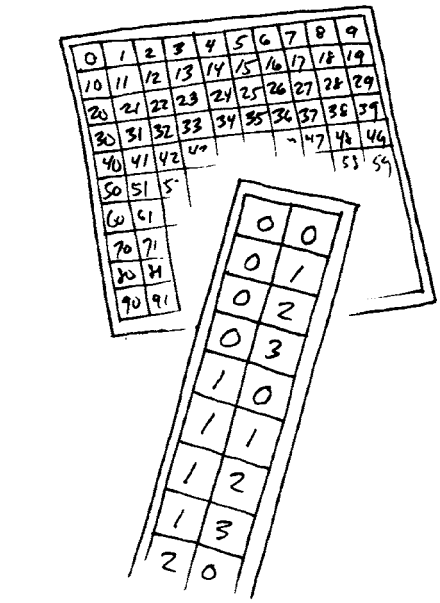
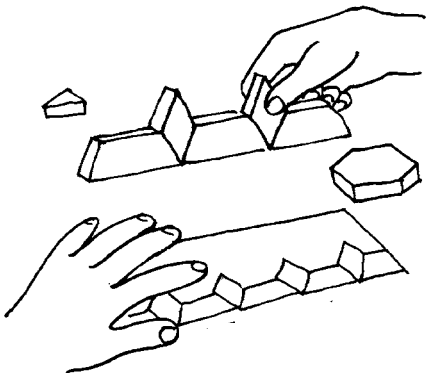
CHAPTER 9:

PATTERN

One of the main objectives of *Mathematics Their Way* is to help children develop an understanding of pattern. By working with patterns, children begin to make sense of their world. Once children begin to understand and trust the notion of pattern, they begin to see patterns in other areas: number sentences, reading (e.g., word families and spelling), art and music; in short, the world around them. The following quotes emphasize the importance of pattern.

Mary Baratta-Lorton wrote the following:





> Looking for patterns trains the mind to search out and discover the similarities that bind seemingly unrelated information together. This encourages us to see the relationship between the parts and the whole. It develops a child's ability to see patterns, facilitates the transfer of knowledge, and the belief that events make sense and can be logically explained.
>
> A child who expects things to "make sense" looks for the sense of things and from this sense develops understanding. A child who does not see patterns often does not expect things to make sense and sees all events as discrete, separate, and unrelated. A child whose mind has not been trained to look for patterns would see the task of writing the numbers from 1 to 100, for example, as 100 steps. He or she frequently gets mixed up and rarely is able to recognize or correct his or her mistakes. This child has a hundred numbers to learn and never really knows whether or not the assignment is being completed correctly.
>
> A child who looks for patterns compacts the world into smaller units by focusing on the relationship that is the essence of a pattern. This child sees the 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 series repeated over and over again in the task of writing the numbers from 10 to 100 and knows at each step if the work is being done correctly. Seeing patterns is a self-checking device based on the knowledge that you can trust the world to behave rationally and orderly. It makes sense!
>
> Children who look for patterns become more persistent and flexible problem solvers. They expect a problem to be solvable. When the first solution is not correct, they keep looking until they find the solution that works. Their calmness is based on the knowledge that there is an answer to be found.
>
> Children who don't see patterns and don't expect the world to make sense give up in frustration at the first difficulty. Problems where you "learn the trick" and get rewarded for the right answer like 4 + 3 = 7 encourages the idea that there is one solution to problems. "How many different ways can you arrange seven tiles?" This approach encourages creativity, flexibility, and allows multiple solutions to a problem.

The *California Mathematics Framework* has consistently emphasized the importance of understanding patterns in mathematics:

> *Pattern (1975, p. 14):* The study of pattern is valuable to the pupil in the study of number systems (their operations and properties). The study of pattern assists the learner in the discovery and development of generalizations, providing not only practice in using the basic facts but experience in working with large numbers. Mathematics has been described as the study of patterns. Important applications of mathematics are a result of the search for trends or patterns among data derived from experiments or from solutions of problems. The discovery of new ideas as through the study of numerical relationships that display unusual patterns should be a regular part of the school mathematics program.
>
> *Pattern in Mathematics (1982, p. 28):* The close connection between the ability to recognize patterns and the ability to think logically should be utilized at all levels; it will provide invaluable information to the pupil in the study of the number system and operations. Pattern exists in most life situations, in nature, in music, and so forth. In mathematics the pupil is taught to utilize not only these patterns but also gain an understanding and appreciation of the beauty, logic and order of the world.
>
> *Patterns and Functions (1985, p. 10):* The study of mathematical patterns and functions enables students to organize and understand most observations of the world around them. It involves discovery of patterns and relations, identification and use of functions, and representation of relations and functions in graphs, mathematical sentences or formulas, diagrams, and tables.
>
> The search for patterns begins with concrete activities that focus on concepts such as symmetry, similarities, congruence, repetition, ordering, and equality. As students progress, they should learn more formal representations of those concepts and develop the ability to express the concepts in a variety of ways. Recognizing and working with numerical, geometric and algebraic patterns will help students develop skill in inductive reasoning to devise strategies for solving problems.

How to Begin

Pattern is the foundation upon which mathematics is built. Focusing on the notion of pattern enables children to see connections between all mathematics areas — arithmetic, geometry, probability and statistics…. One goal of Math Their Way activities is to surround children with a variety of pattern experiences which encourage them to become flexible thinkers and problem solvers. However, one cannot assume that children who experience the beginning pattern activities will automatically apply the knowledge to other mathematical situations. To assure that pattern skills transfer, it must be the underlying theme while learning mathematics — such as searching for patterns while counting; arranging manipulatives into patterns of five; or organizing data into matrices, tables and graphs and then making predictions and drawing conclusions.

