Place Value Discs

Place value discs are math tools students use to represent quantities. They are best used when students understand the values printed on the discs. All Sensational Math™ place value teaching aids use the same place value color-coding system for easy visual reference to values. These colorful discs allow students to "see" operations and understand concepts in a concrete way.

Place value mats allow students to organize quantities. You can either purchase a class set of place value mats or make a simple master of a place value mat using an 11 x 17 sheet of paper.

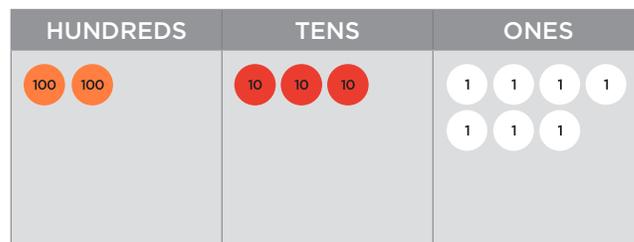## INTRODUCING PLACE VALUE DISCS

1. BASIC USAGE

Example 1: Using Place Value Discs and a place value mat, have students build 237 using:

2 (100 's)

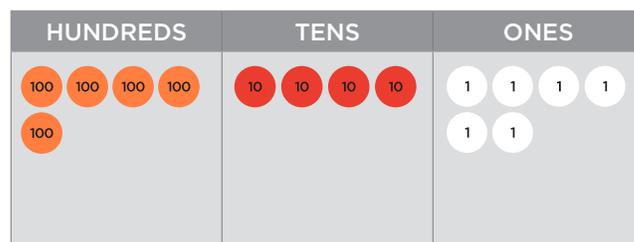3 (10 's)

7 (1 's)

237 = 2(100) + 3(10) + 7(1)

HUNDREDS	TENS	ONES
100 100	10 10 10	1 1 1 1 1 1 1

Example 2: Using Place Value Discs and a place value mat, the teacher builds 546 using:

5 (100 's)

4 (10 's)

6 (1 's)

THEN Students write the quantity in standard form.

| HUNDREDS	TENS	ONES
100 100 100 100 100	10 10 10 10	1 1 1 1 1 1

2. DEMONSTRATING MORE/LESS

The concept of more/less is foundational for addition and subtraction. Using Place Value Discs and a place value mat, build the number 845. Ask the following:

Example 3: What is 20 more than 845?

Students add 2 (10 's) to the place value mat and record the number.

HUNDREDS	TENS	ONES
100 100 100 100	10 10 10 10	1 1 1 1
100 100 100 100	10 10	1

10 10
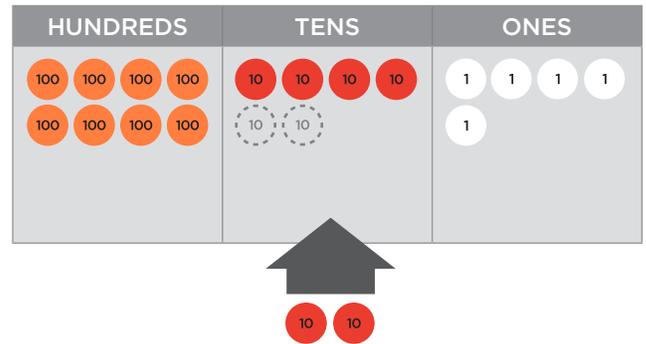
3. DEMONSTRATING COMPARING QUANTITIES

Use Place Value Discs and a place value mat to compare numbers. Divide the place value mat into two or three sections. Plot a number in each section to compare the quantities.

Example 4: Compare 4,343 and 4,334.

THOUSANDS	HUNDREDS	TENS	ONES
1000 1000 1000 1000	100 100 100	10 10 10 10	1 1 1
1000 1000 1000 1000	100 100 100	10 10 10	1 1 1 1

ADDITION

Use Place Value Discs and a place value mat to add whole numbers.

