

## Connecting Literature and Math - Component of STEM Curriculum

### #8 - *Lots and Lots of Zebra Stripes* By Stephen R. Swinburne

#### Introduction

Stephen R. Swinburne, the author and photographer of the featured book, *Lots and Lots of Zebra Stripes*, states on the first page of the book that “Patterns are lines and shapes that repeat.” The focus of the book is on patterns found in nature. It is suggested that you read the Forward page before preparing to read the book to children so that you have a strong foundation for guiding discussion about the story and involving children in patterning activities.

Patterns are all around us. Nature provides patterns in flowers and in the coats of animals such as tigers and zebras. Patterns such as stripes, prints and plaids that repeat themselves can be found in the clothes we wear. Patterns can be created with concrete objects, in sounds and movement, and in colors, shapes and sizes. Understand that a pattern is only a pattern if repeated twice.

As you involve children in the activities found in this guide, help them understand that a pattern is the same thing repeated over and over again and guide them to look for patterns in nature. There will also be some patterning activities with concrete objects of different colors and shapes and with sounds and movement.

#### Teacher Notes about STEM

- Early Childhood Educators are now linking together science, technology, engineering, and math into what is called STEM curriculum.
- CLAM focuses on Math, one of the components of a STEM curriculum.
- CLAM was developed to give preschool children foundations of mathematical understanding through concrete experiences; a foundation for life-long learning and school success in math.

#### Arkansas Child Development and Early Learning Standards: Birth through 60 Months

**Domain Component: Algebraic Thinking**

**Learning Goal: MT2.1 Uses classification and patterning skills** (*patterning*)

**Learning Goals and Strands** will be identified for all activities in the guide.

## Materials to Collect and Make

- Locate items such as counting bears in different colors.
- Locate pieces of fabric with patterns such as stripes, prints, and plaids that repeat themselves.
- Collect rhythm sticks or 12" wooden dowel sticks.
- Unifix Cubes, colored beads, pegboards and colored pegs, colored wooden cubes (for Manipulative Center)
- Sea shells, starfish, and tree blocks (for Discovery Center)
- Pine cones and pine branches (for Discovery Center)
- Magnifying glasses (at least two)
- Provide animal stamps for creating patterns
- Create pattern cards. (See Attachment: [AB Pattern Cards](#))
- Make egg shakers and drums (Refer to the Better Beginnings website and locate Creative Adventures with Literature, Guide #4: *Just a Little Music* by Mercer Meyer, for information on how to make drums and egg shakers)
- Create a teacher-made book titled *Patterns We See in Nature*. Collect photos of zebras, giraffes, leopards, snakes, butterflies, birds, dragon flies, turtles, and spider webs for example. Copy or glue pictures onto cardstock. Laminate the pages or place them in plastic page protectors for durability. Consider using rings to put the pages together. Consider doing a Google search for pictures with small groups of children.

## Story Presentation

### Learning Goals:

**LD1.1 Understands and responds to language (in child's home language)** (*vocabulary and language comprehension*)

**EL1.1 Shows interest in literacy experiences** (*engagement in literacy experiences, variety of interests*)

**EL1.2 Engages in read-alouds and conversations about books and stories** (*engagement with books and stories*)

**EL3.1 Responds to features of books and print** (*book knowledge*)

**MT2.1 Uses classification and patterning skills** (*patterning*)

**Book:** *Lots and Lots of Zebra Stripes* by Stephen R. Swinburne, author and photographer

- First reading of *Lots and Lots of Zebra Stripes*
  - Be familiar with the book, *Lots and Lots of Zebra Stripes*, including the Forward page.
  - Show the cover, give title, author and photographer. (Explain that the author is the person who writes the words and the photographer is the person who takes the pictures/photos. Stephen R. Swinburne is both the author and the photographer.)
  - Invite children to look at the cover and describe what they see. Guide them to see lots and lots of zebra stripes and to notice that the stripes repeat themselves.
  - Explain to children that each zebra has a pattern of stripes which is lines that repeat; that patterns are lines and shapes that repeat.
  - Allow the children time to look at the photos as you read the story to them and to look for patterns in the photos.
  - Read the story so all children can see the photos in the book.
  - Follow up the reading by inviting children to recall some of the things from nature they saw in the photos. Ask them to choose their favorite thing from nature featured in the book and explain why they chose it.

