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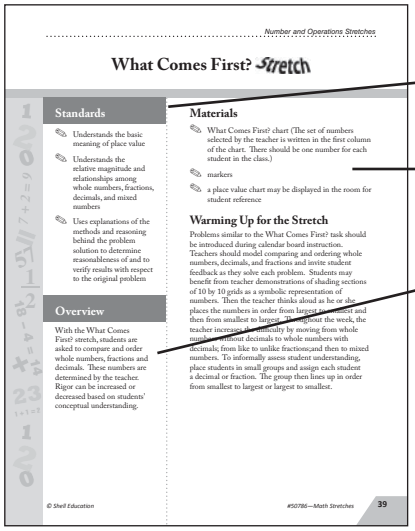
How to Use This Product


Number and Operations Stretches

What Comes First? Stretch

Standards

- Understands the basic meaning of place value
- Understands the relative magnitude and relationships among whole numbers, fractions, decimals, and mixed numbers
- Uses explanations of the methods and reasoning behind the problem solution to determine reasonableness of and to verify results with respect to the original problem

Overview

With the What Comes First? stretch, students are asked to compare and order whole numbers, fractions and decimals. These numbers are determined by the teacher. Rigor can be increased or decreased based on students' conceptual understanding.

Materials

- What Comes First? chart (The set of numbers selected by the teacher is written in the first column of the chart. There should be one number for each student in the class.)
- markers
- a place value chart may be displayed in the room for student reference

Warming Up for the Stretch

Problems similar to the What Comes First? task should be introduced during calendar board instruction. Teachers should model comparing and ordering whole numbers, decimals, and fractions and invite student feedback as they solve each problem. Students may benefit from teacher demonstrations of shading sections of 10 by 10 grids as a symbolic representation of numbers. Then the teacher thinks aloud as he or she places the numbers in order from largest to smallest and then from smallest to largest. Throughout the week, the teacher increases the difficulty by moving from whole numbers without decimals to whole numbers with decimals; from like to unlike fractions;and then to mixed numbers. To informally assess student understanding, place students in small groups and assign each student a decimal or fraction. The group then lines up in order from smallest to largest or largest to smallest.

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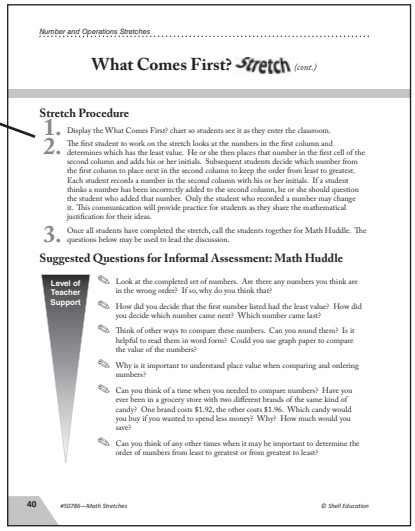
Each section opens with a list of the standards that are represented by the activity, followed by an overview of the stretch. A list of any materials and necessary prerequisite instruction (Warming Up for the Stretch) are included to help the teacher prepare the classroom and the students for the activity, minimizing the need for teacher assistance and allowing the students to have as much independence as possible to complete the task.

Simple, step-by-step procedures direct the teacher in how to conduct the Math Stretch. Included in this section are suggestions for extending the stretch for further mathematical exploration, as well as modifications for students who are nonreaders. The Math Huddle section suggests questions for informal assessment that a teacher can ask to provide varying levels of support and to facilitate a gradual release of responsibility (see more about Inquiry-based Learning on page 33).


Number and Operations Stretches

What Comes First? Stretch (cont.)

Stretch Procedure

1. Display the What Comes First? chart so students see it as they enter the classroom.
2. The first student to work on the stretch looks at the numbers in the first column and determines which has the least value. He or she then places that number in the first cell of the second column and adds his or her initials. Subsequent students decide which number from the first column to place next in the second column to keep the order from least to greatest. Each student records a number in the second column with his or her initials. If a student thinks a number has been incorrectly added to the second column, he or she should question the student who added that number. Only the student who recorded a number may change it. This communication will provide practice for students as they share the mathematical justification for their ideas.
3. Once all students have completed the stretch, call the students together for Math Huddle. The questions below may be used to lead the discussion.

Suggested Questions for Informal Assessment: Math Huddle

Level of Teacher Support

- Look at the completed set of numbers. Are there any numbers you think are in the wrong order? If so, why do you think that?
- How did you decide that the first number listed had the least value? How did you decide which number came next? Which number came last?
- Think of other ways to compare these numbers. Can you round them? Is it helpful to read them in word form? Could you use graph paper to compare the value of the numbers?
- Why is it important to understand place value when comparing and ordering numbers?
- Can you think of a time when you needed to compare numbers? Have you ever been in a grocery store with two different brands of the same kind of candy? One brand costs $1.92, the other costs $1.96. Which candy would you buy if you wanted to spend less money? Why? How much would you save?
- Can you think of any other times when it may be important to determine the order of numbers from least to greatest or from greatest to least?

