summer workshops

# Algebra
# It Really is Patterns!

Archived Information

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No Child LEFT BEHIND

# Research

***Through an emphasis on generalization, justification, and prediction, students can learn to use and appreciate algebraic expressions as general statements….Their absence is an obstacle to developing the "symbol sense" that constitutes the power of algebra." (Adding It Up)***

# Foundation Building

- **Basic understanding is developed by**
  - Describing objects
  - Expressing relationships
  - Making predictions
  - Solving problems

*TEKS*

# Building Understanding of

- **Number**
- **Operation**
- **Shape**
- **Space**

*TEKS*

# Patterns

- Identify, describe, extend
- Skip counting
- Odd & even
- Compare & order numbers
- Place value
- Fact families
- Number pairs

*TEKS*

# Mathematical Tools

- **Attribute blocks, base-ten blocks, books, calculators, color tiles, computers, counters, interlocking cubes, Cuisenaire rods, geoboards, geometric shapes, hundreds chart, number lines, pattern blocks, tangrams, etc.**

# Pattern or Function

- "Patterns are key factors in understanding mathematical concepts. The ability to create, recognize, and extend patterns is essential for making generalizations, seeing relationships, and understanding the order and logic of mathematics." (Marilyn Burns)

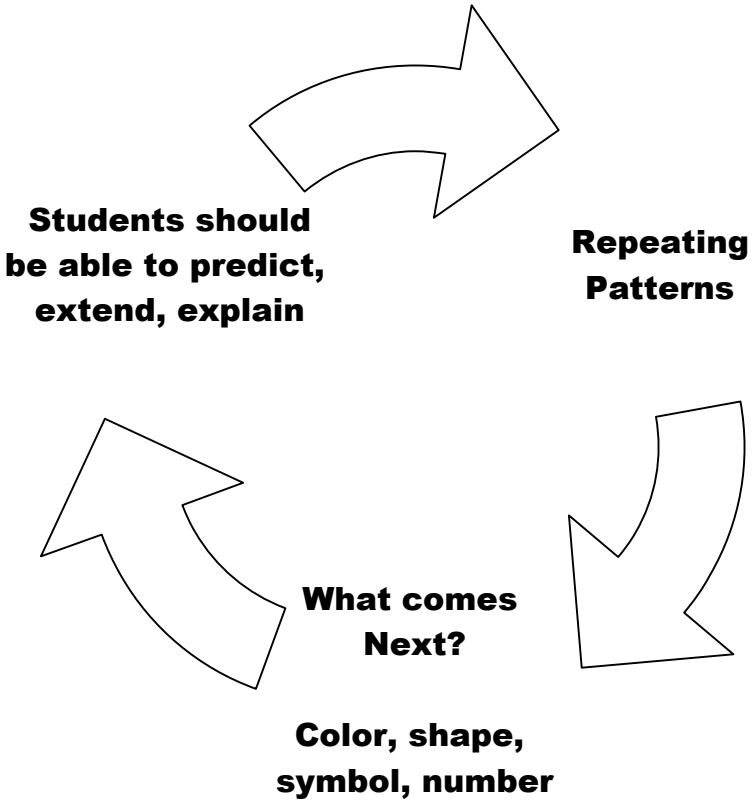
- "Functions evolve from the investigation of patterns and make it possible to predict results beyond the many other fields of study – including science and economics." (Marilyn Burns)

- "Algebra makes it possible to represent patterns and functions and study and understand them further." (Marilyn Burns)

# Representing Functions

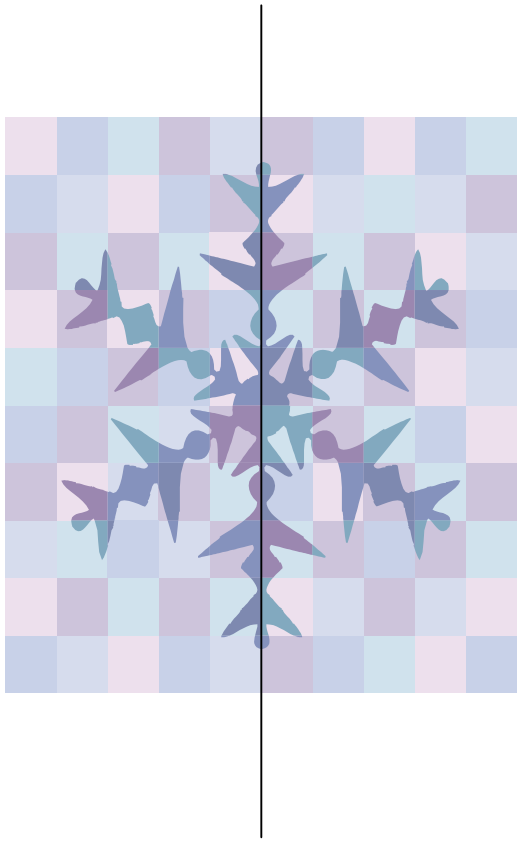
- Table
- Formula (Mathematical Sentence)
- Graph

# Learning Experience 1




- Clapping Patterns
- Pattern Train
- *Assessment*

# Learning Experience 2



- **Mirror Image**
- ***Assessment***

# Learning Experience 3

**Eric Carle's**
***Very Hungry Caterpillar***

**Eric Carle's**
***Rooster's Off to See the World***

*Assessment*

- *Using a new literature piece, have students explain the pattern using pictures, words, and/or numbers.*

# Learning Experience 4

**For a square with 1 unit on a side, you need one square. To build a square with 2 units on a side you need 4 squares. To build a square with 3 units on a side, you need 9 squares. *How many squares do you need to build a square with 12 units on a side?***

Table Formula Graph

# Learning Experience 5

**Use 10x10 grids (Hundreds Charts) to explore the growth of patterns.**

*Assessment: If I give you "x" number of color tiles can you prove that you do indeed have that many color tiles?*

# Fall extension

- Choose a learning experience presented today to present to your students.
- Collect student work.
- Post a few pieces of student work that shows the student's thinking.
- As a group, we will discuss ways to strengthen the student's understanding of the algebraic concepts.
- Keep a  portfolio of these few students work so that you may have a concrete set of student work to demonstrate growth of the concept.
- We will discuss and develop a rubric that addresses the student's understanding .