A Workshop Using the Log Cabin Quilt For Teaching Math Concepts and Patterns

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Abstract

Quilts made using the Log Cabin quilt block date back to American pioneer days. Many beautiful designs can be made by varying the assembly of the individual quilt blocks. This article and workshop will highlight how Log Cabin quilt designs can be used to teach symmetry from geometric transformations and how to investigate sequences and numeric patterns.

Introduction

"The Log Cabin quilt is the quintessential American pattern, its name invokes national ideals of ingenuity and tenacity, and the stories of leaders, such as Abraham Lincoln, who rose from humble beginnings." This quote was part of the description of the 1890 Log Cabin quilt, shown in Figure 1, which was on display at the National Museum of Women in the Arts in Washington, DC [1].

Figure 1: *Log Cabin Quilt, Barn Raising Setting Displayed at the National Museum of Women in the Arts in Washington, DC Between December 20, 2013 and April 27, 2014* [1]

The Log Cabin quilt design dates back to American pioneer days. Pioneer life has a special meaning in America. In less than 300 years, pioneers and civilization spread across the vast continental wilderness of America. From the first landings in Virginia and Massachusetts in the early 1600s, American settlers pushed westward. Hunters, trappers, fur traders, miners, frontier soldiers, surveyors, and pioneer farmers all went into the wild country. Pioneers built log cabins in small clearings and an old quilt weighted with a log was the first doorway covering [2].

Pioneer women made quilts of many styles, and the Log Cabin quilt is one of the simplest quilting patterns. The Log Cabin quilt block (see Figure 2) starts with a center square, usually red to represent the heart or the hearth of the home. Strips are then sewn around the center, which are said to represent the logs of a cabin. In all, 12 strips are sewn around the original center square, which forms the square Log Cabin quilt block. Traditionally, there is a light side of the block and a dark side. The block is symbolic of life itself, with the light side representing babies, weddings, families and friends. The dark side represents death, divorce and disaster [3].

By turning the Log Cabin quilt blocks in different directions, many patterns can be created. By analyzing the quilt patterns, secondary mathematics students become familiar with the concept of symmetry from the four geometric transformations—translation, rotation, reflection, and glide reflection.

Students can also explore aspects of sequences by analyzing the patterns formed with building the quilt block with respect to area and perimeter measurements. Students can learn about common differences of sequences and whether sequences are convergent or divergent.

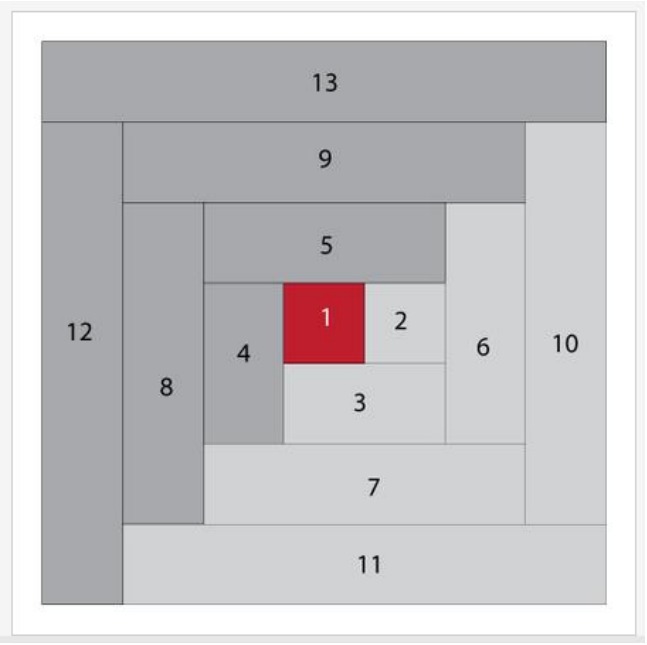

Figure 2: *Log Cabin quilt block*

In its *Principles and Standards for School Mathematics 2000,* the National Council of Teachers of Mathematics states that "the mathematics curriculum should include the investigation of mathematical connections so that students can apply mathematical thinking and modeling to solve problems that arise in other disciplines, such as art, music, and science." [4].

Quilting is not only considered a craft or a hobby, but many quilters view it as a form of art. There are over 21,300,000 quilt-makers in the United States. Some believe that American history can be traced through quilts. Carlos Tortolero, Founder and President of the National Museum of Mexican Art in Chicago, Illinois says that "Quilts are the US art form." [5].

Workshop Activity: Constructing Log Cabin Quilts

In the workshop, participants will construct the All Sevens, Fields & Furrows, Arrow and Barn Raising Log Cabin quilts using small paper representations of the Log Cabin quilt blocks. Participants will be given 16 paper quilt blocks and will work individually or in small groups. As part of the assembly exercise, the participants will record how each block is added to the adjacent block. As blocks are added from left to right in the rows and from top to bottom in the columns, are adjacent blocks translated, reflected or rotated? If rotated how many degrees? Is there a specific pattern involved in the assembly? Once each quilt pattern is assembled, participants will discuss what kind of symmetry exists, if any. Discussions during the workshop will, hopefully, generate ideas on how to incorporate this type of exercise into the secondary classroom setting. Finally, participants will be given an opportunity to create additional Log Cabin quilt designs. There are many possibilities.

