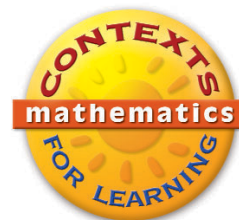


# Investigating Multiplication and Division

## POSTER OVERVIEW



*“The heart of the math workshop consists of ongoing investigations developed within contexts and situations that enable children to mathematize their lives”*

Catherine Twomey Fosnot

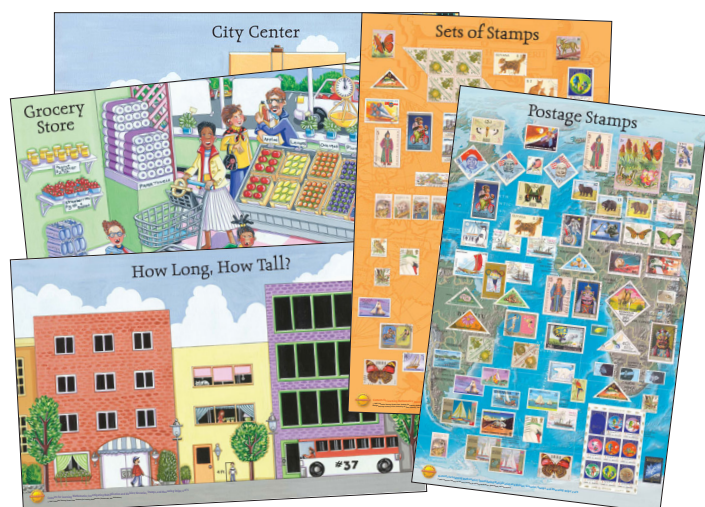
Building learning around rich, instructionally-sound contexts was an overarching goal during the development of the *Contexts for Learning Mathematics* series. Throughout the series context is used to set the stage for learning. It establishes a terrain that will intrigue children and ignite their imaginations. The contexts are situations children can imagine—either realistic or fictional—that enable them to reflect on what they are doing and apply mathematical thinking to their own world.

Contexts for investigations are typically developed with stories and pictures. These are carefully crafted to involve students in meaningful investigations of the big ideas, strategies, and models that shape mathematical thinking.

- ☀ The images and texts are engaging and include age-appropriate children using mathematics to solve real-world problems.
- ☀ The numbers referenced represent landmark numbers or number relationships that are significant and telling.
- ☀ The models and metaphors within a context make relationships and strategies more tangible and explicit.

The contexts for the five units in *Investigating Multiplication and Division* (Grades 3–5) are established through 17 vibrant posters (15” x 24”) that meld humor, intrigue, and good math sense.

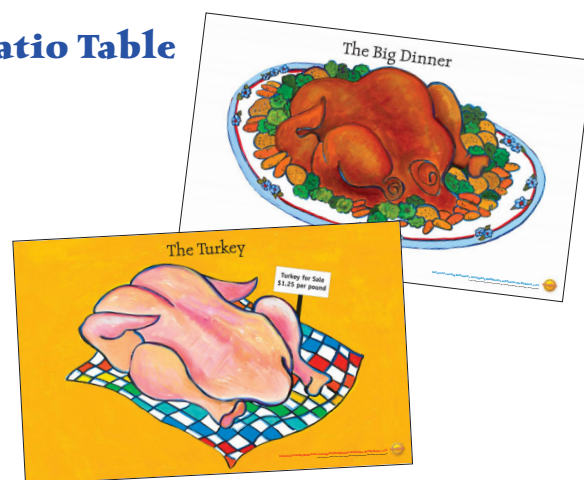
## Groceries, Stamps, and Measuring Strips: Early Multiplication



*Groceries, Stamps, and Measuring Strips* uses baker’s trays, patio tiles, and other real-world resources to introduce fundamental multiplication strategies. The careful arrangements of these resources invite repeated addition, skip-counting, and doubling strategies, as well as introduce the language of grouping. Measurement strips are used to explore the relationships between products. As the unit progresses, formal notation and use of the language of “times” is introduced within the context of measuring buildings and other objects in a city in relation to the height of eight-year-old Antonio, who is four feet tall. For example, a tree is determined to be twelve feet high if it is three times the height of Antonio. Subsequently, making measuring strips invites children to discuss relationships that help them automatize the basic multiplication facts.

## The Big Dinner: Multiplication with the Ratio Table

In *The Big Dinner* the preparation of a turkey dinner introduces early multiplication strategies and supports automatizing the facts, using the ratio table, and developing the distributive property with large numbers. Strings of problems guide learners toward computational fluency with whole-number multiplication and build automaticity with multiplication facts by focusing on relationships.



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



A chocolatier's efforts to cope with the operational challenges of running a truffle shop (counting, pricing, and labeling assorted boxes of chocolates) in *Muffles' Truffles* introduces students to the open array as a model for multiplication and division. A series of investigations explore place value—the multiplicative structure of our base-ten system and quotative division—and big ideas in multiplication, including the distributive, associative, and commutative properties. As the unit progresses, students design boxes for Muffles and build blueprints of their designs with graph paper arrays, and the array of chocolates arranged in rows and columns is progressively transformed into the open array model.

## The Teacher's Lounge: Place Value and Division

The stocking of water and juice vending machines in *The Teachers' Lounge* introduces big ideas related to division. In considering different ways to inventory the contents of each machine, students employ a repertoire of strategies, including the use of the ten-times strategy, partial products and partial quotients, and the distributive property of multiplication over addition—the basis for the long division algorithm. They also examine the relationship between partitive and quotative models of division and explore what to do with remainders in various contexts.



## The Box Factory: Extending Multiplication with the Array



The focus of *The Box Factory* is the deepening and extending of students' understanding of multiplication, specifically the associative and commutative properties and their use with computation; systematic factoring; and the extension of students' understanding of two-dimensional rectangular arrays to three-dimensional arrays within rectangular prisms. As the unit progresses, formulas for area, surface area of rectangular prisms, and volume are generalized and the relationship between surface area and volume is explored within the context of a box factory, with students designing boxes to meet specific size and space requirements.