High-Quality Mathematics Items Module (Grades 3-5)

The pages that follow contain a selection of items from chapter assessments in grades 3-5. These items are representative of the range available in many textbook series. This activity is designed to help teachers think about how they can revise chapter tests to better align to the Standards. Each item below can be revised to more closely embody the characteristics described in the High-Quality Mathematics Items Modules.

Instructions:

1. Solve all of the items.

2. Take a close look at each item, thinking about what the modules explain about expectations of high-quality mathematics items. Focus on the following features:

   a. If the item aligns to a Supporting Work standard, does the item connect to Major Work? (Principle 1)
   b. Does the item align to the aspect of rigor targeted in the Standards? (Principle 2)
   c. Does the item align to grade-level expectations? (Principle 3)
   d. Does the item address the central concern of the identified standard? (Principle 4)
   e. If the item aligns to a Standard for Mathematical Practice, is the item appropriate to the grade? (Principle 7)
   f. Does the item type/format of the item match the content? (Principle 8)

3. Using the chart below, record your thoughts about which Alignment Principle can be used to improve each item.

4. With the Alignment Principle in mind, revise the item.

5. After time for individual reflection, discuss your findings and your proposed revision with your colleagues.
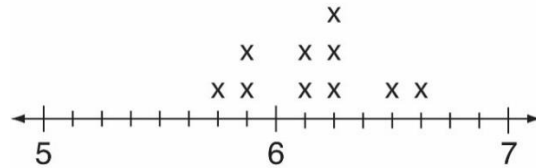
Answer Key:

Standard	Item	Assessment Principle(s)?	Revised Item
3.NBT.A.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	Use the place value chart to add 351 and 248. Draw place value models in each column of the chart and then write the sum. | Hundreds	Tens	Ones
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		| 351 + 248 = ___ hundreds ___ tens ___ ones = _____		

3.NF.A.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.	Yesterday, Trevor rode his bike around the track 6 laps for a total of one mile. Today he wants to ride ⅚ of a mile. How many laps does he need to ride around the track? a) 3 b) 4 c) 5 d) 6		
3.NF.A.3d Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	Complete the comparisons using < , > or =. • $\frac{3}{4}$ $\frac{3}{8}$ • $\frac{1}{2}$ $\frac{4}{8}$ • $\frac{3}{6}$ $\frac{2}{6}$ • $\frac{1}{4}$ $\frac{4}{6}$		

3rd grade MP.8 Look for and express regularity in repeated reasoning.	Complete the multiplication table: 	×	1	2	3	4	5	6	7	8	9
6	6	12	18						| Would the product of 6 × 57 be an even or odd number? Prove your answer.		
4.NBT.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.	Solve the addition problem using two different strategies: 1,645 + 2,351 a) Use the standard algorithm. b) Use another strategy to show how you solved the problem.		

4.MD.B.4 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*	The chart below shows the height, in feet, of some players on a football team: X X X X X X X X X X 5 6 7 Based on the line plot, what is the typical height of this group of football players? a) 6 feet b) $6\frac{1}{8}$ feet c) $6\frac{1}{4}$ feet d) $6\frac{2}{7}$ feet		

5.NF.B.4b Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.	Destiny wanted to find out about what her classmates do after school. She asked ¾ of the students in her class whether they played a musical instrument. She discovered that ⅔ of the students she talked to played a musical instrument. What fraction of the students in her class play a musical instrument? To describe how to solve the problem, circle the number in each statement that completes the sentence - First, draw a rectangular array with 3 rows and [3 4 5] columns. - Next, shade [1 2 3] of the rows with diagonal lines. - Next, shade [4 5 6] of the squares with diagonal lines going the other way. - So, according to the information that Destiny found, [$\frac{1}{2}$ $\frac{3}{4}$ $\frac{4}{8}$] of the students in her class play a musical instrument.		

5.NF.A.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*	Gina ate $\frac{1}{4}$ of a pizza and Tessa ate $\frac{1}{8}$ of the same pizza. **Part A:** Fill in the blanks below to create fractions with a common denominator. $$\frac{1}{4} = \frac{1}{4} \times \frac{\Box}{\Box} = \frac{\Box}{\Box}$$ $$\frac{1}{8} = \frac{1}{8} \times \frac{\Box}{\Box} = \frac{\Box}{\Box}$$ **Part B:** How much pizza did the girls eat together? Explain how you found your answer.		