

Title: Patterns, Patterns, Everywhere!

Brief Overview:

In this unit students will identify, describe, extend and create nonnumeric patterns. It begins with the primary concept of identifying terms, core and patterns to include intermediate concepts, such as extending patterns, distinguishing between patterns and creating repeating patterns.

NCTM Content Standard/National Science Education Standard:

1.0 Knowledge of Algebra, Patterns, and Functions

- Identify, copy, describe, create, and extend nonnumeric patterns

Grade/Level:

First and Second Grade

Duration/Length:

Three sixty-minute lessons

Student Outcomes:

Students will:

- Identify nonnumeric patterns
- Describe and extend repeating patterns
- Organize, interpret and describe situations mathematically by providing mathematical ideas and evidence in oral and written form

Materials and Resources:

- Overhead projector
- Overhead Color Squares
- Stamps (various shapes/designs)
- Math Counters
- White Construction Paper
- Colored Construction Paper
- Crayons
- Glue
- Scissors
- 2 centimeter grid paper
- Snap Cubes

Development/Procedures:

Lesson 1

Pre-assessment:

Direct students to make a (pattern) train using counters. Patterns must include red and yellow counters. Teacher observes students to see if students are able to identify and create repeating patterns.

Launch:

Review students' prior knowledge of patterns by asking the following questions:

1. What is a pattern? (*A pattern is a sequence or order of objects that repeat or grow.*)
2. What are the terms in a pattern? (*A term is each place or position in the sequence.*)

Teacher Facilitation:

Teacher will show students examples of patterns and have students identify the core of a repeating pattern. Students will copy and extend the pattern.

Examples of patterns:

AB pattern (yellow, white,)

ABA pattern (yellow, white, yellow)

AABB pattern (yellow, yellow, white, white)

- Teacher covers core after students have observed it, to see if students remember the core and can extend it.
- Teacher covers beginning and ending of pattern and ask students to describe how the beginning and end of the pattern are alike?

Students should note that the core of a pattern is the part that repeats. Later in the unit, they will be able to distinguish between repeating and growing patterns using the core for comparison.

Student Application

Teacher gives students Repeating Patterns Worksheet (Student Resource Sheet # 1) and has students answer the following:

- What is the core?
- How many terms are in the core?
- Describe your pattern.
- What is the next term in the pattern?

Reteaching:

Students will use linker cubes to make trains with an ABA pattern. After the students create the trains, they will record their patterns on 2-centimeter grid paper strips.

Extension:

Students will work in pairs using clapping and body movements to represent patterns used in the reteaching activity. Partner A will use clapping and body movement to represent patterns. Partner B will record the patterns on 2-Centimeter grid paper (Student Resource Sheet # 2). The patterns will be recorded using an AB pattern. For example, if “Partner A” makes a clap, clap, stomp pattern, then “Partner B” will record “AAB” on the 2-centimeter grid paper.

Lesson 2

Pre-Assessment:

Assign student pairs and have each pair using snap cubes to construct a pattern using the ABBA core pattern. Repeat the core three times.

Launch:

Assess student prior knowledge by asking the following questions:

- What is your core pattern?
- How many terms in core pattern?
- How many times did the core repeat?
- How many terms would you have if you extended the pattern 2 more times?

Teacher Facilitation:

- Put students into pairs. Give each partner ten snap cubes of the same color. (Partner gets all green cubes and Partner B gets all yellow cubes).
- Model how to make a train with four cubes using ABBA pattern and have students create it, following the same pattern. Note: pairs will have different color cubes, but should follow the same ABBA pattern.
- Next have students identify the core and the number of terms in the pattern, ask students what colors make up their core? (*Various colors, all following ABBA pattern.*)

- Next have students extend their pattern to show three cores. Ask students how many terms make up the entire pattern? Start out by having them model two patterns and ask them, “How many patterns of two terms are in the core if repeated twice (*four terms*)? How many patterns of three terms are in the core if repeated three times (*nine terms*)? How many patterns of four terms are in the core if repeated three times (*twelve terms in the pattern*)?”