**Teacher Note:** *The reading of this book will be most effective if read with small groups of children (from 4 to 6) so that each child can more clearly see the photos and recognize the patterns in them.*

### **Second Reading of *Lots and Lots of Zebra Stripes***

- Take items such as sea shells and starfish to the story reading area. Keep them out of the sight of the children until the end of the second reading.
- Show the cover and invite children to read the title with you as you run your fingers under each of the words.
- Invite children to comment on the different photos and to identify the patterns they see as you show each page and read the words.
- Name some of the items in the photos that may not be familiar to the children. If there are some items that you are unable to identify, involve children in discussing what they think the items are and to identify the patterns they see.
- Include information from the Forward that seems appropriate for your group. For example, when showing certain photos, share with them that certain patterns are unique; for example no two snowflakes are alike, no two zebras have the same pattern of stripes, and no two giraffes have the same pattern of dark patches.
- Point out the rings on the tree block and explain to children that the rings of a tree tell its age.
- Show children the sea shells and starfish and allow children to explore them and discuss the patterns they see.
- Explain to children that these and other items will be in the Discovery Center for them to explore.

#### **Teacher Note:**

- *All of the story presentations are teacher guided activities.*

### **Additional Language and Literacy Activities**

#### **Learning Goals:**

**LD1.1 Understands and responds to language (in child's home language)** (*vocabulary and language comprehension, follows directions*)

**EL1.1 Shows interest in literacy experiences** (*engagement in literacy experiences and variety of interests*)

**MT2.1 Uses classification and patterning skills** (*patterning*)

#### **Activity: Singing BINGO**

- Gather children in a group and discuss with them that they read with you the book, *Lots and Lots of Zebra Stripes*, and discovered patterns in nature.
- Explain that there are also patterns in sounds, for example in the song BINGO, and they will have an opportunity to participate in the patterning activity in the song.
- Introduce the song BINGO to the children if they are not familiar with it and sing it with them several times, inviting them to join in as they learn the words.
- Invite them to clap along with you as you clap the BINGO pattern as follows:  
Two steady claps as you sing BI, a slight pause, and three quick claps as you sing NGO. This pattern is repeated twice for a total of three times.

There was a farmer had a dog, And BINGO was his name, Oh! BI NGO, BI NGO, BI NGO, And BINGO WAS HIS NAME Oh!
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#### **Extension:**

- Consider using rhythm sticks, drums, or egg shakers to create the BINGO pattern.
- Involve children in additional patterning activities with drums, rhythm sticks or egg shakers. Play a pattern on a drum, for example, and invite children to play the same pattern with you. Remember that a pattern must be repeated twice.

#### **Teacher Notes:**

- *If you have the book, BINGO by Rosemary Wells, read it to the children.*
- *If you have a CD with the song, BINGO, use it to involve children in singing the song and participating in the patterning activity.*
- *This is a teacher guided activity.*

**Learning Goals:**

**LD1.1 Understands and responds to language (in child's home language)** (*vocabulary and language comprehension*)

**EL1.1 Shows interest in literacy experiences** (*engagement in literacy experiences, variety of interests*)

**MT2.1 Uses classification and patterning skills** (*patterning*)

**Activity: Patterns We See in Nature**

- Involve children in reviewing the teacher-made book, *Patterns We See in Nature*.
- Invite children to look at the photos and describe what they see, especially the patterns observed.

**Teacher Note:** *This activity can involve a group of children or one or two children in the Library Center.*

## Learning Environment

**Teacher Note:** *As children are involved in the learning centers listed here, they are engaged in activities that support the following Domains of Child Development and Early Learning:*

- *Physical Development and Health*
- *Emergent Literacy*
- *Mathematical Thinking*
- *Creativity and Aesthetics*

**Art Center**

- Add pattern cards and animal stamps
- Invite children to extend a pattern you have started on a pattern card or to create their own patterns
- Add paper strips of different colors and glue for creating a pattern with paper chains which can be used to decorate the center

**Dramatic Play Center**

- Add a plaid, striped or checked tablecloth
- Add dress-up clothes with a plaid, striped or checked pattern
- Add a centerpiece of flowers such as pansies that have an obvious pattern