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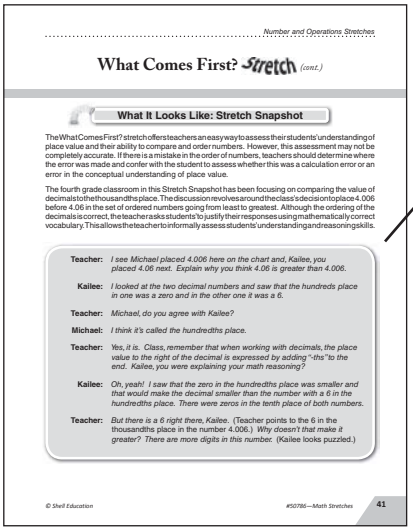
How to Use This Product *(cont.)*



Number and Operations Stretches

What Comes First? Stretch *(cont.)*

What It Looks Like: Stretch Snapshot

The What Comes First? stretch offers teachers an easy way to assess their students' understanding of place value and their ability to compare and order numbers. However, this assessment may not be completely accurate. If there is a mistake in the order of numbers, teachers should determine where the error was made and confer with the student to assess whether this was a calculation error or an error in the conceptual understanding of place value.

The fourth grade classroom in this Stretch Snapshot has been focusing on comparing the value of decimals to the thousandths place. The discussion revolves around the class's decision to place 4.006 before 4.06 in the set of ordered numbers going from least to greatest. Although the ordering of the decimals is correct, the teacher asks students to justify their responses using mathematically correct vocabulary. This allows the teacher to informally assess students' understanding and reasoning skills.

Teacher: *I see Michael placed 4.006 here on the chart and, Kailee, you placed 4.06 next. Explain why you think 4.06 is greater than 4.006.*

Kailee: *I looked at the two decimal numbers and saw that the hundreds place in one was a zero and in the other one it was a 6.*

Teacher: *Michael, do you agree with Kailee?*

Michael: *I think it's called the hundredths place.*

Teacher: *Yes, it is. Class, remember that when working with decimals, the place value to the right of the decimal is expressed by adding "-ths" to the end. Kailee, you were explaining your math reasoning?*

Kailee: *Oh, yeah! I saw that the zero in the hundredths place was smaller and that would make the decimal smaller than the number with a 6 in the hundredths place. There were zeros in the tenth place of both numbers.*

Teacher: *But there is a 6 right there, Kailee.* (Teacher points to the 6 in the thousandths place in the number 4.006.) *Why doesn't that make it greater? There are more digits in this number.* (Kailee looks puzzled.)

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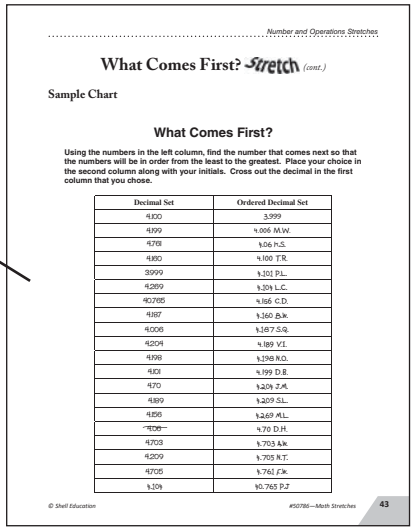
The Math Stretch concludes by providing the teacher with a model of how the Math Huddle may look in an actual classroom setting. This Stretch Snapshot illustrates the kinds of conversations teachers can have with their students, demonstrating how to extend students' thinking or uncover the sources of students' confusion about a concept. These dialogues model guided inquiry, in which the teacher facilitates the conversation, so that students can make connections and discover underlying themes on their own.

A sample of the chart or poster created during each stretch is also provided. The specific information shown in each sample mirrors the content of the Stretch Snapshot. Templates of each chart or poster are available on the Teacher Resource CD, as well as electronic formats using interactive whiteboard technology.



Number and Operations Stretches

What Comes First? Stretch *(cont.)*

Sample Chart

What Comes First?

Using the numbers in the left column, find the number that comes next so that the numbers will be in order from the least to the greatest. Place your choice in the second column along with your initials. Cross out the decimal in the first column that you chose.

