

**A Correlation of**



to the

**New York City School District 30  
Mathematics Curriculum**

Grades K-5



O/M-140

## INTRODUCTION

This document demonstrates how well *Investigations in Number, Data, and Space*<sup>®</sup> integrates with the New York City School District 30 Mathematics curriculum. The citations within this correlation provide Investigation Curriculum Unit titles, the number of each Investigation and where applicable, the number of the Focus Time, Choice Time, or Session correlated to the Scope and Sequence and District Mathematics Calendar of performance objectives for the New York City School District 30 Mathematics program.

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

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

*Investigations in Number, Data and Space*<sup>®</sup> was developed after three years of nationwide field-testing and includes teacher's practical suggestions, student dialogues, and teacher notes.

**TABLE OF CONTENTS**

**Kindergarten .....1**

**Grade 1.....34**

**Grade 2 .....69**

**Grade 3.....111**

**Grade 4.....157**

**Grade 5.....198**

**Investigations in Number, Data, & Space  
to the  
New York City School District 30  
Mathematics**

**Kindergarten**

**Scope and Sequence**

**September:**

**1. Spatial relationship**

**References:**

Mathematical Thinking in Kindergarten

Investigation 1

Choice Time, pages 12-17

Teacher Notes, pages 21-22

Dialogue Box, page 23

Making Shapes and Building Blocks

Investigations 1, 2, 3, 4, 5

Shapes Teacher Tutorial, pages 117-154

**2. Spatial relationships extended**

**References:**

Mathematical Thinking in Kindergarten

Investigation 1

Choice Time, pages 12-17

Teacher Notes, pages 21-22

Dialogue Box, page 23

Making Shapes and Building Blocks

Investigations 1, 2, 3, 4, 5

Shapes Teacher Tutorial, pages 117-154

**3. Seasons of the year**

Seasons of the year may be studied in conjunction with calendar activities. In addition to the following reference, each unit of study in the kindergarten course of ***Investigations in Number, Data, and Space*** includes an appendix entitled, "About Classroom Routines." This appendix is comprised of activities which can be incorporated into the daily classroom schedule. The recurring *Calendar* activity includes experiences with the sequences of, and the relationships between, days, weeks, and months; concepts of before and after, yesterday, today, and tomorrow, this week and next week, how many more days until and how many days since; and numbers and patterns on the calendar.

**Reference:**

Mathematical Thinking in Kindergarten  
Investigation 3

**4. Days of the week**

Days of the week may be studied in conjunction with calendar activities. In addition to the following reference, each unit of study in the kindergarten course of *Investigations in Number, Data, and Space* includes an appendix entitled, "About Classroom Routines." This appendix is comprised of activities which can be incorporated into the daily classroom schedule. The recurring *Calendar* activity includes experiences with the sequences of, and the relationships between, days, weeks, and months; concepts of before and after, yesterday, today, and tomorrow, this week and next week, how many more days until and how many days since; and numbers and patterns on the calendar.

**Reference:**

Mathematical Thinking in Kindergarten  
Investigation 3

**5. Classification by attributes**

Kindergarten students using *Investigations in Number, Data, and Space* sort and classify shapes and objects in a variety of settings. Students explore and compare the attributes of various geometric manipulatives, including pattern blocks and geoblocks. Students classify and sort data. They classify shapes in the environment.

**References:**

Mathematical Thinking in Kindergarten  
Investigation 1

Choice Time, pages 12-17

Teacher Note, page 22

Collecting, Counting, and Measuring  
Investigations 3, 6

Counting Ourselves and Others

Investigations 1, 2, 3, 4

Making Shapes and Building Blocks

Investigations 1, 3, 4, 5

**6. Groups**

**References:**

Mathematical Thinking in Kindergarten  
Investigation 1

Choice Time, pages 12-17

Teacher Note, page 22

Collecting, Counting, and Measuring  
Investigations 3, 6

Counting Ourselves and Others  
Investigations 1, 2, 3, 4  
Making Shapes and Building Blocks  
Investigations 1, 3, 4, 5

**7. Conservation of a number in a set**

**References:**

Mathematical Thinking in Kindergarten  
Investigation 2: Teacher Note, page 36  
Collecting, Counting, and Measuring  
Investigation 1: Teacher Note, page 16  
Counting Ourselves and Others  
Investigation 1: Teacher Note, page 12

**8. Comparison of sets**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. In *Attendance* students compare groups and determining which group has more and how much more.

**References:**

Mathematical Thinking in Kindergarten  
Investigation 2: Choice Time, pages 32-33  
Investigation 4  
Collecting, Counting, and Measuring  
Investigations 3, 4, 5, 6  
How Many in All?  
Investigation 2: Choice Time: Grab Two Handfuls

**9. Vocabulary (more, less, most, least, as many as, fewest)**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. In *Attendance* students compare groups and determining which group has more and how much more.

**References:**

Mathematical Thinking in Kindergarten  
Investigation 2: Choice Time, pages 32-33  
Investigation 4  
Collecting, Counting, and Measuring  
Investigations 3, 4, 5, 6  
How Many in All?  
Investigation 2: Choice Time: Grab Two Handfuls

## 10. Shapes around us (with attributes)

### References:

Making Shapes and Building Blocks  
Investigations 1, 3

## October:

## 11. Numerals one (1) through four (4)

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. Each unit includes *Counting Jar*, which consists of activities involving counting and estimating.

### References:

Mathematical Thinking in Kindergarten  
Investigations 1, 2, 3  
Collecting, Counting, and Measuring  
Investigations 1, 2, 3, 4, 5, 6  
Counting Ourselves and Others  
Investigations 1, 3, 4  
How Many in All?  
Investigations 1, 2, 3, 4

## 12. Non-standard measurement

### References:

Collecting, Counting, and Measuring  
Investigation 3  
How Many in All?  
Investigation 1

## 13. Weight

Students using the series *Investigations in Number, Data, and Space* explore the concept of weight comparison beginning in Grade 1.

## 14. Capacity of containers

Kindergarten students using *Investigations in Number, Data, and Space* begin to explore the concept of volume as they combine smaller three-dimensional shapes to form larger solid objects.

### Reference:

Making Shapes and Building Blocks  
Investigation 4: Choice Time, pages 73-74

### 15. Time of Day

In addition to the following reference, each unit of study in the kindergarten course of ***Investigations in Number, Data, and Space*** includes an appendix entitled, “About Classroom Routines.” This appendix is comprised of activities which can be incorporated into the daily classroom schedule. The recurring *Calendar* activity includes experiences with the sequences of, and the relationships between, days, weeks, and months; concepts of before and after, yesterday, today, and tomorrow, this week and next week, how many more days until and how many days since; and numbers and patterns on the calendar.

**Reference:**

Mathematical Thinking in Kindergarten  
Investigation 3

### December:

### 16. Identification – parts of three dimensional shapes

**References:**

Mathematical Thinking in Kindergarten  
Investigation 1  
Choice Time, pages 16-17  
Teacher Note, page 22  
Making Shapes and Building Blocks  
Investigations 3, 4, 5

### 17. Recognition of shapes with attributes

**References:**

Mathematical Thinking in Kindergarten  
Investigation 1: Choice Time, pp. 16-17, 22, 23  
Making Shapes and Building Blocks  
Investigations 1, 2, 3, 4, 5  
Shapes Teacher Tutorial, pp. 117-154

### 18. Spatial relationships – extended vocabulary

**References:**

Making Shapes and Building Blocks  
Investigation 1  
Investigation 3  
Investigation 4: Dialogue Box, pages 80-81

### 19. General temperature measurement terms

Students have an opportunity to discuss the terms *hot* and *cold* :

**References:**

Collecting, Counting, and Measuring  
Investigations 1, Focus Time Follow Up, page 9



## 20. Size concepts

### References:

Collecting, Counting, and Measuring  
Investigations 3, 4  
How Many in All?  
Investigation 1

## 21. Money: pennies

Kindergarten students using *Investigations in Number, Data, and Space* are given an opportunity to explore monetary values as they simulate the purchase of items in a classroom grocery store.

### Reference:

Counting Ourselves and Others  
Investigation 2: Choice Time: page 50

## January:

## 22. Addition

### References:

Collecting, Counting, and Measuring  
Investigation 4: Choice Time: Collect 10 Together  
How Many in All?  
Investigations 2-4

## 23. Add one

### References:

Collecting, Counting, and Measuring  
Investigation 4: Choice Time: Collect 10 Together  
How Many in All?  
Investigations 2-4

## 24. Number relationships

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. In *Attendance* students compare groups and determining which group has more and how much more. *Counting Jar* includes activities involving counting and estimating.

### References:

Mathematical Thinking in Kindergarten  
Investigations 1, 2, 3, 4  
Collecting, Counting, and Measuring  
Investigations 1, 2, 3, 4, 5, 6

Counting Ourselves and Others

Investigations 1, 3, 4

How Many in All?

Investigations 1, 2, 3, 4

**February:**

**25. Numerals five (5) through nine (9)**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. Each unit includes *Counting Jar*, which consists of activities involving counting and estimating.

**References:**

Mathematical Thinking in Kindergarten

Investigations 1, 2, 3

Collecting, Counting, and Measuring

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

Counting Ourselves and Others

Investigations 1, 3, 4

How Many in All?

Investigations 1, 2, 3, 4

**26. Numeral zero (0)**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. Each unit includes *Counting Jar*, which consists of activities involving counting and estimating. The concept of zero can also be introduced and reinforced in lessons on adding and subtracting whole numbers.

**References:**

Collecting, Counting, and Measuring

Investigations 1: Focus Time, pages 6-7

How Many in All?

Investigation 2: Choice Time, page 44

Investigation 3: Choice Time, page 67

**27. Instruments of measurements**

**References:**

Collecting, Counting, and Measuring

Investigations 3, 4

How Many in All?

Investigation 1

## 28. Numeral ten (10)

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. Each unit includes *Counting Jar*, which consists of activities involving counting and estimating. The concept of ten can also be introduced and reinforced in lessons on adding and subtracting whole numbers, number patterns, and place value.

### References:

Mathematical Thinking in Kindergarten

Investigation 2: Teacher Note, pages 36-37

Collecting, Counting, and Measuring

Investigation 2

Teacher Note, page 32

Dialogue Box, page 33

Investigation 3

Focus Time, pages 38-41

Choice Time, pages 42-43

Investigation 4: Choice Time, pages 64-65

## March:

## 29. Plus (+) and equal (=) signs

### References:

How Many in All?

Investigations 2, 4

## 30. Add two (2)

### References:

Collecting, Counting, and Measuring

Investigation 4: Choice Time: Collect 10 Together

How Many in All?

Investigations 2-4

## 31. Add three (3)

### References:

Collecting, Counting, and Measuring

Investigation 4: Choice Time: Collect 10 Together

How Many in All?

Investigations 2-4

### 32. Counting on

#### References:

Collecting, Counting, and Measuring

Investigation 4: Choice Time: Collect 10 Together

How Many in All?

Investigations 2-4

### 33. Time relationships

In addition to the following reference, each unit of study in the kindergarten course of *Investigations in Number, Data, and Space* includes an appendix entitled, "About Classroom Routines." This appendix is comprised of activities which can be incorporated into the daily classroom schedule. The recurring *Calendar* activity includes experiences with the sequences of, and the relationships between, days, weeks, and months; concepts of before and after, yesterday, today, and tomorrow, this week and next week, how many more days until and how many days since; and numbers and patterns on the calendar.

#### Reference:

Mathematical Thinking in Kindergarten

Investigation 3

### 34. Subtraction

#### References:

How Many in All?

Investigations 2-4

### 35. Comparative size terms

#### References:

Collecting, Counting, and Measuring

Investigations 3, 4, 5

How Many in All?

Investigation 2: Choice Time, pages 40-41

### April:

### 36. Coins: nickel and dime

Kindergarten students using *Investigations in Number, Data, and Space* are given an opportunity to explore monetary values as they simulate the purchase of items in a classroom grocery store.

#### Reference:

Counting Ourselves and Others

Investigation 2: Choice Time: page 50

### 37. Graph reading

In addition to the following references, the end of each unit of *Investigations in Number, Data, and Space* contains a feature entitled, About Classroom Routines. In Kindergarten this includes a section entitled, *Today's Question*, which consists of an activity involving students collecting, displaying, and interpreting data. Students may represent data using charts or graphs. Students are asked to think about "what a graph represents and what it is communicating." The following references are specifically to graphical representations of data and their implications.

#### References:

Counting Ourselves and Others  
Investigation 3: Focus Time, pages 58-60  
Investigation 3: Teacher Note, page 70

### 38. Sets with specific characteristics

#### References:

Mathematical Thinking in Kindergarten  
Investigation 1: Choice Time: pages 12-17  
Investigation 3: Choice Time: Exploring Interlocking Cubes  
Mathematical Materials: pages 61-64  
Collecting, Counting, and Measuring  
Investigation 3: Choice Time: Measuring Table  
Investigation 4  
Choice Time: Comparing Names  
Choice Time: Grab and Count: Compare  
Investigation 5  
Investigation 6: Focus Time: Six Tiles  
Counting Ourselves and Others  
Investigation 1  
Choice Time: Self-Portraits  
Choice Time: Pattern Block Grab  
Investigation 2: Focus Time: What Did You Eat for Lunch?  
Making Shapes and Building Blocks  
Investigation 1  
Choice Time: Book of Shapes  
Investigation 3  
Focus Time: 3-D Shapes in the Classroom  
Choice Time: Shape Hunt  
Choice Time: Exploring Geoblocks  
Investigation 4  
Focus Time: Clay Shapes

### 39. Sequence

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. In *Calendar* students explore patterns on the calendar; in *Patterns on the Pocket Chart* students describe, copy, extend, create, and make predictions about repeating patterns.

#### References:

Mathematical Thinking in Kindergarten  
Investigation 3  
Pattern Trains and Hopscotch Paths  
Investigations 1, 2, 3, 4

### 40. Seasons

Seasons may be studied in conjunction with calendar activities. In addition to the following reference, each unit of study in the kindergarten course of *Investigations in Number, Data, and Space* includes an appendix entitled, “About Classroom Routines.” This appendix is comprised of activities, which can be incorporated into the daily classroom schedule. The recurring *Calendar* activity includes experiences with the sequences of, and the relationships between, days, weeks, and months; concepts of before and after, yesterday, today, and tomorrow, this week and next week, how many more days until and how many days since; and numbers and patterns on the calendar.

#### Reference:

Mathematical Thinking in Kindergarten  
Investigation 3

### 41. Addition extension

Collecting, Counting, and Measuring  
Investigation 4: Choice Time: Collect 10 Together  
How Many in All?  
Investigations 2-4

### May:

### 44. A whole unit

Kindergarten students using *Investigations in Number, Data, and Space* apply the concepts of fractions and whole numbers as they measure and describe lengths which may fall between two whole units. In a geometric application of this concept, students find combinations of shapes that fill an area and explore relationships between pattern block shapes. Grade 1 students divide shapes and groups into equal parts and equal groups.

**References:**

Making Shapes and Building Blocks

Investigation 4: Choice Time: Fill the Hexagons

How Many in All?

Investigation 1

**45. Share objects**

As they participate in Choice Time activities throughout the course of the year, Kindergarten students using *Investigations in Number, Data, and Space* sort and share a variety of manipulatives, including pattern blocks and geoblocks, as they complete individual explorations and group investigations. Students explore the concept of sharing a set of objects by dividing them into equal groups beginning in Grade 1.

**Sample References:**

Mathematical Thinking in Kindergarten

Investigation 1: Choice Time, pages 14-15, 16-23

**46. Compare half unit to a whole unit**

Kindergarten students using *Investigations in Number, Data, and Space* apply the concepts of fractions and whole numbers as they measure and describe lengths which may fall halfway between two whole units. In a geometric application of this concept, students find combinations of shapes that fill an area and explore relationships between pattern block shapes. Grade 1 students divide shapes and groups into equal parts and equal groups.

**References:**

Making Shapes and Building Blocks

Investigation 4: Choice Time: Fill the Hexagons

How Many in All?

Investigation 1

**47. The fraction one-half and one-fourth**

Kindergarten students using *Investigations in Number, Data, and Space* apply the concepts of fractions and whole numbers as they measure and describe lengths, which may fall halfway between two whole units. In a geometric application of this concept, students find combinations of shapes that fill an area and explore relationships between pattern block shapes. Grade 1 students divide shapes and groups into equal parts and equal groups.

**References:**

Making Shapes and Building Blocks

Investigation 4: Choice Time: Fill the Hexagons

How Many in All?

Investigation 1

**48. Construct and count using a number line**

Kindergarten students using Investigations in Number, Data, and Space use a modified number line to record the number of items in the Counting Jar and other data sets.

**References:**

Mathematical Thinking in Kindergarten  
Investigation 2  
Counting Ourselves and Others  
Investigation 1: Focus Time, page 4  
Investigation 3: Teacher Note, page 70

**49. Ordinal numbers first through tenth**

**References:**

Mathematical Thinking in Kindergarten  
Investigation 2: Teacher Note, page 36  
Collecting, Counting, and Measuring  
Investigation 1: Teacher Note, page 16  
Counting Ourselves and Others  
Investigation 1: Teacher Note, page 12

**50. Days of the week (yesterday, today, tomorrow)**

Days of the week may be studied in conjunction with calendar activities. In addition to the following reference, each unit of study in the kindergarten course of ***Investigations in Number, Data, and Space*** includes an appendix entitled, “About Classroom Routines.” This appendix is comprised of activities, which can be incorporated into the daily classroom schedule. The recurring *Calendar* activity includes experiences with the sequences of, and the relationships between, days, weeks, and months; concepts of before and after, yesterday, today, and tomorrow, this week and next week, how many more days until and how many days since; and numbers and patterns on the calendar.

**Reference:**

Mathematical Thinking in Kindergarten  
Investigation 3

**June:**

**51. Numerals eleven (11) through fifteen (15)**

In addition to the following references, every unit of study in ***Investigations in Number, Data, and Space: Kindergarten*** includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. Each unit includes *Counting Jar*, which consists of activities involving counting and estimating.



**References:**

Mathematical Thinking in Kindergarten  
Investigations 1, 2, 3  
Collecting, Counting, and Measuring  
Investigations 2, 4  
Counting Ourselves and Others  
Investigations 1, 3, 4  
How Many in All?  
Investigations 1, 3, 4

**52. Money: quarters through dollar bill**

Kindergarten students using *Investigations in Number, Data, and Space* are given an opportunity to explore monetary values as they simulate the purchase of items in a classroom grocery store.

**Reference:**

Counting Ourselves and Others  
Investigation 2: Choice Time: page 50

**53. Add four (4)**

**References:**

How Many in All?  
Investigations 2-4

**54. Add five through nine**

**References:**

How Many in All?  
Investigations 2-4

**55. Numerals sixteen through twenty (16-20)**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, "About Classroom Routines." The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. Each unit includes *Counting Jar*, which consists of activities involving counting and estimating.

**References:**

Mathematical Thinking in Kindergarten  
Investigations 1, 2, 3  
Collecting, Counting, and Measuring  
Investigations 2, 4  
Counting Ourselves and Others  
Investigations 1, 3, 4  
How Many in All?  
Investigations 1, 3, 4

**56. Number line: counting forward and backward through twenty**

Kindergarten students using Investigations in Number, Data, and Space use a modified number line to record the number of items in the Counting Jar and other data sets.

**References:**

Mathematical Thinking in Kindergarten

Investigation 2

Counting Ourselves and Others

Investigation 1: Focus Time, page 4

Investigation 3: Teacher Note, page 70

**Additional topics that need greater emphasis:**

▪ **Counting on**

**References:**

Collecting, Counting, and Measuring

Investigation 4: Choice Time: Collect 10 Together

How Many in All?

Investigations 2-4

▪ **Patterns in number charts**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, "About Classroom Routines." The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. In *Calendar* students explore patterns on the calendar; in *Patterns on the Pocket Chart* students describe, copy, extend, create, and make predictions about repeating patterns.

**References:**

Mathematical Thinking in Kindergarten

Investigation 3

Pattern Trains and Hopscotch Paths

Investigations 1, 2, 3, 4

▪ **Sorting and classifying according to a rule or generalization (size, color, shape)**

**References:**

Mathematical Thinking in Kindergarten

Investigation 1: Choice Time: pages 12-17

Investigation 3: Choice Time: Exploring Interlocking Cubes

Mathematical Materials: pages 61-64

Collecting, Counting, and Measuring  
Investigation 3: Choice Time: Measuring Table  
Investigation 4  
Choice Time: Comparing Names  
Choice Time: Grab and Count: Compare  
Investigation 5  
Investigation 6: Focus Time: Six Tiles  
Counting Ourselves and Others  
Investigation 1  
Choice Time: Self-Portraits  
Choice Time: Pattern Block Grab  
Investigation 2: Focus Time: What Did You Eat for Lunch?  
Making Shapes and Building Blocks  
Investigation 1  
Choice Time: Book of Shapes  
Investigation 3  
Focus Time: 3-D Shapes in the Classroom  
Choice Time: Shape Hunt  
Choice Time: Exploring Geoblocks  
Investigation 4  
Focus Time: Clay Shapes

▪ **Drawing pictures to show math situations**

Collecting, Counting, and Measuring  
Investigations 1, 2  
Counting Ourselves and Others  
Investigations 1, 3, 4  
Making Shapes and Building Blocks  
Investigation 1  
How Many in All?  
Investigations 1, 4

▪ **Use of math tools and technology including computers and calculators**

**Measurement tools**

**References:**

Mathematical Thinking in Kindergarten  
Investigation 3  
Collecting, Counting, and Measuring  
Investigation 3  
How Many in All?  
Investigation 1  
Making Shapes and Building Blocks  
Appendix: Shapes Teacher Tutorial: 128-131

District Mathematics Calendar

**September:**

**1. Identification of numbers around us**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. Each unit includes *Counting Jar*, which consists of activities involving identification of numbers, counting, and estimating.

**References:**

Mathematical Thinking in Kindergarten

Investigations 1, 2, 3

Collecting, Counting, and Measuring

Investigations 1, 2, 3, 4, 5

Counting Ourselves and Others

Investigations 1, 3, 4

How Many in All?

Investigations 1, 2, 3, 4

**2. Spatial Relationships**

**References:**

Mathematical Thinking in Kindergarten

Investigation 1

Choice Time, pages 12-17

Teacher Notes, pages 21-22

Dialogue Box, page 23

Making Shapes and Building Blocks

Investigations 1, 2, 3, 4, 5

Shapes Teacher Tutorial, pages 117-154

**3. Problem solving: language**

Kindergarten students using *Investigations of Number, Data, and Space* interpret mathematical language as they solve problems throughout the course. The Dialogue Box feature integrated throughout the curriculum illustrates the development of mathematical language through teacher-student guidance and student-student discussion. Students progress through the curriculum by completing investigations, which consist of multiple cooperative learning activities. These explorations entail a great deal of group discussion and communication. For example, students describe patterns, collect data about their classmates, and solve story problems.

**Sample References:**

Mathematical Thinking in Kindergarten  
Investigation 1  
Pattern Trains and Hopscotch Paths  
Investigation 1  
Collecting, Counting, and Measuring  
Investigation 3: Dialogue Box, pages 48-49  
Counting Ourselves and Others  
Investigation 2  
Making Shapes and Building Blocks  
Investigation 1  
How Many in All?  
Investigation 3

**4. Problem solving: one-to-one correspondence**

Kindergarten students develop mathematical arguments for using one-to-one and two-to-one correspondences. They also experience the concept of one-to-one correspondence as they explore counting methods.

**References:**

Mathematical Thinking in Kindergarten  
Investigations 1, 2, 3  
Collecting, Counting, and Measuring  
Investigations 1, 2, 3, 4, 5  
Counting Ourselves and Others  
Investigations 1, 3, 4  
How Many in All?  
Investigations 1, 2, 3, 4

**October:**

**5. Classification by Attributes**

Kindergarten students using *Investigations in Number, Data, and Space* sort and classify shapes and objects in a variety of settings. Students explore and compare the attributes of various geometric manipulatives, including pattern blocks and geoblocks. Students classify and sort data. They classify shapes in the environment.

**References:**

Mathematical Thinking in Kindergarten  
Investigation 1  
Choice Time, pages 12-17  
Teacher Note, page 22  
Collecting, Counting, and Measuring  
Investigations 3, 6

Counting Ourselves and Others  
Investigations 1, 2, 3, 4  
Making Shapes and Building Blocks  
Investigations 1, 3, 4, 5

## 6. Groups

### References:

Mathematical Thinking in Kindergarten  
Investigation 1  
Choice Time, pages 12-17  
Teacher Note, page 22  
Collecting, Counting, and Measuring  
Investigations 3, 6  
Counting Ourselves and Others  
Investigations 1, 2, 3, 4  
Making Shapes and Building Blocks  
Investigations 1, 3, 4, 5

## 7. Comparison of sets

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. In *Attendance* students compare groups and determining which group has more and how much more.

### References:

Mathematical Thinking in Kindergarten  
Investigation 2: Choice Time, pages 32-33  
Investigation 4  
Collecting, Counting, and Measuring  
Investigations 3, 4, 5, 6  
How Many in All?  
Investigation 2: Choice Time: Grab Two Handfuls

## 8. More vocabulary

### References:

Mathematical Thinking in Kindergarten  
Investigation 1  
Focus Time, pages 7, 9  
Choice Time, pages 14, 16  
Teacher Notes, pages 21, 22  
Dialogue Box, page 23  
Investigation 2

Focus Time, pages 27, 28  
Teacher Note, page 36  
Investigation 3: Focus Time, page 44  
Investigation 4: Teacher Notes, pages 62, 64  
Pattern Trains and Hopscotch Paths  
Investigation 1  
Focus Time, page 9  
Teacher Note, page 19  
Investigation 2: Teacher Note, page 45  
Investigation 4  
Focus Time: page 67  
Choice Time: page 78  
Collecting, Counting, and Measuring  
Investigation 3: Choice Time, pages 42-43  
Investigation 6: Focus Time, page 81  
Counting Ourselves and Others  
Investigation 1: Teacher Note, page 12  
Making Shapes and Building Blocks  
Investigation 1  
Investigation 3  
Investigation 4: Dialogue Box, pages 80-81  
How Many in All?  
Investigation 1  
Choice Time, pages 20-21  
Teacher Notes, pages 24, 26

## 9. Identification – parts of three-dimensional shapes

### References:

Mathematical Thinking in Kindergarten  
Investigation 1  
Choice Time, pages 16-17  
Teacher Note, page 22  
Making Shapes and Building Blocks  
Investigations 3, 4, 5

## 10. Numerals one (1) through four (4)

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. Each unit includes *Counting Jar*, which consists of activities involving counting and estimating.

### References:

Mathematical Thinking in Kindergarten  
Investigations 1, 2, 3  
Collecting, Counting, and Measuring

Investigations 1, 2, 3, 4, 5, 6  
Counting Ourselves and Others  
Investigations 1, 3, 4  
How Many in All?  
Investigations 1, 2, 3, 4

**November:**

**11. Non-standard measurement**

**References:**

Collecting, Counting, and Measuring  
Investigation 3  
How Many in All?  
Investigation 1

**12. Weight**

Students using the series *Investigations in Number, Data, and Space* explore the concept of weight comparison beginning in Grade 1.

**13. Capacity of containers**

Kindergarten students using *Investigations in Number, Data, and Space* begin to explore the concept of volume as they combine smaller three-dimensional shapes to form larger solid objects.

**Reference:**

Making Shapes and Building Blocks  
Investigation 4: Choice Time, pages 73-74

**14. Time of Day**

In addition to the following reference, each unit of study in the kindergarten course of *Investigations in Number, Data, and Space* includes an appendix entitled, "About Classroom Routines." This appendix is comprised of activities, which can be incorporated into the daily classroom schedule. The recurring *Calendar* activity includes experiences with the sequences of, and the relationships between, days, weeks, and months; concepts of before and after, yesterday, today, and tomorrow, this week and next week, how many more days until and how many days since; and numbers and patterns on the calendar.

**Reference:**

Mathematical Thinking in Kindergarten  
Investigation 3



**15. Calendar**

In addition to the following reference, each unit of study in the kindergarten course of *Investigations in Number, Data, and Space* includes an appendix entitled, “About Classroom Routines.” This appendix is comprised of activities, which can be incorporated into the daily classroom schedule. The recurring *Calendar* activity includes experiences with the sequences of, and the relationships between, days, weeks, and months; concepts of before and after, yesterday, today, and tomorrow, this week and next week, how many more days until and how many days since; and numbers and patterns on the calendar.

**Reference:**

Mathematical Thinking in Kindergarten  
Investigation 3

**16. More Identification of numbers around us**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. Each unit includes *Counting Jar*, which consists of activities involving counting and estimating.

**References:**

Mathematical Thinking in Kindergarten  
Investigations 1, 2, 3  
Collecting, Counting, and Measuring  
Investigations 1, 2, 3, 4, 5, 6  
Counting Ourselves and Others  
Investigations 1, 3, 4  
How Many in All?  
Investigations 1, 2, 3, 4

**December:**

**17. Shapes around us**

**References:**

Making Shapes and Building Blocks  
Investigations 1, 3

**18. Spatial relationships – extended vocabulary**

**References:**

Making Shapes and Building Blocks  
Investigation 1  
Investigation 3  
Investigation 4: Dialogue Box, pages 80-81

**19. General temperature measurement terms**

Students have an opportunity to discuss the terms *hot* and *cold* :

**References:**

Collecting, Counting, and Measuring  
Investigations 1, Focus Time Follow Up, page 9

**20. Size concepts**

**References:**

Collecting, Counting, and Measuring  
Investigations 3, 4  
How Many in All?  
Investigation 1

**21. Money: Pennies**

Kindergarten students using *Investigations in Number, Data, and Space* are given an opportunity to explore monetary values as they simulate the purchase of items in a classroom grocery store.

**Reference:**

Counting Ourselves and Others  
Investigation 2: Choice Time: page 50

**January:**

**22. Addition**

**References:**

Collecting, Counting, and Measuring  
Investigation 4: Choice Time: Collect 10 Together  
How Many in All?  
Investigations 2-4

**23. Add one**

**References:**

Collecting, Counting, and Measuring  
Investigation 4: Choice Time: Collect 10 Together  
How Many in All?  
Investigations 2-4

**24. Conservation of the number in a set**

**References:**

Mathematical Thinking in Kindergarten  
Investigation 2: Teacher Note, page 36  
Collecting, Counting, and Measuring  
Investigation 1: Teacher Note, page 16  
Counting Ourselves and Others  
Investigation 1: Teacher Note, page 12

**25. Number relationships**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. In *Attendance* students compare groups and determining which group has more and how much more. *Counting Jar* includes activities involving counting and estimating.

**References:**

Mathematical Thinking in Kindergarten

Investigations 1, 2, 3, 4

Collecting, Counting, and Measuring

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

Counting Ourselves and Others

Investigations 1, 3, 4

How Many in All?

Investigations 1, 2, 3, 4

**February:**

**26. Numerals five (5) through nine (9)**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. Each unit includes *Counting Jar*, which consists of activities involving counting and estimating.

**References:**

Mathematical Thinking in Kindergarten

Investigations 1, 2, 3

Collecting, Counting, and Measuring

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

Counting Ourselves and Others

Investigations 1, 3, 4

How Many in All?

Investigations 1, 2, 3, 4

**27. Numeral zero (0)**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. Each unit includes *Counting Jar*, which consists of activities involving counting and estimating. The concept of zero can also be introduced and reinforced in lessons on adding and subtracting whole numbers.

**References:**

Collecting, Counting, and Measuring  
Investigations 1: Focus Time, pages 6-7  
How Many in All?  
Investigation 2: Choice Time, page 44  
Investigation 3: Choice Time, page 67

**28. Instruments of measurement**

**References:**

Collecting, Counting, and Measuring  
Investigations 3, 4  
How Many in All?  
Investigation 1

**29. Numeral ten (10)**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, "About Classroom Routines." The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. Each unit includes *Counting Jar*, which consists of activities involving counting and estimating. The concept of ten can also be introduced and reinforced in lessons on adding and subtracting whole numbers, number patterns, and place value.

**References:**

Mathematical Thinking in Kindergarten  
Investigation 2: Teacher Note, pages 36-37  
Collecting, Counting, and Measuring  
Investigation 2  
Teacher Note, page 32  
Dialogue Box, page 33  
Investigation 3  
Focus Time, pages 38-41  
Choice Time, pages 42-43  
Investigation 4: Choice Time, pages 64-65

**March:**

**30. Plus (+) and equal (=) signs**

**References:**

How Many in All?  
Investigations 2, 4

**31. Add two (2)**

**References:**

Collecting, Counting, and Measuring

Investigation 4: Choice Time: Collect 10 Together

How Many in All?

Investigations 2-4

**32. Add three (3)**

**References:**

Collecting, Counting, and Measuring

Investigation 4: Choice Time: Collect 10 Together

How Many in All?

Investigations 2-4

**33. Time relationships**

In addition to the following reference, each unit of study in the kindergarten course of ***Investigations in Number, Data, and Space*** includes an appendix entitled, “About Classroom Routines.” This appendix is comprised of activities, which can be incorporated into the daily classroom schedule. The recurring *Calendar* activity includes experiences with the sequences of, and the relationships between, days, weeks, and months; concepts of before and after, yesterday, today, and tomorrow, this week and next week, how many more days until and how many days since; and numbers and patterns on the calendar.

**Reference:**

Mathematical Thinking in Kindergarten

Investigation 3

**34. Subtraction**

**References:**

How Many in All?

Investigations 2-4

**35. Comparative size terms**

**References:**

Collecting, Counting, and Measuring

Investigations 3, 4, 5

How Many in All?

Investigation 2: Choice Time, pages 40-41

April:

**36. Coins: nickel and dime**

Kindergarten students using *Investigations in Number, Data, and Space* are given an opportunity to explore monetary values as they simulate the purchase of items in a classroom grocery store.