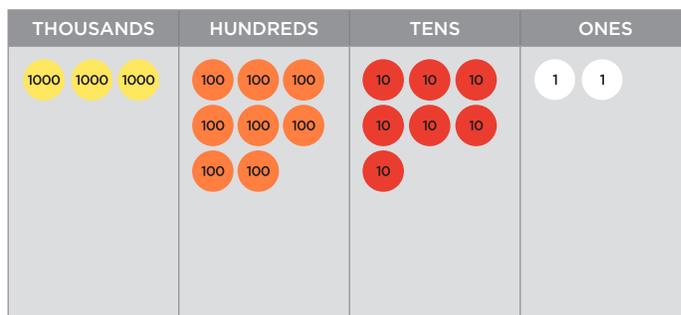**Solve:** 3872 + 2364 ("2364 more than 3872")

1. Students place discs on the place value mat to represent the first value. Working from left to right, students place:

   3 (1000 's) in the thousands place

   8 (100 's) in the hundreds place

   7 (10 's) in the tens place
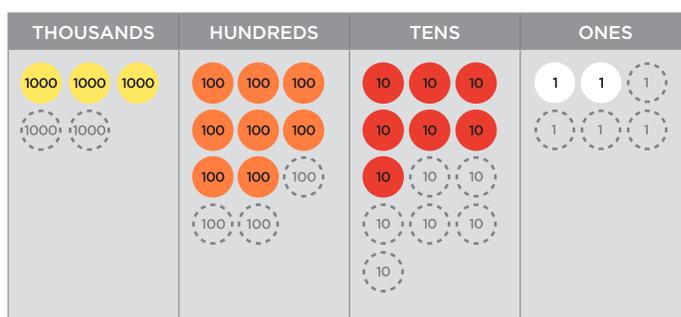
   2 (1 's) in the ones place

THOUSANDS	HUNDREDS	TENS	ONES

2. Students continue by adding 2,364 in the appropriate columns on the place value mat:

   2 (1000 's)

   3 (100 's)

   6 (10 's)

   4 (1 's)

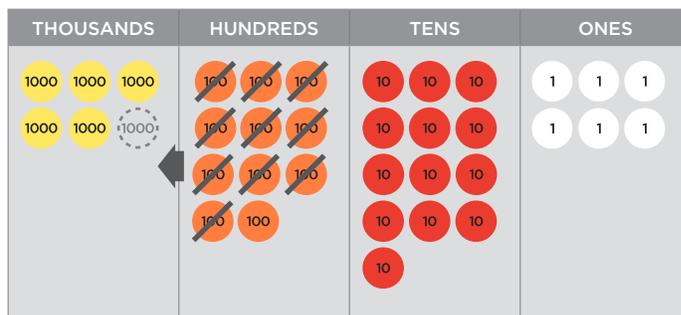| THOUSANDS	HUNDREDS	TENS	ONES

3. Since no regrouping is required in the thousands place, students will begin regrouping in the hundreds place. They pick up 10 (100 's) and exchange them for 1 (1000) and place the new disk in the thousands place.

THOUSANDS	HUNDREDS	TENS	ONES

4. Students check each column for trading opportunities. Once all trades have been made, students are ready to solve the problem.

THOUSANDS	HUNDREDS	TENS	ONES
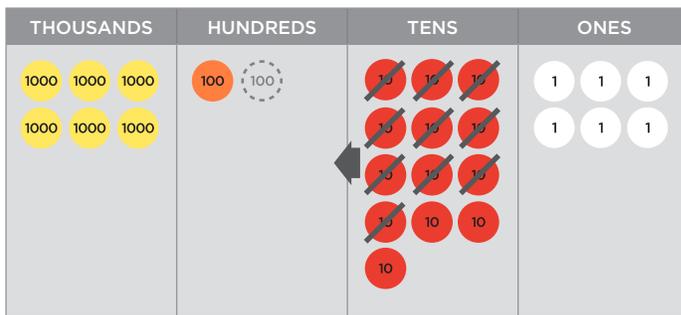
5. Students record the quantity of each column, writing it in expanded form and standard form.

