MGSE4.NF.7 Video Transcript

00:01
[Intro Music]

00:12
In this video, we will deconstruct standard 4.NF.7 of the grade 4 Georgia Standards of Excellence for Mathematics. This standard focuses on comparing two decimal numbers to the hundredths position.

00:26
Standard 4.NF.7 requires students to compare two decimals to hundredths by reasoning about their size.

00:34
This standard also necessitates that students recognize that comparisons are valid only when two decimals refer to the same whole.

00:42
Students record the results of comparisons with symbols >, =, or <, and justify the conclusions.

00:50
For example, looking at the two models, students reason that 0.62 and 0.27 are valid comparisons because the wholes are the same size.

01:01
Additionally, students determine that 0.62 is greater than 0.27 because the area that represents 0.62 is greater than the area that represents 0.27.

01:14
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.

01:30
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.

01:42
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.

02:01
In Grade 6, students fluently use the standard algorithm to perform all four operations with multi-digit decimals.

02:10
Standard 4.NF.7 calls for students to use visual models such as area models, decimal grids, decimal circles, or number lines to compare decimals.

02:20
These experiences support students in developing the understanding that the comparisons between decimals are only valid when the whole is the same for both cases.

02:33
It is important that students have concrete experiences to represent the magnitude of decimal numbers.

02:36
The first task we will look at emphasizes area models and decimal number lines to support conceptual understanding of decimal magnitude and comparisons.

02:45
In Grade 4, students use area models, such as those shown, to represent and compare decimal numbers.

02:53
The area model on the left represents 0.9, and the area model on the right represents 0.90. Because the same amount of area is shaded on both models, 0.9 is equal to 0.90.

03:06
Students might also use a number line to compare decimal numbers. Let's compare the numbers 0.08 and 0.8.

03:14
The arrows show the location of both decimal numbers on the number line. Students often have a misconception that 0.08 is greater than 0.8 because 0.08 has more digits.

03:27
Students need to understand that they must look at the place value digits when comparing two decimals.

03:33
A number line can support students in alleviating decimal misunderstandings. By locating both decimals on the number line, students can determine that 0.08 is less than 0.8.

03:46
Let's watch as a student reasons about decimals in the Double Number Line Decimals scaffolding task.

03:53 (Video)
Teacher: How did you know where to put that first decimal grid, right there?
Student: So, when you have a number line, I had to fill out hundredths. And there's a hundred hundredths in one. And every ten of them is one tenth of the way there. That's these big marks. So, I can count by one tenth or ten hundredths, two tenths or twenty hundredths. And since I have 0.23, I have to do three hundredths… which is 1, 2, 3. So that's why I have to put it right here.

04:17
Teacher: So, are you saying that 0.23 is less than 0.3?
Student: Yes.
Teacher: How do you know that?
Student: So, on the number line, 0.23 is right here… and 0.3 is right here. And when one number is the… left-most to another number, that means that it's less than that other number on a number line.

04:34
Teacher: So, but 0.23 has… 1, 2, 3 digits in it and 0.3 has only two digits in it.
Student: Mm-hmm.

04:43
Teacher: So, how does 0.3, that only has two digits… how is it bigger than 0.23, which has three digits?
Student: Because each digit represents a different place. This is three hundredths, which is way less than three tenths. So… 0.23 is less than 0.3.

05:00
Teacher: Are any of these values equivalent?
Student: Yes.
Teacher: And how do you know?
Student: Right here… 0.5 and 0.50.

05:07
Teacher: Explain. How do you know they're equivalent?
Student: This is 0.5 and it's five tenths. This is 0.50, which is fifty hundredths. There's five ten-hundredths [five groups of ten hundredths] in this one which is equal to five tenths… and this is also five tenths. So, they're equal.

05:19
Now let's look at some other concrete and visual models that students may use to compare decimal numbers.

05:26
Let's start by using base-10 blocks to compare 2.52 and 2.6. In this example, each flat represents one whole, each rod represents one-tenth, and each cube represents one-hundredth.

05:42
Two and fifty-two hundredths can be represented as two-wholes, five tenths rods, and two hundredths cubes.

05:50

Two and six-tenths can be represented as two-wholes and six tenths rods. Looking at the base-ten blocks, we can see that 2.6 is 0.08 greater than 2.52.

06:05
Another concrete model that students may use to represent and compare decimal numbers is place value disks.

06:13
On the left, the place value disks represent 1.06, since ten one-tenths is equal to one whole, and 6 times 0.01 is equal to 0.06.

