

OHIO ACADEMIC  
CONTENT STANDARDS

- Tally Marks (Grade 1)  
Y2003.CMA.S05.GPK-02.BB.L01.I02

Collect and organize data into charts using tally marks.

- Addition (Grade 1) Y2003.CMA.S01.GPK-02.BG.L01.I10  
Model, represent and explain addition as combining sets (part + part = whole) and counting on.

- Equivalent Numbers (Grade 1) Y2003.CMA.S01.GPK-02.BB.L01.I02  
Recognize and generate equivalent forms for the same number using physical models, words and number expressions.

- Place Value (Grade 1) Y2003.CMA.S01.GPK-02.BA.L01.I05

Use place value concepts to represent whole numbers using numerals, words, expanded notation and physical models with ones and tens.

- Fraction Models (Grade 1) Y2003.CMA.S01.GPK-02.BC.L01.I09

Represent commonly used fractions using words and physical models for halves, thirds and fourths, recognizing fractions are represented by equal size parts of a whole and of a set of objects.

- Place Value (Grade 2) Y2003.CMA.S01.GPK-02.BB.L02.I01

Use place value concepts to represent, compare and order whole numbers using physical models, numerals and words, with ones, tens and hundreds.

- Addition & Subtraction (Grade 2) Y2003.CMA.S01.GPK-02.BM.L02.I12

Demonstrate multiple strategies for adding and subtracting 2- or 3-digit whole numbers.

## NUMBER SENSE

## FOCUS

- Counting, grouping, and place value concepts.

## VIDEO “It All Adds Up”

## Ohio Academic Content Standards

- Tally Marks (Math Grade 1)  
Y2003.CMA.S05.GPK-02.BB.L01.I02
- Graph Types (Math Grade 2)  
Y2003.CMA.S05.GPK-02.BC.L02.I02
- Graph Types (Math Grade 3)  
Y2003.CMA.S05.G03-04.BC.L03.I06

Ms. Davis and Seth, one of the older children in the group, combine the information from all five surveys on an eraser board in order to tally the final results. When the prospect of adding so many numbers seems overwhelming to Nigel and Caitlin, Ms. Davis suggests using base ten blocks to make the task easier. Alex, Seth, and Ashley demonstrate and explain the strategy of regrouping to add and subtract. While others are totaling the numbers from each survey item, Seth decides to put their results into graph form using a spreadsheet application on the computer. Ms. Davis, with Seth’s assistance, explains what a graph is and how to interpret various kinds of graphs by using the three graph examples Seth has made including a bar graph, line graph, and pie chart.

## VOCABULARY

- *Base Ten Blocks.* A concrete teaching aid used to show the place value and operations with whole numbers and decimals.
- *Regrouping.* Replacing a specified number of hundreds, tens, ones, etc. with a different combination of those sets while maintaining the same overall value.

## JOURNAL TOPICS

1. What question would you like to ask in a survey?

2. What kind of graph would you use to show your survey results?
3. What kind of information have you seen presented using a graph?

## EXTENSIONS

## 1. RECORDING PLACE VALUE

## Ohio Academic Content Standards

- Equivalent Numbers (Math Grade 1)  
Y2003.CMA.S01.GPK-02.BB.L01.I02
- Place Value (Math Grade 1)  
Y2003.CMA.S01.GPK-02.BA.L01.I05
- Place Value (Math Grade 2)  
Y2003.CMA.S01.GPK-02.BB.L02.I01
- Place Value (Math Grade 3)  
Y2003.CMA.S01.G03-04.BA.L03.I02

**Materials Needed:** Base ten block sets (or tagboard sets made from Appendix 6A and 6B), Place Value Charts (Appendix 6C)

- Give students sets of base ten blocks or duplicate the patterns on tagboard and have students cut a set to use for practice. Demonstrate counting by tens and ones with base ten blocks by recording number values on a chalk board or overhead projector with lines and dots—lines representing “tens,” and dots representing “ones.” (For example, the number 23 would be  $11\dots$ ; the number 14 would be  $1\dots$ ).
- Have students practice in pairs making numbers with base ten blocks. Give each pair a Place Value Chart (Appendix 6C) for recording. Students in pairs take turns—one showing a number of tens and ones blocks, and the other recording the information by drawing lines and dots in the boxes. Students should then collaborate to write the number represented by the lines and dots on the line beneath the box.
- Challenge students to find different ways to represent numbers with base

## NUMBER SENSE

ten blocks. For example, 26 could be 2 tens and 6 ones, 1 ten and 16 ones, or 26 ones. Pose a problem for each group. Ask how many different ways they can represent a certain number. Groups can share their results with the class. Record their results on a chart and ask if any pattern can be found. Could they predict a number of ways to represent another number from the results recorded on the chart?

