Patterns Investigation 1: Sessions 4-6 *All Units: Appendix: About Classroom Routines: Time and Time Again*

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
e. the calendar (2.4.K1a), e.g., Sunday, Monday, Tuesday, …;	Timelines and Rhythm Patterns Investigation 1: Sessions 1-6 *All Units: Appendix: About Classroom Routines: Time and Time Again*
f. money and time (2.4.K1a,d) ($), e.g., $5, $10, $15, or 1:15, 1:30, 1:45, …;	Mathematical Thinking at Grade 2 Investigation 4, Session 2 Coins, Coupons, and Combinations Investigation 2, Sessions 6-9 Putting Together and Taking Apart Investigation 2, Sessions 5-6 Investigation 4, Sessions 3-4 Timelines and Rhythm Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 4-5 *All Units: Appendix: About Classroom Routines: Time and Time Again*
g. things related to daily life (2.4.K1a), e.g., seasons, temperature, or weather;	Coins, Coupons, and Combinations Investigation 2: Sessions 1, 10 Shapes, Halves, and Symmetry Investigation 1: Session 1 Investigation 4: Sessions 1-2, 7 Timelines and Rhythm Patterns Investigation 2: Session 1

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
h. things related to size, shape, color, texture, or movement (2.4.K1a), e.g., ◈◈,◈◈, ◈◈, … ; or snapping fingers, clapping hands, or stomping feet or over, under, or behind using a bean bag toss (kinesthetic patterns).	Mathematical Thinking at Grade 2 Investigation 3: Sessions 1-4, 6 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-8 Investigation 4: Sessions 1-7 Timelines and Rhythm Patterns Investigation 2: Sessions 1-5
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) ($).	Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 4: Sessions 1-4 Investigation 5: Sessions 4-5 Coins, Coupons, and Combinations Investigation 2: Sessions 1-5, 10 Investigation 3: Session 1, pages 91 and 93 Investigation 4: Session 1 Investigation 4: Sessions 2-4: Choice 3: 100 Chart, pages 116-117 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-8 Investigation 3: Sessions 3-5, page 85 Investigation 4: Sessions 1-7 Putting Together and Taking Apart Investigation 2: Sessions 1-2 Timelines and Rhythm Patterns Investigation 2: Sessions 1-5

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
4. generates (2.4.K1a): repeating patterns, e.g., 1-2, 1-2, 1-2, … where the elements repeat; growing (extending) patterns, e.g., 1, 4, 7, ...where the rule is add 3.	Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 4: Sessions 1-4 Investigation 5: Sessions 4-5 Coins, Coupons, and Combinations Investigation 2: Sessions 1-5, 10 Investigation 3: Session 1, pages 91 and 93 Investigation 4: Session 1 Investigation 4: Sessions 2-4: Choice 3: 100 Chart, pages 116-117 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-8 Investigation 3: Sessions 3-5, page 85 Investigation 4: Sessions 1-7 Putting Together and Taking Apart Investigation 2: Sessions 1-2 Timelines and Rhythm Patterns Investigation 2: Sessions 1-5

Benchmark 2: Variables, Equations, and Inequalities – The student uses symbols and whole numbers to solve addition and subtraction equations using concrete objects in a variety of situations.

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student... **1. explains and uses symbols to represent unknown whole number quantities from 0 through 100 (2.4.K1a).**	Coins, Coupons, and Combinations Investigation 1: Session 6 Putting Together and Taking Apart Investigation 1: Sessions 3-4 Investigation 4: Sessions 1: Teacher Note, page 94 Investigation 4: Session 6
2. finds the sum or difference in one-step equations with : ($) **a. whole numbers from 0 through 99 (2.4.K1a-b), e.g., 32 + 19 = Δ or Δ = 79 – 46;**	Mathematical Thinking at Grade 2 Investigation 2: Sessions 1, 6 Investigation 4: Session 1 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 1: Sessions 7, 10 Investigation 2: Sessions 3, 10 Investigation 3: Sessions 1-5 Investigation 4: Sessions 2-5 Putting Together and Taking Apart Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-4, 7 Investigation 3: Sessions 1-5 Investigation 4: Sessions 1-4 Investigation 5: Sessions 1-8

