



HOW TO PLAY: PATTERN GAMES

Math children are practicing:

- Building a mathematical habit of mind around pattern and structure
- Recognizing, duplicating, and extending simple repeating patterns (including in songs, movement, and stories)
- Creating repeating patterns through repetition of a unit (with objects and in movement)
- Recognizing and copying other structures that repeat with regularity such as growing patterns and symmetrical designs.

Materials

- Pattern Blocks (set of 250)
- Repeating pattern block designs (3 double-sided pages)
- Symmetrical pattern block designs (4 double-sided pages)
- *Other:* Any other pattern games and activities

Picture Book: A-B-A-B-A: A Book of Pattern Play by Brian P. Cleary

- *Circle time:* Read the book aloud. This book helps children understand what a pattern is with fun rhyming text and lots of visual illustrations. The end of the book introduces number patterns like skip counting by 2s, 5s, and 10s. You can decide to skip this part of the book for now or expose children to it but do not expect them to learn skip counting.
- *Art table:* Use colored stringing beads and pipe cleaners (or other material of your choice) and have children copy or make their own repeating patterns. Talk to them about the parts of the design that repeat (i.e. "The yellow and red bead repeat over and over.")

Suggested plan for playing with pattern block puzzles	
Game	Materials
Repeating pattern block design templates	Repeating design templates & pattern blocks
Copy my pattern	Pattern blocks
Dance patterns!	
Jewelry store	Stringing objects & pipe cleaners or string
What's missing in my pattern?	Pattern blocks
Add on to my pattern	Pattern blocks

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What is my pattern?

Symmetrical pattern block design templates	Symmetrical templates & pattern blocks
Create your own patterns	Pattern blocks & other materials

Tips from the classroom:

- Have children copy a pattern that you make. They could copy it exactly (same color and shape) or they could follow the same rule (such as an AB pattern) but use different materials.
- Try making a mistake in a repeating pattern that you are making and ask children to help you figure out your mistake.

Questions to ask:

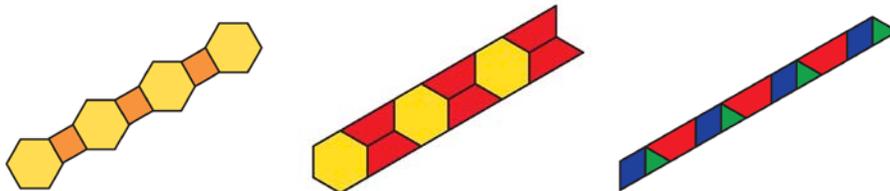
- What do you see repeating in this pattern?
- Did we do that right? Does it look right?
- Can you help me add onto this pattern?
- Uh oh! A piece is missing, can you help me figure out what is missing?
- Uh oh! I think I made a mistake somewhere in this pattern, can you help me find it?

Praising the process:

- You're working hard!
- Good idea!
- Keep trying!
- I like how you took your time and worked hard on that.

Pattern block templates: Repeating designs

1. Set out the pattern block templates with repeating designs.



2. Chant the pattern with the children, such as "Hexagon, square, hexagon, square".
3. Have children place the pattern blocks directly on the pattern. Have children chant the pattern as you point to each block.



What is my pattern?

4. If children are ready, have them extended the pattern
5. *Variation:* Have children copy the pattern not on the template, but look at the template to copy it.

About the learning in this game. This activity helps children understand what a pattern is. Repeating patterns follow certain rules—something repeats in a regular way. It could be “hexagon, square” repeat, or “red, yellow” repeat, or “AB” repeat.

Copy my pattern

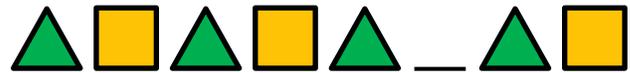
1. Make your own simple repeating patterns out of pattern blocks or other materials (square, circle, square, circle). (If you want, you can glue/tape/Velcro the pieces down on a strip of paper so they don't move.)
2. Chant the pattern with the children so they can hear the repeating unit.
3. Ask children to help you copy the pattern. Have children chant the pattern as you point to it.
4. *Variation:* Children can make their own patterns for others to copy.

About the learning in this game. Pay attention to whether children are beginning to understand that a repeating pattern repeats with regularity—that the same unit repeats over and over. Sometimes when they go to create their own patterns they may or may not follow this rule. Point out to children what is repeating in the patterns you make and in the patterns they make.