06:26
On the right, the place value disks show ten one-hundredths, which is equal to 0.1. By looking at the models, students can conclude that 1.06 > 0.1.

06:40
Another concrete manipulative that students may use to represent and compare decimal numbers is dimes and pennies. On the left, the coins represent 0.32 or $0.32.

06:53
On the right, the coins represent 0.45 or $0.45. The model shows that $0.32 is less than $0.45.

07:03
Another visual model that students might use to compare decimal fractions is a hundredths disk. The red hundredths disk is labeled in tenths.

07:13
Notice that the red shaded area extends about a 0.01 past the 0.6 mark. So, the red shaded area represents 0.61.

07:22
The blue hundredths disk is labeled in hundredths, and the blue shaded area represents 0.39. The area of the red shaded part is greater than the area of the blue shaded part, so 0.61 is greater than 0.39.

07:39
As students build their understanding of decimal numbers, they rely on place value understanding to compare two numbers.

07:46
Looking at the place value chart, we see that both numbers have a 3 in the ones position. If we look at the tenths position, we notice that 3.14 has one-tenth, and 3.9 has nine-tenths.

08:01
Since one-tenth is less than nine-tenths, 3.14 is less than 3.9.

08:10
Another task that can support students with standard 4.NF.7 is "Decimal Line-Up." This task requires students to order decimal numbers and locate them on a number line.

08:20
Let's watch as some students work through this task.

08:23 (Video)
Teacher: What number will come after one and two tenths? And how do you know?
Student: One and six tenths… since two and three tenths is bigger than one and six tenths… by the whole number… So, this one, right here, is one… and six tenths.
Teacher: What number will come next?
Student: Two and three tenths… because two is not greater than three… Then you got the last one… Three and seven tenths.

08:59 (Video)
Teacher: How did you know where to place 3.7 on the number line?
Student: Well, I knew how to place 3.7 because 3.7 equals three-wholes and seven-tenths. Now… three-wholes… 1, 2, 3, and seven-tenths… 1, 2, 3, 4, 5, 6, 7.
Teacher: Ok. Is there another way you could've determined the location of 3.7? Let's say, if you knew where four was, how could you figure out where 3.7 is from four?
Student: Well… 3.7 is three tenths away from four. So, I could count three tenths, backwards [from four] 1 tenth, 2 tenths, 3 tenths and got 3.7.
Teacher: Ok. Great.

09:35
After students have ample experiences with decimal concepts, they begin to solve problems with decimals, which applies to standard MGSE.4.MD.2.

09:44
Let's look at an example: Valerie and her friends are running in a race. The table lists the running distances for each person.

09:53
Valerie ran 4.32 kilometers, Maya ran 4.4 kilometers, and Ayanna ran 4.05 kilometers. Who ran the greatest distance? Justify your answer.

10:07
Let's start by listing each distance in a place-value chart. Looking at the place value chart, we see that all three numbers have a 4 in the ones position.

10:16
If we look at the tenths position, we notice that 4.32 has three-tenths, 4.4 has four-tenths, and 4.05 has zero-tenths.

10:28
Since four-tenths is the greatest, 4.4 is the greatest number. So, Maya ran the greatest distance, Valerie ran the second-greatest distance, and Ayanna ran the least distance.

10:42
For additional information about standard 4.MD.2, check out the MGSE4.MD.2 video and resources.

10:50
Mathlearningcenter.org offers free digital web apps that provide students with visual models that support with conceptual understanding. Let's take a look at the fractions app and the number line app.

11:02
In the Fractions app, students and teachers can use the fraction bar tool to create decimal grids such as those shown on the screen.

11:09
The text-tool feature can be used to label the grids and indicate greater than, less, than, or equal to comparisons.

11:17
The first decimal grid represents 0.34, and the second grid represents 0.4. Since the amount of area shaded on the 0.34 grid is less than the amount of area shaded on the 0.4 grid, 0.34 is less than 0.4.

11:35
Now let's take a look at the number line app. The number line app allows fourth-grade students and teachers to create a number line that is labeled in tenths or hundredths.

11:44
The custom tick mark feature allows for the insertion of additional numbers. Let's suppose that we want to compare 2.35 and 2.13.

11:54
I can use the custom tick mark tool to find and label both decimal numbers on the number line. 2.35 is greater than 2.13.

12:04
For additional information about the Georgia Standards of Excellence, please visit georgiastandards.org.

12:10
[Closing Music]