

A Correlation of



to the

**North Carolina
Mathematics Standard
Course of Study
Grades K-5**



T/M-129B

INTRODUCTION

This document demonstrates how well *Investigations in Number, Data, and Space*[®] integrates with the North Carolina Mathematics Standard Course of Study. The citations within this correlation provide Investigation Curriculum Unit titles, Investigation numbers and Session numbers or Focus Time/Choice Time titles correlated to the goals and standards of the North Carolina Mathematics Standard Course of Study. Thus, teachers know exactly where instruction is located to prepare students for mastery of North Carolina Mathematics Standard Course of Study.

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

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**Investigations in Number, Data, and Space
to the
North Carolina Mathematics Standard Course of Study
Early Grades—Kindergarten**

NUMBER AND OPERATIONS

COMPETENCY GOAL 1: The learner will recognize, model, and write whole numbers through 30.

Objectives

1.01 Develop number sense for whole numbers through 30.

a) Connect model, number word (orally), and number, using a variety of representations.

Mathematical Thinking in Kindergarten

Investigation 1: Focus Time: Attendance

Investigation 2

Investigation 3: Focus Time: Calendar

Investigation 4

Collecting, Counting, and Measuring

Investigations 1, 2, 6

Counting Ourselves and Others

Investigations 1, 3, 4

How Many In All?

Investigations 2, 3, 4

Classroom Routines: Attendance, Calendar

b) Count objects in a set.

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

Classroom Routines: Attendance, The Counting Jar, Calendar

c) Read and write numerals.

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
Classroom Routines: Attendance, Calendar

d) Compare and order sets and numbers.

Mathematical Thinking in Kindergarten
Investigation 1: Focus Time: Attendance
Investigation 4
Collecting, Counting, and Measuring
Investigations 3, 4, 5, 6
How Many in All?
Investigation 2: Choice Time: Grab Two Handfuls
Classroom Routines: Attendance, The Counting Jar, The Calendar

e) Use ordinals (1st-10th).

Mathematical Thinking in Kindergarten
Investigation 3: Focus Time: Calendar

f) Estimate quantities fewer than or equal to 10.

Collecting, Counting, and Measuring
Investigation 4: Choice Time: Collect 10 Together
Investigation 5: Choice Time: Racing Bears
Investigation 6: Arrangements of Six
How Many in All?
Investigation 1: Choice Time: Collect 15 Together
Investigation 2: Focus Time: Six Tiles
Investigation 3: Choice Time: Racing Bears
Classroom Routines: The Counting Jar

g) Recognize equivalence in sets and numbers 1-10.

- Mathematical Thinking in Kindergarten
 - Investigation 1: Focus Time: Attendance
 - Investigations 2, 4
- Patterns, Trains and Hopscotch Paths
 - Investigation 1: Focus Time: Cubes What Do You Notice?
- Collecting, Counting, and Measuring
 - Investigation 6
- Counting Ourselves and Others
 - Investigation 1
- How Many In All?
 - Investigation 2
 - Classroom Routine: Attendance, Today's Question

1.02 Share equally (divide) between two people; explain.

In a geometric application of this concept, Kindergarten students using *Investigations in Number, Data, and Space* find combinations of shapes that fill an area and explore relationships between pattern block shapes. This activity helps Kindergarten students gain experience with preliminary concepts which will lead to understanding situations that entail division, including the subdivision of shapes into equal parts. Grade 1 students divide shapes and groups into equal parts and equal groups.

Reference:

- Making Shapes and Building Blocks
 - Investigation 4: Choice Time: Fill the Hexagons
- Also see Grade 1:
 - Number Games and Story Problems
 - Investigation 1: Sessions 1-3

1.03 Solve problems and share solutions to problems in small groups.

Throughout this standards-based program, students work with others to solve problems. *These are a few of the many examples*

- Mathematical Thinking in Kindergarten
 - Investigation 2
- Pattern Trains and Hopscotch Paths
 - Investigation 1
- Collecting, Counting, and Measuring
 - Investigation 2
- Counting Ourselves and Others
 - Investigations 1, 4
- Making Shapes and Building Blocks:
 - Investigation 3
- How Many In All?
 - Investigations 1, 3

MEASUREMENT

COMPETENCY GOAL 2: The learner will explore concepts of measurement.

Objectives

2.01 Compare attributes of two objects using appropriate vocabulary (color, weight, height, width, length, texture).

Mathematical Thinking in Kindergarten

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

Investigation 3: Choice Time: Exploring Interlocking Cubes Patterns, Trains and Hopscotch Paths

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

Collecting, Counting, and Measuring

Investigations 3, 4, 5

Counting Ourselves and Others

Investigation 2

How Many In All?

Investigation 1

Making Shapes and Building Blocks:

Investigations 4, 5

2.02 Recognize concepts of calendar time using appropriate vocabulary (days of the week, months of the year, seasons).

Mathematical Thinking in Kindergarten

Investigation 3: Focus Time: Calendar

Classroom Routines: Calendar

GEOMETRY

COMPETENCY GOAL 3: The learner will explore concepts of geometry.

Objectives

3.01 Identify, build, draw, and name triangles, rectangles, and circles; identify, build, and name spheres and cubes.

Mathematical Thinking in Kindergarten

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

Investigation 3: Choice Time: Exploring Interlocking Cubes

Making Shapes and Building Blocks

Investigations 1, 2, 3, 4, 5

3.02 Compare geometric shapes (identify likenesses and differences).

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

3.03 Model and use directional and positional vocabulary.

Patterns, Trains, and Hopscotch Paths
Investigation 4: Choice Time: Staircase Patterns
Making Shapes and Building Blocks
Investigations 2, 3, 4

3.04 Complete simple spatial visualization tasks and puzzles.

Mathematical Thinking in Kindergarten
Investigation 1: Choice Time: Exploring Color Tiles, Exploring Pattern Blocks,
Exploring Geoblocks
Investigation 3: Choice Time: Exploring Interlocking Cubes
Patterns, Shapes, and Hopscotch Paths
Investigations 1, 2, 3, 4
Collecting, Counting, and Measuring
Investigation 6
Making Shapes and Building Blocks
Investigations 1, 2, 3, 4, 5

DATA ANALYSIS AND PROBABILITY

COMPETENCY GOAL 4: The learner will collect, organize and display data.

Objectives

4.01 Collect and organize data as a group activity.

Mathematical Thinking in Kindergarten
Investigation 1: Focus time: Attendance
Investigations 2, 4
Collecting, Counting, and Measuring
Investigation 2
Counting Ourselves and Others
Investigations 1, 2, 3, 4
Classroom Routines: Attendance; Today's Question

4.02 Display and describe data with concrete and pictorial graphs as a group activity.

- Mathematical Thinking in Kindergarten
 - Investigation 1: Focus time: Attendance
 - Investigations 2, 4
- Collecting, Counting, and Measuring
 - Investigation 2
- Counting Ourselves and Others
 - Investigations 1, 2, 3, 4
 - Classroom Routines: Attendance; Today's Question

ALGEBRA

COMPETENCY GOAL 5: The learner will model simple patterns and sort objects.

Objectives

5.01 Sort and classify objects by one attribute.

- Mathematical Thinking in Kindergarten
 - Investigation 3: Choice Time: Measuring Table
- Patterns, Trains, and Hopscotch Paths
 - Investigation 4: Choice Time: Staircase Patterns
- Collecting, Counting, and Measuring
 - Investigations 3, 4, 5, 6
- Counting Ourselves and Others
 - Investigations 1, 2, 3, 4
- Making Shapes and Building Blocks
 - Investigations 1, 3, 4, 5

5.02 Create and extend patterns with actions, words, and objects.

- Mathematical Thinking in Kindergarten
 - Investigation 3
- Pattern Trains and Hopscotch Paths
 - Investigations 1, 2, 3, 4
- Making Shapes and Building Blocks
 - Appendix: Shapes Teacher Tutorial, pages 143–144
 - Classroom Routines: Calendar; Patterns on the Pocket Chart

**Investigations in Number, Data, and Space
to the
North Carolina Mathematics Standard Course of Study
Early Grades—Grade One**

NUMBER AND OPERATIONS

COMPETENCY GOAL 1: The learner will read, write, and model whole numbers through 99 and compute with whole numbers.