Student Application:

Using an overhead, transparency graph paper, and colored markers, model creating a pattern with a core of five terms repeated three times. Color the squares using ABBCD pattern.

Give students 2-centimeter grid paper (Student Resource Sheet # 2) and colored markers and have students create a pattern using the ABBCD sequence. Ask students to identify their core and describe their pattern. Display students colored patterns.

Embedded Assessment:

Teacher should observe the following:

- Students are able to identify whether or not a pattern is repeating.
- Students are able to identify the core of the pattern.
- If the pattern is a repeating pattern, how many times does the core repeat?
- Are students able to extend the pattern by three cores?

Re-Teaching:

Students will work in pairs using snap cubes. They will create patterns of 2-5 terms, repeating the core at least three times. Using index cards to record their answers, students will have their partners:

- identify patterns
- number of terms in the core,
- number of times the core is repeating
- number of terms in the pattern.
- Students will also identify the pattern sequence (AB, ABB, ABBA, ABCD...)

Extension:

Have students complete the “Extending Patterns” (Student Resource Sheet # 3) to identify the core, name the number of terms in the core, and extend the pattern to include an additional core. Answers can be found on Teacher Resource Sheet # 1.

Lesson 3

Preassessment

Students will use linker cubes to copy the pattern the teacher makes. The teacher will use a snap, clap, snap, clap pattern. The students will use 14 terms for the pattern. The students will then name the terms using ABAB.

Launch:

Review students' prior knowledge of identifying and copying patterns by asking the following questions:

1. What is the core of the pattern?
2. How many terms will you have if you extend your pattern two more times?

Teacher Facilitation

The teacher will read a part of The Quilt Story by Tony Johnston. This story is about a little girl who moves across the plains to a new home. She feels sad and lonely so she turns to her patchwork quilt for comfort. Generations later, another little girl moves across miles of highways to her new home. She also finds comfort in the same quilt. The teacher will also display pictures of quilts (either from the book or a store magazine) for the students to visually see. The teacher will discuss with the students how a quilt shows a repeated pattern. The teacher will locate and name the repeated patterns on the quilt displays.

Student Application

Students will create a nine-patched quilted pattern using Student Resource Sheet # 4. The quilts must have a repeating pattern. They will use pattern blocks, colored tiles, or stamps to create their quilts. After they finish their creations, they will answer the following questions:

1. Describe your quilted pattern. Tell about the colors and shapes used. (Students will complete a journal activity on Student Resource Sheets # 5 and 6. A BCR for the lesson can be found on Student Resource Sheet # 7.)

Reteaching

The teacher will work with students to create patterns using coins. Ask students to name the value of a dime and the value of a nickel. Place a

nickel, dime, nickel, dime, nickel, dime on the table and ask students to identify the core of the term. After they identify nickel, dime, have the students extend the pattern three more terms. Next, create a core using nickel, nickel, dime, nickel, nickel, dime and have the students identify the core and extend it three more times. The students must identify the number of terms in each problem. Now add some pennies and let them make patterns with the nickels, dimes, and pennies. Give the students the amount that each term should have. For example, using pennies, nickels, and dimes, make up a core that has three terms in it..... four terms in it..... five terms in it.

Extension

Students will complete the Teddy Bear Wear Center (Student Resource Sheet # 8). They will make items of clothing to wear and decorate them with teddy bear stamps using patterns. Each student must make at least three items of clothing. The clothing will be used later in a classroom fashion show where students will model their article of clothing and the other students will identify their patterns. The fashion show is an opportunity for students to demonstrate their patterns and allow for other students to identify their classmate patterns. During the fashion show, the teacher should ask questions of the students as they model their clothing to keep the audience focused. Here are some questions that can be asked:

- Are any of (students' name) patterns alike?
- How many two-color patterns do (students' name) have?
- How many three-color patterns do (students' name) have?
- How many four-color patterns do (students' name) have?
- Can you clap and tap your feet to the number of patterns that (students' name) has on?

