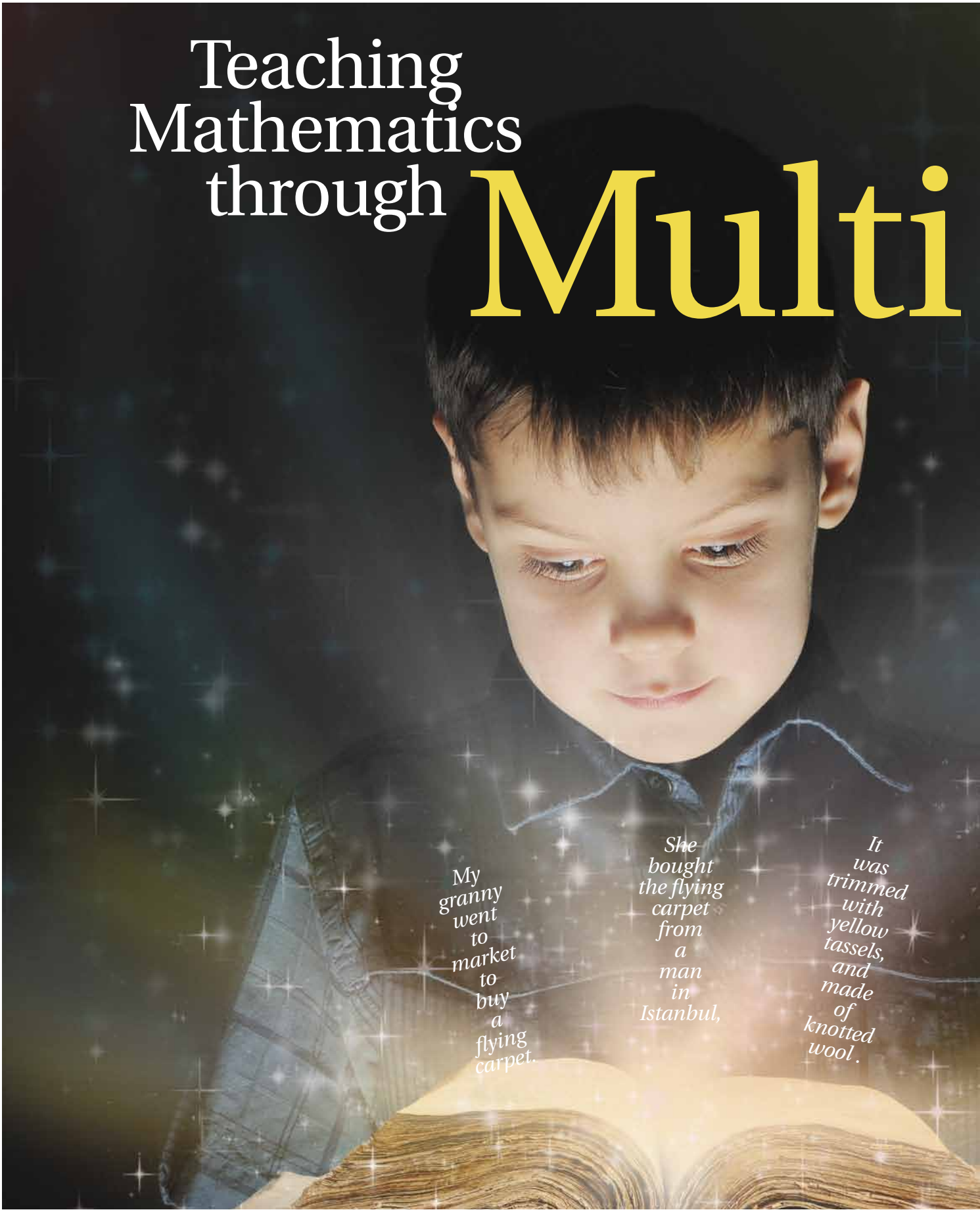
Teaching Mathematics through Multi



VALERIY LEBEDEV/THINKSTOCK

cultural Literature

Enable children of all backgrounds to move beyond their current knowledge base and make culturally relevant mathematical connections.