WHOLE GROUP PATTERN ACTIVITIES

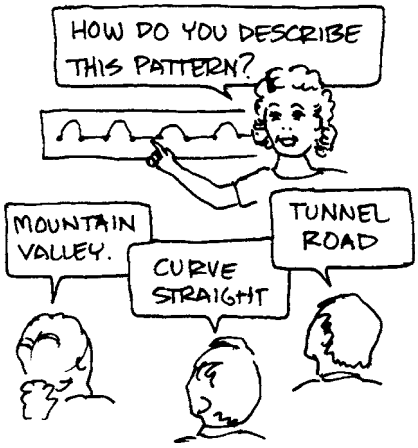
Refer to *Mathematics Their Way*, pp. 21-28 for more detailed descriptions of these activities.

Rhythmic Clapping

No materials needed

Procedure: Begin with simple patterns (A-B-A-B…, A-A-B-B…, A-A-B…). Interpret a single pattern eight or nine different ways in a single session. Use words and body motions to describe a single pattern. ("Head-head-shoulder-shoulder, stand-stand-sit-sit, clap, clap, snap, snap...) This stretches children's imagination and vocabulary. It is helpful for the children to verbalize the pattern as they act it out. Sometimes it is important to accept whatever actions and words the children suggest. Do not expect proficiency from every child.

Once children are familiar with the routine, this activity can happen anywhere — while the class lines up for lunch, after recess, on the bus while traveling on a field trip. If rhythmic patterns are a regular activity throughout the year, all children will catch on.



Dot Chart

Materials: class-size dot chart (see MTW, p. 360); water-soluble pen; damp rag

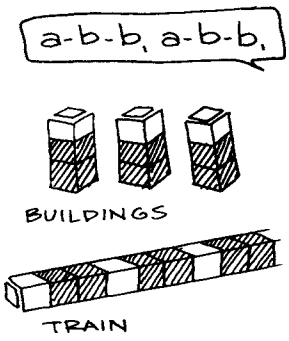
Procedure: Choose a simple pattern for the first few experiences. Isolate the pieces of the pattern. Use words and body motions to describe the pattern. Consult Mathematics Their Way, page 53 for dot chart pattern suggestions.

Translating Pattern with Manipulatives

(see MTW, p. 27)

Materials: dot chart; water-soluble pen; damp rag; manipulative material (e.g., Unifix cubes, pattern blocks, junk, tiles, toothpicks...)

Procedure: Begin with one material. Later introduce other types of manipulatives. (Unifix cubes will be used in the example lesson.) Introduce the dot pattern as before. Ask the children how they could make the dot chart pattern with Unifix cubes. Let's say they choose color to distinguish the pattern. Each pattern part could be a different color. For instance, if the pattern is a-b-b, the children would choose a color for "a", perhaps red, and a color for "b", let's say green. The children could make pattern buildings. They can quickly check to be sure the pattern buildings are the same by standing them up. This helps the children correct the pattern if they've built them in a different color order (e.g., green, red, red instead of red, green, green). Snap the pattern buildings together into a long pattern train. Check the pattern by snapping and clapping.



Ask the children if they can think of a different way to make the dot pattern with Unifix cubes. (Perhaps the new interpretation involves the position or quantity of Unifix cubes.) Reproduce the suggested pattern with the cubes. When the children demonstrate an understanding of how to translate patterns with manipulatives, ask them to work together and explore other ways to reproduce the dot pattern.

Additional Beginning Group Pattern Activities:

Mathematics Their Way

More Challenging Group Pattern Activities:

Mathematics Their Way

Summary Newsletter

PATTERN STATION ACTIVITIES

Refer to *Mathematics Their Way*, pp. 32-40 and the suggested activities list on the Pattern Station Sheets, NL, pp. 9.5-9.6.

Introduce the pattern stations after the class has experienced a variety of whole class and small group activities. Children often begin making patterns while free exploring at the stations. This is a sign for the teacher that the children are ready for the focus of the stations to shift from free exploration to pattern.

Pattern Stations Not Found in Mathematics Their Way

Mirrors, Letters and Numerals

Materials: numerals written on individual cards (NL Blackine #5-7); capital and lower case letters written on individual cards; single-sided and hinged mylar mirrors

Procedure: The children choose a letter and numeral to explore designs and patterns with the mirror(s). Ask the children if they can make the letter (numeral) in the mirror. Then ask the children if they can make different letters (numerals) in the mirror than the one they are using.

Extensions: see NL, p. 9.9

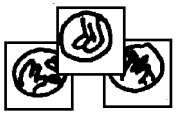
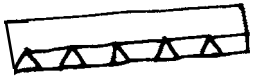
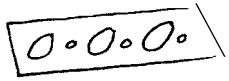
Mirrors and Shapes

Materials: pattern blocks, cards with shapes written on them, and/or attribute blocks; single-sided and hinged mylar mirrors

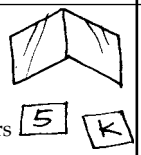
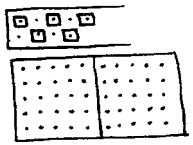
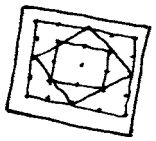
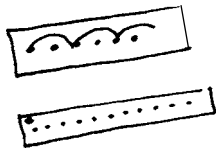
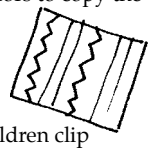
Procedure: The children use manipulatives (e.g., pattern blocks, tiles, Unifix cubes…) to explore designs and patterns with mirrors. Ask the children if they can make the same shape in the mirror. Then ask the children if they can make any different shapes in the mirror other than the one they are using.