Objectives

1.01 Develop number sense for whole numbers through 99.

a) Connect the model, number word, and number using a variety of representations.

Mathematical Thinking at Grade 1

Investigation 2 : Sessions 4–6

Investigation 4 : Sessions 4–6

Building Number Sense

Investigation 1: Sessions 7–9

Investigation 2: Sessions 1–2, 9

Investigation 3: Session 9

Investigation 4: Sessions 1–5, 7–10

Number Games and Story Problems

Investigation 1: Session 1

b) Use efficient strategies to count the number of objects in a set.

Mathematical Thinking at Grade 1

Investigation 1: Sessions 2–8

Investigation 2: Sessions 1–6

Investigation 3: Sessions 3–7

Investigation 4: Sessions 1–6

Investigation 5: Sessions 1–6

Building Number Sense

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–6, 8–9

Investigation 3: Sessions 1–7, 9

Investigation 4: Sessions 1–10

Quilt Squares and Block Towns

Investigation 1: Sessions 2–10

Investigation 3: Sessions 6–7

Number Games and Story Problems
Investigation 1: Sessions 1–10
Investigation 2: Sessions 1–8, 10–12
Bigger, Taller, Heavier, Smaller
Investigation 2: Sessions 1–7

c) Read and write numbers.

Mathematical Thinking at Grade 1
Investigation 1: Sessions 1–8
Investigation 2: Sessions 4–6
Investigation 3: Sessions 1–7, 9
Investigation 4: Sessions 4–6
Building Number Sense
Investigation 1: Sessions 5–8
Investigation 2: Sessions 1–2, 4–9
Investigation 3: Sessions 1–7
Number Games and Story Problems
Investigation 2: Sessions 6–9

d) Compare and order sets and numbers.

Mathematical Thinking at Grade 1
Investigation 2: Sessions 1–3, 5–6
Investigation 4: Sessions 1–3
Investigation 5: Sessions 2–4
Building Number Sense
Investigation 1: Sessions 2–6
Investigation 2: Sessions 3–5
Investigation 3: Sessions 1–7
Investigation 4: Session 10
Survey Questions and Secret Rules
Investigation 4: Sessions 4–5
Number Games and Story Problem
Investigation 1: Sessions 7–9
Investigation 2: Sessions 2, 6–9
Bigger, Taller, Heavier, Smaller
Investigation 3: Sessions 2, 4–5

e) Build understanding of place value (ones, tens).

Building Number Sense
Investigation 3: Sessions 1–2
Number Games and Story Problems
Investigation 2: Sessions 6–9

f) Estimate quantities fewer than or equal to 100.

- Building Number Sense
 - Investigation 3: Session 9
- Quilt Squares and Block Towns
 - Investigation 3: Sessions 6–7
- Bigger, Taller, Heavier, Smaller
 - Investigation 2: Session 1

g) Recognize equivalence in sets and numbers 1-99.

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

1.02 Use groupings of 2's, 5's, and 10's with models and pictures to count collections of objects.

- Number Games and Story Problems
 - Investigation 2: Sessions 1–8, 10–12

1.03 Develop fluency with single-digit addition and corresponding differences using strategies such as modeling, composing and decomposing quantities, using doubles, and making tens.

- Mathematical Thinking at Grade 1
 - Investigation 2: Sessions 1–6
 - Investigation 4: Sessions 2–4, 6
 - Investigation 5: Sessions 2–4
- Building Number Sense
 - Investigation 1: Sessions 1–9
 - Investigation 2: Sessions 1–9
 - Investigation 4: Sessions 1–10
- Number Games and Story Problems
 - Investigation 1: Sessions 1–10
 - Investigation 2: Sessions 1–8, 10–12
 - Investigation 3: Sessions 1–8, 10–13

1.04 Create, model, and solve problems that use addition, subtraction, and fair shares (between two or three).

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

MEASUREMENT

COMPETENCY GOAL 2: The learner will use non-standard units of measure and tell time.

Objectives

2.01 For given objects:

a) Select an attribute (length, capacity, mass) to measure (use non-standard units).

- Bigger, Taller, Heavier, Smaller
 - Investigation 1: Sessions 1–6
 - Investigation 2: Sessions 1–7
 - Investigation 3: Sessions 2–5

b) Develop strategies to estimate size.

- Bigger, Taller, Heavier, Smaller
 - Investigation 2: Session 1

c) Compare, using appropriate language, with respect to the attribute selected.

- Bigger, Taller, Heavier, Smaller
 - Investigation 1: Sessions 1–7
 - Investigation 2: Sessions 1–7
 - Investigation 3: Sessions 1–5

2.02 Develop an understanding of the concept of time.

a) Tell time at the hour and 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

b) Solve problems involving applications of time (clock and calendar).

Survey Questions and Rules
Investigation 3: Sessions 1–3
Classroom Routines: Counting; Understanding Time and Changes

GEOMETRY

COMPETENCY GOAL 3: The learner will identify, describe, draw, and build basic geometric figures.

Objectives

3.01 Identify, build, draw and name parallelograms, squares, trapezoids, and hexagons.

Mathematical Thinking at Grade 1
Investigation 1: Sessions 1–4
Survey Questions and Secret Rules
Investigation 1: Sessions 1–2
Quilt Squares and Block Towns
Investigation 1: Sessions 1, 3–15

3.02 Identify, build, and name cylinders, cones, and rectangular prisms.

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

3.03 Compare and contrast geometric figures.

Mathematical Thinking at Grade 1

Investigation 1: Sessions 1–4

Quilt Squares and Block Towns

Investigation 1: Sessions 1, 11–12

Investigation 2: Sessions 1–2, 4–10

Investigation 3: Sessions 1–5

Bigger, Smaller, Heavier, Taller

Investigation 2: Sessions 2–7

3.04 Solve problems involving spatial visualization.

Mathematical Thinking at Grade 1

Investigation 1: Sessions 1–4

Building Number Sense

Investigation 1: Sessions 1–9

Investigation 2: Sessions 6–8

Quilt Squares and Block Towns

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

Investigation 2: Session 1–10

Investigation 3: Sessions 1–7

Number Games and Story Problems

Investigation 1: Sessions 1–3, 6

Investigation 3: Sessions 6–8

DATA ANALYSIS AND PROBABILITY

COMPETENCY GOAL 4: The learner will understand and use data and simple probability concepts.

Objectives

4.01 Collect, organize, describe and display data using line plots and tallies.

First grade students using *Investigations in Number, Data, and Space* series collect, organize, describe, and display data using line plots, tallies, bar graphs, pictographs, tables, and charts.

Mathematical Thinking at Grade 1

Investigation 5: Sessions 2–6

Survey Questions and Secret Rules

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–3

Investigation 4: Sessions 1–5

Quilt Square and Block Towns

Investigation 1: Sessions 11–12

Bigger, Taller, Heavier, Smaller

Investigation 2: Session 1

4.02 Describe events as certain, impossible, more likely or less likely to occur.

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

ALGEBRA

COMPETENCY GOAL 5: The learner will demonstrate an understanding of classification and patterning.

Objectives

5.01 Sort and classify objects by two attributes.

Mathematical Thinking at Grade 1
Investigation 5: Sessions 3 –6
Survey Questions and Secret Rules
Investigation 1: Sessions 2–6
Investigation 2: Sessions 3–4
Investigation 4: Sessions 2–3
Quilt Squares and Block Towers
Investigation 1: Sessions 11–12
Investigation 2: Sessions 1–3

5.02 Use Venn diagrams to illustrate similarities and differences in two sets.

Students practice sorting objects by various attributes in grade 1. Students use Venn Diagrams in Grade 2.

