Learning Experience:
AKS 21
Composing and Decomposing Fractions

When planning, include the following:

Models (Concrete—Semi-Concrete—Semi-Abstract—Abstract)

Problems/Situations

Questions

AKS: 21/MCC4.NF.3 Recognize that a fraction a/b with a>1 as a sum of fractions 1/b

Vertical Alignment:
3rd Grade: 19.NF.3 – generate and justify equivalent fractions
   20.NF.3 – compare two fractions using models and reasoning
   21.NF.3 – model and express whole numbers as fractions
5th Grade: 19.NF.3 – represent division as a fraction
   20.NF.3 – solve problems with fraction quotient

Standards for Mathematical Practice:
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.

Materials:
The Hershey’s Bar Fractions Book by: Jerry Pallotta and Rob Bolster
Hershey Bars
http://www.mathsisfun.com/numbers/fraction-number-line.html
Circular fraction tiles
Colored computer paper cut out into circles using the following as black line masters:
Scissors
Vocabulary:
Compose  
Decompose  
Fraction  
Sum  
Denominator  
Numerator  
Whole  
Equation  
Addition  
Subtraction  
Equivalent

Essential Question:  
Which operation would I use if I wanted to join or separate parts of a whole?

Activating Strategy:

- Read: Hershey’s Fraction Book by Jerry Pallotta and Rob Bolster and discuss parts of a whole/decomposing a fraction (or whole).
- http://www.mathsisfun.com/numbers/fraction-number-line.html Use this website to discuss how to compose fractions where the numerator is greater than 1.

Instructional Activity:
Opener: Give each group a blank sheet of white paper with the question written on asking:
What do you know about fractions? Give students 3 minutes to write down their ideas. Then share out to the class for 2 minutes (think, pair, share).

Mini-Lesson (Activating Strategy): see above

Guided Math Group: Bring students back to the Hershey Book and give students Hershey Bar. Discuss the parts of a whole and what fractions the students recognize. On white boards, have students write equations with equal fraction parts to create a fraction (example: \(1/b + 1/b = 2/b\)) using the Hershey Bar as a manipulative. Have students model different equations and challenge them to create a different equation than other group members. Students share and justify their responses.

Questions:
- How are fractions used in problem-solving situations?
- How can equivalent fractions be identified?
- How can I add and subtract fractions of a given set?
- How can I find equivalent fractions?
- How can I represent fractions in different ways?
- How can you use fractions to solve addition and subtraction problems?
- How do we add fractions with like denominators?
- How do we apply our understanding of fractions in everyday life?
- What do the parts of a fraction tell about its numerator and denominator?
- What happens to the denominator when I add fractions with like denominators?
- What is a fraction and how can it be represented?
- Why does the denominator remain the same when I add fractions with like denominators?
- Why is it important to identify, label, and compare fractions (halves, thirds, fourths, sixths, eighths, tenths) as representations of equal parts of a whole or of a set?

Independent Work: Have students obtain fifths through eighths circles, ninths through twelfths circles, and 8 sentence strips. Have students cut the fraction circles apart and create their own equations for each circle. (Example: \(1/5 + 1/5 + 1/5 = 3/5\) or \(1/5 + 1/5 + 1/5 + 1/5 + 1/5 = 4/5\)) Students must create 8 different equations. They may create more if time permits or they would like.

Centers:
1. Vocabulary Graphic Organizer – Students will define and illustrate each vocabulary word. Students will use textbook or dictionary to reference.
2. Kidspiration (on laptop carts or lab) Building Fractions lesson and Fractions-Add and Subtract – students will build fractions and shade, practicing composing and decomposing fractions. *If there are not enough computers, please use any suggestions from 6 and 7 as a substitute.
3. Students will create equations (similar to independent work) using fraction circles and fraction towers. Students will illustrate their equation in both circular and rectangular form to show equivalence.
4. Build a Whole. Students will use a fraction spinner with a paperclip. Students will spin and place that fraction on a whole fraction bar. Students will take turns and compete to create a whole first, using the fraction tiles that they spin. Students may not go over or
under. Students must spin to equal a whole.

5. Students will create a fraction number line using sentence strips. Students will fold the sentence strip into $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{7}$, $\frac{1}{8}$, $\frac{1}{9}$, $\frac{1}{10}$. Students will then go back and label each increment until it equals a whole. The challenge will be not to write any whole numbers on the number line, realizing $0/b$ is equal to 0 and $b/b$ is equal to 1.

6. **Expanding the experience (any of these could be used as additional centers)**

   *Directions are included in each resource on the MOCC*
   - Hands On Standards Lesson 20 Addition and Subtraction of Fractions
   - Super Source Grade 3-4 Cuisinaire Rods Fraction Squares
   - Super Source Grade 3-4 Color Tiles Coasting Along
   - Super Source Grade 3-4 Color Tiles Fraction Bars
   - Super Source Grade 3-4 Color Tiles Fraction Fill Up
   - Super Source Grade 3-4 Color Tiles Making Flags
   - Super Source Grade 5-6 Pattern Blocks What’s My Value?
   - Think Math Lesson 7.11
   - Think Math Lesson 7.2
   - Think Math Lesson 7.3

7. **Extending the experience (any of these could be used as additional centers)**

   - Exemplars Lost Spinner
   - Exemplars Deluxe Birthday Cake
   - Exemplars Portfolio Pizza Party
   - Exemplars Disappearing Cookies
   - Exemplars Fun Night
   - Exemplars Taco Spread
   - Exemplars Pieces of Pizza

**Summarizing:**
Think, Pair, Share what they would add to their poster (opening activity) now after their experience and many different ways to make a whole. For homework, have students write a letter explaining how to decompose and compose fractions. Or, students could write an acrostic to the words decompose or compose.

**Did your plans you include the following?**

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<thead>
<tr>
<th>Models</th>
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Fraction Circles (fifths through eighths unlabeled)
<table>
<thead>
<tr>
<th>VOCABULARY</th>
<th>Definition (words)</th>
<th>Representation (Picture)</th>
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<tbody>
<tr>
<td>Fraction</td>
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Fraction Spinner – see attachment pdf.
Directions: To use the spinner, you’ll need a paper clip and a pencil. Put the paper clip down with one end over the center dot. Put the pencil point down inside the paper clip and hold the pencil in place. Thump the paper clip. It will spin around the pencil point and point to one section on the Fraction Spinner.