Kentucky Alternate Assessment Instructional Support Document - Math

KAS: KY.5.NF.3

Standards for Mathematical Practice	
MP.1. Make sense of problems and persevere in solving them. MP.2. Reason abstractly and quantitatively. MP.3. Construct viable arguments and critique the reasoning of others. MP.4. Model with mathematics.	MP.5. Use appropriate tools strategically. MP.6. Attend to precision. MP.7. Look for and make use of structure. MP.8. Look for and express regularity in repeated reasoning.

Standard	Clarifications
KY.5.NF.3 Interpret a fraction as division of the numerator by the denominator $\left(\frac{a}{b} = a \div b\right)$. Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers by using visual fraction models or equations to represent the problem. ***Alternate Assessment Target:*** *Limit to denominators of 2, 3, 4, 6, 8, 10.*	For example students interpret $\frac{3}{4}$ as the result of dividing 3 by 4, noting that $\frac{3}{4}$ multiplied by 4 equals 3 and when 3 wholes are shared equally among 4 people each person has a share of size $\frac{3}{4}$. ***Alternate Assessment Clarification:*** *Example: Ten team members are sharing 3 boxes of cookies. How much of a box will each student get? When working this problem a student should recognize that the 3 boxes are being divided into 10 groups, so s/he is seeing the solution to the following equation, 10 x n = 3 (10 groups of some amount is 3 boxes) which can also be written as n = 3 ÷ 10. Using models or diagrams, they divide each box into 10 groups, resulting in each team member getting $\frac{3}{10}$ of a box.*
Connections to Math Practices	**Coherence/Foundational Understandings**
MP.4 Model with mathematics. (Ask and answer questions about the world.*) **MP.8** Look for and express regularity in repeated reasoning. (Simplify patterns by noticing patterns.*) **MP.6** Attend to precision.(Communicate precisely.*) **Key Vocabulary:** division, fraction, numerator, denominator, quotient, mixed number **Click here to see more about what teachers and students do to build the math practices:** **Engaging the Math Practices and Question Stems**	**Pre-requisite Skills** • Understand the concept of division • Dividing whole numbers • Solving word problems about division and equal sharing • Representing fractions (including mixed numbers) using visual models **Coherence** KY.5.NF.3→KY.6.RP.2 Kentucky Academic Standards for Mathematics

*Clarification from Kaplinsky, R. (2018, November 18). *Making the Math Practices Readable*.

Instructional Considerations

Possible Areas of Difficulties/Misconceptions

- Students may believe that division always results in a smaller number. Using models when dividing with fractions will enable students to see that the results will be larger.
- Students may believe that they should always divide the greater value by the lesser value, as they generally have with whole number division.
- Students may believe that when you multiply fractions and decimals the total gets bigger and when you divide they get smaller. For example to think that $\frac{4}{6}$ x 5 will be 5 times bigger than $\frac{4}{6}$, when in fact the answer is only $3\frac{1}{3}$.

Suggested Tools/Visual Aids

- KY Alternate Assessment Resource Guide (General terms pps 6-11 ; Math terms pps 22-26)
- Fraction circles (concrete and semi-concrete)
- Rectangular fractions (concrete and semi-concrete)
- Fraction tiles/strips (concrete and semi-concrete)
- Cuisenaire rods
- Number lines
- Rulers
- Register tape or paper strips
- Number line
- Whiteboards and markers

Other Considerations

- This standard calls for students to extend their work of partitioning a number line from third and fourth grade. Students need ample experiences to explore the concept that a fraction is a way to represent the division of two quantities. Students are expected to demonstrate their understanding using concrete materials, drawing models, and explaining their thinking when working with fractions in multiple contexts. They read $\frac{3}{5}$ as "three fifths" and after many experiences with sharing problems, learn that $\frac{3}{5}$ can also be interpreted as "3 divided by 5."
- Students benefit from having multiple experiences in the concrete in order to develop an understanding of what the result means when they divide 3 by 5 to get $\frac{3}{5}$.

Additional Resources

- Kaplinsky, R. (2018, November 18). *Making the Math Practices Readable*. Retrieved April 1, 2020 from https://robertkaplinsky.com/?s=revised+math+practices.
- Toy Theater. (2001-2020). *Virtual Manipulatives*. https://toytheater.com/category/teacher-tools/virtual-manipulatives/
- Van de Walle, J.A., Karp, K.S., Bay-Williams, J.M., Wray, J. & Nicole Rigelman, N. (2018). *Elementary and Middle School Mathematics: Teaching Developmentally (10th Edition).* Pearson.