

Comparing Numbers

Goals: Students will use base ten materials to determine which is larger.

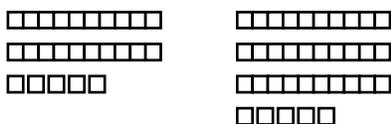
Prior Knowledge Required: Naming numbers from base ten materials
Modeling numbers with base ten materials

Vocabulary: hundreds, tens, ones, base ten blocks, greater than, less than

Introduce the phrases “greater than” and “less than”. Emphasize that to say that one number is greater than another means the first number represents more objects than the second, so 4 is greater than 3 since a collector of objects 4 objects contains more objects than a collection of 3 objects (4 dollars is more money than 3 dollars, 4 metres is longer than 3 metres, 4 goals is more than 3 goals, 4 minutes is more time than 3 minutes). It is crucial that students understand that 4 of anything is more than 3 of the same thing and so it makes sense to compare the numbers 3 and 4 by saying that 4 is “more than” 3. The correct mathematical expression is 4 is greater than 3, and students should get used to using the expression. Then write on the board: 4 ____ 5 and have student volunteers say either “greater than” or “less than” as appropriate (in this case, “less than” is correct). Repeat with several pairs of single-digit numbers to ensure that students are comfortable with the words “greater than” and “less than.”

If your students are comfortable with base ten blocks and trading a tens block for 10 ones blocks, you may use base ten materials for this lesson. Otherwise, you might find more convenient to use link-it cubes built into stacks of 10. This way, instead of trading, students can simply pull apart one stack of 10 if necessary. Some students may find this more natural than trading.

Make the numbers 25 and 35 using base ten blocks:



Have students name the numbers. ASK: Which number is greater? How can we show which number is greater using base ten blocks? Explain that 3 tens blocks is more than 2 tens blocks and 5 ones blocks is the same as 5 ones blocks, so 35 is greater than 25.

Have students use base ten blocks to determine which number is greater:

- a) 26 or 28 b) 42 or 32 c) 67 or 57 d) 23 or 83 e) 74 or 78

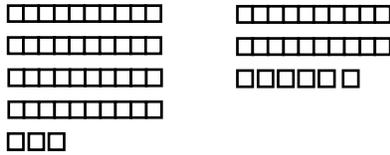
ASK: Do you need to use base ten blocks to determine which number is greater? (no, we can just look at the digits) How does looking at the digits tell us which number is greater? (if one of the digits is the same, just look at the other digit to see which number is greater)

Have students use base ten blocks to determine which number is greater:

- a) 35 or 47 b) 26 or 15 c) 48 or 32 d) 57 or 68 e) 3 or 14

ASK: How does looking at the digits tell us which number is greater? (if the tens and ones digit of one number are both greater than the tens and ones digit of the other number, then that number must be greater)

Make the numbers 43 and 26 using base ten materials.



SAY: Which has more tens blocks? Which has more ones blocks? Hmmm, 43 has more tens blocks, but 26 has more ones blocks—how can we know which one is bigger?

Show students how trading a tens block for more ones blocks can help them compare the two numbers (or break apart a stack of 10 link-it cubes):

$$43 = 4 \text{ tens} + 3 \text{ ones} = 3 \text{ tens} + 13 \text{ ones}$$

$$26 = 2 \text{ tens} + 6 \text{ ones}$$

Now, it is clear that 43 is more than 26—43 has more tens and more ones.

Give students base ten blocks or link-it cubes and ask students make models for each pair of numbers and then to compare the numbers by trading blocks if necessary (or splitting apart stacks of 10 link-it cubes) so that the tens and ones in one number are both the same or greater than the tens and ones in the other number.

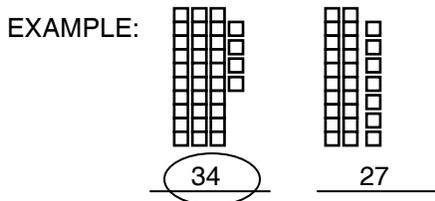
EXAMPLES: Which number is greater:

- a) 56 or 38
- b) 39 or 45
- c) 17 or 46
- d) 38 or 55
- e) 63 or 24

Have students compare several pairs of numbers in their notebook where the tens digit is greater in one number and the ones digit is greater in the other number. They should draw rough sketches of the base ten blocks to help them and then trade ten ones blocks for a tens block.

Invite volunteers to show their work on the board. ASK: If two numbers have different tens and ones digits, which number is greater—the number with greater tens digit or the number with greater ones digit?

Draw pairs of base ten models and have students individually write the numbers modeled and circle the greater number in each pair. Students should see that the number with more tens is always greater.



Repeat the exercise, but this time have students write the names for the numbers in words. Make the words below a regular part of your spelling lessons and have them visible to all students during math lessons: one, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, twenty, thirty, forty, fifty, sixty, seventy, eighty, ninety, one hundred.

When providing pairs of numbers for the students to compare, include examples where both numbers have the same tens digit and ASK: If both numbers have the same tens digit, how can you tell which number is greater? (the number with the greater ones digit will be greater) If the numbers have different tens digits, how can you tell which number is greater? (the number with a greater tens digit will be greater).

Then ask students to make (or draw rough sketches of) base ten models for the numbers 238 and 153.

ASK: Which number has more hundreds blocks? Tens blocks? Ones blocks? Which number do you think is greater? How can you trade some blocks so that one number has at least as many ones, tens and hundreds blocks as the other number? Repeat with other pairs of numbers.

- a) 345, 169 b) 541, 355 c) 102, 45 d) 600, 497 e) 436, 429 f) 810, 801

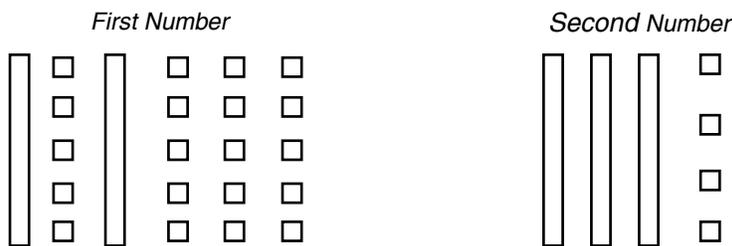
ASK: Which number is greater—the number with more hundreds, more tens or more ones? Is a 3-digit number always greater than a 2-digit number? Is a 2-digit number always greater than a 1-digit number? How do you know?

Then draw base ten models of several pairs of 2- and 3-digit numbers. Have students write the number word and the numeral for each number and then to circle the greater number.

Extensions:

1. Create base ten models of a pair of two-digit numbers. Ask students to say how they know which number is greater. You might make one of the numbers in non-standard form, as shown for the first number below.

EXAMPLE:



To compare the numbers students could remodel the first number in standard form by regrouping ones blocks as tens blocks.

2. Ask students to create base ten models of two numbers where one of the numbers...
 - a) is 30 more than the other
 - b) is 50 less than the other
 - c) has hundreds digit equal to 6 and is 310 more than the other
3. Ask students where they tend to see many numbers in increasing order (page numbers, houses, mailboxes, apartment numbers, line-ups when people need to take a number tag).