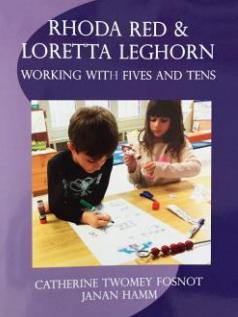


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## **BROCHURE OF UNITS AND THE SUGGESTED SEQUENCE OF EACH BY GRADE**

### **KINDERGARTEN UNITS**



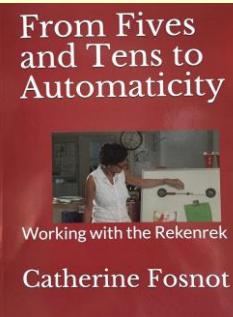
*Rhoda Red and Loretta Leghorn:  
working with fives and tens*

#### **Kindergarten**

Introduces the 5- and 10-bead MathRacks™. The unit builds on children's innate ability to subitize small amounts (1, 2, and 3) and uses it to develop the five-structure, eventually supporting children to see, for example, 5 inside of 7 and 5 inside of 8. In the second week of the unit the 10-structure is developed, first as 5+5, and then relationships between equivalent facts are explored and developed using compensation and associativity, for example, 3+7=4+6=5+5. The unit also introduces many new games that can be played throughout the year.



**Related Read-Alouds**



*From Fives and Tens to Automaticity:  
working with the rekenrek*

#### **Kindergarten**

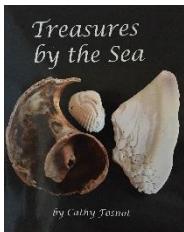
This new resource unit of more than 80 minilessons for kindergarten makes use of the 5- and 10-bead Mathracks™ and provides the research and a developmental progression for using the rekenrek. Like the unit *Rhoda Red and Loretta Leghorn*, this unit builds on children's innate ability to subitize small amounts (1, 2, and 3) and uses it to develop the five-structure (to see, for example, 5 inside of 7 and 5 inside of 8). Used throughout the year, it supports children to automatize the basic addition and subtraction facts to ten. Relationships between the facts are also explored and developed using compensation and associativity to support children to understand and come to see how and why many facts are equivalent, for example:  $3+7=4+6=5+5$ .

**MY FAVORITE COLLECTIONS**  
MEASUREMENT AND DATA  
CATHERINE TWOMEY FOSNOT  
KAREN RUTLEDGE  
SHARON ASKEV

*My Favorite Collections: sorting and representing amounts*

## Kindergarten

Children begin collections of their favorite things, for example: little toy cars, dolls, rocks, insects, and shells. They sort the objects into subgroups and describe and compare them using attributes such as size, length, weight, and color. They classify groups and explore how some categories can cause objects to be in more than one group unless they are mutually-exclusive. The context supports the development of counting and representing quantities with meaning.



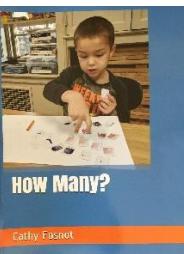
### Related Read-Aloud

**HOW MANY?**  
QUANTIFYING AND REPRESENTING  
CATHERINE TWOMEY FOSNOT

*How Many: Quantifying and Representing*

## Kindergarten

Children extend collections of their favorite things, tallying greater amounts and grouping the amounts into fives and tens. Students deepen their understanding of counting as they explore patterns in the number system and are provided when appropriate with opportunities to count to 100 and beyond.



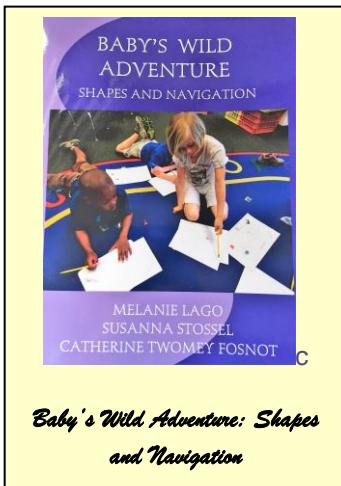
### Related Read-aloud

**Games for Early Number Sense**  
*A Yearlong Resource*  
Catherine Twomey Fosnot  
Antonia Cameron

*Games for Early Number Sense: Book One*

## Kindergarten

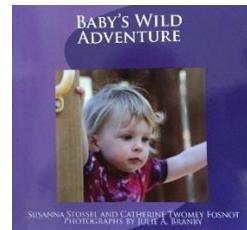
This unit is used throughout the year. In K-1, math workshop is often a games workshop, with children playing games or doing quick images and minilessons with the teacher. Play the games often and bring in board games and dice games, as well. Research shows that board games can increase achievement as they are a precursor to the number line model, a model that will be introduced in grade one to represent addition and subtraction to 100.



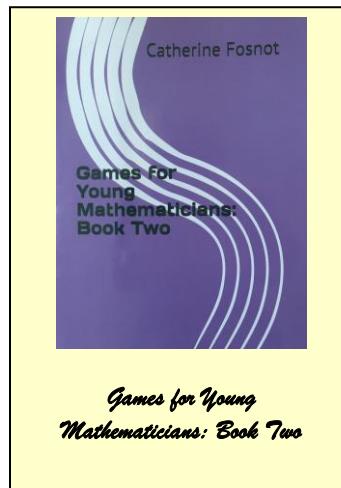
*Baby's Wild Adventure: Shapes and Navigation*

## Kindergarten

Builds on the early core geometries of shape recognition and navigation. Engages children in movement, navigation, early map-making, and exploring, naming, and drawing 2-dimensional shapes.



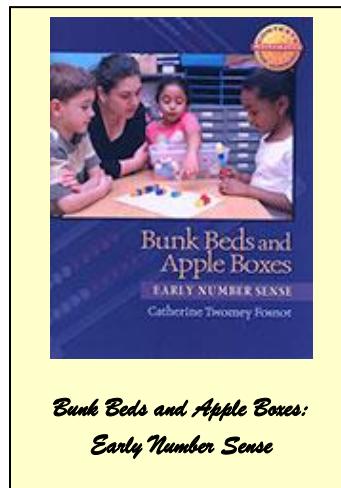
### Related Read-aloud



*Games for Young Mathematicians: Book Two*

## Kindergarten

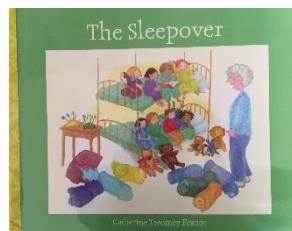
This unit is the second of two books of games for the early years. The first book consisted of approximately 20 games focused primarily on early number sense, addition, and subtraction. This collection expands on that work by providing more games on number and operation, but it also includes games for early geometry, time, and early algebra. The two books of games were designed primarily for K-1 because in the early years math workshop often consists of a mixture of investigations and games. But the books can also be used as yearlong resources for small group work, differentiation, and intervention. Each book includes approximately 20 games that you can choose from as you consider the needs of your students. The two books of games can also be used in Grade 1.