\*The MathTek CD activity “Base 10 Concentration” provides practice at three levels for matching numbers and their place value representations with base ten blocks.

## 2. PLACE VALUE CARD GAMES

### Ohio Academic Content Standards

- Equivalent Numbers (Math Grade 1)  
Y2003.CMA.S01.GPK-02.BB.L01.I02
- Place Value (Math Grade 1)  
Y2003.CMA.S01.GPK-02.BA.L01.I05
- Place Value (Math Grade 2)  
Y2003.CMA.S01.GPK-02.BB.L02.I01
- Place Value (Math Grade 3)  
Y2003.CMA.S01.G03-04.BA.L03.I02

**Materials Needed:** Tens and Ones Cards (Appendix 6D)

- Give each student a sheet of Tens and Ones Cards (Appendix 6D) duplicated on heavy paper or tagboard to cut. Ask them to turn the cards upside down in two piles—small cards (ones) and large cards (tens). Have students, working in pairs, draw one card from each pile. They should tell their partners what they have. For example, “I have 3 tens and 4 ones; that equals 34.” Challenge students to find the largest and smallest numbers they can make with their cards. Partners can each draw two cards, tell what they have, and then decide who has the smallest or largest number.
- Working in groups of four, students can draw their cards, tell their

numbers, and then put all four numbers in order.

## 3. PLACE VALUE CHALLENGE

### Ohio Academic Content Standards

- Equivalent Numbers (Math Grade 1)  
Y2003.CMA.S01.GPK-02.BB.L01.I02
- Place Value (Math Grade 1)  
Y2003.CMA.S01.GPK-02.BA.L01.I05
- Place Value (Math Grade 2)  
Y2003.CMA.S01.GPK-02.BB.L02.I01
- Place Value (Math Grade 3)  
Y2003.CMA.S01.G03-04.BA.L03.I02

**Materials Needed:** Index card sets numbered 0-9, paper for place value charts, base ten blocks

- Arrange students in groups of three. Give each group a set of index cards numbered 0 through 9, a place value chart with three columns labeled “Hundreds/Tens/Ones,” and a set of base ten blocks. (If you do not have enough base ten blocks for classroom use, sets can be made by duplicating the Base Ten Blocks Pattern [Appendix 6A and 6B] on heavy paper for students to cut out and use). Have one group member draw three cards and make a 3-digit number with them. Another group member records the number on the place value chart. The third member represents the number with base ten blocks. Level I students can work with just tens and ones.
- Challenge groups to see how many numbers they can make after drawing three cards. Have them find the largest and smallest number and list them in numerical order. Ask if they can draw any conclusions about those numbers considering place value positions.
- On a chalkboard or overhead projector, draw two place value charts with three columns labeled “Hundreds/Tens/Ones.” Leave one blank space under each heading. Have
  - **Front-end Estimation (Grade 2)** Y2003.CMA.S01.GPK-02.BB.L02.I13  
Estimate the results of whole number addition and subtraction problems using front-end estimation, and judge the reasonableness of the answers.
  - **Even/Odd Numbers (Grade 2)** Y2003.CMA.S01.GPK-02.BB.L02.I02  
Recognize and classify numbers as even or odd.
  - **Fraction Models (Grade 2)** Y2003.CMA.S01.GPK-02.BC.L02.I05  
Represent fractions (halves, thirds, fourths, sixths and eighths), using words, numerals and physical models.
  - **Graph Types (Grade 2)** Y2003.CMA.S05.GPK-02.BC.L02.I02  
Read, interpret and make comparisons and predictions from data represented in charts, line plots, picture graphs and bar graphs.
  - **Graph Types (Grade 3)** Y2003.CMA.S05.G03-04.BC.L03.I06  
Translate information freely among charts, tables, line plots, picture graphs and bar graphs; e.g., create a bar graph from the information in a chart.
  - **Addition & Subtraction (Grade 3)** Y2003.CMA.S01.G03-04.BK.L03.I12  
Add and subtract whole numbers with and without regrouping.
  - **Number Comparisons (Grade 3)** Y2003.CMA.S01.G03-04.BD.L03.I03  
Use mathematical language and symbols to compare and order; e.g., less than, greater than, at most, at least,  $<$ ,  $>$ ,  $=$ .
  - **Fraction Models (Grade 3)** Y2003.CMA.S01.G03-04.BC.L03.I05  
Represent fractions and mixed numbers using words, numerals and physical models.