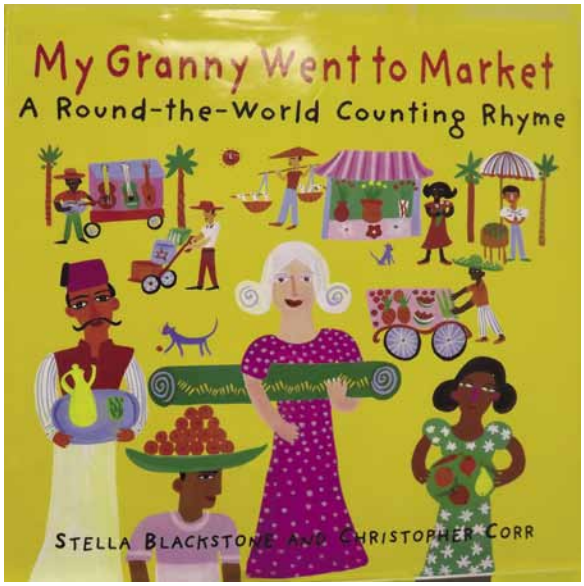
By Nevin Iliev and Frank D'Angelo

The poem at left is from *My Granny Went to Market: A Round-the-World Counting Rhyme* (Blackstone 2005). This popular multicultural children's literature was the basis of a dynamic lesson that focused on strengthening student counting and addition skills through the use of tally marks while increasing their awareness of the global society in which we live.

Incorporating the use of children's literature when teaching mathematics to young children is a developmentally appropriate practice: "Literature … provides a means for children to encounter mathematical concepts and vocabulary in the context of something familiar, a story" (Fogelberg et al. 2008). Moreover, introducing culturally relevant texts into mathematics lessons whenever possible is increasingly important as the faces in our classrooms better reflect the diverse nature of our society. By employing multicultural texts, "a teacher recognizes mathematics as a cultural construct in which all people around the world engage and is able to create a culturally pluralist curriculum that helps all students see mathematics as a creation of people like themselves" (Sleeter 1997, p. 682).

FIGURE 1

From the storybook's front cover, students could not tell that Granny was holding a magic carpet.



Including multicultural literature

"Mathematics … can be taught in ways that constantly *look beyond* what is being learned and what is already known" (Kumashiro 2001). Multicultural literature that focuses on mathematics enables children to move beyond their current knowledge base and make culturally relevant mathematical connections through such universal topics as money, time, and measurement. Furthermore, "using simple stories to raise profound questions is among the oldest and best of teaching techniques" (Peterson 2001). Regardless of their background,

> children enjoy learning words and symbols from other countries. This expands their worldview and may cast a new light on their native system. Good teachers show an interest in the cultures of their students, and the diversity of cultures in classrooms provide many opportunities for sharing and learning. (Reys et al. 2007, p. 154)

With culturally diverse texts, "excellent mathematics teachers … take the time to get to know their students, then shape their pedagogy around relationships with them" (Sleeter 2012, p. 571).

As students listen to stories that feature cultures other than their own, they become curious about how others are similar to and different from themselves. Then, as they study the illustrations found in these books after listening to their story lines, their curiosity continues to grow. From this initial natural curiosity, children gain understanding of the interconnectedness of the global world. Specifically, multicultural literature that features familiar mathematical concepts, such as counting and skip counting, enables children to understand from an early age that math concepts are universal in nature. Children must be able to connect what they are learning in their classroom to global society.

A mathematical multicultural read-aloud

This section describes a mathematics lesson that included a read aloud of *My Granny Went to Market: A Round-the-World Counting Rhyme* by Stella Blackstone and illustrated by Christopher Corr. It was taught to first-grade ESL (English as a second language) students and was designed to increase students' counting and addition skills through the use of tally marks and tally tables. We chose the book because a natural connection could be made in understanding one-to-one correspondence (objects to number). The exposure to this counting concept assists in solidifying the concept of number constancy, which is a vital component of counting mastery. Finally, we created this lesson so that students would have opportunities to read, write, think about, and discuss concepts they learned throughout the lesson.