Extensions: see NL, pp. 9.7-9.9; 9.9-9.11

PATTERN STATIONS

	UNIFIX CUBE PATTERNS	PATTERN BLOCK WALLS	TILE PATTERNS	JUNK PATTERN CARDS	PATTERN BLOCK DESIGNS
Page #'s	MTW, pp. 33-34, 364; NL, p. 9.3	MTW, p. 38-39	MTW, pp. 33, 364	MTW, p. 40	NL, pp. 9.4
Activity Description	***Materials needed:*** • Individual Snap/Clap Cards (NL Blackline #15) • Snap/ Clap Cards (MTW, p. 364) • Unifix cubes   *Procedure:* The children clap and snap the pattern they select. Then they translate the pattern by reproducing and extending it with Unifix cubes. The children can make their own patterns with the individual cards.	***Materials needed:*** • Pattern Block Wall Cards (NL, p. 9.13) • container of "stands" • pattern blocks  *Note:* It's helpful if the children have a sense of how long the pattern should be. You might ask the children to build a pattern block wall as long as their arm or leg. *Procedure:* The children set up a pattern block wall card. They snap and clap the pattern on the card. Next, they build and extend the wall pattern with pattern blocks.	***Materials needed:*** • Individual Snap/Clap Cards (NL Blackline #15) • Snap/ Clap Cards (MTW, p. 364) • Ceramic Tiles  *Procedure:* The children clap and snap the pattern they select. Then they translate the pattern by reproducing it with tiles.	***Materials needed:*** • Junk Pattern Cards with the appropriate boxes of junk (NL, p. 9.14) • Individual Snap /Clap Cards (NL Blackline # 15)  *Note:* The children can use Snap / Clap Cards with any type of junk to create a pattern that repeats at least three times in place of junk pattern cards. *Procedure:* Using the junk boxes that go with the sets of junk cards, the children build patterns. Then they extend the pattern as far as they can with the materials available.	***Materials needed:*** • pattern blocks • single and hinged mylar mirrors   *Procedure:* The children make patterns with either a single or hinged mirror and pattern blocks. Extensions - Reproducing a Pattern: The mirror-pattern block patterns can be reproduced. The children begin by placing a pattern block against the mirror(s). Then they look in the mirror and copy what they see with new pattern blocks beside the original pattern. This continues step-by-step until the pattern is completed.
*** Recording materials are placed in the tubbing stations only after the children have had sufficient time to work at the concrete (concept) level with the manipulatives. Depending on the class's experience and the material in the tubbing station, the time allowed may span from several weeks to several months. Recording should be introduced as an optional activity.**					
*Recording Description	***Additional materials needed:***	***Additional materials needed:*** • 3" x 9" blank tagboard • pattern block shapes or templates • glue stick *Recording:* The children create new walls with the patterns blocks. Then they record the new pattern on a blank card with paper pattern block shapes. The children can paste photocopied pictures of themselves on the back of the cards and place them in the tubbing station for others to try.	***Additional materials needed:*** • 3" x 9" white construction paper • tiles shapes or template • glue stick *Recording:* The children can make tile pattern cards. First they create tile patterns with the ceramic tiles. Then they record the new pattern on a blank card with tile shapes. The children can paste photocopied pictures of themselves on the back of the cards and place them in the tubbing station for others to try.	***Additional materials needed:*** • 3" x 9" white construction paper • crayons and/or markers *Recording:* The children create new junk patterns with the junk. Then they record the new pattern on a blank card with markers. The children can paste photocopied pictures of themselves on the back of the cards and place them in the tubbing station for others to try.	***Additional materials needed:*** • large paper to record design • paste / wet rags • paper pattern block shapes *Recording:* The children begin a pattern and copy it step-by-step by pasting paper shapes onto a large piece of paper.

PATTERN STATIONS

	MIRRORS	GEOBOARD-UNIFIX PATTERNS	GEOBOARD SEQUENCE CARDS	DOT PATTERNS	MATERIAL SCRAPS
Page #'s	NL. p. 9.4	MTW, p. 36	MTW, pp. 37, 361	MTW, pp. 35, 360	MTW, p. 257
Activity Description	***Materials needed:*** • six hinged mirrors • six single mirrors • 3"to 6" squares of tagboard with letters and/or numerals written on them. (see NL Blackline #5-7)  *Procedure:* Ask the children to see what kind of designs and patterns they can make by moving the mirror(s) on the letters / numerals. Extensions: Ask the children to try to make a letter or number in the mirror than the one they are using. Ask the children to search for symmetrical letter and number patterns using mirrors. (see NL, p. 9.4 for a detailed explanation)	***Materials needed:*** • 10 geoboards • Unifix cubes separated by color • Geoboard-Unifix Patterns (NL, p. 9.15)  *Procedure:* The children place two geoboards side-by-side. Above their geoboards they place a Unifix-Pattern Card. They copy and continue to extend the patterns on the geoboard.	***Materials needed:*** • Geoboard Sequence Cards (MTW, p. 361) • 5 geoboards • geobands  *Procedure:* The children copy the partial designs onto their geoboards and then they extend the patterns on their own, predicting the completed pattern.	***Materials needed:*** • Dot Pattern Cards (MTW, p. 360) • acetate dot strips (MTW, p. 35) • wet rags • water color marking pens  *Procedure:* The children choose a dot pattern card and clap/snap the pattern on the card. Then they place the card above a dot strip and copy and extend the pattern to the end of the dot strip.	***Materials needed:*** • 10-15 (6") squares of fabric or wallpaper with simple stripes, plaid, and print designs • 6" x 12" paper • clothespins • crayons or colored pencils in the appropriate colors to copy the patterns.  *Procedure:* The children clip swatches of material to pieces of 6" x 12" white paper with clothespins. They extend the cloth patterns with crayons or colored pencils.