Dance Patterns!

1. Start doing a simple movement pattern such as stomp, clap, stomp, clap.
2. Ask the children to join in as soon as they recognize the pattern.
3. Once most children have joined, say “Freeze”, and ask the children to say what would come next.
4. Other movement ideas:
 - a. Touch your toes
 - b. Touch your head
 - c. Reach up
 - d. Hands on hips
 - e. Clap hands
 - f. Jump on one foot, two feet

About the learning in this game. This is a fun way to feel patterns and feel how the pattern repeats. When you ask children what comes next, you are helping them see

What is my pattern?

the regularity and the repeat in the pattern. Once children get really good at recognizing the pattern, you could make a 'mistake' and see if they catch you!

Jewelry Shop

1. Set up a jewelry shop as a center time activity. Using stringing beads and pipe cleaners or yarn or string—make several examples of AB patterns, ABB, and AABB patterns (or more as children are ready).
2. Have children copy the designs you made to make more necklaces to “sell to customers at the shop”.
3. When children are ready, have them design their own patterned necklaces to “sell to customers”.
4. *Variation:* Make growing patterns and symmetrical patterns for children to copy.

About the learning in this game. This is a fun activity for children to practice copying and making patterns. to patterns and helps them understand what patterns are by duplicating one already made. Remember to ask children what comes next and how they know.

What is missing in my pattern?

1. Lay out 2 different shapes (e.g., circle and square) in an ABABAB pattern.
2. Have children close their eyes.
3. Hide some of the shapes in the pattern using your hand, a piece of fabric, or paper. *Make sure at least 3 repeating units are visible.*
4. Have children open their eyes. Have them figure out what is missing or covered up.
5. *Variation:* Children can build patterns for each other and hide a part of it.
6. *Challenge:* Mix up how the patterns repeat:
 - ABB
 - AAB
 - ABC
 - AABB
 - etc.

About the learning in this game. Most children need to see at least 3 units of repeat or 3 iterations of the pattern before they are able to recognize it, extend it, or



What is my pattern?

determine what is missing. Figuring out what pieces of the pattern are missing helps to draw children's attention to the units that are repeating in pattern.

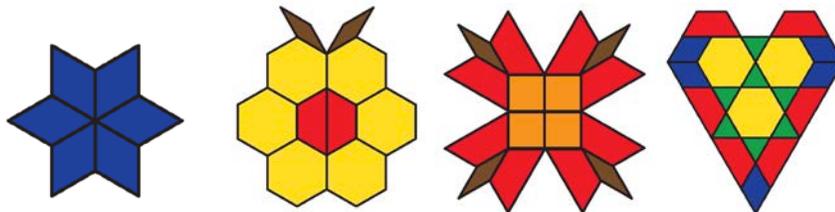
Add on to my pattern?

1. Create a simple repeating pattern out of pattern blocks or other materials. *Make sure you have at least 3 repeating units.*
2. Ask children to chant the pattern.
3. Ask children to extend the pattern—make it longer.
4. Ask children to explain how they knew what came next.
5. *Variation:* Children can start patterns for each other and try to finish their friend's pattern.

About the learning in this game. Again, most children need to see at least 3 units of repeat or 3 iterations of the pattern before they are able to recognize it, extend it, or determine what is missing. Being able to extend a pattern is more complicated skill than recognizing, copying, or filling in a missing part of a pattern.

Pattern block templates: Symmetrical Designs.

1. Set out the pattern block templates with symmetrical designs.



2. Point out the symmetry in these patterns. If you fold these designs, the patterns match—they all have mirror symmetry (one side mirrors the other). The star has another kind of symmetry too, it looks the same when you turn it (rotational symmetry).
3. Have the children cover the designs with pattern blocks using the colored side or the non-colored side.
4. Invite children to make their own symmetrical designs.

About the learning in this game. Symmetry is another type of pattern in math. Symmetrical patterns have segments that repeat but instead of repeating in a line, the segments are the same when flipped, folded, or rotated. Butterflies have mirror symmetry—the butterfly wings match when folded along a line through the middle

What is my pattern?



of the butterfly. Snowflakes have mirror symmetry and rotational symmetry. The segments of a snowflake match when folded and the design looks the same when you turn or rotate it. There is symmetry in artwork, in buildings, in nature, and even in people and animals (our bodies are symmetrical if you draw a line down the middle—two ears, two arms, two legs, etc.)