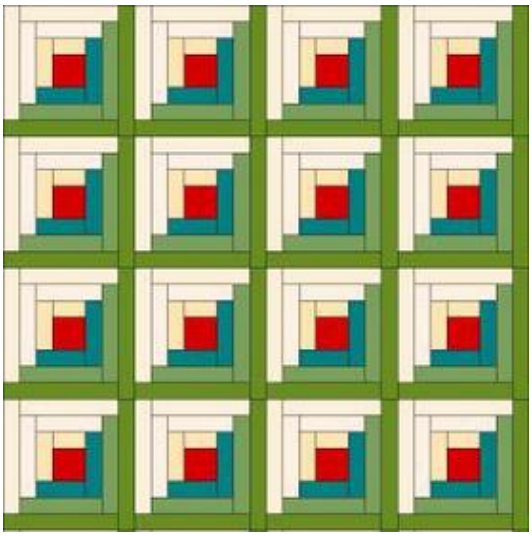

Figure 3: *All Sevens*

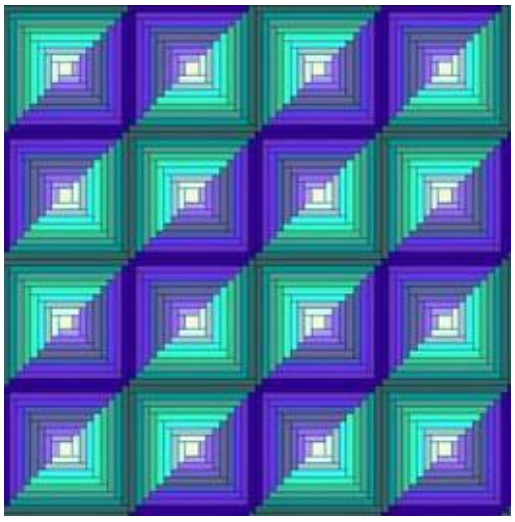

Figure 4: *Fields and Furrows*

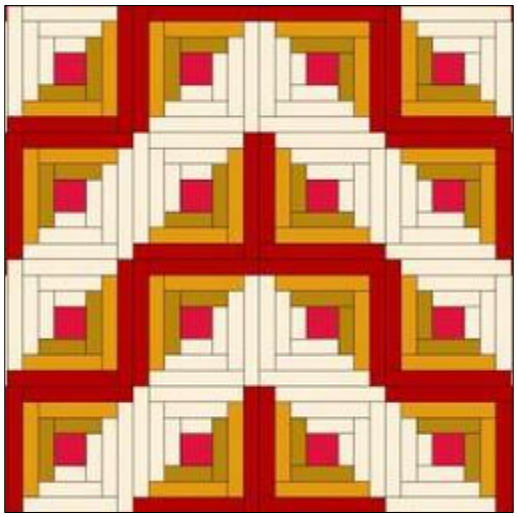

Figure 5: *Arrow*

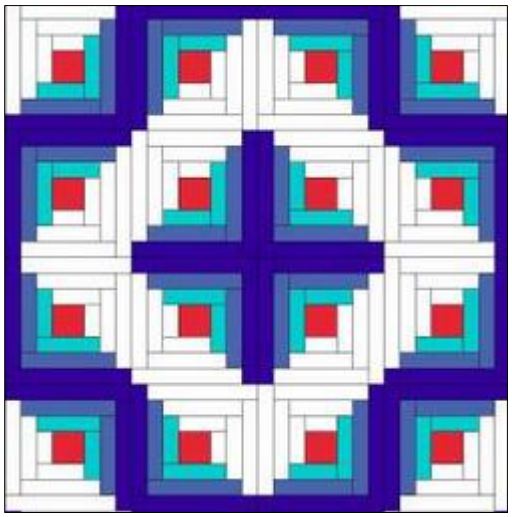

Figure 6: *Barn Raising*

Numeric Patterns within the Log Cabin Quilt Block

In the workshop, participants will explore numeric patterns by analyzing the perimeter, area, and first and second differences of area measurements of the various steps in creating a Log Cabin quilt block. Full-size fabric quilt blocks will be used for this part of the workshop. Rulers will be provided so accurate measurements can be made and recorded.

The perimeter of the incomplete Log Cabin quilt block starts at 4 and increases by 2 with each step. This is a simple arithmetic sequence with a common difference and be defined implicitly or recursively. The area measurements are neither an arithmetic nor a geometric sequence. However, it is interesting to note that each odd step's area measurement is a perfect square. The first and second difference of the area measurements and the ratios of the perimeter and area measurements will also be analyzed for patterns.

Conclusion

The many designs of the Log Cabin quilt can be used to teach symmetry from geometric transformations. The Log Cabin quilt block can be used to investigate numeric patterns. Concepts aligned with secondary mathematics curriculum can be incorporated when teaching and exploring with the simple, yet beautiful Log Cabin quilt designs.

References

[1] *Log Cabin Quilt, Barn Raising Setting*, ca. 1890. Cotton, 76 x 75 1/2 in. (193 x 191.8 cm). Brooklyn Museum, Gift of Alice Bauer Frankenberg, 59.151.3. Creative Commons-BY, Image: overall, 59.151.3_Gavin_Ashworth_photograph.jpg. Brooklyn Museum photograph (Gavin Ashworth, photographer), 2012.
[2] Havighurst, Walter. "Pioneer Life." *The New Book of Knowledge.* Grolier Online, 2014. Web. 25 Apr. 2014.
[3] E. Burns, *Quilt in a Day: Make a Quilt in a Day Log Cabin Pattern,* Quilt In a Day, 5th Edition, San Marcos, CA, 2000.
[4] National Council of Teachers of Mathematics. 2000. *Principles and Standards for School Mathematics.*
[5] The Kentucky Quilt Project, Inc., *Why Quilts Matter: History, Art & Politics* DVD Trailer, 2011.