Unit 6, Week 5: Week of 2/4/19 Kathy Caraway/RRISD

Weekly Lessons/Overview and Goals: Students will explore whole numbers and decompose fractions in more than one way.

Focus TEKS:

- 4.3A represent a fraction a/b as a sum of fractions 1/b, where a and b are whole numbers and b > 0, including when a > b; – S RC1
- 4.3B 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; – S RC1
- 4.3G represent fractions and decimals to the tenths or hundredths as distances from zero on a number line. – S RC1 [include measuring lengths to the nearest half, fourth, eighth, and tenth of a unit, as appropriate]
- 4.9A represent data on a frequency table, dot plot, or stem-and-leaf plot marked with whole numbers and fractions; – R RC4

<u>Equivalent Fractions</u>

4.3C determine if two given fractions are equivalent using a variety of methods; – S RC1
Compare Fractions with Like and Unlike Denominators

4.3D compare two fractions with different numerators and different denominators and represent the comparison using the symbols >, =, or <; – R RC1
Add and Subtract Fractions with Like Denominators

4.3E represent and solve addition and subtraction of fractions with equal denominators using objects and pictorial models that build to the number line and properties of operations; – R RC2
4.3F evaluate the reasonableness of sums and differences of fractions using benchmark fractions 0, 1/4, 1/2, 3/4, and 1, referring to the same whole; and – S RC2
Problem Solving (Some of the types of problems students should be solving during this unit)

4.8C solve problems that deal with measurements of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate. – R RC3 [word problems using measurement contexts, focus on fractions in this unit, addition and subtraction only in this unit]
4.9B solve one- and two-step [addition and subtraction] problems using data in whole number, decimal, and fraction form in a frequency table, dot plot, or stem-and-leaf plot. – S RC4

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Vocabulary		
• add / sumar • addition / suma o adición • **benchmark fractions / fracción de referencia** • compare / comparar • comparison symbols (<, >, =) / símbolos de comparación • compose / componer	• denominator / denominador • difference / diferencia • equal parts / partes iguales • equal shares / partes iguales • equation / ecuación • equivalent / equivalente • **equivalent fractions**	• mixed number / número mixto • number line / recta numérica • numerator / numerador • one whole / un entero • representation / representación • sum / suma • **unit fraction / fracción unitaria** • whole number

Preparation: There are many activities this week that will require prep work. Be sure to organize the sorts and materials you will need prior to beginning on Monday.

Monday: Close Fractions

Engage

Read - *Sir Cumference and the Fraction Faire*. This book is available on Mackin Via

Comparing Fractions - Eating Half

- I recommend downloading the file and opening in Adobe Acrobat. The file should open so that only one page is visible at a time. This allows you to use your mouse or arrow keys to proceed through the document like a book or slideshow - one page appears at a time. If you have to scroll page to page, it still works, it just feels less like a book.

Close Fractions Day 1

Explore & Explain

Say, "Today we're going to explore fractions that are close to 1. We're not going to make any fractions that are equal to 1 and we're not going to make any fractions that are greater than 1. Instead, we're going to focus on fractions that are less than 1, but they're really close to 1!"

1. Give each pair of students a copy of the Student Page and a device. Students will need to access this Fraction Applet.
2. As students are working, circulate around to ensure students understand the directions as they work through the student page.

Elaborate

After most students have completed the student page, call the class together and discuss their answers to the questions. When you get to question 6, be sure to ask, "Why do you believe this fraction is closer to 1 than any of the fractions we can make on the applet?"

Evaluate

Close the lesson with an exit slip. Ask, "Which fraction is greater, ⅔ or 19/20? Explain why you believe your answer is correct." Let students work independently to answer the question in their math journals. You're looking for students who get the answer right, but also the reason why. Students who talk about the distance from 1 (⅓ and 1/20) are on the right track. Students who choose 19/20 because both the numerator and denominator are greater than those in 2/3 are noticing something true, but not something reliable that tells us when one fraction is greater than another fraction.