Summative Assessment:

The students will complete a BCR (Student Resource Sheet # 9) and a worksheet (Student Resource Sheet # 10) to show mastery of the identification and extensions of non-numeric patterns. An answer key can be found on 2.

Authors:

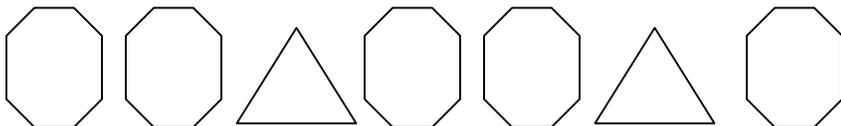
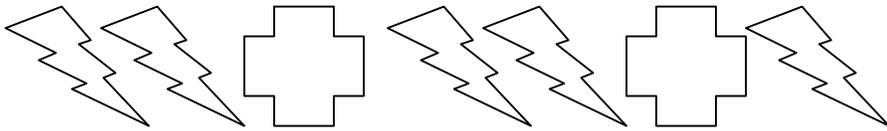
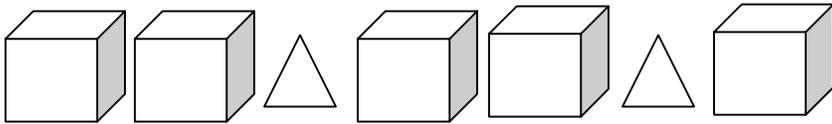
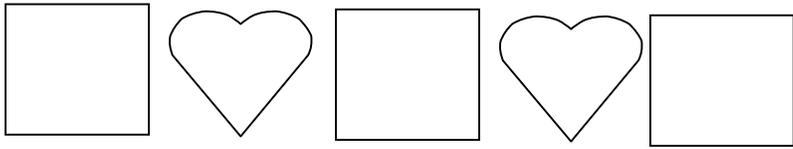
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Rock View Elementary
Montgomery County Public Schools

Maurice F. Bailey
Francis T. Evans Elementary
Prince George's County Public School

