Grade Four Math

Patterns Cluster

Big Understandings of the Content Area

- Mathematics is the study of relationships and algebra represents those relationships symbolically.
- Information can be analyzed and interpreted by identifying patterns and relationships.

Content Standards **G. PATTERNS, RELATIONS, FUNCTIONS:** Students will understand that mathematics is the science of patterns, relationships, and functions. Relationships are central to mathematical understanding. A study of patterns often reveals regularity, indicating the presence of a mathematical relationship. Studying relationships allows students to make generalizations and predictions about phenomena and occurrences.	**H. ALGEBRA CONCEPTS:** Students will understand and apply algebraic concepts. Algebra and analytic thinking are fundamental tools for working in and thinking about mathematics. These tools provide ways to generalize and predict problem solutions when not all information is known. Taught within the context of mathematical and practical applications, the concept of functions is a unifying theme for algebraic concepts.	**K. MATHEMATICAL COMMUNICATION:** Students will reflect upon and clarify their understanding of mathematical ideas and relationships. Communication plays a key role in help in make important connections among physical, pictorial, graphic, symbolic, verbal, and mental representations of mathematical ideas. Providing individual and collaborative opportunities for discussions about issues, people, and the cultural implications of mathematics, reinforce student understanding of the connection between mathematics and out society.
Performance Indicators Students will be able to: • Use the patterns of numbers, geometry, and a variety of graphs to solve a problem. • Use variables and open sentences to express relationships.	• Use the concepts of variables and expressions • Solve linear equations using concrete, informal and formal methods which apply the order of operations • Analyze tables and graphs to identify properties and relationships in a practical context • Use graphs to represent two-variable equations • Demonstrate an understanding of inequalities and non-linear equations • Find solutions for unknown quantities in linear equations and in simple equations and inequalities	• **Use simple tables and graphs to communicate ideas and information in presentations in a concise and clear manner.**
Knowledge / Skills • Examine situations and representations that show change • Make graphs that show change over time • Relate changes and the total • Use curves to communicate changes • Make, describe, and interpret line graphs	• Understand the concepts of greater than, less than, equal and not equal to. • Predicting patterns found in numbers designs, and graphs. • Translate words into mathematical symbols and vice versa. • Be able to know and apply	• Communicates the thought process used to solve problems and calculations • Understands the vocabulary of math • Uses simple tables and graphs to communicate ideas and information in a concise, clear manner

• Translate words into mathematical symbols and vice versa. • Be able to know and apply math vocabulary in mathematical texts. • Be able to discern relevant information to solve math problems	math vocabulary in mathematical texts. • Be able to discern relevant information to solve math problems	• Translate words into mathematical symbols and vice versa. • Be able to know and apply math vocabulary in mathematical texts. • Be able to discern relevant information to solve math problems
Maine Grade Level Expectations • Use the patterns of numbers, geometry, and a variety of graphs to solve a problem. (M4G.4.1) • Use variables and open sentences to express relationships/ (M4G.4.2)	• Develop and evaluate simple formulas in problem-solving contexts (M4H.4.1) • Find replacements for variables that make simple number sentences true. (M4H.4.2)	Due to heavy time load for creating graphs and convincing arguments and the duplication of algebraic notation, there are no grade level expectations.
Assessments • Assessment Sourcebook, pp. 35-41 • State GLE Test	• Scott Foresman, practice master p.12 • State GLE Test	• **MAP Assessment – "Old Ruins"** • **MAP Assessment – "Shape Up!"**
Resources • Changes Over Time	• Scott Foresman, Chapter 1, pp. 32-33 (possible)	
Instructional Strategies for Cluster • Provide a variety of experiences involving patterns and relations. • Provide opportunities for students to share their understandings and representations. • Present many problem-solving situations involving patterns and relations (e.g., open sentences, formulas and equations). • Model efficient representation of patterns and relations. • Use guided reading to introduce new vocabulary and teach reading strategies. • Model the use of mathematical vocabulary • Give multiple graphic representations and demonstrations of specific mathematical language (e.g., multiplication, division) • Create real-world problems to facilitate the application of problem solving to students' lives.		