Task: Getting to School	**4th Grade**

Jason, Lucas, Tyson, and Kyler are fourth-graders at Big River Elementary School.

(A) Jason and Lucas ride their bikes to school. Jason rides his bike 3/4 of a mile to school while Lucas rides his bike 2/3 of a mile to school. Who rides their bike the farthest to school? Explain your reasoning.

(B) Tyson and Kyler walk to school. Tyson walks 1/3 of a mile to school and Kyler walks 1/5 of a mile. Who walks the farthest to school? Explain your reasoning.

(C) Compare the distances traveled to school for each of the four boys. Place each of their fractions correctly on the number line given below. Who travels the longest distance to school? Explain how you know.

Teacher Notes

For Part C, a common denominator is not needed. In fact, the least common denominator of these fractions (60) is beyond the scope of Common Core State Standards for Mathematics in Grade 4. Students should use other methods to determine the locations of these fractions on the number line (See possible solution paths for ideas.)

Students should have experiences with fraction models (like fraction strips or fraction circles) before they are given this task. This will ensure they can use visualization to compare and order fractions.

Common Core State Standards for Mathematical Content	**Common Core State Standards for Mathematical Practice**
4.NF.A.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure.

	8. Look for and express regularity in repeated reasoning.

Essential Understandings

- A fraction represents a part of a whole.
- For two fractions to be compared they must be parts of the same whole.
- The numerator of fractions represents how many pieces of a specific size you have.
- The denominator of a fraction represents what size those pieces are.
- Fractions can be compared using various forms of reasoning (i.e., by comparing to benchmark fractions; comparing like numerators; comparing like denominators, etc.)

Explore Phase

Possible Solution Paths	Assessing and Advancing Questions
Creating Common Denominators The student can show that 3/4=9/12 and that 2/3=8/12. Then they can see that 9>8, so 9/12 > 8/12, therefore 3/4 > 2/3. This means that Jason rides his bike farthest to school. Students can follow the same method to compare 1/3 and 1/5. They should determine that Tyson walks the furthest the school.	**Assessing Questions** • Does changing the numerator and denominator change the distance the boys traveled? **Advancing Questions** • Can you use a different denominator and still get the same answer?
Comparing to Benchmarks Students can create a number line to properly place 1/3 and 1/5 as compared to the benchmark of ½. They will recognize that 1/3 is slightly closer to ½ than 1/5 is, therefore 1/3 > 1/5. They should determine that Tyson walks the furthest the school. They can follow this same method to compare ¾ and 2/3 to the benchmark of 1. They will recognize that ¾ is closer to 1 than 2/3 is, therefore ¾ > 2/3. This means that Jason rides his bike farthest to school.	**Assessing Questions** • How did you decide what benchmark fraction to use? **Advancing Questions** • Could you choose a different benchmark and still find the correct answer?
Comparing Denominators Given Common Numerators (or Comparing Unit Fractions) Students can compare 1/3 and 1/5 by reasoning that a piece that is 1/3 size is bigger than a piece that is 1/5 size. They should determine that Tyson walks the furthest the school.	**Assessing Questions** • Can you explain how you knew that a 1/3 size piece is larger than a 1/5 size piece? **Advancing Questions** • Can you draw a model to compare 1/3 and 1/5?
Using Fraction Models Students could use four different number lines and/or fraction strips to compare the fractions and see that 1/5 < 1/3 < 2/3 < 3/4. They should determine that the distances for each boy (from least to greatest) are: Kyler, Tyson, Lucas, Jason.	**Assessing Questions** • How did you determine how to partition (or scale) your number line/fraction strip? **Advancing Questions** • Can you put all four fractions on a single number line?

<table>
<tr><th colspan="2">Possible Student Misconceptions</th></tr>
<tr><td>Students may not think they can place all four fractions on a single number line without cutting it into 60 pieces, since 60 is the least common denominator for all four fractions.</td><td>Assessing Questions
How could I partition/cut the number line so that I can determine where to place 1/5?
How could I partition/cut the number line so that I can determine where to place 1/3?
How could I partition/cut the number line so that I can determine where to place 2/3?
How could I partition/cut the number line so that I can determine where to place 3/4?</td></tr>
<tr><td>Students may think that because the 5>3 that 1/5 > 1/3.</td><td>Assessing Questions
What happens to the size of each piece of a pie when you cut more pieces?
Advancing Questions
What if I told you that if you have two pies. One pie is cut into thirds and one is cut into fifths? What would that tell you about the size of the pieces of each pie?</td></tr>
<tr><th>Entry/Extensions</th><th>Assessing and Advancing Questions</th></tr>
<tr><td>If students can’t get started…</td><td>Assessing Questions
Tell me about traveling to school? What are you trying to figure out?
Which two boys ride a bike to school?
Which two boys walk to school?
Advancing Questions
What is the whole we are discussing?</td></tr>
<tr><td>If students finish early….</td><td>Assessing Questions
How can you prove that you have found the correct answers?
Advancing Questions
Could you use this same strategy if the boys lived different distances from the school than the ones given?
Can you draw a map to show the distance each boy lives from school?</td></tr>
<tr><th colspan="2">Discuss/Analyze</th></tr>
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Whole Group Questions
The Meaning of Fractions • Tell me what a fraction means to you. • Describe what the different parts of a fraction represent. • Can you use a fraction to represent more than one of something?
Equivalence • What does it mean when two fractions are equivalent? • Can equivalent fractions be represented by fractions with different denominators? • How can you ensure that you have equivalence between two fractions?