

A Correlation of



to the

**North Dakota
Mathematics Standards
and Benchmarks**
Grades K-5



G/M-216

INTRODUCTION

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

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, & Space
to the
North Dakota Mathematics Standards and Benchmarks
Kindergarten**

Standard 1: Number and Operation

Students understand and use basic and advanced concepts of number and number systems

BENCHMARK EXPECTATION

NUMBERS, NUMBER RELATIONSHIPS, AND NUMBER SYSTEMS

K. 1.1. Count to 20

Mathematical Thinking in Kindergarten
Investigation 1: Focus Time: Attendance
Investigations 2, 3, 4
Collecting, Counting, and Measuring
Investigations 1, 2, 4, 5, 6
Counting Ourselves and Others
Investigations 1, 3, 4

K. 1.2. Count backward from 10 to 1

This expectation can be introduced during this investigation.
Mathematical Thinking in Kindergarten
Investigation 3: Focus Time: Calendar

K. 1.3. Demonstrate one- to- one correspondence by counting up to 10 objects

Mathematical Thinking in Kindergarten
Investigations 1, 2, 3
Patterns, Trains, and Hopscotch Paths
Investigation 4: Choice Time: 12 Chips; Choice Time: Staircase Patterns
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

K. 1.4. Identify ordinal numbers to order objects, 1st – 5th

Mathematical Thinking in Kindergarten
Investigation 3: Focus Time: Calendar

K. 1.5. Identify and write numerals to 10

Mathematical Thinking in Kindergarten
Investigations 2, 3, 4
Counting Ourselves and Others
Investigation 1
How Many in All?
Investigation 2
Investigation 3: Choice Time: Counters in a Cup
Investigation 4: Choice Time: Six Crayons in All
Collecting, Counting, and Measuring
Investigation 1
Investigation 2: Focus Time: Taking Inventory

K. 1.6. Determine the relationship between two sets with 10 or fewer objects; i. e., less than, greater than, or equal to

Mathematical Thinking in Kindergarten
Investigation 1: Focus Time: Attendance
Investigations 2, 3, 4
Patterns, Trains, and Hopscotch Paths
Investigation 4: Choice Time: 12 Chips; Choice Time: Staircase Patterns
Counting Ourselves and Others
Investigations 3, 4
How Many In All?
Investigation 2: Choice Time: Grab Two Handfuls
Investigation 3: Choice Time: Double Compare
Investigation 4: Focus Time: Blue and Red Crayons
Collecting, Counting, and Measuring
Investigations 3, 4, 5, 6

K. 1.7. Use concrete materials to represent wholes and halves

This expectation is introduced in Grade 1.

OPERATIONS AND THEIR PROPERTIES

No expectations at this level

COMPUTATIONAL FLUENCY AND ESTIMATION

No expectations at this level

Standard 2: Geometry and Spatial Sense

Student understands and applies geometric concepts and spatial relationships to represent and solve problems in mathematical and nonmathematical situations

BENCHMARK EXPECTATION**TWO- AND THREE-DIMENSIONAL SHAPES, GEOMETRIC PROPERTIES AND RELATIONSHIPS****K. 2.1. Identify and reproduce two- dimensional figures; i. e., circle, triangle, rectangle, and square**

Mathematical Thinking in Kindergarten

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

Making Shapes and Building Blocks

Investigations 1, 2

K. 2.2. Match a three- dimensional object with its stated name; i. e., cone, sphere, cube, cylinder (e. g., which of these is a cone?)

Making Shapes and Building Blocks

Investigations 3, 4, 5

COORDINATE GEOMETRY

No expectations at this level

TRANSFORMATION AND SYMMETRY

No expectations at this level

VISUALIZATION, SPATIAL REASONING, AND GEOMETRIC MODELING**K. 2.3. Identify position and direction; i. e., inside, outside, between, above, below, behind, left, and right**

Patterns, Trains, and Hopscotch Paths

Investigation 4: Choice Time: Staircase Patterns

Making Shapes and Building Blocks

Investigations 2, 3, 4

Standard 3: Data Analysis, Statistics, and Probability

Students use data collection and analysis techniques, statistical methods, and probability to solve problems

BENCHMARK EXPECTATION**DATA COLLECTION, DISPLAY, AND INTERPRETATION****K. 3.1. Sort objects according to a given attribute; e. g., use, size, color, shape**

Mathematical Thinking in Kindergarten

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

Blocks, Exploring Pattern Blocks

Investigation 3: Choice Time: Measuring Table

Patterns, Trains, and Hopscotch Paths

Investigation 1

Investigation 4: Choice Time: Staircase Patterns

Counting Ourselves and Others

Investigation 1: Choice Time: Self-Portraits

Investigation 2

K. 3.2. Use picture graphs as sources of information

Counting Ourselves and Others

Investigation 2: Focus Time: What Did You Eat for Lunch?

Related content:

Counting Ourselves and Others

Investigation 3

See also, Teacher Note, page 54.

PROBABILITY

No expectations at this level

STATISTICAL METHODS

No expectations at this level

PREDICTIONS, DATA ANALYSIS AND INFERENCES

No expectations at this level

Standard 4: Measurement

Students use concepts and tools of measurement to describe and quantify the world

BENCHMARK EXPECTATION**MEASURABLE ATTRIBUTES, MEASUREMENT SYSTEMS AND UNITS****K. 4.1. Name the days of the week in order**

Mathematical Thinking in Kindergarten
Investigation 3: Focus Time: Calendar
Classroom Routines: Calendar

K. 4.2. Tell time to the hour using digital and analog clocks

Clock time is introduced in Grade 2.

K. 4.3. Order pictures first, next, last based on time

Related content:
Mathematical Thinking in Kindergarten
Investigation 3: Focus Time: Calendar
Classroom Routines: Calendar

K. 4.4. Compare and order objects according to their length or weight

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

K. 4.5. Identify a penny, nickel, and dime and state its value

Counting Ourselves and Others
Investigation 2: Choice Time: The Grocery Store

MEASUREMENT TOOLS, TECHNIQUES, AND FORMULAS**K. 4.6. Measure length with non- standard units; e. g., paper clips, cubes**

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

Standard 5: Algebra, Functions, and Patterns

Students use algebraic concepts, functions, patterns, and relationships to solve problems

BENCHMARK EXPECTATION**PATTERNS, RELATIONS, AND FUNCTIONS****K. 5.1. Identify, sort, and classify objects by attributes**

Mathematical Thinking in Kindergarten

Investigation 1: Choice Time: Exploring Color Tiles; Choice Time:

Exploring Pattern Blocks; Choice Time: Exploring Geoblocks

Investigation 2: Choice Time: Exploring Color Tiles; Choice Time:

Exploring Pattern Blocks; Choice Time: Exploring Geoblocks

Investigation 3: Choice Time: Exploring Interlocking Cubes

Patterns, Trains, and Hopscotch Paths

Investigation 1

Investigation 4: Choice Time: Staircase Patterns

Collecting, Counting, and Measuring

Investigations 3, 4, 5, 6

Counting Ourselves and Others

Investigations 2, 3, 4

Making Shapes and Building Blocks

Investigations 1, 3, 4, 5

K. 5.2. Recognize, extend, and describe simple patterns

Mathematical Thinking in Kindergarten

Investigation 1

Pattern Trains and Hopscotch Paths

Investigations 1–4

Classroom Routines: Calendar, Patterns on the Pocket Chart

NUMERIC AND ALGEBRAIC REPRESENTATIONS

No expectations at this level

MATHEMATICAL MODELING**K. 5.3. Use tools and strategies (e. g., manipulatives) to model problems**

In most investigations, students use tools and manipulatives to model problems.

These are some of the many examples.

Mathematical Thinking in Kindergarten

Investigations 2, 3

Pattern Trains and Hopscotch Paths

Investigations 1, 3, 4

Collecting, Counting, and Measuring

Investigation 3

Counting Ourselves and Others

Investigation 1

Making Shapes and Building Blocks

Investigations 1, 2, 4

How Many in All?

Investigation 4

RATES OF CHANGE

No expectations at this level

**Investigations in Number, Data, & Space
to the
North Dakota Mathematics Standards and Benchmarks**

Grade One

Standard 1: Number and Operation

Students understand and use basic and advanced concepts of number and number systems

BENCHMARK EXPECTATION

NUMBERS, NUMBER RELATIONSHIPS, AND NUMBER SYSTEMS

1.1.1. Count and order numbers to 100

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

1.1.2. Identify and write numerals to 100

Mathematical Thinking at Grade 1

Investigation 1: Sessions 2–4

Investigation 2: Sessions 1–6

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

Number Games and Story Problems

Investigation 2: Sessions 6–12

Bigger, Taller, Heavier, Smaller

Investigation 2: Sessions 1–7
Classroom Routines: Counting

1.1.3. Count backward from 20

These investigations provide opportunities to introduce and practice counting backward.

