Catherine L. Kuhns

Building Mathematical Connections with *Village of Round and Square Houses*

Can primary-grade children imagine life without video games, DVDs, soccer practice, juice boxes, or computers? The book *Village of Round and Square Houses* (Grifalconi 1986), told from a child's point of view, serves as a springboard for discussion about the joys of a simple life. The descriptive writing is informative and includes great examples of the use of imagery, similes, and descriptive words.

As a teacher of a multiage class of twenty-eight first and second graders, I use literature as a common thread in mathematics, writing, reading, and social studies lessons whenever possible. Weaving together the curriculum from different academic areas creates seamless, content-rich instruction. The story line in *Village of Round and Square Houses* works well with this type of integrated instruction and was the inspiration for a lesson in which students use geometry and measurement skills to construct a model village. In this lesson, the students locate the village in the book on a globe and in an atlas as they compare life in the village to life in their hometown. After reading and discussing the story, students use construction paper to create a small model of the village. Next, each student writes about the mathematics that he or she used to create each paper home and responds to the story. Finally, we make Corn-Okra Medley to extend the students' measurement skills.

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Edited by **Brenda Hammond,** *hammondb1@juno.com, W.T. Page Elementary School, Silver Spring, MD 20904. Readers are encouraged to share experiences using children's books with* Teaching Children Mathematics. *Please send such descriptions to "Links to Literature," NCTM, 1906 Association Dr., Reston, VA 20191-1502.*

Synopsis of *Village of Round and Square Houses*

This exquisitely illustrated narrative describes the village of Tos, which lies in the remote hills of Cameroon in central Africa. In the tale, a woman explains to her granddaughter that many years ago the volcano, Naka, became angry. This anger resulted in a volcanic eruption. After a long night of flowing lava and noise, the people returned to their village and found only two houses remaining—one round and one square. The village chief took this as a sign and sent the men to live in the square house and the women and children to live in the round house. The women and children of Tos still live in houses that are round, and the men continue to live in square houses. Daily life in Tos has not changed much since Naka's anger. The simple life of catching fish, farming, cooking pots of ground-nut stew, and always honoring the elders continues.

Read-Aloud Discussion

Much value exists in reading aloud to children. It gives students the opportunity to hear fluent reading with expression, exposes them to vocabulary, and allows them to explore literary elements such as imagery, similes, and descriptive words. I read this story in the middle of the year, and both the first and the second graders were successful with

the engaging activities. My students use measuring and geometry skills at least once a week throughout the year, so completing this project was easy for most of them.

First, we located Cameroon on the globe and in an atlas, which allowed the students to practice their map skills. I engaged the children in a discussion about Cameroon's distance from our hometown by asking, "Could we get there by car? How would we get there? Have we read any other stories that take place close to Cameroon?" These questions help set the stage for the activity as well as develop connections to other stories we have read. Making connections increases students' comprehension. This modeled behavior for questioning and making connections should carry over to students' independent reading.

Next, I read the story in a whole-group setting, stopping to discuss the word choice, narrative format, and voice. The children sat nearby so that they could view the rich illustrations. After the story, we discussed the sequence of events and compared life in the village to life in our town. The children were able to draw many comparisons, such as the following:

- "They have a pet in their home like us, but we don't have a pig in our home."
- "Only the elders sit on a stool for meals. We all sit on chairs."
- "We help our family serve the meal like they do."
- "They eat casava, ground-nut stew, and fou-fou. We don't."
- "We have tile floors; they have a dirt floor."
- "The kids love to play and so do we."

Mathematics Activity: Creating a Village

After reading and discussing the story, I asked the children if they would like to create a village of round and square homes. They responded positively. I explained that this version of Tos would be a construction-paper village and that the village we created would be filled with opportunities for using geometry and measurement.

Because children's comprehension increases when they apply reading material, I routinely ask students to use their individual Reading Reflection Logs to reflect on stories. I asked them to write about one of the following questions for this activity:

Figure 1

Materials to make round and square houses

Each child will need—

- one 12" × 4" sheet of green construction paper;
- a ruler;
- scissors;
- glue; and
- a pencil.