- Fractions & Decimals (Grade 3) Y2003.CMA.S01.G03-04.BB.L03.I07

Recognize and use decimal and fraction concepts and notations as related ways of representing parts of a whole or a set.

- Place Value (Grade 3) Y2003.CMA.S01.G03-04.BA.L03.I02

Use place value concepts to represent whole numbers and decimals using numerals, words, expanded notation and physical models.

## NUMBER SENSE

two volunteers play a place value game. Draw one number from one of the sets of index cards with 0-9 on them. Call out the number and the first volunteer will write that number in any column on their place value chart. Continue calling numbers until both volunteers have created 3-digit numbers on their charts. Explain before beginning that the one with the highest number at the end will win the game. Students will have to carefully consider in what column to put each number. Level 2 students can work with two places. This activity can also be done in teams, allowing team members to confer and decide in which place to put each number.

### 4. NUMBER RIDDLES

#### Ohio Academic Content Standards

- Equivalent Numbers (Math Grade 1)  
Y2003.CMA.S01.GPK-02.BB.L01.I02
- Place Value (Math Grade 1)  
Y2003.CMA.S01.GPK-02.BA.L01.I05
- Place Value (Math Grade 2)  
Y2003.CMA.S01.GPK-02.BB.L02.I01
- Place Value (Math Grade 3)  
Y2003.CMA.S01.G03-04.BA.L03.I02

**Materials Needed:** Base Ten Block Riddles (Appendix 6E), base ten blocks, index card sets numbers 0-9

- Give pairs of students a set of base ten blocks or patterns and a sheet of Base Ten Block Riddles (Appendix 6E) to solve by using the blocks as manipulatives. Challenge Level 2 and 3 students to create riddles on index cards for others to solve. Level 2 and 3 students can also solve riddles about 3-digit numbers.
- Another version of the riddle game would be to have students make a set of ten number cards with 0-9 written on them. Give the students clues about 3-digit numbers. Students must guess what your number is by arranging their cards according to

your clues. For example, “Use the numbers 4, 6, and 1. Put the odd number in the hundreds place. Put the 6 in the tens place. What is my number?” or “Use the numbers 4, 7, and 5. My number is less than 500. Put the 7 in the ones place. What is my number?” This game can be made as challenging or as simple as your students’ abilities dictate. For Level 1 students, use 2-digit numbers.

### 5. REGROUPING

#### Ohio Academic Content Standards

- Addition & Subtraction (Math Grade 2)  
Y2003.CMA.S01.GPK-02.BM.L02.I12
- Front-end Estimation (Math Grade 2)  
Y2003.CMA.S01.GPK-02.BM.L02.I13
- Addition & Subtraction (Math Grade 3)  
Y2003.CMA.S01.G03-04.BK.L03.I12

**Materials Needed:** Base ten blocks, Addition and Subtraction Worksheets (Appendix 6F and 6G)

- Place value practice with base ten blocks provides Level 2 and 3 students an excellent transition for students to regrouping with addition and subtraction. Have students practice simple facts with base ten blocks that don’t require regrouping. For example  $16+3=19$ , or  $23-2=21$ . These problems involve “counting on” or “counting all” to find an answer. It is easier to first concentrate on addition and then subtraction.
- Give pairs of students copies of the Addition Worksheet (Appendix 6F) and a set of base ten blocks or patterns. Tell them that they can solve harder addition problems like they did with the simpler ones using base ten blocks and the worksheet. Begin by posing a story problem like “We have 25 students in our class. If we invite the other third grade with 26 students into our room for a movie, how many chairs will we need altogether?” Ask the students to write the numbers for

the problem in the small boxes on the bottom of the worksheet (25+26). Using their base ten blocks, ask students to put the blocks to represent 25 in the top two boxes on the sheet (2 tens and 5 ones) and the blocks to represent 26 in the second row of boxes (2 tens and 6 ones). Ask students how they can use all of the blocks to find the answer to the problem. If necessary, write on a chalkboard or overhead projector what is represented by the blocks on the sheet—4 tens and 11 ones. Ask if there is another way to write that number. Students unfamiliar with regrouping may come up with the idea to exchange (or trade) 10 of the ones blocks for a tens block, leaving 5 tens and 1 one, or 51. Continue with other problems. Explain that when they trade or exchange 10 ones for 1 tens block, they are simply regrouping the numbers to find a sum.

