EMC-KCM
Learning Lab 2: Pattern

Reflecting on Session 1 Research Lesson

Let's Do the Math:

Group 1: Create 3 pattern types, using Pattern Blocks
- First use pattern blocks to establish a pattern—make this fairly obvious but do not use color—then create the same pattern using different materials or different modalities (e.g., clap, snap).
- Do a "tricky" pattern
- Use pattern blocks to fill in the template
- In your presentation talk about why you think "Pattern blocks" are called that.

Group 2: Detect different patterns in *The Mitten* by Jan Brett
- Look for the 3 patterns in the plot and setting: (1) language, (2) features of print, and (3) illustrations
- Present your findings to the whole group, pointing out examples

Group 3: Write a new *Pete the Cat* story
- Read the *Pete the Cat* story
- Prepare a group read-aloud of the story at and identify the linguistic patterns

Group 4 : Perform version of classic children's Movement song
- Choose a classic children's song (e.g., Old McDonald, Hokey-Pokey) but play with the lyrics to produce an original version
- Perform the song for the group and explain how music and movement involve patterns

Group 4: Act out *Napping House*
- Think about the pattern in the story: What is it? How is it different from the repeating patter?
- Act out the story and explain the pattern to the group

Let's Talk About
- Big Ideas and Skills in Patterns
- Developmental Trajectory for understanding patterns

What Does Learning Look Like
Video from EMC's Focus on the Child

Try and Apply
Research Lesson: The Napping House

Reflecting on Session 2: Patterns

Constructing Understanding: Pattern

Personal Note Sheet

Big Ideas about Patterns	My Notes, Comments & Examples
1. Patterns are sequences governed by a rule; they exist in the world and in mathematics • Some patterns are *repeating*—this is the most basic form of pattern; we need 3 repetitions or iterations to know that there is a rule. • Some patterns are *growing*—the increase in each pattern unit follows the same rule (+1, +2) 2. Identifying the rule of a pattern brings predictability and allows one to make generalizations. 3. The same pattern structure can be found in many different forms.	
Key Mathematical Terms about Patterns	
1. Pattern; pattern unit 2. Reiteration (Repetition) 3. Structure	
Key Skills Used in Working with Pattern (What children do and say as evidence of learning)	
1. Observing 2. Knowing the Rule (this follows a developmental trajectory) 3. Generalizing	

What Do Teaching and Learning for Understanding Look Like?

Video Clips note sheet

Observing Children: What do I see them saying and doing (include gestures) that is evidence they are developing understanding or are at a Not Yet stage.

Observing Teacher: What does the teacher say and do to help children develop understanding, include using math terms and open-ended questions, modeling, echoing children's statements to confirm, etc.

I am focusing on CHILDREN TEACHER

Research Lesson: PATTERN AND REGULARITY

WHO IS NAPPING?

Big Idea Focus: Patterns are sequences (repeating or growing) governed by a rule. Identifying a pattern brings predictability and allows one to make generalizations.

In this lesson, children:

- Create a visual representation of a growing pattern
- Discuss ideas about patterns

Materials

- o*The Napping House* by Audrey Wood
- oCharacter cards with felt, magnets, or tape on the back (see Blackline Masters, pp. 1—4)
- oFelt board, magnet board, or chart paper
- oUnifix cubes or inch cubes (optional)

1. Review *The Napping House* and Introduce Activity

Remind children of *The Napping House* story. Ask children, *What happens at the napping house?* and *Who lives in the napping house?*

Show children the character cards you have prepared and ask them to name each one. Tell children that you would like their help to figure out the pattern of the story.

2. Represent the Growing Pattern

Turn to the page where the illustration shows the granny sleeping on the bed. Have a child display the granny character card on the board or chart paper to represent who is napping. For example, say:

- *Who is napping on this page?*
- *Let's show who is napping using a picture.*

Continue to the next page with the granny and the child on the bed.