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
b. up to two different coins (2.4.K1d), e.g., nickel + penny = Δ¢.	Mathematical Thinking at Grade 2 Investigation 4, Session 2 Coins, Coupons, and Combinations Investigation 2, Sessions 6-9 Putting Together and Taking Apart Investigation 2: Sessions 5-6 Investigation 4: Sessions 3-4
3. finds unknown addend or subtrahend using basic addition and subtraction facts (fact family) (2.4.K1a) ($), e.g., 12 = Δ + 7 or 12 – Δ = 7.	Coins, Coupons, and Combinations Investigation 1: Session 6 Putting Together and Taking Apart Investigation 1: Sessions 3-4 Investigation 3: Sessions 3-5: Teacher Note, page 85 Investigation 4: Sessions 1: Teacher Note, page 94 Investigation 4: Session 6 Investigation 5: Session 7, page 129
4. describes and compares two whole numbers from 0 through 1,000 using the terms: is equal to, is less than, is greater than (2.4.K1a-b) ($).	Mathematical Thinking at Grade 2 Investigation 4: Sessions 1, 5 Investigation 5: Session 3 Coins, Coupons, and Combinations Investigation 2: Session 10: Activity, pages 83-84 Investigation 3: Session 1: Activity, page 89 Investigation 3: Session 3: Activity, page 100 Investigation 3: Sessions 4-5: Teacher Note, page 107 Putting Together and Taking Apart Investigation 1: Session 1: Teacher Note, page 11 Investigation 5: Session 1

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

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student... **1. states mathematical relationships between whole numbers from 0 through 100 using various methods including mental math, paper and pencil, and concrete objects (2.4.K1a) ($), e.g., every time a dog is added to the pack, 2 more ears are added to the total.**	Students state mathematical relationships between whole numbers throughout the course. For example, students relate addition and subtraction as they solve "Problems with a Missing Part." **Sample References:** Mathematical Thinking at Grade 2 Investigation 2: Session 1 Coins, Coupons, and Combinations Investigation 4: Session 1 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 4-5 Shapes, Halves, and Symmetry Investigation 1: Sessions 4-5 Putting Together and Taking Apart Investigation 3: Session 2 How Long? How Far? Investigation 1: Sessions 2-4: Dialogue Box, page 27 How Many Pockets? How Many Teeth? Investigation 2: Session 3 Timelines and Rhythm Patterns Investigation 2: Session 5

<table>
<tr><th>Grade Two Knowledge Base Indicators</th><th>Investigations in Number, Data, and Space</th></tr>
<tr><td>2. finds the values and determines the rule that involve addition or subtraction of whole numbers from 0 through 100 using a horizontal or vertical function table (input/output machine, T-table) (2.4.K1e), e.g., after looking at the function table, different students might respond that the rule is In + 2 equals Out, the rule is N + 2, or the rule is plus 2.
<table>
<tr><th>In</th><th>Out</th></tr>
<tr><td>9</td><td>11</td></tr>
<tr><td>2</td><td>4</td></tr>
<tr><td>13</td><td>15</td></tr>
<tr><td>42</td><td>44</td></tr>
<tr><td>57</td><td>59</td></tr>
<tr><td>6</td><td>?</td></tr>
<tr><td>72</td><td>?</td></tr>
<tr><td>N</td><td>?</td></tr>
</table></td><td>Mathematical Thinking at Grade 2
Investigation 2: Session 6, page 43
Coins, Coupons, and Combinations
Investigation 1: Session 11, page 51
Investigation 2
Session 1, pages 58, 60
Session 6, page 76
All Units: Appendix: About Classroom Routines: How Many Pockets?</td></tr>
<tr><td>3. generalizes numerical patterns using whole numbers from 0 through 100 with one operation (addition, subtraction) by stating the rule using words, e.g., if a set of numbers is 2, 4, 6, 8,10, …; the rule is add two.</td><td>Coins, Coupons, and Combinations
Investigation 2: Sessions 1-5, 10
Investigation 3: Session 1, pages 91 and 93
Investigation 4: Session 1
Investigation 4: Sessions 2-4: Choice 3: 100 Chart, pages 116-117
Putting Together and Taking Apart
Investigation 2: Sessions 1-2
Shapes, Halves, and Symmetry
Investigation 3: Sessions 3-5, page 85</td></tr>
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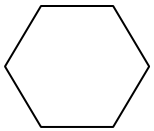
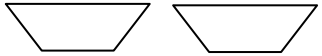
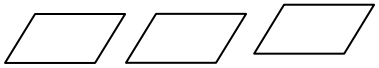
Benchmark 4: Models – The student uses mathematical models including concrete objects to represent, show, and communicate mathematical relationships in a variety of situations.