**Reference:**

Counting Ourselves and Others  
Investigation 2: Choice Time: page 50

**37. Graph reading**

In addition to the following references, the end of each unit of *Investigations in Number, Data, and Space* contains a feature entitled, About Classroom Routines. In Kindergarten this includes a section entitled, *Today's Question*, which consists of an activity involving students collecting, displaying, and interpreting data. Students may represent data using charts or graphs. Students are asked to think about "what a graph represents and what it is communicating." The following references are specifically to graphical representations of data and their implications.

**References:**

Counting Ourselves and Others  
Investigation 3: Focus Time, pages 58-60  
Investigation 3: Teacher Note, page 70

**38. Sequence**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, "About Classroom Routines." The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. In *Calendar* students explore patterns on the calendar; in *Patterns on the Pocket Chart* students describe, copy, extend, create, and make predictions about repeating patterns.

**References:**

Mathematical Thinking in Kindergarten  
Investigation 3  
Pattern Trains and Hopscotch Paths  
Investigations 1, 2, 3, 4

**39. Ordinal numbers first through fourth**

**References:**

Mathematical Thinking in Kindergarten  
Investigation 2: Teacher Note, page 36  
Collecting, Counting, and Measuring  
Investigation 1: Teacher Note, page 16  
Counting Ourselves and Others  
Investigation 1: Teacher Note, page 12

**40. Addition extension**

**References:**

Collecting, Counting, and Measuring

Investigation 4: Choice Time: Collect 10 Together

How Many in All?

Investigations 2-4

**41. Chance events/predicting**

Students using the *Investigations in Number, Data, and Space* series are introduced to the concepts of probability in Grade 3. Students in earlier grades may predict future events based on collected data. For example, Kindergarten students predict whether or not all of their sunflower seeds will germinate.

**Reference:**

Counting Ourselves and Others

Investigation 3: Dialogue Box, pages 74-75

**May:**

**42. A whole unit**

Kindergarten students using *Investigations in Number, Data, and Space* apply the concepts of fractions and whole numbers as they measure and describe lengths, which may fall between two whole units. In a geometric application of this concept, students find combinations of shapes that fill an area and explore relationships between pattern block shapes. Grade 1 students divide shapes and groups into equal parts and equal groups.

**References:**

Making Shapes and Building Blocks

Investigation 4: Choice Time: Fill the Hexagons

How Many in All?

Investigation 1

**43. Share objects**

As they participate in Choice Time activities throughout the course of the year, Kindergarten students using *Investigations in Number, Data, and Space* sort and share a variety of manipulatives, including pattern blocks and geoblocks, as they complete individual explorations and group investigations. Students explore the concept of sharing a set of objects by dividing them into equal groups beginning in Grade 1.

**Sample References:**

Mathematical Thinking in Kindergarten

Investigation 1: Choice Time, pages 14-15, 16-23

**44. Compare a half unit to a whole unit**

Kindergarten students using *Investigations in Number, Data, and Space* apply the concepts of fractions and whole numbers as they measure and describe lengths,

which may fall halfway between two whole units. In a geometric application of this concept, students find combinations of shapes that fill an area and explore relationships between pattern block shapes. Grade 1 students divide shapes and groups into equal parts and equal groups.

**References:**

Making Shapes and Building Blocks

Investigation 4: Choice Time: Fill the Hexagons

How Many in All?

Investigation 1

**45. The fraction one-half ( $1/2$ )**

Kindergarten students using *Investigations in Number, Data, and Space* apply the concepts of fractions and whole numbers as they measure and describe lengths, which may fall halfway between two whole units. In a geometric application of this concept, students find combinations of shapes that fill an area and explore relationships between pattern block shapes. Grade 1 students divide shapes and groups into equal parts and equal groups.

**References:**

Making Shapes and Building Blocks

Investigation 4: Choice Time: Fill the Hexagons

How Many in All?

Investigation 1

**46. Construct and count using a number line**

Kindergarten students using *Investigations in Number, Data, and Space* use a modified number line to record the number of items in the Counting Jar and other data sets.

**References:**

Mathematical Thinking in Kindergarten

Investigation 2

Counting Ourselves and Others

Investigation 1: Focus Time, page 4

Investigation 3: Teacher Note, page 70

**47. Ordinal numbers first through tenth**

**References:**

Mathematical Thinking in Kindergarten

Investigation 2: Teacher Note, page 36

Collecting, Counting, and Measuring

Investigation 1: Teacher Note, page 16

Counting Ourselves and Others

Investigation 1: Teacher Note, page 12



June:

**48. Numerals eleven (11) through fifteen (15)**

In addition to the following references, every unit of study in *Investigations in Number, Data, and Space: Kindergarten* includes a section entitled, “About Classroom Routines.” The pages in this section include suggestions for applying mathematical concepts and skills to everyday situations in the classroom. Each unit includes *Counting Jar*, which consists of activities involving counting and estimating.

**References:**

Mathematical Thinking in Kindergarten

Investigations 1, 2, 3

Collecting, Counting, and Measuring

Investigations 2, 4

Counting Ourselves and Others

Investigations 1, 3, 4

How Many in All?

Investigations 1, 3, 4

**49. Money: quarters through dollar bill**

Kindergarten students using *Investigations in Number, Data, and Space* are given an opportunity to explore monetary values as they simulate the purchase of items in a classroom grocery store.

**Reference:**

Counting Ourselves and Others

Investigation 2: Choice Time: page 50

**50. Add four**

**References:**

How Many in All?

Investigations 2-4

**51. Add five through nine**

**References:**

How Many in All?

Investigations 2-4

**Investigations in Number, Data, & Space  
to the  
New York City School District 30  
Mathematics Scope and Sequence**

**Grade One**

**Scope and Sequence**

**September**

**1. Calendar – months and years, weather, temperature**

In addition to the following references, Classroom Routines described in an appendix at the end of each of the texts in the *Investigations in Number, Data, and Space* series include Understanding Time and Changes, which consists of activities in which students sequence events, explore units of time and relationships among them, and use a calendar to solve problems. The following references are to an investigation in which students become familiar with calendar features; group, order, and describe data about birthdays; and observe the cyclical nature of the sequence of months.

**References:**

Survey Questions and Secret Rules  
Investigation 3: Sessions 1-3

**2. Recognize and name whole numbers 0 through 100 by ones**

**References:**

Mathematical Thinking in Grade 1

Investigation 2: Sessions 1-6

Investigation 4: Sessions 1-6

Investigation 5: Sessions 2-4

Building Number Sense

Investigation 1: Sessions 2-6, 9

Investigation 2: Sessions 1-9

Investigation 3: Sessions 1-7, 9

Investigation 4: Sessions 1-10

Number Games and Story Problems

Investigation 1: Sessions 1-10

Investigation 2: Sessions 1-13

Investigation 3: Sessions 1-13

**3. Recognize and name whole numbers 10 through 100 by tens**

In addition to the following references, each unit of Investigations in *Number, Data, and Space* for Grade 1 includes an appendix entitled, "About Classroom Routines." This appendix includes Counting activities to give students regular practice with counting in familiar classroom contexts, including counting by twos to determine if every student in attendance on a particular school day can paired up with another student in the class.

**References:**

Building Number Sense

Investigation 1: Session 2: Teacher Note, pages 11-12

Investigation 3: Session 9: Extension, page 113

Number Games and Story Problems

Investigation 2: Sessions 6-12

**4. Count hundreds through ten hundred**

**References:**

Building Number Sense

Investigation 3: Sessions 1-2

**5. Read and write standard numerals – 100 through 1,000**

**References:**

Building Number Sense

Investigation 3: Sessions 1-2

**October**

**6. Count by tens and fives to 1,000**

**References:**

Building Number Sense

Investigation 1: Session 2: Teacher Note, pages 11-12

Investigation 3: Session 9: Extension, page 113

Number Games and Story Problems

Investigation 2: Sessions 6-12

**7. Relation symbols =, <, >**

**References:**

Mathematical Thinking at Grade 1

Investigation 2: Sessions 1-3

Building Number Sense

Investigation 1: Session 2

Investigation 2: Session 3

Investigation 3: Sessions 1-7

**8. Locate information**

Students in Grade 1 using *Investigations in Number, Data, and Space* apply and adapt a variety of appropriate strategies to locate information and solve problems throughout the course; in fact, this is a fundamental emphasis of the series. For example, students collect, sort, and classify information about a group of people for purposes of counting, comparing, organizing, and displaying the data.

**Sample References:**

Mathematical Thinking at Grade 1

Investigation 5: Session 2

Building Number Sense

Investigation 4: Session 10

Survey Questions and Secret Rules

Investigation 2: Sessions 3-4

Quilt Squares and Block Towns

Investigation 2: Session 7

Number Games and Story Problems

Investigation 3: Session 13

Bigger, Taller, Heavier, Smaller

Investigation 3: Session 2

**9. Data collection: pictographs and Venn diagrams**

In addition to the following references, the end of each unit of *Investigations in Number, Data, and Space* contains a feature entitled, "About Classroom Routines." The Grade 1 series includes a section in the appendix entitled, "Exploring Data," which includes ideas for class surveys, which involve students collecting, organizing, and displaying data. Another section, Understanding Time and Changes, includes ideas for collecting and displaying weather data. Students use and interpret Venn diagrams in Grade 2.

**References:**

Mathematical Thinking at Grade 1

Investigation 5: Sessions 3-6

Survey Questions and Secret Rules

Investigation 2: Sessions 1-2, 5-6

Investigation 3: Sessions 1-3

Investigation 4: Sessions 2-5

**10. Addition and subtraction facts**

**References:**

Mathematical Thinking in Grade 1

Investigation 2: Sessions 1-6

Investigation 4: Sessions 1-4, 6

Investigation 5: Sessions 2-4

Building Number Sense

Investigation 1: Sessions 1-6, 9

Investigation 2: Sessions 1-9

Investigation 4: Sessions 1-10

Number Games and Story Problems

Investigation 1: Sessions 1-10

Investigation 2: Sessions 1-8, 10-13

Investigation 3: Sessions 1-13

**11. Quarters, half-dollars, pennies, nickels, dimes**

**References:**

Number Games and Story Problems

Investigation 2: Sessions 3-8

**12. Even and odd numbers**

Although Grade 1 students using *Investigations in Number, Data, and Space* do not use the specific terms “even” and “odd,” they gain experience with even numbers as they count by twos.

**References:**

Building Number Sense

Investigation 1: Session 2: Teacher Note, pages 11-12

Investigation 3: Session 9

Number Games and Story Problems

Investigation 2: Sessions 1-12

**13. Round numbers through 99 to the nearest ten**

Grade 1 students estimate which of two containers holds more cubes, and check their estimates by filling the containers and counting the cubes; they also estimate quantities described and illustrated in a story.

**References:**

Building Number Sense

Investigation 3: Sessions 3-4, 10

**November**

**14. Patterns: recognize, describe and extend numeric and geometric patterns**

**References:**

Mathematical Thinking at Grade 1

Investigation 3: Sessions 1-6

Investigation 4: Sessions 2-3, 5

Building Number Sense

Investigation 3: Sessions 1-8

Investigation 4: Session 10: Activity, page 163

Survey Questions and Secret Rules  
Investigation 3: Sessions 2-3  
Quilt Squares and Block Towns  
Investigation 1: Sessions 13-15  
Number Games and Story Problems  
Investigation 2: Sessions 2, 6-9

**15. Open sentences**

**References:**

Mathematical Thinking at Grade 1  
Investigation 2: Session 4: Teacher Note, page 50  
Building Number Sense  
Investigation 2: Sessions 1-2, 4-9  
Number Games and Story Problems  
Investigation 1  
Sessions 4-5, page 21  
Session 6, page 28  
Sessions 7-9: Dialogue Box, page 39

**16. Place value through 999, the meaning of zero**

**References:**

Building Number Sense  
Investigation 2: Session 2  
Investigation 3: Sessions 1-2, 9  
Number Games and Story Problems  
Investigation 2: Sessions 6-12

**17. Money – dollars through ten dollars**

**References:**

Number Games and Story Problems  
Investigation 2: Sessions 3-8

**18. Ordinal numbers: eleventh through thirty-first**

**References:**

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

**19. Explore properties of a circle, square, rectangle, & triangle**

**References:**

Mathematical Thinking at Grade 1  
Investigation 1: Sessions 1-4  
Building Number Sense  
Investigation 1: Sessions 1-9  
Investigation 2: Sessions 6-8

Investigation 3: Sessions 3-7  
Investigation 4: Sessions 6-9  
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  
Investigation 2: Sessions 1-10  
Investigation 3: Sessions 1-7  
Number Games and Story Problems  
Investigation 1: Sessions 1-6  
Investigation 3: Sessions 6-8

**20. Addition of 2- and 3-digit numbers without regrouping (exchange)**

Grade 1 students add 1- and 2-digit numbers.

**References:**

Number Games and Story Problems  
Investigation 3: Sessions 10-13

**December**

**21. Subtraction of 2-digit number from a 3-digit number without regrouping (exchange)**

Grade 1 students subtract 1-digit numbers from 1- and 2-digit numbers.

**References:**

Number Games and Story Problems  
Investigation 3: Sessions 10-13

**22. Addition of 3-digit numbers without regrouping (exchange)**

Grade 1 students add 1- and 2-digit numbers.

**References:**

Number Games and Story Problems  
Investigation 3: Sessions 10-13

**23. Subtraction of a 3-digit number from a 3-digit number without regrouping (exchange)**

Grade 1 students subtract 1-digit numbers from 1- and 2-digit numbers.

**References:**

Number Games and Story Problems  
Investigation 3: Sessions 10-13

**24. Guess and check**

Grade 1 students estimate which of two containers holds more cubes, and check their estimates by filling the containers and counting the cubes.

**References:**

Building Number Sense  
Investigation 3: Sessions 3-4

## 25. Use data

In addition to the following references, the end of each unit of *Investigations in Number, Data, and Space* contains a feature entitled, “About Classroom Routines.” The Grade 1 series includes a section in the appendix entitled, “Exploring Data,” which includes ideas for class surveys which involve students collecting, organizing, and displaying data. Another section, Understanding Time and Changes, includes ideas for collecting and displaying weather data.

### References:

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

## 26. Bar graphs

In addition to the following references, the end of each unit of *Investigations in Number, Data, and Space* contains a feature entitled, “About Classroom Routines.” The Grade 1 series includes a section in the appendix entitled, “Exploring Data,” which includes ideas for class surveys which involve students collecting, organizing, and displaying data. Another section, Understanding Time and Changes, includes ideas for collecting and displaying weather data.

### References:

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

## 27. Temperature – Celsius and Fahrenheit thermometers

There are no specific references to measuring temperatures in degrees Fahrenheit or Celsius in the first grade series. In About Classroom Routines: Understanding Time and Changes, students collect and display weather data.

## January

## 28. Symmetry and congruence

Students using *Investigations in Number, Data, and Space* are not formally introduced to the concept of symmetry until Grade 2. Grade 1 students explore preliminary skills, including the manipulation of shapes through physical manipulation, drawing, and computer technology, as they construct murals and create designs and drawings using basic shapes. They are exposed to symmetry as they examine and manipulate geometric shapes and solids. They physically fit geometric pattern blocks into shape outlines as they explore the concept of congruence.



**References:**

Quilt Squares and Block Towns  
Investigation 1: Sessions 1-15  
Investigation 2: Sessions 1-10  
Investigation 3: Sessions 1-7  
Appendix: *Shapes* Tutorial

**29. Linear Measurement – inch and foot**

Grade 1 students using Investigations in Number, Data, and Space measure and compare lengths using nonstandard and standard units, including hands, feet, and interlocking cubes.

**References:**

Bigger, Taller, Heavier, Smaller  
Investigation 3: Sessions 1-5

**29A. Understanding the need for standard units of measure**

Grade 1 students using Investigations in Number, Data, and Space measure and compare lengths using nonstandard and standard units, including hands, feet, and interlocking cubes.

**References:**

Bigger, Taller, Heavier, Smaller  
Investigation 3: Sessions 1-5

**30. Addition of 2- and 3-digit numbers using expanded notation without regrouping (exchange)**

Grade 1 students add 1- and 2-digit numbers.

**References:**

Number Games and Story Problems  
Investigation 3: Sessions 10-13

**31. Subtraction of 2- and 3-digit numbers using expanded notation without regrouping (exchange)**

Grade 1 students subtract 1- and 2-digit numbers

**References:**

Number Games and Story Problems  
Investigation 3: Sessions 10-13

**32. Addition of 2-digit number and a 1-digit number with regrouping (exchange) ones to tens**

**References:**

Number Games and Story Problems  
Investigation 3: Sessions 10-13

**33. Subtraction of a 1-digit number from a 2-digit number with regrouping (exchange)**

**References:**

Number Games and Story Problems  
Investigation 3: Sessions 10-13

**34. Money – make change through the value of a dollar**

**References:**

Number Games and Story Problems  
Investigation 2: Sessions 3-8

**February**

**35. Fractions – halves, fourths, and thirds of single objects and a group of objects**

Grade 1 students using *Investigations in Number, Data, and Space* are introduced to the concept of fractions as parts of measurement units. They also divide a whole and a set into equal parts.

**References:**

Building Number Sense  
Investigation 1: Session 2  
Bigger, Taller, Heavier, Smaller  
Investigation 2: Sessions 2-4  
Investigation 3: Session 2

**36. Multiplication facts for twos through 10**

Grade 1 students divide shapes and groups into equal parts and equal groups. They also gain experience with repeated addition and skip counting.

**References:**

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

**37. Introduction to division**

Grade 1 students divide shapes and groups into equal parts and equal groups. They also gain experience with repeated addition and skip counting.

**References:**

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

**38. Division facts for twos through 10**

Grade 1 students divide shapes and groups into equal parts and equal groups. They also gain experience with repeated addition and skip counting.

**References:**

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

**39. Linear measurement – meter, decimeter, and centimeter**

Grade 1 students using Investigations in Number, Data, and Space measure and compare lengths using nonstandard and standard units, including hands, feet, and interlocking cubes.

**References:**

Bigger, Taller, Heavier, Smaller

Investigation 3: Sessions 1-5

**40. Addition of 2-digit numbers with regrouping (exchange) ones to tens**

**References:**

Number Games and Story Problems

Investigation 3: Sessions 10-13

**March**

**41. Counting by fives and tens from 0 to 50**

In addition to the following references, each unit of Investigations in **Number, Data, and Space** for Grade 1 includes an appendix entitled, “About Classroom Routines.” This appendix includes Counting activities to give students regular practice with counting in familiar classroom contexts, including counting by twos to determine if every student in attendance on a particular school day can paired up with another student in the class.

**References:**

Building Number Sense

Investigation 1: Session 2: Teacher Note, pages 11-12

Investigation 3: Session 9: Extension, page 113

Number Games and Story Problems

Investigation 2: Sessions 6-12

**42. Dimes**

**References:**

Number Games and Story Problems  
Investigation 2: Sessions 3-8

**43. Commutative property with sums through ten**

**References:**

Mathematical Thinking at Grade 1  
Investigation 2: Session 4:Teacher Note, page 50  
Building Number Sense  
Investigation 2: Sessions 1-2, 4-9  
Number Games and Story Problems  
Investigation 1  
Sessions 4-5, page 21

**44. Associative property for three addends**

**References:**

Mathematical Thinking at Grade 1  
Investigation 4: Sessions 1-3  
Building Number Sense  
Investigation 4: Sessions 7-9  
Number Games and Story Problems  
Investigation 1  
Sessions 4-5, page 21  
Session 6, page 28  
Sessions 7-9: Dialogue Box, page 39  
Session 10  
Investigation 3: Sessions 1, 3-5, 9

**45. Subtraction facts through ten**

**References:**

Mathematical Thinking in Grade 1  
Building Number Sense  
Investigation 4: Session 2  
Number Games and Story Problems  
Investigation 3: Sessions 2-8, 10-13

**46. Number families through ten**

**References:**

Mathematical Thinking in Grade 1  
Investigation 2: Sessions 1, 4-6  
Investigation 4: Session 4  
Building Number Sense  
Investigation 2: Sessions 1-2  
Investigation 4: Session 2

Number Games and Story Problems  
Investigation 1: Sessions 1-10

## April

### 47. Ordinal numbers through tenth

**References:**

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

### 48. Fourths

Grade 1 students using *Investigations in Number, Data, and Space* are introduced to the concept of fractions as parts of measurement units. They also divide a whole and a set into equal parts.

**References:**

Building Number Sense  
Investigation 1: Session 2  
Bigger, Taller, Heavier, Smaller  
Investigation 2: Sessions 2-4  
Investigation 3: Session 2

### 49. Use the equal (=) to compare groups from 0 to 10 objects

**References:**

Building Number Sense  
Investigation 2: Sessions 1-2  
Investigation 4: Sessions 1-2, 7-10  
Number Games and Story Problems  
Investigation 1: Sessions 1-10  
Investigation 2: Sessions 1-2, 10-12  
Investigation 3: Sessions 1-13  
Teacher Notes: Introducing Notation, p. 162

### 50. Greater than (>) and less than (<) symbols

Grade 1 students using *Investigations in Number, Data, and Space* use physical models, pictures, words, and phrases rather than inequality symbols to compare quantities.

**References:**

Mathematical Thinking at Grade 1  
Investigation 2: Sessions 1-3  
Building Number Sense  
Investigation 1: Session 2  
Investigation 2: Session 3  
Investigation 3: Sessions 1-7

**51. Counting by fives and tens from 50 to 100**

In addition to the following references, each unit of Investigations in **Number, Data, and Space** for Grade 1 includes an appendix entitled, “About Classroom Routines.” This appendix includes Counting activities to give students regular practice with counting in familiar classroom contexts, including counting by twos to determine if every student in attendance on a particular school day can paired up with another student in the class.

**References:**

Building Number Sense

Investigation 1: Session 2: Teacher Note, pages 11-12

Investigation 3: Session 9: Extension, page 113

Number Games and Story Problems

Investigation 2: Sessions 6-12

**52. Sums through eighteen**

**References:**

Mathematical Thinking in Grade 1

Investigation 2: Sessions 1, 4-6

Building Number Sense

Investigation 2: Sessions 1-9

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

**53. Count and group by tens through fifty**

In addition to the following references, each unit of Investigations in **Number, Data, and Space** for Grade 1 includes an appendix entitled, “About Classroom Routines.” This appendix includes Counting activities to give students regular practice with counting in familiar classroom contexts, including counting by twos to determine if every student in attendance on a particular school day can paired up with another student in the class.

**References:**

Building Number Sense

Investigation 1: Session 2: Teacher Note, pages 11-12

Investigation 3: Session 9: Extension, page 113

Number Games and Story Problems

Investigation 2: Sessions 6-12

**54. Place value from 10 through 50**

**References:**

Building Number Sense  
Investigation 2: Session 2  
Investigation 3: Sessions 1-2, 9  
Number Games and Story Problems  
Investigation 2: Sessions 6-12

**55. Order numbers from 10 through 50**

**References:**

Mathematical Thinking at Grade 1  
Investigation 2: Sessions 2-3  
Building Number Sense  
Investigation 3: Sessions 1-2, 5-7, 9

**May**

**56. Place value from 51 through 99**

**References:**

Building Number Sense  
Investigation 2: Session 2  
Investigation 3: Sessions 1-2, 9  
Number Games and Story Problems  
Investigation 2: Sessions 6-12

**57. Order numerals from 51 through 99**

**References:**

Building Number Sense  
Investigation 3: Sessions 1-2

**58. Quarters, half dollars, dollars**

**References:**

Number Games and Story Problems  
Investigation 2: Sessions 3-8

**59. Thirds**

Grade 1 students using *Investigations in Number, Data, and Space* are introduced to the concept of fractions as parts of measurement units. They also divide a whole and a set into equal parts.

**References:**

Building Number Sense  
Investigation 1: Session 2  
Bigger, Taller, Heavier, Smaller  
Investigation 2: Sessions 2-4  
Investigation 3: Session 2

**60. Add 2-digit numbers**

**References:**

Mathematical Thinking in Grade 1  
Investigation 5: Session 2

**June**

**61. Subtract a 1-digit number from 11 through 18**

**References:**

Building Number Sense  
Investigation 4: Session 2  
Number Games and Story Problems  
Investigation 3: Sessions 2-8, 10-13

**62. Subtract a 1-digit number from a 2-digit number without regrouping (exchange)**

**References:**

Building Number Sense  
Investigation 4: Session 2  
Number Games and Story Problems  
Investigation 3: Sessions 2-8, 10-13

**63. Probability – chance events**

Students using the *Investigations in Number, Data, and Space* series are introduced to the concepts of probability in Grade 3. Grade 1 students hypothesize about attendance data on “a most unusual day.”

**References:**

Survey Questions and Secret Rules  
Investigation 4: Sessions 4-5

**64. Subtraction of ten(s)**

**References:**

Number Games and Story Problems  
Investigation 3: Sessions 10-13



**65. Subtract a 2-digit number from a 2-digit number without regrouping (exchange)**

**References:**

Number Games and Story Problems  
Investigation 3: Sessions 10-13

**66. Count by twos through 98**

In addition to the following references, each unit of Investigations in *Number, Data, and Space* for Grade 1 includes an appendix entitled, “About Classroom Routines.” This appendix includes Counting activities to give students regular practice with counting in familiar classroom contexts, including counting by twos to determine if every student in attendance on a particular school day can paired up with another student in the class.

**References:**

Building Number Sense  
Investigation 1: Session 2: Teacher Note, pages 11-12  
Investigation 3: Session 9  
Number Games and Story Problems  
Investigation 2: Sessions 1-12

**67. Even and odd numbers through 99**

Although Grade 1 students using *Investigations in Number, Data, and Space* do not use the specific terms “even” and “odd,” they gain experience with even numbers as they count by twos.

**References:**

Building Number Sense  
Investigation 1: Session 2: Teacher Note, pages 11-12  
Investigation 3: Session 9  
Number Games and Story Problems  
Investigation 2: Sessions 1-12

## District Mathematics Calendar

### September

#### 1. Spatial relationships

**References:**

Mathematical Thinking at Grade 1  
Investigation 1: Sessions 1-4  
Building Number Sense  
Investigation 1: Sessions 1-9  
Investigation 2: Sessions 6-8  
Investigation 3: Sessions 3-7  
Investigation 4: Sessions 6-9  
Survey Questions and Secret Rules  
Investigation 1: Sessions 1-2  
Quilt Squares and Block Towns  
Investigation 1: Sessions 1-15  
Investigation 2: Sessions 1-10  
Investigation 3: Sessions 1-7  
Number Games and Story Problems  
Investigation 1: Sessions 1-5

#### 2. Seasons of the year

In addition to the following references, Classroom Routines described in an appendix at the end of each of the texts in the *Investigations in Number, Data, and Space* series include Understanding Time and Changes, which consists of activities in which students sequence events, explore units of time and relationships among them, and use a calendar to solve problems. The following references are to an investigation in which students become familiar with calendar features; group, order, and describe data about birthdays; and observe the cyclical nature of the sequence of months.

**References:**

Survey Questions and Secret Rules  
Investigation 3: Sessions 1-3

#### 3. Days of the week

In addition to the following references, Classroom Routines described in an appendix at the end of each of the texts in the *Investigations in Number, Data, and Space* series include Understanding Time and Changes, which consists of activities in which students sequence events, explore units of time and relationships among them, and use a calendar to solve problems. The following references are to an investigation in which students become familiar with calendar features; group, order, and describe data about birthdays; and observe the cyclical nature of the sequence of months.

**References:**

Survey Questions and Secret Rules  
Investigation 3: Sessions 1-3

**4. Spatial relationships extended**

**References:**

Mathematical Thinking at Grade 1  
Investigation 1: Sessions 1-4  
Building Number Sense  
Investigation 1: Sessions 1-9  
Investigation 2: Sessions 6-8  
Investigation 3: Sessions 3-7  
Investigation 4: Sessions 6-9  
Survey Questions and Secret Rules  
Investigation 1: Sessions 1-2  
Quilt Squares and Block Towns  
Investigation 1: Sessions 1-15  
Investigation 2: Sessions 1-10  
Investigation 3: Sessions 1-7  
Number Games and Story Problems  
Investigation 1: Sessions 1-5

**5. Classification by attributes**

**References:**

In addition to the following references, every text in the Grade 1 *Investigations in Number, Data, and Space* series includes a description of sorting games in the appendix of the text, entitled, “About Classroom Routines.” The first game, entitled, “Guess My Rule,” requires students to determine the common attribute of a set of objects. After students have become familiar with this game, they can play “Guess My Object,” in which students ask yes-or-no questions based on attributes and use the process of elimination to determine which particular object was secretly chosen from a set of objects.

**Sample References:**

Survey Questions and Secret Rules  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 3-6  
Investigation 4: Sessions 2-3  
Quilt Shapes and Block Towns  
Investigation 1: Sessions 11-12

**6. One-to-one and more than one correspondence**

**References:**

Mathematical Thinking at Grade 1  
Investigation 5: Sessions 1-6  
Building Number Sense  
Investigations 1, 2, 3

**7. Sets**

**References:**

Mathematical Thinking at Grade 1  
Investigation 2: Sessions 2-6  
Investigation 4: Sessions 4-6  
Investigation 5: Session 1  
Building Number Sense  
Investigation 1: Sessions 1-9  
Investigation 2: Sessions 1-9  
Investigation 3: Sessions 1-9  
Investigation 4: Sessions 1-10  
Quilt Squares and Block Towns  
Investigation 1: Sessions 2-10  
Number Games and Story Problems  
Investigation 2: Sessions 1-8, 10-12

**8. Compare groups of 1 through 5 objects**

**References:**

Mathematical Thinking at Grade 1  
Investigation 2: Sessions 1-3  
Building Number Sense  
Investigation 1: Session 2  
Investigation 2: Session 3  
Investigation 3: Sessions 1-7

**9. Quantities**

**References:**

Mathematical Thinking at Grade 1  
Investigation 2: Sessions 2-6  
Investigation 4: Sessions 4-6  
Investigation 5: Session 1  
Building Number Sense  
Investigation 1: Sessions 1-9  
Investigation 2: Sessions 1-9  
Investigation 3: Sessions 1-9  
Investigation 4: Sessions 1-10  
Quilt Squares and Block Towns  
Investigation 1: Sessions 2-10  
Number Games and Story Problems  
Investigation 2: Sessions 1-8, 10-12  
Bigger, Taller, Heavier, Smaller  
Investigation 2: Sessions 1-7

**October**

**10. Numerals one (1) through five (5)**

**References:**

Mathematical Thinking in Grade 1  
Investigation 2: Sessions 1-6  
Investigation 4: Sessions 2-6  
Investigation 5: Sessions 1-4  
Building Number Sense  
Investigation 1: Sessions 1-6, 9  
Investigation 2: Sessions 1-9  
Investigation 3: Sessions 1-7, 9  
Investigation 4: Sessions 1-10  
Number Games and Story Problems  
Investigation 1: Sessions 1-10  
Investigation 2: Sessions 1-13  
Investigation 3: Sessions 1-13

**11. Patterns**

**References:**

Mathematical Thinking at Grade 1  
Investigation 3: Sessions 1-6  
Investigation 4: Sessions 2-3, 5  
Building Number Sense  
Investigation 3: Sessions 1-8  
Investigation 4: Session 10: Activity, page 163  
Survey Questions and Secret Rules  
Investigation 3: Sessions 2-3  
Quilt Squares and Block Towns  
Investigation 1: Sessions 13-15  
Number Games and Story Problems  
Investigation 2: Sessions 2, 6-9

**12. Properties of figures and shapes**

**References:**

Mathematical Thinking at Grade 1  
Investigation 1: Sessions 1-4  
Building Number Sense  
Investigation 1: Sessions 1-9  
Investigation 2: Sessions 6-8  
Investigation 3: Sessions 3-7  
Investigation 4: Sessions 6-9  
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  
Investigation 2: Sessions 1-10  
Investigation 3: Sessions 1-7  
Number Games and Story Problems  
Investigation 1: Sessions 1-6  
Investigation 3: Sessions 6-8

### 13. Measurement of length – non standard

**References:**

Bigger, Taller, Heavier, Smaller  
Investigation 3: Sessions 1-5

### 14. Measurement of weight – non standard

**References:**

Bigger, Taller, Heavier, Smaller  
Investigation 1: Sessions 1-6

### 15. Pictographs

In addition to the following references, the end of each unit of *Investigations in Number, Data, and Space* contains a feature entitled, “About Classroom Routines.” The Grade 1 series includes a section in the appendix entitled, “Exploring Data,” which includes ideas for class surveys, which involve students collecting, organizing, and displaying data. Another section, Understanding Time and Changes, includes ideas for collecting and displaying weather data.

**References:**

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

### 16. Size comparison

**References:**

Building Number Sense  
Investigation 3: Sessions 3-4  
Quilt Squares and Block Towns  
Investigation 3: Sessions 6-7  
Bigger, Taller, Heavier, Smaller  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 1-5

### 17. Capacity

**References:**

Building Number Sense  
Investigation 3: Sessions 3-4  
Bigger, Taller, Heavier, Smaller  
Investigation 2: Sessions 1-7

### 18. Pennies and nickels

**References:**

Number Games and Story Problems  
Investigation 2: Sessions 3-8

### 19. Measurement – capacity

**References:**

Building Number Sense  
Investigation 3: Sessions 3-4  
Bigger, Taller, Heavier, Smaller  
Investigation 2: Sessions 1-7

## November

### 20. Temperature – Fahrenheit

There are no specific references to measuring temperatures in degrees Fahrenheit in the first grade series. In About Classroom Routines: Understanding Time and Changes, students collect and display weather data.

### 21. Temperature – Celsius

There are no specific references to measuring temperatures in degrees Celsius in the first grade series. In About Classroom Routines: Understanding Time and Changes, students collect and display weather data.