Children making the round house will need—

- one 12" × 6" sheet of brown paper;
- one 9" × 9" sheet of tan construction paper;
- a thumbtack for the compass;
- a hole puncher for the compass; and
- a 5" × 1" strip of index card for the compass.

Children making the square house will need—

- one 17" × 4" sheet of brown construction paper; and
- one 12" × 6" sheet of tan construction paper.

- Why are the villagers of Tos so happy?
- How is Tos like our town?

I divided the class in half so I could focus on each set of directions for making a home. The girls wrote in their logs while I helped the boys make square homes; then the boys wrote in their logs while I helped the girls make round homes.

To make the houses, I called each group to the floor near me and told them to bring scissors, rulers, and pencils. **Figure 1** lists the materials that I had available for both groups. I gave the students step-by-step directions and modeled each step with my own paper and supplies while highlighting the mathematical language. After I demonstrated each step, the students completed the step. Children can more easily accomplish a task if they hear clear directions and see the process.

Girls' round houses

I gave students the following directions to create a rectangular door:

1. Place your 12" × 6" brown paper rectangle so that it is a wide rectangle.

Figure 2

Girls use a simple compass to create a roof.

Figure 3

Our village of round and square houses

Figure 4

Writing about the houses

2. On the bottom edge of the rectangle, find the middle of the side and draw a four-inch vertical line.
3. Draw a two-inch horizontal line across the top of the four-inch vertical line.
4. Cut both lines.
5. Fold each side to the outside to resemble an open door.

To make the house, students used the rectangle with the cut door to make a six-inch-tall cylinder by gluing the ends together. I did not tell students how much paper to glue. Some students chose to make wider cylinder homes than others did. This independence and individuality is appropriate for young children, and I encourage it.

I always remind my students to help their neighbors, so offering assistance is common and expected in my classroom. I encourage each child to "have a buddy double-check your measurement." This is a valuable practice for everyone.

To explain how to build a roof, I demonstrated each step to the girls while discussing the cuts and shapes as we created them. Hearing the mathematical language helps students feel comfortable using that language in spoken as well as written form.

The following are steps for building a roof:

1. On the 9" × 9" tan paper, create a circle that is nine inches in diameter by using a simple compass. To make a compass, punch a hole in one end of the index-card strip. Working on a carpet square, push the thumbtack through the opposite end of the index-card strip and then through the center of the tan 9" × 9" paper. Slide the pencil through the punched hole and draw with a circular motion (see **fig. 2**). This forms a circle and reinforces the concept that all points on a circle are equidistant from the center.
2. Cut out the circle and make a cut from the outside directly to the thumbtack hole.
3. Create a cone by overlapping the paper and gluing the edge.
4. Decorate the roof by cutting and gluing leaf shapes made with the 12" × 4" green paper.
5. Place the cone roof on top of the cylinder.

Boys' square houses

I gave students the following directions to complete a square house:

1. Fold back one inch of the 17" × 4" brown paper from a four-inch side to create a "tab."
2. Divide the remaining paper into fourths. Measuring will not be necessary. Use folding to create halves. Fold the sixteen inches in half. Do not include the one-inch tab that was created.
3. Next, fold each of the halves in half. Without any measuring, these folds will create four walls of equal length that will serve as the square base.

To make a rectangular door:

1. In one of the middle squares, measure a two-inch vertical line from the bottom edge.
2. Across the top of the vertical line, draw a one-inch horizontal line.
3. Cut both lines.
4. Fold the two sides to the outside to make a door.

Now fold the paper to form a square base for the house and glue the one-inch tab inside the connecting wall.

To make a roof for your house:

1. Fold the tan paper in half to make a "tent-like" roof.
2. You can use the 12" × 4" green paper to make leaf cutouts that you can glue to the roof.