The story is the tale of a grandmother who goes on a quest around the world to purchase different items for her granddaughter. This vibrant book features depictions of different cultures, rhyme, colorful folk art, and fanciful items to count.

Prereading activities

First, I (Iliev) drew a T-chart on the board and explained to my students that a T-chart is a type of graphic organizer that is used to visually represent information. For this lesson, I explained that they would draw pictures of items found in the book I would be reading to them and that they would be using tally marks to count the total number of items. Next, I labeled both sides of the chart. I wrote the word *goods* on one side of the chart and *total number* on the other side of the chart. I defined each word and then introduced the term *consumer*. One example that I offered to illustrate how my students and their parents are *consumers* who purchase *goods* was

that of shopping in a grocery store. Because this is a common activity, the children were able to easily connect these terms with their real lives. With this brief example, I also connected the use of money with the purchase of goods. Then I explained that the main character (Granny) in the story we were going to read was also a consumer who would purchase goods throughout the story. Our job would be to use tally marks to keep careful track of Granny's purchases and make observations about the countries she would visit and the objects she would purchase while on her journey.

Reading activities

To begin, I first showed students the front cover of the book (see **fig. 1**). I pointed to Granny and asked students what they thought she was holding. Their answers varied from a type of food to a possible game. Although students could not initially tell what the item was, once I showed them the picture of Granny on the back cover, they sang out in chorus, "a magic carpet." This was correct; the picture depicted Granny flying on a magic carpet. This created excitement at which point I turned back to the front cover and asked students to look carefully and take notice of similarities and differences they saw in the picture. They noted that people were carrying food, were dressed differently, and had different facial features. I asked them to continue making observations throughout the story.

I began to read the story aloud. After reading each page, I called on a student to identify and count the number of items that Granny had purchased. I then asked the student to complete the T-chart with a picture of the type of goods Granny had purchased and the correct number of tally marks to represent the total number of goods she had acquired. During this part of the activity, several students noted that Granny must have had a lot of money to spend; she had purchased so many items. I was pleased that my students were making these additional real-world connections to what we were reading. Additionally, after we added the fourth item to the T-chart, one child observed, "It looks like we are creating a pattern." I asked if students could predict the quantity of goods Granny would purchase in the next country she would visit. They correctly answered five goods. This observation was important, as students will ultimately learn to use tally marks in conjunction with surveys to predict future outcomes. This also serves as a foundational skill for data analysis, specifically, graphing.

As I read the story, students counted the items by ones and sometimes skip-counted by twos. After using these strategies to count the items, students were then encouraged to view the pictures and observe the differences in cultures including clothing, objects, climate, dwellings, geography, and what makes the individuals that Granny encounters in the story unique. Students noted the snow in Russia and mountains in Switzerland. They remarked that Kenya looks hot and has some of the same animals there that we have in local zoos. This presented an opportunity for me to tell the class that many of the animals we see in our zoos are native to other countries. Several students pointed out that Granny had purchased items they have in their own homes, such as cats and kites. Furthermore, as we progressed through the book, students continued to note that with each new country, Granny would purchase one more good than she had purchased in the previous country, thus confirming their prediction of the mathematical pattern.

Multicultural literature not only enables children to make culturally relevant mathematical connections but also helps them understand that math concepts are universal.