### 22. Use drawings to represent objects

Grade 1 students using *Investigations in Number, Data, and Space* use drawing to represent objects throughout the course.

**Sample References:**

Mathematical Thinking in Grade 1  
Investigation 1: Sessions 1-4  
Building Number Sense  
Investigation 2: Session 2  
Survey Questions and Secret Rules  
Investigation 1: Session 6  
Quilt Squares and Block Towns  
Investigation 3: Sessions 1-2

Number Games and Story Problems

Investigation 3: Session 13

Bigger, Taller, Heavier, Smaller

Investigation 3: Sessions 4-5

### 23. Develop mathematical language through questions

Grade 1 students using *Investigations in Number, Data, and Space* develop mathematical language through questions throughout the course; in fact, this is a fundamental emphasis of the series, as students participate in a myriad of cooperative learning activities. The Dialogue Box is a feature that appears with many investigations and contains the text of discussions between teachers and students in which the teacher encourages students to use the language of mathematics to express mathematical ideas precisely.

#### Sample References:

Mathematical Thinking at Grade 1

Investigation 2: Session 1

Building Number Sense

Investigation 4: Sessions 7-9

Survey Questions and Secret Rules

Investigation 2: Sessions 5-6

Quilt Squares and Block Towns

Investigation 1: Sessions 11-12

Number Games and Story Problems

Investigation 3: Session 9

Bigger, Taller, Heavier, Smaller

Investigation 3: Session 3

### 24. Use tables to develop questioning skills

#### References:

In addition to the following references, the end of each unit of *Investigations in Number, Data, and Space* contains a feature entitled, "About Classroom Routines." The Grade 1 series includes a section in the appendix entitled, "Exploring Data," which includes ideas for class surveys, which involve students collecting, organizing, and displaying data. Another section, Understanding Time and Changes, includes ideas for collecting and displaying weather data.

#### References:

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

**25. Identify the plus (+) symbol and the equal (=) symbol**

**References:**

Mathematical Thinking in Grade 1  
Investigation 2: Sessions 4-6  
Building Number Sense  
Investigation 2: Sessions 1-2, 6-8  
Investigation 3: Sessions 3-4: Choice 4: Exploring Calculators  
Investigation 4: Sessions 1, 6-10  
Number Games and Story Problems  
Investigation 1: Sessions 1-10  
Investigation 2: Sessions 1-8, 10-13  
Investigation 3: Sessions 1-13

**December**

**26. Numeral six (6) through nine (9)**

**References:**

Mathematical Thinking in Grade 1  
Investigation 2: Sessions 1-6  
Investigation 5: Sessions 1-4  
Building Number Sense  
Investigation 1: Sessions 1-6, 9  
Investigation 2: Sessions 1-9  
Investigation 3: Sessions 1-7, 9  
Investigation 4: Sessions 1-10  
Number Games and Story Problems  
Investigation 2: Sessions 1-13  
Investigation 3: Sessions 1-13

**27. Order numerals one (1) through nine (9)**

**References:**

Mathematical Thinking at Grade 1  
Investigation 2: Sessions 2-3  
Building Number Sense  
Investigation 3: Sessions 1-2, 5-7, 9

**28. Number sentences with the plus (+) symbol and the equal (=) symbol**

**References:**

Mathematical Thinking in Grade 1  
Investigation 2: Sessions 4-6  
Building Number Sense  
Investigation 2: Sessions 1-2, 6-8  
Investigation 3: Sessions 3-4: Choice 4: Exploring Calculators  
Investigation 4: Sessions 1, 6-10  
Number Games and Story Problems  
Investigation 1: Sessions 1-10  
Investigation 2: Sessions 1-8, 10-13  
Investigation 3: Sessions 1-13

**29. Commutative property with sums through five**

**References:**

Mathematical Thinking at Grade 1  
Investigation 2: Session 4: Teacher Note, page 50  
Building Number Sense  
Investigation 2: Sessions 1-2, 4-9  
Number Games and Story Problems  
Investigation 1  
Sessions 4-5, page 21

**30. Concept of subtraction**

**References:**

Mathematical Thinking in Grade 1  
Investigation 2: Sessions 2-3  
Building Number Sense  
Investigation 2: Sessions 4-5  
Investigation 4: Session 2  
Number Games and Story Problems  
Investigation 3: Sessions 2-8, 10-13

**31. The minus (-) symbol**

**References:**

Building Number Sense  
Investigation 3: Sessions 3-4: Choice 4: Exploring Calculators  
Investigation 4: Session 2  
Number Games and Story Problems  
Investigation 3: Sessions 2-8, 10-13

### 32. Subtraction facts through five

**References:**

Building Number Sense  
Investigation 4: Session 2  
Number Games and Story Problems  
Investigation 3: Sessions 2-8, 10-13

### 33. Number families through five

**References:**

Mathematical Thinking in Grade 1  
Investigation 2: Sessions 1, 4-6  
Investigation 4: Session 4  
Building Number Sense  
Investigation 2: Sessions 1-2  
Investigation 4: Session 2  
Number Games and Story Problems  
Investigation 1: Sessions 1-10

## January

### 34. Time to the hour

Classroom Routines described in an appendix at the end of each of the texts in the *Investigations in Number, Data, and Space* series include Understanding Time and Changes, which consists of activities in which students sequence events, explore units of time and relationships among them, and use a calendar to solve problems. The only other references to time in the Grade 1 texts of the *Investigations in Number, Data, and Space* series are to dates and months on a calendar. Students become familiar with calendar features; observe the cyclical nature of the sequence of months; and group, describe, organize, and order data about birthdays. Students investigate clock time beginning in Grade 2.

**Calendar References:**

Survey Questions and Secret Rules  
Investigation 3: Sessions 1-3

### 35. Solve story problems

**References:**

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

Number Games and Story Problems  
Investigation 1: Sessions 1-3, 6, 10  
Investigation 2: Sessions 2, 10-13  
Investigation 3: Sessions 1-13

### 36. Story problems/number sentences

#### References:

Mathematical Thinking at Grade 1  
Investigation 2: Sessions 4-6  
Investigation 4: Sessions 4-6  
Building Number Sense  
Investigation 2: Sessions 1-2, 6-9  
Investigation 4: Sessions 1-5, 7-10  
Number Games and Story Problems  
Investigation 1: Sessions 1-3, 6, 10  
Investigation 2: Sessions 2, 10-13  
Investigation 3: Sessions 1-13

### 37. Line symmetry

Students using *Investigations in Number, Data, and Space* are not formally introduced to the concept of symmetry until Grade 2. Grade 1 students explore preliminary skills, including the manipulation of shapes through physical manipulation, drawing, and computer technology, as they construct murals and create designs and drawings using basic shapes. They are exposed to symmetry as they examine and manipulate geometric shapes and solids.

#### References:

Quilt Squares and Block Towns  
Investigation 1: Sessions 1-15  
Investigation 2: Sessions 1-10  
Investigation 3: Sessions 1-7  
Appendix: *Shapes* Tutorial

### 38. Ordinal numbers first through fifth

#### References:

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

### 39. Standard measurement – customary

Grade 1 students using *Investigations in Number, Data, and Space* use nonstandard units of measurement to measure length, weight, and capacity.

#### References:

Building Number Sense  
Investigation 3: Sessions 3-7

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

#### 40. Standard measurement – metric

Grade 1 students using *Investigations in Number, Data, and Space* use nonstandard units of measurement to measure length, weight, and capacity.

##### References:

Building Number Sense  
Investigation 3: Sessions 3-7  
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

#### 41. Number sentences

##### References:

Mathematical Thinking at Grade 1  
Investigation 2: Sessions 4-6  
Investigation 4: Sessions 4-6  
Building Number Sense  
Investigation 2: Sessions 1-2, 6-9  
Investigation 4: Sessions 1-5, 7-10  
Number Games and Story Problems  
Investigation 1: Sessions 1-3, 6, 10  
Investigation 2: Sessions 2, 10-13  
Investigation 3: Sessions 1-13

#### 42. Time to the half-hour

Classroom Routines described in an appendix at the end of each of the texts in the *Investigations in Number, Data, and Space* series include Understanding Time and Changes, which consists of activities in which students sequence events, explore units of time and relationships among them, and use a calendar to solve problems. The only other references to time in the Grade 1 texts of the *Investigations in Number, Data, and Space* series are to dates and months on a calendar. Students become familiar with calendar features; observe the cyclical nature of the sequence of months; and group, describe, organize, and order data about birthdays. Students investigate clock time beginning in Grade 2.

##### Calendar References:

Survey Questions and Secret Rules  
Investigation 3: Sessions 1-3

## February

### 43. Halves

Grade 1 students using *Investigations in Number, Data, and Space* are introduced to the concept of fractions as parts of measurement units. They also divide a whole and a set into equal parts.

**References:**

Building Number Sense

Investigation 1: Session 2

Bigger, Taller, Heavier, Smaller

Investigation 2: Sessions 2-4

Investigation 3: Session 2

### 44. The numeral zero (0)

**References:**

Mathematical Thinking in Grade 1

Investigation 4: Session 4, page 95

Building Number Sense

Investigation 1: Sessions 5-6, page 19

Investigation 2

Session 1, page 47

Session 2, page 50

Sessions 4-5: Dialogue Box, page 67

Number Games and Story Problems

Investigation 1: Session 10, page 41

Investigation 3: Sessions 3-5, page 118

### 45. Bar Graphs

In addition to the following references, the end of each unit of *Investigations in Number, Data, and Space* contains a feature entitled, "About Classroom Routines." The Grade 1 series includes a section in the appendix entitled, "Exploring Data," which includes ideas for class surveys, which involve students collecting, organizing, and displaying data. Another section, Understanding Time and Changes, includes ideas for collecting and displaying weather data.

**References:**

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

#### **46. Problem solving: patterns**

**References:**

Mathematical Thinking at Grade 1  
Investigation 3: Sessions 1-6  
Investigation 4: Sessions 2-3, 5  
Building Number Sense  
Investigation 3: Sessions 1-8  
Investigation 4: Session 10: Activity, page 163  
Survey Questions and Secret Rules  
Investigation 3: Sessions 2-3  
Quilt Squares and Block Towns  
Investigation 1: Sessions 13-15  
Number Games and Story Problems  
Investigation 2: Sessions 2, 6-9

#### **47. The numeral ten (10)**

**References:**

Building Number Sense  
Investigation 2: Sessions 2, 6-9  
Investigation 3: Sessions 1-2  
Number Games and Story Problems  
Investigation 1  
Session 1  
Sessions 4-6  
Sessions 7-9: Dialogue Box, page 39  
Session 10  
Investigation 2: Sessions 6-12  
Investigation 3: Sessions 6-8

#### **48. Dimes**

**References:**

Number Games and Story Problems  
Investigation 2: Sessions 3-8

#### **49. Commutative property with sums through ten**

**References:**

Mathematical Thinking at Grade 1  
Investigation 2: Session 4: Teacher Note, page 50  
Building Number Sense  
Investigation 2: Sessions 1-2, 4-9  
Number Games and Story Problems  
Investigation 1  
Sessions 4-5, page 21

### 50. Associative property for three addends

**References:**

Mathematical Thinking at Grade 1  
Investigation 4: Sessions 1-3  
Building Number Sense  
Investigation 4: Sessions 7-9  
Number Games and Story Problems  
Investigation 1  
Sessions 4-5, page 21  
Session 6, page 28  
Sessions 7-9: Dialogue Box, page 39  
Session 10  
Investigation 3: Sessions 1, 3-5, 9

### March

### 51. Subtraction facts through ten

**References:**

Mathematical Thinking in Grade 1  
Building Number Sense  
Investigation 4: Session 2  
Number Games and Story Problems  
Investigation 3: Sessions 2-8, 10-13

### 52. Number families through ten

**References:**

Building Number Sense  
Investigation 4: Session 2  
Number Games and Story Problems  
Investigation 3: Sessions 2-8, 10-13

### 53. Ordinal numbers through tenth

**References:**

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

### 54. Fourths

**References:**

Grade 1 students using *Investigations in Number, Data, and Space* are introduced to the concept of fractions as parts of measurement units. They also divide a whole and a set into equal parts.



**References:**

Building Number Sense  
Investigation 1: Session 2  
Bigger, Taller, Heavier, Smaller  
Investigation 2: Sessions 2-4  
Investigation 3: Session 2

**55. Use the equal symbol (=) to compare groups from 0 through 10 objects**

**References:**

Building Number Sense  
Investigation 2: Sessions 1-2  
Investigation 4: Sessions 1-2, 7-10  
Number Games and Story Problems  
Investigation 1: Sessions 1-10  
Investigation 2: Sessions 1-2, 10-12  
Investigation 3: Sessions 1-13  
Teacher Notes: Introducing Notation, p. 162

**56. Greater than (>) and less than (<) symbols**

Grade 1 students using *Investigations in Number, Data, and Space* use physical models, pictures, words, and phrases rather than inequality symbols to compare quantities.

**References:**

Mathematical Thinking at Grade 1  
Investigation 2: Sessions 1-3  
Building Number Sense  
Investigation 1: Session 2  
Investigation 2: Session 3  
Investigation 3: Sessions 1-7

**57. Quarters, half dollars, and dollars**

**References:**

Number Games and Story Problems  
Investigation 2: Sessions 3-8

**April**

**58. Thirds**

Grade 1 students using *Investigations in Number, Data, and Space* are introduced to the concept of fractions as parts of measurement units. They also divide a whole and a set into equal parts.

**References:**

Building Number Sense  
Investigation 1: Session 2  
Bigger, Taller, Heavier, Smaller  
Investigation 2: Sessions 2-4  
Investigation 3: Session 2

**59. Sums through eighteen**

**References:**

Mathematical Thinking in Grade 1  
Investigation 2: Sessions 1, 4-6  
Building Number Sense  
Investigation 2: Sessions 1-9  
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

**60. Count and group by tens through fifty**

In addition to the following references, each unit of Investigations in **Number, Data, and Space** for Grade 1 includes an appendix entitled, "About Classroom Routines." This appendix includes Counting activities to give students regular practice with counting in familiar classroom contexts, including counting by twos to determine if every student in attendance on a particular school day can paired up with another student in the class.

**References:**

Building Number Sense  
Investigation 1: Session 2: Teacher Note, pages 11-12  
Investigation 3: Session 9: Extension, page 113  
Number Games and Story Problems  
Investigation 2: Sessions 6-12

**61. Place value from 10 through 50**

**References:**

Building Number Sense  
Investigation 2: Session 2  
Investigation 3: Sessions 1-2, 9  
Number Games and Story Problems  
Investigation 2: Sessions 6-12

**62. Order numbers from 10 through 50**

**References:**

Mathematical Thinking at Grade 1  
Investigation 2: Sessions 2-3  
Building Number Sense  
Investigation 3: Sessions 1-2, 5-7, 9

**May**

**63. Place value from 51 through 99**

**References:**

Building Number Sense  
Investigation 2: Session 2  
Investigation 3: Sessions 1-2, 9  
Number Games and Story Problems  
Investigation 2: Sessions 6-12

**64. Order numerals from 51 through 99**

**References:**

Building Number Sense  
Investigation 3: Sessions 1-2

**65. Add two digit numbers**

**References:**

Mathematical Thinking in Grade 1  
Investigation 5: Session 2

**66. Subtract a 1-digit number from 11 through 18**

**References:**

Building Number Sense  
Investigation 4: Session 2  
Number Games and Story Problems  
Investigation 3: Sessions 2-8, 10-13

**June**

**67. Subtract a 1-digit number from a 2-digit number without regrouping (exchange)**

**References:**

Building Number Sense  
Investigation 4: Session 2  
Number Games and Story Problems  
Investigation 3: Sessions 2-8, 10-13

**68. Probability – chance events**

Students using the *Investigations in Number, Data, and Space* series are introduced to the concepts of probability in Grade 3. Grade 1 students hypothesize about attendance data on “a most unusual day.”

**References:**

Survey Questions and Secret Rules  
Investigation 4: Sessions 4-5

**69. Subtraction of ten (s)**

**References:**

Number Games and Story Problems  
Investigation 3: Sessions 10-13

**70. Subtract a 2-digit number from a 2-digit number without regrouping (exchange)**

**References:**

Number Games and Story Problems  
Investigation 3: Sessions 10-13

**71. Count by twos through 98**

In addition to the following references, each unit of Investigations in *Number, Data, and Space* for Grade 1 includes an appendix entitled, “About Classroom Routines.” This appendix includes Counting activities to give students regular practice with counting in familiar classroom contexts, including counting by twos to determine if every student in attendance on a particular school day can paired up with another student in the class.

**References:**

Building Number Sense  
Investigation 1: Session 2: Teacher Note, pages 11-12  
Investigation 3: Session 9  
Number Games and Story Problems  
Investigation 2: Sessions 1-12

**72. Even and odd numbers through 99**

Although Grade 1 students using *Investigations in Number, Data, and Space* do not use the specific terms “even” and “odd,” they gain experience with even numbers as they count by twos.

**References:**

Building Number Sense  
Investigation 1: Session 2: Teacher Note, pages 11-12  
Investigation 3: Session 9  
Number Games and Story Problems  
Investigation 2: Sessions 1-12

**Investigations in Number, Data, & Space  
to the  
New York City School District 30  
Mathematics Scope and Sequence**

**Grade Two**

**Scope and Sequence**

**September**

**1. Calendar – months and years, weather, temperature**

The Appendix: About Classroom Routines, which appears in every text in the *Investigations in Number, Data, and Space* series, includes a feature entitled, Time and Time Again. This section describes time-related activities which students can do on a daily basis, including discussion of the daily schedule at school each day, identification of relevant clock times and durations, the setting of a timer to go off at specified intervals, the development of a schedule of important times at home, comparison of important times in different students' days, descriptions of types of clocks students have in their homes, and the creation of a timeline of a student's life, called a Life Line. Time-related topics covered in the investigations in the series include sequencing events in time, comparing durations of time within a day, representing events in time, and interpreting traditional representations of time.

**References:**

Timelines and Rhythm Patterns

Investigation 1: Sessions 1-6

Investigation 2: Sessions 4-5

**2. Recognize and name whole numbers 0 through 100 by ones**

In addition to the following references, Start-Up exercises appear in virtually every session of the second grade series of *Investigations in Number, Data, and Space*. Generally they consist of activities involving Today's Number and the Number of School Days. Classroom teachers may choose the calendar date, or any other number, for the day's number. Students are asked to write numerical expressions representing that number as well as the number of school days that have passed in the current school year. A variety of detailed suggestions for these activities appears in the Appendix: About Classroom Routines, which appears in every book in the series.

**References:**

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Sessions 1-3, 6, 8

Investigation 3: Sessions 3-4, 6

- Investigation 4: Sessions 1-5
- Investigation 5: Sessions 1-5
- Coins, Coupons, and Combinations
- Investigation 1: Sessions 1-11
- Investigation 2: Sessions 3-6
- Investigation 3: Sessions 1-5
- Investigation 4: Sessions 1-4
- Putting Together and Taking Apart
- Investigation 1: Sessions 1-6
- Investigation 2: Sessions 1-7
- Investigation 3: Sessions 1-5
- Investigation 4: Sessions 1-4
- Investigation 5: Sessions 1-8

**3. Recognize and name whole numbers 10 through 100 by tens**

**References:**

- Coins, Coupons, and Combinations
- Investigation 2: Sessions 1-3, 10
- Putting Together and Taking Apart
- Investigation 2: Sessions 1-2

**4. Count hundreds through ten hundred**

Grade 2 students using *Investigations in Number, Data, and Space* use the Hundred Number Wall Chart and 200 Chart to investigate patterns and explore other concepts of counting and grouping.

**References:**

- Coins, Coupons, and Combinations
- Investigation 2: Sessions 1-3, 10
- Investigation 4: Sessions 1-4
- Putting Together and Taking Apart
- Investigation 2: Sessions 1-2

**5. Read and write standard numerals – 100 through 1,000**

Grade 2 students using *Investigations in Number, Data, and Space* read and write standard numerals through 200.

**References:**

- Mathematical Thinking at Grade 2
- Investigation 1: Session 1
- Investigation 2: Sessions 1-6, 8
- Investigation 4: Sessions 1, 5
- Investigation 5: Sessions 1-3
- Coins, Coupons, and Combinations
- Investigation 1: Sessions 1-11

Investigation 2: Session 10  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 2-4  
Putting Together and Taking Apart  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-8  
Timelines and Rhythm Patterns  
Investigation 1: Sessions 1-5

## October

### 6. Count by tens and fives to 1,000

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

### 7. Relation symbols =, <, >

#### References:

Mathematical Thinking at Grade 2  
Investigation 5: Session 3  
Coins, Coupons, and Combinations  
Investigation 3: Sessions 1-5  
Putting Together and Taking Apart  
Investigation 1: Sessions 5-6  
Investigation 3: Sessions 3-5: Teacher Note, p. 85  
Investigation 5: Session 7

### 8. Locate information

Students in Grade 2 using *Investigations in Number, Data, and Space* apply and adapt a variety of appropriate strategies to locate information and solve problems throughout the course; in fact, this is a fundamental emphasis of the series. For example, students collect, sort, and classify information about a group of people for purposes of counting, comparing, organizing, and displaying the data.

**Sample References:**

Mathematical Thinking at Grade 2  
Investigation 3: Session 6  
Coins, Coupons, and Combinations  
Investigation 1: Sessions 8-9  
Does It Walk, Crawl, or Swim?  
Investigation 1: Sessions 1-2  
Shapes, Halves, and Symmetry  
Investigation 4: Sessions 5-6  
Putting Together and Taking Apart  
Investigation 3: Session 1  
How Long? How Far?  
Investigation 1: Session 8  
How Many Pockets? How Many Teeth?  
Investigation 1: Sessions 2-3  
Timelines and Rhythm Patterns  
Investigation 2: Sessions 2-3

**9. Data collection: pictographs and Venn diagrams**

In addition to the following references, the end of each unit of *Investigations in Number, Data, and Space* contains a feature entitled, About Classroom Routines. The Grade 2 series includes a section entitled, How Many Pockets?, which describes a long-term activity in which students collect, organize, and represent data on how many pockets everyone in class is wearing on a particular day. Students may use a Hundred Number Wall Chart and a Pocket Data Chart to interpret and record their data.

**References:**

Mathematical Thinking at Grade 2  
Investigation 2: Session 6  
Investigation 5: Sessions 1-6  
Coins, Coupons, and Combinations  
Investigation 1: Session 11  
Investigation 2: Sessions 2, 4-5, 10  
Does It Walk, Crawl, or Swim?  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 1-4  
Investigation 3: Sessions 1-3  
Investigation 4: Sessions 1-3  
How Many Pockets? How Many Teeth?  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Timelines and Rhythm Patterns  
Investigation 1: Sessions 1-6



**10. Addition and subtraction facts**

**References:**

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Sessions 1-6, 8

Investigation 4: Sessions 1, 5

Investigation 5: Sessions 1-3

Coins, Coupons, and Combinations

Investigation 1: Sessions 1-11

Investigation 2: Session 10

Investigation 3: Sessions 1-5

Investigation 4: Sessions 2-4

Putting Together and Taking Apart

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4

Investigation 5: Sessions 1-8

**11. Quarters, half-dollars, pennies, nickels, dimes**

**References:**

Mathematical Thinking at Grade 2

Investigation 4, Session 2

Coins, Coupons, and Combinations

Investigation 2, Sessions 6-9

Putting Together and Taking Apart

Investigation 2, Sessions 5-6

Investigation 4, Sessions 3-4

**12. Even and odd numbers**

Although Grade 2 students using Investigations in Number, Data, and Space do not use the specific terms “even” and “odd,” they 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

**13. Round numbers through 99 to the nearest ten**

The following references are to solving addition and subtraction problems using a variety of methods and then estimating the solution, to an activity in which students accumulate sums as close as possible to 20, and to students estimating the total number of pockets worn by the children in the classroom on a particular day.

**References:**

Coins, Coupons, and Combinations

Investigation 1: Session 7

Investigation 1: Sessions 8-9: Choice 1: Close to 20, p. 41

Investigation 2: Session 10

**November**

**14. Patterns: recognize, describe and extend numeric and geometric patterns**

**References:**

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-3, 10

Investigation 4: Sessions 1-4

Putting Together and Taking Apart

Investigation 2: Sessions 1-2

Timelines and Rhythm Patterns

Investigation 2: Sessions 1-5

**15. Open sentences**

Primary grade students using *Investigations in Number, Data, and Space* use pictures and manipulatives to represent known and unknown quantities in numerical problems as they investigate the operations of addition and subtraction of whole numbers and solve combining and separating problems. Additionally, Grade 2 students solve Problems with a Missing Part.

**References:**

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Sessions 1-3, 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

**16. Place value through 999, the meaning of zero**

**References:**

Coins, Coupons, and Combinations  
Investigation 4: Sessions 1-4  
Putting Together and Taking Apart  
Investigation 2: Sessions 1-7  
Investigation 4: Sessions 2-4  
Investigation 5: Sessions 2-3, 6

**17. Money – dollars through ten dollars**

**References:**

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

**18. Ordinal numbers: eleventh through thirty-first**

While Grade 2 students using *Investigations in Number, Data, and Space* 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

**19. Explore properties of a circle, square, rectangle, and triangle**

**References:**

Mathematical Thinking at Grade 2  
Investigation 3: Sessions 1-6  
Shapes, Halves, and Symmetry  
Investigation 1: Sessions 1-8  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-8  
Investigation 4: Sessions 1-7

**20. Addition of 2- and 3-digit numbers without regrouping (exchange)**

There are no specific references to the addition of 2- and 3-digit numbers without regrouping in the Grade 2 course of *Investigations in Number, Data, and Space*. Students do not receive explicit instruction in this topic; rather, they are encouraged to explore and investigate strategies for adding whole numbers with and without regrouping. The following references are to adding 1- and 2-digit whole numbers, with and without regrouping, using a variety of strategies and techniques.

**References:**

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Sessions 1-6, 8

Investigation 4: Sessions 1, 5

Investigation 5: Sessions 1-3

Coins, Coupons, and Combinations

Investigation 1: Sessions 1-11

Investigation 2: Session 10

Investigation 3: Sessions 1-5

Investigation 4: Sessions 2-4

Putting Together and Taking Apart

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4

Investigation 5: Sessions 1-8

**December**

**21. Subtraction of 2-digit number from a 3-digit number without regrouping (exchange)**

Grade 2 students using *Investigations in Number, Data, and Space* do not receive explicit instruction in the subtraction of a 2-digit number from a 3-digit number; rather, they are encouraged to explore and investigate strategies for subtracting whole numbers with and without regrouping. The following reference is 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.

**Reference:**

Mathematical Thinking at Grade 2

Investigation 2: Session 1

**22. Addition of 3-digit numbers without regrouping (exchange)**

There are no specific references to the addition of 3-digit numbers without regrouping in the Grade 2 course of *Investigations in Number, Data, and Space*. Students do not receive explicit instruction in this topic; rather, they are encouraged to explore and investigate strategies for adding whole numbers with and without regrouping. The following references are to adding 1- and 2-digit whole numbers, with and without regrouping, using a variety of strategies and techniques.

**References:**

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Sessions 1-6, 8

Investigation 4: Sessions 1, 5

Investigation 5: Sessions 1-3

Coins, Coupons, and Combinations

Investigation 1: Sessions 1-11

Investigation 2: Session 10

Investigation 3: Sessions 1-5

Investigation 4: Sessions 2-4

Putting Together and Taking Apart

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4

Investigation 5: Sessions 1-8

**23. Subtraction of a 3-digit number from a 3-digit number without regrouping (exchange)**

Grade 2 students using *Investigations in Number, Data, and Space* do not receive explicit instruction in the subtraction of a 2-digit number from a 3-digit number; rather, they are encouraged to explore and investigate strategies for subtracting whole numbers with and without regrouping. The following reference is 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.

**Reference:**

Mathematical Thinking at Grade 2

Investigation 2: Session 1

## 24. Guess and check

### References:

Coins, Coupons, and Combinations

Investigation 1: Session 7, page 35

Investigation 1: Sessions 8-9: Choice 1: Close to 20, page 41

Investigation 2: Session 10

Shapes, Halves, and Symmetry

Investigation 1: Sessions 2-6

Investigation 2: Sessions 4-5

How Long? How Far?

Investigation 1: Sessions 1-7

Investigation 2: Session 2

## 25. Use data

In addition to the following references, the end of each unit of *Investigations in Number, Data, and Space* contains a feature entitled, About Classroom Routines. The Grade 2 series includes a section entitled, How Many Pockets?, which describes a long-term activity in which students collect, organize, and represent data on how many pockets everyone in class is wearing on a particular day. Students may use a Hundred Number Wall Chart and a Pocket Data Chart to interpret and record their data.

### References:

Mathematical Thinking at Grade 2

Investigation 2: Session 6

Investigation 5: Sessions 1-6

Coins, Coupons, and Combinations

Investigation 1: Session 11

Investigation 2: Sessions 2, 4-5, 10

Does It Walk, Crawl, or Swim?

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-4

Investigation 3: Sessions 1-3

Investigation 4: Sessions 1-3

How Many Pockets? How Many Teeth?

Investigation 1: Sessions 1-5

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5

Timelines and Rhythm Patterns

Investigation 1: Sessions 1-6

**26. Bar graphs**

In addition to the following references, Grade 2 students using *Investigations in Number, Data, and Space* construct and interpret concrete graphs, pictographs, and graphs on a coordinate plane.

**References:**

Does It Walk, Crawl, or Swim?

Investigation 4: Sessions 2-3, page 83

How Many Pockets? How Many Teeth?

Investigation 1: Sessions 2-3, page 19

Investigation 2: Sessions 3-6

Investigation 3: Session 5

**27. Temperature – Celsius and Fahrenheit thermometers**

There are no specific references to reading thermometers in either Fahrenheit or Celsius scales in the second grade series.

**January**

**28. Symmetry and congruence**

**References:**

Shapes, Halves, and Symmetry

Investigation 3: Sessions 3-5

Investigation 4: Sessions 1-7

**29. Linear Measurement – inch and foot**

Grade 2 students using *Investigations in Number, Data, and Space* 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

**29A. Understanding the need for standard units of measure**

**References:**

How Long? How Far?

Investigation 1: Sessions 2-8

Investigation 2: Sessions 2-8

**30. Addition of 2- and 3-digit numbers using expanded notation without regrouping (exchange)**

**Reference:**

Putting Together and Taking Apart

Investigation 1: Session 1: Teacher Note, pages 15-16

**31. Subtraction of 2- and 3-digit numbers using expanded notation without regrouping (exchange)**

Grade 2 students using *Investigations in Number, Data, and Space* do not receive explicit instruction in the subtraction of a 2-digit number from a 3-digit number using expanded notation; rather, they are encouraged to explore and investigate strategies for subtracting whole numbers with and without regrouping. The following reference is to a Teacher Note, “How Students Learn to Add and Subtract.” The text describes how students can feel a sense of ownership by developing their own strategies for adding and subtracting whole numbers, with and without regrouping, rather than being taught rote algorithms for “carrying” and “borrowing.” Students will then apply their own strategies to larger terms by chunking numbers into groups, i.e., using expanded notation, so that they are easier to work with.

**Reference:**

Putting Together and Taking Apart

Investigation 1: Session 1: Teacher Note, pages 15-16

**32. Addition of 2-digit number and a 1-digit number with regrouping (exchange) ones to tens**

**Reference:**

Putting Together and Taking Apart

Investigation 1: Session 1: Dialogue Box, pages 18-19

**33. Subtraction of a 1-digit number from a 2-digit number with regrouping (exchange)**

**References:**

Mathematical Thinking at Grade 2

Investigation 2: Sessions 1, 6

Putting Together and Taking Apart

Investigation 1: Sessions 1-6

Investigation 2: Sessions 3-4

**34. Money – make change through the value of a dollar**

**References:**

Mathematical Thinking at Grade 2

Investigation 4, Session 2

Coins, Coupons, and Combinations

Investigation 2, Sessions 6-9

Putting Together and Taking Apart

Investigation 2, Sessions 5-6

Investigation 4, Sessions 3-4



February

**35. Fractions – halves, fourths, and thirds of single objects and a group of objects**

**References:**

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

**36. Multiplication facts for twos through 10**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2  
Investigation 4: Session 1: Teacher Note, page 82  
Coins, Coupons, and Combinations  
Investigation 2: Sessions 1-10

**37. Introduction to division**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2  
Investigation 4: Session 1: Teacher Note, page 82  
Coins, Coupons, and Combinations  
Investigation 2: Sessions 1-10

**38. Division facts for twos through 10**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2  
Investigation 4: Session 1: Teacher Note, page 82  
Coins, Coupons, and Combinations  
Investigation 2: Sessions 1-10

**39. Linear measurement – meter, decimeter, and centimeter**

Grade 2 students using *Investigations in Number, Data, and Space* 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

**40. Addition of 2-digit numbers with regrouping (exchange) ones to tens**

**Reference:**

Putting Together and Taking Apart

Investigation 1: Session 1: Dialogue Box, pages 18-19

**March**

**41. Subtraction of 2-digit numbers with regrouping (exchange) tens to ones**

**References:**

Mathematical Thinking at Grade 2

Investigation 2: Sessions 1, 6

Putting Together and Taking Apart

Investigation 1: Sessions 1-6

Investigation 2: Sessions 3-4

**42. Fractions – fifths, sixths, and tenths of single objects and groups of objects**

**References:**

Shapes, Halves, and Symmetry

Investigation 3: Sessions 1-8

**43. Probability – predict and tally outcomes**

Students using the *Investigations in Number, Data, and Space* series 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

**44. Weight – ounce, pound**

Grade 2 students using *Investigations in Number, Data, and Space* do not specifically study weight. In the Grade 1 curriculum, students lift and balance familiar objects to develop a sense of weight, and use a balance to compare weights. In the Grade 3 curriculum, students learn to weigh objects with a pan balance.