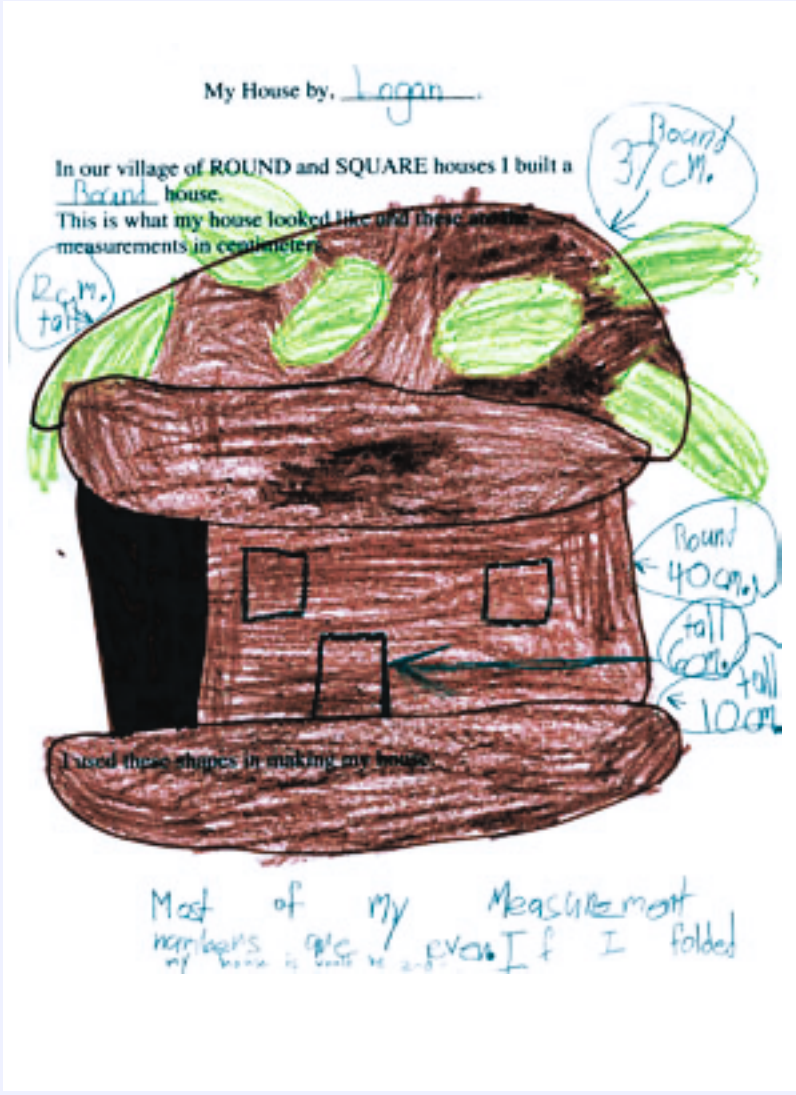
Written-Connection Activity: Reflecting on the Village

My students reflect on stories that we read in guided reading groups or whole groups or that they read independently. Some reflections are discussions and some are written. After they completed the village (see **fig. 3**), I gave students a recording sheet. I explained each part of the sheet, noting that I wanted an illustration to match their home and measurements that showed all the ways that they could measure their homes. I requested metric measurements because we had already measured using standard units when we put the houses together. Most children reported the height (see **fig. 4**). Many boys included the perimeter and width and many girls wrote the circumference and diameter. Some children also measured the roof.

I also asked them to record the geometric shapes that they used in the construction of their homes. The recording sheet had a lot of empty space so that the children could "show what they know" without being given too much structure. This sheet became a part of their student portfolios. **Figures 5** and **6** show some of the students' work.

Figure 5

Logan describes her round house.



Measurement Activity: Extending the Story

Cooking Corn-Okra Medley with my class (see

Figure 6

Gary writes about his square house.

