

Making Patterns - Create, Analyze, and Predict

Summary

Students will practice making patterns using Unifix cubes.

Materials

- [Hundreds Chart](#) (pdf)
- Unifix cubes or pattern blocks
- Graph paper
- Colored pencils

Additional Resources

Books

Many picture books involve patterning. You could read these to your class and have students look for the patterns.

- *The Hungry Caterpillar*
, by Eric Carle; ISBN 024119081
- *Exploring Patterns*
, by Betty Franco (Scholastic 1999), ISBN 0590644405X
- *Math All Around Me--Patterns in the Park*
, by Lisa Bruce (Raintree 2003); ISBN 1410906604
- *MC Escher Coloring Book*
, by Abrams (Target.direct); ASIN 0810926350

CDs

- *Multiplication Unplugged*
, Sara Jordan Publishing; ISBN 1-895523-75-3
- *Skip Counting, Intelli-Tunes*
, by Ron Brown (Joyful Noise Publications, www.joyful-noise.com); Item TTM-103

Background for Teachers

Many people think that math is the science of patterns. As we teach almost any math skill there is some sort of patterning incorporated into it. Place value, multiplication, even long division—the nemesis of so many fourth graders—are all based on patterns.

Helping our students develop a stronger pattern sense also helps them develop a deeper and more thorough understanding of how numbers and mathematical processes work. Giving students this knowledge makes math more accessible and allows students to think their way through a problem rather than relying on memorization or random guessing. This higher level thinking better prepares children for the demands of today's society and the careers of the future.

Students should have had previous experience in making patterns using Unifix cubes and pattern blocks.

Intended Learning Outcomes

3. Reason mathematically
6. Represent mathematical situations.

Instructional Procedures

Invitation to Learn

Detectives solve mysteries by being able to analyze clues and predict the solutions. Today we will be

"pattern detectives" and solve the mysteries of the patterns we look at and create. We will also look for patterns in nature, art, and music.

Show students various patterns using real life objects (e.g., fabrics, wallpaper, etc.), and have them describe the patterns either verbally or in writing.

Instructional Procedures

Give each child a *Hundreds Chart*, a set of Unifix cubes, a sheet of graph paper, and a set of colored pencils.

Have each student use two to five cubes to create a core pattern and display it on his/her *Hundreds Chart*.

Ask students to visualize how the grid will look when the pattern is repeated. Help them predict and analyze the patterns by asking questions such as: "How many squares are in your pattern unit? How many times can you repeat your pattern in one row? What happens if you make your pattern one cube shorter? Or longer?

What color will the ____ cube be?" Some students will like the option of using graph paper and colored pencils to help them determine these patterns.

Pair students up to play the "Secret Patterns" game. Have them place their desks facing each other. They will need a folder to put up between them so they can hide their patterns from each other.

Instruct Partner #1 to create a secret pattern using a specified number of cubes.

Instruct Partner #2 to try to guess and recreate their partner's secret pattern by asking yes/no questions.

Example: Partner one creates a pattern of three red, one blue, two green. Partner two might ask: "Did you use more than two colors? Did you use three colors? Are there two cubes of the same color next to each other?" Model good questioning techniques to help students think their way through the activity rather than just randomly guessing.

When partner two has successfully recreated the pattern, have the partners switch roles and repeat the activity.

Additional Activities with Unifix Cubes

Towers

Give each student two different colors of Unifix cubes, at least 20 of each color.

Challenge them to make as many different patterns as possible making towers that are four cubes high.

Have them try to group their towers into pairs by matching up opposite towers.

Example: Tower 1--blue, white, white, blue would match with Tower 2--white, blue, blue, white.

Ice Cream Cones

Put students into pairs or small groups.

Give each group six Unifix cubes--one of each color.

Tell them each cube represents a flavor of ice cream and challenge them to create as many different cones as possible. You can change criteria by requiring all six flavors to be used or by allowing them to use a minimum number of flavors per cone.

Extensions

Fine Arts Music I-1, 2

Pass any playground and you will hear the age-old sounds of young hands clapping and snapping in perfect rhythm to sing-song chants, either borrowed from previous generations or brand new inventions of their own. Jump rope rhymes, hopscotch, foursquare--children use patterns in all these games--and the possibilities of the patterns they create are endless. Babies will follow the pattern of clapping in *Patty Cake*, and older children love the patterns involved in playing rhythm or doing hand jives. Counting songs such as the *Five Speckled Frogs*, *Five Little Ducks*, and *Three Little Monkeys*

develop number pattern sense. Children have no thought other than having fun while participating in these activities, but they are actually using and developing math skills through their play. Music is a series of mathematically based patterns. The beat and melody of songs are developed through patterns. Combining music and movement helps children "see" the patterns in music. The rondo is a perfect form to show patterns in music through movement.

Rondo

Rondo for Percussion.

Materials

Music with rondo form (*Axel F* or other song)

- [Rondo for Percussion handout](#) (pdf)

Visual Arts I-1, II-1, 2

Visual arts are full of patterns and perhaps the best example is the work of the artist MC Escher. His fantastic tessellations fascinate people of all ages and children love them. Give students the opportunity to make their own tessellations.

Show and discuss prints of Escher's work.

Use pattern blocks to create simple geometric tessellations.

Students create their own tessellation patterns using instructions on the *Tessellations* handout.

Materials

MC Escher prints

Oaktag squares 2" x 2"

12 x 18 art paper

Colored pencils or crayons

Scissors

Tape

Pattern block sets

- [Tessellations handout](#) (pdf)

Family Connections

Assign students to find an example of a pattern in their home (e.g., fabric, wallpaper, door and window arrangements, etc.). Students then recreate the pattern on paper and return it to school.

Nature is full of patterns. Assign students to find an animal, plant, landform, etc., with a pattern and bring a sketch or picture of it to school.

Assessment Plan

Informal assessment techniques with the teacher observing and interacting with the students as they create, predict, and try to guess the patterns would work well with this activity.

Use performance task assessment of finished products, such as the tessellations.

Performance tasks should include repeating/growing pattern understandings, rather than whether or not students can create a tessellation.

Authors

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