Module 1- Focus on Decimals Script

Slide 1: Module 1 use of manipulatives and strategies with a focus on decimals. This is part 2 of a 3-part professional learning session for module 1. We encourage you to follow along and construct the visual representations discussed within this session. Feel free to pause the presentation at any point.

Slide 4: for the examples using base ten blocks, the flat will represent 1 whole, the rod represents 1 tenth because it's one of ten parts needed to create a whole and the unit represents 1 hundredth. It is one of one hundred parts needed to make 1 whole. As with most other manipulatives, base ten blocks can be used flexibly, each block only needs a label to identify it is representing.

Slide 5: to represent 1.54, we have used a flat, 5 rods and 4 units one whole, 5 tenths and 4 hundredths. 0.33 is represented with 3 rods and 3 units. 3 tenths and 3 hundredths.

Slide 6: like blocks are combined, flats, rods and units or wholes, tenths and hundredths.

Slide 7: Visually we see there's one whole, 8 tenths and 7 hundredths.

Slide 8: the sum of 1.54 and 0.33 is 1.87.

Slide 10: place value charts may proof a useful tool for students who have difficulty identify the place of a digit.

Slide 11: here we have insert each digit from both addends into the place value chart. This allows us to see how many ones, tenths and hundredths we're adding.

Slide 12: we have one whole, 8 tenths and 7 hundredths. In standard form it is 1 and 87 hundredths.

Slide 13: empty number lines differ from traditional number lines as they do not contain hash marks nor equal intervals. They are very flexible and can be manipulated to best meet the needs of the student employing the number line.

Slide 14: here, beginning with the greater quantity, we have use the empty number line to solve the problem. The second added was broken into place value parts. Notice the jump sizes vary depending on the amount jumped. Starting with 1.54 we added 0.03 and noted to where that amount has moved us on the number line. With 0.3 left to add, the new amount is increased by 3 tenths and the final location is represented on the number. 1.54 plus 0.33 is the same as 1.87.

Slide 16: with the following examples, the flat represents a whole, the rod represents one tenth and the unit represents one hundredths.

Slide 17: using base ten blocks. We can create an area model using concrete materials. The length of this rectangle is 1.4 represented by 1 flat and 4 rods. The width of the rectangle is 0.4 represented by 4 rods. We want to determine the area of this rectangle.

Slide 18: one part of the area is determined when 1 is multiplied by 0.4 which is equivalent to 4 tenths.

Slide 19: the next part of the area is found by multiplying 0.4 by 0.4 which is 0.16. The benefits of using concrete materials to find the area is students are able use the size of the area to decide which block to use. With ample experiences, students can derive multiplying a tenth by a tenth most likely will result in hundredths and multiplying wholes by tenths will most likely result in tenths.

Slide 20: to determine the area, combine the partial areas of 0.4 and 0.16. Students come even exchange 10 hundredths for 1 tenth. Either strategy will result in the product of 0.56.

Slide 21: base ten fractions are also referred to as decimal fractions. They are distinguished by their denominators which are 10, 100, 1000 and so on.

Slide 22: decimals and fractions before are parts of a whole. When students and teachers use proper mathematical language when referring to decimals the connection to base ten fractions is clear. In this example, 1 and 4 tenths is converted to a mixed number. 1 is the whole within the decimal and the mixed number. As a decimal, 4 is in the tenths place denoting it is out of 10 equal parts. Hence why we have written it as 4 over 10 or 4 tenths as a fraction. The same is done for 4 tenths.

Slide 23: here we are showing the mixed number being converted to an improper fraction. This step is not required, as students can apply a partial product strategy here.

Slide 24: multiplying numerator and numerator as well as denominator and denominator we arrive at a product of 56 over 100.

Slide 25: 56 over 100 or 56 hundredths can be converted to a decimal answer.

Slide 26: the partial product strategy we discussed in part 1 of this 3-part session can be applied to other types of numbers.

Slide 27: using partial products we multiply the wholes, wholes by the other's tenths, then tenths by tenths.
Slide 29: the partial products are combined to find the product of 1.4 X 0.4.

