Investigations in Number, Data, and Space®

Teaching a New Grade 5 Unit: Where to Start

These *Where to Start* documents are designed to provide an overview of the activities that address the important math content in the fifth grade units. They can be used to orient individuals or groups to the units they are preparing to teach.

Grade 5 Unit 1: Number Puzzles and Multiple Towers
Where to Start

This unit is the 1st of 9 units in 5th grade. It is part of the K-5 number and operations strand, and is the 1st of 2 multiplication and division units at this grade. This unit builds on the work of the previous units in this strand. Before teaching this unit, perhaps after working through this *Where to Start*, read *Mathematics in This Unit*, p. 10.

Investigation 1: Finding Factors and Prime Factors

These pages provide an overview of this Investigation:
- Mathematical Emphases (p. 23)
- Investigation 1 Planner (pp. 24 & 26)

The following activities and information support the key math ideas:
- Activity: Building Arrays (p. 31) and Discussion: Primes and Squares (p. 37)
- Activity: Introducing Number Puzzles: 4 Clues (p. 42)
- Dialogue Box: Solving a Number Puzzle (p. 178)
- Activity: Finding Multiplication Combinations for 18 and 180 (p. 49)
- Teacher Note: Finding Prime Factors (p. 154)

Investigation 2: Division Strategies

These pages provide an overview of this Investigation:
- Mathematical Emphases (p. 65)
- Investigation 2 Planner (pp. 66 & 68)

The following activities and information support the key math ideas:
- Activity: Solving 35 x 28 (p. 71) and Discussion: Naming Multiplication Strategies (p. 75)
- Discussion: Multiplying by 10 (p. 86)
- Activity: Introducing Multiplication Cluster Problems (p. 92)
- Teacher Note: About Cluster Problems (p. 165)
- Activity: Starter Problems (p. 101)

Preparation
- Materials to Gather and Prepare (pp. 25, 27, 67, 69, 111, 113)

Assessment
- Assessment (p. 14)
- Assessment Activities (p. 54)
- Assessment Activity (p. 107) and Teacher Note (p. 166)
- End-of-Unit Assessment Activities (p. 152) and Teacher Note (p. 174)

Practice & Review
- Ten-Minute Math (p. 20)
- Practice and Review (p. 21)

©TERC, 2007

Investigation 3: Division Strategies These pages provide an overview of this Investigation: • Mathematical Emphases (p. 109) • Investigation 3 Planner (pp. 110 & 112) The following activities and information support the key math ideas: • Activity: Solving a Division Problem (p. 115) and Discussion: Naming Strategies (p. 117) • Teacher Note: Division Strategies (p. 70) • Activity: Introducing Multiple Towers (p. 122) • Teacher Note: The Relationship Between Multiplication and Division (p. 169) • Activity: Division Cluster Problems (p. 137) • Dialogue Box: How Many 21s Are in 1,344? (p. 188)	

Teaching a New Grade 5 Unit: Where to Start

Grade 5 Unit 2: Prisms and Pyramids

This document is designed to provide an overview of the activities that address the important math content in this unit. It can be used to orient individuals or groups as they prepare to teach the unit.

This unit is the 2nd of 9 units in fifth grade. It is part of the K-5 geometry and measurement strand, and is the 1st of two geometry and measurement units at this grade. This unit builds on the work of the previous units in this strand. Before teaching this unit, perhaps after working through this *Where to Start*, read *Mathematics in This Unit*, p. 10.

Investigation 1: Finding the Volume of Boxes

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 19)
- Investigation 1 Planner (pp. 20 & 22)

The following activities and information support the key math ideas:

- Activity (p. 33) and Discussion (p. 34): Finding Volume
- Teacher Note: Strategies for Finding the Number of Cubes in 3-D Arrays (p. 113)
- Activity: Doubling the Cubes (p. 37) and Discussion: What Are the Dimensions? (p. 38)
- Activity: Differently-Sized Packages (p. 44)

Investigation 2: Using Standard Cubic Units

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 61)
- Investigation 2 Planner (p. 62)

The following activities and information support the key math ideas:

- Discussion: How Many Cubic Centimeters? (p. 67)
- Activity: A Plan to Measure Classroom Space (p. 74)
- Teacher Note: Strategies for Measuring Space in the Classroom (p. 123)
- Dialogue Box: Choosing a Volume Unit to Measure the Classroom (p. 138)

Investigation 3: Volume Relationships Among Solids

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 87)
- Investigation 3 Planner (p. 88)