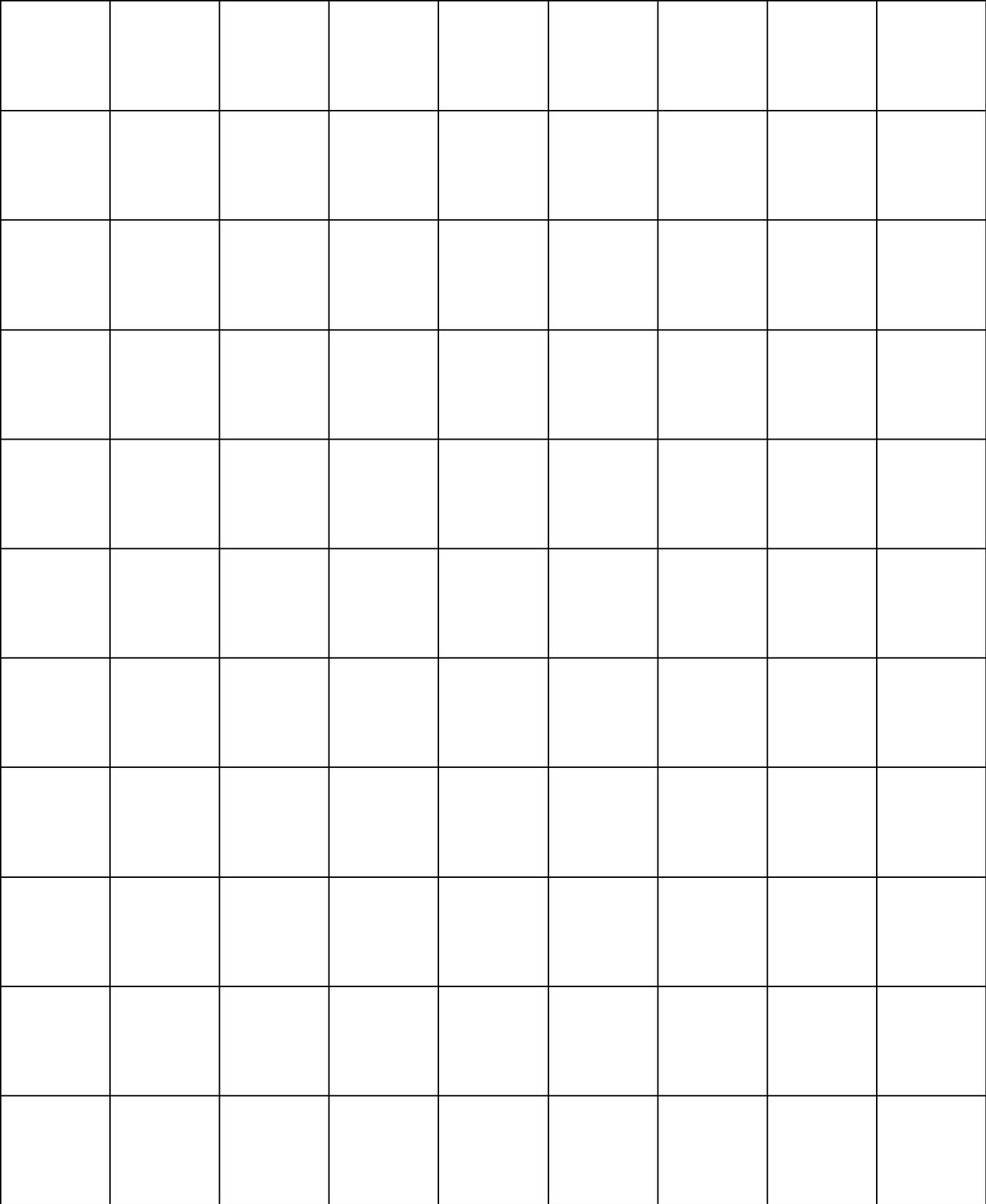
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Repeating Patterns

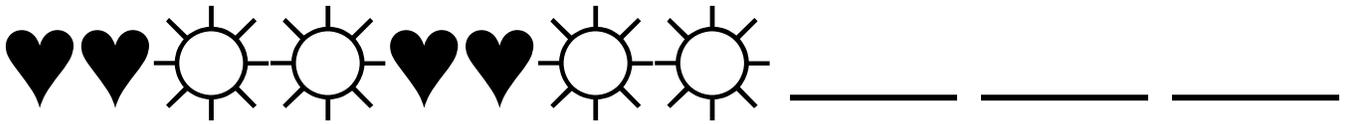
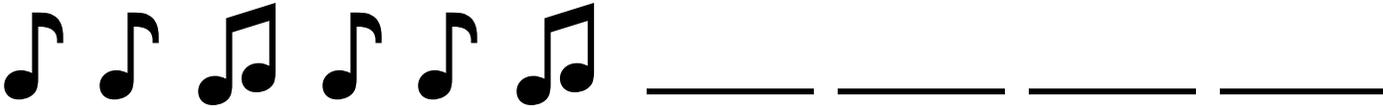
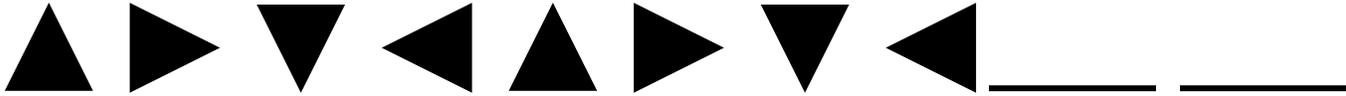


