**Decomposing Fractions into Sums of Fractions 4th Grade**

**TEKS: 4(3)(B) Number and operations.** The student applies mathematical process standards to represent and generate fractions to solve problems.(The student is expected to decompose a fraction in more than one way into a sum of fractions with the same denominator using concrete and pictorial models and recording results with symbolic representations.)

**ELPS: 4(F) Reading.** The student is expected to use visual and contextual support and support from peers and teachers to read grade-appropriate content area text, enhance and confirm understanding, and develop vocabulary, grasp of language structures, and background knowledge needed to comprehend increasingly challenging language.

**Vocabulary Review:** fraction, decompose, sum, numerator, denominator, unit fraction

**Rationale/Purpose:** The purpose of this lesson is to aid development of number sense specific to fractions. This is a necessary life skill in our daily life in cooking, using money, constructing items, understanding time, or any activity requiring numbers. Understanding fractions will help us understand percents and the use of decimals because they are different ways to express the same thing: part to whole, measurement, division, or ratio.

**Engage:** Show a balance scale and challenge the students to share how a balance scale can show or symbolize the relationship of fraction expressions. 1. How can you use this balance scale to show me how two fractions are related? 2. What if you create a fraction math expression (sentence)? Can you still use this balance scale? (Later balance scale will be introduced to show fraction comparisons of unequal values)

**Pre-assessment Quick Check:** I can take the number 10, then decompose it to create an equivalent math expression (sentence). 10 = 7 + 3. I am giving you an area model of 10 squares. I want to see how you think you can decompose the fraction 10/10 into an equivalent expression (10ths are used as a foundation towards later lessons to decimals/percent. This is the same reason why I am choosing to use an area model rather than a fraction strip). This is an individual activity simply to see where you are in your understanding. You may use colored pencils for shading. Assessment will look something like this (separate formal master created):

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|   |  |  |  |  |

10/10 =

I think this because:

**Procedure:**

**1) Number Talk:** Students will share their expressions, explaining their thinking using math stem language taught at the beginning of the year.

**2) Video Direct Teach:**

 **A)** There are two videos, both 5 minutes, from which to choose to show the students depending on my classroom dynamics. One video is more explicit in explanation, while the other video has better visuals though the instructor speaks more quickly. For this lesson plan, I will choose the more explicit. However, both URL addresses are given:

https://learnzillion.com/lessons/1630-decompose-a-fraction-into-a-sum-of-fractions-using-an-area-model

https://www.khanacademy.org/math/cc-fourth-grade-math/cc-4th-fractions-topic/cc-4th-decomposing%20fractions/v/decomposing-a-fraction-visually

 **B)** The video will be stopped at specific points for students to write notes/draw diagrams in their math journals.

**3) Whole Class:** I will have a pre-prepped Anchor Chart with some areas unfinished to complete as a class through discussion describing the steps to decompose a fraction into equivalent sums. I will begin by stating that the area cut represents 1 whole. Because it is divided into 10 equal "fair" shares then it is divided into tenths. Using 1/2 inch grid paper cut into rectangles of 10, I will model 1 or 2 examples (more if seems necessary) of how to decompose fractions into equivalent sums of fractions and glue on a balance beam organizer, asking for student participation throughout.

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**4) Guided Practice:** Students will work in pairs using 1/2 inch grid paper to create posters on manila paper of math expressions depicting the lesson. Example shown (master balance beam on separate paper):

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| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|   |  |  |  |  |

**=**

 8/10 3/10 + 5/10

**Teacher Small Group:** During this time, I will pull a small group of students to the U-table for additional instruction/guidance if needed.

**5)**  **Exit Check:** Draw and label an area or fraction strip which shows 10/10 or 1 = 5/10 + 2/10 + 3/10.

**6) Independent Practice:** will not begin today.

**Math Extensions/Flex/Centers:**

 **a)** http://www.mathplayground.com/Scale\_Fractions.html

 **b)** Kendall's Candy Company - http://mail.clevelandcountyschools.org/~ccselem/FOV1-000411E2/4th%20Fractions%20Unit.pdf?Plugin=Loft

**Next Lesson:** Students will work through problems on dry erase board as I present fraction strips under the document camera. Students will share different ways to decompose various fractions. I will then share a couple of word problems to see how students are applying understanding at this point. Example: A pizza was cut into 6 equal slices for 6 friends at a birthday party. However, one friend had already eaten so she gave her slice to the birthday boy. Draw an area model to show how much pizza each of the 5 friends ate. This will be followed by a short number talk and a couple of more word problems. If students are ready, direct teach will begin showing decomposing improper fractions. Independent practice will begin be implemented today.