Tuesday: Close Fractions Day 2

Engage

Read: *Twinderella: A Fractioned Fairy Tale*

Project slide 1. Ask students, "What do you notice? What do you wonder?" Give to silently record their noticings and wonderings in their math journal. Then let students share 1 noticing and 1 wondering with a partner. Finally, have students share their noticings and wonderings and record them on the board.

1. Depending on whether this was already addressed during students' sharing, ask, "How far is each fraction from 1?"
2. Project slide 2. Ask, "What do you notice about all of the fractions that represent the distance from 1?" Emphasize that each of these fractions are unit fractions. That means each of the fractions on the left is one unit fraction away from the whole.

3. Project slide 3. Say, "The table on the right shows five fractions and their distances from 1. What are some other fractions you can think of that are only one unit fraction away from 1?" Let students share responses and record them in the table on the right side of the screen.

Explore & Explain

4. Say, "Today you're going to explore comparing fractions that are only one unit fraction away from 1." Explain the directions for the activity. Students will get a set of fraction cards. They will mix them up and place them in a pile face down. Then they will draw 2 fractions and compare them. When they are ready, they record this comparison on their student sheet. Students continue drawing, comparing, and recording until they have made 6 comparison. Finally, students attempt the problem at the bottom of the page.
5. As students are working, circulate around to ensure students understand the directions. Ask questions such as:
    a. How far away is this fraction from one? What about the other fraction?
    b. How can you use those unit fractions to help you figure out which fraction is closer to 1?

Elaborate

6. After most students have completed the activity, call the class together. Ask for volunteers to share some of the comparisons they made. For each one, ask, "How do you know this is a true comparison?"
7. Project slide 4. (Be sure to use Present mode because of animations on each slide.) Give students think time to decide which fraction is greater. Let them share their thinking with a partner before continuing to reveal the rest of the slide. Before advancing the animation, ask, "How far is 6/7 from 1?" Then click to reveal the distance. Ask, "How far is 9/10 from 1?" Then click to reveal the distance. Ask, "Which fraction is closer to 1, 6/7 or 9/10? How do you know?" After students' share their thinking, click to reveal the models. Have students discuss how the models support their thinking. Finally, click to reveal the comparison sentence.
8. Project slide 5. Give students think time. Let them share their thinking with a partner before continuing to reveal the rest of the slide. Before advancing the animation, ask, "How far is 10/12 from 1?" Then click to reveal the distance. Ask, "How far is 6/8 from 1?" Then click to reveal the distance. Ask, "Which fraction is closer to 1, 10/12 or 6/8? How do you know?" This one might be more challenging but it's important for students to see that this strategy extends beyond the case where you're a unit fraction away from 1. Ultimately because the two fractions that represent the distance from 1 both have the *same numerator*, you are able to reason about which of the two fractions is closer to 1. After students' share their thinking, click to reveal the models. Have students discuss how the models support their thinking. Finally, click to reveal the comparison sentence.

9. Project slide 6. Give students think time. Let them share their thinking with a partner before continuing to reveal the rest of the slide. This problem was chosen just in case students are developing a misconception that all they have to look at are the numerators and denominators. In all the previous problems, the correct answer has a greater numerator and denominator than the other fraction. That's not the strategy we want students to walk away with because it is not generalizable. This problem was designed to show that just because the numerator and denominator of one fraction are greater doesn't mean we know which fraction is greater.
10. Before advancing the animation, ask, "How far is 5/6 from 1?" Then click to reveal the distance. Ask, "How far is 10/15 from 1?" Then click to reveal the distance. Ask, "Which fraction is closer to 1, 5/6 or 10/15? How do you know?" Let students share their thinking. Hopefully someone will remark that it's not easy to tell because they don't know how ⅙ and 5/15 relate to one another. Click to reveal and discuss the thought bubble. Then click to reveal the final question. Let students share their thinking.
11. Project slide 7. If necessary, divide students into groups and have each group analyze one of the pairs of fractions. Come back together to talk about for which pairs it would be appropriate to use the "compare to 1" strategy.
    a. ¾ and ⅘ would be appropriate because the distances are ¼ and ⅕ which both have the same numerator
    b. 12/14 and ⅞ would not be appropriate because the distances are 2/14 and ⅛ which are not easy to compare mentally
    c. 4/6 and 5/7 are appropriate because the distances are 2/6 and 2/7 which both have the same numerator
    d. 14/15 and 10/11 are appropriate because the distances are 1/15 and 1/11 which both have the same numerator
    e. 4/3 and ⅝ are appropriate because one of the fractions is greater than 1 and the other fraction is less than 1 (This wasn't talked about before in this lesson, but comparing to 1 is an appropriate strategy. We don't even need to address the distance to 1 because we already know one fraction is less than one and the other fraction is greater than one.)