Two-Centimeter Grid Paper



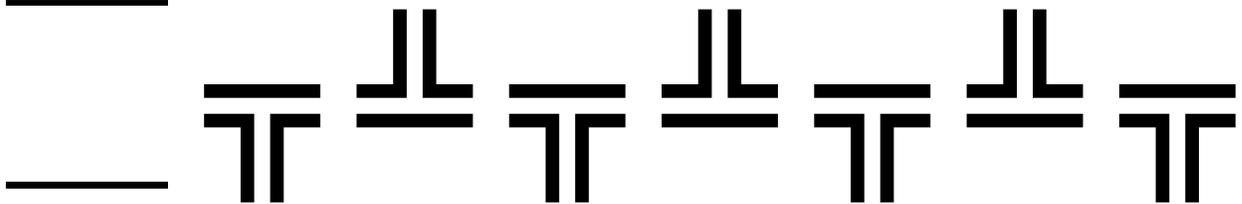
Extending Patterns

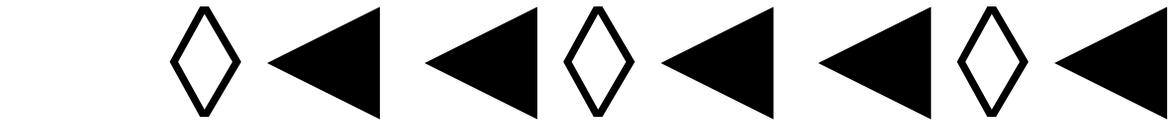
Direction: Extend the repeating pattern.



Is it a repeating pattern? Write Yes or No on the line next to each pattern.