Building Number Sense

Investigation 4: Sessions 2–5

Number Games and Story Problems

Investigation 3: Sessions 2–5

1.1.4. Count by 2's to 20, and 10's to 100

Number Games and Story Problems

Investigation 2: Sessions 1–8, 10–12

Classroom Routines: Counting

This investigation prepares students to meet this expectation:

Building Number Sense

Investigation 3: Sessions 1–2

1.1.5. Group objects by 2's, 5's, and 10's

Number Games and Story Problems

Investigation 2: Sessions 1–8, 10–12

1.1.6. Identify position using ordinal numbers

These investigations provide opportunities for practice with ordinal numbers.

Notes to the teacher point out these opportunities.

Mathematical Thinking at Grade 1

Investigation 2: Sessions 2 and 3 (see p. 37)

Building Number Sense

Investigation 3: Sessions 1–2

**1.1.7. Connect number words and numerals to the quantities they represent
(0 - 10)**

This expectation can be introduced during these activities. Number cards can be reproduced with number words inserted.

Mathematical Thinking at Grade 1

Investigation 2: Sessions 1, 2-3

Building Number Sense

Investigation 1: Sessions 1, 3

1.1.8. Represent and explain fractions (i. e., one half, one fourth) as part of a whole and part of a set using concrete materials/ drawings

Building Number Sense

Investigation 1: Session 2

Bigger, Taller, Heavier, Smaller

Investigation 2: Sessions 2–4

Investigation 3: Session 2

1.1.9. Identify place value for ones and tens

Building Number Sense

Investigation 2: Sessions 6–8

Investigation 3: Sessions 1–2, 5–7, 9

Survey Questions and Secret Rules

Investigation 2: Sessions 1–2, 5–6

Investigation 3: Sessions 1–2

Investigation 4: Sessions 2–3

Number Games and Story Problems

Investigation 2: Sessions 6–8

Investigation 3: Sessions 10–12

1.1.10. Compare two digit numbers using symbols; i. e., $>$, $<$, $=$ *Using symbols to compare two-digit numbers can be introduced during this investigation.*

Building Number Sense

Investigation 3: Sessions 1–2

1.1.11. Use grade- appropriate terms when communicating about addition and subtraction; i. e., sum, difference*These terms can be introduced during these investigations.*

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 1–10

OPERATIONS AND THEIR PROPERTIES**1.1.12. Use symbols to write addition and subtraction number sentences;****i. e., $+$, $-$, $=$**

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 1–10

COMPUTATIONAL FLUENCY AND ESTIMATION**1.1.13. Recall addition facts and subtraction facts (0- 10)**

Mathematical Thinking at Grade 1

Investigation 2: Sessions 4–6

Investigation: 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 2: Sessions 1–8, 10–12

Investigation 3: Sessions 1–8

1.1.14. Estimate the number of objects and check by counting

Classroom Routines: Counting

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

Standard 2: Geometry and Spatial Sense

Student understands and applies geometric concepts and spatial relationships to represent and solve problems in mathematical and nonmathematical situations

BENCHMARK EXPECTATION**TWO- AND THREE-DIMENSIONAL SHAPES, GEOMETRIC PROPERTIES AND RELATIONSHIPS****1.2.1. Identify, compare, draw, and sort two- dimensional figures; i. e., circle, triangle, rectangle, square, oval and diamond**

Quilt Squares and Block Towns

Investigation 1: Sessions 1, 2, 3–6, 7, 8–10, 11–12

Survey Questions and Secret Rules

investigation 1 : Sessions 1–2

1.2.2. Identify three- dimensional objects; i. e., pyramid, cube, cone, cylinder, sphere

Quilt Squares and Block Towns

Investigation 1: Session 1

Investigation 2: Sessions 1–10

Investigation 3: Sessions 1–5

COORDINATE GEOMETRY*No expectations at this level***TRANSFORMATION AND SYMMETRY****1.2.3. Identify lines of symmetry in two- dimensional figures**

This expectation is addressed in Shapes Halves, and Symmetry in Grade 2.

VISUALIZATION, SPATIAL REASONING, AND GEOMETRIC MODELING**1.2.4. Arrange and describe objects in space by proximity, position, and direction; e. g., near, far, below, above, up, down, behind, in front of, next to, left or right of**

Quilt Squares and Block Towns

Investigation 3: Sessions 6–7

Standard 3: Data Analysis, Statistics, and Probability

Students use data collection and analysis techniques, statistical methods, and probability to solve problems

BENCHMARK EXPECTATION**DATA COLLECTION, DISPLAY, AND INTERPRETATION****1.3.1. Identify and display various forms of data in their world using charts and graphs; e. g., tally charts and bar graphs**

Mathematical Thinking at Grade 1

Investigation 5: Sessions 2–6

Survey Questions and Secret Rules

Investigation 1: Sessions 1–6

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–3

Investigation 4: Sessions 1–5

Quilt Squares and Block Towns

Investigation 1: Sessions 11–12

Bigger, Taller, Heavier, Smaller

Investigation 2: Sessions 1–2

Investigation 3: Sessions 1–5

Classroom Routines: Exploring Data

1.3.2. Read and interpret tally charts and picture graphs as sources of information

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

1.3.3. Sort objects by common attribute

Mathematical Thinking at Grade 1
Investigation 5: Session 2
Survey Questions and Secret Rules
Investigation 1: Sessions 1–2
Investigation 2: Sessions 3–4
Classroom Routines: Exploring Data, Understanding Time and Changes

PROBABILITY

No expectations at this level

STATISTICAL METHODS

No expectations at this level

PREDICTIONS, DATA ANALYSIS AND INFERENCES

No expectations at this level

Standard 4: Measurement

Students use concepts and tools of measurement to describe and quantify the world

BENCHMARK EXPECTATION**MEASURABLE ATTRIBUTES, MEASUREMENT SYSTEMS AND UNITS****1.4.1. Use the days of the week to show knowledge of yesterday, today, and tomorrow**

Survey Questions and Secret Rules
Investigation 3: Sessions 1–3
See also, Classroom Routines: Understanding Time and Changes.

1.4.2. Tell time to the hour and half- hour using digital and analog clocks

These Classroom Routines provide opportunities to introduce this expectation.
Classroom Routines: Understanding Time and Changes.
See also, Grade 2.

1.4.3. Estimate, and verify by measuring, length, weight, or capacity using nonstandard units

Bigger, Taller, Heavier, Smaller

Investigation 1: Sessions 1–6

Investigation 2: Sessions 1–7

Investigation 3: Sessions 2, 4–5

1.4.4. Estimate, and verify by measuring length to the nearest inch, foot, and centimeter

In these investigations, students use standard units (interlocking cubes) to measure length objects.

Bigger, Taller, Heavier, Smaller

Investigation 3: Sessions 4–5

1.4.5. Identify a penny, nickel, dime, and quarter and state its value

Building Number Sense

Investigation 3: Sessions 5–7 (See p. 101)

Number Games and Story Problems

Investigation 2: Sessions 3–8

1.4.6. Count a like set of pennies, nickels, or dimes to \$1.00

Number Games and Story Problems

Investigation 2: Sessions 3–8

1.4.7. Demonstrate that different combinations of coins (i. e., pennies, nickels and dimes) can have the same value

Number Games and Story Problems

Investigation 2: Sessions 3–8

1.4.8. Sequence events with respect to time; e. g., yesterday, today, tomorrow, seasons

Survey Questions and Secret Rules

Investigation 3: Sessions 2, 3

MEASUREMENT TOOLS, TECHNIQUES, AND FORMULAS**1.4.9. Identify the appropriate tool used to measure length (i.e., ruler), weight (i.e., scale), time (i.e., clock, calendar) and temperature (i.e., thermometer)**

Survey Questions and Secret Rules

Investigation 3: Sessions 1–3

See also, Classroom Routines: Understanding Time and Changes and Grade 2.

Standard 5: Algebra, Functions, and Patterns

Students use algebraic concepts, functions, patterns, and relationships to solve problems

BENCHMARK EXPECTATION**PATTERNS, RELATIONS, AND FUNCTIONS****1.5.1. Identify, sort, and classify objects by two or more 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

1.5.2. Recognize, extend, create and describe patterns

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

NUMERIC AND ALGEBRAIC REPRESENTATIONS**1.5.3. Demonstrate the commutative property of addition; e. g., $3+5=5+3$**

This expectation can be introduced during this investigation.