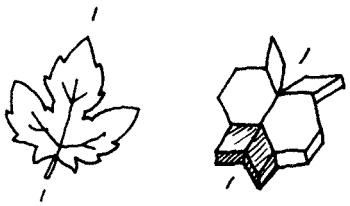
*** Recording materials are placed in the tubbing stations only after the children have had sufficient time to work at the concrete (concept) level with the manipulatives. Depending on the class's experience and the material in the tubbing station, the time allowed may span from several weeks to several months. Recording should be introduced as an optional activity.**

*Recording Description	***Additional materials needed*:** • a class chart • an individual chart *Recording:* The children could keep track of the letters (numerals) that can be made into other letters (numerals) on a chart — either a class chart or an individual chart. The children could keep track of the letters (numerals) that are symmetrical on a chart — either a class chart or an individual chart. (See NL, p. 9.9)	***Additional materials needed:*** • blank Geoboard paper cut in half (BL #17) • markers and/or crayons *Recording:* Children create geoboard-Unifix patterns with the the geoboards and Unifix cubes. Then they record the new pattern on half sheets of blank geoboard paper and mount it onto tagboard. The children can paste photocopied pictures of themselves on the back of the cards and place them in the tubbing station for others to try.	***Additional materials needed:*** • blank geoboard paper (MTW, BL #17) • markers and/or crayons • tagboard *Recording:* Children create a new geoboard-seqence with geoboards on a geoboard. Then they record the new pattern on a blank geoboard paper with markers and mount it onto tagboard. The children can paste photocopied pictures of themselves on the back of the cards and place them in the tubbing station for others to try.	***Additional materials needed:*** • paper dot strips (NL Blacklines #48-49) • markers and/or pencils *Recording:* The children make recordings on the paper dot strips. They can extend the pattern as long as they like by taping the strips. Some children like to make a different pattern on each strip and staple them into a dot pattern book. Extension: Some children enjoy making new patterns for the class to use. (see MTW, p. 35 for details)	***Additional materials needed:***

Pattern Extension Activities

SYMMETRY ACTIVITIES

There are three different forms of symmetry: bilateral, rotational and translational (repetitive). Many of these forms can be found among man-made and natural shapes in the children's environment. Encourage the children to search for natural forms of symmetry.

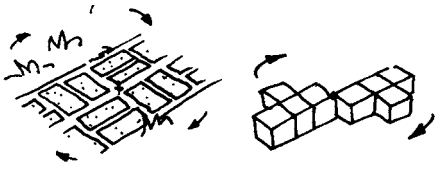


Bilateral Symmetry

A pattern or object has bilateral symmetry when it can be divided into two identical halves by a line. Some objects and patterns are bilaterally symmetrical from several different positions.

Rotational Symmetry

A pattern or object has rotational symmetry when it can be reproduced by rotating the pattern about an axis through the center of the pattern.



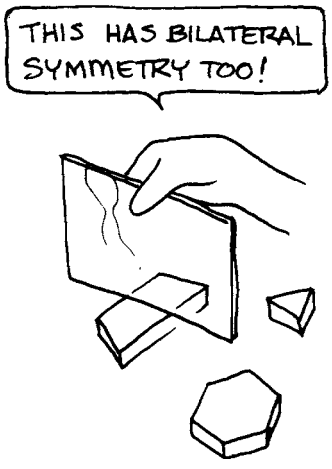
Translational Symmetry

A pattern or object possesses translational symmetry when it repeats itself over and over. It can be infinitely extended from the starting or ending point. *Mathematics Their Way* provides many activities in which the translational patterns are experienced. (see MTW, Chapter Two)

Mirrors and Shapes

Materials: pattern blocks, cards with shapes written on them and/or attribute blocks; single-sided mylar mirrors

Objective: The children use mirrors to find shapes that possess symmetry.

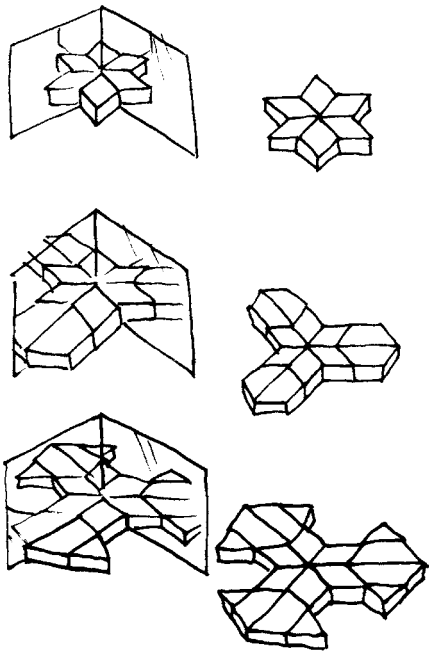


Bilateral Procedure: The child takes a shape and places a mirror upright on either a horizontal, vertical, or diagonal axis to see whether the shape is symmetrical. A shape could be symmetrical on more than one axis.

Rotational Procedure: The child takes two identical shapes and places one on top of the other. He or she then rotates the top shape to see if the shape can be reproduced in a new position.

Sample Questions:
"Which shapes have a vertical axis (horizontal axis/diagonal axis) of symmetry?
"Which shapes possess bilateral symmetry on more than one axis?"
"Which shapes are rotational? How many different rotations does each shape have?"

Extension: Make a graph to organize the information. (see NL, p. 9.9)



Pattern Blocks and Mirrors

Materials: pattern blocks sorted by color; single-sided and hinged mylar mirrors

Bilateral Procedure: The child builds a small pattern block design. He or she places a single-sided mirror against a side or corner of the design. The child then builds a new pattern block design which includes both the original design and the reflected design.

Rotational Procedure: The child places a pattern block against the two sides of the hinged mirrors. He or she looks at the new pattern in the mirror and builds this pattern off to the side. The child then adds another pattern block shape to the mirror pattern. He or she builds the additional pattern onto the large pattern with pattern blocks. The child continues building the surrounding pattern following this procedure.