**45. Multiplication facts for fives through 25**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

**46. Division facts for fives through 25**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

**April**

**47. Identify and write Roman numerals I – XII**

Grade 2 students using *Investigations in Number, Data, and Space* are not introduced to the system of Roman numerals. They use the Hundred Number Wall Chart to investigate the base-ten system of numeration.

**References:**

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-3, 10

Investigation 4: Sessions 1-4

Putting Together and Taking Apart

Investigation 2: Sessions 1-2

**48. Count forward and backward by patterns of three**

Grade 2 students using *Investigations in Number, Data, and Space* practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

Putting Together and Taking Apart

Investigation 2: Sessions 1-2

**49. Multiplication facts for threes through 15**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

**50. Division facts for threes through 15**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

**51. Weight – gram and kilogram**

Grade 2 students using *Investigations in Number, Data, and Space* do not specifically study weight. In the Grade 1 curriculum, students lift and balance familiar objects to develop a sense of weight, and use a balance to compare weights. In the Grade 3 curriculum, students learn to weigh objects with a pan balance.

**52. Count forward and backward by patterns of four**

Grade 2 students using *Investigations in Number, Data, and Space* practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

Putting Together and Taking Apart

Investigation 2: Sessions 1-2

**53. Multiplication facts for fours through 20**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

**54. Division facts for fours through 20**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

**55. Identify fractional parts of a group ( $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{1}{8}$ , and  $\frac{1}{10}$ )**

**References:**

Shapes, Halves, and Symmetry

Investigation 3: Sessions 1-8

**May**

**56. Linear measurement – half inch**

Grade 2 students using *Investigations in Number, Data, and Space* 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

**57. Dozen and half dozen**

There are no specific references in the Grade 2 texts to the concept of a dozen or a half-dozen. Related concepts that may be used in conjunction with this objective are located on the following pages where students group by 2's, 5's, and 10s:

**References:**

Coins, Coupons, and Combinations  
Investigation 2

**58. Time - Quarter hour, minutes, and seconds**

The Appendix: About Classroom Routines, which appears in every text in the Grade 2 series of *Investigations in Number, Data, and Space*, includes a feature entitled, Time and Time Again. This section describes time-related activities which students can do on a daily basis, including discussion of the daily schedule at school each day, identification of relevant clock times and durations, the setting of a timer to go off at specified intervals, the development of a schedule of important times at home, comparison of important times in different students' days, descriptions of types of clocks students have in their homes, and the creation of a timeline of a student's life, called a Life Line. Time-related topics covered in the investigations in the series include sequencing events in time, comparing durations of time within a day, representing events in time, and interpreting traditional representations of time.

**References:**

Timelines and Rhythm Patterns  
Investigation 1: Sessions 4-6

**59. Attributes of three-dimensional objects**

**References:**

Mathematical Thinking at Grade 2  
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

**60. Commutative and associative properties of addition through 999 (number families and open sentences)**

In addition to the following references, Grade 2 students using *Investigations in Number, Data, and Space* are frequently asked to develop strategies for combining more than two addends. They implicitly apply the commutative and associative properties of addition by regrouping and recombining conveniently compatible addends.

**References:**

Mathematical Thinking at Grade 2  
Investigation 2: Session 6: Dialogue Box, page 45  
Coins, Coupons, and Combinations  
Investigation 1: Session 1

**61. Properties of subtraction**

**References:**

Mathematical Thinking at Grade 2  
Investigation 5: Session 3, page 115  
Putting Together and Taking Apart  
Investigation 1: Session 1  
Teacher Notes, pages 13-14 and 15-16  
Dialogue Box, page 18  
Investigation 2: Sessions 3-4: Dialogue Box, page 65  
Investigation 3: Sessions 1-5  
Investigation 5: Sessions 7-8

**62. Cup, pint, quart**

Grade 2 students using *Investigations in Number, Data, and Space* 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 2, pages 19-21  
Sessions 6-8

**63. Patterns**

**References:**

Coins, Coupons, and Combinations  
Investigation 2: Sessions 1-3, 10  
Investigation 4: Sessions 1-4  
Putting Together and Taking Apart  
Investigation 2: Sessions 1-2  
Timelines and Rhythm Patterns  
Investigation 2: Sessions 1-5

June

**64. Addition of 2- and 3-digit numbers with regrouping (exchange) ones to tens**

Grade 2 students using *Investigations in Number, Data, and Space* do not receive explicit instruction in the addition of 2- and 3-digit numbers with regrouping; rather, they are encouraged to explore and investigate strategies for adding whole numbers with and without regrouping. The following reference is 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.

**Reference:**

Putting Together and Taking Apart

Investigation 1: Session 1: Dialogue Box, pages 18-19

**65. Commutative property of multiplication**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations. After they have gained some experience in counting by different numbers, students discover that they can count the same set in more than one way by Counting by Different Groups, thus providing them with Counting Choices.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 3-5

**66. Division and multiplication as inverse operations**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting (multiplying) and grouping (dividing) and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10



**67. Arrangements of 2 through 5 items**

**References:**

Mathematical Thinking at Grade 2  
Investigation 1: Session 1  
Coins, Coupons, and Combinations  
Investigation 1: Session 1  
Investigation 2: Sessions 3, 6  
Shapes, Halves, and Symmetry  
Investigation 1: Sessions 2-8  
Investigation 2: Sessions 3-6  
Investigation 3: Sessions 1-2, 6-8

**68. Ratio – 2:1 correspondence (include many to one)**

**Reference:**

Coins, Coupons, and Combinations  
Investigation 2: Session 1

**69. Missing information**

Primary grade students using *Investigations in Number, Data, and Space* use pictures and manipulatives to represent known and unknown quantities in numerical problems as they investigate the operations of addition and subtraction of whole numbers and solve combining and separating problems. Additionally, Grade 2 students solve Problems with a Missing Part.

**References:**

Mathematical Thinking at Grade 2  
Investigation 1: Session 1  
Investigation 2: Sessions 1-3, 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

**70. Deciliter**

Grade 2 students using *Investigations in Number, Data, and Space* 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 2, pages 19-21

Sessions 6-8

## District Mathematics Calendar

### September

#### 1. Time – months and years

The Appendix: About Classroom Routines, which appears in every text in the Grade 2 series of *Investigations in Number, Data, and Space*, includes a feature entitled, Time and Time Again. This section describes time-related activities which students can do on a daily basis, including discussion of the daily schedule at school each day, identification of relevant clock times and durations, the setting of a timer to go off at specified intervals, the development of a schedule of important times at home, comparison of important times in different students' days, descriptions of types of clocks students have in their homes, and the creation of a timeline of a student's life, called a Life Line. Time-related topics covered in the investigations in the series include sequencing events in time, comparing durations of time within a day, representing events in time, and interpreting traditional representations of time.

#### **References:**

Timelines and Rhythm Patterns  
Investigation 1: Sessions 4-6

#### 2. Recognize and name whole numbers 0 through 100 by ones

In addition to the following references, Start-Up exercises appear in virtually every session of the second grade series of *Investigations in Number, Data, and Space*. Generally they consist of activities involving Today's Number and the Number of School Days. Classroom teachers may choose the calendar date, or any other number, for the day's number. Students are asked to write numerical expressions representing that number as well as the number of school days which have passed in the current school year. A variety of detailed suggestions for these activities appears in the Appendix: About Classroom Routines, which appears in every book in the series.

#### **References:**

Mathematical Thinking at Grade 2  
Investigation 1: Session 1  
Investigation 2: Sessions 1-3, 6, 8  
Investigation 3: Sessions 3-4, 6  
Investigation 4: Sessions 1-5  
Investigation 5: Sessions 1-5  
Coins, Coupons, and Combinations  
Investigation 1: Sessions 1-11  
Investigation 2: Sessions 3-6  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4

Putting Together and Taking Apart  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-8

**3. Recognize and name whole numbers 10 through 100 by ones**

**References:**

Coins, Coupons, and Combinations  
Investigation 2: Sessions 1-3, 10  
Putting Together and Taking Apart  
Investigation 2: Sessions 1-2

**4. Count hundreds through ten hundred (1,000)**

Grade 2 students using *Investigations in Number, Data, and Space* use the Hundred Number Wall Chart and 200 Chart to investigate patterns and explore other concepts of counting and grouping.

**References:**

Coins, Coupons, and Combinations  
Investigation 2: Sessions 1-3, 10  
Investigation 4: Sessions 1-4  
Putting Together and Taking Apart  
Investigation 2: Sessions 1-2

**5. Read and write standard numerals – 100 through 1,000**

Grade 2 students using *Investigations in Number, Data, and Space* read and write standard numerals through 200.

**References:**

Mathematical Thinking at Grade 2  
Investigation 1: Session 1  
Investigation 2: Sessions 1-6, 8  
Investigation 4: Sessions 1, 5  
Investigation 5: Sessions 1-3  
Coins, Coupons, and Combinations  
Investigation 1: Sessions 1-11  
Investigation 2: Session 10  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 2-4  
Putting Together and Taking Apart  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-8

Timelines and Rhythm Patterns  
Investigation 1: Sessions 1-5

## October

### 6. Count by tens and fives to 1, 000

#### 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

### 7. Relation symbols $+$ , $<$ , $>$

#### References:

Mathematical Thinking at Grade 2  
Investigation 5: Session 3  
Coins, Coupons, and Combinations  
Investigation 3: Sessions 1-5  
Putting Together and Taking Apart  
Investigation 1: Sessions 5-6  
Investigation 3: Sessions 3-5: Teacher Note, p. 85  
Investigation 5: Session 7

### 8. Locate information

Students in Grade 2 using *Investigations in Number, Data, and Space* apply and adapt a variety of appropriate strategies to locate information and solve problems throughout the course; in fact, this is a fundamental emphasis of the series. For example, students collect, sort, and classify information about a group of people for purposes of counting, comparing, organizing, and displaying the data.

#### Sample References:

Mathematical Thinking at Grade 2  
Investigation 3: Session 6  
Coins, Coupons, and Combinations  
Investigation 1: Sessions 8-9  
Does It Walk, Crawl, or Swim?  
Investigation 1: Sessions 1-2  
Shapes, Halves, and Symmetry  
Investigation 4: Sessions 5-6  
Putting Together and Taking Apart  
Investigation 3: Session 1

How Long? How Far?

Investigation 1: Session 8

How Many Pockets? How Many Teeth?

Investigation 1: Sessions 2-3

Timelines and Rhythm Patterns

Investigation 2: Sessions 2-3

### 9. Data – collect, tabulate, arrange, and compare in tables

In addition to the following references, the end of each unit of *Investigations in Number, Data, and Space* contains a feature entitled, About Classroom Routines. The Grade 2 series includes a section entitled, How Many Pockets?, which describes a long-term activity in which students collect, organize, and represent data on how many pockets everyone in class is wearing on a particular day. Students may use a Hundred Number Wall Chart and a Pocket Data Chart to interpret and record their data.

#### References:

Mathematical Thinking at Grade 2

Investigation 2: Session 6

Investigation 5: Sessions 1-6

Coins, Coupons, and Combinations

Investigation 1: Session 11

Investigation 2: Sessions 2, 4-5, 10

Does It Walk, Crawl, or Swim?

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-4

Investigation 3: Sessions 1-3

Investigation 4: Sessions 1-3

How Many Pockets? How Many Teeth?

Investigation 1: Sessions 1-5

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5

Timelines and Rhythm Patterns

Investigation 1: Sessions 1-6

### 10. Addition and subtraction facts

#### References:

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Sessions 1-6, 8

Investigation 4: Sessions 1, 5

Investigation 5: Sessions 1-3

Coins, Coupons, and Combinations

Investigation 1: Sessions 1-11

Investigation 2: Session 10

Investigation 3: Sessions 1-5

Investigation 4: Sessions 2-4

Putting Together and Taking Apart  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-8

### 11. Quarters, half-dollars

#### References:

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

### 12. Even and odd numbers

Although Grade 2 students using Investigations in Number, Data, and Space do not use the specific terms “even” and “odd,” they 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

### 13. Round numbers through 99 to the nearest ten

The following references are to solving addition and subtraction problems using a variety of methods and then estimating the solution, to an activity in which students accumulate sums as close as possible to 20, and to students estimating the total number of pockets worn by the children in the classroom on a particular day.

#### References:

Coins, Coupons, and Combinations  
Investigation 1: Session 7  
Investigation 1: Sessions 8-9: Choice 1: Close to 20, p. 41  
Investigation 2: Session 10

November

**14. Points, lines, line segments, and rays around us**

Grade 2 students using *Investigations in Number, Data, and Space* recognize, describe, and illustrate points, lines, line segments, and rays as they identify sides and corners of triangles and rectangles and as they walk, visualize, and represent paths on a grid.

**References:**

Shapes, Halves, and Symmetry

Investigation 2: Sessions 1-6

How Long? How Far?

Investigation 2: Sessions 1-8

Ongoing Excursion: *Geo-Logo*: Shapes and Pictures, pages 79-81

**15. Open sentences**

Primary grade students using *Investigations in Number, Data, and Space* use pictures and manipulatives to represent known and unknown quantities in numerical problems as they investigate the operations of addition and subtraction of whole numbers and solve combining and separating problems. Additionally, Grade 2 students solve Problems with a Missing Part.

**References:**

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Sessions 1-3, 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

**16. Place value through 999**

**References:**

Coins, Coupons, and Combinations

Investigation 4: Sessions 1-4

Putting Together and Taking Apart

Investigation 2: Sessions 1-7

Investigation 4: Sessions 2-4

Investigation 5: Sessions 2-3, 6



**17. Money – dollars**

**References:**

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

**18. Ordinal numbers eleventh through thirty–first**

While Grade 2 students using *Investigations in Number, Data, and Space* 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

**19. Explore properties of a circle, square, rectangle, and triangle**

**References:**

Mathematical Thinking at Grade 2  
Investigation 3: Sessions 1-6  
Shapes, Halves, and Symmetry  
Investigation 1: Sessions 1-8  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-8  
Investigation 4: Sessions 1-7

**20. Addition of 2- and 3-digit numbers without regrouping (exchange)**

There are no specific references to the addition of 2- and 3-digit numbers without regrouping in the Grade 2 course of *Investigations in Number, Data, and Space*. Students do not receive explicit instruction in this topic; rather, they are encouraged to explore and investigate strategies for adding whole numbers with and without regrouping. The following references are to adding 1- and 2-digit whole numbers, with and without regrouping, using a variety of strategies and techniques.

**References:**

Mathematical Thinking at Grade 2  
Investigation 1: Session 1  
Investigation 2: Sessions 1-6, 8  
Investigation 4: Sessions 1, 5  
Investigation 5: Sessions 1-3  
Coins, Coupons, and Combinations  
Investigation 1: Sessions 1-11  
Investigation 2: Session 10  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 2-4  
Putting Together and Taking Apart  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-8

**December**

**21. Subtraction of 2-digit number from a 3-digit number without regrouping (exchange)**

Grade 2 students using *Investigations in Number, Data, and Space* do not receive explicit instruction in the subtraction of a 2-digit number from a 3-digit number; rather, they are encouraged to explore and investigate strategies for subtracting whole numbers with and without regrouping. The following reference is 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.

**Reference:**

Mathematical Thinking at Grade 2  
Investigation 2: Session 1

**22. Addition of 3-digit numbers without regrouping (exchange)**

There are no specific references to the addition of 3-digit numbers without regrouping in the Grade 2 course of *Investigations in Number, Data, and Space*. Students do not receive explicit instruction in this topic; rather, they are encouraged to explore and investigate strategies for adding whole numbers with and without regrouping. The following references are to adding 1- and 2-digit whole numbers, with and without regrouping, using a variety of strategies and techniques.

**References:**

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Sessions 1-6, 8

Investigation 4: Sessions 1, 5

Investigation 5: Sessions 1-3

Coins, Coupons, and Combinations

Investigation 1: Sessions 1-11

Investigation 2: Session 10

Investigation 3: Sessions 1-5

Investigation 4: Sessions 2-4

Putting Together and Taking Apart

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4

Investigation 5: Sessions 1-8

**23. Subtraction of a 3-digit numbers without regrouping (exchange)**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for subtracting numbers.

The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, including cubes, counters, and a 100 chart or a 300 chart; and to use landmark numbers for comparing.

**Reference:**

Combining and Comparing

Investigation 1

Session 1: Teacher Note, page 10

Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**24. Guess and check**

**References:**

Coins, Coupons, and Combinations

Investigation 1: Session 7, page 35

Investigation 1: Sessions 8-9: Choice 1: Close to 20, page 41

Investigation 2: Session 10

Shapes, Halves, and Symmetry

Investigation 1: Sessions 2-6

Investigation 2: Sessions 4-5

How Long? How Far?

Investigation 1: Sessions 1-7

Investigation 2: Session 2

## 25. Use data

In addition to the following references, the end of each unit of *Investigations in Number, Data, and Space* contains a feature entitled, About Classroom Routines. The Grade 2 series includes a section entitled, How Many Pockets?, which describes a long-term activity in which students collect, organize, and represent data on how many pockets everyone in class is wearing on a particular day. Students may use a Hundred Number Wall Chart and a Pocket Data Chart to interpret and record their data.

### References:

Mathematical Thinking at Grade 2

Investigation 2: Session 6

Investigation 5: Sessions 1-6

Coins, Coupons, and Combinations

Investigation 1: Session 11

Investigation 2: Sessions 2, 4-5, 10

Does It Walk, Crawl, or Swim?

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-4

Investigation 3: Sessions 1-3

Investigation 4: Sessions 1-3

How Many Pockets? How Many Teeth?

Investigation 1: Sessions 1-5

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5

Timelines and Rhythm Patterns

Investigation 1: Sessions 1-6

## 26. Bar graphs

In addition to the following references, Grade 2 students using *Investigations in Number, Data, and Space* construct and interpret concrete graphs, pictographs, and graphs on a coordinate plane.

### References:

Does It Walk, Crawl, or Swim?

Investigation 4: Sessions 2-3, page 83

How Many Pockets? How Many Teeth?

Investigation 1: Sessions 2-3, page 19

Investigation 2: Sessions 3-6

Investigation 3: Session 5

## 27. Temperature – Celsius and Fahrenheit thermometers

There are no specific references to reading thermometers in either Fahrenheit or Celsius scales in the second grade series.

January

**28. Symmetry**

**References:**

Shapes, Halves, and Symmetry  
Investigation 4: Sessions 1-7

**29. Linear Measurement – inch and foot**

Grade 2 students using *Investigations in Number, Data, and Space* 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

**30. Addition of 2- and 3-digit numbers using expanded notation without regrouping (exchange)**

**Reference:**

Putting Together and Taking Apart  
Investigation 1: Session 1: Teacher Note, pages 15-16

**31. Subtraction of 2- and 3-digit numbers using expanded notation without regrouping (exchange)**

Grade 2 students using *Investigations in Number, Data, and Space* do not receive explicit instruction in the subtraction of a 2-digit number from a 3-digit number using expanded notation; rather, they are encouraged to explore and investigate strategies for subtracting whole numbers with and without regrouping. The following reference is to a Teacher Note, “How Students Learn to Add and Subtract.” The text describes how students can feel a sense of ownership by developing their own strategies for adding and subtracting whole numbers, with and without regrouping, rather than being taught rote algorithms for “carrying” and “borrowing.” Students will then apply their own strategies to larger terms by chunking numbers into groups, i.e., using expanded notation, so that they are easier to work with.

**Reference:**

Putting Together and Taking Apart  
Investigation 1: Session 1: Teacher Note, pages 15-16

**32. Addition of 2-digit number and a 1-digit number with regrouping (exchange) ones to tens**

**Reference:**

Putting Together and Taking Apart  
Investigation 1: Session 1: Dialogue Box, pages 18-19

**33. Subtraction of a 1-digit number from a 2-digit number with regrouping (exchange)**

**References:**

Mathematical Thinking at Grade 2  
Investigation 2: Sessions 1, 6  
Putting Together and Taking Apart  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 3-4

**34. Money – make change through the value of a dollar**

**References:**

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

**February**

**35. Fractions – halves, fourths, and thirds**

**References:**

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

**36. Multiplication facts for twos through 10**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2  
Investigation 4: Session 1: Teacher Note, page 82  
Coins, Coupons, and Combinations  
Investigation 2: Sessions 1-10

**37. Introduction to division**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

**38. Division facts for twos through 10**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

**39. Linear measurement – meter, decimeter, and centimeter**

Grade 2 students using *Investigations in Number, Data, and Space* 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

**40. Addition of 2-digit numbers with regrouping (exchange) ones to tens**

**Reference:**

Putting Together and Taking Apart

Investigation 1: Session 1: Dialogue Box, pages 18-19

**March**

**41. Subtraction of 2-digit numbers with regrouping (exchange)**

**References:**

Mathematical Thinking at Grade 2

Investigation 2: Sessions 1, 6

Putting Together and Taking Apart

Investigation 1: Sessions 1-6

Investigation 2: Sessions 3-4

**42. Fractions – fifths, sixths, and tenths**

**References:**

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

**43. Probability – predict and tally outcomes**

Students using the *Investigations in Number, Data, and Space* series 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

**44. Weight – ounce, pound**

Grade 2 students using *Investigations in Number, Data, and Space* do not specifically study weight. In the Grade 1 curriculum, students lift and balance familiar objects to develop a sense of weight, and use a balance to compare weights. In the Grade 3 curriculum, students learn to weigh objects with a pan balance.

**45. Multiplication facts for fives through 25**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2’s, 5’s, and 10’s. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2  
Investigation 4: Session 1: Teacher Note, page 82  
Coins, Coupons, and Combinations  
Investigation 2: Sessions 1-10

**46. Division facts for fives through 25**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2’s, 5’s, and 10’s. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2  
Investigation 4: Session 1: Teacher Note, page 82  
Coins, Coupons, and Combinations  
Investigation 2: Sessions 1-10



April

**47. Identify and write Roman numerals I-XII**

Grade 2 students using *Investigations in Number, Data, and Space* are not introduced to the system of Roman numerals. They use the Hundred Number Wall Chart to investigate the base-ten system of numeration.

**References:**

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-3, 10

Investigation 4: Sessions 1-4

Putting Together and Taking Apart

Investigation 2: Sessions 1-2

**48. Count forward and backward by patterns of three**

Grade 2 students using *Investigations in Number, Data, and Space* practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

Putting Together and Taking Apart

Investigation 2: Sessions 1-2

**49. Multiplication facts for threes through 15**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

**50. Division facts for threes through 15**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

**51. Weight – gram and kilogram**

Grade 2 students using *Investigations in Number, Data, and Space* do not specifically study weight. In the Grade 1 curriculum, students lift and balance familiar objects to develop a sense of weight, and use a balance to compare weights. In the Grade 3 curriculum, students learn to weigh objects with a pan balance.

**52. Count forward and backward by patterns of four**

Grade 2 students using *Investigations in Number, Data, and Space* practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

Putting Together and Taking Apart

Investigation 2: Sessions 1-2

**53. Multiplication facts for fours through 20**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

**54. Division facts for fours through 20**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

**55. Identify fractional parts of a group ( $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ )**

**References:**

Shapes, Halves, and Symmetry

Investigation 3: Sessions 1-8

May

**56. Linear measurement – half inch**

Grade 2 students using *Investigations in Number, Data, and Space* 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

**57. Dozen and half dozen**

There are no specific references in the Grade 2 texts to the concept of a dozen or a half-dozen. Related concepts that may be used in conjunction with this objective are located on the following pages where students group by 2's, 5's, and 10s:

**References:**

Coins, Coupons, and Combinations

Investigation 2

**58. Time – quarter hour, minutes, and seconds**

The Appendix: About Classroom Routines, which appears in every text in the Grade 2 series of *Investigations in Number, Data, and Space*, includes a feature entitled, Time and Time Again. This section describes time-related activities which students can do on a daily basis, including discussion of the daily schedule at school each day, identification of relevant clock times and durations, the setting of a timer to go off at specified intervals, the development of a schedule of important times at home, comparison of important times in different students' days, descriptions of types of clocks students have in their homes, and the creation of a timeline of a student's life, called a Life Line. Time-related topics covered in the investigations in the series include sequencing events in time, comparing durations of time within a day, representing events in time, and interpreting traditional representations of time.

**References:**

Timelines and Rhythm Patterns

Investigation 1: Sessions 4-6

**59. Attributes of three-dimensional objects**

**References:**

Mathematical Thinking at Grade 2

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

**60. Commutative and associative properties of addition through 999**

In addition to the following references, Grade 2 students using *Investigations in Number, Data, and Space* are frequently asked to develop strategies for combining more than two addends. They implicitly apply the commutative and associative properties of addition by regrouping and recombining conveniently compatible addends.

**References:**

Mathematical Thinking at Grade 2

Investigation 2: Session 6: Dialogue Box, page 45

Coins, Coupons, and Combinations

Investigation 1: Session 1

**61. Properties of subtraction**

**References:**

Mathematical Thinking at Grade 2

Investigation 5: Session 3, page 115

Putting Together and Taking Apart

Investigation 1: Session 1

Teacher Notes, pages 13-14 and 15-16

Dialogue Box, page 18

Investigation 2: Sessions 3-4: Dialogue Box, page 65

Investigation 3: Sessions 1-5

Investigation 5: Sessions 7-8

**62. Cup, pint, quart**

Grade 2 students using *Investigations in Number, Data, and Space* 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 2, pages 19-21

Sessions 6-8

**63. Patterns**

**References:**

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-3, 10

Investigation 4: Sessions 1-4

Putting Together and Taking Apart

Investigation 2: Sessions 1-2

Timelines and Rhythm Patterns

Investigation 2: Sessions 1-5

June

**64. Addition of 2- and 3-digit numbers with regrouping (exchange) ones to tens**

Grade 2 students using *Investigations in Number, Data, and Space* do not receive explicit instruction in the addition of 2- and 3-digit numbers with regrouping; rather, they are encouraged to explore and investigate strategies for adding whole numbers with and without regrouping. The following reference is 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.

**Reference:**

Putting Together and Taking Apart

Investigation 1: Session 1: Dialogue Box, pages 18-19

**65. Commutative property of multiplication**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting and grouping and apply these concepts to problem situations. After they have gained some experience in counting by different numbers, students discover that they can count the same set in more than one way by Counting by Different Groups, thus providing them with Counting Choices.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 3-5

**66. Division and multiplication as inverse operations**

Students using *Investigations in Number, Data, and Space* are gradually and progressively introduced to multiplication and division concepts. Grade 2 students practice skip counting by 2's, 5's, and 10's. They explore the relationship between skip counting (multiplying) and grouping (dividing) and apply these concepts to problem situations.

**References:**

Mathematical Thinking at Grade 2

Investigation 4: Session 1: Teacher Note, page 82

Coins, Coupons, and Combinations

Investigation 2: Sessions 1-10

**67. Arrangements of 2 through 5 items**

**References:**

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Coins, Coupons, and Combinations

Investigation 1: Session 1

Investigation 2: Sessions 3, 6

Shapes, Halves, and Symmetry  
Investigation 1: Sessions 2-8  
Investigation 2: Sessions 3-6  
Investigation 3: Sessions 1-2, 6-8

**68. Ratio – 2:1 correspondence**

**Reference:**

Coins, Coupons, and Combinations  
Investigation 2: Session 1

**69. Missing information**

Primary grade students using *Investigations in Number, Data, and Space* use pictures and manipulatives to represent known and unknown quantities in numerical problems as they investigate the operations of addition and subtraction of whole numbers and solve combining and separating problems. Additionally, Grade 2 students solve Problems with a Missing Part.

**References:**

Mathematical Thinking at Grade 2  
Investigation 1: Session 1  
Investigation 2: Sessions 1-3, 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

**70. Deciliter**

Grade 2 students using *Investigations in Number, Data, and Space* 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 2, pages 19-21  
Sessions 6-

**Investigations in Number, Data, & Space  
to the  
New York City School District 30  
Mathematics Scope and Sequence**

**Grade Three**

**Scope and Sequence**

**September**

**1. Days and dates on a calendar**

Grade 3 students using *Investigations in Number, Data, and Space* use a calendar to make time comparisons that involve the question, “How much longer?” They find distances between various time periods on the calendar. They also plan the activities and timing for a party that will last exactly two hours: the students are given the starting and ending times of the party, not the duration.

**References:**

Landmarks in the Hundreds  
Ten-Minute Math: Calendar Math  
Combining and Comparing  
Investigation 3: Session 3  
Investigation 5: Sessions 1-3

**2. Basic addition and subtraction facts**

**References:**

Mathematical Thinking at Grade 3  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 3-4  
Investigation 4: Session 1  
Ten-Minute Math: Calendar Math  
Up and Down the Number Line  
Investigation 1: Sessions 1-8  
Combining and Comparing  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-2  
Investigation 3: Sessions 1-3  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-3  
Ten-Minute Math: Estimation and Number Sense

### 3. Bar graphs-add line plots, discuss graphs in publications

Students using *Investigations in Number, Data, and Space* are encouraged to organize and represent data using a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables may be provided to the students, or created by the students in various problem situations. Students are asked to choose an appropriate means to display their data, and are asked to explain or justify their choices.

#### References:

Mathematical Thinking at Grade 3  
Investigation 3: Sessions 1-2  
From Paces to Feet  
Investigation 2: Session 2  
Combining and Comparing  
Ten-Minute Math: Exploring Data

### 3A Read and interprets line plots

#### References:

From Paces to Feet  
Investigation 2: Session 2  
Combining and Comparing  
Ten-Minute Math: Exploring Data

### 4. Measurement – time

Grade 3 students using *Investigations in Number, Data, and Space* use a calendar to make time comparisons that involve the question, “How much longer?” They find distances between various time periods on the calendar. They also plan the activities and timing for a party that will last exactly two hours: the students are given the starting and ending times of the party, not the duration.

#### References:

Landmarks in the Hundreds  
Ten-Minute Math: Calendar Math  
Combining and Comparing  
Investigation 3: Session 3  
Investigation 5: Sessions 1-3

### 5. Place value and expanded notation through 999

Grade 3 students using *Investigations in Number, Data, and Space* explore concepts of place value as they construct and investigate patterns on hundred and thousand charts. They learn the significance of the decimal point and examine decimal place value in relation to the calculator and problems involving money. Counting by tens and hundreds supports students’ familiarity with the base-ten system.

#### References:

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



Landmarks in the Hundreds  
Investigation 2: Sessions 1-3  
Investigation 3: Session 1  
Ten-Minute Math: Counting Around the Class  
Combining and Comparing  
Investigation 4: Sessions 3-4  
Fair Shares  
Investigation 3: Sessions 1-2

**6. Count by tens and hundreds through 1,000**

Grade 3 students using *Investigations in Number, Data, and Space* explore concepts of place value as they construct and investigate patterns on hundred and thousand charts. They learn the significance of the decimal point and examine decimal place value in relation to the calculator and problems involving money. Counting by tens and hundreds supports students' familiarity with the base-ten system.

**References:**

Mathematical Thinking at Grade 3  
Investigation 1: Sessions 1-3  
Investigation 4: Session 2  
Landmarks in the Hundreds  
Investigation 2: Sessions 1-3  
Investigation 3: Session 1  
Ten-Minute Math: Counting Around the Class  
Combining and Comparing  
Investigation 4: Sessions 3-4  
Fair Shares  
Investigation 3: Sessions 1-2

**7. Round 3-digit numbers to the nearest ten/hundred**

**References:**

From Paces to Feet  
Ten-Minute Math: Estimation and Number Sense  
Up and Down the Number Line  
Ten-Minute Math: Estimation and Number Sense  
Combining and Comparing  
Investigation 3: Sessions 1-2  
Ten-Minute Math: Estimation and Number Sense

October

**8. Place value through 9,999**

Grade 3 students using *Investigations in Number, Data, and Space* explore concepts of place value as they construct and investigate patterns on hundred and thousand charts. They learn the significance of the decimal point and examine decimal place value in relation to the calculator and problems involving money. Counting by tens and hundreds supports students' familiarity with the base-ten system.

**References:**

Mathematical Thinking at Grade 3

Investigation 1: Sessions 1-3

Investigation 4: Session 2

Landmarks in the Hundreds

Investigation 2: Sessions 1-3

Investigation 3: Session 1

Ten-Minute Math: Counting Around the Class

Combining and Comparing

Investigation 4: Sessions 3-4

Fair Shares

Investigation 3: Sessions 1-2

**9. Order numbers through 9,999**

**References:**

Mathematical Thinking at Grade 3

Investigation 3: Sessions 3-4

Flips, Turns, and Area

Investigation 1: Session 4

Combining and Comparing

Investigation 1: Sessions 1-3

Investigation 4: Sessions 1-2

Investigation 5: Sessions 1-3

**10. Guess and check**

The use of the guess-and-check method to solve problems is inherent in the nature of the *Investigations in Number, Data, and Space* series: students “guess” what will happen in a given problem situation, they investigate, and they “check” their results. Third grade students form and test conjectures, estimate results of computations and then check the accuracy of their estimates, and use trial-and-error methods to solve problems. Most of the Ten-Minute Math appendices in the texts in the series include computation problems involving estimation and verification.

**Sample references:**

Flips, Turns, and Area

Investigation 1: Sessions 2-3

From Paces to Feet

Ten-Minute Math: Estimation and Number Sense

Landmarks in the Hundreds

Investigation 3: Sessions 2-3

Turtle Paths

Investigation 1: Sessions 2-4

Investigation 2: Session 4

**11. Temperature - Fahrenheit and Celsius thermometers**

There are no specific references to reading thermometers in either Fahrenheit or Celsius scales in the third grade series.

