Sir Cumference and All the King's Tens

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Ages 8–11

The Knightly Number Neighborhood
Activities for teachers and students
By Cindy Neuschwander

Understanding place value gives students a foundation for knowing how numbers operate. Here are some activities that connect to *Sir Cumference and All the King's Tens* and support this learning.

All the World's Digits

Gather together models of the digits 0–9. Use large representations, at least 6 inches tall. These can be made of cardboard, sponge material, or plastic. Place them all in a large paper bag with "The World's Digits" written on the outside of the bag. Let students know that the real term for these 10 special numbers is *digit* and that any number can be made from them. To illustrate this, choose students to pick a digit out of the bag and stand in the front of the classroom. The rest of the class can then call out the name of the number that digit makes. For example, if a student chooses a 2, standing alone at the front of the class, the rest of the students would call out, "That's a two!" Then a second student is chosen to select another digit from the bag and stand next to the first student. If a 9 is chosen, the class will call out, "29!" or "92!" depending on where the second student stands. You can continue this activity until all ten digits are used. This will make a very large number that students may need help in reading.

This activity helps students to understand that all numbers are comprised only of 10 different digits, and that where the digits "stand" determines the number.

Story Connections

After reading *Sir Cumference and All the King's Tens*, pass out Knightly Number Neighborhood number boards to each student. These can be backed with colored construction paper and laminated for durability. Each student should also have a baggie full of multiples of all ten digits. These digits will be placed on the lines under the tents in the neighborhood. Having at least four of each digit will give students many choices as they build numbers.

Go through each part of the story, recreating on the number board the people at King Arthur's birthday party. This can start by building 9, representing the nine people who fit into the tiny tent on page 12 of the story. The tiny tent could not hold more than nine people. Sir Cumference then decides to arrange all the people into groups of tens because it is easier to count. That can be represented on the number board by one group in the tens tent and a zero in the ones tent because no one is inside that littlest tent any longer.

Lady Di requests that the party guests regroup themselves into larger formations of 100, to make the counting even easier. This can be represented by the digit one in the hundreds place and a zero in the tens tent and another zero in the ones tent, as both of those tents are empty. They are too small to hold 100 people.

Lady Di then counts all the partygoers. These can be represented on the number board. Nine can be placed on the line under the hundreds tent, representing 900 folks. An 8 can be put under the tens tent, showing 80 people. Finally, a 7 can go in the ones tent, meaning there are seven people in the tiniest ones tent. Altogether, Lady Di counts 987 for lunch.

Then 25 more people arrive. Lady Di groups them, completing another group of 100. This now makes ten groups of one hundred, or one thousand. Then there is just a group of ten and two additional farmers off to the side.

As more people arrive from Camelot, they are grouped accordingly. Students can follow along as the story unfolds, changing the numbers as they grow.

Finally, participants arrive from Addingmoor. The number is not specifically mentioned in the story so that students and teachers can experiment with an infinite number of choices, practicing building numbers with understanding. How many people could be in each tent?

Building Numbers

After the teacher reads the story, more numbers can be imagined and built on the Knightly Number Neighborhood boards. Using language from the story, the teacher can ask students for a digit and which tent it goes in. That digit represents how many people are in that tent. For example, the teacher may say, "Nick, give me a digit and which tent it goes into." Nick might say, "Put a 7 in the hundreds tent." That means there are 700 people in that tent. As other students contribute their digits and tents (or places), finally an entire number is built. Then students can practice reading that number.

Depending upon the age and ability of students, the Knightly Number Neighborhood can be as large or as small as necessary. A first grade class might only have three tents in its neighborhood; a ones tent, a tens tent, and a hundreds tent. A fourth grade class would likely have a much larger Knightly Number Neighborhood, going up to a tent that could hold a million partygoers.

Rearranging Built Numbers

After a number has been built and read, the teacher can say to the students, "Can you take the digits you have used and rearrange them into an order that makes it the biggest number possible?" Then students can share their arrangements, reading their solutions. Similarly, the smallest number possible can be made with the same selected set of digits on the Knightly Number Neighborhood card. Students will begin to see patterns: the largest number has digits that descend in value while the smallest number has digits that ascend in value.

