MGSE4.NF.5 & 4MGSE.NF.6 Video Transcript

00:01
[Opening Music]

00:12
In this video, we will deconstruct standards 4.NF.5 and 4.NF. 6 of the Grade 4 GSE for mathematics. These two standards focus on fractions with denominators of 10 or 100 and the relationship between fractions and decimals.

00:29
Standard 4.NF.5 requires students to express a fraction with denominator 10 as an equivalent fraction with denominator 100 and use this technique to add two fractions with respective denominators 10 and 100. For example, students establish that 3/10 and 30/100 are equivalent fractions, and using this understanding, they determine that 3/10 + 4/100 is the same as 30/100 + 4/100, which is equal to 34/100.

01:04
Standard 4.NF.6 calls for students to use decimal notation for fractions with denominators 10 or 100. Students determine that fractions such as 6/10 and 29/100 can be written using decimal notation. This standard also necessitates that students read, write, model, and represent decimal numbers, as well as locate decimal numbers on a number line.

01:30
Grade 4 is the first time that students are introduced to decimal concepts, and standards 4.NF.5, 4.NF.6, and 4.NF.7 lay the foundation for performing operations with decimals in grades 5 and 6. In Grade 4, students (a) investigate the relationship between fractions and decimals; (b) read, write, and represent decimals; and (c) compare two decimals to the hundredths place value position.

O1:59
In Grade 5, students (a) read, write, and compare decimals to the thousandths place value position; (b) use place value understanding to round decimals to the hundredths place value position; and (c) use concrete models and drawings to add, subtract, multiply, and divide decimals to the hundredths place value position and relate the strategy to a written method.

02:21
In Grade 6, students fluently use the standard algorithm to perform all four operations with multi-digit decimals.

02:30

Let's start by looking at the expectations for standard 4.NF.5. This standard continues the work of equivalent fractions by having students change fractions with a 10 in the denominator into equivalent fractions that have a 100 in the denominator.

For example, the model shows 5/10 of the grid shaded. If the grid is partitioned into hundredths, we see that the same area, or 50 of the 100 squares are shaded. So, 5/10 is equal to 50/100.

Students need ample experiences working with visual models instead of algorithms, in order to develop understanding for future work with decimal numbers.

03:11
Standard 4.NF.5 also requires students to add two fractions with respective denominators of 10 and 100. Consider the problem 2/10 + 7/100. Using their knowledge and understanding of equivalent fractions, students determine that 2/10 = 20/100. Thus, we can rename 2/10 + 7/100 as 20/100 + 7/100. The model represents 20/100 and 7/100, for a total of 27/100.

03:44
Another way that students might represent 20/100 plus 7/100 is with dimes and pennies, where 2 dimes is equal to 20/100 and 7 pennies is equal to 7/100. 2 dimes and 7 pennies is equal to 27/100.

04:03
Students need multiple opportunities to compose and decompose decimal fractions, including fractions greater than 1. Students can use number bonds and their knowledge of place value to demonstrate flexibility with numbers.

04:18
One Georgia Standards of Excellence Scaffolding task that can support students with standard 4.NF.5 is "Decimal Fraction Number Line." This task requires students to create a model for each decimal fraction using a tenths or hundredths square. Students then use the decimal fraction models to create a number line. Let's watch as some students work through this task.

04:39 (Video)
Teacher: Which fraction are you representing?
Student: Nine-tenths.
Teacher: How do you know it's nine-tenths?
Student: Because the numerator is nine and the denominator is ten, so it means nine out of ten.
Teacher: So, how many of those are you going to shade on your grid?
Student: Nine.
Teacher: How many are there in all?
Student: Ten.

04:56 (Video)
Teacher: What fraction are you representing on your grid?
Student: A hundred-hundredths.
Teacher: And how many tenths is equal to a hundred hundredths?
Student: Ten-tenths which is also one whole.
Teacher: How much of that grid are you going to be shading?

Student: The whole thing. 100/100.

05:13
After students developed their decimal fraction models, they developed a number line to reflect equivalent fractions with denominators of ten and one hundred.