- *Who is napping now?*
- *Let's use two pictures now to show who is napping. Let's line them up.*

Help children align the character cards so that a simple pictograph results. (All granny cards are lined up, all child cards are lined up, and so on.) Stop at the illustration with the flea; there are now six characters piled on the bed.

Planning Tips

Make sure that children are familiar with *The Napping House* prior to this lesson.

Introduce this activity to **small groups**. Once children are familiar with the materials, they can use them independently during center time to retell the story and represent the growing pattern.

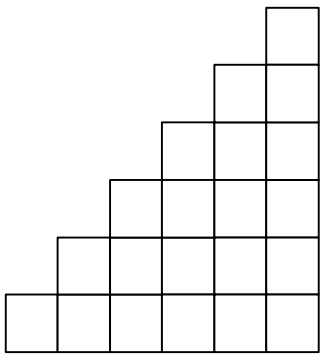
Facilitation Tip

In order to focus on the math of the lesson, keep the book review brief.

Do not re-read the book as you represent the growing pattern. Use the illustrations as a guide and have children tell who is napping on each page.

Math Note

Growing patterns change (increase or decrease) by a constant amount. The pattern of *The Napping House* is based on a constant change of plus one.



Research Lesson: PATTERN AND REGULARITY

3. Discuss the Growing Pattern

Draw children's attention to the shape of the pictograph they have constructed. Ask questions to help them describe the growing pattern. For example:

- *What do you notice? How can you describe the pictograph we made?*
- *Why is this a pattern? Have you seen a pattern like this anywhere else?*
- *If this pattern continued, what would happen next?*

Observation

Do children notice that the result looks like steps or a staircase?

Do any children use numbers to describe the pattern they see?

Can they explain what should come next in the pattern?

4. Close the Lesson

Tell children that you appreciate their help in finding the pattern in the story. Remind them that finding patterns in stories helps them know what comes next. It helps them make predictions.

Invite children to be on the lookout for other stories with a growing pattern. (See **Book Connections** for suggestions.)

Math Note

It is important to identify what repeats in a pattern. In the case of a growing pattern, it's a quantitative change that repeats. This constant change brings predictability and allows one to make generalizations, just as with a repeating AB pattern.

Book Connections

> *I Went Walking* by Sue Williams
> *There Was an Old Lady Who Swallowed a Fly* by Simms Taback
> *This is the House that Jack Built* by Simms Taback
> *Bringing the Rain to Kapiti Plain* by Verna Aardema
> *Rooster's Off to See the World* by Eric Carle
> Other cumulative tales

Teacher as Learner

Ask children to copy and extend the plus one growing pattern using unifix cubes or inch cubes.
For children who are ready, add numerals to label the pictograph or their cubes.

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Early Mathematics Collaborative

Activity Plan

Date _____ **Completed by:**
Teacher _____ † **Pre-K** † **KG** † **Teacher**
School _____ †

Related Book (title/author)	
NCTM Content Standards (check one or more) †Number and Operations †Algebra †Geometry †Measurement †Data Analysis and Probability	**NCTM Process Standards** (check one or more) †Problem Solving †Reasoning and Proof †Communication †Connections †Representation
What **Big Idea** will children explore?	
What **Learning Standard/Objective** will be addressed?	
Format Used †Whole group †Small group †Centers/Free choice	**Target Age** †Pre-K †Kindergarten
Materials:	
Procedure:	**Key Words**:
Questions to **assess understanding**:	
Ideas to provide **support** or **challenge**:	

