Students have developed their understanding of place value in previous grades. Fourth graders are expected to generalize this understanding of place value to multi-digit whole numbers. This three-part task calls for students to demonstrate reasoning skills and a deep conceptual knowledge of place value in atypical ways. This task uses the securely-held content of rounding to assess the Standards for Mathematical Practice—MP.3: Construct viable arguments and critique the reasoning of others and MP.6: Attend to precision. Because these practices, and not the content, are the focus of the task, it is considered a “practice forward” task.

Part a is designed to allow students an accessible entry into the content, asking them to sequence three large numbers using drag-and-drop technology. This technology enables students to test their ideas about number relationships before submitting their answer electronically. In Parts b and c, students must think deeply about what rounding means in terms of the sizes of numbers and their relationships to one another. Knowing the rules of rounding and place value is not sufficient for students to answer the questions and explain their thinking. Part b asks students to critique the work of others (MP.3), while Part c asks students to justify their conclusions (MP.3) and addresses both precise communication and flexible reasoning (MP.6).

This task asks students to demonstrate their understanding and explain their thinking in ways to which many American students have not been exposed. Future research might address more broadly how students respond to tasks that call for deep understanding, supported by precise explanations, and what the influence of such assessment tasks might be on instruction.

Use the navigation at the upper right of this page to access the task.
Numbers of stadium seats (grade 4)

MP.3  Construct viable arguments and critique the reasoning of others.
Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

MP.6  Attend to precision.
Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

Generalize place value understanding for multi-digit whole numbers.

2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

3. Use place value understanding to round multi-digit whole numbers to any place.

2 Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.
Numbers of stadium seats (grade 4)

Baseball stadiums have different numbers of seats. Drag the tiles to arrange the stadiums from least to greatest number of seats.

San Francisco Giants’ stadium: 41,915 seats
Washington Nationals’ stadium: 41,888 seats
San Diego Padres’ stadium: 42,445 seats

Write your answer to the following problem in your answer booklet.

San Francisco Giants’ stadium: 41,915 seats
Washington Nationals’ stadium: 41,888 seats
San Diego Padres’ stadium: 42,445 seats

Compare these statements from two students.

Jeff said, “I get the same number when I round all three numbers of seats in these stadiums.”

Sara said, “When I round them, I get the same number for two of the stadiums but a different number for the other stadium.”

Can Jeff and Sara both be correct? Explain how you know.
Numbers of stadium seats (grade 4)

Write your answer to the following problem in your answer booklet.

When rounded to the nearest hundred, the number of seats in Aces Baseball Stadium is 9,100.

What is the greatest number of seats that could be in this stadium? Explain how you know.
### Numbers of stadium seats (grade 4)

#### Part a
- **Student places the tiles in the correct order:**
  - Washington Nationals’ stadium: 41,888 seats
  - San Francisco Giants’ stadium: 41,915 seats
  - San Diego Padres’ stadium: 42,445 seats

<table>
<thead>
<tr>
<th>Part</th>
<th>Solution</th>
<th>Points</th>
<th>Maximum points possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Student places the tiles in the correct order:</td>
<td>1</td>
<td>1</td>
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#### Part b
- **Student gives a clear and correct explanation such as:**
  - Yes. Rounding to different place values gives you a different estimate/number.
  - Yes. If you round all three numbers to the nearest thousand or ten thousand all three numbers round the same.
  - Any other mathematically valid explanation.

*Note: If a student answers that either Sara or Jeff were wrong, the student can receive partial credit at most.*

(Partial credit: The student’s explanation lacks precision, but he or she shows some understanding of rounding—as related to the problem.)

2* | 2 |
<table>
<thead>
<tr>
<th></th>
<th>Student gives the correct answer: 9,149</th>
<th>2²</th>
<th>4</th>
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<tbody>
<tr>
<td></td>
<td>(Partial credit: The student gives a number between 9,101 and 9,148 - inclusive).</td>
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<tr>
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<td>Student gives a clear and correct explanation for the answer:</td>
<td>2²</td>
<td></td>
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<td></td>
<td>- 9,150 rounds up to 9,200 and 9,149 rounds down to 9,100. Therefore, 9,149 is the largest number that rounds to 9,100 when rounding to the nearest hundred.</td>
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<tr>
<td></td>
<td>- 9,149 is the largest number that is closer to 9,100 than any other hundred.</td>
<td></td>
<td>(1)²</td>
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<tr>
<td></td>
<td>- Any other mathematically valid explanation.</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>(Partial credit for explanation: The student’s explanation is not accurate or precise, but he or she shows some understanding of rounding—as related to the problem.)</td>
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</tbody>
</table>

|   | Total points possible | 7 | 7 |