



Montana
Office of Public Instruction
Denise Juneau, State Superintendent

Mathematics Model Teaching Unit

I'm Beading: Northern Cheyenne Bead Work

Created by: Jessica Cox

Grade 4: Duration 1 hour

Stage 1 Desired Results

Established Goals:

Algebraic and Functional Reasoning Mathematics Content Standard 4: A student, applying reasoning and problem solving, will use algebraic concepts and procedures to understand processes involving number, operation, and variables and will use procedures and function concepts to model the quantitative and functional relationships that describe change within a variety of relevant cultural contexts, including those of Montana American Indians.

- **4.1 Patterns and Relations:** Describe, extend, and make generalizations about geometric or numeric patterns.

IEFA Essential Understanding 1: There is great diversity among the 12 tribal Nations of Montana in their languages, cultures, histories and governments. Each Nation has a distinct and unique cultural heritage that contributes to modern Montana.

IEFA Essential Understanding 2: There is great diversity among individual American Indians as identity is developed, defined and redefined by entities, organizations and people. A continuum of Indian identity, unique to each individual, ranges from assimilated to traditional. There is no generic American Indian.

Understandings:

- Students will understand how to create a complex pattern.
- Students will be able to connect complex patterns to Northern Cheyenne moccasin beading.
- Students will see real-world relationships between patterning in class and beaded artwork.

Essential Questions:

- What is a pattern? Give a dictionary definition and explain its meaning in your own words.
- Are there many ways for patterns to be created?
- What do you think a complex pattern is?
- What does symmetry mean? Can anyone give me an example of something in this room that is symmetrical?
- Why do you think the Northern Cheyenne wore moccasins?
- Why do you think Northern Cheyenne decorated their moccasins with patterns?



Mathematics Grade 4 - I'm Beading: Northern Cheyenne Bead Work (continued)

Students will be able to...

- create a complex pattern.
- relate the pattern to Montana Indian beaded art, specifically Northern Cheyenne.
- view various forms of beaded artwork on the Internet, Smart Board, or through books.

Students will know...

- Montana Indians were the first people to live in Montana.
- Montana Indians live amongst us today and many still enjoy making traditional clothing and beading.
- Northern Cheyenne Indians of today continue to make beaded moccasins for decoration and Pow wow regalia.
- the uses and needs of Northern Cheyenne beaded moccasins.
- the many uses of patterning.
- the aesthetics of symmetry.

Assessment Evidence

Performance Tasks:

- Students will create a pattern shown on either the overhead projector or Smart Board. They will be given an Excel Spreadsheet handout, which shows the colors and numbers of beads for each row. Students will follow teacher facilitation to begin gluing their beads onto the grid paper, but will need to follow spreadsheet directions and the picture provided on the overhead to complete the pattern.
- Students will find the dictionary or math text glossary definition for the word “pattern.” This definition will be copied down and discussed with the class.
- Students will show lines of symmetry upon completion of their beading pattern.

Other Evidence

- Students will answer “Essential Questions” as a pre-assessment.
- Students are proficient with math vocabulary (pattern, symmetry).

Stage 3 Learning Plan

Learning Activities:

- “Today you will learn how to create a symmetrical beading design used by the Northern Cheyenne for designing moccasins. You will use your knowledge about patterns to help you create this complex design. The Northern Cheyenne tribe used various types of beading. One of the types is called a ‘lazy stitch,’ which you will learn about today.”
- “I would like each of you to use a dictionary or your math textbook glossary to look up the word pattern (write the word on the board, Smart Board, or overhead projector). According to the definition, what is a pattern? How would you describe a pattern in your own words? Do you think patterns can be created in many ways? Can anybody tell me what a complex pattern might be? (A complex pattern is a pattern that is more complicated to create. This type of pattern does not always follow a “rule.”)

