

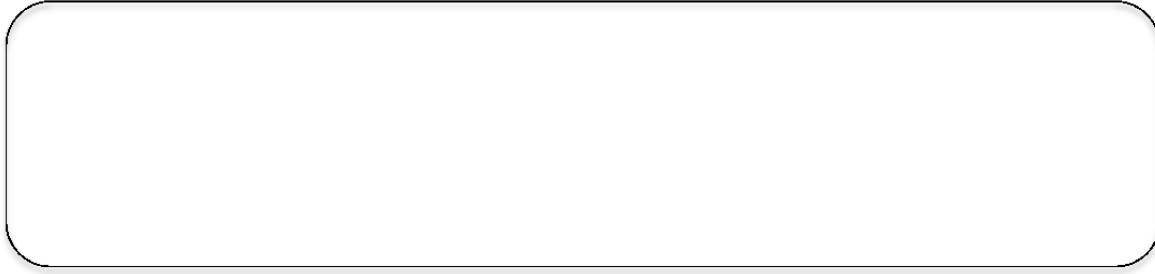


**Houghton Mifflin Harcourt**

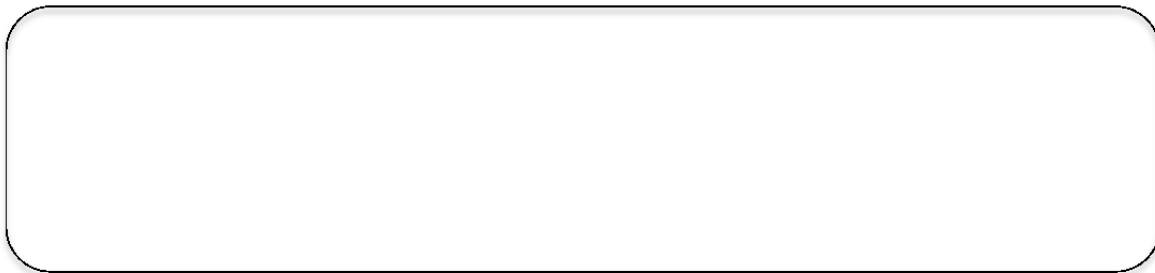
**The Use of Visual Models in Math in Focus  
And Beginning Bar Models**

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## Visualization



## Instruction



## CPA

### Concrete

In the concrete stage, the **teacher** begins instruction by modeling each mathematical concept with concrete materials (e.g., two sided counters, cubes, base-ten blocks, pattern blocks, fraction bars, or geometric solids) and **students represent problems with concrete materials**. The importance of students taking over the responsibility of creating the mathematical situations cannot be emphasized enough.

### Pictorial

In this stage, the **teacher and student** transform the concrete model into a **pictorial** (semi-concrete) level, which may involve drawing pictures using circles, dots, rectangles, tallies, etc. Initially, the picture looks exactly like the concrete material then can become more abstract. The students will recognize a picture before being able to create the picture. **But, until the student can create the mathematical situation pictorially, true understanding will not happen.**

### Abstract

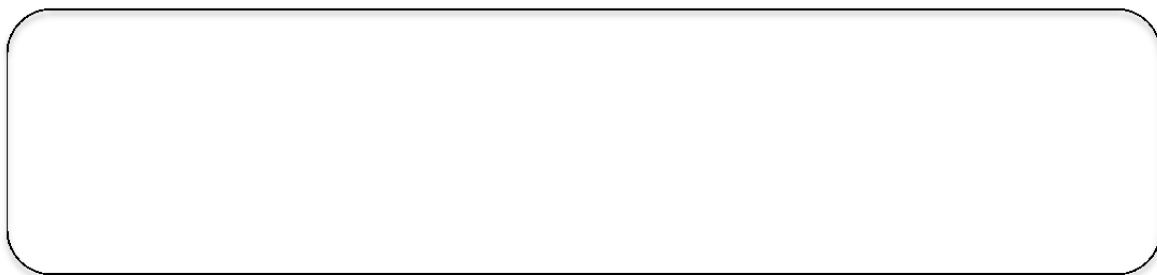
At this stage, teachers and students record the **mathematics concept at a symbolic level**, using only numbers, notation, and mathematical symbols to represent the concept. Operation symbols (+, -,  $\times$ ,  $\div$ ) to indicate addition, subtraction, multiplication, or division and symbolic representations of amounts are used. At this level, true understanding of concepts can be seen.