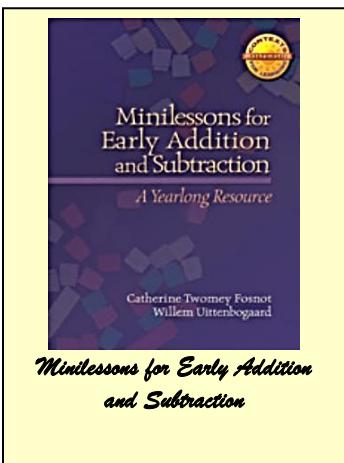
*Bunk Beds and Apple Boxes:  
Early Number Sense*

## Kindergarten

Introduces the 20-bead Mathrack™ and supports the development of cardinality, equivalence, compensation, conservation, addition and subtraction (part/whole), and symbolic representation of quantities.

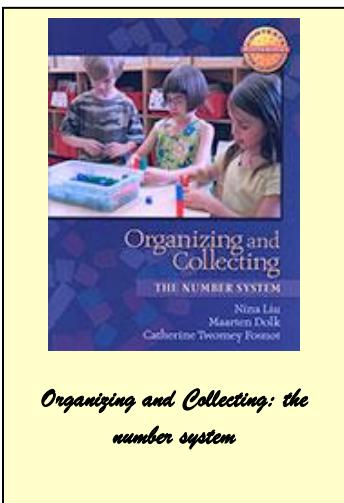


### Related Read-aloud



## Kindergarten

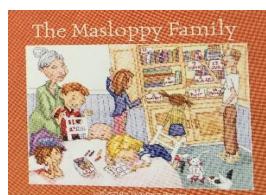
A resource of minilessons using quick images and strings of related problems with the 20-bead MathRack™ for use each day to support the development of early number sense to 20. Emphasize the quick images and the 5 and 10 Mathracks™ in the fall and, after using *Bunkbeds and Apple Boxes*, use the section designed for the 20-bead Mathrack™ to start working on the basic addition facts to 20.



### *Organizing and Collecting: the number system*

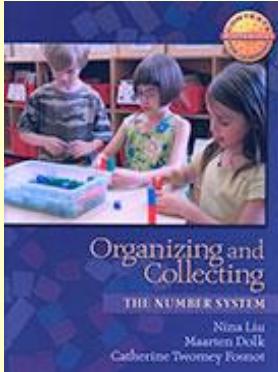
## Kindergarten

The context of this unit is helping the teacher to organize and take inventory of classroom materials. It supports the development of counting to 100 and beyond, making groups of fives and tens, skipcounting, representing amounts, and the noticing of the place value patterns in our number system. The amounts provided to children can be differentiated according to their needs. This unit will also be used in grade one with larger amounts.



### Related Read-Aloud

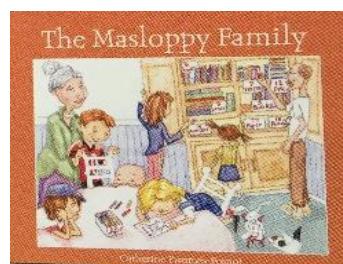
## GRADE ONE UNITS



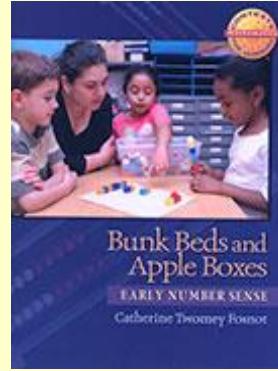
*Organizing and Collecting:*  
*the number system*

### Grade One

This unit is used twice in grade one, as well as at the end of kindergarten. It is not a repeat for children, as this is a new class with new materials in need of an inventory and at the end of the year the inventory done is to determine if more materials need to be ordered for the incoming class next year. Using it again continues to support the development of counting, making groups of fives and tens, skipcounting, representing amounts, and early place value. In grade one the amounts being inventoried can be greater and more emphasis can be placed on the place value patterns in our number system.



### Related Read-Aloud

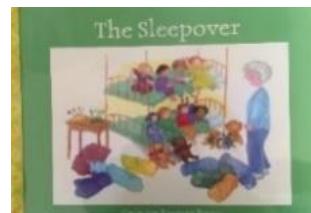


*Bunk Beds and Apple Boxes:*  
*EARLY NUMBER SENSE*  
Catherine Twomey Fosnot

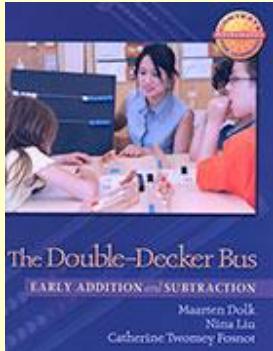
*Bunk Beds and Apple Boxes:*  
*Early Number Sense*

### Kindergarten or Grade One

If this unit was not used in kindergarten, it should be used early in the year of grade one because it introduces the 20-bead Mathrack™, a model which supports the development of cardinality, equivalence, compensation, conservation, addition and subtraction (part/whole), and the symbolic representation of quantities up to 20. The 20-bead MathRack™ model is critical also in the development of the basic addition and subtraction facts to 20. If the unit was used previously, you can skip it. But, if your children need more work on these ideas, you can substitute a different context for the apples, like 2 types of Halloween candy or two different kinds of fruit, or balls. You can also use the same context (the red and green apples) and just remind children that mathematicians love doing problems again to see if they can think of even better strategies than they used before. Follow this unit with The Double-decker Bus.