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student...	
1. knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include:	
a. process models (concrete objects, pictures, diagrams, number lines, unifix cubes, hundred charts, or measurement tools) 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.K5-6, 1.3.K1-2, 1.4.K1-8, 2.1.K1, 2.2K1, 2.1K1a-b, 2.1K1d-h, 2.1.K3-4, 2.2.K2a, 2.2.K3-4, 2.3.K1, 3.2.K1-5, 3.3.K1, 3.4.K1-3, 4.2.K3-5) ($);	Students use concrete and visual materials and tools to model processes throughout the course. They use number cubes, dot cubes, square color tiles, pattern blocks, buttons, coins, counters, attribute logic blocks, geoblocks, tetronimoes, snap cubes, hundred charts, and balances to model numbers, operations, patterns, and problem situations. **Sample References:** Mathematical Thinking at Grade 2 Investigation 2: Sessions 4-5 Coins, Coupons, and Combinations Investigation 2: Session 6 Does It Walk, Crawl, or Swim? Investigation 4: Sessions 1-3 Shapes, Halves, and Symmetry Investigation 1: Sessions 6-8 Putting Together and Taking Apart Investigation 2: Sessions 5-6 How Long? How Far? Investigation 2: Sessions 2-3 Timelines and Rhythm Patterns Investigation 2: Sessions 2-3

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
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 (1.1.K3, 1.2.K2, 1.2.K4, 1.3.K1, 1.4.K6-7, 1.4.K7a, 2.2.K2a, 2.2.K4) ($);	Coins, Coupons, and Combinations Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-4 Putting Together and Taking Apart Investigation 1: Session 1 Investigation 2: Sessions 1-7 Investigation 4: Sessions 2-4 Investigation 5: Sessions 2-3, 6
c. fraction models (fraction strips or pattern blocks) to compare, order, and represent numerical quantities (1.1.K2b) ($);	Shapes, Halves, and Symmetry Investigation 3: Sessions 1-8
d. money models (base ten blocks or coins) to compare, order, and represent numerical quantities (1.1.K5-6, 1.3.K1, 1.4.K7b, 2.1.K1f, 2.2.K2b) ($);	Mathematical Thinking at Grade 2 Investigation 4, Session 2 Putting Together and Taking Apart Investigation 2, Sessions 5-6 Investigation 4, Sessions 3-4 Choice Time, page 100 Follow-Up, page 101
e. function tables (input/output machines, T-tables) to model numerical relationships (2.3.K2) ($);	Mathematical Thinking at Grade 2 Investigation 2: Session 6, page 43 Coins, Coupons, and Combinations Investigation 1: Session 11, page 51 Investigation 2 Session 1, pages 58, 60 Session 6, page 76 *All Units: Appendix: About Classroom Routines: How Many Pockets?*

