LESSON 1

Objective

Estimate the sum or difference in addition and subtraction problems.

Common Core State Standards

- **3.NBT.1** Use place value understanding to round whole numbers to the nearest 10 or 100.
- **3.NBT.2** Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Number and Operations in Base Ten

Estimating the Sum or Difference

As students become more familiar with adding and subtracting, they come to understand that sometimes a situation calls for an estimate rather than an exact answer. Estimates are helpful when dealing with very large numbers and save time when an exact answer is not needed.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- **Ask:** *When is an estimate enough information to solve a problem?* Guide students to understand that when a problem asks for "about" how many, they can use an estimate.
- **Ask:** *What number did you round 104 to? How did you know to round down instead of up? What about 328? How did you know to round up?*
- **Ask:** *Was your estimate close to the exact answer? Will rounding always give you an estimate that is close to the exact answer? What if you rounded the same numbers to the closest hundred?*

Solve It

With students, reread the problem. Have students write to describe how they used Base Ten Blocks to help them estimate 104 + 328. They should then write a sentence telling whether the class will have enough labels for a new computer.

More Ideas

For other ways to teach about estimating sums and differences—

- Have students use Base Ten Blocks to estimate differences. Give students a subtraction problem. Then ask them to round the numbers in the problem and subtract to find an estimate.
- Give students sample addition and subtraction word problems. Some problems should ask for an exact answer, while others should indicate that they require an estimate by using phrases such as "about how many." Have students decide for each problem whether an exact answer or an estimate is needed. For problems requiring an estimate, have students estimate using mental math first. Then have them use Base Ten Blocks to check their answers.

Formative Assessment

Have students try the following problem.

Estimate the difference between 812 and 489 by rounding each number to the nearest 100.

A. 300 **B.** 320 **C.** 420 **D.** 480

Try It! 25 minutes | Groups of 4

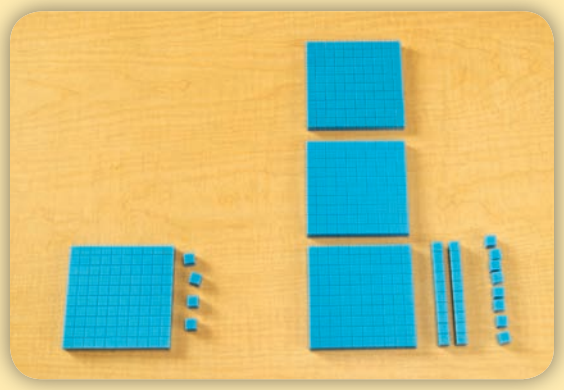
Here is a problem about estimating a sum.

Mrs. Vasquez's class is collecting box top labels for a new computer. The class collects 104 labels in September and 328 labels in October. They need 500 labels for a new computer. Can the students find out if they have enough labels without counting them or adding 104 + 328?

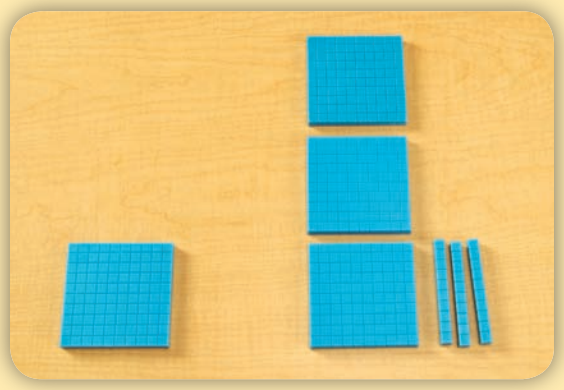
Introduce the problem. Then have students do the activity to solve the problem. Distribute Base Ten Blocks to students. Introduce the concept of rounding to students, and explain how they can use rounding to estimate sums and differences. With students, practice rounding one-, two-, three-, and four-digit numbers using 5 as the benchmark. Write the addition problem *104 + 328* on the board.

Materials

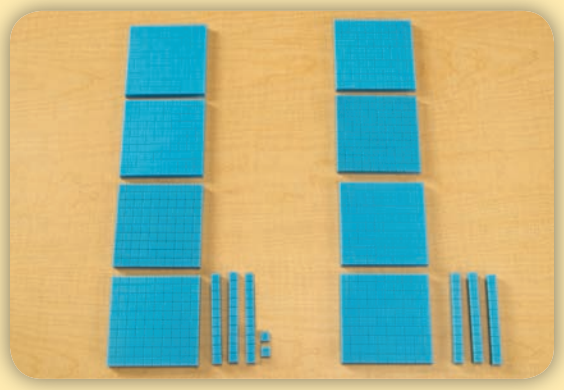
- Base Ten Blocks (10 flats, 10 rods, and 20 units per group)
- paper (1 sheet per group)
- pencils (1 per group)



1. Have students model the numbers 104 and 328 using blocks. Have students use these models to assist them in rounding to the tens place.



2. Students should then model the rounded numbers using blocks. Ask students to add the rounded numbers to find the sum. Have students write down the rounded sum.



3. Now ask students to find the exact answer using blocks. Have students write down their exact answer and compare it to their estimated answer.

