LESSON

2·2

Use Blocks to Add

How do the blocks make regrouping in addition clear?

Students use blocks to represent addends. They push the addends together and show regrouping by packing as much as possible. They discuss the need to line up the decimal points when adding decimal numbers. Finally, students use block drawings to solve addition problems.

Objectives

- To understand the basic meaning of addition as joining sets
- To use a physical and visual model to add whole numbers and decimal numbers
- To describe with words and pictures what happens in each place when numbers are added
- To understand regrouping in addition

Materials

Each group will need:

- 3 blocks-of-100
- 1 whole number mat
- tenth blocks
- hundredth blocks
- 1 decimal mat

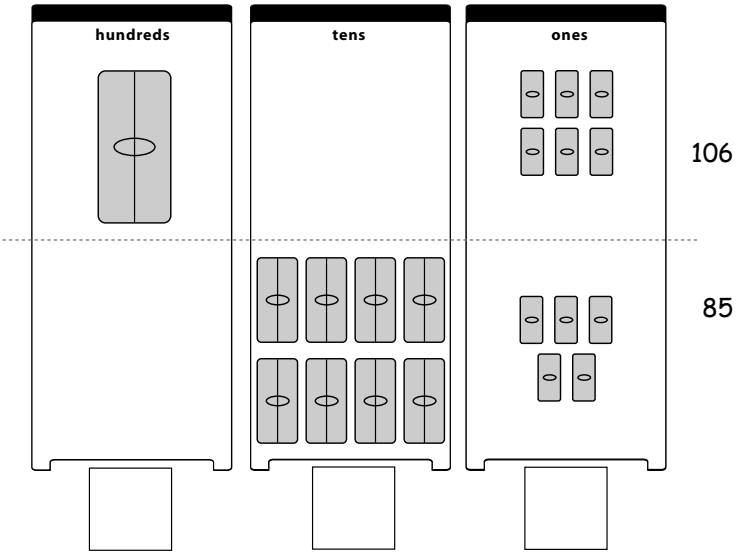
- 1 transparency of the whole number mat (p. A2) (optional)
- 1 transparency of the decimal mat (p. A3) (optional)
- 1 of each *Pick a Problem* + **activity sheet per student**

◆ Class Introduction 30 MIN.

- Note that this lesson can be separated into two distinct sections: 1) Add Whole Numbers and 2) Add Decimal Numbers.

Add Whole Numbers

- Have students work in groups with a whole number place value mat and blocks. Ask each group to model 106 on the top portion of the mat and 85 on the lower portion of the mat. Students may want to draw a dotted line to separate the space for the two numbers.



Have them join their blocks and write the digits in the boxes at the bottom of each column. In order to write the digits to match the blocks, students must pack or "regroup" - in this case they must pack ten single blocks to make a block-of-10.

Ask students to write a number sentence for what they just did. Make sure they understand that the equal sign tells them that both sides of the sign are equivalent. Practicing writing equations in more than one way is important.

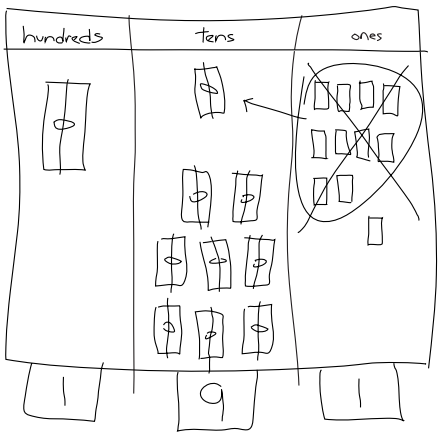
106 + 85 = 191 **191 = 106 + 85**

Draw the decimal place value mat on the board (or copy on transparency and show on overhead) and ask a volunteer pair to come up and draw what they did with the blocks *(see figure)*. Discuss methods for showing regrouping such as circling the regrouped blocks and drawing an arrow to the new place.

