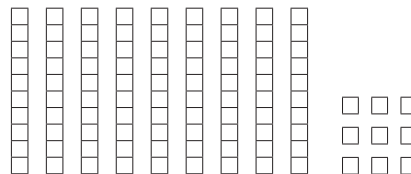


Place Value: Units and Tens

I describe this important subject by saying, “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.” 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, and so on.

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 greatest 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 greatest number is nine! 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 house and knocking to see how many are at 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 number and have the student write how many are at 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 also improve. 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.

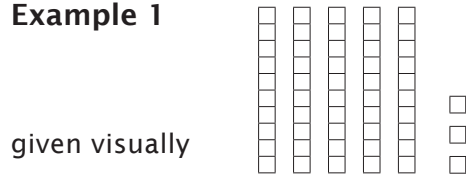
The teens can be problematic. Some researchers believe that students in Japan and China have a better understanding of place value than students in Europe and the United States. One of the reasons for this is that, in the Chinese and

Japanese languages, the words for numbers are very regular, and the words for numbers greater than nine are built quite logically from the words for zero to nine. In contrast, there are a number of irregular words for numbers in English and in other European languages, and the English language in particular is very irregular in the words for eleven through nineteen.

To compensate for this, 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 fun.

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

Example 1



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, 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.