Number Games and Story Problems

Investigation 1: Sessions 2–3

MATHEMATICAL MODELING

No expectations at this level

RATES OF CHANGE

No expectations at this level

**Investigations in Number, Data, & Space
to the
North Dakota Mathematics Standards and Benchmarks**

Grade Two

Standard 1: Number and Operation

Students understand and use basic and advanced concepts of number and number systems

BENCHMARK EXPECTATION

NUMBERS, NUMBER RELATIONSHIPS, AND NUMBER SYSTEMS

2.1.1. Count and order numbers up to 1,000

Mathematical Thinking at Grade 2

Investigation 2: Session 6

Investigation 3: Sessions 3–4, 6

Investigation 4: Sessions 1–4

Investigation 5: Sessions 4–5

Coins, Coupons, and Combinations

Investigation 2: Sessions 1–5

Investigation 4: Sessions 1–4

Putting Together and Taking Apart

Investigation 2: Sessions 3–7

Investigation 4: Session 1

2.1.2. Count backward from 100

Coins, Coupons, and Combinations

Investigation 3: Session 3

2.1.3. Count by 2's, 5's, and 10's

Mathematical Thinking in Grade 2

Investigation 2: Session 6

Investigation 4: Sessions 1–4

Investigation 5: Sessions 4–5

Coins, Coupons, and Combinations

Investigation 2: Sessions 1–5

2.1.4. Identify and write numerals to 1,000

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?

2.1.5. Connect number words and numerals to the quantities they represent up to 100

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Sessions 1– 6, 8

Coins, Coupons, and Combinations

Investigation 4: Session 1

2.1.6. Demonstrate, identify, and explain the difference between odd and even numbers using concrete objects or drawings*Students gain experience with even numbers when counting by twos in these investigations.*

Mathematical Thinking at Grade 2

Investigation 4: Session 2: Teacher Note, page 91

Coins, Coupons, and Combinations

Investigation 2: Sessions 1–5

*See also, Grade 3.***2.1.7. Identify place value concepts through the hundreds place**

Coins, Coupons, and Combinations

Investigation 3: Session 1, 4–5

Investigation 4: Sessions 1–4

Putting Together and Taking Apart

Investigation 1: Sessions 1, 4–5

Investigation 2: Sessions 1–7

Investigation 4: Sessions 2–4

Investigation 5: Sessions 2–3, 4–5, 6

2.1.8. Use the appropriate symbols (i.e., $>$, $<$, $=$) to compare whole numbers to 1,000

Using symbols to compare whole numbers can be introduced during these investigations.

Coins, Coupons, and Combinations

Investigation 4: Sessions 1–4

Putting Together and Taking Apart

Investigation 2: Sessions 3–7

Investigation 4: Session 1

2.1.9. Round numbers to tens and hundreds

Rounding is introduced in Grade 3.

2.1.10. Use grade- appropriate terms when communicating about addition and subtraction; i. e., addend, sum, difference

These terms can be introduced during these investigations.

Mathematical Thinking at Grade 2

Investigation 2: Session 1, 4–6

Investigation 3: Session 5

Investigation 4: Sessions 1, 5

Coins, Coupons, and Combinations

Investigation 1: Sessions 2–11

Investigation 2: Session 7–9

Investigation 3: Sessions 1–5

Investigation 4: Sessions 2–5

Putting Together and Taking Apart

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–4, 7

Investigation 3: Sessions 1–5

Investigation 4: Sessions 1–5

Investigation 5: Sessions 5–4, 7

How Long? How Far?

Investigation 1: Sessions 5–7

Classroom Routines: Today's Number

2.1.11. Represent and explain fractions (i.e., one half, one third, one fourth, one sixth and one eighth) as part of a whole and part of a set

Shapes, Halves, and Symmetry

Investigation 3: Sessions 1–8

OPERATIONS AND THEIR PROPERTIES**2.1.12. Select the appropriate operation to solve problems involving addition and subtraction of whole numbers**

Putting Together and Taking Apart

Investigation 1: Sessions 1, 3–4, 5–6

Investigation 3: Sessions 1–5

Investigation 5: 1–3

Classroom Routines: Writing equations for the number of days in school

2.1.13. Demonstrate the inverse relationship between addition and subtraction; e. g., $3 + 4 = 7$, $7 - 4 = 3$

Coins, Coupons, and Combinations

Investigation 3: Sessions 3, 4–5

Putting Together and Taking Apart

Investigation 1: Sessions 1, 2 (see also, Teacher Note, p. 25)

Investigation 3: Session 2

2.1.14. Model multiplication using equal sets of objects

Mathematical Thinking at Grade 2

Investigation 4: Session 1

Coins, Coupons, and Combinations

Investigation 2: Sessions 2–5,

Shapes, Halves, and Symmetry

Investigation 1 Sessions 6–8

Investigation 2: Sessions 2–6

2.1.15. Add and subtract two- digit whole numbers between 0 and 100 without regrouping

Mathematical Thinking at Grade 2

Investigation 4: Sessions 1, 5

Investigation 5: Sessions 3

Coins, Coupons, and Combinations

Investigation 1: Sessions 1–5, 10

Investigation 2: Session 7–9

Investigation 3: Sessions 1–2

Investigation 4: Sessions 2–4, 5

Putting Together and Taking Apart

Investigation 2: Sessions 1–4

Investigation 3: Sessions 1–5

Investigation 4: Sessions 1–4

Investigation 5: Sessions 2–3, 6, 8

COMPUTATIONAL FLUENCY AND ESTIMATION**2.1.16. Recall addition facts and subtraction facts (0–18)**

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2 : Sessions 1–5

Session 6: Dialogue Box, page 45

Session 8

Investigation 4: Session 1

Investigation 5: Session 3

Coins, Coupons, and Combinations

Investigation 1:

Sessions 1–6

Sessions 8–9: Activity, pages 42–44

Sessions 10–11

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

2. 1.17. Estimate whole number sums and differences

Coins, Coupons, and Combinations

Investigation 1: Session, Sessions 8–9

Investigation 2: Session 10

Classroom Routines: How Many Pockets?

Standard 2: Geometry and Spatial Sense

Student understands and applies geometric concepts and spatial relationships to represent and solve problems in mathematical and nonmathematical situations

BENCHMARK EXPECTATION**TWO- AND THREE-DIMENSIONAL SHAPES, GEOMETRIC PROPERTIES AND RELATIONSHIPS****2.2.1. Recognize geometric shapes and structures in their environment**

Shapes, Halves, and Symmetry

Investigation 1: Session 1

2.2.2. Identify, describe, and sort three- dimensional objects; i. e., pyramid, cube, rectangular prism, cone, cylinder, and sphere

Mathematical Thinking at Grade 2

Investigation 3: Sessions 1–5

2.2.3. Predict and demonstrate the results of putting together and taking apart shapes

Shapes, Halves, and Symmetry

Investigation 1: Sessions 2–8

Investigation 2: Sessions 3, 6

Investigation 4: Sessions 1–4

COORDINATE GEOMETRY*No expectations at this level***TRANSFORMATION AND SYMMETRY****2.2.4. Identify symmetrical shapes and draw their line of symmetry**

Shapes, Halves, and Symmetry

Investigation 4: Sessions 1–7

2.2.5. Identify congruent figures from a selection of similar figures

Shapes, Halves, and Symmetry

Investigation 3: Sessions 1–8

Investigation 4: Sessions 5–6

VISUALIZATION, SPATIAL REASONING, AND GEOMETRIC MODELING*No expectations at this level***Standard 3: Data Analysis, Statistics, and Probability**

Students use data collection and analysis techniques, statistical methods, and probability to solve problems

BENCHMARK EXPECTATION**DATA COLLECTION, DISPLAY, AND INTERPRETATION****2.3.1. Sort and classify objects according to their attributes and organize data about the objects; e. g., Venn diagrams, graphs, tables**

Mathematical Thinking at Grade 2

Investigation 5: Sessions 1–2, 4–5, 6

Does It Walk, Crawl, or Swim?

Investigation 1: Sessions 1–6

Investigation 2: Sessions 1–4

Investigation 3: Sessions 1–4

Investigation 4: Sessions 1–3

2.3.2. Demonstrate that data can be represented in more than one way

Does It Walk, Crawl, or Swim?

Investigation 1: Sessions 1–2

Investigation 2: Sessions 3–4

Investigation 3: Sessions 1–4

Investigation 4: Sessions 1–3

2.3.3. Formulate and answer simple questions from data represented by graphs

Mathematical Thinking at Grade 2

Investigation 5: Sessions 1–2, 4–6

How Many Pockets? How Many Teeth?