5.03 Create and extend patterns, identify the pattern unit, and translate into other forms.

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

**Investigations in Number, Data, and Space
to the
North Carolina Mathematics Standard Course of Study**

Early Grades—Grade Two

NUMBER AND OPERATIONS

COMPETENCY GOAL 1: The learner will read, write, model, and compute with whole numbers through 999.

Objectives

1.01 Develop number sense for whole numbers through 999.

a) Connect model, number word, and number using a variety of representations.

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Sessions 1, 6, 8

Investigation 5: Session 3

Coins, Coupons, and Combinations

Investigation 1: Sessions 1–6, 8–9

Shapes, Halves, and Symmetry

Investigation 2: Sessions 3–5

Putting Together and Taking Apart:

Investigation 1: Session 1

Investigation 4: Sessions 1–2

Classroom Routines: Today's Number; Quick Images

b) Read and write numbers.

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Sessions 1–7

Coins, Coupons, and Combinations

Investigation 4: Session 1

Putting Together and Taking Apart:

Investigation 2: Session 1

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

c) Compare and order.

Mathematical Thinking at Grade 2
Investigation 2: Session 1
Investigation 4: Sessions 1–5
Investigation 5: Sessions 1–5
Does It Walk, Crawl, or Swim?
Investigation 4: Sessions 2–3
Putting Together and Taking Apart:
Investigation 2: Session 1
How Many Pockets? How Many Teeth?
Investigation 2: Sessions 4–6
Timelines and Rhythm Patterns
Investigation 1: Sessions 1–3
Classroom Routines: How Many Pockets?

d) Rename.

Coins, Coupons, and Combinations
Investigation 2: Sessions 4–5
Putting Together and Taking Apart
Investigation 1: Session 1
Classroom Routines: How Many Pockets?

e) Estimate.

Mathematical Thinking at Grade 2
Investigation 5: Session 3
Coins, Coupons, and Combinations
Investigation 2: Session 10
Shapes, Halves, and Symmetry
Investigation 1: Sessions 2–5

f) Use a variety of models to build understanding of place value (ones, tens, hundreds).

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

1.02 Use area or region models and set models of fractions to explore part-whole relationships in contexts.

a) Represent fractions (halves, thirds, fourths) concretely and symbolically.

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

b) Compare fractions (halves, thirds, fourths) using models.

Students are introduced to comparing fractions in grade 1. Students have additional opportunities to expand their knowledge of comparing fractions in grade 3.

c) Make different representations of the same fraction.

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

d) Combine fractions to describe parts of a whole.

Shapes, Halves, and Symmetry
Investigation 3: Sessions 1–2, 7–8

1.03 Create, model, and solve problems that involve addition, subtraction, equal grouping, and division into halves, thirds, and fourths (record in fraction form).

Throughout this standards-based program, students create, model, and solve problems. These are a few of the many examples:

Mathematical Thinking at Grade 2

Investigation 2: Sessions 4–5

Coins, Coupons, and Combinations

Investigation 2: Session 6

Shapes, Halves, and Symmetry

Investigation 1: Sessions 6–8

Putting Together and Taking Apart:

Investigation 1: Session 1–2, 5–6

Investigation 2: Session 7

Investigation 3: Session 2

Investigation 4: Session 1, 3–4

Investigation 5: Session 1

How Long? How Far?

Investigation 2: Sessions 2–3

How Many Pockets? How Many Teeth?

Investigation 2: Sessions 1–2

Timelines and Rhythm Patterns

Investigation 2: Sessions 2–3

1.04 Develop fluency with multi-digit addition and subtraction through 999 using multiple strategies.

a) Strategies for adding and subtracting numbers.

Mathematical Thinking at Grade 2

Investigation 4: Session 1

Investigation 5: Session 3

Coins, Coupons, and Combinations

Investigation 1: Sessions 1–3, 10

Investigation 2: Session 10

Investigation 3: Sessions 1–5

Putting Together and Taking Apart

Investigation 1: Sessions 1–6

Investigation 2: Sessions 1–7

Investigation 3: Sessions 1–5

Investigation 4: Sessions 1–4

Investigation 5: Sessions 1–8

b) Estimation of sums and differences in appropriate situations.

Coins, Coupons, and Combinations

Investigation 1: Session 7–9

c) Relationships between operations.

Coins, Coupons, and Combinations

Investigation 2: Sessions 2–5, 10

Investigation 3: Sessions 3–5

Putting Together and Taking Apart

Investigation 1: Sessions 1–2

Investigation 3: Session 2

1.05 Create and solve problems using strategies such as modeling, composing and decomposing quantities, using doubles, and making tens and hundreds.

Throughout this standards-based program, students model and use strategies to solve addition and subtraction problems. These are a few of the many examples:

Mathematical Thinking at Grade 2

Investigation 2: Sessions 2–6, 8

Investigation 4: Sessions 1,5

Coins, Coupons, and Combinations

Investigation 1: Sessions 1–11

Investigation 2: Sessions 7–9

Investigation 3: Sessions 1–5

Investigation 4: Sessions 2–5

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

1.06 Define and recognize odd and even 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 2: Session 6
Investigation 5: Sessions 4–5
Coins, Coupons, and Combinations
Investigation 2: Sessions 1–5

MEASUREMENT

COMPETENCY GOAL 2: The learner will recognize and use standard units of metric and customary measurement.

Objectives

2.01 Estimate and measure using appropriate units.

a) Length (meters, centimeters, feet, inches, yards).

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.

How Long? How Far?

Investigation 1: Sessions 1–8
Investigation 2: Sessions 4–5

b) Temperature (Fahrenheit).

The following activity provides a foundation for understanding Fahrenheit.

Grade 3:

Up and Down the Number Line
Investigation 1: Session 1-2, 8

2.02 Tell time at the five-minute intervals.

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.

Timelines and Rhythm Patterns

Investigation 1: Sessions 4–5

Investigation 2: Sessions 4–5

Classroom Routines: Time and Time Again

GEOMETRY

COMPETENCY GOAL 3: The learner will perform simple transformations.

Objectives

3.01 Combine simple figures to create a given shape.

Mathematical Thinking at Grade 2

Investigation 3: Sessions 1–4, 6

Shapes, Halves, and Symmetry

Investigation 1: Sessions 2–8; Investigation 3: Sessions 1–5

Investigation 4: Sessions 1–7

3.02 Describe the change in attributes as two- and three-dimensional figures are cut and rearranged.

Shapes, Halves, and Symmetry

Investigation 1: Sessions 2–8

Investigation 2: Session 1

Investigation 3: Sessions 1–8

Investigation 4: Sessions 1–7

3.03 Identify and make:

a) Symmetric figures.

Shapes, Halves, and Symmetry

Investigation 4: Sessions 1–7

b) Congruent figures.

Shapes, Halves, and Symmetry

Investigation 2: Session 3

Investigation 3: Sessions 3–5

DATA ANALYSIS AND PROBABILITY

COMPETENCY GOAL 4: The learner will understand and use data and simple probability concepts.

Objectives

4.01 Collect, organize, describe and display data using Venn diagrams (three sets) and pictographs where symbols represent multiple units (2's, 5's, 10's).

Second grade students using *Investigations in Number, Data, and Space* series collect, organize, describe, and display data using Venn Diagrams, pictographs, line plots, tallies, bar graphs, tables, and charts.