   Expanded: 6000 + 200 + 30 + 6
   Standard: 6,236

THOUSANDS	HUNDREDS	TENS	ONES

ADDITION: Place Value Discs
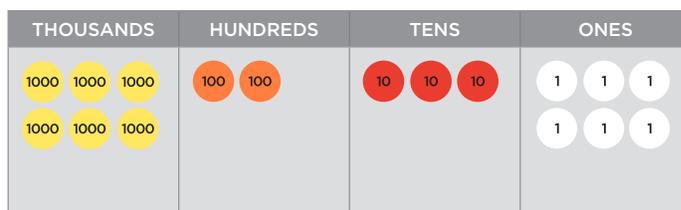
SUBTRACTION

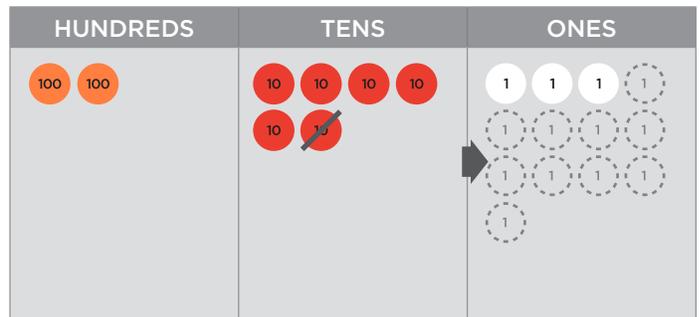Use Place Value Discs and a place value mat to subtract whole numbers.

Solve: 263 − 54 ("54 less than 263")

1. Using Place Value Discs and a place value mat, students make 263 using:

   2 (100 's) in the hundreds place

   6 (10 's) in the tens place

   3 (1 's) in the ones place

   Students will only be plotting the first number.

HUNDREDS	TENS	ONES
100 100	10 10 10 10 10 10	1 1 1
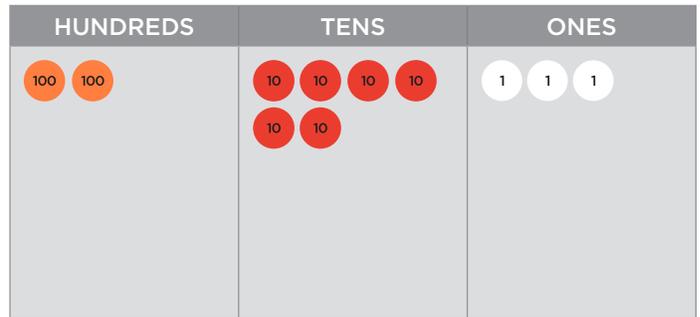
2. Working from right to left, since 4 (1 's) cannot by subtracted from 3 (1 's), students will trade or regroup 1 (10) for 10 (1 's), making a total of 13 (1 's).

HUNDREDS	TENS	ONES
100 100	10 10 10 10 10 10	1 1 1 1 1 1 1 1 1 1 1 1 1

3. Now students can begin to subtract 54 by subtracting the 4 (1 's) from the ones column.

   THEN, moving left to the tens column, students now take away 5 (10 's).

   No regrouping is required.

HUNDREDS	TENS	ONES
100 100	10 10 10 10 10	1 1 1 1 1 1 1 1 1 1 1 1 1

4. The remaining discs represent the difference.

   Expanded: 200 + 0 + 9
   Standard: 209

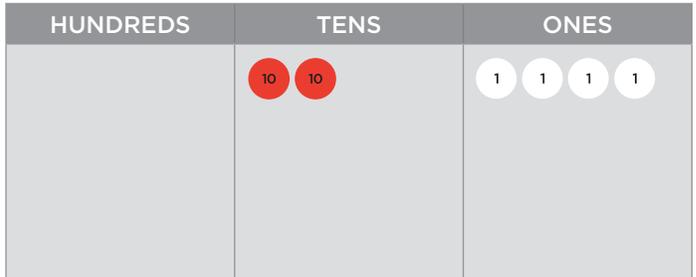| HUNDREDS	TENS	ONES
100 100		1 1 1 1 1 1 1 1 1
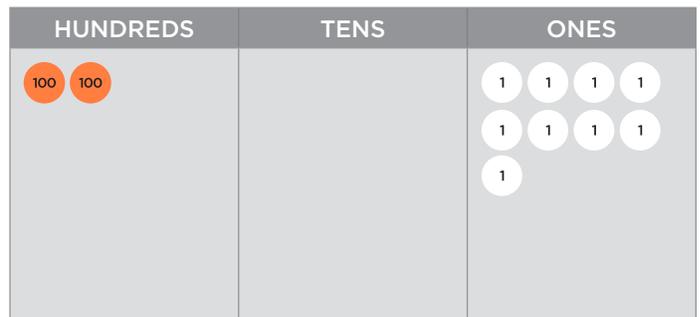
MULTIPLICATION