The following activities and information support the key math ideas:

- Activity: Comparing Solids and Their Volumes (p. 96) and Discussion: Related Solids (p. 97)
- Activity: Designing a Prism (p. 100)
- Activity: Measuring with Cubic Centimeters (p. 106) and Discussion: How We Found the Volume (p. 108)
- Dialogue Box: Exploring the Three-to-One Relationship (p. 139)

Preparation

- Materials to Gather and Prepare (pp. 21, 23, 63, 89)
- Review the logistics of Building Models of Volume Units (p. 72); Measuring the Classroom (p. 78); Comparing Volumes of Containers (p. 91) and Making Solids from Patterns (p. 93)

Assessment

- Assessment (p. 14)
- Assessment Activity (p. 85)
- Assessment Activity (p. 52) and Teacher Note (p. 117)
- End-of-Unit Assessment Activities (p. 111) and Teacher Note (p. 128)

Practice & Review

- Ten-Minute Math (p. 16)
- Practice and Review (p. 17)

Teaching a New Grade 5 Unit: Where to Start

Grade 5 Unit 3: Thousands of Miles, Thousands of Seats

This document is designed to provide an overview of the activities that address the important math content in this unit. It can be used to orient individuals or groups as they prepare to teach the unit.

This unit is the 3rd of 9 units in fifth grade. It is part of the K-5 number and operations strand, and is the addition, subtraction, and number system unit at this grade. This unit builds on the work of the previous units in this strand. Before teaching this unit, perhaps after working through this *Where to Start*, read *Mathematics in This Unit*, p. 10.

Investigation 1: Using Place Values

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 23)
- Investigation 1 Planner (p. 24)

The following activities and information support the key math ideas:

- Activity: Introducing the 10,000 Chart (p. 26)
- Activity: How Many Steps to 10,000 (p. 37)
- Activity: Related Problems (p. 45)
- Discussion: The Largest Number (p. 52)
- Teacher Note: Representing Subtraction on the Number Line (p. 118)

Investigation 2: Studying Subtraction

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 55)
- Investigation 2 Planner (p. 56)

The following activities and information support the key math ideas:

- Discussion: Subtraction Strategies (p. 60)
- Teacher Note: Describing, Comparing, and Classifying Subtraction Strategies (p. 123)
- Activities: Introducing (p. 70) and doing (p. 71) Starter Problems
- Activity: Examining the U.S. Algorithm (p. 76)
- Dialogue Box: Working with the U.S. Algorithm (p. 147)
- Discussion: Using Strategies (p. 82)

Investigation 3: Adding and Subtracting Large Numbers

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 85)
- Investigation 3 Planner (p. 86)

The following activities and information support the key math ideas:

- Activity: Close to 7,500 (p. 89)
- Discussion: Solving Problems with Large Numbers (p. 98)
- Math Workshop: Adding and Subtracting Large Numbers (pp. 100-103)

Preparation

- Materials to Gather and Prepare (pp. 25, 57, 87)
- Review the logistics of the 10,000 Chart (p. 28)

Assessment

- Assessment (p. 14)
- Assessment Activities (pp. 33, 103, 109)
- Assessment Activity (p. 83) and Teacher Note (p. 132)
- Assessment Activity (p. 91) and Teacher Note (p. 130)
- End-of-Unit Assessment Activities (p. 111) and Teacher Note (p. 137)

Practice & Review

- Ten-Minute Math (p. 20)
- Practice and Review (p. 21)

Teaching a New Grade 5 Unit: Where to Start

Grade 5 Unit 4: What's That Portion?

This document is designed to provide an overview of the activities that address the important math content in this unit. It can be used to orient individuals or groups as they prepare to teach the unit.

This unit is the 4th of 9 units in fifth grade. It is part of the K-5 rational number strand, and is the first of two rational number units at this grade. This unit builds on the work of the previous units in this strand. Before teaching this unit, perhaps after working through this *Where to Start*, read *Mathematics in This Unit*, p. 10.