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
f. two-dimensional geometric models (geoboards, dot paper, pattern blocks, tangrams, or attribute blocks) to model perimeter 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, 3.3.K2-3);	Mathematical Thinking at Grade 2 Investigation 1: Sessions 1-3 Investigation 3: Sessions 1-6 Appendix: *Shapes* Teacher Tutorial Shapes, Halves, and Symmetry Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-8 Investigation 4: Sessions 1-7
g. two-dimensional geometric models (spinners), three-dimensional geometric models (number cubes), and process models (concrete objects) to model probability (4.1.K1-2) ($);	Grade 2 students play games with number cubes, including Roll-a-Square and Get to 100. **Sample References:** Coins, Coupons, and Combinations Investigation 4: Sessions 2-4 Putting Together and Taking Apart Investigation 2: Session 1

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
h. graphs using concrete objects, representational objects, or abstract representations, pictographs, frequency tables, horizontal and vertical bar graphs, Venn diagrams or other pictorial displays, and line plots to organize and display data (4.1.K2, 4.2.K1, 4.2.K2) ($);	Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 5: Sessions 1-6 Coins, Coupons, and Combinations Investigation 1: Session 11 Investigation 2: Sessions 2, 4-5, 10 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3 How Many Pockets? How Many Teeth? Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5 Timelines and Rhythm Patterns Investigation 1: Sessions 1-6 *All Units: Appendix: About Classroom Routines: How Many Pockets?*
i. Venn diagrams to sort data.	Does It Walk, Crawl, or Swim? Investigation 1: Session 6 Investigation 2: Sessions 1-4 Investigation 3: Session 1

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
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 using **a**  **(1/1) or** **two**  **(2/2) or** **three**  **(3/3) or** **six**  **(6/6).**	Mathematical Thinking at Grade 2 Investigation 1: Sessions 1-4 Investigation 3: Sessions 1-6 Appendix: *Shapes* Teacher Tutorial Shapes, Halves, and Symmetry Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-8 Investigation 4: Sessions 1-7

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 properties using concrete objects in a variety of situations.

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student... **1. recognizes and investigates properties of circles, squares, rectangles, triangles, and ellipses (ovals) (plane figures/two-dimensional shapes) using concrete objects, drawings, and appropriate technology (2.4.K1f).**	Mathematical Thinking at Grade 2 Investigation 1: Sessions 1-3 Investigation 3: Sessions 1-6 Appendix: *Shapes* Teacher Tutorial Shapes, Halves, and Symmetry Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-8 Investigation 4: Sessions 1-7
2. ■ recognizes, draws, and describes circles, squares, rectangles, triangles, ellipses (ovals) (plane figures) (2.4.K1f).	Mathematical Thinking at Grade 2 Investigation 1: Sessions 1-3 Investigation 3: Sessions 1-6 Appendix: *Shapes* Teacher Tutorial Shapes, Halves, and Symmetry Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-8 Investigation 4: Sessions 1-7

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
3. recognizes cubes, rectangular prisms, cylinders, cones, and spheres (solids/three-dimensional figures) (2.4.K1f).	Mathematical Thinking at Grade 2 Investigation 1: Sessions 2-4 Investigation 3: Sessions 1-5 Shapes, Halves, and Symmetry Investigation 1: Sessions 2-3, 6-8 Investigation 3: Sessions 1-2 Investigation 4: Sessions 1-2
4. recognizes the square, triangle, rhombus, hexagon, parallelogram, and trapezoid from a pattern block set (2.4.K1f).	Mathematical Thinking at Grade 2 Investigation 1: Sessions 2-3 Investigation 3: Sessions 1-4, 6 Appendix: *Shapes* Teacher Tutorial Shapes, Halves, and Symmetry Investigation 1: Sessions 2-8 Investigation 4: Sessions 1-4
5. compares geometric shapes (circles, squares, rectangles, triangles, ellipses) to one another (2.4.K1f).	Mathematical Thinking at Grade 2 Investigation 1: Sessions 1-4 Investigation 3: Sessions 1-6 Appendix: *Shapes* Teacher Tutorial Shapes, Halves, and Symmetry Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-8 Investigation 4: Sessions 1-7