05:23 (Video)
Teacher: What patterns did you see as you completed your number line?
Student (Pointing to the hundredths representations): I saw that it went in tens. Ten, 20, 30, 40, 50, 60, 70, and so on.
Teacher: What do you notice about 50/100 and 5/10?
Student: They're both half.
Teacher: What about 70/100 and 7/10?
Student: They're like… across from each other.
Teacher: What would that indicate?
Student: That they're equivalent.

05:48
In the next section of the video, we'll investigate the expectations for standard 4.NF.6, which requires students to use decimal notation for fractions with denominators 10 and 100. In Grade 4, students make connections between decimal fractions, such as 45/100, and writing this number using decimal notation. Using a place value chart can assist students with developing place value understanding.

06:13
Students also need concrete experiences to represent the magnitude of numbers and base-ten blocks can serve this purpose. In this example, each rod represents one-tenth, and each cube represents one-hundredth. Forty-five hundredths can be represented with four tenths rods and 5 hundredths cubes.

06:34
Let's represent the magnitude of another decimal number, such as 2.72. In this example, each flat represents one whole, each rod represents one-tenth, and each cube represents one-hundredth. Two and seventy-two hundredths can be represented as two wholes, seven tenths rods, and two hundredths cubes. This can also be written in expanded form: $(2 \times 1) + (7 \times 0.1) + (2 \times 0.01) = 2.72$.

07:09
Standard 4.NF.6 also necessitates that students identify and locate decimal numbers on a number line. After students have experiences using concrete models to show the magnitude of decimal numbers, they can use these models to develop a number line. Let's build a number line from 0-1 using base-ten rods. Each rod represents one-tenth.

07:32
Now, let's label the number line in both tenths and hundredths. We need to find and locate 0.38 on the number line. Starting at three-tenths, we need to count forward another eight-hundredths. The arrow shows the location of 0.38 on the number line.

07:52
The Georgia Standards of Excellence Construction task "Decimal Designs" supports students with standard 4.NF.6. This task requires students to write decimal fractions with denominators of tenths and hundredths in decimal notation. Let's watch as some students reason through this task.

08:08 (Video)
Teacher: What are representing with your models?
Student: Four-tenths and 0.4.
Teacher: And how do you say, "point four?"
Student: Four-tenths.
Teacher: Are those equivalent?
Student: Yes, they are because decimal form is pretty much the same as fraction form.
Teacher: Tell me how you know that.
Student: We have four one-tenths, so that'd be 4 x 1/10 is just like 4 x 0.1.
Teacher: And how do you say, "point one?"
Student: One-tenth. 4 x 0.1 is 4/10.

08:38 (Video)
Teacher: What are you representing?
Student: I'm representing 10 out of 10 or one-whole.
Teacher: How do you know that?
Student: I know that 10 out of 10 equals one-whole because 1/10 is one part of 10. If there are 10 of those parts that make up that 10… 10 out of 10 equals one.
Teacher: Can you show me how you represented that on your paper?
Student: I represented 10 out of 10 or 10/10 by putting the numerator as 10 and the denominator as 10. In decimal form, I put 1.0 because 10/10 equals one-whole.

09:12
After students have ample experiences with decimal concepts, they begin to solve problems with decimals, which applies to standard MGSE.4.MD.2. Let's look at an example: Tyson spent $5.00 on a pair of sunglasses and a small pack of gumballs. If the sunglasses cost $3.48, how much did the pack of gumballs cost?

09:35
Let's represent this problem with a bar model. We know that Tyson spent a total of $5.00. We also know that the sunglasses cost $3.48. We need to know the cost of the gumballs. We can find the cost of the gumballs by calculating $5.00 - $3.48, which gives a difference of $1.52. The pack of gumballs costs $1.52.

10:06
For additional tasks that support standards 4.NF.5 and 4.NF.6, check out openmiddle.com. In the task, Decomposing Tenths & Hundredths, students use the digits 0 to 9, no more than one time each, to fill the boxes to decompose 1 1/10. Tasks such as this incorporate the Standards for Mathematical Practice and encourage students to reason flexibly with numbers.

10:34
Likewise, Illustrative Mathematics includes numerous tasks that can be implemented to support student learning.

10:40
For additional information about the Georgia Standards of Excellence, please visit georgiastandards.org.

10:47
[Closing Music]