Investigation 1: Sessions 1–5

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–4

Does It Walk, Crawl, or Swim

Investigation 1: Sessions 1–2

Investigation 2: Sessions 1–2

Investigation 3: Session 1–3

Investigation 4: Sessions 1–3

Investigation 3: Sessions 1–5

PROBABILITY

No expectations at this level

STATISTICAL METHODS

No expectations at this level

PREDICTIONS, DATA ANALYSIS AND INFERENCES**2.3.4. Record results of activities involving chance (e. g., coin flips, dice rolls) and make reasonable predictions based upon data**

Chance is introduced, practiced, and applied in Grade 3.

2.3.5. Describe the likelihood of an event; e. g., cloudy, it may rain

How Many Pockets? How Many Teeth?

Investigation 2: Session 6

Standard 4: Measurement

Students use concepts and tools of measurement to describe and quantify the world

BENCHMARK EXPECTATION**MEASURABLE ATTRIBUTES, MEASUREMENT SYSTEMS AND UNITS****2.4.1. Tell time to the nearest quarter hour and 5 minute interval using digital and analog clocks**

Timelines and Rhythm Patterns

Investigation 1: Sessions 4–5

Investigation 2: Sessions 4–5

Classroom Routines: Time and Time Again

2.4.2. Distinguish between week days and weekend days

This expectation can be introduced during these investigations.

Timelines and Rhythm Patterns

Investigation 1: Sessions 4–5, 6

Classroom Routines: Time and Time Again

2.4.3. Recall the months of the year in order

This expectation can be introduced during these investigations.

Timelines and Rhythm Patterns

Investigation 1: Sessions 1–2, 3

Classroom Routines: Time and Time Again

2.4.4. Count mixed coins to \$1.00

Mathematical Thinking at Grade 2

Investigation 4: Sessions 2–4

Coins, Coupons, and Combinations

Investigation 2: Sessions 6–9

2.4.5. Estimate and measure weight to the nearest pound or kilogram

Related content in Grade 3:

Combining and Comparing

Investigation 2: Sessions 1–2

2.4.6. Estimate and measure capacity to the nearest cup or liter

Related content in Grade 3:

Exploring Solids and Boxes

Investigation 4: Session 1

Investigation 5: Sessions 1–4

2.4.7. Estimate and measure length to the nearest inch, half-inch, foot, or centimeter

Standard units are introduced in Grade 3.

2.4.8. Estimate and verify a quantity; e. g., marbles in a jar

This expectation is addressed in Grade 1.

2.4.9. Compare and order given lengths, capacities, weights, or temperatures that are expressed in the same unit of measure

Standard units are introduced in Grade 3.

2.4.10. Identify the approximate size of basic units; e. g., width of finger is about one centimeter, large soda bottle is two liters, a paper clip weighs one gram

Standard units are introduced in Grade 3.

MEASUREMENT TOOLS, TECHNIQUES, AND FORMULAS**2.4.11. Select the appropriate units for measuring time, length, weight, and temperature**

Nonstandard measurements are used at this grade level.

How Long? How Far?

Investigation 1: Sessions 1–8

Investigation 2: Sessions 1–8

2.4.12. Use the symbols for the dollar and cent

Mathematical Thinking at Grade 2

Investigation 4: Sessions 2–4

Standard 5: Algebra, Functions, and Patterns

Students use algebraic concepts, functions, patterns, and relationships to solve problems

BENCHMARK EXPECTATION**PATTERNS, RELATIONS, AND FUNCTIONS****2.5.1. Extend and create number patterns**

Mathematical Thinking at Grade 2

Investigation 4: Sessions 2–4

Coins, Coupons, and Combinations

Investigation 2: Sessions 2–5

Putting Together and Taking Apart

Investigation 2: Sessions 1–2

2.5.2. State the rule that describes a given repeating and growing pattern

Coins, Coupons, and Combinations

Investigation 2: Sessions 1, 4–5

Timelines and Rhythm Patterns

Investigation 2: Sessions 1–5

NUMERIC AND ALGEBRAIC REPRESENTATIONS**2.5.3. Solve addition and subtraction equations with unknown variables;****e.g., $2 + _ = 5$**

Mathematical Thinking at Grade 2

Investigation 2: Session 6

Coins, Coupons, and Combinations

Investigation 1: Sessions 2–3, 6, 10–11

Investigation 2: Session 1

Investigation 3: Session 2

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

MATHEMATICAL MODELING**2.5.4. Use symbols (i.e., +, -, =, <, >) to write simple number sentences**

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Session 6

Coin, Coupons, and Combinations

Investigation 1: Sessions 1–3, 6, 10–11

Investigation 2: Session 1

Investigation 3: Session 2

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

2.5.5. Use words, objects, and number sentences to represent addition and subtraction problems

Mathematical Thinking at Grade 2

Investigation 1: Session 1

Investigation 2: Session 6

Coin, Coupons, and Combinations

Investigation 1: Sessions 1–3, 6, 10–11

Investigation 2: Session 1

Investigation 3: Session 2

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

RATES OF CHANGE***No expectations at this level***

**Investigations in Number, Data, & Space
to the
North Dakota Mathematics Standards And Benchmarks**

Grade Three

Standard 1: Number and Operation

Students understand and use basic and advanced concepts of number and number systems

BENCHMARK EXPECTATION

NUMBERS, NUMBER RELATIONSHIPS, AND NUMBER SYSTEMS

3.1.1. Count and order numbers up to 10,000

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

3.1.2. Read and write numerals to 10,000

3.1.3. Represent numbers up to 10,000 in standard, expanded, and word form

Mathematical Thinking at Grade 3

Investigation 3: Sessions 3–4

Landmarks in the Hundreds

Investigation 1: Sessions 1–3

Investigation 4: Sessions 1–4

Up and Down the Number Line

Investigation 1: Sessions 3–4, 6–7

Investigation 2: Sessions 1–3

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

3.1.4. Identify the odd and even whole numbers from 0 to 10, 000

Mathematical Thinking at Grade 3

Investigation 4: Sessions 1, 2, 3

3.1.5. Identify place values from ten thousands through the hundredths place*Related content:*

Landmarks in the Hundreds

Investigation 1: Session

Investigation 2: Session 4

Investigation 3: Session 1, 2-3

Combining and Comparing

Investigation 4: Sessions 3–4

3.1.6. Use the appropriate symbols to compare whole numbers from 0 to 10, 000; i. e., $>$, $<$, $=$ *These investigations provide opportunities to introduce using symbols to compare whole numbers.*

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

3.1.7. Use appropriate terms when communicating about computations; i. e., factor, product, divisor, dividend, quotient

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

Landmarks in the Hundreds

Investigation 1: Sessions 1–7

Investigation 2: Sessions 1–6

Investigation 3: Session 1

See Teacher's Note, page 15.

3.1.8. Round numbers to tens, hundreds, and thousands

These investigations involve concepts that prepare students to round numbers.

Comparing and Combining

Investigation 1: Session 1

Investigation 2: Sessions 1, 2

Investigation 3: Session 1, Session 3 (See Teacher's Note, p. 37)

3.1.9. Represent fractions and mixed numbers using words, numerals, and physical models

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

3.1.10. Model, represent, and explain the concept of multiplication; i. e., repeated addition, rectangular arrays, and skip counting

Landmarks in the Hundreds

Investigation 2: Sessions 5–6

Things That Come in Groups

Investigation 1: Session 2

Investigation 2: Session 2

Investigation 3: Sessions 1–5

3.1.11. Model, represent, and explain the concept of division; i. e., repeated subtraction, rectangular arrays, and equal sharing

Landmarks in the Hundreds

Investigation 2: Sessions 5–6

Things That Come in Groups

Investigation 3: Sessions 1, 2, 3

Investigation 4: Sessions 1, 2, 3–4

Investigation 5: Session 1

3.1.12. Use a variety of methods and tools for problem solving; e. g., computing, including mental math, paper and pencil, calculator, manipulatives

Throughout this standards-based program, students use a variety of methods and 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

OPERATIONS AND THEIR PROPERTIES

3.1.13. Add and subtract whole numbers between 0 and 10,000

Mathematical Thinking at Grade 3

Investigation 2: Sessions 1–7

Investigation 3: Sessions 3–4

Investigation 4: Session 1

Ten-Minute Math: Calendar Math

Flips, Turns, and Area

Ten-Minute Math: Broken Calculator

From Paces to Feet

Ten-Minute Math: Broken Calculator

Landmarks in the Hundreds

Ten-Minute Math: Calendar Math

Up and Down the Number Line

Investigation 1: Sessions 1–8

Ten-Minute Math: Estimation and Number Sense

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

3.1.14. Model and use the commutative and associative properties of addition and multiplication

Combining and Comparing

Investigation 3 (See Teacher's Note, p. 37)