Sample Questions:

"How many different ways is the surrounding pattern symmetrical?"

"In how many different positions is it rotationally symmetrical?" (The child places a hinged mirror over a segment of the large surrounding pattern to find how many segments of the design it takes to reproduce the whole surrounding pattern.)

"How many different axes are in the pattern?"
(The child places a single-sided mirror on the large surrounding pattern to find how many different axes of symmetry are in the surrounding pattern.)

Note: Some shapes can form symmetrical patterns by touching two corners of a pattern block to the mirror sides; one side of a pattern block to one side of the mirror; or one pattern block corner to the hinged position of the mirrors. The mirrors may have to be moved back and forth until a symmetrical pattern appears.

Recording Pattern Block Symmetry Patterns

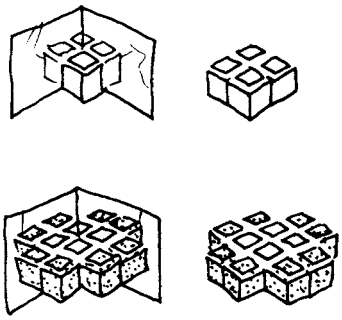
Materials needed for each group: pattern blocks separated by color; pattern block templates; paper pattern block shapes; glue sticks; large black paper; large white paper (If necessary, tape four pieces of 8-1/2" x 11" black or white paper together to make a large recording sheet.)

Procedure: Some children enjoy making a recording of their pattern block designs. They record the pattern block surrounding patterns either by drawing the shapes in position on a large white paper with a pattern block template or gluing pre-cut pattern block shapes onto a large piece of black paper.

This procedure may take severals days if the design is large. The child should build the design in a classroom area where the design won't be disturbed.

Unifix Cubes and Mirrors

Materials: Unifix cubes; mirrors



Procedure: The child places one Unifix cube (nubside-up) in the corner of the hinged mirrors so two sides touch a side of the mirrors. He or she builds the pattern in the mirror off to the side. The child chooses another color Unifix cube and places two of them on each side of the first cube to form a surrounding pattern. He or she adds the same color cube to the larger surrounding pattern off to the side.

The child chooses a different color Unifix cube and surrounds the second pattern. He or she could surround all the cubes or just the second color. The child should establish the rules to use before beginning the design.

The child continues to extend the Unifix cubes design following this procedure.

Mirrors, Letters and Numerals

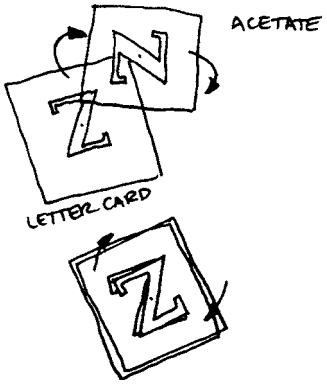
Materials: numerals written on individual cards (NL, Blackline, #5-7); capital and lower case letters written on individual cards; single-sided mylar mirrors; numerals, acetate capital letters and lower case letters the same size as the symbols on the cards with the axis indicated with a dot (see Rotational Symmetry NL, p. 9.7)

Objective: The children use mirrors to find numerals and letters that possess bilateral and/or rotational symmetry.

Bilateral Procedure: The child takes a card and places a mirror upright on either a horizontal, vertical, or diagonal axis to check if the letter or numeral is symmetrical. A letter or numeral could be symmetrical on more than one axis.

Bilateral Symmetry Example

Rotational Symmetry Example



Rotational Procedure: The child chooses a letter and its acetate counterpart. He or she places the acetate letter exactly on top of the letter card. The child then rotates the acetate letter about its axis (through the center) to see if he or she can reproduce the letter in a new position.

Sample Questions:

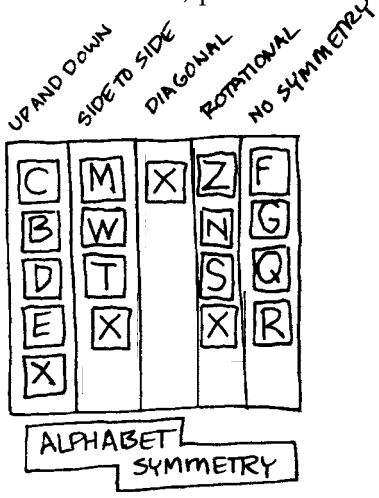
"Which numerals (capital /lower case letters) have a vertical axis (horizontal axis/diagonal axis) of symmetry?

"Which numerals (letters) possess bilateral symmetry on more than one axis?""Which numerals (capital/lower case letters) possess rotational symmetry?"

"Are there any numerals (letters) that possess both rotational and bilateral symmetry?"

"Are there any numerals (letters) that are not symmetrical?"

Extension: Make a graph to organize the number (letter) symmetry information. See illustration.



SURROUNDING PATTERNS

Paper Squares

Materials: 3" square colored construction paper (20-30 black for the base design and 20-30 each of a variety of colors)

Procedure: Choose a base pattern (see: Sample Base Designs, NL Blackline #16) to model to a small group of children. It's best to start with a symmetrical base design. Ask a child to build the base with the black construction pieces.

Ask the class to decide upon the rule(s) to surround the pattern (e.g., only one side of the new color being placed can touch the old color). Ask several children to surround the base design following the predetermined rule(s).

Ask the class to choose a new color to surround the old pattern. Continue to make as many surroundings as possible in the time remaining. Some designs become predictable quite fast, others take awhile.