Visualization at Work:

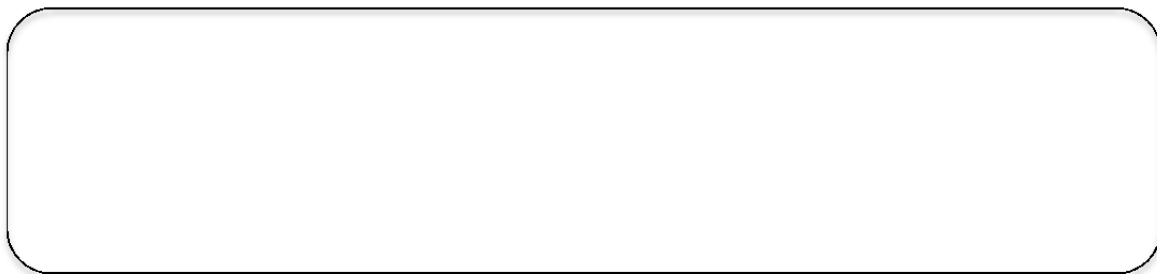
Number Bonds



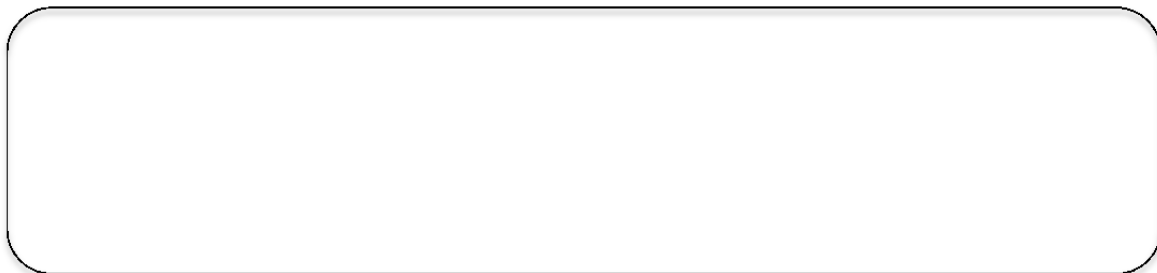
Place Value



Geometry



Fractions



Miss Lucy has 27 students in her morning ballet class. She has 39 students in her afternoon ballet class. How many students does she have in both classes?

\_\_\_ men and \_\_\_ women go to a concert. How many adults are at the concert?

Luke has 83 toy cars. His brother gives him 52 more toy cars. How many toy cars does he have altogether?

Daniel has \_\_\_ craft sticks for his project. He needs \_\_\_ more craft sticks. How many craft sticks does he need for his project?

102 children at a swimming pool do not wear goggles. 23 more children wear goggles than those who do not wear goggles. How many children wear goggles?

Alice made \_\_\_ ham sandwiches for a party. She made \_\_\_ fewer cheese sandwiches than ham sandwiches for the party. How many cheese sandwiches did Alice make?

Sophie has 356 stamps in her collection. Rita has 192 stamps more than Sophie.

- a. How many stamps does Rita have?
- b. How many stamps do they have in all?

Mr. Kim has 78 boxes of apples and 130 boxes of oranges. He sells some boxes of oranges. Now he has 159 boxes of apples and oranges left.

- a. How many boxes of apples and oranges did Mr. Kim have at first?
- b. How many boxes of oranges did Mr. Kim sell?

Farah has 8 vases. She puts 5 flowers in each vase. How many flowers does Farah have in all?

Ben has 35 leather strips. He uses 5 strips for each necklace he makes. How many necklaces does he make?

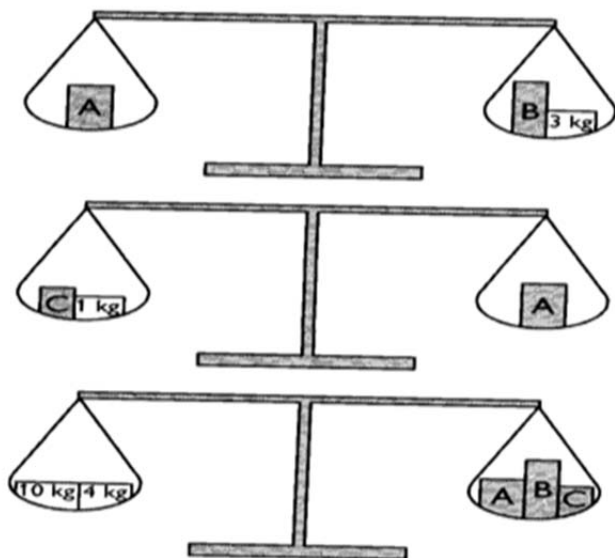
Lily sews 24 dresses for her dolls. Each doll gets 3 dresses. How many dolls does Lily have?

Ricardo spends  $\frac{8}{9}$  of an hour reading the newspaper. He spends  $\frac{1}{4}$  of the time reading the world news and splits the remaining time equally between the sports and the comics.

How much time does he spend reading the comics?

3.5 times a positive number is equal to the sum of the positive number and 0.5.  
What is the positive number?

Find the weight of **A**.



The cost of 3 pairs of socks and 4 T-shirts is \$132. Each T-shirt costs twice as much as a pair of socks.

What is the cost of each pair of socks?

What is the cost of each T-shirt?

<b>Ones</b>	
<b>Tens</b>	
<b>Hundreds</b>	