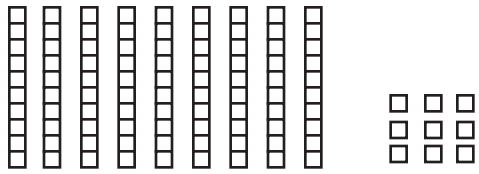
LESSON 9

Place Value: Units and Tens

I define this important subject as "Every value has its own place!" To an older child I would add, "Place determines value!" Both are true. There are 10 symbols to tell you how many, and many places to represent what kind or what value. Zero through nine tell us how many; ***units*** and ***tens*** tell us what kind. For the sake of accuracy, units will be the word used to denote the first value, instead of ones. One is a counting number that tells us how many, and units is a place value that denotes what kind. This will save potential confusion by not saying "10 ones" or "one ten." Remember, one is a number and units is a place value. The numerals (0, 1, 2, . . . 9) tell us how many tens or how many units. We begin our study focusing on the units and tens, but there are other values, such as hundreds, thousands, millions, billions . . .

When teaching this, I like to use a street since I'm talking about a place. I call the street ***Decimal Street*** and have the house for the little green units and the house for the tall blue tens next door to each other. We don't want to forget that when counting we only count from zero to nine and then start over. To make this more real, begin by asking, "What is the largest number of units that can live in this house?" You can get any response to this question from zero to nine, and you might say "yes" to all of them, but remind the student that the largest number is nine! So we imagine how many little green beds, or green toothbrushes, or green chairs there would be in the house. Ask the student what else there would be nine of. Do the same with the tens. Remember that in the Units house, all the furniture will be green, and in the Tens house it will be blue like the blue ten bars.

There are directions for making a Decimal Street poster in lesson 10.



Decimal Street

Throughout the program, whenever we teach we will employ the following strategy: Build—Write—Say. To teach place value, we will build the number, count how many in each place, write the number, and then read what we've written.

Let's build 42 (four tens, two units). After building, count how many are "at home" in each house. I like to imagine going up to the door of each home and knocking to see how many are home in each place. Then write the numeral 42 as you count (always beginning with the units) to show the value on paper. Finally, say, "Four tens and two units or forty-two." Build another one and have the student write how many are home. When he or she understands this, you write how many on paper, and have the student build it! Try 37. After he builds it, you read what he has built. Keep practicing back and forth with the teacher building and the student writing and vice versa.

Here is another exercise I do to reinforce the fact that every value has its own place. I have the student close his or her eyes as I move the pieces around by placing the blue tens where the units should be and vice versa . I then ask the student to make sure the blocks are all in the right place. You might call this "scramble the values" or "walk the blocks home." As the student looks at the problem and begins to work on it, I ask, "Is every value in its own place?"

You've probably noticed the important relationship between language and place value. Consider 42, read as "forty-two." We know that it is four blue ten bars (for-ty, "ty" for ten) and two units. When pronouncing 90, 80, 70, 60, and 40, work on enunciating clearly, so that 90 is ninety, not "ninedee." 80 is eighty, not "adee." When you pronounce the number accurately, not only will your spelling improve, but your understanding of place value will improve as well. The number 70 (seventy) is seven tens; 60 (sixty) is six tens. The number 40 is pronounced correctly but spelled without the "u" in it. Carrying through on this logic, 50 should be pronounced "fivety" instead of "fifty." The numbers 30 and 20 are similar to 50; not completely consistent but close enough so we know what they mean. The teens are the real problem.

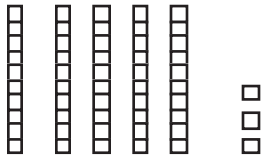
Some researchers have concluded that one of the chief differences between western (American and Canadian) and eastern (Chinese and Japanese) students is their understanding of place value. The culprit, in the researchers' eyes, is the English language. In eastern culture, when a child can count to nine, with a few minor variations, he can count to 100. This is not so in English with such numbers as 10, 11, 12 and the rest of the teens. Not only are these numbers difficult to teach because there doesn't seem to be rhyme nor reason for their origin, but more importantly, they do not reflect and indicate place value. To remedy this serious deficiency, I'm suggesting a new way to read the numbers 10 through 19. You decide whether this method reinforces the place value concept and restores logic and order to the decimal system.

Ten is "onety," 11 is "onety-one," 12 is "onety-two," 13 is "onety-three," . . . 19 is "onety-nine." Now it is not that the student can't say "ten," "eleven," "twelve," but learning this method enhances his understanding and makes math logical again. Also, students think it is neat.

When presenting place value, or any other topic in this curriculum, model how you think as you solve the problems. As you the teacher work through a problem with the manipulatives, do so verbally, so that as the student observes, he also hears your thinking process. Then record your answer.

Example 1

given visually



As you look at the picture, slowly say it, proceeding from left to right, "fifty-three." Then count, beginning with the units, "1-2-3" and write a "3" in the units place. Then count the tens, "1-2-3-4-5" and write a "5" in the tens place. Do several of these, and then give the student the opportunity to do some.

Example 2
74 (given the written number)

Read the number seventy-four, and then say "seven-ty or seven tens" and pick up seven blue ten bars. Then say "four" and pick up four green unit pieces. Place them in the correct place as you say, "Every value has its own place." Do several of these, and then give the student the opportunity to do some.

Example 3
"sixty-five" (given verbally)

Read the number out loud slowly. Then pick up six blue ten bars as you say, "six-ty" or "six tens." Then say "five" and pick up five green unit pieces. Place them in the correct place as you say, "Every value has its own place." Then write the number 65. Do several of these, and then give the student the opportunity to do some.

Game for Place Value

Pick a Card - Make up a set of cards with 0 through 9 written in green. Then make another stack of cards written in blue with the same numbers 0 through 9. Shuffle the green cards, pick one, and show that number of green unit blocks. If a child picks a green 4, count out four green unit blocks and show them.

When the child is proficient at this game, try it with the blue cards and do the same as before, except choose blue ten bars instead of the green unit blocks. When the student can do the tens well, add the green cards to the blue cards. Have the child choose one card from the green pile and one card from the blue pile and then pick up the correct number of blue ten bars and green unit blocks.