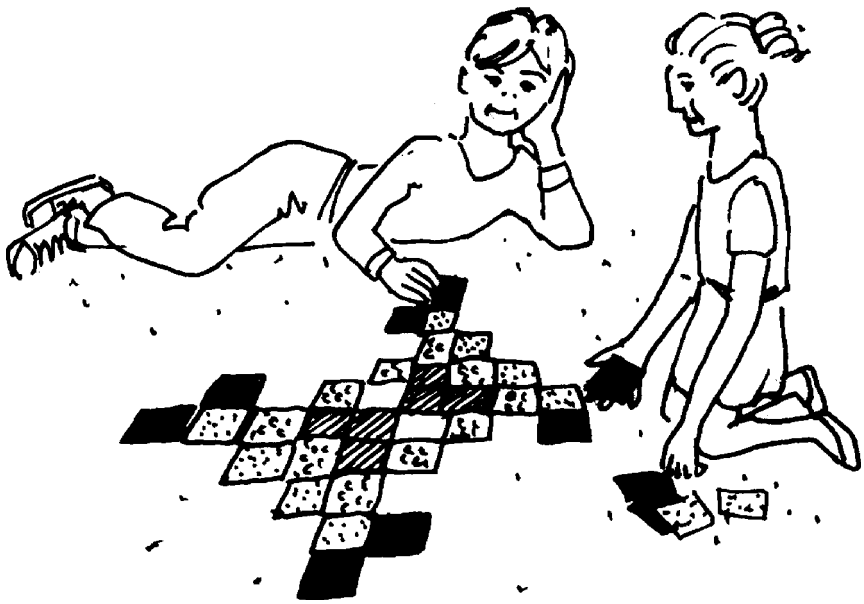
Sample questions:

"Is this design symmetrical?

"If the surrounding pattern is symmetrical, how many different symmetrical axes does it have?"

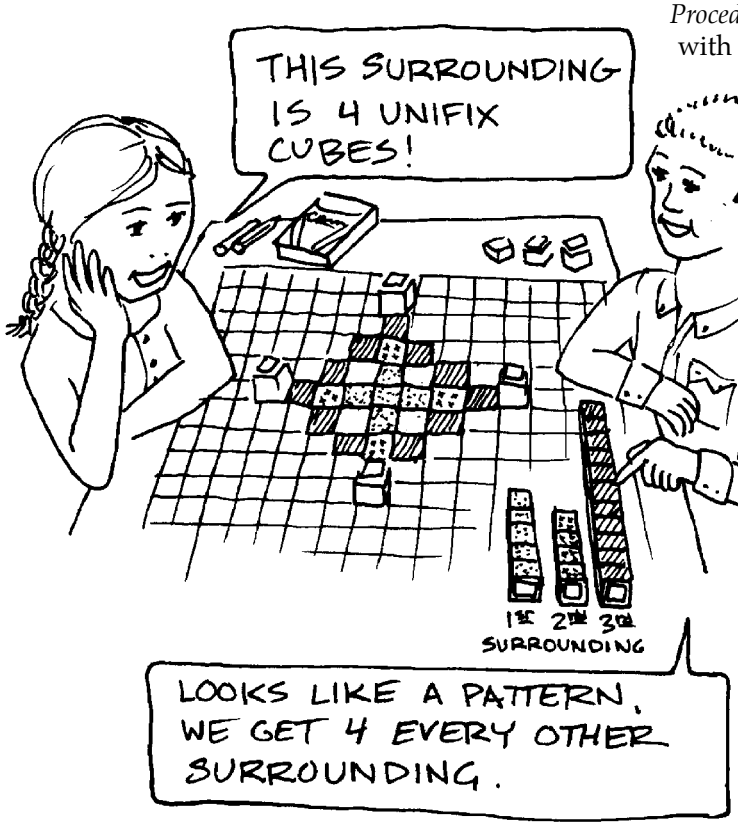
"Does the pattern possess rotational symmetry?" If so, how many different rotations are in the design?"

Extension: Split the class into groups. Ask them to repeat the process with a new base design. Children should have an opportunity to repeat this activity several times with different base designs before building surrounding patterns with other manipulative materials.



Unifix Cubes or Colored Wooden Cubes

Materials needed for each group: Unifix cubes or colored cubes separated by color; crayons or markers

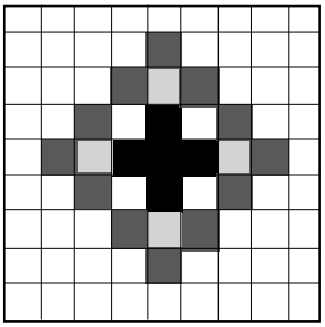


Procedure: Ask the group to arrange a base design with the black cubes and decide on the rule(s) for the surrounding pattern. The group then chooses a different color cube and places it in position around the black cube base. They continue by choosing a different cube color and surrounding the second pattern. Encourage the children to make several more surrounding patterns.

Extension: (This extension is best performed with Unifix cubes.) After the surrounding pattern is completed, ask the children to stack together the Unifix cubes from each surrounding step together. Then ask them to lay the cubes on the table or floor in order, from the base to the last surrounding. Ask the children to count the number of Unifix cubes at each surrounding. Ask them if a pattern is developing? If so, can they predict how many cubes it would take to make the next surrounding?

Recording Surrounding Patterns

Materials needed for each group: 1 large piece of graph paper (or 4 copies of MTW blackline #5. Tape the sheets together to make one); Unifix cubes or colored cubes sorted by color; crayons or markers; small graphing paper to record the sequence



After a group of children have built a surrounding pattern, ask them to remove the cubes one at a time and make a colored dot with a crayon to indicate the color of the cube. Once all the cubes are removed, ask them to finish the recording by coloring in the squares.

