

At the Heart of Math

by Ellis Hein

Do you want your students to enjoy math? The first thing they need is an intuitive sense of whole numbers. Most math texts try to accomplish this with a number line. The trouble is, a number line can't convey how numbers work. Take some time to look at numbers. You soon begin to see that while there seems to be an endless supply, certain aspects are cyclical. I suggest a new model for our numbers. A model consisting of an increasing number of shells, like ripples generated by dropping a rock into water. Each shell is made up of a spiral that almost makes two complete revolutions. Think of a wound spring that only has two turns. If we completed the second turn, we would need a symbol for the number 10, say a *. However, our numbers don't work that way. We need to chop off the spiral at nine. The beginning point is zero. Directly above the zero point, one turn up, is the number five. Directly above one is six, above two is seven, above three is eight, and above four is nine.

Now imagine your name is Ones. You are on the spiral of the first shell, standing at zero. If I hand you one item, you jump to the number one. If I hand you another item, you jump to the number two. If I keep on handing you items, you soon end at the top of the spiral at nine. But silly me, I hand you another item and you jump to...oops! You come crashing down to land at zero.

The force of your fall throws your stack of items into the hands of your friend, Tens, standing on zero of the next spiral. Tens has now jumped to one.

Suppose I keep handing you items so that you keep having to jump from number to number and come crashing back down again and again until you have driven Tens up to nine and you are on nine. Then what do I do but hand you another item. You crash to zero and toss the stack to Tens. Tens crashes to zero and tosses his stack to Hundreds who was standing at zero on the third shell.

If I run out of items to hand to you, here we would stop. You would be standing on zero, Tens would be standing on zero and Hundreds would be standing on one. We would write that number as one "Hundreds" zero "Tens" and zero "Units" or "100". You might think of this sort of as a score. At which point you will quite rightly point out that you, Units, have been doing the bulk of the work—all that running up the spiral only to crash down to zero time and again. But the better way to think of it is that your score has gotten so big, that you keep getting bigger and stronger friends to hold it for you. That score is really yours and everybody knows it.

Now, if you have quite caught your breath, I have a whole castle full of beads to count. Ready?

Ellis Hein and his wife, Rebecca, homeschool their two children. Ellis teaches the math and science while Rebecca teaches the music and literature.

To see availability of other math resources by Ellis go to <http://www.health-helps.com/math.html>

To learn more about this homeschooling family, visit <http://www.rebeccahein.com>