- Follow the same procedure for subtraction, starting with simple problems to represent with base ten blocks where students can take away the number of ones blocks being subtracted. For example, 73-4 or 26-5. Next, give pairs of students copies of the Subtraction Worksheet (Appendix 6G) and base ten blocks. Pose a problem like 16-9. Have students write the problem in the boxes at the bottom of the page. Then ask them to represent the top number (16) with their base ten blocks in the large boxes on the page. The next step is to take away 9. See if they can come up with the idea to change the tens block into 10 ones so that they can take away 9 ones. Again, this strategy can be referred to as “trading” or “regrouping” in order to find an answer.
- Continue with other examples that involve regrouping.

## 6. 20 QUESTIONS

### Ohio Academic Content Standards

- Even/Odd Numbers (Math Grade 2)  
Y2003.CMA.S01.GPK-02.BB.L02.I02
- Number Comparisons (Math Grade 3)  
Y2003.CMA.S01.G03-04.BD.L03.I03

**Technology Used:** Instant message or email

- Set up e-mail pals for individuals or establish a partner class. Explain the procedure for 20 Questions. Only questions requiring a yes or no answer are usable. Practice in class. One partner chooses a number for the other to guess. Questions involving more, less, odd, even, factors, etc. can be asked. Points can be given for yes answers and used to gain clues. This activity can be done with any category/subject being covered by both classes.

## 7. MATHEK CD ACTIVITIES

### Base 10 Concentration

### Ohio Academic Content Standards

- Equivalent Numbers (Math Grade 1)  
Y2003.CMA.S01.GPK-02.BB.L01.I02
- Place Value (Math Grade 1)  
Y2003.CMA.S01.GPK-02.BA.L01.I05
- Place Value (Math Grade 2)  
Y2003.CMA.S01.GPK-02.BB.L02.I01
- Place Value (Math Grade 3)  
Y2003.CMA.S01.G03-04.BA.L03.I02

In this concentration game students must match numbers and their representations using base ten blocks. Each of the three levels offers eight random variations of the game. At Level 1, there are eight boxes to match. At Level 2, there are twelve boxes. At Level 3, there are sixteen boxes. Levels 1 and 2 use tens and ones. Level 3 includes hundreds.

## NUMBER SENSE

**Fraction Action****Ohio Academic Content Standards**

- Fraction Models (Math Grade 1)  
Y2003.CMA.S01.GPK-02.BC.L01.I09
- Fraction Models (Math Grade 2)  
Y2003.CMA.S01.GPK-02.BC.L02.I05
- Fraction Models (Math Grade 3)  
Y2003.CMA.S01.G03-04.BC.L03.I05
- Fractions & Decimals (Math Grade 3)  
Y2003.CMA.S01.G03-04.BB.L03.I07

Students are directed to color a designated fraction of a given shape. Ten random variations are offered at each of three levels. Level 3 presents several equivalent fractions.

**Number Search****Ohio Academic Content Standards**

- Place Value (Math Grade 2)  
Y2003.CMA.S01.GPK-02.BA.L02.I01
- Number Comparisons (Math Grade 3)  
Y2003.CMA.S01.G03-04.BD.L03.I03

This logic activity requires students to select numbers that fit within given parameters. Each of three levels offers twelve random variations to complete. At Level 1, the concepts of more and less are used. At Level 2, the concepts of even and odd numbers, as well as doubles, are introduced. Level 3 uses factors and numbers divisible by a given number.

**Leap Frog****Ohio Academic Content Standards**

- Addition (Math Grade 1)  
Y2003.CMA.S01.GPK-02.BG.L01.I10
- Front-end Estimation (Math Grade 2)  
Y2003.CMA.S01.GPK-02.BM.L02.I13
- Addition & Subtraction (Math Grade 3)  
Y2003.CMA.S01.G03-04.BK.L03.I12