**12. Multiplication Facts (use manipulative to model)**

**References:**

Things That Come in Groups

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4

Investigation 5: Sessions 1-4

Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds

Investigation 1: Sessions 1-7

Investigation 2: Sessions 1-6

Ten-Minute Math: Counting Around the Class

**November**

**13. Concepts of division**

**References:**

Things That Come in Groups

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4

Investigation 5: Sessions 1-4

Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds

Investigation 1: Sessions 1-7

Investigation 2: Sessions 1-6

Ten-Minute Math: Counting Around the Class

**14. The identify element (1) for multiplication and the role of zero**

**References:**

Flips, Turns, and Area  
Ten-Minute Math: Broken Calculator  
Landmarks in the Hundreds  
Ten-Minute Math: Calendar Math

**15. Equivalent fractions**

**References:**

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

**16. Weight in customary units**

Grade 3 students using *Investigations in Number, Data, and Space* use nonstandard units with a pan balance to weigh and compare objects.

**References:**

Combining and Comparing  
Investigation 2: Sessions 1-2

**17. Open sentences**

**References:**

Things That Come in Groups  
Investigation 1  
Session 2  
Session 3, page 15  
Session 4, page 17  
Investigation 4: Sessions 1-4  
Up and Down the Number Line  
Investigation 1: Sessions 6-7

**December**

**18. Even and odd numbers**

**References:**

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

**19. Commutative and associative properties of addition through 999**

**References:**

Mathematical Thinking in Grade 3

Investigation 2: Session 1: Teacher Note, pages 22-23

Investigation 2: Session 2

Up and Down the Number Line

Investigation 1: Sessions 1-8

**20. Addition of 3-digit numbers without regrouping (exchange)**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for adding numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, to add larger quantities first, to round to nearby landmarks, and to change the order of the addends.

**Reference:**

Combining and Comparing

Investigation 1: Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**21. Subtraction of 3-digit numbers without regrouping (exchange)**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for subtracting numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, including cubes, counters, and a 100 chart or a 300 chart; and to use landmark numbers for comparing.

**Reference:**

Combining and Comparing

Investigation 1

Session 1: Teacher Note, page 10

Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**22. Addition of 3-digit numbers with one regrouping (exchange) ones to tens**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for adding numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, to add larger quantities first, to round to nearby landmarks, and to change the order of the addends.

**Reference:**

Combining and Comparing

Investigation 1: Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**January**

**23. Subtraction of 2-digit numbers with regrouping (exchange) tens to ones**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for subtracting numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, including cubes, counters, and a 100 chart or a 300 chart; and to use landmark numbers for comparing.

**Reference:**

Combining and Comparing

Investigation 1

Session 1: Teacher Note, page 10

Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**24. Subtraction of 3-digit numbers with regrouping (exchange) tens to ones**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for subtracting numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, including cubes, counters, and a 100 chart or a 300 chart; and to use landmark numbers for comparing.

**Reference:**

Combining and Comparing

Investigation 1

Session 1: Teacher Note, page 10

Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**25. Count by twos, threes, fours, fives**

**References:**

Mathematical Thinking at Grade 3

Investigation 2: Sessions 5-7

Things That Come in Groups

Investigation 2: Sessions 1-6

Investigation 3: Sessions 3-4

Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds

Investigation 1: Sessions 1-5

Investigation 2: Sessions 5-6: Teacher Note, page 49

Ten-Minute Math: Counting Around the Class

## 26. Multiplication of twos

### References:

Things That Come in Groups

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4

Investigation 5: Sessions 1-4

Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds

Investigation 1: Sessions 1-7

Investigation 2: Sessions 1-6

Ten-Minute Math: Counting Around the Class

## 27. Multiplication of fives

### References:

Things That Come in Groups

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4

Investigation 5: Sessions 1-4

Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds

Investigation 1: Sessions 1-7

Investigation 2: Sessions 1-6

Ten-Minute Math: Counting Around the Class

## 28. Division of whole numbers for twos through 18, for fives through 45

### References:

Things That Come in Groups

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4

Investigation 5: Sessions 1-4

Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds

Investigation 1: Sessions 1-7

Investigation 2: Sessions 1-6

Ten-Minute Math: Counting Around the Class

## 29. Points and lines

### References:

Flips, Turns, and Area

Investigation 1: Sessions 1-5

Investigation 2: Sessions 1-5

Turtle Paths

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-7

## February

## 30. Weight in metric units

Grade 3 students using *Investigations in Number, Data, and Space* use nonstandard units with a pan balance to weigh and compare objects.

### References:

Combining and Comparing

Investigation 2: Sessions 1-2

## 31. Decimals

### References:

Mathematical Thinking at Grade 3

Investigation 4: Session 2

Combining and Comparing

Investigation 3: Sessions 1-2

Fair Shares

Investigation 3: Sessions 1-3

## 32. Addition of 2- and 3-digit numbers with one regrouping (exchange) tens to hundreds

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for adding numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, to add larger quantities first, to round to nearby landmarks, and to change the order of the addends.

### References:

Combining and Comparing

Investigation 1: Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39



**33. Subtraction of 3-digit numbers with one regrouping (exchange) hundreds to tens**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for subtracting numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, including cubes, counters, and a 100 chart or a 300 chart; and to use landmark numbers for comparing.

**References:**

Combining and Comparing

Investigation 1

Session 1: Teacher Note, page 10

Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**34. Addition of 3-digit numbers with two regroupings (exchanges) ones to tens, tens to hundreds**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for adding numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, to add larger quantities first, to round to nearby landmarks, and to change the order of the addends.

**References:**

Combining and Comparing

Investigation 1: Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**35. Subtraction of 3-digit numbers with two regroupings (exchanges) tens to ones, and hundreds to tens**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for subtracting numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, including cubes, counters, and a 100 chart or a 300 chart; and to use landmark numbers for comparing.

**References:**

Combining and Comparing

Investigation 1

Session 1: Teacher Note, page 10

Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

## March

### 36. Inch, foot, yard

#### References:

From Paces to Feet

Investigation 2: Sessions 1-4

Investigation 3: Sessions 1-3

Combining and Comparing

Investigation 3: Sessions 1-2

### 37. Construction of plane figures

#### References:

Flips, Turns, and Area

Investigation 1: Sessions 1-5

Investigation 2: Sessions 1-5

Turtle Paths

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-7

### 37A Congruent, similar

#### References:

Flips, Turns, and Area

Investigation 2: Sessions 2-5

Turtle Paths

Investigation 1: Session 3

Investigation 3: Sessions 3-5

### 38. Multiplication of threes and fours

#### References:

Things That Come in Groups

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4

Investigation 5: Sessions 1-4

Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds

Investigation 1: Sessions 1-7

Investigation 2: Sessions 1-6

Ten-Minute Math: Counting Around the Class

**39. Division of whole numbers for threes through 27, for fours through 36**

**References:**

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

**40. Non-unit fractional parts of a group**

**References:**

Fair Shares  
Investigation 1: Sessions 3-4  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 1-3

**41. Recognize and compare relationships (one dollar, five dollars, and ten dollars)**

**References:**

Mathematical Thinking at Grade 3  
Investigation 2: Sessions 5-7  
Landmarks in the Hundreds  
Investigation 1: Sessions 6-7  
Investigation 2: Session 4  
Combining and Comparing  
Investigation 3: Sessions 1-2

**41A Understand the relationship between fraction and decimal**

**References:**

Mathematical Thinking at Grade 3  
Investigation 4: Session 2  
Fair Shares  
Investigation 3: Sessions 1-3

**42. Open and closed figures and curves**

**References:**

Flips, Turns, and Area  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-5

Turtle Paths

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-7

**43. Locate information**

Students in Grade 3 using *Investigations in Number, Data, and Space* locate information and then apply appropriate strategies to solve problems throughout the course; in fact, this is a fundamental emphasis of the series. For example, students collect information about a group of people; sort and classify information; count and compare sets of data; and use pictures, tables, and graphs to organize and display data to solve problems.

**Sample References:**

Mathematical Thinking at Grade 3

Investigation 3: Sessions 1-2

Things That Come in Groups

Investigation 5: Session 3

Flips, Turns, and Area

Investigation 1: Session 5

From Paces to Feet

Investigation 2: Session 2

Landmarks in the Hundreds

Investigation 2: Session 4

Up and Down the Number Line

Investigation 2: Session 4

Combining and Comparing

Investigation 1: Sessions 1-3

Turtle Paths

Investigation 3: Sessions 1-2

Fair Shares

Investigation 3: Session 3

Exploring Solids and Boxes

Investigation 2: Sessions 4-5

**44. Addition and subtraction of fractions with like denominators**

**References:**

Flips, Turns, and Areas

Investigation 2: Sessions 1-5

Fair Shares

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-3

**45. Addition and subtraction of decimals to tenths and to hundredths**

**References:**

Combining and Comparing  
Investigation 3: Sessions 1-2

**46. Probability**

**1. use fractional notation showing probability of the outcome**

**2. explain why a game is fair/unfair**

Students using *Investigations in Number, Data, and Space* in Grade 3 describe events as likely or unlikely, and certain, equally likely, and impossible, through regular and extended features of the curriculum. The Grade 3 series includes Ten-Minute Math features entitled, “Likely or Unlikely?” and “What Is Likely?”, which involve students in considering the likelihood of the occurrence of a particular event.

**References:**

Things That Come in Groups  
Ten-Minute Math: Likely or Unlikely?  
Exploring Solids and Boxes  
Ten-Minute Math: What Is Likely?

**April**

**47. Multiplication of sixes and sevens**

**References:**

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

**48. Division of whole numbers for sixes through 54, for sevens through 63**

**References:**

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

**49. Solid figures**

**References:**

Exploring Solids and Boxes  
Investigation 1: Sessions 1-2  
Investigation 2: Sessions 1-5  
Investigation 3: Sessions 1-2  
Investigation 4: Sessions 1-3  
Investigation 5: Sessions 1-4

**50. Coordinate position**

**References:**

Turtle Paths  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-7

**51. Multiplication of eights and nines (use calculators)**

**References:**

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

**52. Division of whole numbers for eights through 72, for nines through 81**

**References:**

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

### 53. Inequalities

The *Investigations in Number, Data, and Space* series does not provide third grade students with specific instruction in the use of inequality symbols to compare numbers; rather, quantities, including numbers of objects and areas of rectangles, are compared using words like “more” and “fewer.”

#### References:

Mathematical Thinking at Grade 3  
Investigation 3: Sessions 3-4  
Flips, Turns, and Area  
Investigation 1: Session 4  
Combining and Comparing  
Investigation 1: Sessions 1-3  
Investigation 4: Sessions 1-2  
Investigation 5: Sessions 1-3

### 53A Discuss, justify, and write solution sets

Students using *Investigations in Number, Data, and Space* discuss and justify their answers and solution processes throughout the curriculum as they perform the activities in the sessions for each investigation. The Dialogue Box is a feature that appears with many investigations and contains the text of discussions between teachers and students in which the teacher encourages students to describe their solution processes and justify their answers.

#### Sample References:

Mathematical Thinking at Grade 3  
Investigation 4: Session 1  
Things That Come in Groups  
Investigation 3: Sessions 1-2  
Flips, Turns, and Area  
Investigation 2: Sessions 4-5  
From Paces to Feet  
Investigation 2: Session 2  
Landmarks in the Hundreds  
Investigation 2: Session 4  
Up and Down the Number Line  
Investigation 1: Sessions 6-7  
Combining and Comparing  
Investigation 1: Sessions 1-2  
Turtle Paths  
Investigation 3: Sessions 1-2

Fair Shares  
Investigation 2: Session 3  
Exploring Solids and Boxes  
Investigation 3: Session 2

**54. Multiplication of tens**

**References:**

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

**55. Patterns**

**References:**

Mathematical Thinking at Grade 3  
Investigation 1: Sessions 2-3  
Things That Come in Groups  
Investigation 2: Sessions 1-6  
Investigation 5: Session 1  
Flips, Turns, and Area  
Investigation 1: Sessions 1-3  
Fair Shares  
Investigation 2: Sessions 5-6

**May**

**56. Patterns in multiplication tables through 10 x 10**

**References:**

Things That Come in Groups  
Investigation 2: Sessions 1-6  
Landmarks in the Hundreds  
Investigation 1: Sessions 2-3: Teacher Note, pages 14-15  
Investigation 2: Sessions 5-6: Teacher Note, page 49



**57. Arrangements – tree diagrams**

Grade 3 students using *Investigations in Number, Data, and Space* find all possible geometric arrangements of a given number of squares, find all possible combinations of numbers that will result in a given net change, find all possible paths from a given starting point to a fixed destination, and design different boxes with given constraints.

**References:**

Flips, Turns, and Area

Investigation 1: Sessions 1, 4-5

Up and Down the Number Line

Investigation 1: Sessions 3-4, 6-7

Turtle Paths

Investigation 1: Sessions 3-4

Exploring Solids and Boxes

Investigation 3: Sessions 1-2

Investigation 4: Session 2

**58. Multiplication of 2- and 3-digit numbers by a 1-digit multiplier without regrouping (exchange)**

**References:**

Things That Come in Groups

Investigation 5: Sessions 1-4

Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds

Investigation 2: Sessions 5-6

Ten-Minute Math: Counting Around the Class

**59. Division of 2- and 3-digit dividends by 1-digit divisors without regrouping (exchange)**

**References:**

Landmarks in the Hundreds

Investigation 1: Sessions 1-7

Investigation 2: Sessions 1-6

Ten-Minute Math: Counting Around the Class

**59A Mean, median, mode, average**

Grade 3 students using *Investigations in Number, Data, and Space* find the largest and smallest as well as the average (or “middle-sized”) data values and describe their significance relative to the data set.

**References:**

From Paces to Feet

Investigation 1: Sessions 3-6

Investigation 2: Sessions 2-7

**60. Addition of 4-digit numbers**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for adding numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, to add larger quantities first, to round to nearby landmarks, and to change the order of the addends.

**Reference:**

Combining and Comparing

Investigation 1: Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**61. Subtraction of 4-digit numbers**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for subtracting numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, including cubes, counters, and a 100 chart or a 300 chart; and to use landmark numbers for comparing.

**Reference:**

Combining and Comparing

Investigation 1

Session 1: Teacher Note, page 10

Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**62. Linear measurement –metric**

**References:**

From Paces to Feet

Investigation 2: Sessions 5-7

Investigation 3: Sessions 1-3

Investigation 4: Sessions 1-3

**63. Polygons**

**References:**

Flips, Turns, and Area

Investigation 1: Sessions 1-5

Investigation 2: Sessions 1-5

Turtle Paths

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-7

### 63A Symmetry

#### References:

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

### 64. Create models/charts to solve problems

Students at all grade levels using *Investigations in Number, Data, and Space* model problem situations with objects, pictures, tables, numbers, letters, and other symbols throughout the course. Indeed, the fundamental emphasis of this curriculum is modeling problem situations. Students are encouraged to devise their own problem-solving strategies and representations, so that it is usually the case that a wide variety of representations will be created for any given problem.

#### Sample References:

Mathematical Thinking at Grade 3  
Investigation 3: Sessions 3-4  
Things That Come in Groups  
Investigation 3: Sessions 1-2  
Flips, Turns, and Area  
Ten-Minute Math: Broken Calculator  
From Paces to Feet  
Investigation 1: Session 2  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-3  
Up and Down the Number Line  
Investigation 2: Sessions 1-3  
Combining and Comparing  
Investigation 4: Session 1  
Turtle Paths  
Investigation 1: Sessions 3-4  
Fair Shares  
Investigation 3: Session 3  
Exploring Solids and Boxes  
Investigation 4: Session 1

### 64A Venn diagrams

Grade 3 students using *Investigations in Number, Data, and Space* are encouraged to organize and represent data using a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables may be provided to the students, or created by the students in various problem situations. Students are asked to choose an appropriate means to display their data, and are asked to explain or justify their choices.

#### References:

Mathematical Thinking at Grade 3  
Investigation 3: Sessions 1-2  
Combining and Comparing  
Ten-Minute Math: Exploring Data

**65. Ordinal numbers through 500**

There are no direct references to ordinal numbers in the Grade 3 course of *Investigations in Number, Data, and Space*. Students gain experience with order as they explore the Hundred Number Wall Chart and calendars, and as they compare and order numbers.

**June**

**66. Customary capacity**

Grade 3 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of rectangular prisms.

**References:**

Exploring Solids and Boxes

Investigation 4: Sessions 1-3

Investigation 5: Sessions 1-4

**67. Negative numbers**

Grade 3 students using *Investigations in Number, Data, and Space* explore concepts of positive and negative numbers through problems involving finding net change in which they are given a starting and an ending number and asked to determine the direction and magnitude of the change. Students build knowledge about positive and negative change by graphing problem situations related to elevator trips.

**References:**

Up and Down the Number Line

Investigation 1: Sessions 1-8

Investigation 2: Sessions 1-4

Investigation 3: Sessions 1-3

**68. Roman Numerals**

There are no references to Roman numerals in the Grade 3 course of *Investigations in Number, Data, and Space*.

**69. Capacity – metric**

Grade 3 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of rectangular prisms.

**References:**

Exploring Solids and Boxes

Investigation 4: Sessions 1-3

Investigation 5: Sessions 1-4

**70. Multiplication through 3-digit numbers by a 1-digit multiplier with regrouping (exchange)**

**References:**

Things That Come in Groups  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 2: Sessions 5-6  
Ten-Minute Math: Counting Around the Class

**71. Division with remainders**

**References:**

Landmarks in the Hundreds  
Investigation 1: Sessions 6-7: Dialogue Box, page 29

**72. Improper fractions and mixed numbers**

**References:**

Fair Shares  
Investigation 1: Sessions 3-4  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 1-3

**73. Ratio**

**References:**

Mathematical Thinking at Grade 3  
Investigation 2: Sessions 3-4  
Investigation 4: Session 2  
Flips, Turns, and Areas  
Investigation 2: Sessions 1-5  
Up and Down the Number Line  
Investigation 3: Session 1  
Turtle Paths  
Investigation 2: Sessions 1-2  
Fair Shares  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 1-3

**74. Measurement – speed**

Grade 3 students using *Investigations in Number, Data, and Space* explore the concept of rate of change as they alter the size of nonstandard units used to measure distance, compare pace lengths, measure paths, compare path lengths, create scale drawings, and graph changes in location with respect to change over time.

**References:**

From Paces to Feet

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-3

Investigation 4: Sessions 1-3

Up and Down the Number Line

Investigation 2: Sessions 2-4

**74A Recognize use of math in other subject areas**

Students in Grades 3 using *Investigations in Number, Data, and Space* recognize and apply mathematics in contexts outside of mathematics throughout the course; in fact, this is a fundamental emphasis of the series. For example, students apply statistical analysis to real-world data, apply computation strategies to solve real-world problems, measure objects in their immediate or larger environment, and describe objects in their environment in geometric terms.

**Sample References:**

Mathematical Thinking at Grade 3

Investigation 2: Sessions 5-7

Things That Come in Groups

Investigation 1: Session 4

Flips, Turns, and Area

Investigation 2: Sessions 4-5

From Paces to Feet

Investigation 3: Sessions 1-3

Landmarks in the Hundreds

Investigation 2: Session 4

Up and Down the Number Line

Investigation 1: Sessions 1-2

Combining and Comparing

Investigation 3: Sessions 1-3

Turtle Paths

Investigation 1: Session 1

Fair Shares

Investigation 1: Sessions 1-4

Exploring Solids and Boxes

Investigation 5: Sessions 1-4

## District Mathematics Calendar

### September

#### 1. Days and weeks on a calendar

Grade 3 students using *Investigations in Number, Data, and Space* use a calendar to make time comparisons that involve the question, “How much longer?” They find distances between various time periods on the calendar. They also plan the activities and timing for a party that will last exactly two hours: the students are given the starting and ending times of the party, not the duration.

##### **References:**

Landmarks in the Hundreds  
Ten-Minute Math: Calendar Math  
Combining and Comparing  
Investigation 3: Session 3  
Investigation 5: Sessions 1-3

#### 2. Basic addition and subtraction facts

##### **References:**

Mathematical Thinking at Grade 3  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 3-4  
Investigation 4: Session 1  
Ten-Minute Math: Calendar Math  
Up and Down the Number Line  
Investigation 1: Sessions 1-8  
Combining and Comparing  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-2  
Investigation 3: Sessions 1-3  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-3  
Ten-Minute Math: Estimation and Number Sense

#### 3. Bar graphs

Students using *Investigations in Number, Data, and Space* are encouraged to organize and represent data using a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables may be provided to the students, or created by the students in various problem situations. Students are asked to choose an appropriate means to display their data, and are asked to explain or justify their choices.

**References:**

Mathematical Thinking at Grade 3  
Investigation 3: Sessions 1-2  
From Paces to Feet  
Investigation 2: Session 2  
Combining and Comparing  
Ten-Minute Math: Exploring Data

**4. Measurement – time**

Grade 3 students using *Investigations in Number, Data, and Space* use a calendar to make time comparisons that involve the question, “How much longer?” They find distances between various time periods on the calendar. They also plan the activities and timing for a party that will last exactly two hours: the students are given the starting and ending times of the party, not the duration.

**References:**

Landmarks in the Hundreds  
Ten-Minute Math: Calendar Math  
Combining and Comparing  
Investigation 3: Session 3  
Investigation 5: Sessions 1-3

**5. Place value and expanded notation through 999**

Grade 3 students using *Investigations in Number, Data, and Space* explore concepts of place value as they construct and investigate patterns on hundred and thousand charts. They learn the significance of the decimal point and examine decimal place value in relation to the calculator and problems involving money. Counting by tens and hundreds supports students’ familiarity with the base-ten system.

**References:**

Mathematical Thinking at Grade 3  
Investigation 1: Sessions 1-3  
Investigation 4: Session 2  
Landmarks in the Hundreds  
Investigation 2: Sessions 1-3  
Investigation 3: Session 1  
Ten-Minute Math: Counting Around the Class  
Combining and Comparing  
Investigation 4: Sessions 3-4  
Fair Shares  
Investigation 3: Sessions 1-2



**6. Count by tens and hundreds through 1,000**

Grade 3 students using *Investigations in Number, Data, and Space* explore concepts of place value as they construct and investigate patterns on hundred and thousand charts. They learn the significance of the decimal point and examine decimal place value in relation to the calculator and problems involving money. Counting by tens and hundreds supports students' familiarity with the base-ten system.

**References:**

Mathematical Thinking at Grade 3

Investigation 1: Sessions 1-3

Investigation 4: Session 2

Landmarks in the Hundreds

Investigation 2: Sessions 1-3

Investigation 3: Session 1

Ten-Minute Math: Counting Around the Class

Combining and Comparing

Investigation 4: Sessions 3-4

Fair Shares

Investigation 3: Sessions 1-2

**7. Round 3-digit numbers to the nearest ten/hundred**

**References:**

From Paces to Feet

Ten-Minute Math: Estimation and Number Sense

Up and Down the Number Line

Ten-Minute Math: Estimation and Number Sense

Combining and Comparing

Investigation 3: Sessions 1-2

Ten-Minute Math: Estimation and Number Sense

**October**

**8. Place value through 999**

Grade 3 students using *Investigations in Number, Data, and Space* explore concepts of place value as they construct and investigate patterns on hundred and thousand charts. They learn the significance of the decimal point and examine decimal place value in relation to the calculator and problems involving money. Counting by tens and hundreds supports students' familiarity with the base-ten system.

**References:**

Mathematical Thinking at Grade 3

Investigation 1: Sessions 1-3

Investigation 4: Session 2

Landmarks in the Hundreds  
Investigation 2: Sessions 1-3  
Investigation 3: Session 1  
Ten-Minute Math: Counting Around the Class  
Combining and Comparing  
Investigation 4: Sessions 3-4  
Fair Shares  
Investigation 3: Sessions 1-2

**9. Order numbers through 9,999**

**References:**

Mathematical Thinking at Grade 3  
Investigation 3: Sessions 3-4  
Flips, Turns, and Area  
Investigation 1: Session 4  
Combining and Comparing  
Investigation 1: Sessions 1-3  
Investigation 4: Sessions 1-2  
Investigation 5: Sessions 1-3

**10. Guess and check**

The use of the guess-and-check method to solve problems is inherent in the nature of the *Investigations in Number, Data, and Space* series: students “guess” what will happen in a given problem situation, they investigate, and they “check” their results. Third grade students form and test conjectures, estimate results of computations and then check the accuracy of their estimates, and use trial-and-error methods to solve problems. Most of the Ten-Minute Math appendices in the texts in the series include computation problems involving estimation and verification.

**Sample references:**

Flips, Turns, and Area  
Investigation 1: Sessions 2-3  
From Paces to Feet  
Ten-Minute Math: Estimation and Number Sense  
Landmarks in the Hundreds  
Investigation 3: Sessions 2-3  
Turtle Paths  
Investigation 1: Sessions 2-4  
Investigation 2: Session 4

**11. Temperature – Fahrenheit and Celsius thermometers**

There are no specific references to reading thermometers in either Fahrenheit or Celsius scales in the third grade series.

## 12. Multiplication facts

### References:

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

## November

## 13. Concepts of division

### References:

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

## 14. The identify element (1) for multiplication and the role of zero

### References:

Flips, Turns, and Area  
Ten-Minute Math: Broken Calculator  
Landmarks in the Hundreds  
Ten-Minute Math: Calendar Math

## 15. Equivalent fractions

### References:

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

**16. Weight in customary units**

Grade 3 students using *Investigations in Number, Data, and Space* use nonstandard units with a pan balance to weigh and compare objects.

**References:**

Combining and Comparing  
Investigation 2: Sessions 1-2

**17. Open sentences**

**References:**

Things That Come in Groups  
Investigation 1  
Session 2  
Session 3, page 15  
Session 4, page 17  
Investigation 4: Sessions 1-4  
Up and Down the Number Line  
Investigation 1: Sessions 6-7

**December**

**18. Even and odd numbers**

**References:**

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

**19. Commutative and associative properties of addition through 999**

**References:**

Mathematical Thinking in Grade 3  
Investigation 2: Session 1: Teacher Note, pages 22-23  
Investigation 2: Session 2  
Up and Down the Number Line  
Investigation 1: Sessions 1-8

**20. Addition of 3-digit numbers without regrouping (exchange)**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for adding numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, to add larger quantities first, to round to nearby landmarks, and to change the order of the addends.

**Reference:**

Combining and Comparing

Investigation 1: Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**21. Subtraction of 3-digit numbers without regrouping (exchange)**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for subtracting numbers.

The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, including cubes, counters, and a 100 chart or a 300 chart; and to use landmark numbers for comparing.

**Reference:**

Combining and Comparing

Investigation 1

Session 1: Teacher Note, page 10

Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**22. Addition of 3-digit numbers with one regrouping (exchange) ones to tens**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for adding numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, to add larger quantities first, to round to nearby landmarks, and to change the order of the addends.

**Reference:**

Combining and Comparing

Investigation 1: Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**January**

**23. Subtraction of 2-digit numbers with regrouping (exchange) tens to ones**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for subtracting numbers.

The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, including cubes, counters, and a 100 chart or a 300 chart; and to use landmark numbers for comparing.

**Reference:**

Combining and Comparing

Investigation 1

Session 1: Teacher Note, page 10

Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**24. Subtraction of 3-digit numbers with regrouping (exchange) tens to ones**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for subtracting numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, including cubes, counters, and a 100 chart or a 300 chart; and to use landmark numbers for comparing.

**Reference:**

Combining and Comparing

Investigation 1

Session 1: Teacher Note, page 10

Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**25. Count by twos, threes, fours, fives**

**References:**

Mathematical Thinking at Grade 3

Investigation 2: Sessions 5-7

Things That Come in Groups

Investigation 2: Sessions 1-6

Investigation 3: Sessions 3-4

Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds

Investigation 1: Sessions 1-5

Investigation 2: Sessions 5-6: Teacher Note, page 49

Ten-Minute Math: Counting Around the Class

**26. Multiplication of twos**

**References:**

Things That Come in Groups

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4

Investigation 5: Sessions 1-4

Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

**27. Multiplication of fives**

**References:**

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

**28. Division of whole numbers for twos through 18, for fives through 45**

**References:**

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

**29. Points and lines**

**References:**

Flips, Turns, and Area  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-5  
Turtle Paths  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-7

February

**30. Weight in metric units**

Grade 3 students using *Investigations in Number, Data, and Space* use nonstandard units with a pan balance to weigh and compare objects.

**References:**

Combining and Comparing  
Investigation 2: Sessions 1-2

**31. Decimals**

**References:**

Mathematical Thinking at Grade 3  
Investigation 4: Session 2  
Combining and Comparing  
Investigation 3: Sessions 1-2  
Fair Shares  
Investigation 3: Sessions 1-3

**32. Addition of 2- and 3-digit numbers with one regrouping (exchange) tens to hundreds**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for adding numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, to add larger quantities first, to round to nearby landmarks, and to change the order of the addends.

**References:**

Combining and Comparing  
Investigation 1: Session 3: Teacher Notes, pages 16 and 17  
Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**33. Subtraction of 3-digit numbers with one regrouping (exchange) hundreds to tens**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for subtracting numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, including cubes, counters, and a 100 chart or a 300 chart; and to use landmark numbers for comparing.



**References:**

Combining and Comparing

Investigation 1

Session 1: Teacher Note, page 10

Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**34. Addition of 3-digit numbers with two regrouping (exchanges) ones to tens, tens to hundreds**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for adding numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, to add larger quantities first, to round to nearby landmarks, and to change the order of the addends.

**References:**

Combining and Comparing

Investigation 1: Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**35. Subtraction of 3-digit numbers with two regrouping (exchanges) tens to ones and hundreds to tens**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for subtracting numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, including cubes, counters, and a 100 chart or a 300 chart; and to use landmark numbers for comparing.

**References:**

Combining and Comparing

Investigation 1

Session 1: Teacher Note, page 10

Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**March**

**36. Inch, foot, yard**

**References:**

From Paces to Feet

Investigation 2: Sessions 1-4

Investigation 3: Sessions 1-3

Combining and Comparing  
Investigation 3: Sessions 1-2

**37. Construction of plane figures**

**References:**

Flips, Turns, and Area

Investigation 1: Sessions 1-5

Investigation 2: Sessions 1-5

Turtle Paths

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-7

**38. Multiplication of threes and fours**

**References:**

Things That Come in Groups

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4

Investigation 5: Sessions 1-4

Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds

Investigation 1: Sessions 1-7

Investigation 2: Sessions 1-6

Ten-Minute Math: Counting Around the Class

**39. Division of whole numbers for threes through 27, for fours through 36**

**References:**

Things That Come in Groups

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4

Investigation 5: Sessions 1-4

Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds

Investigation 1: Sessions 1-7

Investigation 2: Sessions 1-6

Ten-Minute Math: Counting Around the Class

**40. Non-unit fractional parts of a group**

**References:**

Fair Shares

Investigation 1: Sessions 3-4

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-3

**41. Recognize and compare relationships (one dollar, five dollars, and ten dollars)**

**References:**

Mathematical Thinking at Grade 3

Investigation 2: Sessions 5-7

Landmarks in the Hundreds

Investigation 1: Sessions 6-7

Investigation 2: Session 4

Combining and Comparing

Investigation 3: Sessions 1-2

**42. Open and closed figures and curves**

**References:**

Flips, Turns, and Area

Investigation 1: Sessions 1-5

Investigation 2: Sessions 1-5

Turtle Paths

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-7

**43. Locate information**

Students in Grade 3 using *Investigations in Number, Data, and Space* locate information and then apply appropriate strategies to solve problems throughout the course; in fact, this is a fundamental emphasis of the series. For example, students collect information about a group of people; sort and classify information; count and compare sets of data; and use pictures, tables, and graphs to organize and display data to solve problems.

**Sample References:**

Mathematical Thinking at Grade 3

Investigation 3: Sessions 1-2

Things That Come in Groups

Investigation 5: Session 3

Flips, Turns, and Area

Investigation 1: Session 5

From Paces to Feet

Investigation 2: Session 2

Landmarks in the Hundreds

Investigation 2: Session 4

Up and Down the Number Line

Investigation 2: Session 4  
Combining and Comparing  
Investigation 1: Sessions 1-3  
Turtle Paths  
Investigation 3: Sessions 1-2  
Fair Shares  
Investigation 3: Session 3  
Exploring Solids and Boxes  
Investigation 2: Sessions 4-5

**44. Addition and subtraction of fractions with like denominators**

**References:**

Flips, Turns, and Areas  
Investigation 2: Sessions 1-5  
Fair Shares  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 1-3

**45. Addition and subtraction of decimals to tenths**

**References:**

Combining and Comparing  
Investigation 3: Sessions 1-2

**46. Probability**

Students using *Investigations in Number, Data, and Space* in Grade 3 describe events as likely or unlikely, and certain, equally likely, and impossible, through regular and extended features of the curriculum. The Grade 3 series includes Ten-Minute Math features entitled, “Likely or Unlikely?” and “What Is Likely?”, which involve students in considering the likelihood of the occurrence of a particular event.

**References:**

Things That Come in Groups  
Ten-Minute Math: Likely or Unlikely?  
Exploring Solids and Boxes  
Ten-Minute Math: What Is Likely?

**April**

**47. Multiplication of sixes and sevens**

**References:**

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

**48. Division of whole numbers for sixes through 54, for sevens through 63**

**References:**

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

**49. Solid figures**

**References:**

Exploring Solids and Boxes  
Investigation 1: Sessions 1-2  
Investigation 2: Sessions 1-5  
Investigation 3: Sessions 1-2  
Investigation 4: Sessions 1-3  
Investigation 5: Sessions 1-4

**50. Coordinate positions**

**References:**

Turtle Paths  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-7

**51. Multiplication of eights and nines**

**References:**

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

**52. Division of whole numbers for eights through 72, for nines through 81**

**References:**

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

**53. Inequalities**

The *Investigations in Number, Data, and Space* series does not provide third grade students with specific instruction in the use of inequality symbols to compare numbers; rather, quantities, including numbers of objects and areas of rectangles, are compared using words like “more” and “fewer.”