Ten-Minute Math: Estimation and Number Sense Variation

Things That Come in Groups

Investigation 3: Sessions 1–2, 3–4

3.1.15. Apply the multiplication property of zero and one*Related content:*

Things That Come in Groups

Investigation 3: Sessions 1–2

Investigation 3: Sessions 1–2

3.1.16. Multiply two- and three- digit numbers by a single- digit number

Things That Come in Groups

Investigation 5: Sessions 1–4

3.1.17. Divide two- and three- digit numbers by a single- digit number without remainders

Things That Come in Groups

Investigation 4: Sessions 1–2, 3–4

Investigation 5: Session 4

3.1.18. Demonstrate the inverse relationship between multiplication and division

Things That Come in Groups

Investigation 1: Session 3 (The Relationship Between Multiplication and Division)

Investigation 3: Sessions 3, 4

Investigation 4: Session 1

Investigation 5: Session 4

3.1.19. Add and subtract simple fractions with like denominators; e. g., $1/4 + 2/4 = 3/4$

Fair Shares

Investigation 2: Sessions 1–2, 4, 5-6, 7

Investigation 3: Sessions 1–2, 3, 4

COMPUTATIONAL FLUENCY AND ESTIMATION**3.1.20. Recall multiplication and division facts (0- 10)**

Things That Come in Groups

Investigation 1: Session 4

Investigation 2: Sessions 1, 2, 3–4, 5–6

Investigation 5: Sessions 1, 3

3.1.21. Estimate whole number products and quotients

Things That Come in Groups

Ten-Minute Math: Counting Around the Class

Landmarks In the Hundreds

Investigation 3: Sessions 2–3

3.1.22. Use estimation to determine if solutions are reasonable

From Paces to Feet

Investigation 1: Sessions 2, 5–6 (Ten-Minute Math)

Combining and Separating

Investigation 1: Sessions 1–2

Investigation 3: Sessions 1–2

Investigation 4: Sessions 1, 3–4 (Ten-Minute Math)

Standard 2: Geometry and Spatial Sense

Student understands and applies geometric concepts and spatial relationships to represent and solve problems in mathematical and nonmathematical situations

BENCHMARK EXPECTATION**TWO- AND THREE-DIMENSIONAL SHAPES, GEOMETRIC PROPERTIES AND RELATIONSHIPS****3.2.1. Compare physical attributes of two- dimensional shapes; i. e., square, triangle, rectangle, and parallelogram**

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

3.2.2. Describe the characteristics of a cylinder, pyramid, cube, sphere, and cone

Exploring Solids and Boxes

Investigation 1: Sessions 1, 2

Investigation 2: Sessions 1, 2, 3, 4, 5

Investigation 3: Session 1

3.2.3. Identify points, endpoints, lines, line segments, rays, and angles and use symbols to represent them

From Paces to Feet

Investigation 1: Sessions 3–4

Turtle Paths

Investigation 1: Session 1

Investigation 1: Sessions 3–4

Investigation 2: Sessions 1–3

Investigation 3: Sessions 1–2

3.2.4. Identify right angles

Turtle Paths

Investigation 1: Sessions 1, 3–4

Investigation 2: Sessions 1–2, 3, 4

COORDINATE GEOMETRY**3.2.5. Use ordered pairs to identify the locations of points in a grid; e. g., A-10 on a map**

Turtle Paths

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–6

Investigation 3: Sessions 1–7

TRANSFORMATION AND SYMMETRY**3.2.6. Identify and create shapes that have lines of symmetry**

Mathematical Thinking at Grade 3

Investigation 2: Session 1

*See also, Grade 2.***3.2.7. Identify two- dimensional shapes that are congruent or similar**

Flips, Turns, and Area

Investigation 1: Session 1

Investigation 2: Sessions 2–3, 4–5

Turtle Paths

Investigation 3: Sessions 1–2, 3–5

VISUALIZATION, SPATIAL REASONING, AND GEOMETRIC MODELING***No new expectations at this level*****Standard 3: Data Analysis, Statistics, and Probability**

Students use data collection and analysis techniques, statistical methods, and probability to solve problems

BENCHMARK EXPECTATION**DATA COLLECTION, DISPLAY, AND INTERPRETATION****3.3.1. Identify different parts of a graph; i.e., label, scale, and data**

Mathematical Thinking at Grade 3

Investigation 3: Sessions 1–2

Up and Down the Number Line

Investigation 2: Sessions 1, 2, 3

3.3.2. Display and interpret graphs with symbols or pictures that represent more than one object or event

Mathematical Thinking at Grade 3

Investigation 3: Sessions 1–2

3.3.3. Solve problems based on data displayed on a graph

Mathematical Thinking at Grade 3

Investigation 3: Sessions 1–4

Things That Come in Groups

Investigation 5: Session 3

From Paces to Feet

Investigation 1: Sessions 1–2, 5–6

Investigation 2: Sessions 2–4

Investigation 3: Sessions 1–3

Up and Down the Number Line

Investigation 2: Sessions 1, 2, 3

Combining and Comparing

Investigation 4: Session 1

Ten-Minute Math: Exploring Data

3.3.4. Recognize the elements in the union and intersection of sets represented by Venn diagrams

Venn diagrams are investigated in Grade 1.

PROBABILITY**3.3.5. Use a simple probability experiment to collect data, display the data in a graph, and interpret the likelihood of the outcome***Related content:*

Things That Come In Groups

Ten-Minute Math: Likely or Unlikely

Exploring Solids and Boxes

Investigation 4: Session 2 (Ten-Minute Math)

Investigation 5: Sessions 1–4 (Ten-Minute Math)

STATISTICAL METHODS***No expectations at this level*****PREDICTIONS, DATA ANALYSIS AND INFERENCES**

3.3.6. Determine which outcomes are most likely to occur in certain situations; e. g., spinning red is most likely to occur when the spinner is divided among red, blue, green, red

Things That Come In Groups

Ten-Minute Math: Likely or Unlikely

Exploring Solids and Boxes

Investigation 4: Session 2 (Ten-Minute Math)

Investigation 5: Sessions 1–4 (Ten-Minute Math)

Standard 4: Measurement

Students use concepts and tools of measurement to describe and quantify the world

BENCHMARK EXPECTATION**MEASURABLE ATTRIBUTES, MEASUREMENT SYSTEMS AND UNITS**

3.4.1. Tell time to the nearest minute using digital and analog clocks

See Grade 2.

3.4.2. Determine elapsed time by the hour

Combining and Comparing

Investigation 3: Session 3

3.4.3. Count coins and bills

Mathematical Thinking at Grade 3

Investigation 2: Sessions 5–7

Combining and Comparing

Investigation 3: Sessions 1–2, 3

3.4.4. Read and measure temperature with a thermometer using Fahrenheit and Celsius scales

Related content:

Up and Down the Number Line

Investigation 1: Session 1–2, 8

3.4.5. Estimate and measure to the nearest half inch or centimeter

From Paces to Feet

Investigation 2: Sessions 1–7

Investigation 3: Sessions 1–3

Investigation 4: Sessions 1–3

3.4.6. State specific relationships between units within the same measuring system; e. g., hours in a day, inches in a foot, cups in a pint

From Paces to Feet

Investigation 2: Sessions 1, 2 (Follow-Up)

Investigation 2: Sessions 5 (Follow-Up), 6–7

Combining and Comparing

Investigation 3: Sessions 1–2, 3

Investigation 5: Session 1

3.4.7. Estimate and measure perimeter, area, and volume using links, tiles, grid paper, geoboards, and dot paper

Flips, Turns, and Area

Investigation 1: Sessions 1, 2–3, 4–5

Investigation 2: Sessions 2–3, 4–5

Turtle Paths

Investigation 1: Sessions 3–4

Investigation 2: Sessions 5–6

Investigation 3: Sessions 1–5

Ten-Minute Math: Length and Perimeter

MEASUREMENT TOOLS, TECHNIQUES, AND FORMULAS**3.4.8. Select a variety of tools for measuring length, weight, and capacity**

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 2: Sessions 1–2

Investigation 3: Session 2

Investigation 5: Sessions 1–3

Standard 5: Algebra, Functions, and Patterns

Students use algebraic concepts, functions, patterns, and relationships to solve problems

BENCHMARK EXPECTATION**PATTERNS, RELATIONS, AND FUNCTIONS****3.5.1. Use patterns to solve problems**

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
Fair Shares
Investigation 2: Sessions 5–6