**Modifications/Accommodations:**

**SPED:** small group additional instruction, use of concrete manipulatives, heterogeneous grouping

**ADD/ADHD:** During guided practice, pairs may move to different areas of the room. Working in the journal during the video also allows for controlled multi-tasking to increase engagement. Water break allowed between whole class and guided practice.

**Tag/GT:** allow for larger denominators, creative equivalent exploration, using multiple fraction addends

**ELL:** refer to word wall as reviewing terms, allow for wait time before asking for student response, use of visual aid, small group (partner) work to reduce anxiety.

Extension from North Carolina Department of Public Instruction

Lesson 5: Kendall’s Candy Company

Decompose a fraction into a sum of fractions with the same denominator in

more than one way, recording each decomposition by an equation. Justify

decompositions, e.g., by using a visual fraction model. Examples: 3/8 = 1/8 +

1/8 + 1/8; 3/8 = 1/8 + 2/8; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.

**Materials:** Unifix connecting cubes, math notebooks, markers/crayons

In today’s activity students build “Special Bars” from different colored pop cubes. Each color will represent a different flavor of candy. The bars come in different sizes depending on the number of candies the buyer wants. The teacher will need to make a bar using 8 total pop cubes prior to the beginning of class.

“Today we are going to pretend to visit a special candy store called Kendall’s Candy Company. At the company they have a very unique candy bar called the Special Bar. This bar is special because the buyer of the bar is able to pick out all the flavors that will be in the bar. This way each bar is different and the buyer can get exactly what they want. As a treat, each person who visits the store

To personalize this task students can use their names when designing a bar of their own.

“Let’s look at the Special Bar that I made on my visit.” Share with student a bar you created that

has 8 pieces.

 **Suggested Questions:**

• Which flavor of candy do I have the most of?

• Which flavor of candy do I have the least of?

• How do you know which candy I have the most of?

• How much of my bar is flavored blueberry? Cherry? Banana? Lime? etc.

The answers of the students should be in fraction form. You are not asking how many pieces are

certain flavors, but how much of the bar is that flavor. As students tell you the fraction for each

flavor, record the fractions on the board.

If I add up the all the fractions 3/8 + 4/8 + 1/8 I will get 8/8 which is the whole candy bar.

 Today you are going to build Special Bars of different sizes and record them in you math notebook.

First you will build a Special Bar of that has 8 pieces of candy. Then you will record the bar by

drawing it in your notebook. After that you will write an equation to show the sizes of your Special

Bar. You will repeat the process with Special Bars of different sizes. (2, 3, 4, 5, 6, 8, 10, or 12

pieces)

Explore 18-20 minutes

**Building and Recording Special Bars**

Students work on building and recording different sized Special Bars. They first start with a bar that has 8 pieces of candy.

As the students are building and recording the bars, the teacher should be questioning the students

work.

• How many (flavor) pieces do you have?

• How many more pieces would you need to complete a bar?

• Which do you have more of? Less of? Equal to?

• What does your equation look like?

• How are you getting the fractions for your equation?

• How does your representation match your Love Bug Bar?

**Explain 12-15 minutes**

Students re-build their favorite Special Bar from the day. Bring the Special Bar and the equations for the bar to a large group meeting. Students share their drawings and discuss the equation that goes along with it.

**Elaborate 8-10 minutes**

Students write a story problem about their Special Bar.

Regan’s Special Bar was 4/10 Cotton Candy, 5/10 Marsh mellow, and 1/10 Orange. Her dog, Izzy, ate all of the cotton candy pieces while she was at school. How much of her Love Bug Bar was remaining?

Students are given part of a bar, and need to complete the rest of the bar.

I have 7/12 of my bar complete with banana and chocolate. I don’t want any more banana or

chocolate, but I want two more flavors, what are some of my options?

Evaluation of Students

**Formative Assessment:** As you are working with the students are they able to describe each section of the bar in fraction from? Can they create equations that equal a whole?

**Summative Assessment:** If I had a bar with 3 licorice, 3 cotton candy, 2 apple, and 4 orange pieces, could you draw what the bar looks like. Can you write an equation that represents my Love Bug Bar?

**Extension:** Build the Mega Special Bar which is only sold for Valentine’s Day. The Mega Special

Bar has 100 pieces of candy, and can have up to 10 different types of candy.

 **Possible Flavors for the Colored Connecting Cubes**

Red – Cherry

Blue – Blueberry

Light Green – Lime

White – Marshmallow

Brown – Chocolate

Black – Licorice

Yellow – Banana

Pink – Cotton Candy

Dark Green – Apple

Orange - Orange