Mathematical Thinking at Grade 2

Investigation 2: Session 6

Investigation 5: Sessions 1–6

Classroom Routine: Collecting and recording data about pockets

Classroom Routing: Solving “how many pockets”

Coins, Coupons, and Combinations

Investigation 1: Session 11

Investigation 2: Sessions 2, 4–5, 10

Classroom Routine: Collecting and recording data about pockets

Classroom Routing: Solving “how many pockets”

Does It Walk, Crawl, or Swim

Investigation 1: Sessions 1–2, 6

Investigation 2: Sessions 1–4

Investigation 3: Session 1–3

Investigation 4: Sessions 1–3

Classroom Routine: Collecting and recording data about pockets

Classroom Routing: Solving “how many pockets”

Putting Together and Taking Apart

Classroom Routine: Collecting and recording data about pockets

Classroom Routing: Solving “how many pockets”

How Long? How Far?

Classroom Routine: Collecting and recording data about pockets

How Many Pockets? How Many Teeth
Investigation 1: Sessions 1–5
Investigation 2: Sessions 1–6
Investigation 3: Sessions 1–5
Classroom Routine: Collecting and recording data about pockets
Classroom Routing: Solving “how many pockets”
Timelines and Rhythm Patterns
Investigation 1: Sessions 1–6

4.02 Conduct simple probability experiments; describe the results and make predictions.

Grade 2 students using *Investigations in Number, Data, and Space* make a hypothesis based on sampling and the representation of a set of data. Students are introduced to the concepts of probability in Grade 3.

References:

How Many Pockets? How Many Teeth?
Investigation 2: Session 6
Grade 3:
Things That Come in Groups
Ten Minute Math: Likely or Unlikely?
Exploring Solids and Boxes
Ten-Minute Math: What Is Likely?

ALGEBRA

COMPETENCY GOAL 5: The learner will recognize and represent patterns and simple mathematical relationships.

Objectives

5.01 Identify, describe, translate, and extend repeating and growing patterns.

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: Session 1–5
Investigation 4: Sessions 1–4
Putting Together and Taking Apart
Investigation 2: Sessions 1–2
Timelines and Rhythm Patterns
Investigation 2: Sessions 1–5

5.02 Write addition and subtraction number sentences to represent a problem; use symbols to represent unknown quantities.

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Session 1, 4–6

Investigation 4: Sessions 1,5

Classroom Routine: Writing equations that equal the number of days in school

Coins, Coupons, and Combinations

Investigation 1: Sessions 2–11

Investigation 2: Session 1, 3, 7–9

Investigation 3: Session 1–5

Investigation 4: Sessions 2–5

Classroom Routine: Writing equations that equal the number of days in school

Does It Walk, Crawl, or Swim?

Classroom Routine: Writing equations that equal the number of days in school

Shapes, Halves, and Symmetry

Classroom Routine: Writing equations that equal the number of days in school

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

Classroom Routine: Writing equations that equal the number of days in school

How Long? How Far?

Classroom Routine: Writing equations that equal the number of days in school

How Many Pockets? How Many Teeth?

Classroom Routine: Writing equations that equal the number of days in school

Timelines and Rhythm Patterns

Classroom Routine: Writing equations that equal the number of days in school

**Investigations in Number, Data, and Space
to the
North Carolina Mathematics Standard Course of Study
Intermediate—Grade Three**

NUMBER AND OPERATIONS

COMPETENCY GOAL 1: The learner will model, identify, and compute with whole numbers through 9,999.

Objectives

1.01 Develop number sense for whole numbers through 9,999.

a) Connect model, number word, and number using a variety of representations.

Mathematical Thinking at Grade 3

Investigation 1: Sessions 1–3

Investigation 2: Session 1

Ten Minute Math: Calendar Math

Things That Come in Groups

Investigation 1: Session 2

Investigation 3: Sessions 1–5

Investigation 4: Sessions 1–2

Flips, Turns, and Area

Ten Minute Math: Broken Calculator

Landmarks in the Hundreds

Investigation 1: Sessions 1–7

Investigation 2: Sessions 1–6

Investigation 3: Session 1; Ten Minute Math: Calendar Math

Up and Down the Number Line

Investigation 1: Sessions 3–4, 6–7

b) Build understanding of place value (ones through thousands).

Mathematical Thinking at Grade 3

Investigation 1: Sessions 1–3

Things That Come in Groups

Investigation 2: Sessions 1–6

Landmarks in the Hundreds
Investigation 1: Sessions 4–7
Investigation 2: Sessions 1–3
Combining and Comparing
Investigation 4: Sessions 3–4

c) Compare and order.

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

1.02 Develop fluency with multi-digit addition and subtraction through 9,999 using:

a) Strategies for adding and subtracting numbers.

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

b) Estimation of sums and differences in appropriate situations.

Mathematical Thinking at Grade 3
Investigation 3: Sessions 3–4
From Paces to Feet
Investigation 1 Sessions 1–4
Ten Minute Math: Estimation and Number Sense
Landmarks On the Hundreds Chart
Investigation 3: Sessions 2–3
Up and Down the Number Line
Ten Minute Math: Estimation and Number Sense

Combining and Comparing
Investigation 1: Sessions 1–2
Investigation 2 : Session 1–2
Investigation 3: Sessions 1–3
Investigation 4: Sessions 1–4
Investigation 5: Sessions 1–3
Ten Minute Math: Estimation and Number Sense
Turtle Paths
Investigation 2: Sessions 1–2
Ten Minute Math: Lengths and Perimeters

c) Relationships between operations.

Up and Down the Number Line
Investigation 1: Sessions 1–4
Combining and Comparing
Investigation 4: Session 2
Turtle Paths
Investigation 1: Sessions 3–4

1.03 Develop fluency with multiplication from 1x1 to 12x12 and division up to two-digit by one-digit numbers using:

a) Strategies for multiplying and dividing numbers.

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

b) Estimation of products and quotients in appropriate situations.

Things That Come in Groups
Ten Minute Math: Counting Around the Class
Landmarks In the Hundreds
Investigation 3: Sessions 2–3

c) Relationships between operations.

- Mathematical Thinking at Grade 3
 - Investigation 2: Sessions 3–4
- Things That Come in Groups
 - Investigation 1: Session 3
 - Investigation 3: Session 3
 - Investigation 4: Sessions 1–4
 - Investigation 5: Session 4
- Up and Down the Number Line
 - Investigation 3: Session 1

1.04 Use basic properties (identity, commutative, associative, order of operations) for addition, subtraction, multiplication, and division.

Students in grade 3 use the basic properties of identity, commutative, and associative. Order of operations is introduced in grade 4.

- Things That Come in Groups
 - Investigation 3: Sessions 1–2
 - Investigation 5: Session 2
- Flips, Turns, and Area
 - Investigation 1: Sessions 2–3
 - Teacher Note, page 19, Sessions 4–5
- Combining and Comparing
 - Ten Minute Math: Estimation and Number Sense

1.05 Use area or region models and set models of fractions to explore part-whole relationships.

a) Represent fractions concretely and symbolically (halves, fourths, thirds, sixths, eighths).

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

b) Compare and order fractions (halves, fourths, thirds, sixths, eighths) using models and benchmark numbers (zero, one-half, one); describe comparisons.

Fair Shares

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–4

Investigation 3: Sessions 1–2

c) Model and describe common equivalents, especially relationships among halves, fourths, and eighths, and thirds and sixths.

Mathematical Thinking at Grade 3

Investigation 2: Sessions 3–4

Investigation 4: Session 2

Flips, Turns, and Areas

Investigation 2: Sessions 1–5

Fair Shares

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–7

Investigation 3: Sessions 1–3

d) Understand that the fractional relationships that occur between zero and one also occur between every two consecutive whole numbers.

Mathematical Thinking at Grade 3

Investigation 2: Sessions 3–4

Investigation 4: Session 2

Flips, Turns, and Areas

Investigation 2: Sessions 1–5

Fair Shares

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–7

Investigation 3: Sessions 1–3

e) Understand and use mixed numbers and their equivalent fraction forms.