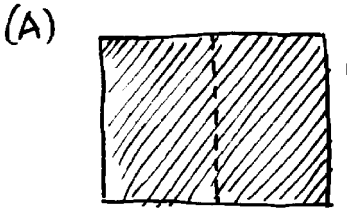
Optional: The children could record each step of the pattern as it grows on pieces of small graphing paper (see NL, Blackline #17). One child records only the base on the first sheet. On the next sheet, a child records the base and the first surrounding. This process is continued for each step. When the pattern is completed, there should be as many individual recording sheets as steps in the pattern. Ask the children to arrange the recordings in sequences and observe how the pattern grew. Ask them to predict the next surrounding pattern.

SYMMETRY ART

Materials needed for each person: one large piece of colored construction paper; one half-size piece of a different color construction paper; scissors; glue; pencil; red crayon and green crayon (optional)

Introduction: There are several children's books that illustrate symmetry. You may want to introduce the children to these books before the symmetry art lesson. Three examples of books to use are: Round Trip and Reflections by Ann Jonas and *The Mirror Puzzle* Book by Marion Walter.

Procedure:

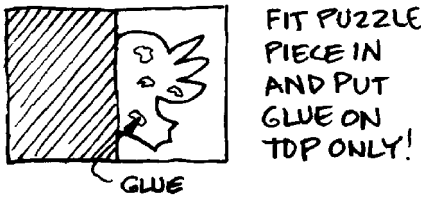


Fold large paper (A) in half, either vertically, horizontally or diagonally. The second piece of paper (B) should be the shape of the piece (A) folded in half.

Draw a red dot and green dot on the edge of the smaller paper (B). Draw wiggly line from the green dot to the red dot. Do not draw too close to the outside edges or cross over the lines.

Cut out the puzzle (B). Put glue on frame (match corners). Fold paper, press hard.

Lay puzzle piece back into frame. Put glue on top of puzzle piece(s). Fold paper (A) over, press hard. Now unfold the paper. A symmetrical pattern should appear.

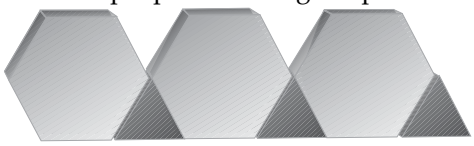


PATTERN MATERIALS

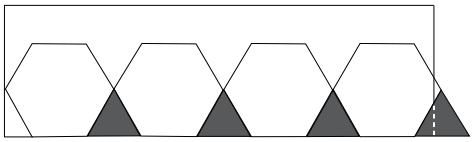
Pattern Block Walls

Materials to make a set of 8 cards: 9 (3" x 9") tagboard strips; paste or glue; 8 paper clips; scissors; small container of pattern blocks; tape; pre-cut pattern block shapes

Procedure: Build 2-3 repetitions of a simple pattern using the pattern blocks. The blocks are standing up!



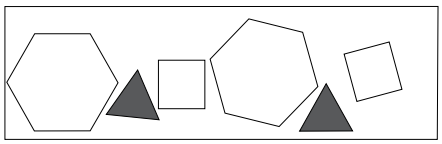
Paste the pre-cut pattern block shapes directly on the tagboard. If the last shape extends off the end of the card, it's okay to cut off the extension.



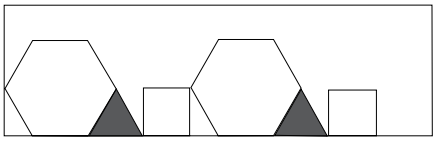
Note: Keep a tally of the number of each color you've used. Try to use the same number of each color, otherwise your children won't have enough of certain colors of pattern blocks.

Pointers:

- Paste the shapes along the bottom edge of the card (be sure there are no flying shapes!).



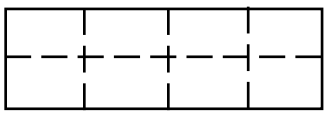
- Start close to the left.

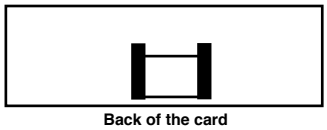


Pattern Block Wall Stands

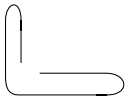
Materials: 1 blank 3" x 9" tagboard strip; masking tape; 8 paper clips

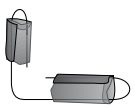
Take the 9th blank 3" x 9" card and cut it into 8 rectangles (see below). Turn each completed pattern block wall cards face down. Tape one piece on the back of each pattern block wall patterns.





Back of the card





Take the 8 paper clips and open them to make an "L" shape or a 90° angle. Wrap each end of the open paper clip with masking tape to make pattern block wall "stand". To use, insert the stand under the piece of tagboard taped to your card.

Junk Box Pattern Cards

Materials: 15 -20 (3" x 9") tagboard pieces; markers; junk

Procedure: Each set of cards for a particular set of junk is usable only with that unique box of junk. You need cards for only three or four boxes. Start with four or five cards for the junk box you choose for pattern cards. Encourage your class to add to the collection of junk pattern cards when (and if) they are ready.

Put each idea on a separate card. Keep the pattern simple. When color isn't the attribute, make outlines approximately the size of the real materials with a black marker. Let the last object shown in your pattern "bleed off" the card to indicate that there is an extension to be made.

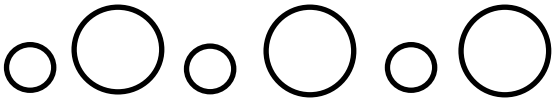
Suggestions for Junk Pattern Cards

Change of One Attribute:

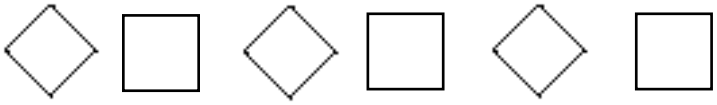
Color

Shape

Size



Position



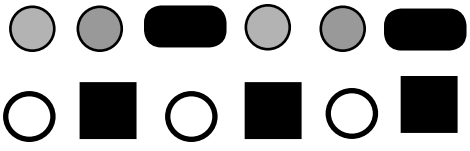
Texture

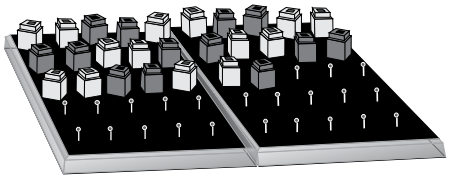
Number

For more challenge change 2 or more attributes...