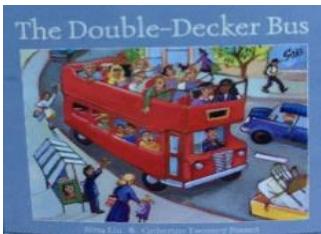
### Related Read-aloud



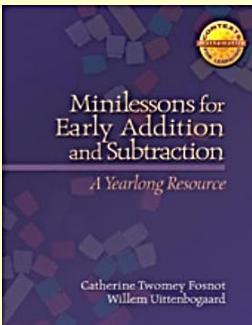
*The Double-decker Bus: Early Addition and Subtraction*

## Grade One

Develops the basic facts to 20 and works toward getting the facts automatic by employing the use of the 20-bead Mathrack™ to support the use of the five and ten structures and strategies such as doubles +/-, making a ten, and compensation. After the unit is done, work on minilessons with the rack all year to get the basic facts automatic.



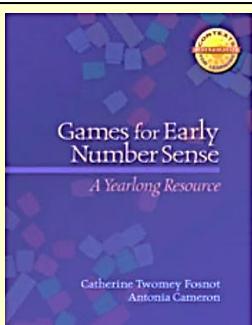
### Related Read-Aloud



*Minilessons for Early Addition and Subtraction*

## Kindergarten and Grade One

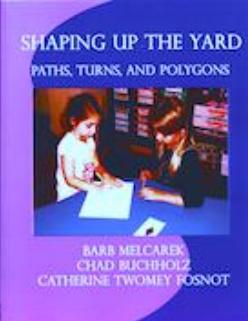
A resource of minilessons using quick images and strings of related problems with the 20-bead MathRack™ for use each day throughout the year to continue supporting the development of addition and subtraction to 20. In grade one, emphasize the section designed for the 20-bead Mathrack™ to start working on the automatization of the basic addition facts to 20 and continue to the end to include further work on place value with ten frames.



*Games for Early Number Sense: Book One*

## Kindergarten and Grade One

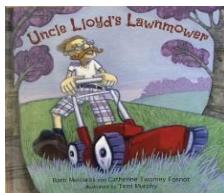
Math workshop in K-1 is often a games workshop, with the children working in small groups on different activities. Some of the games were already introduced in kindergarten, but others are more appropriate for grade one. Games are a great way to differentiate for young children and accommodate to their development. Choose and assign the games wisely. Some children may be on Dreambox, while others are playing a variety of games or doing quick images and minilessons with the teacher. Play the games often and bring in other board games and dice games, as well. Research shows that board games can increase achievement as they are a precursor to the number line model—a model you will be developing in the spring in preparation for work on addition and subtraction to 100.



*Shaping Up the Yard: Paths,  
Turns, and Polygons*

## Grade One

Fosters exploration of the shapes of large-scale navigable surface layouts and small scale drawn 2-D shapes. Supports children to reason with shapes and their attributes. [Note: if *Baby's Wild Adventure* was not used in K, you can use that unit on grade one also, as it is a nice precursor to this unit, but do it prior to *Shaping Up the Yard* as this unit is designed to meet the CCSS objectives on grade one for geometry.]



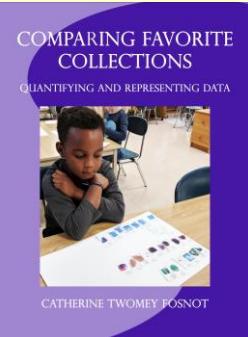
### Related Read-Aloud



*Games for Young  
Mathematicians: Book Two*

## Kindergarten and Grade One

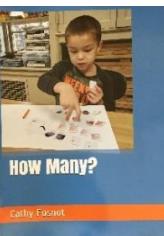
This unit is the second of two books of games for the early years. The first book consisted of approximately 20 games focused primarily on early number sense, addition, and subtraction. This collection expands on that work by providing more games on number and operation, but it also includes games for early geometry, time, and early algebra. The two books of games were designed primarily for K-1 because in the early years math workshop often consists of a mixture of investigations and games. But the books can also be used as yearlong resources for small group work, differentiation, and intervention. Each book includes approximately 20 games that you can choose from as you consider the needs of your students.



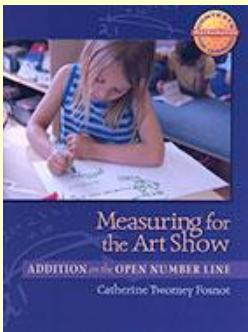
*Comparing Favorite Collections:  
Quantifying and Representing  
Data*

## Grade One

Introduces bar graphs as a way to compare amounts as children extend their favorite collections started with the kindergarten units, *My Favorite Collection* and *How Many?* In contrast to the prior K units, this unit is designed to support counting to 120 and beyond, packaging groups of tens and noting place value patterns, and using place value and properties of operations to add and subtract within 100 using value bars. It also continues the work of automatizing the basic facts to 20 and introduces the equality and inequality symbols:  $<$ ,  $>$ , and  $=$ .



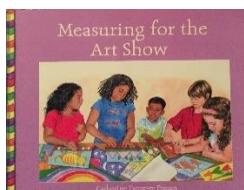
### Related Read-aloud



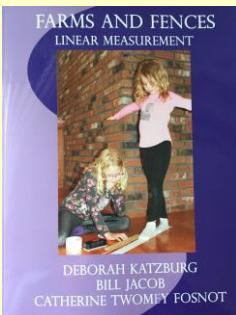
*Measuring for the Art Show:  
Addition on the Open Number  
Line*

## Grade One

Introduces measurement with non-standard units to emerge the open number line model and prepares the way for examining 2-digit numbers, magnitude, number relations, landmark numbers, and addition up to 100. This unit needs to be done BEFORE addition with double digit work starts. Usually used in the spring of grade one.



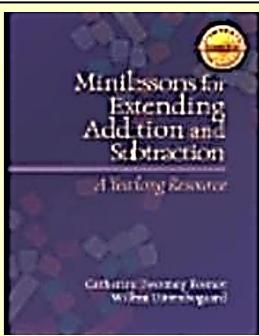
**Related Read-aloud**



*Farms and Fences:  
Linear Measurement*

## Grade One

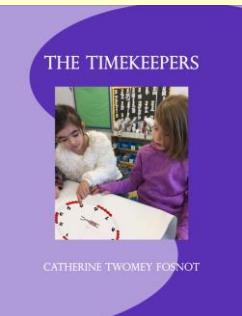
Supports children to construct length as a linear span, from point-to-point, that can be measured with an iteration of smaller linear units. The need for a common standard unit emerges and feet and centimeters are introduced. Usually used in the spring after Measuring for the Art Show. The accompanying read-aloud is included in the appendix of the unit.