**Discovery Center**

- Add at least 2 magnifying glasses
- Add items from nature such as:
  - Sea shells
  - Starfish
  - Pine cones
  - Pine branches
  - Tree block
- Add fabric pieces with patterns:
  - Stripes
  - Prints
  - Plaids

**Library**

- Add the following books:
  - Lots and Lots of Zebra Stripes*
  - BINGO*
  - Ten Little Rabbits*
- Add the teacher-made book, *Nature's Patterns*

### **Manipulative Center**

Begin with an understanding of these pattern basics:

- A pattern is only a pattern if it is repeated twice
- The easiest patterns are those that involve two variables such as color. For example, red, blue, red blue, red blue. This is the AB, AB, AB pattern
- More complex patterns are:
  - Red, blue, yellow, red blue, yellow, red blue, yellow. This is an ABC, ABC, ABC pattern
  - Red, red, blue, red, red, blue, red, red, blue. This is an AAB, AAB, AAB pattern.
  - Additional patterns such as AABB, AABB, AABB and ABB, ABB, ABB can be added. However, it is important that children begin with the easiest pattern, the AB, AB, AB pattern
- Provide opportunities for children extend a pattern you have started, then to create their own patterns using some of the following materials:
  - Plastic chips/poker chips
  - Stringing beads
  - Unifix Cubes
  - Pegboards and colored pegs
  - Counting bears of different colors
  - Pattern cards
  - Animal stampers
- Use the AB Pattern Cards (See Attachment: [AB Pattern Cards](#)) to involve children in extending a pattern as follows:
  - Explain to children that you are going to start a pattern and they will have an opportunity to complete it.
  - Place a green counting bear on the first green circle, a blue counting bear on the first blue circle, a green counting bear on the second green circle, a blue counting bear on the second blue circle, and a green counting bear on the third circle.
  - “Read” the pattern you are creating (green, blue, green blue).
  - Invite children to complete the pattern you have started.
  - Repeat this activity with the yellow/red pattern.
  - Invite children to create their own patterns using the Create AB Pattern card.

**Teacher Note:** *Wooden color cubes or beads can also be used for this activity.*

- Use colored stringing beads or pegboards and colored pegs to create AABB, AAB, AAB, and ABB, ABB, ABB patterns, following the same procedures that you used with the counting bears and the AB, AB, AB pattern.

**Teacher Note:** *Give children an opportunity to “read” the pattern they have created. This allows them an opportunity to fix any misplaced objects in the pattern.*

### **Music Center**

- Add rhythm sticks and drums to the center.
- Place egg shakers in music center.
- Observe children to see if they use the instruments to create patterns.

### **Nutrition Experience**

- Plan a fruit tasting experience with fruits such as orange halves and kiwi slices that have obvious patterns
- Invite children to look at the fruit and talk about the patterns they see.

**Teacher Note:** *Be aware of children’s allergies when planning nutrition experiences.*

### **Group Time**

- Involve children in movement patterns during group time.
- Begin with the AB pattern: clap, pat, clap, pat, clap, pat or clap, stomp, clap, stomp, clap, stomp.
- Add more complex patterns such as the ABC pattern: clap, pat, stomp, clap, pat, stomp, clap, pat, stomp.

### **Transition Activities**

- Ask children to replicate a movement pattern such as clap, snap as they transition to the next activity.

### **Family Connection**

- Designate a certain day as “Pattern Day” and invite families to dress their children in clothing they have that has a pattern such as stripes, plaids, or checks

### **Additional Books**

*BINGO* by Rosemary Wells

*Ten Little Rabbits* by Virginia Grossman and Sylvia Long

### **Assessment Ideas**

Refer to page 5 in this guide: **Learning Environment - Manipulatives** for an activity to assess the following:

**Domain: Mathematical Thinking**

**Domain Component: MT2. Algebraic Thinking**

**Learning Goal:**

**MT2.1 Uses classification and patterning skills** (*patterning*)

**To Assess:**

- Become involved with children in the Manipulative Center.
- Assess their competence as they use the patterning materials such as counting bears, wooden cubes or stringing beads. Can they replicate a pattern you create? Can they create a pattern? Can they describe the pattern they have created?