Mathematics All Around: Patterns

Big Idea	Developmental Trajectory		SKIll
Patterns are sequences governed by a rule; they exist both in the world and in mathematics **Some patterns are repeating—this is the most basic form of pattern; we need 3 repetitions or iterations to know that there is a rule.** **Some patterns are growing—the increase in each pattern unit follows the same rule (+1, +2…**	**Recognizing** Detects regularity **–done from infancy intuitively by 3-4** applies the word "pattern" to simple repeating sequences **Copying--** Duplicates simple patterns alongside a model pattern **Completing** Fills in missing element of pattern	*Do you see a pattern here? Do you notice anything that repeats?* *Can you copy this pattern? Does yours follow the same rule?* *How can you fix this pattern? How do you know what's missing*	*Observation* *Know the Rule (can be at different levels-)*
Identifying the rule of a pattern brings predictability and allows one to make generalizations.	**Continuing a pattern** **Describing a pattern** Identifies the rule of a pattern by naming the smallest unit that repeats	*What comes next? How would this pattern keep going?* *How could we name this pattern? What is its rule??*	*Generalizing*
The same pattern structure can be found in many different forms.	**Translating**	*Can you make this pattern another way? How are they the same?*	

Observing Your Children to Work on Pattern

1. Where are children **finding** patterns? (On clothes, in pictures, on the furniture or fixtures, on the playground …)
2. Are children **copying** patterns? How? (With identical materials, with similar materials, with different materials)
3. Are children **extending** patterns? How? (With identical materials, with similar materials, with different materials)
4. Are children **creating** patterns? How?
5. What **types** of patterns are children finding, copying, extending or creating? (Simple repeating, more complex repeating, growing)
6. What sorts of **materials** are children using in their patterning? (Blocks or other building toys, manipulatives or table toys, art materials, drawing or writing tools …)
7. In what **context** is patterning happening? (Teacher-led small group, independent center, free play, transition …)

Some Pattern Activities You Can Try

1. At the snack table or during transitions, talk about patterns. (*"The stripes on Chris's shirt are red, blue, red, blue, red, blue. Can anyone find other patterns like that?"*)
2. Ask children to copy a pattern in a different modality. (*"We found an AB pattern on Chris's shirt. Can you make an AB pattern with blocks? Can you make an AB pattern with sounds?*)
3. Play "What's my pattern?" (Make a line of children that follows a pattern, such as long sleeves, short sleeves, long sleeves, short sleeves. Ask the children who could be next.)

Words and Phrases You Might Use When Talking With Children About Patterns

1. Do you see a pattern? Tell me about it.
2. What happens over and over again with these beads? [repeating pattern]
3. What is changing? How does it change? Do you know what the next change will be? [growing pattern]
4. How could we make this pattern with different materials?
5. How could we remember this pattern? Could we make a picture to help us? Could we use letters or numbers?
6. What comes next? How do you know?

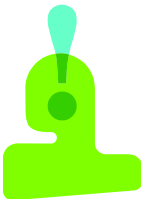
Books to Inspire Children's Mathematical Thinking About Sets, Pattern & Structure (Algebra)

- Aardema, V. *Bringing the Rain to Kapiti Plain.*
- Carle, E. *Rooster's Off to See the World*.
- Carle, E. *Today is Monday.*
- Franco, B. *Sorting All Sorts of Socks.*
- Harris, T. *Pattern Bugs. Pattern Fish*
- Martin, Jr. and Eric Carle: any book in the *Brown Bear, Brown Bear, What Do You See series*
- Murphy, S.J. *A Pair of Socks.* HarperTrophy, 1996.
- Reid, M.S. *The Button Box*. Dutton, 1990.
- Swinburne, S.R. *Lots and Lots of Zebra Stripes: Patterns in Nature*.
- Williams, S. *I Went Walking*. [También en español: *Salí de Paseo*.]
- Wood, A. & D. *The Napping House* [También en español: *La Casa Adormecida*]
- Wood, A. & D. *Silly Sally*.
- Any version of *I Know an Old Lady Who Swallowed a Fly*

EMC-KCM Math Learning Lab 2

Reflection: Session 2

Name: _____



1. What was said or done today that surprised you? Delighted you? Made you wonder?

2. What might you take back into your classroom practice?

3. Is there anything you would like to hear more about or have clarified?