3.5.2. Create patterns using multiplication

Things That Come in Groups
Investigation 2: Sessions 1, 2, 3–4, 5–6

3.5.3. Determine the missing elements of a pattern of multiples

Things That Come in Groups
Investigation 2: Sessions 3–4, 5–6

NUMERIC AND ALGEBRAIC REPRESENTATIONS

3.5.4. Solve addition, subtraction, multiplication, and division equations with unknown numbers; e.g., $8x = 56$

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

MATHEMATICAL MODELING

3.5.5. Use symbols to write number sentences; i.e., +, -, >, <, =, x, and ÷

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

RATES OF CHANGE

No new expectations at this level

**Investigations in Number, Data, & Space
to the
North Dakota Mathematics Standards and Benchmarks**

Grade Four

Standard 1: Number and Operation

Students understand and use basic and advanced concepts of number and number systems

BENCHMARK EXPECTATION

NUMBERS, NUMBER RELATIONSHIPS, AND NUMBER SYSTEMS

4.1.1. Identify place value from hundred thousands through the hundredths place

Mathematical Thinking at Grade 4

Investigation 1: Session 1

Arrays and Shares

Investigation 1: Sessions 1–3

Landmarks in the Thousands

Investigation 3: Session 1

Investigation 4: Sessions 1–3

Different Shapes, Equal Pieces

Investigation 1: Sessions 2–4

The Shape of the Data

Investigation 2: 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

Three Out of Four Like Spaghetti

Practice Pages 69–81

4.1.2. Order and compare using symbols; i. e., $>$, $<$, $=$, whole numbers (0 to 100,000) and decimals to hundredths

These investigations provide opportunities to introduce using symbols to order and compare whole numbers and decimals.

Landmarks in the Thousands

Investigation 3: Sessions 1, 2

Investigation 4: Sessions 1–3

Money, Miles and Large Numbers

Investigation 2: Sessions 1–2, 4

4.1.3. Read and write numerals to 100,000

Mathematical Thinking at Grade 4

Investigation 1: Session 1–3

Landmarks in the Thousands

Investigation 3: Sessions 1–2

Investigation 4: Sessions 1–3

The Shape of Data

Investigation 1 : Sessions 1–3

Investigation 2 : Session 1

4.1.4. Round whole numbers to the nearest tens, hundreds, thousands, ten thousands, and hundred thousands

Mathematical Thinking at Grade 4

Investigation 1: Sessions 2–3 (See also, p. 19)

4.1.5. Represent numbers up to hundred thousands in standard and expanded forms

Money, Miles and Large Numbers

Investigation 3: Sessions 2, 3, 4

4.1.6. Write tenths and hundredths as decimals and fractions

Money, Miles, and Large Numbers

Investigation 2: Sessions 1–4

4.1.7. Compare equivalent decimals and fractions, e. g., $5/10 = .5$

Money, Miles, and Large Numbers

Investigation 2: Sessions 1–4

4.1.8. Use appropriate terms when communicating about computations; i. e., numerator and denominator

Terminology such as numerator and denominator can be introduced during these fraction investigations.

Three Out of Four Like Spaghetti

Investigation 1: Sessions 1–4

Different Shapes, Equal Pieces

Investigation 1: Session 5

4.1.9. Explain the meaning of remainders in real- world situations

Arrays and Shares

Investigation 2: Sessions 7–8

4.1.10. Determine what information is relevant for solving a problem

Mathematical Thinking at Grade 4

Investigation 3: Sessions 4–5

Arrays and Shares

Investigation 1: Sessions 1–4

Investigation 2: Sessions 2–6

Investigation 3: Sessions 2–4

Landmarks in the Thousands

Investigation 2: Session 1

Packages and Groups

Investigation 2: Sessions 1–3

Investigation 3: Sessions 4–6

Money, Miles, and Large Numbers

Investigation 1: Sessions 1–2, 4–5, 7–8

Investigation 2: Session 3

Investigation 3: Sessions 1–4

Different Shapes, Equal Pieces

Investigation 1: Sessions 2–4

Investigation 2: Sessions 1–2, 3, 4, 5

Investigation 3: Sessions 1–2, 3, 4–5

The Shape of the Data

Investigation 1: Sessions 1, 2–3, 6–7

Investigation 2: Sessions 1, 4, 5–7

Investigation 3: Session 1

Changes Over Time

Investigation 1: Sessions 3–4, 6–7

Investigation 3: Sessions 1–8

Seeing Solids and Silhouettes

Investigation 2: Session 5

Investigation 3: Sessions 1–3

4.1.11. Use a variety of strategies to solve problems; e.g., guess and check, work backwards, draw pictures, use objects*Throughout this standards-based program, students use a variety of strategies 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

OPERATIONS AND THEIR PROPERTIES

4.1.12. Add and subtract whole numbers between 0 and 100, 000

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

4.1.13. Multiply multi- digit numbers by two- digit numbers

- 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

4.1.14. Divide multi- digit numbers by a single- digit number

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

4.1.15. Add and subtract fractions and mixed numbers with like denominators

Different Shapes, Equal Pieces

Investigation 1: Session 1–5

Investigation 2: Session 1–4

4.1.16. Add and subtract decimals

Mathematical Thinking at Grade 4

Investigation 2: Sessions 1–2, 3–4

Money, Miles, and Large Numbers

Investigation 1: Sessions 1–2, 4–8

Investigation 2: Sessions 1–2, 4

4.1.17. Use the distributive property to simplify and perform computations

The distributive property is addressed in Grade 5.

COMPUTATIONAL FLUENCY AND ESTIMATION**4.1.18. Determine when a rounded solution is appropriate**

Mathematical Thinking at Grade 4

Investigation 1: Sessions 1–2 (Ten-Minute Math), 2–3 (Also see p. 19)

Money, Miles, and Large Numbers

Investigation 1: Sessions 1–2, 4–5

Related content:

Landmarks in the Thousands

Investigation 3: Sessions 3–5

4.1.19. Estimate computations of whole numbers, fractions, and decimals

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

Investigation 3: Sessions 3–5

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

Money, Miles, and Large Numbers

Investigation 1: Sessions 1–2, 4–5

Investigation 3: Session 1

Standard 2: Geometry and Spatial Sense

Student understands and applies geometric concepts and spatial relationships to represent and solve problems in mathematical and nonmathematical situations

BENCHMARK EXPECTATION**TWO- AND THREE-DIMENSIONAL SHAPES, GEOMETRIC PROPERTIES AND RELATIONSHIPS****4.2.1. Analyze the attributes of two- and three- dimensional shapes (i.e., circle, squares, trapezoid, rhombus) and use vocabulary to describe the attributes****Seeing Solids and Silhouettes**

Investigation 1: Sessions 1–2

Investigation 2: Sessions 1–4

Investigation 4: Sessions 1–4

Ten-Minute Math: Quick Images

Sunken Ships and Grid Patterns

Investigation 2: Sessions 1–4, 6–7

4.2.2. Identify, describe, and model (e. g., using straws or other materials) parallel, perpendicular, and intersecting lines and line segments**Sunken Ships and Grid Patterns**

Investigation 1: Sessions 3–4

Investigation 2: Sessions 1–7

COORDINATE GEOMETRY

No new expectations at this level (See grade 3)

TRANSFORMATION AND SYMMETRY

4.2.3. Recognize the changes in position and orientation of two-dimensional figures after transformations; i.e., flips (reflections), turns (rotations), and slides (translations)

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

4.2.4. Use motion geometry to show that shapes are congruent or similar

Different Shapes, Equal Pieces

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–2

Sunken Ships and Grid Patterns

Investigation 2: Sessions 6–

VISUALIZATION, SPATIAL REASONING, AND GEOMETRIC MODELING

No new expectations at this level

Standard 3: Data Analysis, Statistics, and Probability

Students use data collection and analysis techniques, statistical methods, and probability to solve problems

BENCHMARK EXPECTATION**DATA COLLECTION, DISPLAY, AND INTERPRETATION**

4.3.1. Determine a sample group to survey

The Shape of the Data

Investigation 1: Sessions 2-3

Investigation 2: Sessions 1, 2–3

Investigation 3: Sessions 1–2

4.3.2. Collect and record data

The Shape of the Data

Investigation 2: Sessions 2–7

Investigation 3: Sessions 3–5

Changes Over Time

Investigation 1: Sessions 1–4

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

4.3.3. Organize and display data in line graphs and circle graphs

Changes Over Time

Investigation 1: Sessions 1–2

Investigation 3: Sessions 1–2, 3, 4, 5, 7–8

4.3.4. Read, interpret, and generate questions from data displayed in graphs; i.e., line graphs and circle graphs

The Shape of the Data

Investigation 1: Sessions 1–3, 6–7

Investigation 2: Sessions 1–7

Investigation 3: Sessions 3–5

Changes Over Time

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–2

Investigation 3: Sessions 1–8

Landmarks in the Thousands

Investigation 1: Session 2

Three out of Four Like Spaghetti

Investigation 1: Session 4

Investigation 2: Sessions 1–2, 4, 5–7

4.3.5. Use computers and spreadsheets to organize and display data

Technology can be introduced and used in this data project investigation.