*Minilessons for Extending  
Addition and Subtraction*

## Grade One

A resource of minilessons using strings of related problems for addition and subtraction beyond 20. Once the open number line has been introduced with *Measuring for the Art Show*, start using this resource to support the development of strategies for addition and subtraction to 100 and beyond. The second half of this unit is used in Grade Two.



THE TIMEKEEPERS

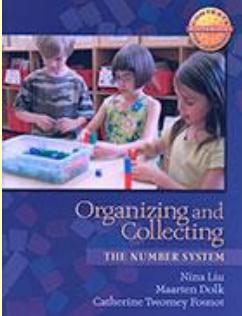


CATHERINE TWOMEY FOSNOT

*The Timekeepers*

## Grade One

The focus of this unit is the extension of linear measurement to the measurement of time. To compare durations, standard units are needed like hours, minutes, and seconds and these can be decomposed, added, seen as fractional pieces of a larger unit (for example, half an hour), or exchanged—for example, 30 minutes can be exchanged for half an hour. The teaching of time has often been misconstrued as the “telling of time.” Being able to read and recite time from the face of the clock does not mean that children understand time, the passing of it, or the mathematics involved in the measuring of it. This unit is crafted and sequenced carefully to foster those understandings.

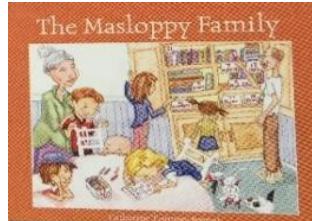


Organizing and  
Collecting  
THE NUMBER SYSTEM  
Nina Liu  
Maureen Dolk  
Catherine Twomey Fosnot

*Organizing and Collecting: the  
number system*

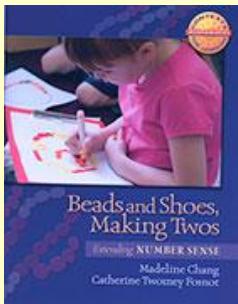
## Grade One

Although used in the beginning of the year, this unit is repeated at the end of the year as well, using the context that inventory is needed again to see if the teacher needs to order new materials for the next year’s class. Using it again continues to support the development of counting, making groups of fives and tens, representing amounts, and examining the place value patterns in our number system. And, it gives you a chance to do an assessment on the growth in numeracy from the beginning of the year to the end.



**Related read-aloud**

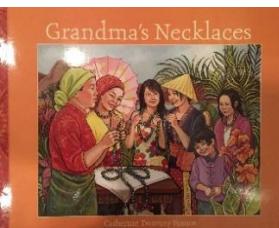
## GRADE TWO UNITS



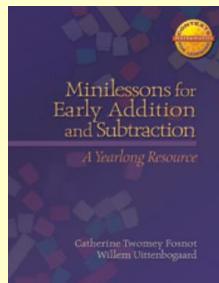
*Beads and Shoes, Making Twos:  
Extending Number Sense*

### Grade Two

Introduces even and odd numbers by exploring doubles and pairs and includes more work with the 20-bead Mathrack™ to get the basic facts to 20 automatic. Start your year with it and then continue afterwards using the MathRack™ with small groups of students who still do not have automaticity with the basic facts to 20. The unit also includes work on patterns.



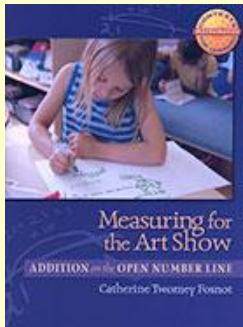
### Related read-aloud



*Minilessons for Early Number  
Sense, Addition and Subtraction*

### Grade Two, only as needed

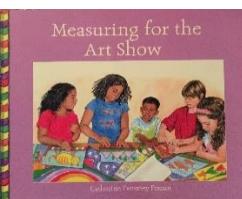
This unit is primarily a K-1 resource for number strings. Crafted tighter to be more powerful than just number “talks,” number “strings” ensure the development of numeracy and fluent computation. We’ve listed it under grade 2, just so you know it is available in case you have children who need more work to achieve fluency with basic facts. If you decide to use it in grade 2, use just the last section of the guide with the Mathrack™. Use with small guided groups of children needing work to get the facts automatic. DreamBox will provide the differentiation needed to help kids get the facts automatic as well.



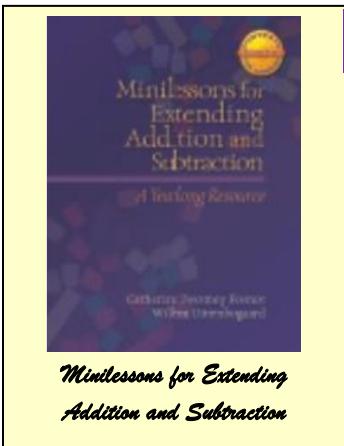
*Measuring for the Art Show:  
Addition on the Open Number  
Line*

### Grade One or Two

This unit was designed for grade one, but if it was not used in grade one consider inserting it into the grade 2 sequence because its purpose is to develop the open number line model—a representational model you will need as you work on addition and subtraction within 1000. The unit also introduces measurement with non-standard units to emerge the open number line model and prepares the way for examining 2-digit numbers, magnitude, number relations, and landmark numbers. This unit should be done BEFORE concerted work on addition and subtraction with double digits starts.

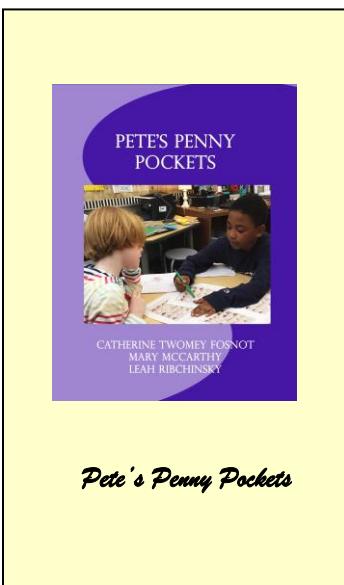


### Related Read-aloud



## Grade One and Two

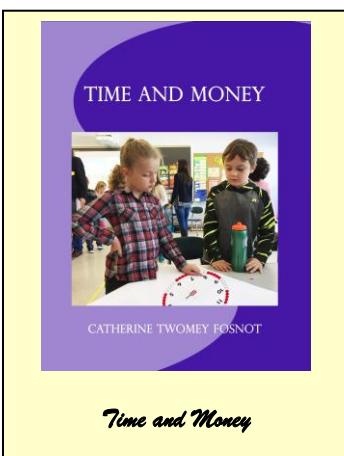
A resource of minilessons using strings of related problems for addition and subtraction. Once the open number line has been introduced with *Measuring for the Art Show*, start using this resource to support the development of strategies for addition and subtraction to 100 and beyond.