Investigation 1: Using Percents and Fractions

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 19)
- Investigation 1 Planner (p. 20)

The following activities and information support the key math ideas:

- Teacher Note: About Teaching Fractions and Percents Together (p. 145)
- Activity: Percents for Fourths and Eighths (p. 36) and Discussion: What Percent is 3/8? (p. 37)
- Activity: Fraction and Percent Equivalents (p. 39)
- Discussion: Reasoning about Fraction-Percent Equivalents (p. 42)
- Dialogue Box: Finding Thirds and Sixths on the Grids (p. 170)

Investigation 2: Comparing and Ordering Fractions

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 53)
- Investigation 2 Planner (pp. 54 & 56)

The following activities and information support the key math ideas:

- Teacher Note: Strategies for Comparing Fractions (p. 152)
- Activity: Marking a Percent Equivalents Strip (p. 59)
- Activity: Introducing Which is Greater? (p. 64) and Discussion: Comparing Fractions (p. 68)
- Activity: In Between (p. 73)
- Discussion: Solving Fraction Comparison Problems (p. 83)

Investigation 3: Adding and Subtracting Fractions

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 89)
- Investigation 3 Planner (pp. 90 & 92)

Preparation

- Materials to Gather and Prepare (pp. 21, 55, 57, 91, 93)
- Review the logistics of the class Equivalents chart (p. 31)

Assessment

- Assessment (p. 14)
- Assessment Activities (pp. 49, 108)
- Assessment Activity (p. 86) and Teacher Note (p. 154)
- End-of-Unit Assessment Activities (p. 143) and Teacher Note (p. 162)

Practice & Review

- Ten-Minute Math (p. 16)
- Practice and Review (p. 17)

The following activities and information support the key math ideas: • Teacher Note: Adding and Subtracting Fractions (p. 160) • Activities: Clock Fractions (p. 96) and Adding Clock Fractions (p. 98) • Activity: *Roll Around the Clock* (p. 104) and Discussion: Writing Fraction Problems (p. 105) • Activities: Introducing Fraction Tracks (p. 113) and Labeling the Fraction Tracks (p. 114) • Activities: Introducing *Fraction Track* (p. 122) and Moving on More Than One Track (p. 125) • Dialogue Box: Playing *Fraction Track* (p. 173) • Math Workshop (pp. 136-137) and Discussion (p. 137): Adding and Subtracting Fractions	

Teaching a New Grade 5 Unit: Where to Start

Grade 5 Unit 5: Measuring Polygons

This document is designed to provide an overview of the activities that address the important math content in this unit. It can be used to orient individuals or groups as they prepare to teach the unit.

This unit is the 5th of 9 units in fifth grade. It builds on the work of the previous units in the K-5 geometry and measurement strand. Before teaching this unit, perhaps after working through this *Where to Start*, read *Mathematics in This Unit*, p. 10.

Investigation 1: Polygons: Names, Properties, and Angles

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 19)
- Investigation 1 Planner (pp. 20 & 22)

The following activities and information support the key math ideas:

- Teacher Note: Classification of Triangles and Quadrilaterals (p. 137)
- Activity: Some Figures Have Many Names (p. 40)
- Discussion: Relationships Among Quadrilaterals (p. 43)
- Activities: Introducing (p. 51) and doing (p. 52) Angles in the Power Polygons
- Dialogue Box: Finding Angles Measures of Power Polygons (p. 163)

Investigation 2: Finding Perimeter and Area of Related Rectangles

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 65)
- Investigation 2 Planner (pp. 66 & 68)

The following activities and information support the key math ideas:

- Activity: Doubling Squares (p. 77)
- Dialogue Box: Doubling Dimensions (p. 165)
- Activity: Rearranging Rectangles (p. 90)
- Discussion: Why is the Area the Same? (p. 92)
- Activities: Introducing (p. 96) and doing (p. 97) Fencing a Garden

Investigation 3: Similarity

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 105)
- Investigation 3 Planner (p. 106)

The following activities and information support the key math ideas:

- Teacher Note: Similar Shapes (p. 152)
- Activity: Introducing Similarity (p. 109)
- Activity: Building Similar Polygons (p. 111)
- Discussions: Comparing Similar Figures (p. 112) and About Growing Shapes (p. 125)

Preparation

- Materials to Gather and Prepare (pp. 21, 23, 67, 69)

Assessment

- Assessment (p. 14)
- Assessment Activity (p. 63) and Teacher Note (p. 143)
- Assessment Activity (p. 103) and Teacher Note (p. 149)
- End-of-Unit Assessment Activities (p. 134) and Teacher Note (p. 155)

Practice & Review

- Ten-Minute Math (p. 16)
- Practice and Review (p. 17)

Teaching a New Grade 5 Unit: Where to Start

Grade 5 Unit 6: Decimal Grids and Number Lines

This document is designed to provide an overview of the activities that address the important math content in this unit. It can be used to orient individuals or groups as they prepare to teach the unit.