**References:**

Mathematical Thinking at Grade 3  
Investigation 3: Sessions 3-4  
Flips, Turns, and Area  
Investigation 1: Session 4  
Combining and Comparing  
Investigation 1: Sessions 1-3  
Investigation 4: Sessions 1-2  
Investigation 5: Sessions 1-3

**54. Multiplication of tens**

**References:**

Things That Come in Groups  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5

Investigation 4: Sessions 1-4  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

## 55. Patterns

### References:

Mathematical Thinking at Grade 3  
Investigation 1: Sessions 2-3  
Things That Come in Groups  
Investigation 2: Sessions 1-6  
Investigation 5: Session 1  
Flips, Turns, and Area  
Investigation 1: Sessions 1-3  
Fair Shares  
Investigation 2: Sessions 5-6

## May

## 56. Patterns in multiplication tables through 10 x 10

### References:

Things That Come in Groups  
Investigation 2: Sessions 1-6  
Landmarks in the Hundreds  
Investigation 1: Sessions 2-3: Teacher Note, pages 14-15  
Investigation 2: Sessions 5-6: Teacher Note, page 49

## 57. Arrangements – tree diagrams

Grade 3 students using *Investigations in Number, Data, and Space* find all possible geometric arrangements of a given number of squares, find all possible combinations of numbers that will result in a given net change, find all possible paths from a given starting point to a fixed destination, and design different boxes with given constraints.

### References:

Flips, Turns, and Area  
Investigation 1: Sessions 1, 4-5  
Up and Down the Number Line  
Investigation 1: Sessions 3-4, 6-7

Turtle Paths  
Investigation 1: Sessions 3-4  
Exploring Solids and Boxes  
Investigation 3: Sessions 1-2  
Investigation 4: Session 2

**58. Multiplication of 2- and 3-digit numbers by 1-digit multiplier without regrouping (exchange)**

**References:**

Things That Come in Groups  
Investigation 5: Sessions 1-4  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Hundreds  
Investigation 2: Sessions 5-6  
Ten-Minute Math: Counting Around the Class

**59. Division of 2-and 3-digit dividends by 1-digit divisors without regrouping (exchange)**

**References:**

Landmarks in the Hundreds  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-6  
Ten-Minute Math: Counting Around the Class

**60. Addition of 4-digit numbers**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for adding numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, to add larger quantities first, to round to nearby landmarks, and to change the order of the addends.

**Reference:**

Combining and Comparing  
Investigation 1: Session 3: Teacher Notes, pages 16 and 17  
Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**61. Subtraction of 4-digit numbers**

Grade 3 students using *Investigations in Number, Data, and Space* are expected to develop and apply meaningful strategies for subtracting numbers. The program asserts that students who have developed their own strategies have a greater understanding of the underlying process and are better able to recognize when to use a particular operation to solve a given problem. Students are encouraged to use concrete materials, including cubes, counters, and a 100 chart or a 300 chart; and to use landmark numbers for comparing.



**References:**

Combining and Comparing

Investigation 1

Session 1: Teacher Note, page 10

Session 3: Teacher Notes, pages 16 and 17

Investigation 3: Session 3: Teacher Note, pages 37-38, 39

**62. Linear measurement – metric**

**References:**

From Paces to Feet

Investigation 2: Sessions 5-7

Investigation 3: Sessions 1-3

Investigation 4: Sessions 1-3

**63. Polygons**

**References:**

Flips, Turns, and Area

Investigation 1: Sessions 1-5

Investigation 2: Sessions 1-5

Turtle Paths

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-6

Investigation 3: Sessions 1-7

**64. Create models/charts to solve problems**

Students at all grade levels using *Investigations in Number, Data, and Space* model problem situations with objects, pictures, tables, numbers, letters, and other symbols throughout the course. Indeed, the fundamental emphasis of this curriculum is modeling problem situations. Students are encouraged to devise their own problem-solving strategies and representations, so that it is usually the case that a wide variety of representations will be created for any given problem.

**Sample References:**

Mathematical Thinking at Grade 3

Investigation 3: Sessions 3-4

Things That Come in Groups

Investigation 3: Sessions 1-2

Flips, Turns, and Area

Ten-Minute Math: Broken Calculator

From Paces to Feet

Investigation 1: Session 2

Landmarks in the Hundreds

Investigation 1: Sessions 1-3

Up and Down the Number Line

Investigation 2: Sessions 1-3

Combining and Comparing  
Investigation 4: Session 1  
Turtle Paths  
Investigation 1: Sessions 3-4  
Fair Shares  
Investigation 3: Session 3  
Exploring Solids and Boxes  
Investigation 4: Session 1

**65. Ordinal numbers through 500**

There are no direct references to ordinal numbers in the Grade 3 course of *Investigations in Number, Data, and Space*. Students gain experience with order as they explore the Hundred Number Wall Chart and calendars, and as they compare and order numbers.

**June**

**66. Customary capacity**

Grade 3 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of rectangular prisms.

**References:**

Exploring Solids and Boxes  
Investigation 4: Sessions 1-3  
Investigation 5: Sessions 1-4

**67. Negative numbers**

Grade 3 students using *Investigations in Number, Data, and Space* explore concepts of positive and negative numbers through problems involving finding net change in which they are given a starting and an ending number and asked to determine the direction and magnitude of the change. Students build knowledge about positive and negative change by graphing problem situations related to elevator trips.

**References:**

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

**68. Roman numerals**

There are no references to Roman numerals in the Grade 3 course of *Investigations in Number, Data, and Space*.

**69. Capacity – metric**

Grade 3 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of rectangular prisms.

**References:**

Exploring Solids and Boxes

Investigation 4: Sessions 1-3

Investigation 5: Sessions 1-4

**70. Multiplication through 3-digit numbers by a 1-digit multiplier with regrouping (exchange)**

**References:**

Things That Come in Groups

Investigation 5: Sessions 1-4

Ten-Minute Math: Counting Around the Class

Landmarks in the Hundreds

Investigation 2: Sessions 5-6

Ten-Minute Math: Counting Around the Class

**71. Division with remainders**

**References:**

Landmarks in the Hundreds

Investigation 1: Sessions 6-7: Dialogue Box, page 29

**72. Improper fractions and mixed numbers**

**References:**

Fair Shares

Investigation 1: Sessions 3-4

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-3

**73. Ratio**

**References:**

Mathematical Thinking at Grade 3

Investigation 2: Sessions 3-4

Investigation 4: Session 2

Flips, Turns, and Areas

Investigation 2: Sessions 1-5

Up and Down the Number Line

Investigation 3: Session 1

Turtle Paths

Investigation 2: Sessions 1-2

Fair Shares

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-3

**74. Measurement – speed**

Grade 3 students using *Investigations in Number, Data, and Space* explore the concept of rate of change as they alter the size of nonstandard units used to measure distance, compare pace lengths, measure paths, compare path lengths, create scale drawings, and graph changes in location with respect to change over time.

**References:**

From Paces to Feet

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-3

Investigation 4: Sessions 1-3

Up and Down the Number Line

Investigation 2: Sessions 2-4

**Investigations in Number, Data, & Space  
to the  
New York City School District 30  
Mathematics**

**Grade Four**

**Scope and Sequence**

**September**

**1. Review basic addition and subtraction facts**

**References:**

Mathematical Thinking at Grade 4

Investigation 1: Sessions 2-4

Investigation 2: Sessions 1-2

Investigation 3: Sessions 3-5

Ten-Minute Math: Estimation and Number Sense

Arrays and Shares

Ten-Minute Math: Counting Around the Class

Landmarks in the Thousands

Investigation 2: Sessions 2-4

Different Shapes, Equal Pieces

Investigation 1: Session 5

Investigation 2: Session 3

Money, Miles, and Large Numbers

Investigation 1: Sessions 1-8

Investigation 2: Sessions 1-2, 4

Investigation 3: Sessions 1-4

Sunken Ships and Grid Patterns

Ten-Minute Math: Lengths and Perimeters

**1A. Reviews Multiplication and Division**

**References:**

Mathematical Thinking at Grade 4

Investigation 1: Sessions 2-3

Arrays and Shares

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-8

Investigation 3: Sessions 1-5

Ten-Minute Math: Counting Around the Class

Ten-Minute Math: Multiple BINGO

Landmarks in the Thousands  
Investigation 2: Session 1  
Ten-Minute Math: Counting Around the Class  
Packages and Groups  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 1-10

## 2. Solid geometric figures (space figures) and their properties

### References:

Seeing Solids and Silhouettes  
Investigation 1: Sessions 1-2  
Investigation 2: Sessions 1-5  
Investigation 3: Sessions 1-3  
Investigation 4: Sessions 1-4

## 3. Place value

### References:

Landmarks in the Thousands  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-5  
Investigation 3: Sessions 1-5  
Investigation 4, Sessions 1-3  
Money, Miles, and Large Numbers  
Investigation 1, Sessions 1-8  
Investigation 2, Sessions 1-2  
Investigation 3, Sessions 1-4

## 4. Place value through thousands

### References:

Landmarks in the Thousands  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-5  
Investigation 3: Sessions 1-5  
Investigation 4, Sessions 1-3  
Money, Miles, and Large Numbers  
Investigation 1, Sessions 1-8  
Investigation 2, Sessions 1-2  
Investigation 3, Sessions 1-4

### 5. Graphs, tally, line and bar

Grade 4 students using *Investigations in Number, Data, and Space* are encouraged to organize and represent data using a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables may be provided to the students, or created by the students in various problem situations. Students are asked to choose an appropriate means to display their data, and are asked to explain or justify their choices.

#### References:

The Shape of the Data

Investigation 2: Sessions 2-7

Investigation 3: Sessions 3-5

Changes Over Time

Preparation Session 3

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-2

Investigation 3: Sessions 1-8

Sunken Ships and Grid Patterns

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-9

Three Out of Four Like Spaghetti

Investigation 1: Session 2

### 6. Problem solving: use tables and graphs to locate information

#### References:

Mathematical Thinking at Grade 4

Ten-Minute Math: Exploring Data

The Shape of the Data

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-5

Changes Over Time

Unit Preparation: Sessions 1-3

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-2

Investigation 3: Sessions 1-8

Packages and Groups

Ten-Minute Math: Exploring Data

Sunken Ships and Grid Patterns

Investigation 1: Sessions 5-6

Investigation 2: Sessions 1-9

Ten-Minute Math: Lengths and Perimeters

Three out of Four Like Spaghetti

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-7

## 7. Place value of 5- and 6-digit numbers

### References:

Landmarks in the Thousands

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-5

Investigation 4, Sessions 1-3

Money, Miles, and Large Numbers

Investigation 1, Sessions 1-8

Investigation 2, Sessions 1-2

Investigation 3, Sessions 1-4

## 7A Increasing and decreasing values

### References:

Mathematical Thinking at Grade 4

Investigation 3: Sessions 1-5

Arrays and Shares

Investigation 1: Sessions 1-3

Landmarks in the Thousands

Investigation 1: Sessions 1-3

Investigation 3: Session 1

Investigation 4: Sessions 1-3

Changes Over Time

Investigation 1: Sessions 1-2

Investigation 3: Sessions 1-8

## October

## 8. Round 4- and 5-digit numbers

### References:

Mathematical Thinking at Grade 4

Investigation 1: Sessions 2-4

Investigation 2: Sessions 3-4

Ten-Minute Math: Estimation and Number Sense

Landmarks in the Thousands

Investigation 3: Sessions 3-5

The Shape of the Data

Ten-Minute Math: Estimation and Number Sense

Money, Miles, and Large Numbers

Investigation 1: Sessions 1-2, 7-8

Investigation 2: Sessions 1-2

Investigation 3: Session 1



Packages and Groups  
Investigation 2: Sessions 2-3

**9. Money through fifty-dollar bill, including coins, making change**

**References:**

Mathematical Thinking at Grade 4  
Investigation 2: Sessions 1-4  
Investigation 3: Sessions 4-5  
Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-8

**10. Review-addition**

**References:**

Mathematical Thinking at Grade 4  
Investigation 1: Sessions 2-4  
Investigation 2: Sessions 1-2  
Investigation 3: Sessions 3-5  
Ten-Minute Math: Estimation and Number Sense  
Arrays and Shares  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Thousands  
Investigation 2: Sessions 2-4  
Different Shapes, Equal Pieces  
Investigation 1: Session 5  
Investigation 2: Session 3  
Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-8  
Investigation 2: Sessions 1-2, 4  
Investigation 3: Sessions 1-4  
Sunken Ships and Grid Patterns  
Ten-Minute Math: Lengths and Perimeters

**11. Addition of numbers through 4 digits**

**References:**

Mathematical Thinking at Grade 4  
Investigation 1: Sessions 2-4  
Investigation 2: Sessions 1-2  
Investigation 3: Sessions 3-5  
Ten-Minute Math: Estimation and Number Sense  
Arrays and Shares  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Thousands  
Investigation 2: Sessions 2-4

Money, Miles, and Large Numbers  
Investigation 3: Sessions 1-4  
Sunken Ships and Grid Patterns  
Ten-Minute Math: Lengths and Perimeters

**12. Review – subtraction**

**References:**

Mathematical Thinking at Grade 4  
Investigation 1: Sessions 2-4  
Investigation 2: Sessions 1-2  
Investigation 3: Sessions 3-5  
Ten-Minute Math: Estimation and Number Sense  
Arrays and Shares  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Thousands  
Investigation 2: Sessions 2-4  
Different Shapes, Equal Pieces  
Investigation 1: Session 5  
Investigation 2: Session 3  
Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-8  
Investigation 2: Sessions 1-2, 4  
Investigation 3: Sessions 1-4  
Sunken Ships and Grid Patterns  
Ten-Minute Math: Lengths and Perimeters

**13. Subtraction of 4-digit numbers**

The Grade 4 course of *Investigations in Number, Data, and Space* includes subtraction of numbers through 3 digits. The reference below is to a lesson on Addition and Subtraction Strategies. The suggested techniques of this lesson, along with students' experiences in this grade and in earlier grades, enable students to apply previously learned strategies to larger numbers.

**Reference:**

Mathematical Thinking at Grade 4  
Investigation 3: Sessions 4-5

**14. Addition and subtraction of fractions with common denominators**

**References:**

Different Shares, Equal Pieces  
Investigation 1: Session 5  
Investigation 2: Session 3

November

**15. Open sentences**

Grade 4 students using *Investigations in Number, Data, and Space* gain experience and practice in solving problems involving missing information, including on-computer and off-computer activities to find missing lengths and turns.

**References:**

Landmarks in the Thousands  
Investigation 2: Sessions 2-4  
Changes Over Time  
Investigation 1: Sessions 5-6

**16. Problem solving – use number sentences to solve problems**

**References:**

Arrays and Shares  
Investigation 2: Sessions 2-3  
Investigation 3: Session 1  
Landmarks in the Thousands  
Investigation 2: Sessions 2-4  
Changes Over Time  
Investigation 1: Sessions 5-6  
Packages and Groups  
Investigation 3: Sessions 1-2

**16A Elapsed time**

**References:**

Changes Over Time  
Unit Preparation: Sessions 1-3  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-2  
Investigation 3: Sessions 1-8

**17. Review – multiplication and division facts**

**References:**

Mathematical Thinking at Grade 4  
Investigation 1: Sessions 2-3  
Arrays and Shares  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-8  
Investigation 3: Sessions 1-5  
Ten-Minute Math: Counting Around the Class  
Ten-Minute Math: Multiple BINGO

Landmarks in the Thousands  
Investigation 2: Session 1  
Ten-Minute Math: Counting Around the Class  
Packages and Groups  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 1-10

**18. Basic multiplication facts for 11 and 12 through 144**

**References:**

Mathematical Thinking at Grade 4  
Investigation 1: Sessions 2-3  
Arrays and Shares  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-8  
Investigation 3: Sessions 1-5  
Ten-Minute Math: Counting Around the Class  
Ten-Minute Math: Multiple BINGO  
Landmarks in the Thousands  
Ten-Minute Math: Counting Around the Class  
Packages and Groups  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 1-10

**19. Problem solving-guess and check**

Several of the Grade 4 texts in the *Investigations in Number, Data, and Space* series include Ten-Minute Math: Estimation and Number Sense as one of the appendices.

**References:**

Landmarks in the Thousands  
Investigation 3: Sessions 3-5  
The Shape of Data  
Investigation 1: Sessions 2-3: Ten-Minute Math  
Investigation 2: Session 1: Ten-Minute Math  
Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-5, 7-8  
Investigation 2: Sessions 1-2  
Investigation 3: Sessions 1-4

**20. Multiplication of 2- and 3-digit numbers by a 1-digit number**

**References:**

Arrays and Shares  
Investigation 3: Sessions 1-5  
Packages and Groups  
Investigation 1: Sessions 4-5  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 4-6

**21. Properties of division**

**References:**

Mathematical Thinking at Grade 4  
Investigation 1: Sessions 2-3  
Arrays and Shares  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-8  
Investigation 3: Sessions 1-5  
Ten-Minute Math: Counting Around the Class  
Ten-Minute Math: Multiple BINGO  
Landmarks in the Thousands  
Investigation 2: Session 1  
Ten-Minute Math: Counting Around the Class  
Packages and Groups  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 1-2, 10

**December**

**22. Division of 2- and 3-digit dividend by a 1-digit divisor without regrouping**

**References:**

Landmarks in the Thousands  
Investigation 2: Session 1  
Packages and Groups  
Investigation 3: Sessions 1-2

**23. Division of 2- and 3-digit dividend by a 1-digit divisor with regrouping**

**References:**

Landmarks in the Thousands  
Investigation 2: Session 1  
Packages and Groups  
Investigation 3: Sessions 1-2

**24. Statistics – identifying median and mode**

**References:**

The Shape of the Data  
Investigation 2: Sessions 4-7

**25. Multiplication of fractions**

Students may multiply fractions by 2 to determine if the fractions are greater than or less than one-half.

**Reference:**

Different Shapes, Equal Pieces  
Investigation 3: Sessions 4-5:Teacher Note, page 48

**26. Equivalent fractions and reducing fractions**

**References:**

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

**27. Order of unit fractions**

**References:**

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

**28. Linear measurement**

**References:**

The Shape of the Data  
Investigation 2: Sessions 1-4  
Money, Miles, and Large Numbers  
Investigation 2: Sessions 1-4  
Investigation 3: Sessions 2-4  
Changes Over Time  
Unit Preparation: Sessions 1-3  
Sunken Ships and Grid Patterns  
Investigation 1: Sessions 1-6

**29. Even and odd patterns with addition and subtraction**

Grade 4 students using *Investigations in Number, Data, and Space* explore even and odd numbers on a 100 chart, and they investigate the divisibility of even and odd numbers.

**References:**

Arrays and Shares  
Investigation 1: Sessions 1-2  
Investigation 2: Sessions 2-3  
Packages and Groups  
Investigation 3: Sessions 7-8

**January**

**30. Lines and properties of lines; introduce parallelograms.**

Grade 4 students using the *Investigations in Number, Data, and Space* series gain experience with parallel lines and perpendicular lines as they use the computer to construct and manipulate points, segments, and rectangles on coordinate grids.

**References:**

Sunken Ships and Grid Patterns  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 1-9  
Ten-Minute Math: Lengths and Perimeters

**31. Decimals to hundredths**

**References:**

Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-2, 4-8  
Investigation 2: Sessions 1-2, 4

**31A Percents as part of one hundred**

Students using *Investigations in Number, Data, and Space* are introduced to the concept of percent in a Grade 5.

**32. Order decimals**

**References:**

Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-2  
Investigation 2: Sessions 1-2

**33. Probability**

**References:**

Landmarks in the Thousands  
Ten-Minute Math: What Is Likely?  
Money, Miles, and Large Numbers  
Ten-Minute Math: Likely or Unlikely?  
Three Out of Four Like Spaghetti  
Ten-Minute Math: What Is Likely?

### 33A Ratio

#### References:

Different Shapes, Equal Pieces  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-4  
Investigation 3: Sessions 1-5  
Money, Miles, and Large Numbers  
Investigation 2: Sessions 1-3  
Three out of Four Like Spaghetti  
Investigation 1: Sessions 1-4

### 34. Prime numbers

#### References:

Arrays and Shares  
Investigation 2: Sessions 2-3

### 35. Properties of a circle-add circumference

Grade 4 students using *Investigations in Number, Data, and Space* investigate circles as silhouettes of spheres, cylinders, and cones.

#### References:

Seeing Solids and Silhouettes  
Investigation 2: Sessions 1-2

### 36. Polygons-including congruence –similarity

#### References:

Mathematical Thinking at Grade 4  
Investigation 4: Sessions 2-6  
Seeing Solids and Silhouettes  
Investigation 2: Sessions 1-2  
Ten-Minute Math: Quick Images  
Different Shapes, Equal Pieces  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-4  
Changes Over Time  
Ten-Minute Math: Quick Images  
Sunken Ships and Grid Patterns  
Investigation 2: Sessions 1-9

### 37. Addition of 5-digit numbers with or without regrouping

The Grade 4 course of *Investigations in Number, Data, and Space* includes addition of numbers through the thousands (4 digits). The reference below is to a lesson on Addition and Subtraction Strategies. The suggested techniques of this lesson, along with students' experiences in this grade and in earlier grades, enable students to apply previously learned strategies to larger numbers.



**Reference:**

Mathematical Thinking at Grade 4  
Investigation 3: Sessions 4-5

**February**

**38. Subtraction of 5-digit numbers with or without regrouping (exchange) in one or more places**

The Grade 4 course of *Investigations in Number, Data, and Space* includes subtraction of numbers through 3 digits. The reference below is to a lesson on Addition and Subtraction Strategies. The suggested techniques of this lesson, along with students' experiences in this grade and in earlier grades, enable students to apply previously learned strategies to larger numbers.

**Reference:**

Mathematical Thinking at Grade 4  
Investigation 3: Sessions 4-5

**39. Improper fractions and mixed numbers**

**References:**

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

**40. Addition and subtraction of mixed numbers**

Although this objective is not explicitly taught in the Grade 4 course of *Investigations in Number, Data, and Space*, it is a direct extension of the addition and subtraction of fractions with common denominators, which is referenced below.

**References:**

Different Shares, Equal Pieces  
Investigation 1: Session 5  
Investigation 2: Session 3

**41. Customary capacity relationships**

Grade 4 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of cube configurations and rectangular solids.

**References:**

Seeing Solids and Silhouettes  
Investigation 1: Sessions 1-2  
Landmarks in the Thousands  
Investigation 1: Session 2

**42.**

### 43. Parallelograms

#### References:

Mathematical Thinking at Grade 4  
Investigation 4: Sessions 2-6  
Seeing Solids and Silhouettes  
Ten-Minute Math: Quick Images  
Different Shapes, Equal Pieces  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-4  
Changes Over Time  
Ten-Minute Math: Quick Images  
Sunken Ships and Grid Patterns  
Investigation 2: Sessions 1-9

### 44. Perimeters

#### References:

Sunken Ships and Grid Patterns  
Ten-Minute Math: Lengths and Perimeters

### 45. The distributive property of division

#### References:

Mathematical Thinking at Grade 4  
Ten-Minute Math: Estimation and Number Sense  
Arrays and Shares  
Investigation 2: Sessions 2-6  
Investigation 3: Sessions 1-5  
Changes Over Time  
Investigation 1: Sessions 5-6  
Packages and Groups  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 3-8

## March

### 46. Multiplication of money values

Grade 4 students using *Investigations in Number, Data, and Space* add and subtract money values.

#### References:

Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-8

### 47.

**48. Division of money values**

Grade 4 students using *Investigations in Number, Data, and Space* add and subtract money values.

**References:**

Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-8

**49. Roman system to symbol C**

There are no references to Roman numerals in the Grade 4 course of *Investigations in Number, Data, and Space*.

**50. Circumference review**

Grade 4 students using *Investigations in Number, Data, and Space* find perimeters of polygons.

**References:**

Sunken Ships and Grid Patterns  
Ten-Minute Math: Lengths and Perimeters

**51. Associative property of addition**

**References:**

Mathematical Thinking at Grade 4  
Ten-Minute Math: Estimation and Number Sense  
Arrays and Shares  
Investigation 2: Sessions 2-6  
Investigation 3: Sessions 1-5  
Changes Over Time  
Investigation 1: Sessions 5-6  
Packages and Groups  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 3-8

**49A Addition of 5 and 6 digit numbers with or without regrouping (exchange) in one or more places**

The Grade 4 course of *Investigations in Number, Data, and Space* includes addition of numbers through the thousands (4 digits). The reference below is to a lesson on Addition and Subtraction Strategies. The suggested techniques of this lesson, along with students' experiences in this grade and in earlier grades, enable students to apply previously learned strategies to larger numbers.

**Reference:**

Mathematical Thinking at Grade 4  
Investigation 3: Sessions 4-5

**52. Subtraction of 5- and 6-digit numbers with or without regrouping (exchange) in one or more places**

The Grade 4 course of *Investigations in Number, Data, and Space* includes subtraction of numbers through 3 digits. The reference below is to a lesson on Addition and Subtraction Strategies. The suggested techniques of this lesson, along with students' experiences in this grade and in earlier grades, enable students to apply previously learned strategies to larger numbers.

**Reference:**

Mathematical Thinking at Grade 4  
Investigation 3: Sessions 4-5

**53. Multiplication of 4- and 5-digit numbers with or without regrouping (exchange) in one or more places**

There are no specific references in the Grade 4 course to the multiplication of 4- and 5-digit numbers; however, the multiplication strategies referenced below can be readily extended to apply to this objective.

**References:**

Arrays and Shares

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-8

Investigation 3: Sessions 1-5

Ten-Minute Math: Counting Around the Class

Ten-Minute Math: Multiple BINGO

Landmarks in the Thousands

Investigation 2: Session 1

Ten-Minute Math: Counting Around the Class

Packages and Groups

Investigation 1: Sessions 1-5

Investigation 2: Sessions 1-3

Investigation 3: Sessions 1-10

**54. Division of 4-digit dividends by 1- digit divisors**

There are no specific references in the Grade 4 course to the division of 4-digit dividends by 1-digit divisors; however, the division properties and strategies referenced below can be readily extended to apply to this objective.

**References:**

Arrays and Shares

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-8

Investigation 3: Sessions 1-5

Ten-Minute Math: Counting Around the Class

Ten-Minute Math: Multiple BINGO

Landmarks in the Thousands  
Investigation 2: Session 1  
Ten-Minute Math: Counting Around the Class  
Packages and Groups  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 1-2, 10

**55. Measurement – temperature using thermometers**

**References:**

Changes Over Time  
Investigation 2

**56. Integers**

**References:**

Money, Miles, and Large Numbers  
Investigation 1: Session 3: Teacher Note, page 17  
Sunken Ships and Grid Patterns  
Investigation 1  
Sessions 2-4  
Sessions 5-6: Extension, page 38

**57. Coordinate geometry**

**References:**

Sunken Ships and Grid Patterns  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 1-9  
Ten-Minute Math: Lengths and Perimeters

**58. Arrangements**

**References:**

Arrays and Shares  
Investigation 2: Sessions 1-6  
Landmarks in the Thousands  
Investigation 1: Session 2  
Different Shapes, Equal Pieces  
Investigation 1: Sessions 1, 5  
Investigation 2: Sessions 3-4

**59. Problem solving – patterns**

**References:**

Mathematical Thinking at Grade 4  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-6  
Arrays and Shares  
Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Ten-Minute Math  
Landmarks in the Thousands  
Investigation 1: Sessions 1-2  
Investigation 2: Sessions 2-4  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-3  
Changes Over Time  
Unit Preparation: Sessions 1-3  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 1-2  
Investigation 3: Sessions 1-8  
Packages and Groups  
Investigation 1: Sessions 1-2  
Investigation 3: Sessions 4-8  
Sunken Ships and Grid Patterns  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 2-4, 8-9

**60. Common factors and common multiples**

**References:**

Packages and Groups  
Investigation 3: Sessions 7-9

**May**

**61. Area**

**References:**

Arrays and Shares  
Investigation 2: Sessions 1-6  
Landmarks in the Thousands  
Investigation 1: Session 2  
Different Shapes, Equal Pieces  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-4

**62. Volume**

**References:**

Seeing Solids and Silhouettes  
Investigation 1: Sessions 1-2  
Landmarks in the Thousands  
Investigation 1: Session 2

**63. Addition and subtraction of decimals to hundredths introduced at Unit 45 reviewing multiplication and division of decimals to tenths**

**References:**

Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-2, 4-8  
Investigation 2: Sessions 1-2, 4

**64. Patterns in numeration including symmetry pattern block and square numbers**

**References:**

Landmarks in the Thousands  
Investigation 3, Sessions 1, 2  
Investigation 4, Sessions 1-3

**65. Place value through hundred millions**

**References:**

Landmarks in the Thousands  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-5  
Investigation 3: Sessions 1-5  
Investigation 4, Sessions 1-3  
Money, Miles, and Large Numbers  
Investigation 1, Sessions 1-8  
Investigation 2, Sessions 1-2  
Investigation 3, Sessions 1-4

**66. Addition and subtraction of fractions with unlike denominators**

**References:**

Different Shares, Equal Pieces  
Investigation 1: Session 5  
Investigation 2: Session 3

**67. Multiplication of 2-digit numbers**

**References:**

Packages and Groups  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 4-6

**June**

**68. Multiplication of a 3-digit number by a 2-digit number**

There are no specific references in the Grade 4 course to the multiplication of a 3-digit number by a 2-digit number; however, the multiplication strategies referenced below can be readily extended to apply to this objective.

**References:**

Arrays and Shares

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-8

Investigation 3: Sessions 1-5

Ten-Minute Math: Counting Around the Class

Ten-Minute Math: Multiple BINGO

Landmarks in the Thousands

Investigation 2: Session 1

Ten-Minute Math: Counting Around the Class

Packages and Groups

Investigation 1: Sessions 1-5

Investigation 2: Sessions 1-3

Investigation 3: Sessions 1-10

**69. Division of 2- and 3-digit dividends by multiples of 10 as divisors**

**References:**

Landmarks in the Thousands

Investigation 2: Session 1

Packages and Groups

Investigation 3: Session 3

**70. Division of 2- and 3-digit dividends by 2-digit divisors**

**References:**

Landmarks in the Thousands

Investigation 2: Session 1

Packages and Groups

Investigation 3: Sessions 4-6

**71. Symmetry**

**References:**

Mathematical Thinking at Grade 4

Investigation 4: Sessions 1-6

Sunken Ships and Grid Patterns

Investigation 2: Sessions 2-3, 6-9

**72. Coordinate geometry**

**References:**

Sunken Ships and Grid Patterns

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-9

Ten-Minute Math: Lengths and Perimeters



**73. Geometric designs**

**References:**

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

**74. Review of ratio**

**References:**

Different Shapes, Equal Pieces  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-4  
Investigation 3: Sessions 1-5  
Money, Miles, and Large Numbers  
Investigation 2: Sessions 1-3  
Three out of Four Like Spaghetti  
Investigation 1: Sessions 1-4

**75. Compare relationship between fractions, decimals, percents**

**References:**

Money, Miles, and Large Numbers  
Investigation 2: Sessions 1-4  
Three out of Four Like Spaghetti  
Investigation 1: Sessions 1-4

## District Mathematics Calendar

### September

#### 1. Review basic addition and subtraction facts

##### References:

Mathematical Thinking at Grade 4

Investigation 1: Sessions 2-4

Investigation 2: Sessions 1-2

Investigation 3: Sessions 3-5

Ten-Minute Math: Estimation and Number Sense

Arrays and Shares

Ten-Minute Math: Counting Around the Class

Landmarks in the Thousands

Investigation 2: Sessions 2-4

Different Shapes, Equal Pieces

Investigation 1: Session 5

Investigation 2: Session 3

Money, Miles, and Large Numbers

Investigation 1: Sessions 1-8

Investigation 2: Sessions 1-2, 4

Investigation 3: Sessions 1-4

Sunken Ships and Grid Patterns

Ten-Minute Math: Lengths and Perimeters

#### 2. Solid geometric figures (space figures) and their properties

##### References:

Seeing Solids and Silhouettes

Investigation 1: Sessions 1-2

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-3

Investigation 4: Sessions 1-4

#### 3. Place value

##### References:

Landmarks in the Thousands

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-5

Investigation 4, Sessions 1-3

Money, Miles, and Large Numbers

Investigation 1, Sessions 1-8

Investigation 2, Sessions 1-2

Investigation 3, Sessions 1-4

#### 4. Place value through thousands

##### References:

Landmarks in the Thousands

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-5

Investigation 4, Sessions 1-3

Money, Miles, and Large Numbers

Investigation 1, Sessions 1-8

Investigation 2, Sessions 1-2

Investigation 3, Sessions 1-4

#### 5. Graphs

Grade 4 students using *Investigations in Number, Data, and Space* are encouraged to organize and represent data using a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables may be provided to the students, or created by the students in various problem situations. Students are asked to choose an appropriate means to display their data, and are asked to explain or justify their choices.