### *Pete's Penny Pockets*

## Grade Two

Using the context of pennies, dimes, and dollars, this unit supports the deepening of an understanding of place value and the number system. It provides many opportunities for addition and subtraction within 1000 using place value and the properties of the operations. The penny pockets are also presented in arrays, designed to provide opportunities for students to work with equal groups of objects to gain foundations for multiplication.



### *Time and Money*

## Grade Two

This unit uses the context of money (nickels and dimes) as a support to help students become more comfortable with the grouping of five and ten minutes on the analog clock. Students learn that a quarter of dollar is quite different than a quarter of an hour, which is only 15 minutes, and that the 60 minutes in an hour is broken up into 5-minute chunks on the analog clock. Emphasis is placed on unitizing the groups of fives and being able to read the clock to the nearest five minutes.

**TANISHA AND  
TAMIKA'S TOOLBOX**  
LINEAR MEASUREMENT SYSTEMS

CATHERINE TWOMEY FOSNOT  
REBECCA MURRY  
SYLVIA GLASSCO

*Tanisha and Tamika's Toolbox:  
Linear Measurement Systems*

## Grade Two

Focuses on the development of linear measurement systems, including the relationship between inches, feet, and yards and between centimeters and meters. This unit also promotes the development of the open number line model.

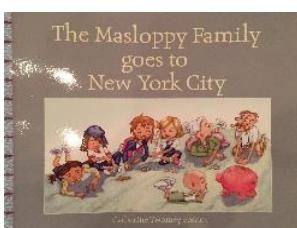
**Trades, Jumps,  
and Stops**  
EARLY ALGEBRA

Catherine Twomey Fosnot  
Patricia Lens

*Trades, Jumps, and Stops:  
Early Algebra*

## Grade Two

Focuses on equivalence, exchanging equivalent expressions, and solving for unknowns. The context of coins (money) and exchanging equivalent amounts is used throughout.



### Related Read-Aloud

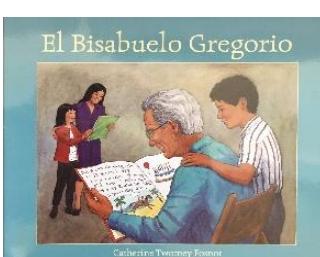
**Ages and Timelines**  
SUBTRACTION on the OPEN NUMBER LINE

Catherine Twomey Fosnot

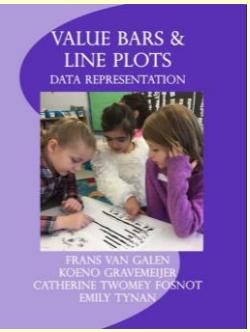
*Ages and Timelines: Subtraction  
on the Open Number Line*

## Grade Two

Explores various subtraction models (difference, removal, missing addends) and relates addition to subtraction while developing mental arithmetic strategies for subtraction with 2- and 3-digit numbers.



### Related Read-aloud



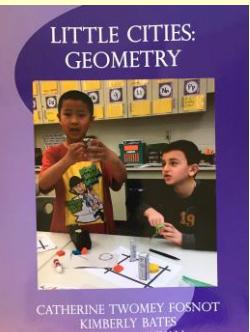
**VALUE BARS &  
LINE PLOTS  
DATA REPRESENTATION**

FRANS VAN GALEN  
KOENO GRAVEMEIJER  
CATHERINE TWOMEY FOSNOT  
EMILY TYNAN

*Value Bars and Line Plots: Data Representation*

## Grade Two

Introduces data representation using value bars and line plots. With value bars, children graph heights of animals and the length of their jumps. With line plots, age frequencies and hitting the target number in a game are plotted. By the end of the unit, students are analyzing the shape of the data and drawing conclusions about data sets.



**LITTLE CITIES:  
GEOMETRY**

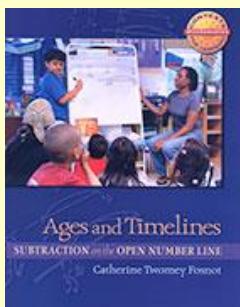
CATHERINE TWOMEY FOSNOT  
KIMBERLY BATES  
TAMMIE HULPVAN

*Little Cities: Geometry*

## Grade Two

Students are supported to categorize and sort polygons by their properties. They work to transform 2-D shapes into 3-D polygonal prisms as they build little city models. Adding arrays for patios, students figure out the number of tiles in each, the cost of the patios with tiles at \$2 each, and they explore equal partitions of the patios and determine that shapes don't need to be congruent to be of equal size.

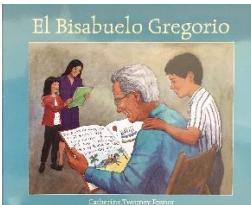
## GRADE THREE UNITS



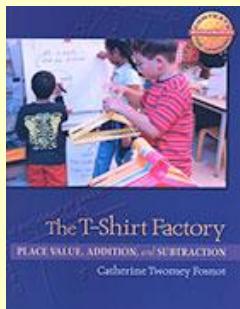
*Ages and Timelines: Subtraction  
on the Open Number Line*

### Grade Two or Three

If your students need more work on subtraction, this is a good unit to use to review various subtraction models (difference, removal, missing addends) and strategies for subtraction with 2- and 3-digit numbers. If the unit was used in Grade Two, just ask students to bring more data of birth years in of other people they know, such as aunts and uncles, grandparents, etc. or add in historical figures. Use in the Fall as it aligns primarily with Grade 2.



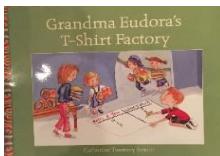
### Related Read-aloud



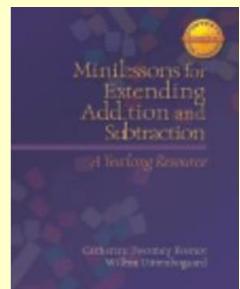
*The T-Shirt Factory: Place  
Value, Addition, and Subtraction*

### Grade Three

Deepens an understanding of place value to three and four places. Because the unit is a simulation game, where students form companies that sell T-shirts packed in rolls of ten, and ten rolls to a pallet, many opportunities are provided for differentiation to deepen an understanding of place value. The t-shirts sell for \$10 apiece and students have to keep track of both the inventory they have in their warehouse, and the amount of money they have made. It's a great unit for working on addition and subtraction strategies based on place value within 1000.