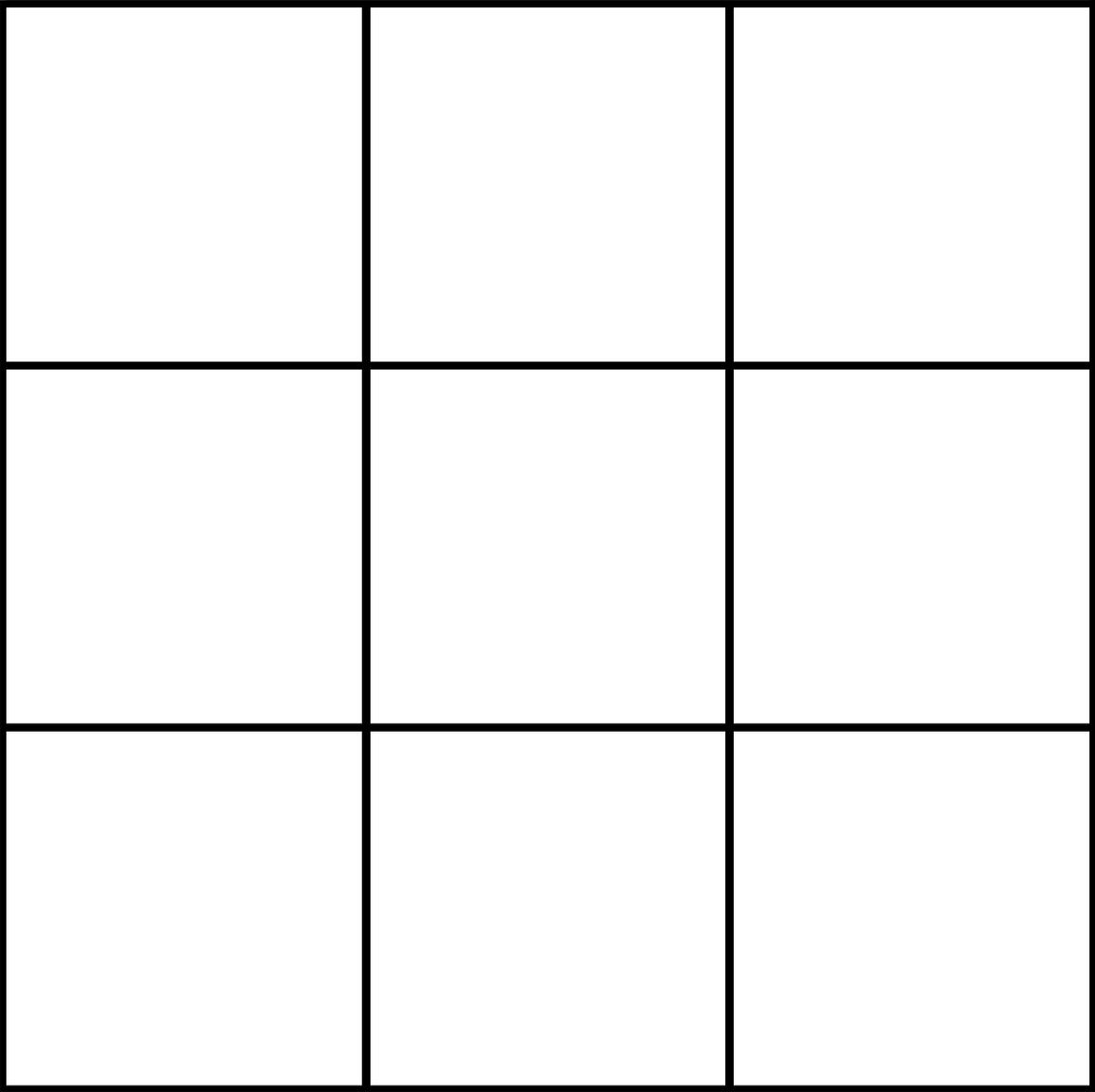








Nine-Patch Quilted Pattern



Quilt Journal Activity

Directions: Describe what your quilt pattern looks like. Make sure you use descriptive words and complete sentences.

Directions: Illustrate your quilt pattern at the bottom of the page. Make sure you follow the same pattern as your picture.

Quilt Journal (Optional)

My quilt pattern looks like...

I used _____ color(s) and

_____ shape(s). The core of my pattern is

_____. I did/did not notice additional

patterns in my quilt. Some of the patterns were...

Directions: Illustrate your quilt pattern at the bottom of the page.
Make sure you follow the same pattern as your picture.

Brief Constructed Response

Step A

Continue the pattern in the quilt.

Step B

Use what you know about patterns to explain why your answer is correct. Use words and/or numbers in your explanation.

Teddy Bear Wear

1. Cut Paper in the shape of something you can wear.
2. Make a pattern with the snap cubes.
3. Stamp the pattern on the paper.
4. Cut out other things to wear. Make a different design on each one.

Brief Constructed Response



Step A

Extend the pattern three more times.

Step B

Use what you know about patterns to explain why your answer is correct. Use words and/or numbers in your explanation.

Summative Assessment for *Patterns, Patterns, Everywhere!*

Directions: Complete the pattern for numbers 1-5 by identifying the core and extending it three more times.

1. ▲ ▼ ☺ ☺ ▲ ▼ ☺ ☺ ▲ ▼ ☺ ☺

2. ♥ ☼ ☼ ☼ ♥ ☼ ☼ ☼ ♥ ☼ ☼ ☼

3. ◻ ◻ ◻ ◻ ◻

4. ■ ◻ ■ ■ ■ ■ ◻ ■ ■ ■ ■ ■

5. ▶ ◀ ▶ ◀ ▶ ◀ ▶ ◀

Directions: Write the core of the following patterns using letters.

6. ♥ ♥ ■ ♥ ♥ ■ ♥ ♥ ■ _____

7. ☺ ☺ ☺ ☹ ☹ ☺ ☹ ☹ ☺ _____

8. ◻ ◀ ▼ ◻ ◀ ▼ ◻ ◀ ▼ _____

Directions: Write your own pattern using pictures. Name the core of your pattern and how many terms are in your pattern. Don't go over five terms!

The core of my pattern is _____.

There are _____ terms in my pattern.

The core of my pattern is _____.

There are _____ terms in my pattern