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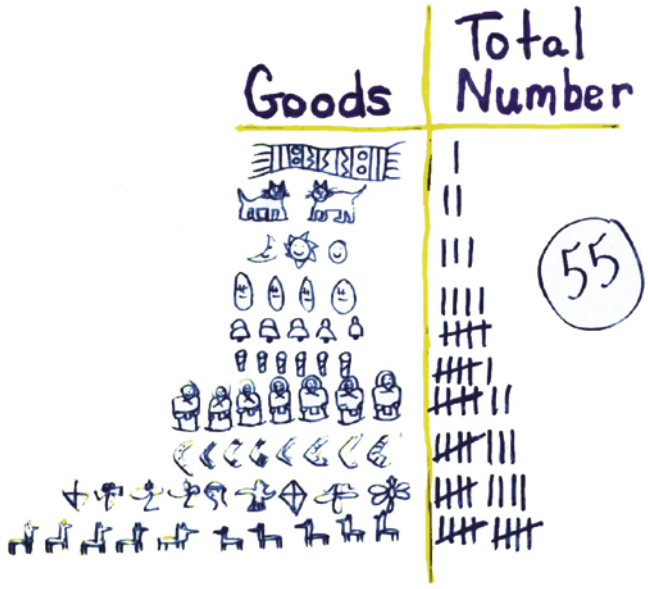
FIGURE 2

The class used the chart on the last page of the book to check the number of tally marks on the class chart.



Postreading activities

At the story's conclusion, we returned to our T-chart and counted our tally marks (see **fig. 2**). The last page of the book included a chart with pictures of the items purchased and the total number of each item, so we used this chart to double-check our numbers. Then we totaled the number of goods Granny had purchased throughout the story and determined a total of fifty-five. Students arrived at this total by counting the pictures of the goods purchased and/or the tally marks. They counted by ones or skip-counted by twos or fives. Additionally, some students used the cardinal method of counting, which involves calculating the total value of the set to compute the total value of the tally marks. I prompted students through various questioning techniques to communicate their reasoning and proof skills, and they consequently mastered them through repeated experiences. Students exhibited these skills when they answered missing-addend questions, using data that the tally charts showed. Further, skills were illustrated when students looked at the total number and were able to identify which item Granny had purchased the most, an important precursor to the mathematical term *mode*. Additionally, we also counted the number of pushpins on the map and totaled the number of countries Granny had visited (ten).

Finally, to extend the activity, I asked which country students would most like to visit. As they raised their hands for each country, we counted the number of hands and kept a tally of the numbers on the board. The overwhelming winner was Japan; students thought that kites were the best items that Granny had purchased. To complete and assess the lesson, I had students write their own conclusion to the open-ended story in their writing journals. I asked them to think of the country for which they had voted and to write about what additional items they would like to purchase if they could visit this country. I asked them to also draw their own T-chart to depict the items purchased and tally marks to represent the total number of items purchased. They were to then add up all the items and circle the total number they had counted. While circulating around the classroom as students were completing this activity, I noted that students used different strategies to count the tally marks. For example, when one boy converted his tally marks to cardinal numbers, he skip-counted by fives to arrive at fifteen sets of chopsticks (see **fig. 3**). Another child, however, added five twice to her mathematical equation instead of combining the fives to find a sum of ten. Students enjoyed this activity and were eager to share their journal entry with a partner at the close of this lesson.

Making connections

Because multicultural literature is a vehicle through which children can make significant connections to the world in which they live, incorporating its use into all aspects of teaching

FIGURE 3

Students used different strategies to count tally marks. When the boy who sketched the figures below converted his tally marks to cardinal numbers, he skip-counted by fives.

is important for educators to do. In particular, the specific inclusion of multicultural literature when teaching mathematics gives children the opportunity to think about mathematical concepts in a global sense from a young age. Multicultural literature that features common mathematical concepts, such as counting, enlightens students as to similarities in one another's cultures. Educators who incorporate multicultural literature into their mathematics lessons demonstrate understanding of children's natural need to find commonalities between each other. The lesson illustrates how children can learn mathematics and gain global awareness when literature is purposefully chosen. Finally, it demonstrates that children's learning can be enriched when multicultural texts are included in mathematical lessons.

Common Core Connections

K.CC.B.4
1.NBT.A.1

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