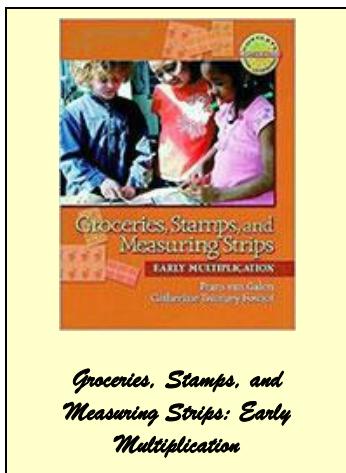
### Related Read-Aloud



*Minilessons for Extending  
Addition and Subtraction*

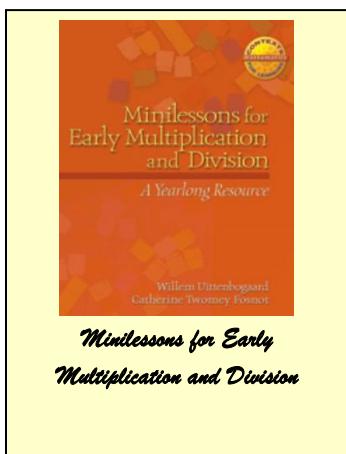
### Grade Two (and Three as needed)

A resource of minilessons using strings of related problems for addition and subtraction. In grade 3 use as needed to strengthen addition and subtraction strategies within 1000. It's also a helpful resource for work with small guided groups. Use this as a resource in the fall to do computation work every day as needed and then go to the minilessons for early multiplication resource.



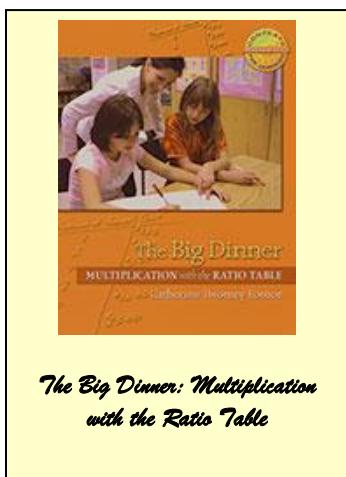
### Grade Three

Introduces multiplication by building sequentially from repeated addition to partial products on the open number line and builds strategies for automaticity of the basic facts.



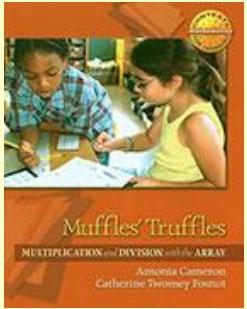
### Grade Three

A resource of strings of related problems. Crafted more tightly than number “talks,” number “strings” ensure the development of numeracy and fluent computation because of the way they are crafted. Use throughout grade 3 to work towards automaticity of the basic multiplication facts.



### Grade Three

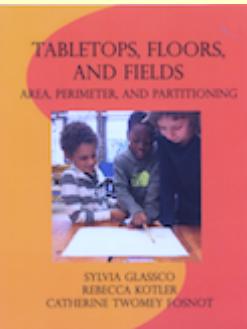
Introduces the ratio table as a powerful tool for multiplicative reasoning and lays a foundation for the development of proportional reasoning and the use of partial products. This unit can also be used in grade 4.



*Muffles' Truffles: Multiplication  
and Division with the Array*

### Grade Three

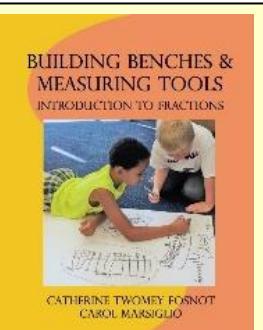
Develops the open array model, which can be used as a powerful tool to support the development of partial products and the distributive, commutative, and associative properties.



*Tabletops, Floors, and Fields:  
Area, Perimeter, and  
Partitioning*

### Grade Three

Designed to promote mathematical inquiry on area and perimeter by decomposing and rearranging, and to support students' growing understanding of the properties of multiplication.



*Building Benches: Introducing  
Fractions*

### Grade Three

Landmark fractions are introduced in the context of measurement. As students work to determine the overall length of benches they are faced with units that need to be decomposed into fractional pieces.

**ALL ABOUT SHARKS**DATA REPRESENTATION  
AND ANALYSISKOENO GRAVEMEIJER  
FRANS VAN GALEN  
CATHERINE TWOMEY FOSNOT*All about Sharks: Data Representation and Analysis***Grade Three**

*All About Sharks* introduces the use of two marked dimensions (horizontal and vertical scales), effectively turning value bar comparisons and line plots into more easily readable graphs. The scales are also extended to include fractions and scaled data. Students explore and graph the lengths and lifespans of a variety of sharks, measure their teeth, and work with real data sets from an environmental study near the Great Barrier Reef. This unit should be used at the end of the year, after Building Benches has been used (or after landmark fractions have been introduced).

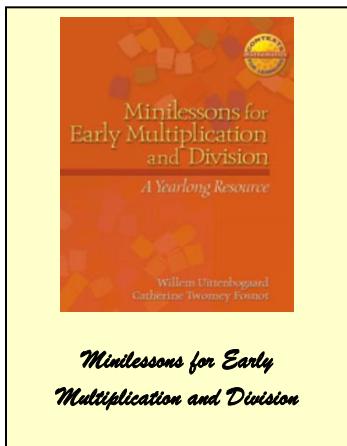
**ELAPSED TIME,  
WEIGHT, AND  
LIQUID VOLUME**

CATHERINE TWOMEY FOSNOT

*Elapsed Time, Weight, and Liquid Volume***Grade Three**

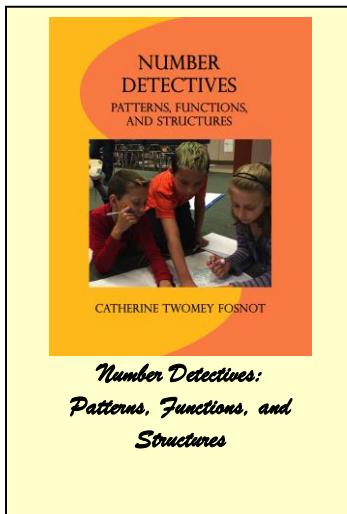
Elapsed time, weight, and liquid volume are all explored in the context of walking and feeding 9 dogs. Students are also supported to build connections between the operations of multiplication and division as they develop a feeding chart for the dogs and engage in minilessons. A new board game is also introduced whereby students try to walk and feed all the dogs in the least amount of time, calculating elapsed time to determine their score for the round.

