5.MD.B.2: Create and Solve Problems with Line Plots Using Unit Fractions

**Common Core Domain: Convert** Measurement Units within a Given Measurement System

**Common Core Cluster:** Represent and Interpret Data

**Standard (with text below): 5.MD.B.2**

Make a line plot to display a data set of measurements in [fractions](javascript:showTip('fractions','A%20number%20expressible%20in%20the%20form%20a/b%20where%20a%20is%20a%20whole%20number%20and%20b%20is%20a%20positive%20whole%20number.%20(The%20word%20fraction%20in%20these%20standards%20always%20refers%20to%20a%20non-negative%20number.)%20See%20also:%20rational%20number.')) of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in [line plots](javascript:showTip('line%20plots','A%20method%20of%20visually%20displaying%20a%20distribution%20of%20data%20values%20where%20each%20data%20value%20is%20shown%20as%20a%20dot%20or%20mark%20above%20a%20number%20line.%20Also%20known%20as%20a%20dot%20plot.')). For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

**MAIN CONCEPTS**

* Reason that since there are b portions of 1/b in 1 then there must be a x b in a (There are 3 portions of 1/3 in 1 then there must be 4 x 3 in 4, so 4 1/3 = 4 x 3 = 12).
* See that dividing a whole number by a unit fraction is determining how many of that unit fraction is in the whole number.
* Use factor families to show that a 1/b = c so c x 1/b = a (3 ¼ = 12 so 12 x ¼ = 3).
* Use visual fraction models to show and prove reasoning.
* Recognize that division of a whole number as multiply by a unit fraction.
* Due to the reasoning that dividing a whole number can be represented as a fraction (1 3 = 1 x 1/3) divide a unit fraction by a whole shown as 1/3 4 = 1/3 x ¼ = 1/12
* Use visual fraction models to show the quotient.
* Dividing a unit fraction into more whole number parts means partitioning the denominator into smaller parts (1/3 4 means splitting the whole 1 of 1/3 into 4 more parts yielding 12 parts).
* Finding the equivalent fractions with common denominators does not change the value of either fraction.
* In order to add or subtract fractions with unlike denominators you must find equivalent fractions with the same denominator.
* o find the sum or difference of fractions with unlike denominators finding the Least Common Denominator (LCD) is not necessary. Students may use the method of multiplying the numerator and denominator by the unlike fraction’s denominator. (a/b + c/d = a/b x d/d + c/d x b/b = (ad+bc)/bd) This is the preferred method at this point.
* Problems involve addition, subtraction, multiplication and division of fractions and mixed numbers.
* Produce line plots scaled with fractional units.
* Analyze data in a given line plot to answer questions (If all beakers containing liquid in fractional units had to be combined and then distributed equally).

**TESTING FOCUS:**

**5.MD.B.2** IS SUBJECT TO TYPE I QUESTIONS ON THE PARCC ASSESSMENT

**Clarifications, limits, emphases, and other information intended to ensure**

**appropriate variety in tasks:**

* Tasks requiring students to produce a line plot should only involve fractions 1/2, 1/4, or 1/8.

**Relationship to Mathematical Practices**

* [CCSS.MATH.PRACTICE.MP5](http://www.corestandards.org/Math/Practice/MP5/) Use appropriate tools strategically.

**Additional Resources:**

* Progressions for Common Core Mathematics: [3-5 Number and Operations – Fractions](http://mathematicalmusings.org/wp-content/uploads/2018/08/ccss_progression_nf_35_2018_08_10.pdf)
* [IXL](https://www.ixl.com/standards/common-core/math/grade-5) – see main concepts and hover over each to see example problems
* [Khan Academy](https://www.khanacademy.org/math/arithmetic/fraction-arithmetic/arith-review-add-sub-fractions/v/visually-adding-fractions-with-unlike-denominators): There are 6 additional videos and practice links to the left that are all applicable for adding and subtracting fractions with unlike denominators.
* [OJUSD](https://ojusd-ca.schoolloop.com/pf4/cms2/view_page?d=x&group_id=1412232636067&vdid=i24b1tyjgb7s): Video that shows how students can work through solving problems to add and subtract fractions with unlike denominators.
* [Grade 5 Eureka Essentials (Teacher lesson google doc)](https://docs.google.com/document/d/1XT82a9U58vwLEw6ZOyTN4nteZnCvkCWH2j75CiPXQtk/edit#heading=h.uw1rw11tpbn5): Go to pages 32-43.
  + [Application problems from lesson](https://www.k-5mathteachingresources.com/support-files/closest-to-25.pdf)
* [K-5 Math Teaching Resources](https://www.k-5mathteachingresources.com/support-files/closest-to-25.pdf): Simple dice game
* Standards For Mathematical Practice : <http://www.corestandards.org/Math/Practice/>