Sample:

Change of color and shape

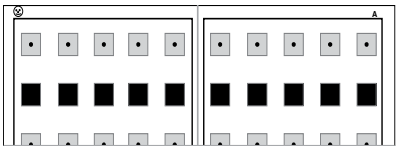




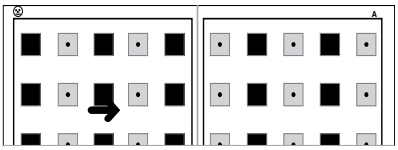
Geoboard-Unifix Pattern Cards

Materials: large geoboard (MTW, BL #17) either mounted or run off on tagboard; markers and crayons

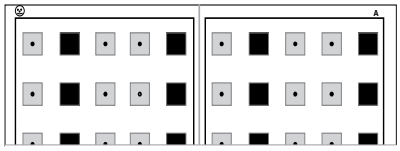
Making directions for each card:
Cut the geoboard recording in half (right through the middle row of dots). The hint of the third row suggests the extension of the pattern. Tape the two halves together on the back of the card so the two cards fold. Color a Unifix cube pattern on the card (see examples below). Any Unifix cube color can be used for any of the patterns. Vary the Unifix colors on each card to assure that the children will not run out of any color of Unifix cubes when they construct the patterns on the geoboards.



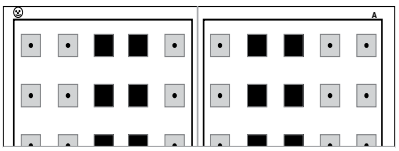
ABAB ◊



ABAB ➜



ABAAB ➜



AABB ◊

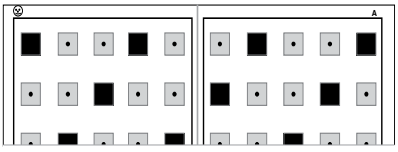
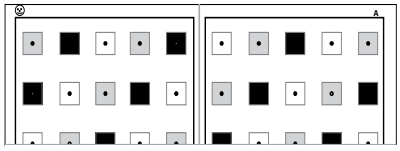
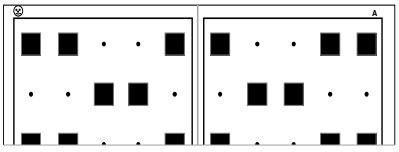


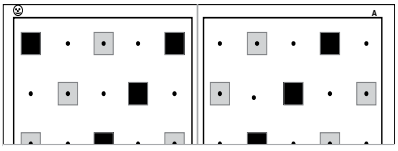
ABB ➜



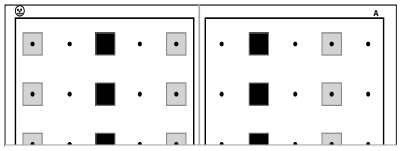
ABCABAB➜



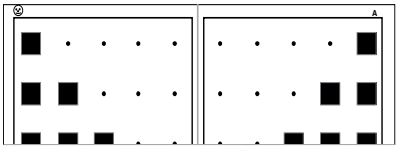
AA (skip, skip) ➜



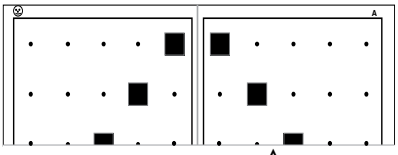
A (skip) B (skip)➜



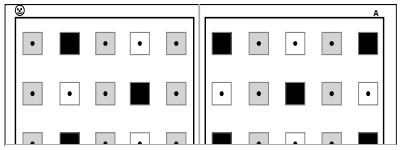
A (skip) B (skip) ➜



One, two, three… ◊



5th, 6th; 4th, 7th… ◊

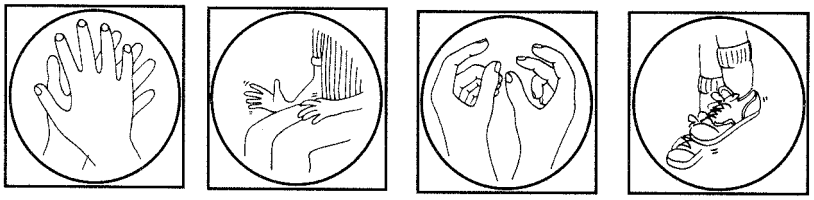


ABAC ➜

Large Individual Snap/Clap Cards

Materials: 12 copies of (NL, BL#15) run off onto tagboard; paper cutter; clear Contact paper

Procedure: Cut the copies of the snap/clap blackline on the dotted line. Cover the cards with Contact paper for protection.



Paper Dot Strips

Materials: NL, blackline #48 and #49; paper cutter; duplicating paper

Procedure: Duplicate NL, blacklines #48 and #49. Cut the copies on the dotted line. Place in a large zippered bag.

Single Row of Dots **Double Row of Dots**

Mylar Mirrors

Materials for each mirror: a piece of mylar; a piece of cardboard; transparent tape (in red plaid dispenser)

Note: A Google search for Chrome Mylar yields hundreds of suppliers. Use the .005" thickness and pasted it onto standard chipboard.

Procedure: Tape each sheet of chrome mylar (on all 4 sides) to an individual sheet of cardboard using Scotch tape. To make hinged mirrors, place several pieces of tape across the back of two single mirrors (standing either vertically or horizontally) so the two mirrors are attached and can fold in half.