## GRADE FOUR UNITS



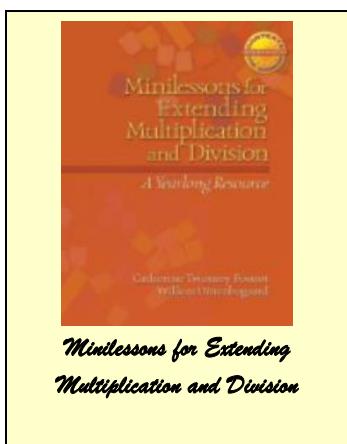
Grade Four, as needed

A resource of strings of related problems. Crafted more tightly than number “talks,” number “strings” ensure the development of numeracy and fluent computation because of the way they are crafted. Can be used in grade 4 with children who still need work on getting the basic facts automatic. Use if needed with small guided groups.



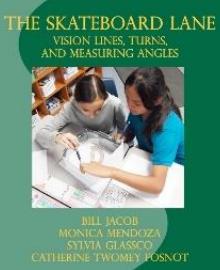
Grade Four

The focus of this unit is the extension of operations to algebraic reasoning by gaining familiarity with common factors and multiples, generating and analyzing patterns and sequences, and exploring the importance of primes as they relate to composites. The unit also supports a unification of the strand of number and operation with the strand of geometry. Students learn about the mystery of triangular numbers, build a sequence, and examine patterns in it. They transform quantities into geometric shapes, explore sequences of squares and cubes of primes, and eventually are introduced to the Fibonacci sequence and the related spiral, where the mystery and wonders of number are connected to the beauty and regularity of nature around them. The unit also develops the relationship of multiplication and division by connecting factors to divisors and supports the automaticity of the basic facts.



Grade Four

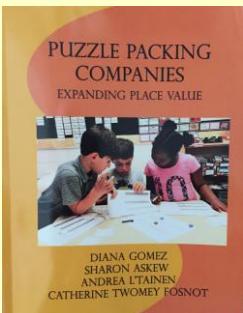
A resource of strings of related problems to develop strategies for multiplication and division with 2- and 3-digit numbers. More powerful than just number “talks,” number “strings” ensure the development of numeracy and fluent computation. Use throughout grades 4 and 5 for fluency with computation.



*The Skateboard Lane: Vision  
Lines, Turns, and Measuring  
Angles*

## Grade Four

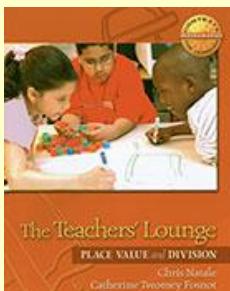
Part One of a two-unit sequence on angles. As students explore vision lines in a skateboard park, they are faced with the dilemma of how to measure the angles they make when they turn from one vision line to another. Students make measurement tools and are introduced to the protractor.



*Puzzle Packing Companies:  
Extending Place Value*

## Grade Four

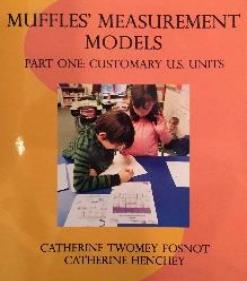
Fosters multiplication and division by powers of ten, develops the standard subtraction and addition algorithms with meaning, strengthens and extends place value within 100,000, and prepares the way for place value to 1,000,000.



*The Teachers' Lounge: Place  
Value and Division*

## Grade Four

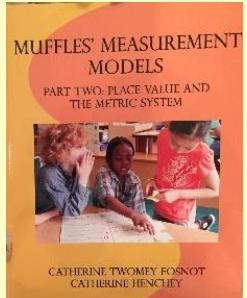
This unit emphasizes place value and the distributive property as they relate to division. Partitive and quotative situations are examined, as well as division with remainders.



***Muffles' Measurement Models:  
U.S. Customary Units***

**Grade Four**

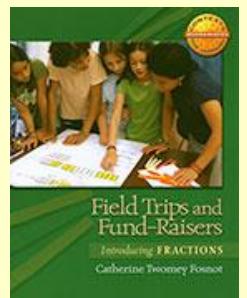
This unit is the first of two related, companion units for grade 4. Muffles (of *Muffles' Truffles*) returns, expands his business, and several problems arise as he tries to convert the measurements in his recipes to make bigger batches of truffles. Children are asked to select and use an appropriate measurement unit (U.S. Customary units), to compare and relate the measurements (length and liquid volume), to construct the need for decomposition of units into smaller units, and to use operations to convert within the system. The models used throughout are the double number line for equivalence and the ratio table for scaling and proportional reasoning.



***Muffles' Measurement Models:  
Place Value and the Metric  
System***

**Grade Four**

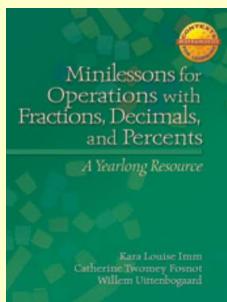
This unit is Part Two of the measurement sequence for grade 4. Ratio tables and double number lines are used to develop conversions within the Metric System. The context also deepens students' understanding of place value and fosters insights related to multiplication and division by powers of ten.



***Field Trips and Fund-Raisers:  
Fractions***

**Grade Four**

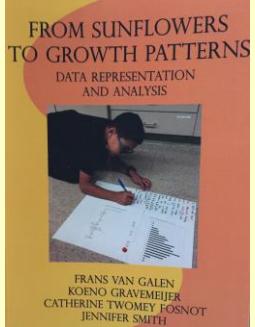
This unit develops the connection of fractions to division and employs the use of various fraction models (fair-sharing, part/parts, bar, and area models).



*Minilessons for Fractions,  
Decimals, and Percents*

## Grade Four

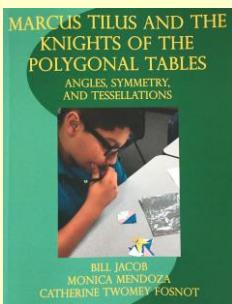
A resource book for doing minilessons with strings of related problems on fractions, decimals, and percents. More powerful than just number “talks,” number “strings” ensure the development of numeracy and fluent computation. In grade 4, just use the first part of the guide where coins and clocks are used as models.