##### References:

The Shape of the Data

Investigation 2: Sessions 2-7

Investigation 3: Sessions 3-5

Changes Over Time

Preparation Session 3

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-2

Investigation 3: Sessions 1-8

Sunken Ships and Grid Patterns

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-9

Three Out of Four Like Spaghetti

Investigation 1: Session 2

#### 6. Problem solving: use tables and graphs to locate information

##### References:

Mathematical Thinking at Grade 4

Ten-Minute Math: Exploring Data

The Shape of the Data

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-5

Changes Over Time

Unit Preparation: Sessions 1-3

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-2

Investigation 3: Sessions 1-8

Packages and Groups  
Ten-Minute Math: Exploring Data  
Sunken Ships and Grid Patterns  
Investigation 1: Sessions 5-6  
Investigation 2: Sessions 1-9  
Ten-Minute Math: Lengths and Perimeters  
Three out of Four Like Spaghetti  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-7

## 7. Place value of 5- and 6-digit numbers

### References:

Landmarks in the Thousands  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-5  
Investigation 3: Sessions 1-5  
Investigation 4, Sessions 1-3  
Money, Miles, and Large Numbers  
Investigation 1, Sessions 1-8  
Investigation 2, Sessions 1-2  
Investigation 3, Sessions 1-4

## October

## 8. Round 4- and 5-digit numbers

### References:

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

**9. Money to fifty-dollar bill**

**References:**

Mathematical Thinking at Grade 4  
Investigation 2: Sessions 1-4  
Investigation 3: Sessions 4-5  
Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-8

**10. Review – addition**

**References:**

Mathematical Thinking at Grade 4  
Investigation 1: Sessions 2-4  
Investigation 2: Sessions 1-2  
Investigation 3: Sessions 3-5  
Ten-Minute Math: Estimation and Number Sense  
Arrays and Shares  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Thousands  
Investigation 2: Sessions 2-4  
Different Shapes, Equal Pieces  
Investigation 1: Session 5  
Investigation 2: Session 3  
Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-8  
Investigation 2: Sessions 1-2, 4  
Investigation 3: Sessions 1-4  
Sunken Ships and Grid Patterns  
Ten-Minute Math: Lengths and Perimeters

**11. Addition of numbers through 4 digits**

**References:**

Mathematical Thinking at Grade 4  
Investigation 1: Sessions 2-4  
Investigation 2: Sessions 1-2  
Investigation 3: Sessions 3-5  
Ten-Minute Math: Estimation and Number Sense  
Arrays and Shares  
Ten-Minute Math: Counting Around the Class  
Landmarks in the Thousands  
Investigation 2: Sessions 2-4  
Money, Miles, and Large Numbers  
Investigation 3: Sessions 1-4  
Sunken Ships and Grid Patterns  
Ten-Minute Math: Lengths and Perimeters

## 12. Review – subtraction

### References:

Mathematical Thinking at Grade 4

Investigation 1: Sessions 2-4

Investigation 2: Sessions 1-2

Investigation 3: Sessions 3-5

Ten-Minute Math: Estimation and Number Sense

Arrays and Shares

Ten-Minute Math: Counting Around the Class

Landmarks in the Thousands

Investigation 2: Sessions 2-4

Different Shapes, Equal Pieces

Investigation 1: Session 5

Investigation 2: Session 3

Money, Miles, and Large Numbers

Investigation 1: Sessions 1-8

Investigation 2: Sessions 1-2, 4

Investigation 3: Sessions 1-4

Sunken Ships and Grid Patterns

Ten-Minute Math: Lengths and Perimeters

## 13. Subtraction of 4-digit numbers

The Grade 4 course of *Investigations in Number, Data, and Space* includes subtraction of numbers through 3 digits. The reference below is to a lesson on Addition and Subtraction Strategies. The suggested techniques of this lesson, along with students' experiences in this grade and in earlier grades, enable students to apply previously learned strategies to larger numbers.

### Reference:

Mathematical Thinking at Grade 4

Investigation 3: Sessions 4-5

## 14. Addition of subtraction of fractions with common denominators

### References:

Different Shares, Equal Pieces

Investigation 1: Session 5

Investigation 2: Session 3

## November

## 15. Open sentences

Grade 4 students using *Investigations in Number, Data, and Space* gain experience and practice in solving problems involving missing information, including on-computer and off-computer activities to find missing lengths and turns.

**References:**

Landmarks in the Thousands  
Investigation 2: Sessions 2-4  
Changes Over Time  
Investigation 1: Sessions 5-6

**16. Problem solving – use number sentences to solve problems**

**References:**

Arrays and Shares  
Investigation 2: Sessions 2-3  
Investigation 3: Session 1  
Landmarks in the Thousands  
Investigation 2: Sessions 2-4  
Changes Over Time  
Investigation 1: Sessions 5-6  
Packages and Groups  
Investigation 3: Sessions 1-2

**17. Review – multiplication and division facts**

**References:**

Mathematical Thinking at Grade 4  
Investigation 1: Sessions 2-3  
Arrays and Shares  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-8  
Investigation 3: Sessions 1-5  
Ten-Minute Math: Counting Around the Class  
Ten-Minute Math: Multiple BINGO  
Landmarks in the Thousands  
Investigation 2: Session 1  
Ten-Minute Math: Counting Around the Class  
Packages and Groups  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 1-10

**18. Basic multiplication facts for 11 and 12 through 144**

**References:**

Mathematical Thinking at Grade 4  
Investigation 1: Sessions 2-3  
Arrays and Shares  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-8

Investigation 3: Sessions 1-5  
Ten-Minute Math: Counting Around the Class  
Ten-Minute Math: Multiple BINGO  
Landmarks in the Thousands  
Ten-Minute Math: Counting Around the Class  
Packages and Groups  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 1-10

**19. Problem solving – guess and check**

Several of the Grade 4 texts in the *Investigations in Number, Data, and Space* series include Ten-Minute Math: Estimation and Number Sense as one of the appendices.

**References:**

Landmarks in the Thousands  
Investigation 3: Sessions 3-5  
The Shape of Data  
Investigation 1: Sessions 2-3: Ten-Minute Math  
Investigation 2: Session 1: Ten-Minute Math  
Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-5, 7-8  
Investigation 2: Sessions 1-2  
Investigation 3: Sessions 1-4

**20. Multiplication of 2- and 3-digit numbers by a 1-digit number**

**References:**

Arrays and Shares  
Investigation 3: Sessions 1-5  
Packages and Groups  
Investigation 1: Sessions 4-5  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 4-6

**21. Properties of division**

**References:**

Mathematical Thinking at Grade 4  
Investigation 1: Sessions 2-3  
Arrays and Shares  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-8  
Investigation 3: Sessions 1-5  
Ten-Minute Math: Counting Around the Class  
Ten-Minute Math: Multiple BINGO



Landmarks in the Thousands  
Investigation 2: Session 1  
Ten-Minute Math: Counting Around the Class  
Packages and Groups  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 1-2, 10

## December

### 22. Division of 2- and 3-digit dividends by a 1-digit divisor without regrouping

#### References:

Landmarks in the Thousands  
Investigation 2: Session 1  
Packages and Groups  
Investigation 3: Sessions 1-2

### 23. Division of 2- and 3-digit dividend by a 1-digit divisor with regrouping

#### References:

Landmarks in the Thousands  
Investigation 2: Session 1  
Packages and Groups  
Investigation 3: Sessions 1-2

### 24. Statistics

As the title of the course implies, data analysis and interpretation is an important feature in *Investigations in Number, Data, and Space*. In addition to the regular coursework, some appendices contain supplemental features related to data collection and analysis. The series for Grade 4 includes Ten-Minute Math exercises, which include a feature entitled, Exploring Data, which gives students further and ongoing opportunities to collect, analyze, organize, display, describe, and interpret data. Students are encouraged to organize and represent data using a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables may be provided to the students, or created by the students in various problem situations. Students are asked to choose an appropriate means to display their data, and are asked to explain or justify their choices. Students use *Geo-Logo* software to specify motions and draw paths and shapes on a coordinate grid.

#### References:

Mathematical Thinking at Grade 4  
Ten-Minute Math: Exploring Data  
The Shape of the Data  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 1-5

Changes Over Time  
Unit Preparation: Sessions 1-3  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 1-2  
Investigation 3: Sessions 1-8  
Packages and Groups  
Ten-Minute Math: Exploring Data  
Sunken Ships and Grid Patterns  
Investigation 1: Sessions 5-6  
Investigation 2: Sessions 1-9  
Ten-Minute Math: Lengths and Perimeters  
Three out of Four Like Spaghetti  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-7

**25. Multiplication of fractions**

Students may multiply fractions by 2 to determine if the fractions are greater than or less than one-half.

**Reference:**

Different Shapes, Equal Pieces

Investigation 3: Sessions 4-5: Teacher Note, page 48

**26. Equivalent fractions**

**References:**

Different Shapes, Equal Pieces

Investigation 1: Session 5

Investigation 2: Session 3

Investigation 3: Sessions 1-2

**27. Order of unit fractions**

**References:**

Different Shapes, Equal Pieces

Investigation 2: Session 4

Investigation 3: Sessions 1-5

Three out of Four Like Spaghetti

Investigation 1: Sessions 1-3

**28. Linear measurement**

**References:**

The Shape of the Data

Investigation 2: Sessions 1-4

Money, Miles, and Large Numbers

Investigation 2: Sessions 1-4

Investigation 3: Sessions 2-4

Changes Over Time  
Unit Preparation: Sessions 1-3  
Sunken Ships and Grid Patterns  
Investigation 1: Sessions 1-6

**29. Even and odd patterns with addition and subtraction**

Grade 4 students using *Investigations in Number, Data, and Space* explore even and odd numbers on a 100 chart, and they investigate the divisibility of even and odd numbers.

**References:**

Arrays and Shares  
Investigation 1: Sessions 1-2  
Investigation 2: Sessions 2-3  
Packages and Groups  
Investigation 3: Sessions 7-8

**January**

**30. Lines and properties of lines**

Grade 4 students using the *Investigations in Number, Data, and Space* series gain experience with parallel lines and perpendicular lines as they use the computer to construct and manipulate points, segments, and rectangles on coordinate grids.

**References:**

Sunken Ships and Grid Patterns  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 1-9  
Ten-Minute Math: Lengths and Perimeters

**31. Decimals to hundredths**

**References:**

Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-2, 4-8  
Investigation 2: Sessions 1-2, 4

**32. Order decimals**

**References:**

Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-2  
Investigation 2: Sessions 1-2

### 33. Probability

#### References:

Landmarks in the Thousands  
Ten-Minute Math: What Is Likely?  
Money, Miles, and Large Numbers  
Ten-Minute Math: Likely or Unlikely?  
Three Out of Four Like Spaghetti  
Ten-Minute Math: What Is Likely?

### 34. Prime numbers

#### References:

Arrays and Shares  
Investigation 2: Sessions 2-3

### 35. Properties of a circle

Grade 4 students using *Investigations in Number, Data, and Space* investigate circles as silhouettes of spheres, cylinders, and cones.

#### References:

Seeing Solids and Silhouettes  
Investigation 2: Sessions 1-2

### 36. Polygons

#### References:

Mathematical Thinking at Grade 4  
Investigation 4: Sessions 2-6  
Seeing Solids and Silhouettes  
Investigation 2: Sessions 1-2  
Ten-Minute Math: Quick Images  
Different Shapes, Equal Pieces  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-4  
Changes Over Time  
Ten-Minute Math: Quick Images  
Sunken Ships and Grid Patterns  
Investigation 2: Sessions 1-9

### 37. Addition of 5-digit numbers with or without regrouping (exchange) in one or more places

The Grade 4 course of *Investigations in Number, Data, and Space* includes addition of numbers through the thousands (4 digits). The reference below is to a lesson on Addition and Subtraction Strategies. The suggested techniques of this lesson, along with students' experiences in this grade and in earlier grades, enable students to apply previously learned strategies to larger numbers.

**Reference:**

Mathematical Thinking at Grade 4  
Investigation 3: Sessions 4-5

**February**

**38. Subtraction of 5-digit numbers with or without regrouping (exchange) in one or more regrouping**

The Grade 4 course of *Investigations in Number, Data, and Space* includes subtraction of numbers through 3 digits. The reference below is to a lesson on Addition and Subtraction Strategies. The suggested techniques of this lesson, along with students' experiences in this grade and in earlier grades, enable students to apply previously learned strategies to larger numbers.

**Reference:**

Mathematical Thinking at Grade 4  
Investigation 3: Sessions 4-5

**39. Improper fractions and mixed numbers**

**References:**

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

**40. Addition and subtraction of mixed numbers with common denominators**

Although this objective is not explicitly taught in the Grade 4 course of *Investigations in Number, Data, and Space*, it is a direct extension of the addition and subtraction of fractions with common denominators, which is referenced below.

**References:**

Different Shares, Equal Pieces  
Investigation 1: Session 5  
Investigation 2: Session 3

**41. Customary capacity relationships**

Grade 4 students using *Investigations in Number, Data, and Space* explore volume concepts by finding the volumes of cube configurations and rectangular solids.

**References:**

Seeing Solids and Silhouettes  
Investigation 1: Sessions 1-2  
Landmarks in the Thousands  
Investigation 1: Session 2

#### 42. Parallelograms

##### References:

Mathematical Thinking at Grade 4  
Investigation 4: Sessions 2-6  
Seeing Solids and Silhouettes  
Ten-Minute Math: Quick Images  
Different Shapes, Equal Pieces  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-4  
Changes Over Time  
Ten-Minute Math: Quick Images  
Sunken Ships and Grid Patterns  
Investigation 2: Sessions 1-9

#### 43. Perimeters

##### References:

Sunken Ships and Grid Patterns  
Ten-Minute Math: Lengths and Perimeters

#### 44. The distributive property of division

##### References:

Mathematical Thinking at Grade 4  
Ten-Minute Math: Estimation and Number Sense  
Arrays and Shares  
Investigation 2: Sessions 2-6  
Investigation 3: Sessions 1-5  
Changes Over Time  
Investigation 1: Sessions 5-6  
Packages and Groups  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 3-8

### March

#### 45. Multiplication of money values

Grade 4 students using *Investigations in Number, Data, and Space* add and subtract money values.

##### References:

Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-8

**46. Division of money values**

Grade 4 students using *Investigations in Number, Data, and Space* add and subtract money values.

**References:**

Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-8

**47. Roman systems to symbol C**

There are no references to Roman numerals in the Grade 4 course of *Investigations in Number, Data, and Space*.

**48. Circumference**

Grade 4 students using *Investigations in Number, Data, and Space* find perimeters of polygons.

**References:**

Sunken Ships and Grid Patterns  
Ten-Minute Math: Lengths and Perimeters

**49. Associative property of addition**

**References:**

Mathematical Thinking at Grade 4  
Ten-Minute Math: Estimation and Number Sense  
Arrays and Shares  
Investigation 2: Sessions 2-6  
Investigation 3: Sessions 1-5  
Changes Over Time  
Investigation 1: Sessions 5-6  
Packages and Groups  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 3-8

**50. Addition of 5- and 6-digit numbers with or without regrouping (exchange) in one or more places**

The Grade 4 course of *Investigations in Number, Data, and Space* includes addition of numbers through the thousands (4 digits). The reference below is to a lesson on Addition and Subtraction Strategies. The suggested techniques of this lesson, along with students' experiences in this grade and in earlier grades, enable students to apply previously learned strategies to larger numbers.

**Reference:**

Mathematical Thinking at Grade 4  
Investigation 3: Sessions 4-5

**51. Subtraction of 5- and 6-digit numbers with or without regrouping (exchange) in one or more places**

The Grade 4 course of *Investigations in Number, Data, and Space* includes subtraction of numbers through 3 digits. The reference below is to a lesson on Addition and Subtraction Strategies. The suggested techniques of this lesson, along with students' experiences in this grade and in earlier grades, enable students to apply previously learned strategies to larger numbers.

**Reference:**

Mathematical Thinking at Grade 4  
Investigation 3: Sessions 4-5

**April**

**52. Multiplication of 4- and 5-digit numbers by a 1-digit number**

There are no specific references in the Grade 4 course to the multiplication of 4- and 5-digit numbers by a 1-digit number; however, the multiplication strategies referenced below can be readily extended to apply to this objective.

**References:**

Arrays and Shares

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-8

Investigation 3: Sessions 1-5

Ten-Minute Math: Counting Around the Class

Ten-Minute Math: Multiple BINGO

Landmarks in the Thousands

Investigation 2: Session 1

Ten-Minute Math: Counting Around the Class

Packages and Groups

Investigation 1: Sessions 1-5

Investigation 2: Sessions 1-3

Investigation 3: Sessions 1-10

**53. Division of 4-digit dividends by 1-digit divisors**

There are no specific references in the Grade 4 course to the division of 4-digit dividends by 1-digit divisors; however, the division properties and strategies referenced below can be readily extended to apply to this objective.

**References:**

Arrays and Shares

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-8

Investigation 3: Sessions 1-5

Ten-Minute Math: Counting Around the Class

Ten-Minute Math: Multiple BINGO



Landmarks in the Thousands  
Investigation 2: Session 1  
Ten-Minute Math: Counting Around the Class  
Packages and Groups  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-3  
Investigation 3: Sessions 1-2, 10

**54. Measurement – temperature**

**References:**

Changes Over Time  
Investigation 2

**55. Integers**

**References:**

Money, Miles, and Large Numbers  
Investigation 1: Session 3: Teacher Note, page 17  
Sunken Ships and Grid Patterns  
Investigation 1  
Sessions 2-4  
Sessions 5-6: Extension, page 38

**56. Arrangements**

**References:**

Arrays and Shares  
Investigation 2: Sessions 1-6  
Landmarks in the Thousands  
Investigation 1: Session 2  
Different Shapes, Equal Pieces  
Investigation 1: Sessions 1, 5  
Investigation 2: Sessions 3-4

**57. Problem solving – patterns**

**References:**

Mathematical Thinking at Grade 4  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-6  
Arrays and Shares  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-6  
Investigation 3: Sessions 1-5  
Ten-Minute Math

Landmarks in the Thousands  
Investigation 1: Sessions 1-2  
Investigation 2: Sessions 2-4  
Investigation 3: Sessions 1-5  
Investigation 4: Sessions 1-3  
Changes Over Time  
Unit Preparation: Sessions 1-3  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 1-2  
Investigation 3: Sessions 1-8  
Packages and Groups  
Investigation 1: Sessions 1-2  
Investigation 3: Sessions 4-8  
Sunken Ships and Grid Patterns  
Investigation 1: Sessions 1-6  
Investigation 2: Sessions 2-4, 8-9

**58. Common factors**

**References:**

Packages and Groups  
Investigation 3: Sessions 7-9

**May**

**59. Area**

**References:**

Arrays and Shares  
Investigation 2: Sessions 1-6  
Landmarks in the Thousands  
Investigation 1: Session 2  
Different Shapes, Equal Pieces  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-4

**60. Volume**

**References:**

Seeing Solids and Silhouettes  
Investigation 1: Sessions 1-2  
Landmarks in the Thousands  
Investigation 1: Session 2

**61. Addition and subtraction of decimals to hundredths**

**References:**

Money, Miles, and Large Numbers  
Investigation 1: Sessions 1-2, 4-8  
Investigation 2: Sessions 1-2, 4

**62. Multiplication and division of decimals**

**References:**

Money, Miles, and Large Numbers

Investigation 2: Session 3: Dialogue Box, page 39

**63. Patterns in numeration**

**References:**

Landmarks in the Thousands

Investigation 3, Sessions 1, 2

Investigation 4, Sessions 1-3

**64. Place value through hundred millions**

**References:**

Landmarks in the Thousands

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-5

Investigation 4, Sessions 1-3

Money, Miles, and Large Numbers

Investigation 1, Sessions 1-8

Investigation 2, Sessions 1-2

Investigation 3, Sessions 1-4

**65. Addition and subtraction of fractions with unlike denominators**

**References:**

Different Shares, Equal Pieces

Investigation 1: Session 5

Investigation 2: Session 3

**66. Multiplication of 2-digit numbers**

**References:**

Packages and Groups

Investigation 2: Sessions 1-3

Investigation 3: Sessions 4-6

**June**

**67. Multiplication of a 3-digit number by a 2-digit number**

There are no specific references in the Grade 4 course to the multiplication of a 3-digit number by a 2-digit number; however, the multiplication strategies referenced below can be readily extended to apply to this objective.

**References:**

Arrays and Shares

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-8

Investigation 3: Sessions 1-5

Ten-Minute Math: Counting Around the Class

Ten-Minute Math: Multiple BINGO

Landmarks in the Thousands

Investigation 2: Session 1

Ten-Minute Math: Counting Around the Class

Packages and Groups

Investigation 1: Sessions 1-5

Investigation 2: Sessions 1-3

Investigation 3: Sessions 1-10

**68. Division of 2- and 3-digit dividends by multiples of 10 as divisors**

**References:**

Landmarks in the Thousands

Investigation 2: Session 1

Packages and Groups

Investigation 3: Session 3

**69. Division of 2- and 3-digit dividends**

**References:**

Landmarks in the Thousands

Investigation 2: Session 1

Packages and Groups

Investigation 3: Sessions 4-6

**70. Symmetry**

**References:**

Mathematical Thinking at Grade 4

Investigation 4: Sessions 1-6

Sunken Ships and Grid Patterns

Investigation 2: Sessions 2-3, 6-9

**71. Coordinate geometry**

**References:**

Sunken Ships and Grid Patterns

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-9

Ten-Minute Math: Lengths and Perimeters

**72. Geometric designs**

**References:**

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

**73. Ratio**

**References:**

Different Shapes, Equal Pieces  
Investigation 1: Sessions 1-5  
Investigation 2: Sessions 1-4  
Investigation 3: Sessions 1-5  
Money, Miles, and Large Numbers  
Investigation 2: Sessions 1-3  
Three out of Four Like Spaghetti  
Investigation 1: Sessions 1-4

**Investigations in Number, Data, & Space  
to the  
New York City School District 30  
Mathematics**

**Grade Five**

**Scope and Sequence**

**September**

**1. Place value to hundred thousands**

**References:**

Mathematical Thinking at Grade 5

Investigation 2: Session 5

Investigation 3: Session 1

Investigation 4: Sessions 1-6

Building on Numbers You Know

Investigation 4: Sessions 1-2

Investigation 5: Sessions 4-7

**2. Comparing and ordering whole numbers to 100,000**

**References:**

Building on Numbers You Know

Investigation 1: Session 2

**3. Addition and subtraction of whole numbers to 1,000 place with regrouping**

**References:**

Mathematical Thinking at Grade 5

Investigation 4: Session 1

Building on Numbers You Know

Investigation 1: Sessions 3-4: Teacher Note, pp. 23-24

Investigation 1: Sessions 6-8

Investigation 5: Sessions 4-6

**4. Rounding and estimating whole numbers to the 10,000 place with regrouping**

Estimation and Number Sense is a recurrent feature in the Ten-Minute Math appendices in each of the texts in the *Investigations in Number, Data, and Space* series.

**References:**

Between Never and Always

Ten-Minute Math: Nearest Answer

Building on Numbers You Know

Investigation 1: Session 2

Investigation 3: Sessions 1-6

Investigation 5: Sessions 1-2

Measurement Benchmarks

Ten-Minute Math: Estimation and Number Sense

Data: Kids, Cats, and Ads

Investigation 3: Sessions 1-3

Investigation 4: Sessions 1-3

### **5. Problem Solving: Basic operations with whole numbers/logical reasoning and estimating**

Grade 5 students using Investigations in *Number, Data, and Space* apply a variety of problem-solving strategies throughout the course. They explore numbers, number relationships, and operations on numbers; they apply logical reasoning to predict the lengths of the sides of smaller and larger similar shapes; and they develop strategies for estimating answers to difficult multiplication and division problems.

#### **References:**

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1-6

Picturing Polygons

Investigation 3: Sessions 5-6

Name That Portion

Investigation 1: Sessions 5-6

Between Never and Always

Investigation 2: Sessions 1-5

Building on Numbers You Know

Investigation 5: Sessions 1-7

Measurement Benchmarks

Investigation 1: Sessions 1-8

Patterns of Change

Investigation 3: Sessions 1-7

Containers and Cubes

Investigation 3: Sessions 1-4

Data: Kids, Cats, and Ads

Investigation 5: Sessions 1-5

**6. Multiplication of 3-digit numbers by 2- digit numbers including multiplication by 10, 100, 1000**

**References:**

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-4

Investigation 3: Sessions 1-5

Picturing Polygons

Ten-Minute Math: Multiple and Factor BINGO

Building on Numbers You Know

Investigation 1: Sessions 3-4

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-10

Investigation 5: Sessions 4-6

Containers and Cubes

Investigation 1: Sessions 1-5

Investigation 4: Sessions 7-9

Ten-Minute Math: Counting Around the Class

**October**

**7. Division of 4- and 5-digit dividends by 1-digit divisor**

**References:**

Building on Numbers You Know

Investigation 5: Sessions 4-6

**8. Number patterns**

**References:**

Mathematical Thinking at Grade 5

Investigation 2: Sessions 1-4

Investigation 3: Session 1

Name That Portion

Investigation 3: Sessions 5-6: Activity, pages 86-88

Building on Numbers You Know

Investigation 1: Sessions 1-5

Patterns of Change

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-7

Ten-Minute Math: Graph Stories

Containers and Cubes

Ten-Minute Math: Counting Around the Class



**9. Problem Solving: Draw a picture, make a table or chart, find a pattern**

Grade 5 students using *Investigations in Number, Data, and Space* model and solve problems by drawing a picture, making a table or chart, and finding a pattern throughout the course.

**Sample References:**

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1-3

Picturing Polygons

Investigation 1: Session 3

Name That Portion

Investigation 2: Sessions 1-2

Between Never and Always

Investigation 1: Sessions 1-2

Building on Numbers You Know

Investigation 4: Session 1

Measurement Benchmarks

Investigation 1: Sessions 5-6

Patterns of Change

Investigation 2: Session 3

Containers and Cubes

Investigation 2: Sessions 3-4

Data: Kids, Cats, and Ads

Investigation 5: Sessions 3-5

**10. Prime and composite numbers – Prime factorization/factor trees**

**References:**

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1-6

**11. Factors and GCF**

**References:**

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-5

Investigation 4: Sessions 5-6

Picturing Polygons

Ten-Minute Math: Multiple and Factor BINGO

Building on Numbers You Know

Investigation 4: Session 1

## 12. Multiples and LCM

### References:

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-5

Investigation 4: Sessions 5-6

Picturing Polygons

Ten-Minute Math: Multiple and Factor BINGO

Building on Numbers You Know

Investigation 1: Sessions 1, 3-5

## 13. Meaning of fractions

### References:

Name That Portion

Investigation 1: Sessions 1-7

Investigation 2: Sessions 1-9

Investigation 3: Sessions 5-8

Investigation 4: Sessions 1, 3-6

Ten-Minute Math: Seeing Numbers

Between Never and Always

Investigation 1: Sessions 1-4

Building on Numbers You Know

Investigation 2: Session 3: Teacher Note, page 54

Data: Kids, Cats, and Ads

Investigation 3: Sessions 1-4

Investigation 4: Sessions 1-3

## 14. Comparing and ordering fractions on a number line

### References:

Name That Portion

Investigation 1: Sessions 5-6

Investigation 2: Sessions 4-6

## November

## 15. Equivalence of fractions

### References:

Name That Portion

Investigation 1: Sessions 2-6

Investigation 2: Sessions 3-8

Investigation 3: Sessions 1

Between Never and Always  
Investigation 1: Sessions 1-2  
Data: Kids, Cats, and Ads  
Investigation 3: Session 1

**16. Simplification of fractions**

**References:**

Name That Portion  
Investigation 1: Sessions 2-6  
Investigation 2: Sessions 3-8  
Investigation 3: Sessions 1  
Between Never and Always  
Investigation 1: Sessions 1-2  
Data: Kids, Cats, and Ads  
Investigation 3: Session 1

**17. Fractional parts of circle graphs**

**References:**

Name That Portion  
Investigation 4: Sessions 1-7

**18. Converting mixed numbers and improper fractions**

**References:**

Name That Portion  
Investigation 2: Sessions 1-9  
Investigation 3: Sessions 5-6: Dialogue Box, page 91  
Building on Numbers You Know  
Investigation 2: Session 3: Teacher Note, page 54  
Investigation 2: Sessions 4-6

**19. Addition of fractions and simple mixed numbers with like and unlike denominators**

**References:**

Name That Portion  
Investigation 2: Sessions 1-3, 6-9  
Investigation 3: Session 7  
Data: Kids, Cats, and Ads  
Investigation 4: Session 3

**20. Subtraction of fractions and simple mixed numbers with like and unlike denominators**

**References:**

Name That Portion

Investigation 2: Sessions 1-3, 6-9

Investigation 3: Session 7

Data: Kids, Cats, and Ads

Investigation 4: Session 3

**21. Multiplication of fractions and a whole number with problem solving**

**References:**

Name That Portion

Ten-Minute Math: Seeing Numbers

**22. Problem Solving: Draw a picture**

**References:**

Picturing Polygons

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-9

Investigation 3: Sessions 1-6

Name That Portion

Investigation 1: Session 2

Investigation 2: Sessions 1-2

Investigation 3: Sessions 2, 8

Investigation 4: Session 2

Building on Numbers You Know

Investigation 2: Session 4, page 58

Measurement Benchmarks

Investigation 1: Sessions 5-6

Patterns of Change

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1, 4

Investigation 3: Sessions 1-7

Containers and Cubes

Investigation 2: Sessions 3-4, page 32

**23. Multiplication of fractions and a whole number with problem solving**

**References:**

Name That Portion

Ten-Minute Math: Seeing Numbers

**24. Problem Solving: Draw a picture**

**References:**

Picturing Polygons

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-9

Investigation 3: Sessions 1-6

Name That Portion

Investigation 1: Session 2

Investigation 2: Sessions 1-2

Investigation 3: Sessions 2, 8

Investigation 4: Session 2

Building on Numbers You Know

Investigation 2: Session 4, page 58

Measurement Benchmarks

Investigation 1: Sessions 5-6

Patterns of Change

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1, 4

Investigation 3: Sessions 1-7

Containers and Cubes

Investigation 2: Sessions 3-4, page 32

**December**

**25. Meaning of decimal numbers to the thousandths place**

**References:**

Name That Portion

Investigation 3: Sessions 1-8

Between Never and Always

Investigation 1: Sessions 1-2

Building on Numbers You Know

Investigation 2: Session 3: Teacher Note, page 54

Containers and Cubes

Ten-Minute Math: Counting Around the Class: Fractions and Decimals

Data: Kids, Cats, and Ads

Investigation 3: Session 1, page 50

**26. Relationship of decimals and money**

**References:**

Name That Portion

Investigation 3: Session 1, page 67

Containers and Cubes

**27. Place value and rounding decimal numbers to the 1000<sup>th</sup> place**

**References:**

Between Never and Always  
Ten-Minute Math: Nearest Answer

**28. Comparing and ordering decimal numbers**

**References:**

Name That Portion  
Investigation 3: Sessions 2-6

**29. Rounding decimal numbers to the nearest whole number**

**References:**

Between Never and Always  
Ten-Minute Math: Nearest Answer

**30. Exchanging fractions and decimals**

**References:**

Name That Portion  
Investigation 1: Sessions 1-7  
Investigation 3: Sessions 1-8  
Ten-Minute Math: Seeing Numbers  
Between Never and Always  
Investigation 1: Sessions 1-4  
Building on Numbers You Know  
Investigation 2: Session 3: Teacher Note, page 54  
Data, Kids, Cats, and Ads  
Investigation 3: Session 1

**31. Operations with decimals using problem solving approach (+, -, x, /) includes multiplication of decimals by 10, 100, 1000**

**References:**

Measurement Benchmarks  
Ten-Minute Math: Estimation and Number Sense

**32. Meaning of percent**

**References:**

Name That Portion  
Investigation 1: Sessions 1-7  
Investigation 3  
Session 1: Extension, page 71  
Session 7  
Investigation 4: Sessions 1-7  
Data, Kids, Cats, and Ads  
Investigation 3: Sessions 1-4

### 33. Exchanging percents, decimals and fractions

#### References:

Name That Portion

Investigation 1: Sessions 1-7

Investigation 3: Sessions 1-8

Ten-Minute Math: Seeing Numbers

Between Never and Always

Investigation 1: Sessions 1-4

Building on Numbers You Know

Investigation 2: Session 3: Teacher Note, page 54

Data, Kids, Cats, and Ads

Investigation 3: Session 1

## January

### 34. Percentages of circle graphs

#### References:

Name That Portion

Investigation 4: Sessions 1-7

### 35. Exponents and order of operations (include square and cubed numbers)

#### References:

Name That Portion

Ten-Minute Math: Seeing Numbers

Building on Numbers You Know

Investigation 1:

Sessions 3-4: Teacher Note, pages 23-24

Sessions 6-8: Teacher Note, page 34; Dialogue Box, page 35

Investigation 3: Sessions 1-3, 7-10

Investigation 4: Session 1

### 36. Problem Solving: solve a simpler problem

Solving a simpler problem is one of the many problem-solving strategies employed by Grade 5 students using *Investigations in Number, Data, and Space* throughout the course.

#### Sample References:

Mathematical Thinking at Grade 5

Investigation 1: Sessions 4-6

Picturing Polygons

Investigation 3: Session 4

Name That Portion

Investigation 1: Session 7

Between Never and Always

Investigation 1: Session 5

Building on Numbers You Know

Investigation 5: Session 3  
Measurement Benchmarks  
Investigation 1: Sessions 7-8  
Patterns of Change  
Investigation 3: Sessions 1-2  
Containers and Cubes  
Investigation 3: Session 4  
Data: Kids, Cats, and Ads  
Investigation 4: Session 1

**37. Customary linear measure, use of ruler**

**References:**

Measurement Benchmarks  
Investigation 1: Sessions 1-8

**38. Customary capacity and weight**

**References:**

Measurement Benchmarks  
Investigation 2: Sessions 1-8  
Containers and Cubes  
Investigations 1-4

**39. Metric linear measure, use of ruler**

**References:**

Measurement Benchmarks  
Investigation 1: Sessions 1-8

**40. Metric capacity and weight**

**References:**

Measurement Benchmarks  
Investigation 2: Sessions 1-8  
Containers and Cubes  
Investigations 1-4

**41. Time and time equivalents with problem solving**

Grade 5 students use “lifetime strips” to represent and compare ages; they use stories, graphs, and tables to represent changes in speed and position over time.