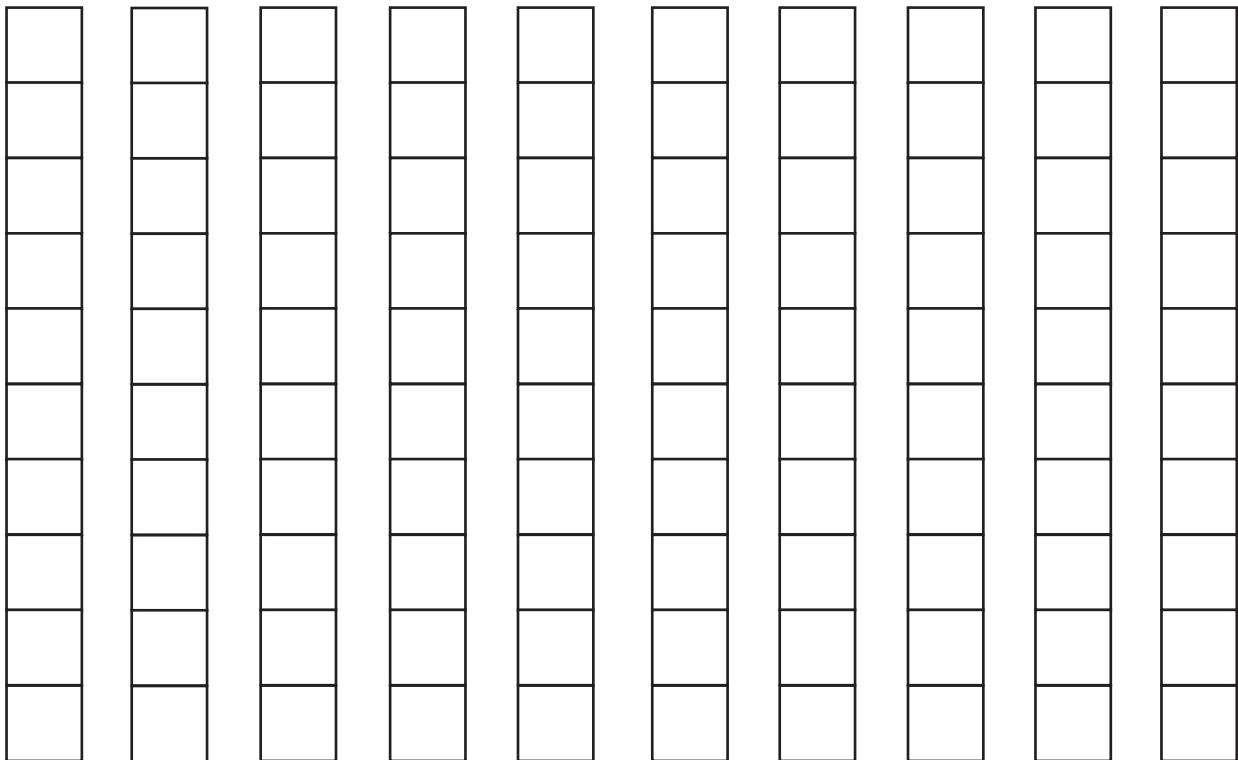
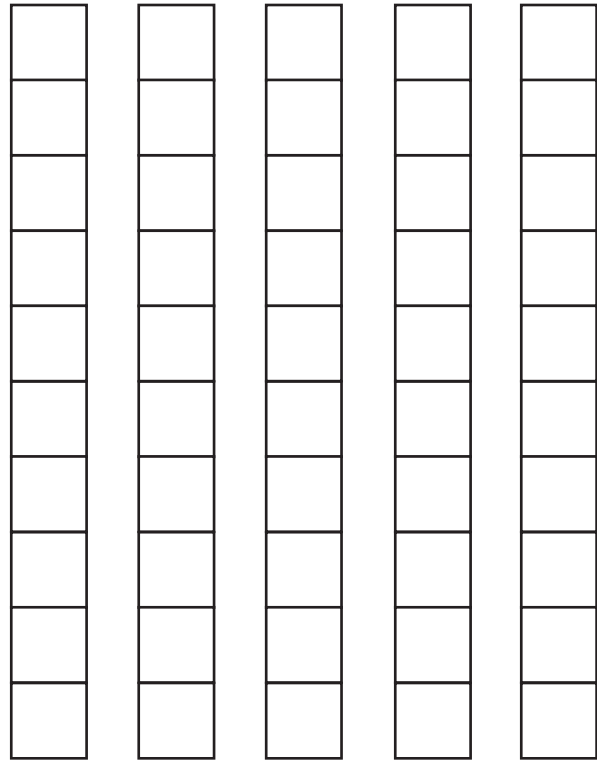
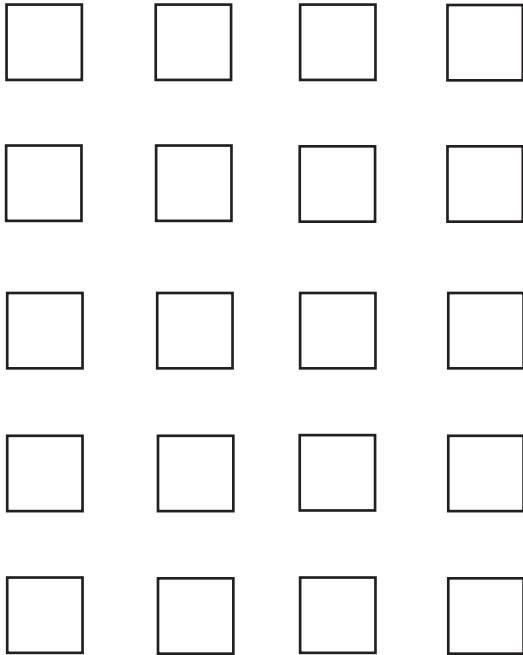
This activity consists of 30 variations in which students try to move a frog to the last number on the number line using combinations of two different units of hops. For example, they might be asked to get the frog to the