*From Sunflowers to Growth  
Patterns: Data Representation  
and Analysis*

## Grade Four

This unit extends the work on data representation and analysis by focusing on growth over time, including again the use of scaled axes on marked dimensions (horizontal and vertical scales), but also extending the markings on the scales to eighths and introducing line graphs. It also includes more work with line plots, developing an understanding of range and building a foundation for an analysis of central tendencies (mode and median), which will be more formally taught in grades 5 and 6.

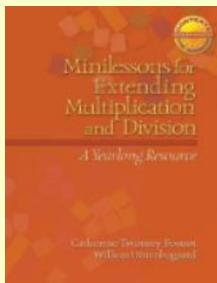


*Marcus Tilius and the Knights of  
the Polygonal Tables: Angles,  
Symmetry, and Tessellations*

## Grade Four

Part Two of the two-unit sequence on angles for grade 4. As students explore shapes and make designs for tabletops, they are faced with the challenges of exploring which polygons tessellate and how the interior angles of the polygons are involved. In the second week of the unit their designs bring them into explorations with symmetry.

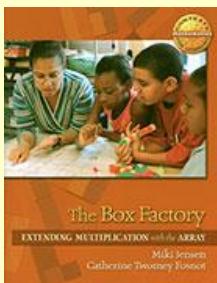
## GRADE FIVE UNITS



*Minilessons for Extending  
Multiplication and Division*

Grade Five

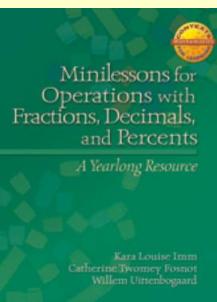
A resource of strings of related problems to develop strategies for fluent multiplication and division with 2- and 3-digit numbers. More powerful than just number “talks,” number “strings” ensure the development of numeracy and fluent computation. Use throughout grades 4 and 5 for the development of fluency.



*The Box Factory: Extending  
Multiplication with the Array*

Grade Five

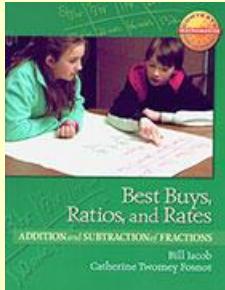
Develops the associative property, factoring, the area formula for rectangles and the relationship between surface area and volume in rectangular prisms.



*Minilessons for Fractions,  
Decimals, and Percents*

Grade Five

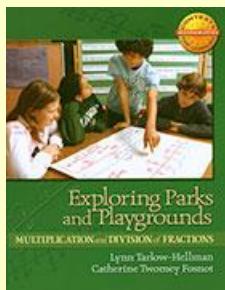
A resource book for doing minilessons with strings of related problems. More powerful than just number “talks,” number “strings” ensure the development of numeracy and fluent computation. This unit may have been used in grade 4, but only the beginning portion with clocks and coins. In grade 5, use the complete resource to work on all four operations with fractions.



*Best Buys, Ratios, and Rates:  
Addition and Subtraction of  
Fractions*

## Grade Five

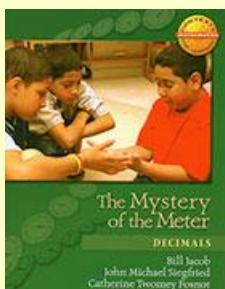
Develops fraction equivalence and proportional reasoning and generates the double open number line model for addition and subtraction of fractions.



*Exploring Parks and  
Playgrounds: Multiplication and  
Division of Fractions*

## Grade Five

Focuses on multiplication and division of fractions by fractions. The open number line, array and ratio table models are used throughout to develop fluency.



*The Mystery of the Meter:  
Decimals*

## Grade Five

Provides an important multiplicative treatment of decimals by introducing the analog electric meter to emphasize place value, powers of ten, and equivalence.

**STAIRSTEPS & SCALES**  
MULTIPLICATION AND DIVISION WITH DECIMALS



SYLVIA GLASSCO  
CATHERINE TWOMEY FOSNOT

*Stairsteps and Scales:  
Multiplication and Division with  
Decimals*

**Grade Five**

Strengthens a multiplicative understanding of place value and supports efficient multiplication and division of decimals.

**SURVEYORS  
& SUBWAYS**  
THE COORDINATE PLANE

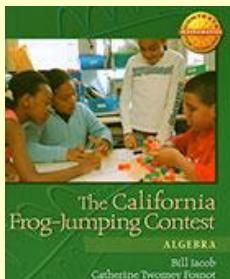


SYLVIA GLASSCO  
CATHERINE TWOMEY FOSNOT

*Subways and Surveyors: The  
Coordinate Plane*

**Grade Five**

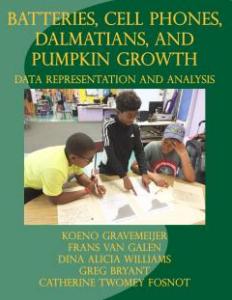
A grid system is introduced as a measurement tool for surveyors. At first only the first quadrant of the coordinate plane is used, but students very naturally extend it to include all 4 quadrants as they design subway tracks to get to city landmarks.



*The California Frog Jumping  
Contest: Algebra*

**Grade Five**

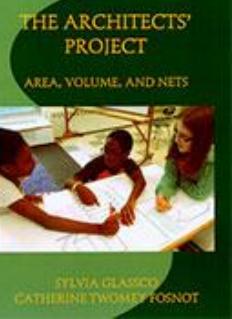
Uses the open number line to develop symbolizing with variables and treating equivalent algebraic expressions as interchangeable objects for solving for unknowns in linear equations.



*Batteries, Cell Phones,  
Dalmatians, and Pumpkin Growth:  
Data Representation and Analysis*

Grade Five

This unit extends the work on data representation and analysis to include the use of scaled axes on marked dimensions but with the decomposition of intervals encompassing fractional sections on the scales. It also develops an understanding of range, clusters, and outliers and builds a foundation for the development of the mean, mode, and median.



*The Architects' Project: Area,  
Volume, and Nets*

Grade Five

Develops area formulas for various polygons and volume formulas for various prisms. The relationship between surface area and volume of prisms is also explored. This unit aligns best with grade 6, but is a nice challenge to develop area, volume, surface area of prisms with 5<sup>th</sup> graders.