Fair Shares

Investigation 1: Sessions 3–4

Investigation 2: Sessions 3–4

1.06 Develop flexibility in solving problems by selecting strategies and using mental computation, estimation, calculators or computers, and paper and pencil.

Throughout this standards-based program, students select appropriate methods and work flexibly with various tools to solve problems. These are a few of the many examples:

Mathematical Thinking at Grade 3

Investigation 4: Session 2

From Paces to Feet

Investigation 1: Sessions 1–4

Ten Minute Math: Estimation and Number Sense

Things That Come in Groups:

Investigation 1: Session 4

Investigation 2: Sessions 2–4

Investigation 3: Sessions 1–2

Investigation 4: Sessions 3–4

Investigation 5: Session 3

Landmarks On the Hundreds Chart

Investigation 3: Sessions 2–3

Combining and Comparing

Investigation 1: Sessions 1–2

Investigation 3: Sessions 1–3

Investigation 4: Sessions 3–4

Investigation 5: Sessions 1–3

Ten Minute Math: Counting Around the Class; Calendar Math

Turtle Paths

Investigation 2: Sessions 1–2

Investigation 3: Sessions 1–2

MEASUREMENT

COMPETENCY GOAL 2: The learner will recognize and use standard units of metric and customary measurement.

Objectives

2.01 Solve problems using measurement concepts and procedures involving:

a) Elapsed time.

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

Combining and Comparing
Investigation 3: Session 3
Investigation 5: Sessions 1–3

b) Equivalent measures within the same measurement system.

From Paces to Feet
Investigation 2: Sessions 2–4, 6, 7

2.02 Estimate and measure using appropriate units.

a) Capacity (cups, pints, quarts, gallons, liters).

Exploring Solids and Boxes
Investigation 4: Sessions 1–3
Investigation 5: Sessions 1–4

b) Length (miles, kilometers)

Students in grade 3 estimate and measure with both standard and non-standard units. Students measure in inches, feet, centimeters, and meters.

From Paces to Feet
Investigation 1: Sessions 1–6
Investigation 2: Sessions 1–7
Investigation 3: Sessions 1–3
Investigation 4: Sessions 1–3
Combining and Comparing
Investigation 3: Sessions 1–2
Turtle Paths
Investigation 2: Sessions 5–6
Investigation 3: Sessions 1–2
Ten Minute Math: Lengths and Perimeters

c) Mass (ounces, pounds, grams, kilograms).

Students in grade 3 estimate and measure the mass of objects using a pan balance and non-standard units.

Combining and Comparing
Investigation 2: Sessions 1–2

d) Temperature (Fahrenheit, Celsius).

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

Related Content:

Up and Down the Number Line
Investigation 1: Session 1–2, 8

GEOMETRY

COMPETENCY GOAL 3: The learner will recognize and use basic geometric properties of two- and three-dimensional figures.

Objectives

3.01 Use appropriate vocabulary to compare, describe, and classify two- and three-dimensional figures.

Flips, Turns, and Area

Investigation 1: Sessions 1–5

Investigation 2: Sessions 1–5

Turtle Paths

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–7

Exploring Solids and Boxes

Investigation 1: Sessions 1–2

Investigation 2: Sessions 1–5

Investigation 3: Sessions 1–2

Investigation 4: Sessions 1–3

Investigation 5: Sessions 1–4

3.02 Use a rectangular coordinate system to solve problems.

a) Graph and identify points with whole number and/or letter coordinates.

Turtle Paths

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–7

b) Describe the path between given points on the plane.

Turtle Paths

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–7

DATA ANALYSIS AND PROBABILITY

COMPETENCY GOAL 4: The learner will understand and use data and simple probability concepts.

Objectives

4.01 Collect, organize, analyze, and display data (including circle graphs and tables) to solve problems.

- Mathematical Thinking at Grade 3
 - Investigation 1: Sessions 2–3
 - Investigation 3: Sessions 1–4
- Things That Come in Groups
 - Investigation 1: Session 1
 - Investigation 2: Sessions 1, 5–6
 - Investigation 5: Sessions 1–4
- From Paces to Feet
 - Investigation 1: Sessions 1–2, 5–6
 - Investigation 2: Session 2
- Landmarks in the Hundreds
 - Investigation 1: Sessions 2–3, 6–7
 - Investigation 2: Sessions 1–3
 - Investigation 3: Session 1
- Up and Down the Number Line
 - Investigation 1: Sessions 1–2
 - Investigation 2: Sessions 1–4
- Combining and Comparing
 - Investigation 1: Session 3
 - Investigation 4: Session 1
 - Ten Minute Math: Exploring Data
- Fair Shares
 - Investigation 2: Sessions 5–6

4.02 Determine the number of permutations and combinations of up to three items.

- 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

4.03 Solve probability problems using permutations and combinations.

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

ALGEBRA

COMPETENCY GOAL 5: The learner will recognize, determine, and represent patterns and simple mathematical relationships.

Objectives

5.01 Describe and extend numeric and geometric patterns.

Mathematical Thinking at Grade 3

Investigation 1: Sessions 2–3

Things That Come in Groups

Investigation 2: Session 1–6

Investigation 3: Session 3

Investigation 5: Session 1, 4

Flips, Turns, and Area

Investigation 1: Sessions 1–3

From Paces to Feet:

Investigation 1: Session 2

Landmarks in the Hundreds

Ten Minute Math: Counting Around the Class

Fair Shares

Investigation 2: Sessions 5–6

5.02 Extend and find missing terms of repeating and growing patterns.

Mathematical Thinking at Grade 3

Investigation 1: Sessions 2–3

Things That Come in Groups

Investigation 2: Session 1–6

Investigation 3: Session 3

Investigation 5: Session 1, 4

Flips, Turns, and Area

Investigation 1: Sessions 1–3

From Paces to Feet

Investigation 1: Session 2

Landmarks in the Hundred

Ten Minute Math: Counting Around the Class

Fair Shares

Investigation 2: Sessions 5–6

5.03 Use symbols to represent unknown quantities in number sentences.

Things That Come in Groups

Investigation 1: Sessions 2–4

Investigation 4: Sessions 1–4

Up and Down the Number Line

Investigation 1: Sessions 6–7

5.04 Find the value of the unknown in a number sentence.

Things That Come in Groups

Investigation 1: Sessions 2–4

Investigation 4: Sessions 1–4

Up and Down the Number Line

Investigation 1: Sessions 6–7

**Investigations in Number, Data, and Space
to the
North Carolina Mathematics Standard Course of Study
Intermediate—Grade Four**

NUMBER AND OPERATIONS

COMPETENCY GOAL 1: The learner will read, write, model, and compute with non-negative rational numbers.

Objectives

1.01 Develop number sense for rational numbers 0.01 through 99,999.

a) Connect model, number word, and number using a variety of representations.

- Mathematical Thinking at Grade 4
 - Investigation 1: Session 2
- 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 1–4
- Sunken Ships and Grid Patterns
 - Investigation 2: Session 5
- Three Out of Four Like Spaghetti
 - Investigation 1: Sessions 1–4

b) Build understanding of place value (hundredths through ten thousands).

- Mathematical Thinking at Grade 4
 - Investigation 1: Session 1–3
- Arrays and Shares
 - Investigation 1: Sessions 1–3
- Landmarks in the Thousands
 - Investigation 4: Sessions 1–3
- Different Shapes, Equal Pieces
 - Investigation 1: Sessions 2–4
- The Shape of the Data
 - Investigation 2: Session 5–7

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

c) Compare and order rational numbers.

Students compare and order non-negative rational numbers. Students are introduced to negative numbers in grade 3.