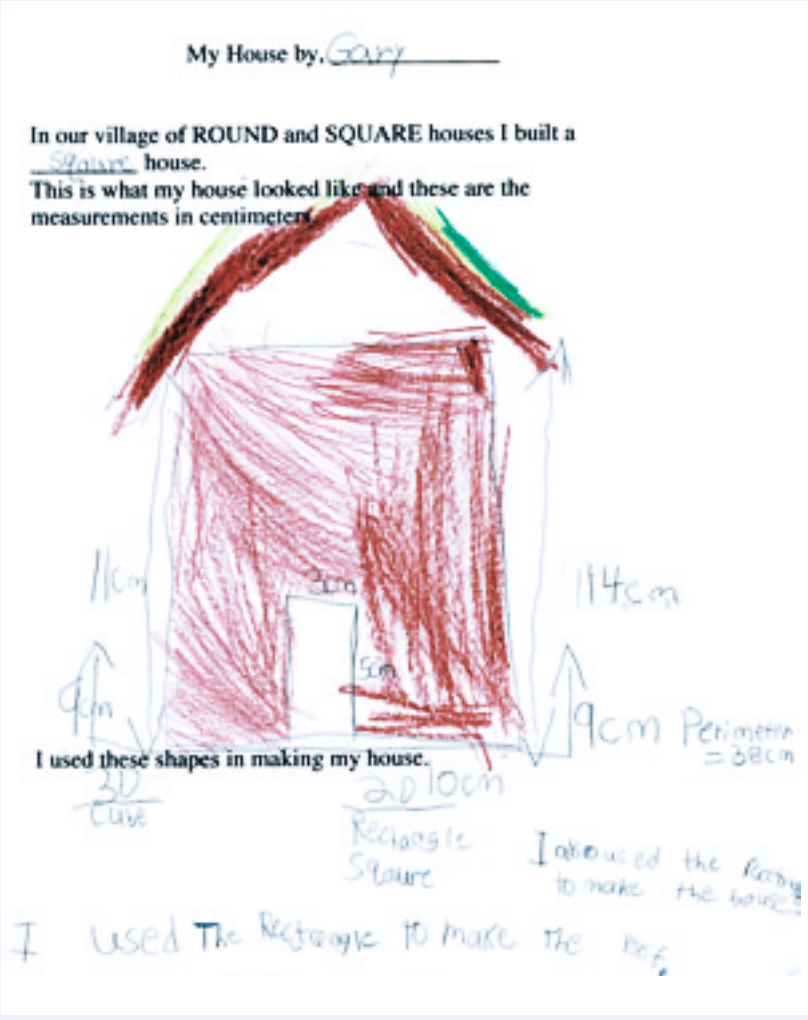


Figure 7

Corn-Okra Medley recipe

1. Add corn scraped from 12 ears to 4 cups of fresh-cut okra.
2. Cook in uncovered skillet with 2/3 cup of butter for 15 minutes on medium heat. Stir frequently.
3. Add 6 chopped tomatoes, 2 tbsp. sugar, and 2 tsp. salt.
4. Cook uncovered for 3 minutes.

This recipe made enough to give each of my twenty-eight students a paper cup filled with vegetables.

fig. 7) is another activity I use to connect *Village of Round and Square Houses* to my mathematics lesson. Okra was an important crop in Africa, and the African slaves introduced this vegetable to the American South. Use the simple Corn-Okra Medley recipe to give students another measuring experience. The children can be a part of the entire process, from chopping board to electric skillet to snack.

I post the recipe in the classroom so that we can read it together and discuss the sequence and the measuring units. Sequencing is an important skill for young children to develop. I might ask, "What do we do after we cook the corn and okra for fifteen minutes?" or "What do we do before we add tomatoes?" This also is a perfect time to say, "We have to add 2/3 cup of butter. How much do you estimate that to be?" or "We are going to add 2 tablespoons of sugar and 2 teaspoons of salt. Which is a greater amount, a teaspoon or a tablespoon? What would you use to measure medicine, a cup or a teaspoon?" My students use their hands and fingers to demonstrate the measurements, showing that they have benchmarks in mind.

I break the recipe into small steps so that everyone can help prepare the food. I have found that children enjoy being able to say, "I helped make this!" My class loved this recipe. I sent home copies to the students' families so that they could re-create the meal at home.

Conclusion

Completing activities with *Village of Round and Square Houses* has become an annual event in my classroom. The book's value extends into many areas of my curriculum, from mathematics to writing to social studies. Its story line, lush illustrations, and extension possibilities continue to intrigue me. When my students come to class with newspaper clippings showing volcanoes, thatched-roof homes, or African villages, I know that they are making connections between our classroom and their world. These connections signal an understanding that learning is part of their lives and not just contained in room 509.

Reference

Grifalconi, Ann. *Village of Round and Square Houses.* New York: Little, Brown & Co., 1986. ▲