- Repeat with other whole number addition problems as needed. Include problems in the thousands and beyond. Encourage students to use drawings as an alternative to blocks when the numbers grow larger.

Example of class drawing:

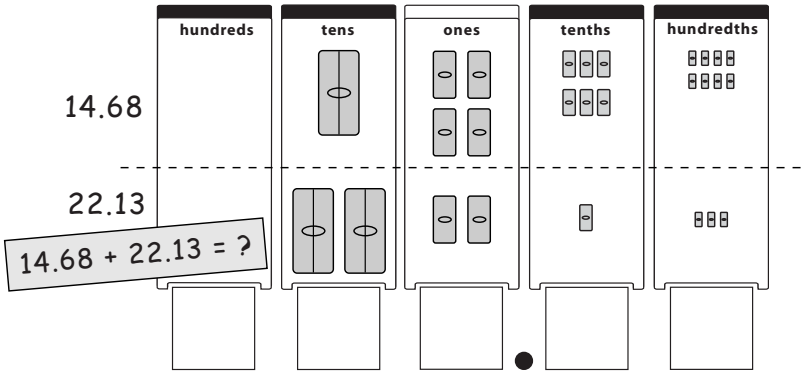
106 + 85 = 191



33 + 89 + 52 = _____ **78 + 214 = _____** **1835 + 1428 = _____**

39	**116**	**243**	**867 + 2049**
+27	**+149**	**98**	
		+107	

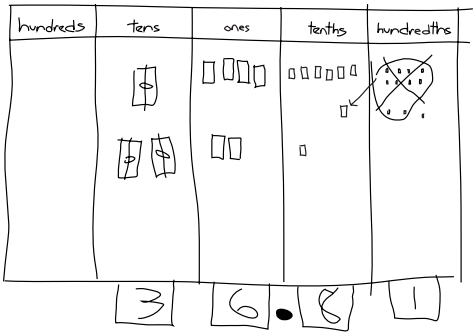
Add Decimal Numbers



- Pass out the decimal place value mats and decimal blocks. Have students model 14.68 at the top of the mat and 22.13 in the bottom portion of the mat.
- Again, ask students to push the blocks together (or join the sets) and write the digits for the total number of blocks. In order to do this, they will need to regroup. Discuss how the regrouping in this case requires them to visualize packing 10 hundredth blocks to make 1 tenth block.

Example of class drawing:

14.68 + 22.13 = 36.81



- Draw the decimal place value mat on the board (or copy on transparency and show on overhead) and ask a volunteer pair to come up and draw what they did with the blocks *(see figure)*. Discuss methods for showing regrouping such as circling the regrouped blocks and drawing an arrow to the new place.
- Repeat with other decimal number addition problems. Include problems in the thousandths and beyond. Encourage students to use drawings as an alternative to blocks when the numbers grow smaller.

1.5 + 3.72 = __

43.7 + 1.09 + 3.2 = __

__ = 0.05 + 78

2.049 + 0.8672

$$\begin{array}{r} 3.9 \\ +2.7 \\ \hline \end{array}$$

$$\begin{array}{r} 3.16 \\ 2.75 \\ +3.04 \\ \hline \end{array}$$

$$\begin{array}{r} 8.29 \\ +6.5 \\ \hline \end{array}$$

◆ Group Activity 15 MIN.

- Distribute the activity sheets and explain that students will pick two problems from the sheet to model with blocks. They will then draw what they did on the place value mat image on the activity sheet and write a number sentence.
- While students are working, walk around and have individuals show their drawings and explain the steps of adding with the blocks.

◆ Closure 15 MIN.

- Have students compare their drawings and ask a few volunteers to share their drawing/recording methods with the class.
- Ask students to give a good estimate to the problem 28.65 + 2.9. Then show them an example of the problem with the decimal point lined up improperly. Ask,

What happened here?

$$\begin{array}{r} 28.65 \\ +\ \ 2.9 \\ \hline 28.94 \end{array}$$

How would we model this problem with blocks?