Landmarks in the Thousand
Investigation 1: Session 1
Investigation 3: Session 1, 2
Investigation 4: Session 1–3
Different Shapes, Equal Pieces
Investigation 1: Session 5
Investigation 2: Sessions 1–4
Investigation 3: Sessions 3–5
Money, Miles, and Large Numbers
Investigation 1: Session 1–2
Investigation 2: Session 1–2
Three Out of Four Like Spaghetti
Investigation 1: Sessions 2–3

d) Make estimates of rational numbers in appropriate situations.

Students make estimates of non-negative rational numbers. Students are introduced to negative numbers in grade 3.

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

1.02 Develop fluency with multiplication and division:

a) Two-digit by two-digit multiplication (larger numbers with calculator).

- Mathematical Thinking at Grade 4
 - Investigation 3: Sessions 4–5
- Arrays and Shares
 - Investigation 1: Sessions 1–4
 - Investigation 2: Session 2–6
 - Investigation 3: Session 2–4
- Landmarks in the Thousands
 - Investigation 2: Session 1
- Packages and Groups
 - Investigation 2: Session 1–3
 - Investigation 3: Session 4–6

b) Up to three-digit by two-digit division (larger numbers with calculator).

- Mathematical Thinking at Grade 4
 - Investigation 3: Session 4
- Arrays and Shares
 - Investigation 1: Session 3
 - Investigation 2: Session 7–8
 - Investigation 3: Session 2–4
- Landmarks in the Thousands
 - Investigation 2: Session 1
- Packages and Groups
 - Investigation 3: Session 4–6

c) Strategies for multiplying and dividing numbers.

- 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 1: Session 1, 3
 - Investigation 2: Sessions 1–5
 - Investigation 3: Sessions 2–5
 - Investigation 4: Sessions 1–3
 - Ten Minute Math: Counting Around the Class
- Different Shapes, Equal Pieces
 - Ten Minute Math: Guess My Number

The Shape of the Data
Ten Minute Math: Broken Calculator
Packages and Groups
Investigation 1: Sessions 1–5
Investigation 2: Sessions 1–3
Investigation 3: Sessions 1–10

d) Estimation of products and quotients in appropriate situations.

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 1: Sessions 1–2
Investigation 2: Sessions 1–5
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

e) Relationships between operations.

Landmarks in the Thousands
Investigation 2: Sessions 1, 5
Packages and Groups
Investigation 3: Sessions 1–8

1.03 Solve problems using models, diagrams, and reasoning about fractions and relationships among fractions involving halves, fourths, eighths, thirds, sixths, twelfths, fifths, tenths, hundredths, and mixed numbers.

Throughout this standards-based program, students use models, diagrams, and reasoning to solve a variety of story problems . These are a few of the many examples:

Mathematical Thinking at Grade 4
Investigation 1: Session 4
Investigation 2: Session 1–4
Arrays and Shares
Investigation 2: Session 5–8
Investigation 3: Session 2–4
Seeing Solids and Silhouettes
Investigation 1: Session 1
Investigation 2: Session 3–4
Investigation 4: Session 1–4

- Landmarks in the Thousands
 - Investigation 2: Session 2–4
 - Investigation 3: Session 3–5
- Different Shapes, Equal Pieces
 - Investigation 1: Session 1–5
 - Investigation 2: Session 1–2
 - Investigation 3: Session 4
- The Shape of Data
 - Investigation 1: 1–3
 - Investigation 2: Session 1, 4, 6–7
- Money, Miles, and Large Numbers
 - Investigation 1: Session 1–8
 - Investigation 3: Session 1–4
- Changes Over Time
 - Investigation 1: Session 5–6
 - Investigation 3: Session 1–7
- Packages and Groups
 - Investigation 2: Session 1
 - Investigation 3: Session 1–6
- Sunken Ships and Grid Patterns
 - Investigation 1: Session 3–4
 - Investigation 2: Session 5
- Three out of Four Like Spaghetti
 - Investigation 1: Session 2
 - Investigation 2: Session 1–3

1.04 Develop fluency with addition and subtraction of non-negative rational numbers with like denominators, including decimal fractions through hundredths.

a) Develop and analyze strategies for adding and subtracting numbers.

- Mathematical Thinking at Grade 4
 - Investigation 2: Sessions 1–4
 - Investigation 3: Sessions 1–5
- Landmarks in the Thousands
 - Investigation 1: Session 3
 - Investigation 2: Sessions 2–4
 - Investigation 3: Sessions 2–5
 - Investigation 4: Sessions 1–3
- Different Shapes, Equal Pieces
 - Investigation 1: Session 1–5
 - Investigation 2: Session 1–4
- Money, Miles, and Large Numbers
 - Investigation 1: Sessions 1–8
 - Investigation 2: Sessions 1–2, 4
 - Investigation 3 : Sessions 1–4

b) Estimate sums and differences.

Mathematical Thinking at Grade 4

Investigation 1: Session 4

Ten Minute Math: Estimation and Number Sense

Landmarks in the Thousands

Investigation 1: Session 3

Investigation 2: Sessions 2–4

Investigation 3: Sessions 2–5

Investigation 4: Sessions 1–3

Money, Miles, and Large Numbers

Investigation 1: Sessions 1–5, 7–8

Investigation 2: Sessions 1–3

Investigation 3: Sessions 1–4

c) Judge the reasonableness of solutions.

Mathematical Thinking at Grade 4

Investigation 2: Sessions 1–4

Investigation 3: Sessions 1–5

Ten Minute Math: Estimation and Number Sense

Landmarks in the Thousands

Investigation 1: Session 3

Investigation 2: Sessions 2–4

Investigation 3: Sessions 2–5

Investigation 4: Sessions 1–3

Different Shapes, Equal Pieces

Investigation 1: Session 1–5

Investigation 2: Session 1–4

Money, Miles, and Large Numbers

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–2, 4

Investigation 3 : Sessions 1–4

1.05 Develop flexibility in solving problems by selecting strategies and using mental computation, estimation, calculators or computers, and paper and pencil.

Throughout this standards-based program, students select appropriate methods and work flexibly with various tools to solve problems. These are a few of the many examples:

Mathematical Thinking at Grade 4

Investigation 1: Session 1–4

Investigation 2: Session 1

Investigation 3: Session 1–5

- Arrays and Shares
 - Investigation 1: Session 1–3
 - Investigation 2: Session 1–8
 - Investigation 3: Session 1–5
- 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 11—2, 4–8
 - Investigation 2: Sessions 1–2, 4
 - Investigation 3: Session 1
- Landmarks in the Thousands
 - Investigation 2: Sessions 1–5
- Packages and Groups
 - Investigation 1: Sessions 1–5
 - Investigation 2: Sessions 1–3
 - Investigation 3: Sessions 1–10
- Sunken Ships and Grid Patterns
 - Investigation 1: Sessions 5–6

MEASUREMENT

COMPETENCY GOAL 2: The learner will understand and use perimeter and area.

Objectives

2.01 Develop strategies to determine the area of rectangles and the perimeter of plane figures.

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

2.02 Solve problems involving perimeter of plane figures and areas of rectangles.

- Arrays and Shares
 - Investigation 2: Sessions 1–6
- Different Shapes, Equal Pieces
 - Investigation 1: Sessions 1–5
 - Investigation 2: Sessions 1–4
- Sunken Ships and Grid Patterns
 - Ten Minute Math: Lengths and Perimeters

GEOMETRY

COMPETENCY GOAL 3: The learner will recognize and use geometric properties and relationships.

Objectives

3.01 Use the coordinate system to describe the location and relative position of points and draw figures in the first quadrant.

Sunken Ships and Grid Patterns

Investigation 1: Sessions 1–6

Investigation 2: Sessions 1–9

3.02 Describe the relative position of lines using concepts of parallelism and perpendicularity.

Sunken Ships and Grid Patterns

Investigation 2: Sessions 1–7

3.03 Identify, predict, and describe the results of transformations of plane figures.

a) Reflections.