This unit is the 6th of 9 units in fifth grade. It builds on the work of the previous grade 5 unit, What's That Portion? and units in the K-5 fractions and decimals strand. Before teaching this unit, perhaps after working through this *Where to Start*, read *Mathematics in This Unit*, p. 10.

Investigation 1: Understanding and Comparing Decimals

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 19)
- Investigation 1 Planner (pp. 20 & 22)

The following activities and information support the key math ideas:

- Activity: Introducing Decimals on Grids (p. 26)
- Discussion: Place Value of Tenths and Hundredths (p. 32) and Activity: Introducing Thousandths (p. 33)
- Activities: Introducing Decimals on a Number Line (p. 39) and Ordering Tenths and Hundredths (p. 40)
- Activity: Comparing Decimals (p. 56)
- Teacher Note: Extending Place Value to Thousandths and Beyond (p. 123)
- Dialogue Box: Filling in the Fraction-to-Decimal Division Table (p. 140)

Investigation 2: Adding Decimals

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 81)
- Investigation 2 Planner (pp. 82 & 84)

The following activities and information support the key math ideas:

- Activity: Jeweler's Gold (p. 93) and Discussion: Explaining Solutions (p. 95)
- Activity: Adding Decimals (p. 98)
- Dialogue Box: Student Strategies for Adding Decimals (p. 145)
- Math Workshop Activity (p. 109) and Discussion (p. 113): Adding Decimals

Preparation

- Materials to Gather and Prepare (pp. 21, 23, 83, 85)

Assessment

- Assessment (p. 14)
- Assessment Activity (p. 53)
- Assessment Activity (p. 80) and Teacher Note (p. 127)
- End-of-Unit Assessment Activities (p. 118) and Teacher Note (p. 134)

Practice & Review

- Ten-Minute Math (p. 16)
- Practice and Review (p. 17)

Teaching a New Grade 5 Unit: Where to Start

Grade 5 Unit 7: How Many People? How Many Teams?

This document is designed to provide an overview of the activities that address the important math content in this unit. It can be used to orient individuals or groups as they prepare to teach the unit.

This unit is the 7th of 9 units in fifth grade. It is part of the K-5 number and operations strand, and is the 2nd of two multiplication and division units at this grade. This unit builds on the work of the previous units in this strand. Before teaching this unit, perhaps after working through this *Where to Start*, read *Mathematics in This Unit*, p. 10.

Investigation 1: Equivalence in Multiplication and Division

These pages provide an overview of this Investigation:
- Mathematical Emphases (p. 23)
- Investigation 1 Planner (p. 24)

The following activities and information support the key math ideas:
- Dialogue Box: 6 X 9 = 3 X 18 (p. 144)
- Teacher Note: Reasoning and Proof in Mathematics (p. 121)
- Activity: Creating Equivalent Expressions in Division (p. 42)

Investigation 2: Reviewing Multiplication Strategies

These pages provide an overview of this Investigation:
- Mathematical Emphases (p. 45)
- Investigation 2 Planner (p. 46)

The following activities and information support the key math ideas:
- Discussion: Reviewing Strategies (p. 49)
- Activity: Estimating Products (p. 54)

Investigation 3: Division Strategies and Notation

These pages provide an overview of this Investigation:
- Mathematical Emphases (p. 65)
- Investigation 3 Planner (p. 66)

The following activities and information support the key math ideas:
- Activity: Solving a Division Problem (p. 69)
- Dialogue Box: Naming Division Strategies (p. 148)
- Activity: Clear and Concise Notation (p. 76)
- Discussion: First Steps (p. 82)

Investigation 4: Using the Operations

These pages provide an overview of this Investigation:
- Mathematical Emphases (p. 99)
- Investigation 4 Planner (p. 100)

The following activities and information support the key math ideas:
- Math Workshop: Field Day (pp. 111-113)
- Dialogue Box: Understanding and Keeping Track of Multistep Problems (p. 150)

Preparation
- Materials to Gather and Prepare (pp. 25, 47, 67, 101)
- Review the logistics of Multiplication: How Did I Solve It? (p. 51) and Starter Problems (p. 86)

Assessment
- Assessment (p. 14)
- Assessment Activities (pp. 28, 33, and 38)
- Assessment Activity (p. 64) and Teacher Note (p. 130)
- Assessment Activity (p. 97) and Teacher Note (p. 136)
- End-of-Unit Assessment Activities (p. 118) and Teacher Note (p. 139)

Practice & Review
- Ten-Minute Math (p. 20)
- Practice and Review (p. 21)

Teaching a New Grade 5 Unit: Where to Start

Grade 5 Unit 8: Growth Patterns

This document is designed to provide an overview of the activities that address the important math content in this unit. It can be used to orient individuals or groups as they prepare to teach the unit.