Extensions

Playing with numbers on the Knightly Number Neighborhood board gives students plenty of opportunities to experiment with digit placement and value. Don't be surprised if students want to place 9s in all the tents. This is a large, exotic number for them!

They also love to see what happens when there are 0s in the number. A good way to express this is to say, "It looks like that tent is empty. There is no one inside right now." That way, students begin to understand zero as a placeholder. The tent or place did not go away—it is just empty.

Expanded notation, or stretching out numbers into their parts, can also be incorporated into Knightly Number Neighborhood activities. Under each digit selected in its tent (or place), the teacher or students can write how many people are in each tent (or value). If students use laminated number boards, they can use an overhead pen to write this number under the place, putting + signs between each tent. In this way, they practice identifying the value of each digit on the board and seeing the value of the entire number.

As students gain experience with this activity, teachers can begin to move their language towards mathematical terms. Instead of *tent*, the word *place* can be substituted. Instead of *how many people are in a tent*, the word *value* can be used. In this way, students can begin to think about the concept of place value with a concrete story and end with an abstract understanding of place value.

Many experiences with this Knightly Number Neighborhood concept can help students have a stronger understanding of place value. This concept can also be used for teaching decimals. Numbers on the right side of the decimal live in ever-smaller tents!

Whatever activities teachers choose to use, they can help students to enjoy the math!

Cindy Neuschwander

"You are the boss of your stories. You can make anything happen."

Cindy Neuschwander is a native Californian born in San Diego, but she has lived in many places, including Germany, England, Austria, and Hawaii. She received a BA in international studies from Willamette University and an MA in education from Stanford University. She has been teaching since 1975, both at the high school and elementary levels.

As a mathematics education specialist, Cindy sought ways to make math fun, interesting, and comprehensible to her students. In 1992, while living in England, Cindy began working on her first book with this goal in mind. *Sir Cumference and the First Round Table* took five years to reach publication, but it remains a very popular book for its presentation of math concepts, as well as for its amusing and exciting story.

It has been followed by further adventures of Sir Cumference and his family, including *Sir Cumference and the Dragon of Pi, Sir Cumference and the Great Knight of Angleland, Sir Cumference and the Sword in the Cone, Sir Cumference and the Isle of Immeter*, and *Sir Cumference and All the King's Tens.*

Cindy speaks at conferences often about writing, mathematics, and being an author. In her spare time, when she isn't writing or dreaming up new math adventures, Cindy enjoys activities with her family. The entire Neuschwander clan has spent time on five of the earth's seven continents. Only Australia and Antarctica remain to be visited.

Cindy is also the author of *Amanda Bean's Amazing Dream, 88 Pounds of Tomatoes, The Chocolate Champs* (all Scholastic), *Patterns in Peru, Pastry School in Paris,* and *Mummy Math* (all Henry Holt & Co.). She lives in Pleasanton, California.