Mathematical Thinking at Grade 4

Investigation 4: Session 1–6

Different Shapes, Equal Pieces

Investigation 1: Session 1

Sunken Ships and Grid Patterns

Investigation 2: Sessions 1–9

b) Translations.

Different Shapes, Equal Pieces

Investigation 1: Session 1

c) Rotations.

Mathematical Thinking at Grade 4

Investigation 4: Session 1–6

Different Shapes, Equal Pieces

Investigation 1: Session 1

Sunken Ships and Grid Patterns

Investigation 2: Sessions 1–9

DATA ANALYSIS AND PROBABILITY

COMPETENCY GOAL 4: The learner will understand and use graphs, probability, and data analysis.

Objectives

4.01 Collect, organize, analyze, and display data (including line graphs and bar graphs) to solve problems.

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

Investigation 1: Sessions 1–6

Investigation 3: Sessions 1–8

Packages and Groups

Investigation 1 : Sessions 4–5

Ten Minute Math: Exploring Data

Sunken Ships and Grid Patterns

Investigation 1: Sessions 1–6

Investigation 2: Sessions 1–9

Three Out of Four Like Spaghetti

Investigation 1: Session 2–4

Investigation 2: Sessions 1–7

4.02 Describe the distribution of data using median, range and mode.

The Shape of the Data

Investigation 2: Sessions 4–7

4.03 Solve problems by comparing two sets of related data.

Landmarks in the Thousands

Investigation 1: Session 2

The Shape of the Data

Investigation 1: Sessions 2–3

Investigation 2: Sessions 1–4, 6–7

Changes Over Time

Investigation 1: Session 1–4

Investigation 3: Session 1–8

Three out of Four Like Spaghetti

Investigation 1: Session 4

Investigation 2: Sessions 1–2, 4–7

4.04 Design experiments and list all possible outcomes and probabilities for an event.

- Arrays and Shares
 - Investigation 2: Sessions 1–6
- Landmarks in the Thousands
 - Investigation 1: Session 2
 - Ten Minute Math: What Is Likely?
- Different Shapes, Equal Pieces
 - Investigation 2: Session 3–4
- Money, Miles, and Large Numbers
 - Ten Minute Math: Likely or Unlikely?
- Three Out of Four Like Spaghetti
 - Ten Minute Math: What Is Likely?

ALGEBRA

COMPETENCY GOAL 5: The learner will demonstrate an understanding of mathematical relationships.

Objectives

5.01 Identify, describe, and generalize relationships in which:

a) Quantities change proportionally.

- Sunken Ships and Grid Patterns
 - Ten Minute Math: Lengths and Perimeters
- Packages and Groups
 - Investigation 3: Session 7–8

b) Change in one quantity relates to change in a second quantity.

- Arrays and Shares
 - Investigation 2: Sessions 1–6
- Changes Over Time
 - Investigation 1: Sessions 1–6
 - Investigation 2: Sessions 1–2
 - Investigation 3: Sessions 1–8
- Packages and Groups
 - Investigation 3: Sessions 7–8
- Sunken Ships and Grid Patterns
 - Investigation 1: Sessions 5–6

5.02 Translate among symbolic, numeric, verbal, and pictorial representations of number relationships.

- Mathematical Thinking at Grade 4
 - Investigation 1: Session 1–3
 - Investigation 3: Session 3
 - Investigation 4: Session 1–4
- Money, Miles, and Large Numbers
 - Investigation 1: Session 1–2
 - Investigation 2: Session 1–2
- Packages and Groups
 - Investigation 1: Sessions 1–2
 - Investigation 3: Sessions 7–8
- Three Out of Four Like Spaghetti
 - Investigation 1: Session 3

5.03 Verify mathematical relationships using:

a) Models, words, and numbers.

Throughout this standards-based program, students use models, words, and numbers to justify concepts and relationships. These are a few of the many examples:

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

Sunken Ships and Grid Patterns
Investigation 2: Sessions 8–9
Three Out of Four Like Spaghetti
Investigation 1: Sessions 3–4

b) Order of operations and the identity, commutative, associative, and distributive properties.

Mathematical Thinking at Grade 4
Ten Minute Math: Estimation and Number Sense
Arrays and Shares
Investigation 2: Sessions 2–6
Investigation 3: Sessions 1–5
Changes Over Time
Investigation 1: Sessions 5–6
Packages and Groups
Investigation 2: Sessions 1–3
Investigation 3: Sessions 3–8

**Investigations in Number, Data, and Space
to the
North Carolina Mathematics Standard Course of Study**

Intermediate—Grade Five

NUMBER AND OPERATIONS

COMPETENCY GOAL 1: The learner will understand and compute with non-negative rational numbers.

Objectives

1.01 Develop number sense for rational numbers 0.001 through 999,999.

a) Connect model, number word, and number using a variety of representations.

Mathematical thinking at Grade 5

Investigation 1: Session 1–3

Investigation 2: Session 5

Name that Portion

Investigation 1: Sessions 1, 2

Investigation 2: Session 1–8

Investigation 3: Sessions 1–4, 7–8

Investigation 4: Session 1, 5–7

Ten Minute Math: Seeing Numbers

Between Never and Always

Investigation 1: Session 1–2

Building on Numbers You Know

Investigation 2: Session 7

Investigation 4: Session 1–2

Data; Kids, Cats, and Ads

Investigation 3: Sessions 1, 4

Investigation 4: Session 2

b) Build understanding of place value (thousandths through hundred thousands).

Mathematical Thinking at Grade 5

Investigation 2: Session 2–4

Investigation 3: Sessions 1, 5

Investigation 4: Sessions 5–6

Name that Portion

Investigation 3: Session 2–4, 7

c) Compare and order rational numbers.

Mathematical Thinking at Grade 5
Investigation 2: Session 5
Investigation 4: Session 2–4
Name that Portion
Investigation 1: Session 7
Investigation 2: Session 3–9
Investigation 3: Sessions 2–6, 7–8
Building on Number You Know
Investigation 1: Sessions 1–2, 5
Investigation 5: Sessions 4–6
Patterns of Change
Ten Minute Math: Nearest Answer
Data; Kids, Cats, and Ads
Investigation 1: Session 1–3
Investigation 3: Session 1–3
Investigation 4: Session 1, 3
Investigation 5: Session 3–5

d) Make estimates of rational numbers in appropriate situations.

Mathematical Thinking at Grade 5
Investigation 2: Session 1
Investigation 3: Session 1
Investigation 4: Session 5–6
Picturing Polygons
Investigation 2: Session 8
Building on Numbers You Know
Investigation 4: Session 1–2
Investigation 5: Session 1–2
Measurement Benchmarks
Investigation 3: Session 1
Patterns of Change
Ten Minute Math: Nearest Answer

1.02 Develop fluency in adding and subtracting non-negative rational numbers (halves, fourths, eighths; thirds, sixths, twelfths; fifths, tenths, hundredths, thousandths; mixed numbers).

a) Develop and analyze strategies for adding and subtracting numbers.

Mathematical Thinking at Grade 5
Investigation 4: Session 1–4
Name That Portion
Investigation 2: Sessions 1–3, 6–9
Investigation 3: Sessions 2–4, 7

Between Never and Always
Investigation 1: Session 7
Ten Minute Math: Nearest Answer
Building on Numbers You Know
Investigation 1: Sessions 1–4, 6–8
Investigation 5: Sessions 4–6
Measurement Benchmarks
Investigation 1: Sessions 5–6
Ten Minute Math: Estimation and Number Sense
Data, Kids, Cats, and Ads
Investigation 4: Session 3

b) Estimate sums and differences.

Name That Portion
Investigation 1: Sessions 1–2
Investigation 4: Sessions 1–7
Between Never and Always
Ten Minute Math: Nearest Answer
Building on Numbers you Know
Investigation 1: Session 2
Measurement Benchmarks
Ten Minute Math: Estimation and Number Sense
Patterns of Change
Ten Minute Math: Nearest Answer

c) Judge the reasonableness of solutions.