Decimal Set	Ordered Decimal Set
4.100	3.999
4.199	4.006 M.W.
4.761	4.06 K.S.
4.180	4.100 T.R.
3.999	4.101 P.L.
4.269	4.304 L.C.
40.765	4.166 C.D.
4.187	4.260 B.K.
4.006	4.267 S.G.
4.204	4.189 V.I.
4.198	4.198 R.O.
4.101	4.199 D.B.
4.70	4.204 Z.M.
4.189	4.209 S.L.
4.156	4.269 A.L.
4.06	4.70 D.H.
4.703	4.703 E.K.
4.209	4.705 N.T.
4.705	4.761 J.K.
4.304	40.765 P.J.

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What Comes First? Stretch

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Warming Up for the Stretch

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What Comes First? Stretch *(cont.)*

Stretch Procedure

1. Display the What Comes First? chart on the board or the interactive whiteboard so students see it as they enter the classroom. The first student to work on the stretch looks at the numbers in the first column and determines which has the least value. He or she then places that number in the first cell of the second column and adds his or her initials. Subsequent students decide which number from the first column to place next in the second column to keep the order from least to greatest.

2. Each student records a number in the second column with his or her initials. If a student thinks a number has been incorrectly added to the second column, he or she should question the student who added that number. Only the student who recorded a number may change it. This communication will provide practice for students as they share the mathematical justification for their ideas.

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What Comes First? Stretch *(cont.)*

What It Looks Like: Stretch Snapshot

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The class in this Stretch Snapshot has been focusing on comparing the value of decimals to the thousandths place. The discussion revolves around the class's decision to place 4.006 before 4.06 in the set of ordered numbers going from least to greatest. Although the ordering of the decimals is correct, the teacher asks students' to justify their responses using mathematically correct vocabulary. This allows the teacher to informally assess students' understanding and reasoning skills.

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Kailee: *Oh, yeah! I saw that the zero in the hundredths place was smaller and that would make the decimal smaller than the number with a 6 in the hundredths place. There were zeros in the tenth place of both numbers.*

Teacher: *But there is a 6 right there, Kailee.* (Teacher points to the 6 in the thousandths place in the number 4.006.) *Why doesn't that make it greater? There are more digits in this number.* (Kailee looks puzzled.)

What Comes First? Stretch *(cont.)*

What It Looks Like: Stretch Snapshot *(cont.)*

Teacher: *We worked on the place value of digits last week in class. What happens to the value of a numeral as it moves farther to the right, away from the decimal point?*

Kailee: *It gets smaller.*

Teacher: *Its value decreases. So, let's look at both numbers and compare them. When comparing decimals, do we work left to right or right to left?*

Michael: *Left to right!*

Teacher: *That's right! So, with these two numbers, what place do we look at first?*

Kailee: *The ones place.*

Teacher: *Using your math vocabulary, compare the numerals in each place value of 4.06 to the numerals in each place value of 4.006.*

Michael: *Well, they both have a 4 in the ones place, so that doesn't help us compare their place value.*

Kailee: *They also each have a zero in the tens, no, tenths, place. So, we need to go to the next numeral.* (The teacher notes that Kailee corrected herself and referred to the tenths place correctly.)

Michael: *We just need to look over farther. I've got it. Four and six thousandths is less than four and six hundredths. Just like Kailee said to begin with, when we get to the hundredths place, the numbers are different. The number with a 6 in the hundredths place is greater than the number with a zero in the hundredths place. We were right—4.06 is greater than 4.006!*

Teacher: *But what about the six in the thousandths place in the number you chose, Michael?*

Michael: *It doesn't matter because it is less than a hundredth. Kailee's number has 6 hundredths; mine doesn't have any hundredths, so Kailee's number has to be greater.*

Teacher: *You are both doing a great job comparing these decimals. We worked like mathematicians to compare numbers. Whenever you are trying to find the order of number, remember to do just what we did. Work from left to right, comparing the values of the numerals in each position.*

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What Comes First? Stretch *(cont.)*

Sample Chart

What Comes First?

Using the numbers in the left column, find the number that comes next so that the numbers will be in order from the least to the greatest. Place your choice in the second column along with your initials. Cross out the decimal in the first column that you chose. The first one has been done for you.

Decimal Set	Ordered Decimal Set
~~4.100~~	3.999
~~4.199~~	4.006 M.W.
~~4.761~~	4.06 K.S.
~~4.160~~	4.100 T.R.
~~3.999~~	4.101 P.L.
~~4.269~~	4.104 L.C.
~~40.765~~	4.156 C.D.
~~4.187~~	4.160 B.W.
~~4.006~~	4.187 S.Q.
~~4.204~~	4.189 V.I.
~~4.198~~	4.198 N.O.
~~4.101~~	4.199 D.B.
~~4.70~~	4.204 J.M.
~~4.189~~	4.209 S.L.
~~4.156~~	4.269 M.L.
~~4.06~~	4.70 D.H.
~~4.703~~	4.703 A.W.
~~4.209~~	4.705 N.T.
~~4.705~~	4.761 F.W.
~~4.104~~	40.765 P.J.