This unit is the 8th of 9 units in fifth grade. It builds on the work of the previous units in the K-5 patterns, functions, and change strand. Before teaching this unit, perhaps after working through this *Where to Start*, read *Mathematics in This Unit*, p. 10.

Investigation 1: Height and Growth

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 23)
- Investigation 1 Planner (p. 24)

The following activities and information support the key math ideas:

- Activity: Growth Stories: Tara and Nat (p. 29) and Discussion: Comparing Tara and Nat (p. 34)
- Teacher Note: Understanding Line Graphs (p. 115)
- Activity: Animals' Growth (p. 42) and Discussion: How Tall at Age 100? (p. 44)
- Teacher Note: Situations with a Constant Rate of Change: Linear Functions (p. 118)

Investigation 2: Growing Patterns

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 61)
- Investigation 2 Planner (pp. 62 & 64)

The following activities and information support the key math ideas:

- Activity: 3 Tiles Across (p. 67) and Discussion: Using Symbolic Notation (p. 69)
- Activity (p. 78) and Discussion (p. 81): Double or Not?
- Activities: Introducing Penny Jar Situations (p. 98) and Penny Jar Problems (p. 99)
- Discussion: Comparing Penny Jars (p. 100)
- Teacher Note: When the Rate of Change Is Not Constant (p. 130)

Preparation

- Materials to Gather and Prepare (pp. 25, 63, 65)

Assessment

- Assessment (p. 16)
- Assessment Activity (p. 52) and Teacher Note (p. 125)
- End-of-Unit Assessment Activities (p. 112) and Teacher Note (p. 133)

Practice & Review

- Classroom Routines (p. 20)
- Practice and Review (p. 21)

Teaching a New Grade 5 Unit: Where to Start

Grade 5 Unit 9: How Long Can You Stand on One Foot?

This document is designed to provide an overview of the activities that address the important math content in this unit. It can be used to orient individuals or groups as they prepare to teach the unit.

This unit is the 9th of 9 units in fifth grade. It builds on the work of the previous units in the K-5 data analysis and probability strand. Before teaching this unit, perhaps after working through this *Where to Start*, read *Mathematics in This Unit*, p. 10.

Investigation 1: Comparing Balancing Data

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 19)
- Investigation 1 Planner (p. 20)

The following activities and information support the key math ideas:

- Activity: Comparing Adults and Students (p. 37)
- Teacher Note: Focusing on the Shape of the Data (p. 115)
- Discussions: Comparing Left (p. 39) and Right (p. 42) Foot Data
- Activity: Drawing Conclusions (p. 42)
- Dialogue Box: Who Are Better Balancers? (p. 138)

Investigation 2: Collecting Data from Experiments

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 47)
- Investigation 2 Planner (p. 48 & 50)

The following activities and information support the key math ideas:

- Activity: Introducing Collecting Data from Experiments (p. 53)
- Teacher Note: Managing Students' Projects (p. 119)
- Discussion: Representing Experiment Data (p. 69)
- Activity: Analyzing Experiment Data (p. 73)
- Dialogue Box: What Did You Find Out? (p. 143)

Investigation 3: Fair and Unfair Games

These pages provide an overview of this Investigation:

- Mathematical Emphases (p. 81)
- Investigation 3 Planner (p. 82 & 84)

The following activities and information support the key math ideas:

- Activity: Spinner Experiment with a Half-Green-Spinner (p. 87) and Discussion: The Results of Many Spins (p. 91)
- Teacher Note: Why Doesn't a Half-Green-Spinner Spin Half Green Half the Time? (p. 127)
- Activity: Race to the Top: Version 1 (p. 99)
- Dialogue Box: Is This Game Fair? (p. 145)
- Activity: Designing a Fair Game with an Unfair Spinner (p. 105)

Preparation

- Materials to Gather and Prepare (pp. 21, 49, 51, 83, 85)

Assessment

- Assessment (p. 14)
- Assessment Activity (p. 60) and Teacher Note (p. 122)
- End-of-Unit Assessment Activities (p. 110) and Teacher Note (p. 129)

Practice & Review

- Ten-Minute Math (p. 16)
- Practice and Review (p. 17)