number fifteen, making her hop in increments of three and four. Multiple solutions are possible. There are no level designations.

**8. ADDITIONAL RESOURCES**

- *PBS Kids: Cyberchase*  
<http://pbskids.org/cyberchase/games/numbersense/index.html>
- *Elementary Sites: Number Sense*  
[http://edweb.tusd.k12.az.us/ekowalc/math/elementary\\_web\\_sites.htm](http://edweb.tusd.k12.az.us/ekowalc/math/elementary_web_sites.htm)
- *Fantastic Four*  
[http://www.exploratorium.edu/math\\_explorer/playFF1-2.html](http://www.exploratorium.edu/math_explorer/playFF1-2.html)
- *The Counting Game*  
<http://home.earthlink.net/~cmalumphy/countinggame.html>
- *Count Us In*  
<http://www.abc.net.au/countusin/>
- *Number Cracker*  
<http://www.funbrain.com/cracker/index.html>
- *Aunty Math*  
<http://www.dupagechildrensmuseum.org/aunty/>

**Base Ten Blocks Pattern**







**Place Value Charts**

tens	ones

\_\_\_\_\_

tens	ones

\_\_\_\_\_

tens	ones

\_\_\_\_\_

tens	ones

\_\_\_\_\_

tens	ones

\_\_\_\_\_

tens	ones

\_\_\_\_\_

tens	ones

\_\_\_\_\_

tens	ones

\_\_\_\_\_

tens	ones

\_\_\_\_\_

tens	ones

\_\_\_\_\_

tens	ones

\_\_\_\_\_

tens	ones

\_\_\_\_\_

Tens and Ones Cards

□	□ □	□ □ □	□ □ □ □	
□ □ □ □ □	□ □ □ □ □ □	□ □ □ □ □ □ □	□ □ □ □ □ □ □ □	□ □ □ □ □ □ □ □ □

Base Ten Block Riddles

1. I have 2 blocks. I have the same number of tens-blocks as ones-blocks.  
The value is\_\_\_\_\_.
2. I have 4 blocks. I have the same number of tens-blocks as ones-blocks.  
The value is\_\_\_\_\_.
3. I have 6 blocks. I have the same number of tens-blocks as ones-blocks.  
The value is\_\_\_\_\_.
4. I have 8 blocks. I have the same number of tens-blocks as ones-blocks.  
The value is\_\_\_\_\_.
5. I have 11 blocks. 7 of them are ones-blocks. The rest are tens-blocks. The value is\_\_\_\_\_.
6. I have 8 blocks. 5 blocks are tens-blocks. The rest are ones blocks.  
The value is\_\_\_\_\_.
7. I have 6 blocks. Only 1 block is a ones-block. The rest are tens-blocks. The value is\_\_\_\_\_.
8. I have 10 blocks. 2 blocks are tens-blocks. The rest are ones-blocks.  
The value is\_\_\_\_\_.

**Addition Worksheet**

+

		Tens

+

		Tens

+

		Tens

+

		Tens

+

		Tens

		Tens	Tens
		Ones	Ones

Subtraction Worksheet

—

		Tens
		Ones

—

		Tens
		Ones

—

		Tens
		Ones

—

		Tens
		Ones

—

		Tens
		Ones

	Tens
	Ones