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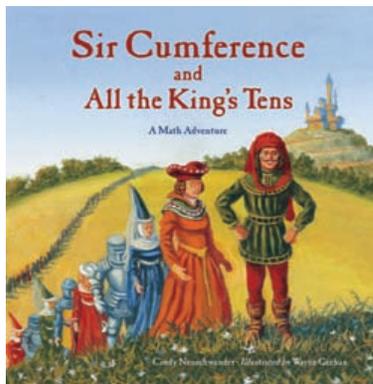
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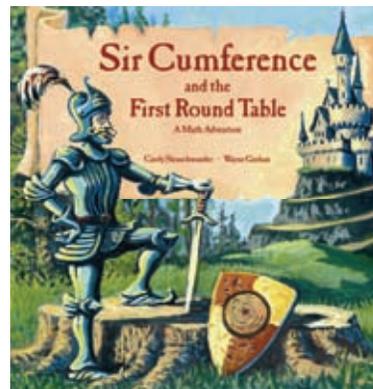
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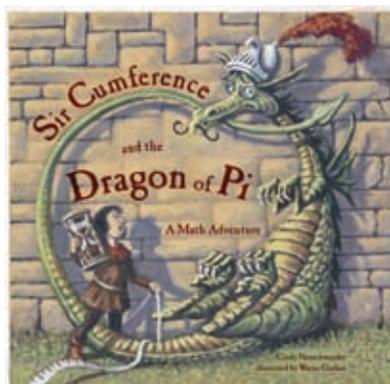
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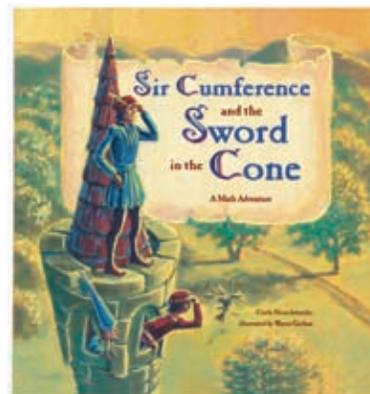
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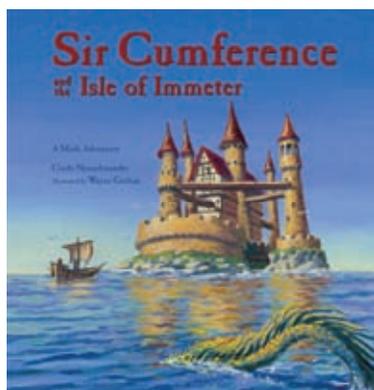
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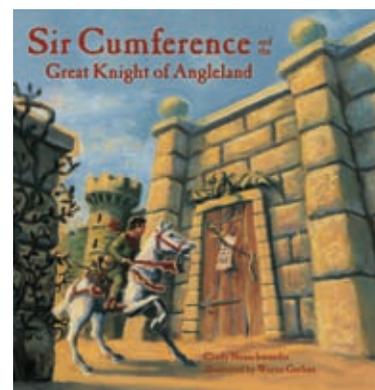
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The Knightly Number Neighborhood

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Expanded Notation
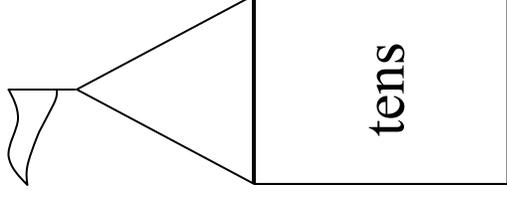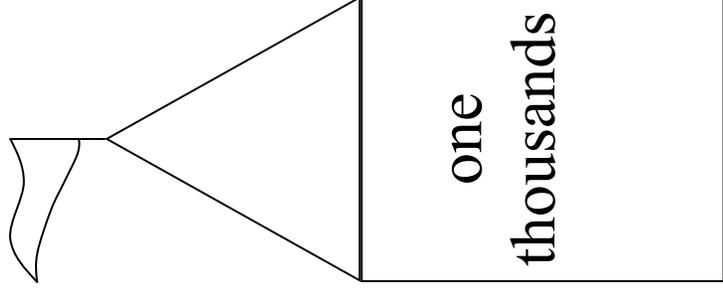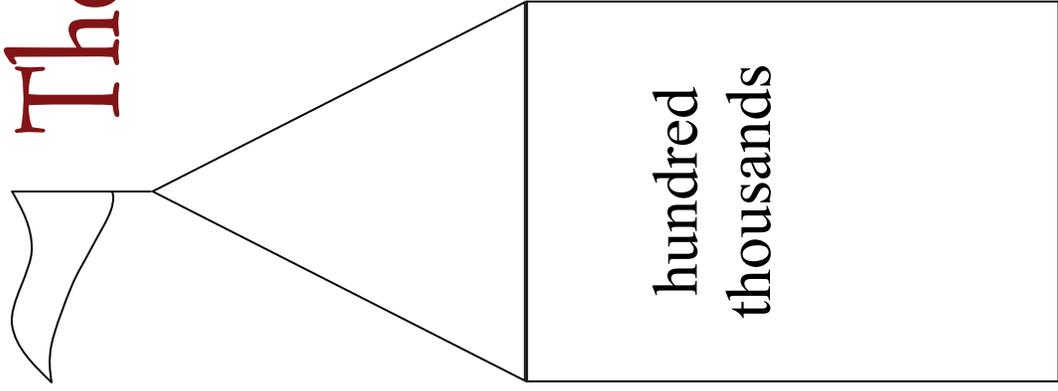
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