Have a volunteer model the problem with blocks. Discuss how to correctly align the decimal points in each addend to match the correct alignment of the blocks.

```
  28.65
+  2.9
 31.55
```

When adding whole numbers, we are accustomed to arranging the numbers in the problem by lining up the right hand side. Why does this work? *(In a whole number the right-most digit is always the ones place.)*

Explain how the decimal point is always there, even with whole numbers, but that there is not always a need to show it. Present an example:

3 + 40 = 43 ***Is the same as:***

```
  3.
+ 40.
 43.
```

With decimals, the right-most digit is not always the same. For example, it is tenths in 3.5 but hundredths in 3.47. So if we align the right-most digits in this example, we would be adding tenths with hundredths. This is incorrect.

To make sure we add blocks of equal size, we align the decimal point.

◆ Assessment

- Do students see that what they are doing is the physical definition of adding—that is, combining sets of blocks together—without relying on numerical algorithms they may have already learned?
- Do students recognize situations that require regrouping?
- Are students able to regroup decimal blocks by visualizing packing (which is really trading 10 smaller blocks for a block one size larger)?
- Are students able to describe with pictures and or words what they do with the blocks when they add?
- Are students able to write number sentences for what they do?

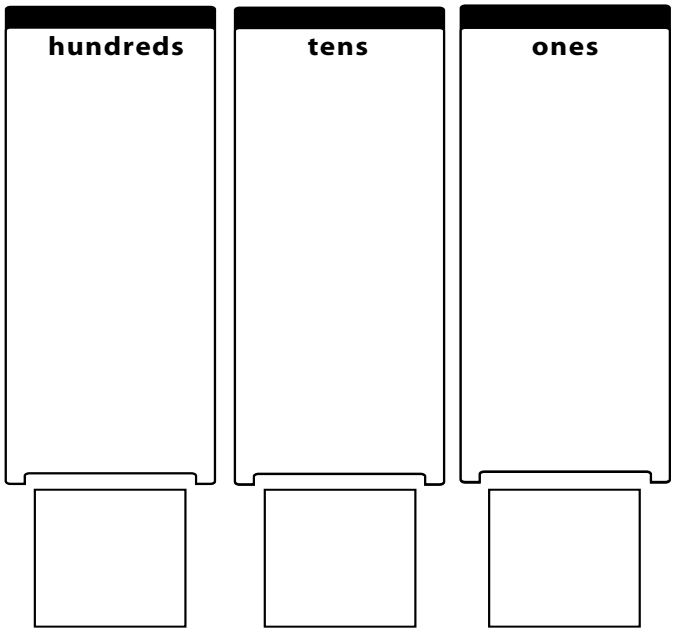
Name

Pick a Problem +

Pick two problems from the list. Model the problems, then draw what you did with the blocks on the mats below. You can also describe what you did with words. Write a number sentence when you complete the problem.

A. 45 + 85
B. 67 + 83 + 124
C. 4 + 207 + 39
D. 149 + 138
E. 109 + 187
F. 89 + 89 + 89

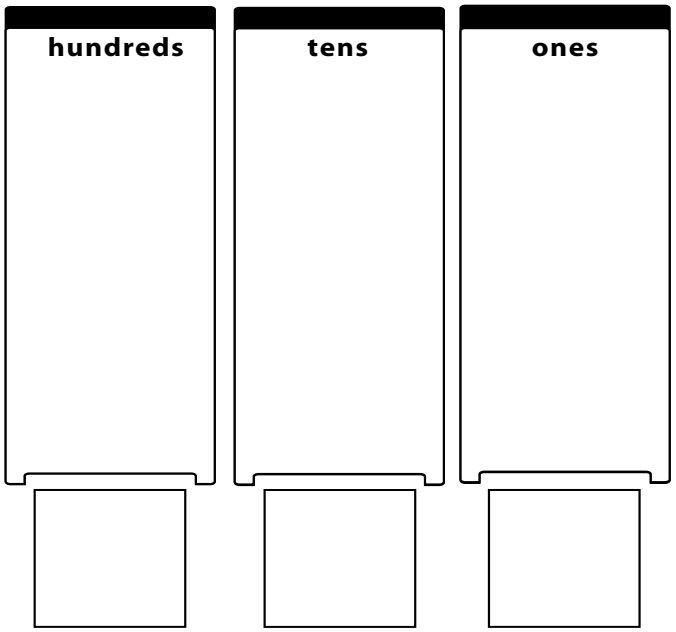
1.