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
6. recognizes whether a shape has a line of symmetry (2.4.K1f).	Mathematical Thinking at Grade 2 Appendix: *Shapes* Teacher Tutorial Shapes, Halves, and Symmetry Investigation 4: Sessions 1-7

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 Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student... **1. uses whole number approximations (estimations) for length, weight, and volume using standard and nonstandard units of measure (2.4.K1a) ($), e.g., the height of the classroom door is 14 chalkboard erasers laid end to end or 7 feet high or an apple weighs about 42 unifix cubes.**	Shapes, Halves, and Symmetry Investigation 1 Sessions 2-3: Choice Time: Build the Geoblock Sessions 6-8 How Long? How Far? Investigation 1: Sessions 1-8

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
2. ▲ reads and tells time by five-minute intervals using analog and digital clocks (2.4.K1a).	Time-related activities described in the Grade 5 course include discussion of the daily schedule at school each day, identification of relevant clock times and durations, the setting of a timer to go off at specified intervals, the development of a schedule of important times at home, comparison of important times in different students' days, descriptions of types of clocks students have in their homes, and the creation of a timeline of a student's life, called a Life Line. Investigative sessions involve sequencing events in time, comparing durations of time within a day, representing events in time, and interpreting traditional representations of time. **References:** Timelines and Rhythm Patterns Investigation 1: Sessions 4-5 Investigation 2: Sessions 4-5 *All Units: About Classroom Routines: Time and Time Again*
3. selects and uses appropriate measurement tools and units of measure for length, weight, volume, and temperature for a given situation (2.4.K1a) ($).	Shapes, Halves, and Symmetry Investigation 1 Sessions 2-3: Choice Time: Build the Geoblock Sessions 6-8 How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 4-8

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
4. measures (2.4.K1a) ($): **a. ▲ length to the nearest inch or foot and to the nearest whole unit of a nonstandard unit;**	Students explore linear measurement using direct and indirect comparison, nonstandard units, and *GeoLogo* software. They construct, compare, and measure simple paths in both on-computer and off-computer activities. **References:** How Long? How Far? Investigation 1: Sessions 1-8 Investigation 2: Sessions 4-5
b. weight to the nearest nonstandard unit;	Grade 2 students do not specifically study weight. In the Grade 1 curriculum, students lift and balance familiar objects to develop a sense of weight, and use a balance to compare weights. In the Grade 3 curriculum, students learn to weigh objects with a pan balance.
c. volume to the nearest cup, pint, quart, or gallon;	Grade 2 students explore concepts of volume as they assemble structures with Geoblocks, using multiple arrangements of three-dimensional shapes to make a three-dimensional whole. They explore spatial relationships and use logical reasoning as they use interlocking cubes to construct rectangular prisms with given dimensions. **References:** Shapes, Halves, and Symmetry Investigation 1 Sessions 2-3: Choice Time: Build the Geoblock Sessions 6-8

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
d. temperature to the nearest degree.	In an appendix at the end of each text in Grade 1 is Classroom Routines – Time and Change, consisting of activities in which students explore units of time, relationships among them, daily schedules and weather.
5. states (2.4.K1a): **a. the number of minutes in an hour,**	Time-related activities described in the Grade 5 course include discussion of the daily schedule at school each day, identification of relevant clock times and durations, the setting of a timer to go off at specified intervals, the development of a schedule of important times at home, comparison of important times in different students' days, descriptions of types of clocks students have in their homes, and the creation of a timeline of a student's life, called a Life Line. Investigative sessions involve sequencing events in time, comparing durations of time within a day, representing events in time, and interpreting traditional representations of time. **References:** Timelines and Rhythm Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 4-5 *All Units: Appendix: About Classroom Routines: Time and Time Again*