**References:**

Measurement Benchmarks  
Investigation 3: Sessions 1-3  
Patterns of Change  
Investigation 2: Sessions 1-5  
Ten-Minute Math: Graph Stories

**42.**



**43. Distance**

**References:**

Picturing Polygons

Investigation 1: Sessions 3-4

Investigation 2: Sessions 4-7

Investigation 3: Sessions 1-2, 5-6

Measurement Benchmarks

Investigation 1: Sessions 1-8

**44. Problem Solving: Determine number sentence to solve problem, solve simple number sentence with one variable**

**References:**

Mathematical Thinking at Grade 5

Investigation 2: Session 1

Investigation 3: Sessions 2-5

Investigation 4: Session 1

Name That Portion

Ten-Minute Math: Seeing Numbers

Building on Numbers You Know

Investigation 1: Sessions 1, 3-4, 6-8

Investigation 2: Sessions 1-2, 5-6

Investigation 3: Sessions 1-10

**February**

**45. Lines, line segments, rays, points and intersection (Parallel, perpendicular)**

**References:**

Picturing Polygons

Investigation 2: Sessions 1-7

**46. Planes, angles and angle measurement – include within a triangle, square, and circle)**

**References:**

Picturing Polygons

Investigation 2: Sessions 1-3, 6-9

Investigation 3: Sessions 1-3

**47. Identify basic polygons**

**References:**

Mathematical Thinking at Grade 5

Picturing Polygons  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-9  
Investigation 3: Sessions 1-6  
Building on Numbers You Know  
Ten-Minute Math: Quick Images

**48. Triangles – identify type**

**References:**

Picturing Polygons  
Investigation 2: Sessions 1-9  
Investigation 3: Sessions 1-6

**49. Rectangles and parallelograms, properties**

**References:**

Picturing Polygons  
Investigation 2: Sessions 1-5, 8  
Investigation 3: Sessions 1-6

**50. Perimeter of simple polygons**

**References:**

Picturing Polygons  
Investigation 3: Sessions 5-6: Extension, page 108  
Measurement Benchmarks  
Investigation 1: Sessions 5-6

**51. Area of simple polygons – irregular shapes and estimation**

**References:**

Mathematical Thinking at Grade 5  
Investigation 1: Sessions 1-3  
Picturing Polygons  
Investigation 3: Sessions 4-6  
Name That Portion  
Investigation 1: Sessions 2-4  
Investigation 3: Sessions 2, 8

**52. Geometric patterns – slides, flips, turns**

**References:**

Picturing Polygons: 51, 53, 71, 93-111  
Data: Kids, Cats, and Ads: 109

**53. Congruence, similarity**

Grade 5 students using *Investigations in Number, Data, and Space* use *Geo-Logo* to construct polygons with given conditions that are necessary and sufficient to determine the size and shape of the figure. Students also use scales on maps to calculate approximate distances.

**References:**

Picturing Polygons

Investigation 2: Sessions 4-5

Investigation 3: Sessions 4-6

Measurement Benchmarks

Investigation 1: Sessions 7-8

Containers and Cubes

Investigation 1: Sessions 3-4

**54. Line of symmetry**

**References:**

Picturing Polygons

Investigation 3: Session 4

**55. Circle concepts and circumference (using  $\pi = 3.14$ )**

Grade 5 students using *Investigations in Number, Data, and Space* investigate properties and relationships of circles as they explore fractional areas of a clock face and as they construct circle graphs.

**References:**

Name That Portion

Investigation 1: Session 7, page 31

Investigation 2: Sessions 1-2

Investigation 3: Session 8

Investigation 4: Sessions 2-7

**56. Space figures**

**References:**

Containers and Cubes

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-4

Investigation 4: Sessions 1-9

Data, Kids, Cats, and Ads

Ten-Minute Math: Volume and Surface Area

### 57. Volume of cube and rectangular prism

#### References:

Containers and Cubes

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-4

Investigation 4: Sessions 1-9

Data, Kids, Cats, and Ads

Ten-Minute Math: Volume and Surface Area

## March

### 58. Mean, median, mode and range

Grade 5 students gain experience with measures of central tendency through finding the median of a set of data and through discussion of the spread and clustering of data.

#### References:

Between Never and Always

Investigation 1: Sessions 3-6

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1-4

Investigation 2: Session 1

### 59. Sets – subsets, intersection, union, Venn diagrams

Grade 5 students using *Investigations in Number, Data, and Space* explore sets of factor pairs, sets of polygons, and sets of data.

#### References:

Mathematical Thinking at Grade 5

Investigation 1: Sessions 3-4

Investigation 2: Sessions 2-5

Picturing Polygons

Investigation 1: Session 1

Investigation 2: Sessions 1-3

Investigation 3: Sessions 1-2

Building on Numbers You Know

Ten-Minute Math: Quick Images

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-3

Investigation 3: Sessions 1-4

Investigation 4: Sessions 1-3

Investigation 5: Sessions 1-5

**60. Line graphs – read, interpret and design**

Grade 5 students using *Investigations in Number, Data, and Space* are encouraged to interpret, analyze, and communicate information through a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables and graphs may be provided to the students, or created by the students in various problem situations.

**References:**

Picturing Polygons

Investigation 1: Session 4

Investigation 2: Sessions 4-5

Investigation 3: Sessions 1-2, 4-6

Between Never and Always

Investigation 2: Sessions 1-3

Measurement Benchmarks

Investigation 2: Sessions 7-8

Investigation 3: Sessions 1-2

Patterns of Change

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-6

Ten-Minute Math: Graph Stories

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-3

**61. Bar graphs – read, interpret and design double bar graphs**

Grade 5 students using *Investigations in Number, Data, and Space* are encouraged to interpret, analyze, and communicate information through a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables and graphs may be provided to the students, or created by the students in various problem situations.

**References:**

Patterns of Change

Investigation 3: Sessions 5-6

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-3

Investigation 5: Sessions 3-5

**62. Circle graphs – read, interpret and design**

**References:**

Name That Portion

Investigation 4: Sessions 1-7

**63. Pictographs – read, interpret and design**

Grade 5 students using *Investigations in Number, Data, and Space* are encouraged to interpret, analyze, and communicate information through a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables and graphs may be provided to the students, or created by the students in various problem situations.

**References:**

Picturing Polygons

Investigation 1: Session 4

Investigation 2: Sessions 4-5

Investigation 3: Sessions 1-2, 4-6

Between Never and Always

Investigation 2: Sessions 1-3

Measurement Benchmarks

Investigation 2: Sessions 7-8

Investigation 3: Sessions 1-2

Patterns of Change

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-6

Ten-Minute Math: Graph Stories

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-3

**64. Ratio and scale drawings (using graph paper)**

**References:**

Picturing Polygons:

Investigation 1: Sessions 3-4

Investigation 2: Sessions 4-5

Investigation 3: Sessions 1-2, 5-6

Measurement Benchmarks

Investigation 1: Sessions 7-8

**65. Problem Solving – Working backward**

Working backward is one of the many problem-solving strategies employed by Grade 5 students using *Investigations in Number, Data, and Space* throughout the course.

**Sample References:**

Mathematical Thinking at Grade 5

Investigation 2: Session 5

Picturing Polygons

Investigation 3: Sessions 5-6

Name That Portion

Investigation 3: Session 8

Between Never and Always

Investigation 2: Sessions 4-5  
Building on Numbers You Know  
Investigation 3: Sessions 7-9  
Measurement Benchmarks  
Investigation 3: Session 3  
Patterns of Change  
Investigation 1: Sessions 3-4  
Containers and Cubes  
Investigation 1: Sessions 3-4  
Data: Kids, Cats, and Ads  
Investigation 1: Session 4

## April

### **66. Probability – Determine outcome of spinner and independent pick**

#### **References:**

Between Never and Always  
Investigation 1: Sessions 1-7  
Investigation 2: Sessions 1-5  
Building on Numbers You Know  
Ten-Minute Math: What Is Likely?

### **67. Sample tree diagram**

#### **References:**

Between Never and Always  
Investigation 2: Sessions 1-2, pages 51-52

### **68. Introduction to integers using real-world situation, e.g., temperature**

#### **References:**

Mathematical Thinking at Grade 5  
Investigation 4: Session 1: Teacher Note, page 79  
Picturing Polygons  
Investigation 1: Sessions 3-4  
Investigation 2: Sessions 4-5

### **69. Integers on the number line**

#### **References:**

Picturing Polygons  
Investigation 1: Sessions 3-4  
Investigation 2: Sessions 4-5

## 70. Ordered pairs and coordinate graphing

### References:

Picturing Polygons

Investigation 1: Sessions 3-4

Investigation 2: Sessions 4-7, 9

Investigation 3: Sessions 1-2, 5-6

## May and June

### General Review and Remediation

General Review and Remediation are integrated into the *Investigations in Number, Data, and Space* curriculum. Each unit includes an appendix with ongoing activities which teachers can use to review, practice, and strengthen previously learned skills and concepts. Most sessions open with a Ten-Minute Math exercise, which reinforces previously learned skills in a creative setting.

### Problem solving

Mathematical problem solving is integrated throughout the *Investigations in Number, Data, and Space* curriculum; in fact, it is a fundamental component of the course at all grade levels. Students practice and apply a variety of problem-solving strategies and skills in a wide range of settings on a daily basis.

### Enrichment

The discovery-based learning structure of the *Investigations in Number, Data, and Space* curriculum facilitates innumerable enrichment opportunities for students. Students can expand on any of the investigations in the series and deepen their knowledge and understanding of the underlying mathematical concepts.



## District Mathematics Calendar

### September

#### 1. Review: Problem Solving – locating information

Students in Grade 5 using *Investigations in Number, Data, and Space* apply and adapt a variety of appropriate strategies to locate information and solve problems throughout the course; in fact, this is a fundamental emphasis of the series. For example, students plan and conduct surveys on age and gender distribution.

##### Sample References:

Mathematical Thinking at Grade 5

Investigation 2: Sessions 2-4

Picturing Polygons

Investigation 2: Sessions 1-3

Name That Portion

Investigation 4: Sessions 1-7

Between Never and Always

Investigation 1: Session 6

Building on Numbers You Know

Investigation 2: Session 7

Measurement Benchmarks

Investigation 1: Sessions 5-6

Patterns of Change

Investigation 3: Session 4

Containers and Cubes

Investigation 4: Session 6

Data: Kids, Cats, and Ads

Investigation 4: Session 2

#### 2. Review: Place value

##### References:

Mathematical Thinking at Grade 5

Investigation 2: Session 5

Investigation 3: Session 1

Investigation 4: Sessions 1-6

Building on Numbers You Know

Investigation 4: Sessions 1-2

Investigation 5: Sessions 4-7

### 3. Round 5-and 6-digit numbers

Estimation and Number Sense is a recurrent feature in the Ten-Minute Math appendices in each of the texts in the *Investigations in Number, Data, and Space* series.

#### References:

Between Never and Always

Ten-Minute Math: Nearest Answer

Building on Numbers You Know

Investigation 1: Session 2

Investigation 3: Sessions 1-6

Investigation 5: Sessions 1-2

Measurement Benchmarks

Ten-Minute Math: Estimation and Number Sense

Data: Kids, Cats, and Ads

Investigation 3: Sessions 1-3

Investigation 4: Sessions 1-3

### 4. Review: Addition and subtraction

#### References:

Mathematical Thinking at Grade 5

Investigation 4: Session 1

Building on Numbers You Know

Investigation 1: Sessions 3-4: Teacher Note, pp. 23-24

Investigation 1: Sessions 6-8

Investigation 5: Sessions 4-6

### 5. Review: Fractions

#### References:

Name That Portion

Investigation 1: Sessions 1-7

Investigation 2: Sessions 1-9

Investigation 3: Sessions 5-8

Investigation 4: Sessions 1, 3-6

Ten-Minute Math: Seeing Numbers

Between Never and Always

Investigation 1: Sessions 1-4

Building on Numbers You Know

Investigation 2: Session 3: Teacher Note, page 54

Data: Kids, Cats, and Ads

Investigation 3: Sessions 1-4

Investigation 4: Sessions 1-3

## 6. Equivalent fractions

### References:

Name That Portion  
Investigation 1: Sessions 2-6  
Investigation 2: Sessions 3-8  
Investigation 3: Sessions 1  
Between Never and Always  
Investigation 1: Sessions 1-2  
Data: Kids, Cats, and Ads  
Investigation 3: Session 1

## 7. fractions and mixed numerals

### References:

Name That Portion  
Investigation 2: Sessions 1-9  
Investigation 3: Sessions 5-6: Dialogue Box, page 91  
Building on Numbers You Know  
Investigation 2: Session 3: Teacher Note, page 54  
Investigation 2: Sessions 4-6

## 8. Multiplication with fractions

### References:

Name That Portion  
Ten-Minute Math: Seeing Numbers

## October

## 9. Linear measurement – customary

### References:

Measurement Benchmarks  
Investigation 1: Sessions 1-8

## 10. Decimals – thousandths

### References:

Name That Portion  
Investigation 3: Sessions 1-8  
Between Never and Always  
Investigation 1: Sessions 1-2  
Building on Numbers You Know  
Investigation 2: Session 3: Teacher Note, page 54  
Containers and Cubes  
Ten-Minute Math: Counting Around the Class: Fractions and Decimals  
Data: Kids, Cats, and Ads  
Investigation 3: Session 1, page 50

**11. Rounding decimals**

**References:**

Between Never and Always  
Ten-Minute Math: Nearest Answer

**12. Addition and subtraction with decimals through thousandths**

**References:**

Name That Portion  
Investigation 3: Sessions 2-4, 7  
Measurement Benchmarks  
Ten-Minute Math: Estimation and Number Sense

**13. Linear measurement – metric**

**References:**

Measurement Benchmarks  
Investigation 1: Sessions 1-8

**14. Review – Multiplication**

**References:**

Mathematical Thinking at Grade 5  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-4  
Investigation 3: Sessions 1-5  
Picturing Polygons  
Ten-Minute Math: Multiple and Factor BINGO  
Building on Numbers You Know  
Investigation 1: Sessions 3-4  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 1-10  
Investigation 5: Sessions 4-6  
Containers and Cubes  
Investigation 1: Sessions 1-5  
Investigation 4: Sessions 7-9  
Ten-Minute Math: Counting Around the Class

**15. Multiplication of 4-digit numbers by 2-digit numbers**

**References:**

Building on Numbers You Know  
Investigation 5: Sessions 4-6

**16. Division of 4- and 5- digit dividends by 1-digit divisor**

**References:**

Building on Numbers You Know  
Investigation 5: Sessions 4-6

November

**17. Review: Division of 2- and 3-digit dividends by 2-digit divisors**

**References:**

Mathematical Thinking at Grade 5  
Investigation 2: Session 1, page 33  
Building on Numbers You Know  
Investigation 1: Sessions 3-4  
Investigation 5: Sessions 4-6

**18. Division of 4- and 5- digit dividends by 2-digit divisors**

**References:**

Mathematical Thinking at Grade 5  
Investigation 2: Session 1, page 33  
Building on Numbers You Know  
Investigation 1: Sessions 3-4  
Investigation 5: Sessions 4-6

**19. Statistics – mean or median**

Grade 5 students gain experience with measures of central tendency through finding the median of a set of data and through discussion of the spread and clustering of data.

**References:**

Between Never and Always  
Investigation 1: Sessions 3-6  
Data: Kids, Cats, and Ads  
Investigation 1: Sessions 1-4  
Investigation 2: Session 1

**20. Line graphs**

Grade 5 students using *Investigations in Number, Data, and Space* are encouraged to interpret, analyze, and communicate information through a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables and graphs may be provided to the students, or created by the students in various problem situations.

**References:**

Picturing Polygons  
Investigation 1: Session 4  
Investigation 2: Sessions 4-5  
Investigation 3: Sessions 1-2, 4-6  
Between Never and Always  
Investigation 2: Sessions 1-3

Measurement Benchmarks  
Investigation 2: Sessions 7-8  
Investigation 3: Sessions 1-2  
Patterns of Change  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-5  
Investigation 3: Sessions 1-6  
Ten-Minute Math: Graph Stories  
Data: Kids, Cats, and Ads  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-3

## 21. Planes

### References:

Picturing Polygons  
Investigation 1: Sessions 3-4  
Investigation 2: Sessions 4-7, 9  
Investigation 3: Sessions 1-2, 5-6

## 22. Angles

### References:

Picturing Polygons  
Investigation 2: Sessions 1-3, 6-9  
Investigation 3: Sessions 1-3

## 23. Angle measurement

### References:

Picturing Polygons  
Investigation 2: Sessions 1-3, 6-9  
Investigation 3: Sessions 1-3

## 24. Perimeter

### References:

Picturing Polygons  
Investigation 3: Sessions 5-6: Extension, page 108  
Measurement Benchmarks  
Investigation 1: Sessions 5-6

## December

### 25. Problem Solving: Draw a picture/make a table

Grade 5 students using *Investigations in Number, Data, and Space* model and solve problems by drawing a picture or making a table throughout the course.

**Sample References:**

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1-3

Picturing Polygons

Investigation 1: Session 3

Name That Portion

Investigation 2: Sessions 1-2

Between Never and Always

Investigation 1: Sessions 1-2

Building on Numbers You Know

Investigation 4: Session 1

Measurement Benchmarks

Investigation 1: Sessions 5-6

Patterns of Change

Investigation 2: Session 3

Containers and Cubes

Investigation 2: Sessions 3-4

Data: Kids, Cats, and Ads

Investigation 5: Sessions 3-5

**26. Sets**

Grade 5 students using *Investigations in Number, Data, and Space* explore sets of factor pairs, sets of polygons, and sets of data.

**References:**

Mathematical Thinking at Grade 5

Investigation 1: Sessions 3-4

Investigation 2: Sessions 2-5

Picturing Polygons

Investigation 1: Session 1

Investigation 2: Sessions 1-3

Investigation 3: Sessions 1-2

Building on Numbers You Know

Ten-Minute Math: Quick Images

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-3

Investigation 3: Sessions 1-4

Investigation 4: Sessions 1-3

Investigation 5: Sessions 1-5

**27. Venn diagrams**

Grade 5 students using *Investigations in Number, Data, and Space* sort and classify a variety of objects and data, including polygons, mental images, and data samples. Students do not construct Venn diagrams in the Grade 5 course.

**References:**

Picturing Polygons

Investigation 1: Session 1

Investigation 2: Sessions 1-3

Investigation 3: Sessions 1-2

Building on Numbers You Know

Ten-Minute Math: Quick Images

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1-4

Investigation 2: Sessions 1-3

Investigation 3: Sessions 1-4

Investigation 4: Sessions 1-3

Investigation 5: Sessions 1-5

**28. Review: prime numbers**

**References:**

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1-6

**29. Greatest common factor (GCF)**

**References:**

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-5

Investigation 4: Sessions 5-6

Picturing Polygons

Ten-Minute Math: Multiple and Factor BINGO

Building on Numbers You Know

Investigation 4: Session 1

**30. Addition and subtraction of mixed numerals with common denominators**

**References:**

Name That Portion

Investigation 1: Sessions 5-7

Investigation 2: Sessions 1-9

Investigation 3: Sessions 7-8



**31. Problem Solving: using prior knowledge**

Grade 5 students using *Investigations in Number, Data, and Space* use prior knowledge to solve problems throughout the course.

**Sample References:**

Mathematical Thinking at Grade 5

Investigation 2: Session 1

Picturing Polygons

Investigation 1: Session 1

Name That Portion

Investigation 1: Session 1

Between Never and Always

Investigation 2: Sessions 1-2

Building on Numbers You Know

Investigation 2: Sessions 5-6

Measurement Benchmarks

Investigation 3: Session 2

Patterns of Change

Investigation 2: Session 5

Containers and Cubes

Investigation 3: Session 3

Data: Kids, Cats, and Ads

Investigation 3: Sessions 2-3

**January**

**32. Circle concepts**

Grade 5 students using *Investigations in Number, Data, and Space* investigate properties and relationships of circles as they explore fractional areas of a clock face and as they construct circle graphs.

**References:**

Name That Portion

Investigation 1: Session 7, page 31

Investigation 2: Sessions 1-2

Investigation 3: Session 8

Investigation 4: Sessions 2-7

**33. Circle graphs**

**References:**

Name That Portion

Investigation 4: Sessions 1-7

### 34. Comparing graphs

Grade 5 students using *Investigations in Number, Data, and Space* are encouraged to interpret, analyze, and communicate information through a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables and graphs may be provided to the students, or created by the students in various problem situations.

#### References:

- Mathematical Thinking at Grade 5
  - Investigation 3: Session 1
- Picturing Polygons
  - Investigation 1: Session 4
  - Investigation 2: Sessions 4-5
  - Investigation 3: Sessions 1-2, 4-6
- Name That Portion
  - Investigation 1: Session 1
  - Investigation 3: Sessions 1, 5-7
  - Investigation 4: Sessions 2-4, 7
- Between Never and Always
  - Investigation 1: Session 7
  - Investigation 2: Sessions 1-3
- Building on Numbers You Know
  - Investigation 1: Sessions 3-4
  - Investigation 4: Session 1
  - Investigation 5: Sessions 4-6
- Measurement Benchmarks
  - Investigation 1: Sessions 7-8
  - Investigation 2: Sessions 1-2, 7-8
  - Investigation 3: Sessions 1-3
- Patterns of Change
  - Investigation 1: Sessions 1-4
  - Investigation 2: Sessions 1-5
  - Investigation 3: Sessions 1-7
- Ten-Minute Math: Nearest Answer Number Line Problems
- Containers and Cubes
  - Investigation 4: Sessions 2-5, 7-9
- Data: Kids, Cats, and Ads
  - Investigation 1: Sessions 1-3
  - Investigation 2: Sessions 1-3
  - Investigation 3: Sessions 1-3
  - Investigation 4: Sessions 2-3
  - Investigation 5: Sessions 1, 3-5

**35. Circumference**

Grade 5 students using *Investigations in Number, Data, and Space* find perimeters of similar polygons and the distance along a path.

**References:**

Picturing Polygons

Investigation 3: Sessions 5-6: Extension, page 108

Measurement Benchmarks

Investigation 1: Sessions 5-6

**36. Addition – 3 or more numbers through 999, 999**

**References:**

Mathematical Thinking at Grade 5

Investigation 4: Session 1

Building on Numbers You Know

Investigation 1: Sessions 3-4: Teacher Note, pp. 23-24

Investigation 1: Sessions 6-8

Investigation 5: Sessions 4-6

**37. Subtraction - minuends through 999,999**

**References:**

Mathematical Thinking at Grade 5

Investigation 4: Session 1

Building on Numbers You Know

Investigation 1: Sessions 6-8

Investigation 5: Sessions 4-6

**February**

**38. Multiplication of 3-digit numbers by 3-digit numbers**

Although there are no specific references to multiplication of 3-digit numbers by 3-digit numbers in the Grade 5 course of *Investigations of Number, Data, and Space*, students are prepared to do these calculations by the instruction and practice provided in multi-digit factor multiplication, as referenced below.

**References:**

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1-3

Investigation 2: Sessions 1-4

Investigation 3: Sessions 1-5

Picturing Polygons

Ten-Minute Math: Multiple and Factor BINGO

Building on Numbers You Know

Investigation 1: Sessions 3-4

Investigation 2: Sessions 1-7

Investigation 3: Sessions 1-10

Investigation 5: Sessions 4-6

Containers and Cubes

Investigation 1: Sessions 1-5

Investigation 4: Sessions 7-9

Ten-Minute Math: Counting Around the Class

**39. Division of 4- and 5- digit dividends by 2-digit divisors**

**References:**

Mathematical Thinking at Grade 5

Investigation 2: Session 1, page 33

Building on Numbers You Know

Investigation 1: Sessions 3-4

Investigation 5: Sessions 4-6

**40. Exponents**

**References:**

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1-3

Picturing Polygons

Investigation 3: Session 4, pages 97-98

Building on Numbers You Know

Investigation 4: Sessions 7-9

Containers and Cubes

Investigation 4: Sessions 7-9, pages 88-89

**41. Place values through 100 millions**

**References:**

Mathematical Thinking at Grade 5

Investigation 2: Session 5

Investigation 3: Session 1

Investigation 4: Sessions 1-6

Building on Numbers You Know

Investigation 4: Sessions 1-2

Investigation 5: Sessions 4-7

**42. Order of operations**

**References:**

Name That Portion

Ten-Minute Math: Seeing Numbers

Building on Numbers You Know

Investigation 1:

Sessions 3-4: Teacher Note, pages 23-24

Sessions 6-8: Teacher Note, page 34; Dialogue Box, page 35

Investigation 3: Sessions 1-3, 7-10

Investigation 4: Session 1

**43. Problem solving: solve a simpler problem**

Solving a simpler problem is one of the many problem-solving strategies employed by Grade 5 students using *Investigations in Number, Data, and Space* throughout the course.

**Sample References:**

Mathematical Thinking at Grade 5

Investigation 1: Sessions 4-6

Picturing Polygons

Investigation 3: Session 4

Name That Portion

Investigation 1: Session 7

Between Never and Always

Investigation 1: Session 5

Building on Numbers You Know

Investigation 5: Session 3

Measurement Benchmarks

Investigation 1: Sessions 7-8

Patterns of Change

Investigation 3: Sessions 1-2

Containers and Cubes

Investigation 3: Session 4

Data: Kids, Cats, and Ads

Investigation 4: Session 1

**44. Probability**

**References:**

Between Never and Always

Investigation 1: Sessions 1-7

Investigation 2: Sessions 1-5

Building on Numbers You Know

Ten-Minute Math: What Is Likely?

**March**

**45. Multiplication with decimals**

**References:**

Measurement Benchmarks

Ten-Minute Math: Estimation and Number Sense

**46. Least common multiple (LCM)**

**References:**

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1-6

Investigation 2: Sessions 1-5

Investigation 3: Sessions 1-5

Investigation 4: Sessions 5-6

Picturing Polygons

Ten-Minute Math: Multiple and Factor BINGO

Building on Numbers You Know

Investigation 1: Sessions 1, 3-5

**47. Addition and subtraction of fractions with unlike denominators**

**References:**

Name That Portion

Investigation 2: Sessions 1-3, 6-9

Investigation 3: Session 7

Data: Kids, Cats, and Ads

Investigation 4: Session 3

**48. Addition and subtraction of mixed numerals with unlike denominators**

**References:**

Name That Portion

Investigation 2: Sessions 1-3, 6-9

Investigation 3: Session 7

Data: Kids, Cats, and Ads

Investigation 4: Session 3

**49. Simple probability**

**References:**

Between Never and Always

Investigation 1: Sessions 1-7

Investigation 2: Sessions 1-5

Building on Numbers You Know

Ten-Minute Math: What Is Likely?

**50. Geometry constructions**

**References:**

Mathematical Thinking at Grade 5

Investigation 3: Session 1

Investigation 4: Session 1

Ten-Minute Math

Picturing Polygons  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-9  
Investigation 3: Sessions 1-6  
Building on Numbers You Know  
Investigation 3: Sessions 1-3  
Investigation 5: Sessions 1-2  
Containers and Cubes  
Investigation 1: Sessions 1-4  
Investigation 2: Sessions 1-5  
Investigation 3: Sessions 1-4  
Investigation 4: Sessions 1-9  
Data: Kids, Cats, and Ads  
Investigation 3: Sessions 2-3  
Investigation 4: Session 2  
Ten-Minute Math

## April

### 51. Area of a rectangular region

#### References:

Mathematical Thinking at Grade 5  
Investigation 1: Sessions 1-3  
Picturing Polygons  
Investigation 3: Sessions 4-6  
Name That Portion  
Investigation 1: Sessions 2-4  
Investigation 3: Sessions 2, 8

### 52. Congruent and similar figures

Grade 5 students using *Investigations in Number, Data, and Space* use *Geo-Logo* to construct polygons with given conditions that are necessary and sufficient to determine the size and shape of the figure. Students also use scales on maps to calculate approximate distances.

#### References:

Picturing Polygons  
Investigation 2: Sessions 4-5  
Investigation 3: Sessions 4-6  
Measurement Benchmarks  
Investigation 1: Sessions 7-8  
Containers and Cubes  
Investigation 1: Sessions 3-4

**53. Area of irregular shapes**

**References:**

Mathematical Thinking at Grade 5  
Investigation 1: Sessions 1-3  
Picturing Polygons  
Investigation 3: Sessions 4-6  
Name That Portion  
Investigation 1: Sessions 2-4  
Investigation 3: Sessions 2, 8

**54. Scale drawings**

**References:**

Picturing Polygons:  
Investigation 1: Sessions 3-4  
Investigation 2: Sessions 4-5  
Investigation 3: Sessions 1-2, 5-6  
Measurement Benchmarks  
Investigation 1: Sessions 7-8

**55. Division with decimals**

**References:**

Measurement Benchmarks  
Ten-Minute Math: Estimation and Number Sense

**56. Multiplication with mixed numerals**

There are no specific references in the Grade 5 course to multiplying with mixed numerals. The reference below is to an example of a fraction being multiplied with a whole number.

**Reference:**

Name That Portion  
Ten-Minute Math: Seeing Numbers

**57. Division of whole numbers by a fraction**

**Reference:**

Name That Portion  
Investigation 2, Session 3

**May**

**58. Positive and negative numbers**

**References:**

Mathematical Thinking at Grade 5  
Investigation 4: Session 1: Teacher Note, page 79  
Picturing Polygons  
Investigation 1: Sessions 3-4  
Investigation 2: Sessions 4-5



**59. Ordered number pairs**

**References:**

Picturing Polygons  
Investigation 1: Sessions 3-4  
Investigation 2: Sessions 4-7, 9  
Investigation 3: Sessions 1-2, 5-6

**60. Weight**

**References:**

Measurement Benchmarks  
Investigation 2: Sessions 1-8

**61. Linear measurement/fractional relationships**

**References:**

Measurement Benchmarks  
Investigation 1: Sessions 1-8

**62. Time: fractional relationship**

Grade 5 students use “lifetime strips” to represent and compare ages; they use stories, graphs, and tables to represent changes in speed and position over time.

**References:**

Measurement Benchmarks  
Investigation 3: Sessions 1-3  
Patterns of Change  
Investigation 2: Sessions 1-5  
Ten-Minute Math: Graph Stories

**63. Distance**

**References:**

Picturing Polygons  
Investigation 1: Sessions 3-4  
Investigation 2: Sessions 4-7  
Investigation 3: Sessions 1-2, 5-6  
Measurement Benchmarks  
Investigation 1: Sessions 1-8

**64. Double bar graphs**

Grade 5 students using *Investigations in Number, Data, and Space* are encouraged to interpret, analyze, and communicate information through a variety of displays, including tables, line plots, bar graphs, and line graphs. Tables and graphs may be provided to the students, or created by the students in various problem situations.

**References:**

Patterns of Change  
Investigation 3: Sessions 5-6  
Data: Kids, Cats, and Ads  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-3  
Investigation 5: Sessions 3-5

**65. Problem solving: working backward**

Working backward is one of the many problem-solving strategies employed by Grade 5 students using *Investigations in Number, Data, and Space* throughout the course.

**Sample References:**

Mathematical Thinking at Grade 5  
Investigation 2: Session 5  
Picturing Polygons  
Investigation 3: Sessions 5-6  
Name That Portion  
Investigation 3: Session 8  
Between Never and Always  
Investigation 2: Sessions 4-5  
Building on Numbers You Know  
Investigation 3: Sessions 7-9  
Measurement Benchmarks  
Investigation 3: Session 3  
Patterns of Change  
Investigation 1: Sessions 3-4  
Containers and Cubes  
Investigation 1: Sessions 3-4  
Data: Kids, Cats, and Ads  
Investigation 1: Session 4

**66. Multiplication of 4-digit numbers by 3-digit numbers**

Although there are no specific references to multiplication of 4-digit numbers by 3-digit numbers in the Grade 5 course of *Investigations of Number, Data, and Space*, students are prepared to do these calculations by the instruction and practice provided in multi-digit factor multiplication, as referenced below.

**References:**

Mathematical Thinking at Grade 5  
Investigation 1: Sessions 1-3  
Investigation 2: Sessions 1-4  
Investigation 3: Sessions 1-5  
Picturing Polygons  
Ten-Minute Math: Multiple and Factor BINGO

Building on Numbers You Know  
Investigation 1: Sessions 3-4  
Investigation 2: Sessions 1-7  
Investigation 3: Sessions 1-10  
Investigation 5: Sessions 4-6  
Containers and Cubes  
Investigation 1: Sessions 1-5  
Investigation 4: Sessions 7-9  
Ten-Minute Math: Counting Around the Class

**67. Division by multiples of 100**

**Reference:**

Mathematical Thinking at Grade 5  
Investigation 2: Session 1, page 33

**June**

**68. Division by 3-digit divisors**

Although there are no specific references to division by 3-digit divisors in the Grade 5 course of *Investigations of Number, Data, and Space*, students are prepared to do these calculations by the instruction and practice provided in multi-digit divisor multiplication, as referenced below.

**References:**

Mathematical Thinking at Grade 5  
Investigation 2: Session 1, page 33  
Building on Numbers You Know  
Investigation 1: Sessions 3-4  
Investigation 5: Sessions 4-6

**69. Roman numerals to MM**

There are no references to Roman numerals in the Grade 5 course of *Investigations in Number, Data, and Space*.

**70. Place value through billions**

**References:**

Mathematical Thinking at Grade 5  
Investigation 2: Session 5  
Investigation 3: Session 1  
Investigation 4: Sessions 1-6  
Building on Numbers You Know  
Investigation 4: Sessions 1-2  
Investigation 5: Sessions 4-7

**71. Base five**

Grade 5 students using *Investigations in Number, Data, and Space* gain experience with the base-ten system of numeration, as referenced in the objectives on place value.

**72. Base twelve**

Grade 5 students using *Investigations in Number, Data, and Space* gain experience with the base-ten system of numeration, as referenced in the objectives on place value.