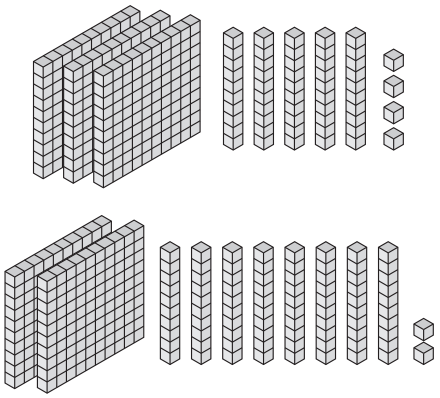
⚠ Look Out!

Students may feel compelled to find an exact answer every time. Brainstorm with students to identify situations in which they need an estimate rather than an exact answer. Also, for students who are confused about when to round up or down, you may wish to draw a blank ten frame on paper and use counters to illustrate the rule that numbers under 5 are rounded down, while numbers 5 and above are rounded up.

Answer Key

Use Base Ten Blocks to build each pair of numbers. Estimate each sum or difference to the nearest 100. (Check students' work.)

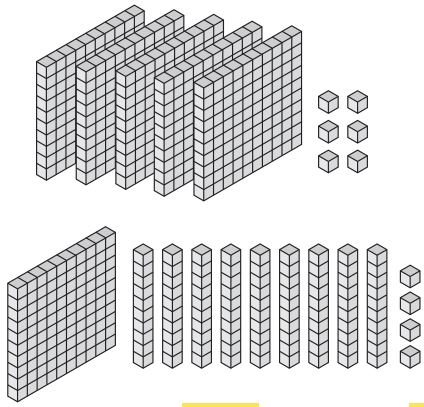
1.



Model: 354 + 282

Estimate: 400 + 300 = 700

2.



Model: 506 – 194

Estimate: 500 – 200 = 300

Build each problem using Base Ten Blocks. Sketch the model. Estimate each sum or difference to the nearest 10. (Check students' work.)

3. 77 + 42

80 + 40 = 120

4. 261 – 237

260 – 240 = 20

Estimate each sum or difference to the nearest 10.

5. 522 + 179

520 + 180 = 700

6. 85 – 53

90 – 50 = 40

7. 103 + 517

100 + 520 = 620

Estimate each sum or difference to the nearest 100.

8. 463 – 268

500 – 300 = 200

9. 145 + 827

100 + 800 = 900

10. 557 – 299

600 – 300 = 300

Answer Key

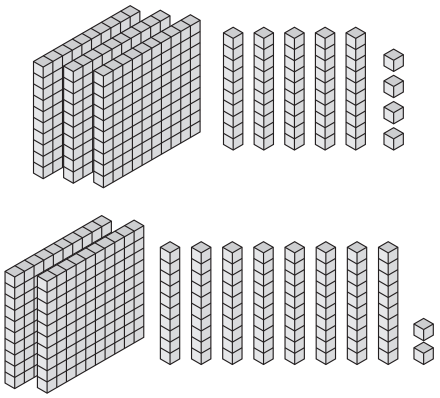
Challenge! Write rules for Base Ten Blocks that describe how to round numbers to the nearest 10, nearest 100, and nearest 1,000. Use examples or draw pictures to help.

Challenge: (Sample) For rounding to the nearest 10 when there are 5 or more units, replace the units with a rod. When there are fewer than 5 units, remove the units. For rounding to the nearest 100 when there are 5 or more rods, replace the rods with a flat and remove any units. When there are fewer than 5 rods, remove the rods and units. For rounding to the nearest 1,000 when there are 5 or more flats, replace the flats with a cube and remove any rods and units. When there are fewer than 5 flats, remove the flats, rods, and units.

Name _____

Use Base Ten Blocks to build each pair of numbers. Estimate each sum or difference to the nearest 100.

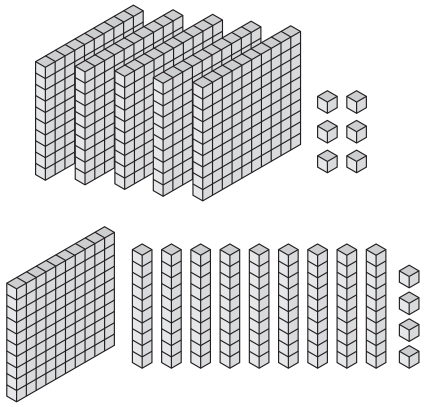
1.



Model: _____ + _____

Estimate: _____ + _____ = _____

2.



Model: _____ – _____

Estimate: _____ – _____ = _____

Build each problem using Base Ten Blocks. Sketch the model. Estimate each sum or difference to the nearest 10.

3. 77 + 42

_____ + _____ = _____

4. 261 – 237

_____ – _____ = _____

Estimate each sum or difference to the nearest 10.

5. 522 + 179

____ + ____ = _____

6. 85 – 53

____ – ____ = _____

7. 103 + 517

____ + ____ = _____

Estimate each sum or difference to the nearest 100.

8. 463 – 268

____ – ____ = _____

9. 145 + 827

____ + ____ = _____

10. 557 – 299

____ – ____ = _____

Name _____

Challenge! Write rules for Base Ten Blocks that describe how to round numbers to the nearest 10, nearest 100, and nearest 1,000. Use examples or draw pictures to help.