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
b. the number of days in each month.	Time-related activities described in the Grade 5 course include discussion of the daily schedule at school each day, identification of relevant clock times and durations, the setting of a timer to go off at specified intervals, the development of a schedule of important times at home, comparison of important times in different students' days, descriptions of types of clocks students have in their homes, and the creation of a timeline of a student's life, called a Life Line. Investigative sessions involve sequencing events in time, comparing durations of time within a day, representing events in time, and interpreting traditional representations of time. **References:** Timelines and Rhythm Patterns Investigation 1: Sessions 1-6 Investigation 2: Sessions 4-5 *All Units: Appendix: About Classroom Routines:* *Time and Time Again*

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

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student... **1. knows and uses the cardinal points (north, south, east, west) (2.4.K1a).**	In addition to physical movement and measurement of shapes and objects, Grade 2 students apply concepts of direction and distance through the use of *Shapes*, a software program which allows students to construct and manipulate geometric shapes, see objects move according to rules they specify, and explore rotation and reflection. They use *Geo-Logo* software, which enables students to extend their investigations to coordinate geometry and angles. **References:** Mathematical Thinking at Grade 2 Investigation 3: Sessions 1-6 Appendix: Shapes Tutorial Putting Together and Taking Apart Investigation 5: Session 8 How Long? How Far? Investigation 1: Sessions 2-4 Investigation 2: Sessions 1-8 Ongoing Excursion: Geo-Logo: Shapes and Pictures Shapes, Halves, and Symmetry Investigation 1: Sessions 1-8 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-8 Investigation 4: Sessions 1-7

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
2. recognizes that changing an object's position or orientation including whether the object is nearer or farther away does not change the name, size, or shape of the object (2.4.K1f).	Shapes, Halves, and Symmetry Investigation 2: Sessions 1-6
3. recognizes when a shape has undergone one transformation (flip/reflection, turn/rotation, slide/translation) (2.4.K1f).	Students use computer programs, including *Shapes* and *Geo-Logo*, to identify and demonstrate flips, turns, and slides. **References:** Mathematical Thinking at Grade 2 Appendix: *Shapes* Tutorial How Long? How Far? Investigation 2 Sessions 2-8 Ongoing Excursion: *Geo-Logo*: Shapes and Pictures

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

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student... **1. locates and plots whole numbers from 0 through 1,000 on a segment of a number line (horizontal/vertical) (2.4.K1a), e.g., using a segment of a number line from 800 to 820 to locate the whole number 805.**	Mathematical Thinking at Grade 2 Investigation 2: Session 1, pages 23-24 Investigation 4: Sessions 3-4 How Many Pockets? How Many Teeth? Investigation 1: Session 1 Investigation 2: Sessions 1-6 Timelines and Rhythm Patterns Investigation 1: Sessions 1-6
2. represents the distance between two whole numbers from 0 through 1,000 on a segment of a number line (2.4.K1a).	Students use Counting Strips to keep track of the Number of Days in School, and to explore number concepts and patterns. They use number lines to sort and graph numerical data and to represent time. **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 1, pages 23-24 Investigation 4: Sessions 3-4 How Many Pockets? How Many Teeth? Investigation 1: Session 1 Investigation 2: Sessions 1-6 Timelines and Rhythm Patterns Investigation 1: Sessions 1-6

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
3. uses a segment of number line to model addition and subtraction using whole numbers from 0 through 1,000 (2.4.K1a), e.g., 333 + n = 349 or 333 + 16= n or 400-n=352 or 400 – 48 = n.	Students use Counting Strips to keep track of the Number of Days in School, and to explore number concepts and patterns. They use number lines to sort and graph numerical data and to represent time. **References:** Mathematical Thinking at Grade 2 Investigation 2: Session 1, pages 23-24 Investigation 4: Sessions 3-4 How Many Pockets? How Many Teeth? Investigation 1: Session 1 Investigation 2: Sessions 1-6 Timelines and Rhythm Patterns Investigation 1: Sessions 1-6

