

Teaching to the Common Core mathematics standards

IMPORTANT NEW CHANGES

Eliminate this old habit

Defining equality as “same as.”

For example: “Remember students, the equal sign means same as.”

Calling digits “numbers.”

For example: “The numbers 7 and 3 are in 73.”

Adopt this new habit

Define equality as “same value as.”

You might say this: “Remember students, the equals sign means same value as. The two values do not have to look alike, but they will have the same value. $3 + 4$ tells a different math story than $4 + 3$, but we know that they will both yield the same value of 7, so they are equal. Are they exactly the same? No, but they are equal.”

Don’t conflate digits with numerals. Instead clearly distinguish the difference between them, and take the time to be precise.

You might say this: “Digits are in numerals. Numerals are written symbols that represent numbers.

“73 has two digits – 7 and 3. 73 is a numeral that represents the number value of 73. 7 is a digit, and 3 is a digit within that numeral. In standard form, 73 is composed of the numbers 70 and 3.”

Why?

The definition “same as” is mathematically incorrect and leads to misconceptions. Equals means that two things are the same based on one attribute – their quantitative value. Just as red or rough is an attribute, a thing’s quantitative value also is an attribute. It is as absurd to say that $4 + 3$ is the same as $1 + 6$ as it is to say that a red truck is the same as a red lollipop. In the former, they have the same value; in the latter, they have the same color. In neither instance are they the same thing.

Be precise (Carpenter et al., 1999; Carpenter, Franke, & Levi, 2003).

It is important to distinguish between digits, numerals, and numbers. Numbers and numerals are essentially the same; numerals are the written form of the idea of the number. Digits and numerals are not the same. When we are imprecise about digits and numerals, we lose an opportunity to reinforce the workings of the base-10 number system. 7 is not a number when it is contained in 73. It does not mean 7 in the number sense. It means 7 in the digit sense and must be multiplied by a power of 10 to be fully understood (Ma, 2010).