Use Place Value Discs and a place value mat to multiply whole numbers.

Solve: 3 x 24 ("3 groups of 24")

1. Have students make 24 in the tens and ones place.

HUNDREDS	TENS	ONES
	10 10	1 1 1 1

2. Then have students make a second and third group of 24 directly below the first set.

   They have created a visual representation of 3 x 24 (3 groups of 24).

HUNDREDS	TENS	ONES
	10 10	1 1 1 1
	10 10	1 1 1 1
	10 10	1 1 1 1

3. Working from left to right, students look for regrouping opportunities.

   In this example, no regrouping is necessary in the tens place, **BUT** the ones place can trade 10 (1)'s for 1 (10).

   Students remove 10 (1)'s and place 1(10) in the tens column.

HUNDREDS	TENS	ONES
	10 10	1 1 1 1
	10 10 10	1 1 1 1
	10 10	1 1 1 1
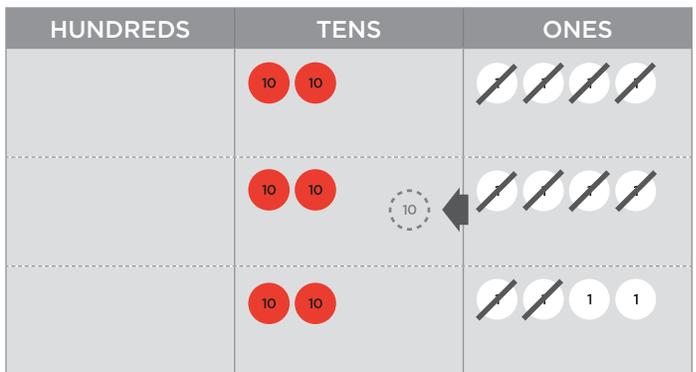
4. Students record the quantity in each column, writing in expanded form and standard form.

   Expanded: 70 + 2
   Standard: 72

HUNDREDS	TENS	ONES
	10 10 10 10 10 10 10	1 1

DIVISION

Use Place Value Discs and a place value mat to divide whole numbers.

Solve: 327 ÷ 34 ("327 divided into 3 groups)

1. Students plot 327 at the top of the place value mat using:

   3 (100 's)
   2 (10 's)
   7 (1 's)

HUNDREDS	TENS	ONES
100 100 100	10 10	1 1 1 1 1 1 1

2. Since the divisor is 3, students should divide the remaining space on the place value mat into three sections to divide 327 into 3 groups.

3. Working from left to right, dividing will start in the hundreds place.

   The 3 (100 's) are split into the three newly created sections on the place value mat (300 divided into 3 groups).

HUNDREDS	TENS	ONES
100 100 100	10 10	1 1 1 1 1 1 1
100		
100		
100		

4. Since 2 (10 's) cannot be split into three groups, students will regroup/trade each ten for 10 (1 's) for a total of 27 ones.

HUNDREDS	TENS	ONES
	10 10	1 1 1 1 1 1 1
100		
100		
100		

5. Students distribute the 27 (1 's) into three groups, so there are 9 (1 's) in each group.

6. Once the entire dividend is divided into three groups, students look at one group to determine the quotient.

   The solution: 109

HUNDREDS	TENS	ONES
		1 1 1 1 1 1 1 1 1
100		1 1 1 1 1 1 1 1 1
100		1 1 1 1 1 1 1 1 1
100		

Essential Learning Products™
a Highlights company

P.O. Box 2590 Columbus, OH 43216-2590

Click here to view the Sensational Math Catalog.