The Shape of the Data

Investigation 3: Sessions 1–2, 3–5

See also, Grade 5.

4.3.6. Use number lines and coordinate graphs to represent data

Related coordinate graph content:

Sunken Ships and Grid Patterns

Investigation 1: Sessions 1–6

Investigation 2: Sessions 1–9

These investigations involve line plots.

The Shape of the Data

Investigation 1: Sessions 1, 2–3

Investigation 2 : Sessions 2–3, 5, 6–7

These investigations involve line graphs.

Changes Over Time

Investigation 1: Sessions 1–2

Investigation 3: Sessions 1–2, 3, 4, 5, 7–8

PROBABILITY

4.3.7. Conduct simple probability experiments

Related content:

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?

There are additional probability experiments in Grade 5.

STATISTICAL METHODS

4.3.8. Determine or calculate the mode, mean/ average, and range for a data set

The Shape of the Data

Investigation 2: Sessions 4, 5, 6–7

Investigation 3: Session 1–

PREDICTIONS, DATA ANALYSIS AND INFERENCES

4.3.9. Make predictions and draw conclusions from simple probability experiments

Related content:

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?

There are additional probability experiments in Grade 5.

Standard 4: Measurement

Students use concepts and tools of measurement to describe and quantify the world

BENCHMARK EXPECTATION**MEASURABLE ATTRIBUTES, MEASUREMENT SYSTEMS AND UNITS****4.4.1. State specific relationships between units within the same measuring system; e. g., feet to yards, minutes to hours, milliliters to liters**

Unit conversions are investigated in Grade 5.

4.4.2. Estimate and measure length to the nearest quarter inch

The Shape of Data

Investigation 2: Sessions 2–3

Changes Over Time

Unit Preparation: Preparation Session 3

4.4.3. Analyze relationships between perimeter and area

These investigations provide opportunities to analyze the relationship between perimeter and area.

Different Shapes, Equal Pieces

Investigation 1: Sessions 1, 2–4

Sunken Ships and Grid Patterns

Investigation 2: Sessions 2–3, 4

4.4.4. Make change up to \$20

Money, Miles, and Large Numbers

Investigation 1: Sessions 6, 7–8

4.4.5. Apply the concept of elapsed time; i.e., schedules, and calendars

The Shape of the Data

Investigation 3: Sessions 1–2

These investigations involve time in the sense of growth and speed.

Changes Over Time

Investigation 3: Sessions 1–2, 3

MEASUREMENT TOOLS, TECHNIQUES, AND FORMULAS**4.4.6. Select appropriate units for measuring perimeter, area, and volume**

Landmarks in the Thousands

Investigation 1: Session 2

Different Shapes, Equal Pieces

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–2

Seeing Solids and Silhouettes

Investigation 1 : Session 1

Sunken Ships and Grid Patterns

Ten-Minute Math: Lengths and Perimeters

Standard 5: Algebra, Functions, and Patterns

Students use algebraic concepts, functions, patterns, and relationships to solve problems

BENCHMARK EXPECTATION**PATTERNS, RELATIONS, AND FUNCTIONS****4.5.1. Determine the missing elements of complex repeating patterns**

Mathematical Thinking at Grade 4

Investigation 3: Sessions 1–2, 3

Arrays and Shares

Investigation 1: Sessions 1–2

Ten-Minute Math: Counting Around the Class

NUMERIC AND ALGEBRAIC REPRESENTATIONS**4.5.2. Explain that variables represent unknowns**

Changes Over Time

Investigation 1: Sessions 5–6

MATHEMATICAL MODELING**4.5.3. Solve problems with variables**

Changes Over Time

Investigation 1: Sessions 5–6

4.5.4. Use parentheses in solving simple equations*Parentheses can be introduced during these investigations.*

Arrays and Shares

Investigation 2: Sessions 5–6 (see p. 33)

Money, Miles and Large Numbers

Investigation 1: Sessions 1–2 (see p. 10)

RATES OF CHANGE***No new expectations at this level***

**Investigations in Number, Data, & Space
to the
North Dakota Mathematics Standards and Benchmarks**

Grade Five

Standard 1: Number and Operation

Students understand and use basic and advanced concepts of number and number systems

BENCHMARK EXPECTATION

NUMBERS, NUMBER RELATIONSHIPS, AND NUMBER SYSTEMS

5.1.1. Identify place value from the billions through the thousandths place

Name That Portion

Investigation 1: Session 1

Investigation 3: Sessions 1–7

Investigation 4: Session 2

Between Never and Always

Investigation 1: Sessions 1–2

Ten Minute Math: Nearest Answer Number Line

Measurement Benchmarks

Investigation 1: Sessions 4–6

Investigation 2: Sessions 1–2

Patterns of Change

Investigation 2: Sessions 2–4

Investigation 3: Sessions 3–6

Data: Kids, Cats, and Ads

Investigation 2: Session 1

Investigation 3: Session 1

Ten Minute Math: The Digits Game

5.1.2. Order and compare whole numbers using symbols

Mathematical Thinking at Grade 5

Investigation 2: Session 5

Investigation 4: Sessions 2–4

Building on Numbers You Know

Investigation 1: Sessions 1–2, 5

Investigation 5: Sessions 1–2, 4–6

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1–3

5.1.3. Round whole numbers to the nearest million*Related content:*

Mathematical Thinking at Grade 5

Investigation 3: Session 1

Investigation 4: Session 1

Building on Numbers You Know

Investigation 1: Session 2

Investigation 2: Session 4

Investigation 4: Session 2

5.1.4. Read and represent numbers to 1,000,000 in standard, expanded, and short word form

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1–3

Investigation 2: Session 5

Building on Numbers You Know

Investigation 2: Session 7

Investigation 4: Sessions 1, 4

5.1.5. Place integers on a number line*Related content:*

Mathematical Thinking at Grade 5

Investigation 2: Session 1

Investigation 4: Sessions 1–3

Building on Number You Know

Investigation 1: Sessions 1–2, 5

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1–3

5.1.6. Use negative integers in real- world situations; e.g., thermometer reading, yardage in a football game

Mathematical Thinking at Grade 5

Investigation 4: Session 1: Teacher Note, page 79

Picturing Polygons

Investigation 1: Session 4

Investigation 2: Sessions 4–5

5.1.7. Identify prime and composite numbers

Mathematical Thinking at Grade 5

Investigation 1: Sessions 1–3, 4–6

5.1.8. Round, order, and compare using symbols fractions with like and unlike denominators

Name That Portion

Investigation 2: Sessions 4–9

Data: Kids, Cats, and Ads

Investigation 3: Session 1

5.1.9. Round, order, and compare using symbols decimals to the tenths, hundredths, and thousandths place

Name That Portion

Investigation 3: Sessions 2–4, 7

Building on Numbers You Know

Patterns of Change

Ten-Minute Math: Nearest Answer

5.1.10. Explain and demonstrate the concept of a percent

Name That Portion

Investigation 1: Sessions 1–7

Investigation 3: Sessions 7–8

Investigation 4: Sessions 1–7

5.1.11. Compare equivalent fractions, decimals, and percents, e. g., $\frac{75}{100} = .75 = 75\%$

Between Never and Always

Investigation 1: Sessions 1–2

Name That Portion

Investigation 1: Sessions 1–7

Investigation 2: Sessions 1–9

Investigation 3: Sessions 1, 3–8

Investigation 4: Sessions 1–7

Data: Kids, cats, and Ads

Investigation 3: Sessions 1–4

Investigation 4: Session 3

Investigation 5: Sessions 3–5

5.1.12. Represent ratios and percents as parts of a whole using models and pictures

Name That Portion

Investigation 1: Sessions 1–7

Investigation 3: Sessions 7–8

Investigation 4: Sessions 1–7

5.1.13. Explain and demonstrate the relationship between exponential notation and repeated multiplication; e. g., $3^2 = 3 \times 3$ *Related content:*

Building on Numbers You Know

Investigation 4: Sessions 1–4

OPERATIONS AND THEIR PROPERTIES**5.1.14. Add and subtract whole numbers between 0 and 1,000, 000**