Slide 30: keeping our thinking flexible, we will explore using base ten materials to visually represent the division of decimals and how base ten fractions help bridge the gap between fractional understanding and decimals.

Slide 32: this rectangle has an area of 2.31 square units composed of 2 wholes, 3 tenths and 1 hundredth.

Slide 33: the length of the rectangle is 2.1. The red line highlights the length. Notice going across is 2 wholes and 1 tenth. We must determine the width of this rectangle.

Slide 34: taking a closer look at the width. It is composed of 1 whole and 1 tenth.

Slide 35: the width of the rectangle is 1.1. Therefore 2.31 divided by 2.1 is 1.1.

Slide 36: here we are using the same strategy with a written representation. The area is 3.6 and the width is 1.2.

Slide 37: the rectangle now displays the whole and tenths to within the area.

Slide 38: take a look at the width of the rectangle, notice it is 3 wholes going down. The width is 3. 3.6 divided by 1.2 is 3.

Slide 39: as the decimals within the equation become less friendly, students will need to apply a more efficient strategy.

Slide 40: just as when we were applying the base ten fractions with multiplication, we have converted the decimals to mixed numbers and fractions.

Slide 41: here, we are using the common denominator strategy as discussed in part 1 of this 3-part session.

Slide 42: we have decided to convert the mixed number to an improper fraction.

Slide 43: because we are dealing with the same size pieces, we are looking to find how many groups of 20 are in 136.
Slide 45: many believe the standard algorithm is the most efficient strategy for dividing decimals. We want to reiterate one very foundational idea with using the standard algorithm.

Slide 46: remember, the mathematical language we use can create misconceptions or alleviate them. One misconception many educators have, so in turn students have is the movement of the decimal point. 4.NBT1 states students should be able to recognize that in a multi digit whole number, a digit in one place represents ten times what it represents in the place to its right. And 5.NBT.1 says students should recognize that in a multi digit number a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left. If students are developing this understanding in 4th and 5th grade, and it isn't a hard leap to make the place value connection with this algorithm. Here, we have equivalent expressions. The dividend and the divisor have both been multiplied by 10, so the 2 in 2.6 actually shifts to the tens place and the 4 in 4.83 has shifted to the tens place. The decimal point remained between the ones and the tenths places.

Slide 48: what do you do when students struggle?

Slide 49: allow students to work at their own pace of understanding. It's perfectly fine for students to hover between the representational stage and abstract stage.

Slide 50: tiered tasks are a great way to allow students to work at their own pace of understanding while continuing to move through the curriculum. You may have a single task tiered at three different levels. Below expectation, at expectation and above expectation.

Slide 51: here is an example of a tiered task. The order of tiers does not matter. We have aligned tier 1 to above expectation, were students will work with larger numbers. Tier 2 presents smaller quantities but still requires students to use abstract reasoning to support their answers. Tier 3 is only required to use representations, concrete or visual.

Slide 52: meeting with small groups of students is certainly beneficial. We have pulled suggestions for implementing small groups. The link listed will provide insight on how other teachers are implementing small groups at the secondary level.

Slide 54: this suggestion comes from the Social Emotional Learning in Mathematics session from Global Math Department. It lists a class size of 30 students to demonstrate you do not have to have a small class size to implement small group instruction. The GADOE is not suggesting the FOA class sizes should be increased to 30 students.

Slide 56: this suggestion comes from the Social Emotional Learning in Mathematics session from Global Math Department. It lists a class size of 30 students to demonstrate you do not have to have a small class size to implement small group instruction. The GADOE is not suggesting the FOA of algebra class sizes should be increased to 30 students.

Slide 57: The GaDOE has created a wiki space for high school teachers to engage in discussions about math teaching using the GSE. Here you'll find a forum to keep the conversation going, resources and who knows, you might make a few friends. It's a call to action and you are invited to make a difference. Access this online community here: https://ccgpsmathematics9-10.wikispaces.com/