Mathematics Grade 4 - I'm Beading: Northern Cheyenne Bead Work (continued)

- “What does symmetry mean?” Either after receiving the correct answer or giving the answer, ask students to find something in the classroom that is symmetrical. If students have difficulty, use faces and bodies to explain... “If you draw a line from the middle of your forehead to the middle of your chin, you may find that the right side of your face looks just like the left side of your face. If you were to fold one side over the other, they would match up almost perfectly. Try this idea with your whole bodies. Did you know that symmetry is attractive to look at? Most people like the look of a symmetrical design as opposed to a non-symmetrical design.”
- Can anybody think of a symmetrical pattern that they know of or does anybody see a symmetrical pattern in the room? Not only will we learn to create a complex pattern, but we will learn how to create it with symmetry.”
- “Why do you think the Northern Cheyenne Indians wore moccasins? (To protect their feet and keep them warm) Why did they decorate them with symmetrical patterns?” (To show which tribe they were from, to trade with other people, because they are attractive to view, for decoration and today they are used in Powwows.)
- Place an overhead transparency of the colored pattern on the overhead, or use a Smart Board to project the picture. Have students look at the pattern to follow exactly. Do line one together, as a group, walking through each bead color step by step. Move onto line two together. Ask students if they have any questions about following these steps to complete their pattern. Allow students to work alone or in groups to complete.
- Upon completion, have students find lines of symmetry from their pattern. Assessment should be through participation and teacher observation.

Variation 1	Variation 2	Variation 3
Use food coloring to dye <i>noodles</i> red, dark blue, blue, green, red, and pink. Do at least two days in advance to be sure students have enough noodles for the project. Macaroni noodles may be the best. Small groups of three or four students will most likely be easiest when using noodles. Glue onto chart paper.	Use actual colored <i>beads</i> . Glue onto chart paper.	Use <i>colored pencils</i> for each bead color and have students color in the appropriate areas on their grid sheets. This is the easiest variation and takes very little preparation .

Mathematics Grade 4 - I'm Beading: Northern Cheyenne Bead Work (continued)

Variation 1 Materials	Variation 2 Materials	Variation 3 Materials
<ul style="list-style-type: none"> • Green colored noodles • Blue colored noodles • Light blue colored noodles • Red colored noodles • Pink colored noodles • Brick grid sheet (one copy per student): attached • Glue stick • Overhead of Northern Cheyenne beaded work, or project this on a Smart Board: <i>attached</i> • Overhead transparency of Cheyenne beading story, I'm Beading Moccasins by Jeannette Howlingcrane: <i>found at</i> www.rci.rutgers.edu/~semurray/moccasins.pdf 	<ul style="list-style-type: none"> • Green colored beads • Blue colored beads • Light blue colored beads • Red colored beads • Pink colored beads • Brick grid sheet (one copy per student): <i>attached</i> • Glue stick • Overhead of Northern Cheyenne beaded work, or project this on a Smart Board: <i>attached</i> • Overhead transparency of Cheyenne beading story, I'm Beading Moccasins by Jeannette Howlingcrane: <i>found at</i> www.rci.rutgers.edu/~semurray/moccasins.pdf 	<ul style="list-style-type: none"> • Colored pencils • Brick grid sheet (one copy per student): <i>attached</i> • Overhead of Northern Cheyenne beaded work, or project this on a Smart Board: <i>attached</i> • Overhead transparency of Cheyenne beading story, I'm Beading Moccasins by Jeannette Howlingcrane: <i>found at</i> www.rci.rutgers.edu/~semurray/moccasins.pdf

Teacher Resources:

Division of Indian Education. (2007). Montana Indians: Their History and Location. Montana Office of Public Instruction. Retrieved PDF version June 21, 2007, from <http://www.opi.mt.gov/pdf/indianed/resources/MTIndiansHistoryLocation.pdf>



Mathematics Grade 4 - I'm Beading: Northern Cheyenne Bead Work (continued)

Row	Dark Blue	Green	White	Blue	Pink	Red	Total
1	4	2	2	2	0	0	10
2	5	4	2	0	0	0	11
3	4	0	2	4	0	0	10
4	2	2	2	2	2	1	11
5	2	0	2	2	2	2	10
6	2	0	2	4	2	1	11
7	2	0	2	2	2	2	10
8	2	2	2	2	2	1	11
9	2	2	2	2	2	0	10
10	2	2	2	4	1	0	11
11	4	2	2	2	0	0	10
12	4	4	2	1	0	0	11
13	4	2	2	2	0	0	10
14	2	2	2	4	1	0	11
15	2	2	2	2	2	0	10
16	2	2	2	2	2	1	11
17	2	0	2	2	2	2	10
18	2	0	2	4	2	1	11
19	2	0	2	2	2	2	10
20	2	2	2	2	2	1	11
21	4	0	2	4	0	0	10
	57	30	42	51	26	14	220