Mathematical Thinking at Grade 5
Investigation 4: Session 5–6
Name that Portion
Investigation 2: Session 6–8
Investigation 3: Session 2–4
Building on Numbers You Know
Investigation 1: Session 6–8

1.03 Develop flexibility in solving problems by selecting strategies and using mental computation, estimation, calculators or computers, and paper and pencil.

Throughout this standards-based program, students select appropriate methods and work flexibly with various tools to solve problems. These are a few of the many examples:

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

Picturing Polygons

Investigation 1: Session 3–4

Investigation 2: Session 4–7

Investigation 3: Sessions 1–2, 5–7

Name That Portion

Investigation 1: Sessions 1–2

Investigation 2: Sessions 1–3, 6–9

Investigation 3: Sessions 2–4, 7

Investigation 4: Sessions 1–7

Between Never and Always

Ten Minute Math: Nearest Answer

Building on Numbers You Know

Investigation 1: Session 2–7

Investigation 2: Session 1–6

Investigation 4: Session 1–2

Investigation 5: Sessions 1–2, 4–6

Investigation 2: Session 7–8

Measurement Benchmarks

Investigation 1: Session 5–6

Ten Minute Math; Estimation and Number Sense

Building on Numbers You Know

Investigation 3: Sessions 1, 7–9

Investigation 5: Session 1–2

Patterns of Change

Investigation 3: Session 1–3

Ten Minute Math: Nearest Answer

Containers and Cubes

Investigation 4: session 7–9

Data: Kids, Cats, and Ads

Investigation 2: Session 3

Investigation 3: Session 1

Investigation 4: Session 1

MEASUREMENT

COMPETENCY GOAL 2: The learner will recognize and use standard units of metric and customary measurement.

Objectives

2.01 Estimate the measure of an object in one system given the measure of that object in another system.

Measurement Benchmarks

Investigation 1: Sessions 1, 3

Investigation 2: Session 1–4

2.02 Identify, estimate, and measure the angles of plane figures using appropriate tools.

Picturing Polygons

Investigation 2: Sessions 1–3, 6–9

Investigation 3: Sessions 1–3

GEOMETRY

COMPETENCY GOAL 3: The learner will understand and use properties and relationships of plane figures.

Objectives

3.01 Identify, define, describe, and accurately represent triangles, quadrilaterals, and other polygons.

Mathematical Thinking at Grade 5

Ten Minute Math: Quick Images

Picturing Polygons

Investigation 1: Session 1–4

Investigation 2: Session 1–9

Investigation 3: Session 1–6;

Building on Numbers You Know

Ten Minute Math: Quick Images

3.02 Make and test conjectures about polygons involving:

a) Sum of the measures of interior angles.

Picturing Polygons

Investigation 2: Sessions 1–3, 6–9

Investigation 3: Sessions 1–3

b) Lengths of sides and diagonals.

Picturing Polygons

Investigation 1: Sessions 2–4

Investigation 2: Sessions 1–7

Investigation 3: Sessions 1–6

c) Parallelism and perpendicularity of sides and diagonals.

Picturing Polygons

Investigation 2: Sessions 1–7

Investigation 3: Session 4–6

3.03 Classify plane figures according to types of symmetry (line, rotational).

See Grade 4, Sunken Ships and Grid Patterns
Investigation 2: Sessions 2–3, 6–9

3.04 Solve problems involving the properties of triangles, quadrilaterals, and other polygons.

a) Sum of the measures of interior angles.

Picturing Polygons
Investigation 2: Sessions 1–3, 6–9
Investigation 3: Sessions 1–3

b) Lengths of sides and diagonals.

Picturing Polygons
Investigation 1: Sessions 2–4
Investigation 2: Sessions 1–7
Investigation 3: Sessions 1–6

c) Parallelism and perpendicularity of sides and diagonals.

Picturing Polygons
Investigation 2: Sessions 1–7
Investigation 3: Session 4–6

DATA ANALYSIS AND PROBABILITY

COMPETENCY GOAL 4: The learner will understand and use graphs and data analysis.

Objectives

4.01 Collect, organize, analyze, and display data (including stem-and-leaf plots) to solve problems.

Name That Portion
Investigation 4: Session 1–7
Between Never and Always
Investigation 1: Session 3–6
Investigation 2: Session 1–3
Measurement Benchmarks
Investigation 2: Session 7–8
Investigation 3: Session 1–2
Patterns of Change
Investigation 1: Session 1–4
Investigation 2: Session 1–5
Investigation 3: Session 1–6
Ten Minute Math: Graph Stories

Data: Kids, Cats, and Ads
Investigation 1: Session 1–4
Investigation 2: Session 1–3
Investigation 3: Session 2–4
Investigation 4: Session 2–3
Investigation 5: Session 2–5

4.02 Compare and contrast different representations of the same data; discuss the effectiveness of each representation.

Name That Portion
Ten Minute Math: Exploring Data
Patterns of Change
Investigation 1: Session 1–4
Investigation 2: Session 1–5
Investigation 3: Session 3–6
Data: Kids, Cats, and Ads
Investigation 2: Session 2
Investigation 5: Session 3–5

4.03 Solve problems with data from a single set or multiple sets of data using median, range, and mode.

Between Never and Always
Investigation 1: Session 3–6
Investigation 2: Session 3
Data: Kids, Cats, and Ads
Investigation 1, Session 1–4
Investigation 2: Session 1–3
Investigation 3: Session 1–4
Investigation 5: Session 3–5

ALGEBRA

COMPETENCY GOAL 5: The learner will demonstrate an understanding of patterns, relationships, and elementary algebraic representation.

Objectives

5.01 Describe, extend, and generalize numeric and geometric patterns using tables, graphs, words, and symbols.

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

Picturing Polygons

Investigation 2 Session 4–5

Investigation 3: Session 1–7;

Name That Portion

Investigation 3: Sessions 1, 5–6

Building on Numbers You Know

Investigation 1: Session 1–5

Investigation 2: Sessions 1–3, 5–6

Investigation 4: Session 1–2;

Investigation 5: Session 1–8

Patterns of Change

Investigation 1: Session 1–4

Investigation 2: Session 1–5

Investigation 3: Session 1–7

Containers and Cubes

Investigation 1: Session 1–4

Investigation 2: Session 4–3

Investigation 4: Session 2–9

Data: Kids, Cats, and Ads

Ten Minute Math: Volume and Surface Area

5.02 Use algebraic expressions, patterns, and one-step equations and inequalities to solve problems.

Mathematical Thinking at Grade 5

Investigation 2: Session 1

Investigation 3: Session 2–5

Investigation 4: Session 1

Picturing Polygons

Investigation 1: Sessions 3–4

Investigation 2: Sessions 4–7

Investigation 3: Sessions 1–2, 4–6

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: Session 1–10

Investigation 4: Session 1

Investigation 5: Session 1–2, 4–7

Patterns of Change

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–5

Investigation 3: Sessions 1–7

Containers and Cubes

Investigation 4: Sessions 7–9, page 89

Data: Kids, Cats, and Ads

Investigation 2: Session 1, 3

5.03 Identify, describe, and analyze situations with constant or varying rates of change.

Picturing Polygons

Investigation 1: Session 3–4

Investigation 2: Session 4–7

Investigation 3: Sessions 1–2, 5–6

Building on Numbers You Know

Investigation 1: Session 3–4

Measurement Benchmarks

Investigation 3: Session 1–3

Patterns of Change

Investigation 1: Session 1–4

Investigation 2: Session 1–5

Investigation 3: Session 1–7

Containers and Cubes

Investigation 1: Session 1–4

Data, Kids, Cats and Ads

Ten Minute Math: Volume and Surface Area