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 Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student... **1. recognizes any outcome of a simple event in an experiment or simulation as impossible, possible, certain, likely, or unlikely (2.4.K1g) ($).**	Students are introduced to the concepts of probability in Grade 3. Students in Grade 2 may predict future events based on collected data. For example, they make a hypothesis based on sampling and the representation of a set of "mystery" data. **Reference:** How Many Pockets? How Many Teeth? Investigation 2: Session 6
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).	Grade 2 students play games with number cubes, including Roll-a-Square and Get to 100. **Sample References:** Coins, Coupons, and Combinations Investigation 4: Sessions 2-4 Putting Together and Taking Apart Investigation 2: Session 1

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

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
The student... **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) ($):** **a. ▲ graphs using concrete objects;**	Mathematical Thinking at Grade 2 Investigation 5: Sessions 1-2 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-2 Investigation 4: Sessions 2-3 How Many Pockets? How Many Teeth? Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-6 Investigation 3: Sessions 2-5
b. ▲ pictographs with a whole symbol or picture representing one, two, or ten (no partial symbols or pictures);	Mathematical Thinking at Grade 2 Investigation 5: Sessions 1-2 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-2 Investigation 4: Sessions 2-3 How Long? How Far? Investigation 2: Sessions 6-8 How Many Pockets? How Many Teeth? Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-6 Investigation 3: Sessions 2-5

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
c. ▲■ frequency tables (tally marks);	Mathematical Thinking at Grade 2 Investigation 2: Session 6, page 42 Investigation 5: Sessions 1-2 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-2, page 7 Investigation 4: Sessions 2-3, page 81 How Many Pockets? How Many Teeth? Investigation 1: Sessions 2-3
d. ▲ horizontal and vertical bar graphs;	Mathematical Thinking at Grade 2 Investigation 5: Sessions 1-2 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-2 Investigation 4: Sessions 2-3 How Many Pockets? How Many Teeth? Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-6 Investigation 3: Sessions 2-5
e. Venn diagrams or other pictorial displays, e.g., glyphs;	Does It Walk, Crawl, or Swim? Investigation 1: Session 6 Investigation 2: Sessions 1-4 Investigation 3: Session 1
f. line plots.	Does It Walk, Crawl, or Swim? Investigation 4: Sessions 2-3, page 83 How Many Pockets? How Many Teeth? Investigation 1: Session 1 Investigation 2: Sessions 1-6

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
2. collects data using different techniques (observations, interviews, or surveys) and explains the results (2.4.K1h) ($).	Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 5: Sessions 1-6 Coins, Coupons, and Combinations Investigation 1: Session 11 Investigation 2: Sessions 2, 4-5, 10 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3 How Many Pockets? How Many Teeth? Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5 Timelines and Rhythm Patterns Investigation 1: Sessions 1-6 *All Units: Appendix: About Classroom Routines: How Many Pockets?*

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
3. identifies the minimum (lowest) and maximum (highest) values in a whole number data set (2.4.K1a) ($).	Mathematical Thinking at Grade 2 Investigation 2: Session 6 Investigation 5: Sessions 1-3 Coins, Coupons, and Combinations Investigation 1: Session 11 Investigation 2: Sessions 4-5, 10 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-3 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3 How Many Pockets? How Many Teeth? Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5
4. finds the range for a data set using two-digit whole numbers (2.4.K1a) ($).	Students draw conclusions about "typical" tooth-loss data for children of a certain age and apply these conclusions to determine the origin of "mystery" data. **References:** How Many Pockets? How Many Teeth? Investigation 2: Sessions 1-6
5. finds the mode (most) for a data set using concrete objects that include (2.4.K1a) ($): **a. quantitative/numerical data (whole numbers through 100);**	How Many Pockets? How Many Teeth? Investigation 1: Sessions 1-5 Investigation 2: Sessions 1-6 Investigation 3: Sessions 1-5

Grade Two Knowledge Base Indicators	Investigations in Number, Data, and Space
b. qualitative/non-numerical data (category that occurs most often).	Mathematical Thinking at Grade 2 Investigation 5: Sessions 1-2 Does It Walk, Crawl, or Swim? Investigation 1: Sessions 1-6 Investigation 2: Sessions 1-4 Investigation 3: Sessions 1-3 Investigation 4: Sessions 1-3