Mathematical Thinking at Grade 5

Investigation 4: Sessions 1–4

5.1.15. Use commutative, associative, and identity properties to solve problems

Mathematical Thinking at Grade 5

Investigation 2: Sessions 1–4

Investigation 3: Sessions 2–5

Building on Numbers You Know

Investigation 1: Sessions 3–4, 6–7

Investigation 2: Sessions 5–6

Investigation 3: Sessions 1–3

Measurement Benchmarks

Ten-Minute Math: Estimation and Number Sense

5.1.16. Use divisibility rules for 2, 5, and 10

Building on Numbers You Know

Investigation 1: Sessions 3–5

Between Never and Always

Investigation 1: Session 7

5.1.17. Determine the prime factors for a number using a factor tree

Mathematical Thinking at Grade 5

Investigation 1: Sessions 4–6

5.1.18. Determine least common multiple

Name That Portion

Investigation 2: Sessions 4–8

5.1.19. Determine greatest common factor*Related content:*

Mathematical Thinking at Grade 5

Investigation 3: Session 1

Investigation 3: Session 5

Investigation 4: Sessions 5–6

5.1.20. Use order of operations to simplify numeric expressions*Related content:*

Building on Numbers You Know

Investigation 5: Sessions 4–6

5.1.21. Multiply multi- digit numbers by three- digit numbers

Mathematical Thinking at Grade 5

Investigation 2: Session 5

Investigation 3: Sessions 1–5

Investigation 4: Sessions 5–6

Building on Numbers You Know

Investigation 1: Sessions 1, 3–5

Investigation 2: Sessions 1,7

Investigation 3: Sessions 1–3, 7–10

Investigation 4: Session 1

Investigation 5: Sessions 4–7

5.1.22. Divide multi- digit numbers by two- digit numbers with or without remainders

Mathematical Thinking at Grade 5

Investigation 3: Sessions 2–4

Building on Numbers You Know

Investigation 2: Sessions 1–7

Investigation 3: Sessions 4–10

Investigation 5: Sessions 1–7

5.1.23. Add and subtract improper fractions and mixed numbers with unlike denominators

Name That Portion

Investigation 2: Sessions 1–2, 3, 6, 7, 9

Investigation 3: Session 7

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 3–5

Ten-Minute Math: Estimation and Number Sense

5.1.24. Add and subtract multi- digit decimals

Name That Portion

Investigation 3: Sessions 2, 3–4, 7

5.1.25. Multiply and divide multi- digit decimals

Name That Portion

Investigation 3: Session 7

COMPUTATIONAL FLUENCY AND ESTIMATION***No new content at this level*****Standard 2: Geometry and Spatial Sense**

Student understands and applies geometric concepts and spatial relationships to represent and solve problems in mathematical and nonmathematical situations

BENCHMARK EXPECTATION**TWO- AND THREE-D IMENSIONAL SHAPES, GEOMETRIC PROPERTIES AND RELATIONSHIPS****5.2.1. Describe properties and attributes of two- and three- dimensional figures; i.e., obtuse angle, acute angle, radius, chord, diagonal, equilateral triangle, isosceles triangle, parallel lines, perpendicular lines**

Measurement Benchmarks

Ten-Minute Math: Quick Images

Picturing Polygons

Investigation 1: Session 2

Investigation 2: Sessions 1–5

Investigation 3: Sessions 1–2

Containers and Cubes

Investigation 4: Sessions 1–9

5.2.2. Draw circles using a compass, and identify the components; i.e., radius, chord, diameter, center, and circumference

Compasses are not used at this grade level. Students use *Geo-Logo* software to investigate polygons.

5.2.3. Identify the attributes of an angle and draw angles using protractors

Picturing Polygons

Investigation 2: Sessions 1–3, 6–9

Investigation 3: Sessions 1–3

5.2.4. Determine the degrees of the interior angles of triangles and quadrilaterals

Picturing Polygons

Investigation 2: Sessions 1–7

Investigation 3: Sessions 1–2

5.2.5. Determine the characteristics of, and the relationships among, points, lines, line segments, rays, and planes

Picturing Polygons

Investigation 2: Sessions 1–7

COORDINATE GEOMETRY**5.2.6. Use ordered pairs in quadrant 1 of a coordinate grid**

Picturing Polygons

Investigation 1: Sessions 3–4

Investigation 2: Sessions 4–5

TRANSFORMATION AND SYMMETRY**5.2.7. Describe properties of congruent figures and use them to solve problems***Similar shapes are investigated in these sessions.*

Picturing Polygons

Investigation 3: Session 4, 5-6

*See also, Grade 4.***VISUALIZATION, SPATIAL REASONING, AND GEOMETRIC MODELING*****No new expectations at this level*****Standard 3: Data Analysis, Statistics, and Probability**

Students use data collection and analysis techniques, statistical methods, and probability to solve problems

BENCHMARK EXPECTATION**DATA COLLECTION, DISPLAY, AND INTERPRETATION****5.3.1. Read and interpret bar, line, and circle graphs, pictographs, and frequency tables**

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

PROBABILITY

5.3.2. Determine the probability of a simple event and express it as a ratio

Between Never and Always

Investigation 1: Sessions 1–2, 3–4, 5

Investigation 2: Sessions 4–5

5.3.3. State possible outcomes for a given situation

Between Never and Always

Investigation 1: Sessions 1–7

Investigation 2: Sessions 1–5

5.3.4. Determine possible arrangements of four or fewer items

Between Never and Always

Investigation 2: Sessions 1–2

STATISTICAL METHODS

5.3.5. Determine or calculate the mode, mean, and range of a set of data

Between Never and Always

Investigation 1: Sessions 3–6

Investigation 2: Session 3

Data: Kids, Cats, and Ads

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–3

Investigation 3: Sessions 1–4

Investigation 5: Sessions 3–5

PREDICTIONS, DATA ANALYSIS AND INFERENCES**5.3.6. Make predictions and draw conclusions based on data collected from a sample group**

Data: Kids, Cats, and Ads

Investigation 2: Sessions 1, 2

Investigation 3: Sessions 2-3, 4

Investigation 5: Session 1–5

Standard 4: Measurement

Students use concepts and tools of measurement to describe and quantify the world

BENCHMARK EXPECTATION**MEASURABLE ATTRIBUTES, MEASUREMENT SYSTEMS AND UNITS****5.4.1. Estimate and measure length to the nearest eighth inch**

Measurement Benchmarks

Investigation 1: Sessions 1–4

5.4.2. Measure and apply elapsed time; i.e., time zones, schedules, and calendars

This activity provides the opportunity for students to apply this expectation.

Measurement Benchmarks

Investigation 3: Session 1

See also, Grade 3

5.4.3. Measure angles using protractors

Students use Geo-Logo software to construct and measure angles.

Picturing Polygons

Investigation 2: Sessions 1–3, 8

Investigation 3: Sessions 1–3

5.4.4. Estimate angle measures using the benchmark angles 45°, 90°, 180°, 270°, and 360°

Picturing Polygons

Investigation 2: Session 8

MEASUREMENT TOOLS, TECHNIQUES, AND FORMULAS**5.4.5. Select and use appropriate units when measuring length, area, and volume**

Measurement Benchmarks

Investigation 1: Sessions 1, 3, 4, 5–6, 7

Investigation 2: Sessions 3, 4

Investigation 3: Session 1

5.4.6. Use formulas to calculate the perimeter and area of squares and rectangles*Related content:*

Picturing Polygons

Investigation 1: Sessions 2, 3

Investigation 2: Sessions 4–5

5.4.7. Use formulas to calculate the volume of rectangular prisms*Related content:*

Containers and Cubes

Investigation 4: Sessions 4–5

Standard 5: Algebra, Functions, and Patterns

Students use algebraic concepts, functions, patterns, and relationships to solve problems

BENCHMARK EXPECTATION**PATTERNS, RELATIONS, AND FUNCTIONS****5.5.1. Analyze patterns represented by tables and graphs**

Picturing Polygons

Investigation 3: Session 4

Patterns of Change

Investigation 1: Sessions 1–4

Investigation 2: Sessions 1–5

5.5.2. Identify a rule for a pattern involving addition, subtraction, or multiplication

Patterns of Change

Investigation 1: Sessions 1–4

Investigation 2: Sessions 2–3, 5

5.5.3. Identify the rule for a pattern and then use the rule to solve a problem

Patterns of Change

Investigation 1: Sessions 1–4

Investigation 2: Sessions 2–3, 5

NUMERIC AND ALGEBRAIC REPRESENTATIONS**5.5.4. Identify a variable in an expression**

Patterns of Change

Investigation 1: Sessions 3–4 (See Teacher Note pages)

MATHEMATICAL MODELING**5.5.5. Use equations to solve problems; e. g., $28/x=7$** *Related content:*

Patterns of Change

Investigation 1: Sessions 1–2, 3–4

Investigation 2: Sessions 2 (Follow-Up), 3, 4, 5

Investigation 3: Sessions 1, 2, 3, 5–6

RATES OF CHANGE***No new expectations at this level***