COMMON MISCONCEPTIONS

• First, compare digits in the least place value.

Students may start by comparing digits in the ones place, instead of the greatest place value. These students may remember that they are supposed to start comparing the digits at one end of the number but start at the right side, since that is where they start for operations with numbers. Help these students think conceptually about why you need to start from the greatest place value when you compare numbers. Ask students to model the numbers they are comparing with base-10 blocks to see which one is greater. Use this model to help them see that if there are more hundreds in one number than the other, it doesn't matter which number has more tens or more ones. The number with most hundreds is the greater number. Explain that therefore you must start from the greatest place value when comparing two numbers.

• To compare a 2-digit number to a 3-digit number, first compare the digit in the greatest place value in each number.

When comparing a 2-digit number to a 3-digit number, some students may compare the digit in the greatest place value in each number, instead of comparing place values starting with the greatest place value. For example, they may compare 86 to 150 by comparing 8 to 1, and conclude that 86 > 150. These students are simply comparing the left-most digits in each number, without considering their place value. Remind students that it doesn't make sense to compare the digits unless they have the same place value. You cannot compare the 8 in 86 to the 1 in 150 because the 8 represents 8 tens and the 1 represents 1 hundred. Help students realize that there are 0 hundreds in 86. This means it is less than 150, because 150 has 1 hundred. Regrouping hundreds as tens may also help students compare these numbers by showing 150 as 15 tens compared to the 8 tens in 86.

• Students mix up the symbols for greater than and lesser than.

If students consistently write inequalities that identify the wrong number as the greater number, they may be comparing the numbers correctly but mixing up the symbols. The greater than symbol, >, and the lesser than symbol, <, are easy to confuse because they look alike. Tell students that one way to remember which symbol to use is to think of the symbol as an alligator's (or other animal's) mouth. Since the animal is hungry, it always wants to eat the number that is greater. So, the open side of the symbol (the open mouth) should always face the greater number. As students use this memory trick to write more inequalities, suggest that they check that their comparisons make sense by reading them in words, including reading the symbol as “is greater than” or “is less than.”

PLACE VALUE

A good understanding of place value is essential before students begin comparing 3-digit numbers. Students should understand that the first digit in a 3-digit number represents the number of hundreds, the second digit represents the number of tens, and the third digit represents the number of ones.
They should be able to think of a number like 649 as 6 hundreds, 4 tens, and 9 ones. Students may need to review place value to the tens and hundreds before starting comparisons.

COMPARING 3-DIGIT NUMBERS

Students are already familiar with comparing 2-digit numbers and with writing comparisons using the symbols >, =, and <. In this lesson, they build on that knowledge and their understanding of place value to compare 3-digit numbers.

When comparing two numbers, students should begin by comparing the digits in the greatest place value. In 3-digit numbers, this means comparing the quantity of hundreds in each number. The number that has more hundreds is the greater number. If both numbers have the same quantity of hundreds, students should compare the digits in the next greatest place value, the tens place. If both numbers have the same number of tens, students should move on to the ones place.

Students can develop their understanding of how to use place value to compare numbers by using base-10 blocks to visually represent the numbers they are comparing. They can also use place-value charts that line up the digits of the numbers vertically. As they gain more confidence, students can solve problems without base-10 blocks.

COMPARING A 3-DIGIT NUMBER TO A 2-DIGIT NUMBER

Students also need to be able to compare numbers that do not have the same number of digits, such as a 3-digit number and a 2-digit number. To compare numbers like 456 and 92, help students use their understanding of place value to see that you cannot compare the first digit of each number, 4 and 9, because 4 represents 4 hundreds while 9 represents 9 tens. Direct students’ focus to the number with fewer digits, 92. Since there is no digit in the hundreds place, this means there are 0 hundreds. Students may find it easier to compare the two numbers if they write the numbers in a place-value chart. This way they can see that there is no digit for 92 in the hundreds column.

TEACHER TIPS

Base-10 blocks and place-value charts can help students understand how to compare numbers using place value. By using base-10 blocks to represent the numbers they are comparing, students can clearly see the role that place value plays in determining which number is greater. Encourage students to start out by using base-10 blocks. As they become more comfortable with comparing 3-digit numbers, they will likely prefer faster methods, but remind them that if they are stuck on a problem, they can try modeling it with base-10 blocks.