Number sentence:

_____

2.



Number sentence:

_____

ß

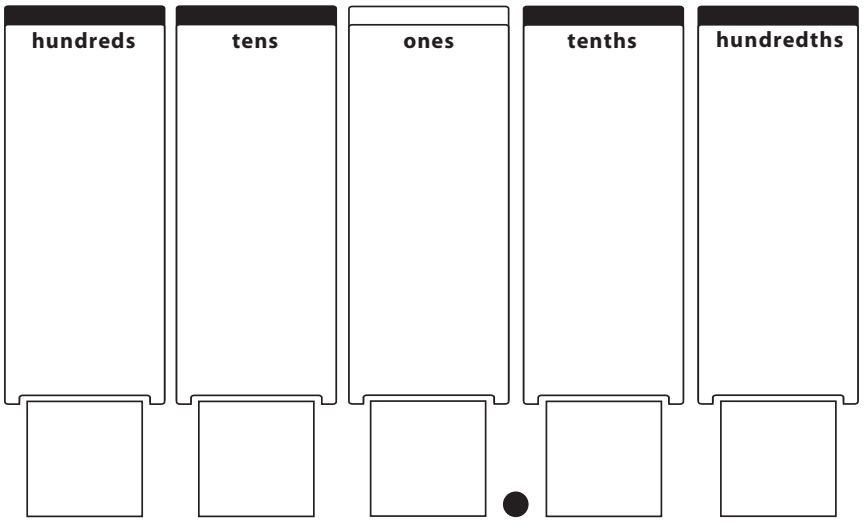
Name

Pick a Problem +

Pick two problems from the list. Model the problems, then draw what you did with the blocks on the mats below. You can also describe what you did with words. Write a number sentence when you complete the problem.

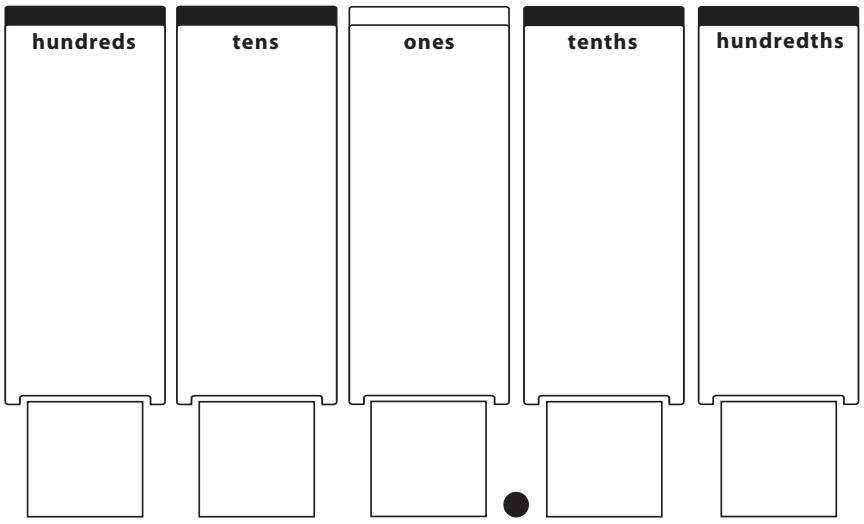
A. 29.3 + 40.02
B. 61.76 + 2.15
C. 88.22 + 22.88
D. 31.45 +9.7
E. 9.99 + 0.01
F. 16.8 + 0.25

3.



Number sentence:_____

4.



Number sentence:_____