Evaluate

12. Close the lesson with an exit slip reflection students write in their math journals. "How do benchmark numbers like ½ and 1 help us compare fractions?"

Wednesday: Creating a Need for a New Strategy

Engage

Project slide 1. (Be sure you're in Present mode) and hand out the Engage Student Page. Say, "For each strategy in the table, I want you to choose two fractions from the board that can be compared easily using that strategy. For example, the first strategy is

'common denominators'. Do you see any fractions on the board that have common denominators? If so, you can choose those two fractions and compare them in that row of your table."

- Give students time to work in partners to complete the table.
- For each strategy, let students share the pairs of fractions they came up with. For each one, be sure to ask, "How do you know these two fractions can be compared easily using this strategy?" The purpose is to help students realize they can compare a lot of different fractions using the strategies they already know. They likely don't even need to write anything down to make the comparisons.

Explore & Explain

- Project slide 2. Say, "What about these two fractions? Are these easy to compare using the strategies we know?" Click to reveal a table of strategies. As you discuss each strategy, click to reveal an X that shows these two fractions cannot be easily compared using that strategy.
    a. *Common denominators* - The fractions do not have the same denominator so we can't use this strategy. (If someone says you could make the denominators the same, acknowledge that it's an interesting idea they'll have a chance to explore soon.)
    b. *Common numerators* - The fractions do not have the same numerator so we can't use this strategy
    c. *Compare to ½* - Both of these fractions are greater than ½, so we can't use this strategy
    d. *Compare to 1* - 3/4 is 1/4 away from 1 and 8/12 is 4/12 away from 1. Some students might have some *ideas* about what this means, but the explanation is not going to be as simple or straightforward as for other pairs of fractions we've compared using this strategy. If a student does have some ideas, tell them to hold onto those because students are going to have a chance to compare these fractions on their own in just a moment.

Elaborate

Let students work in pairs or trios to compare these two fractions. Students should use words, pictures, and or numbers to convince their classmates their comparison is true.

- When students are finished, have students do a Gallery Walk to see how their classmates compared the two fractions. Then lead a short discussion of how students made the comparison. The important point you want to come out of the conversation is that if we *could* make these two fractions have the same denominator, they would be much easier to compare, and that we do have a way to rewrite fractions using equivalent fractions.

- Lead students through this modified Step In Discussion. Then let students work on page 2 of the Student Journal to practice creating equivalent fractions with models.

Evaluate

Project the Lesson Close slide. Direct students to choose a pair of fractions on screen. Ask, "How can you use some of the equivalent fractions you made to help compare the two fractions you chose?" Students should use equivalent fractions they made on the Student Journal page to help them.

Thursday: Stepping Stones, Module 5, Lesson 2 - Calculating Equivalent Fractions

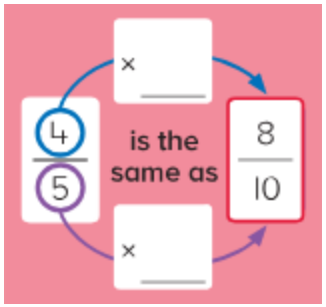
Engage

Remind students how they discovered yesterday that equivalent fractions can help them compare fractions when their other strategies won't help them. Say, "Today we're going to explore equivalent fractions and how to make them so that we can use them to help us compare fractions."

Then facilitate this step as written in the Origo lesson

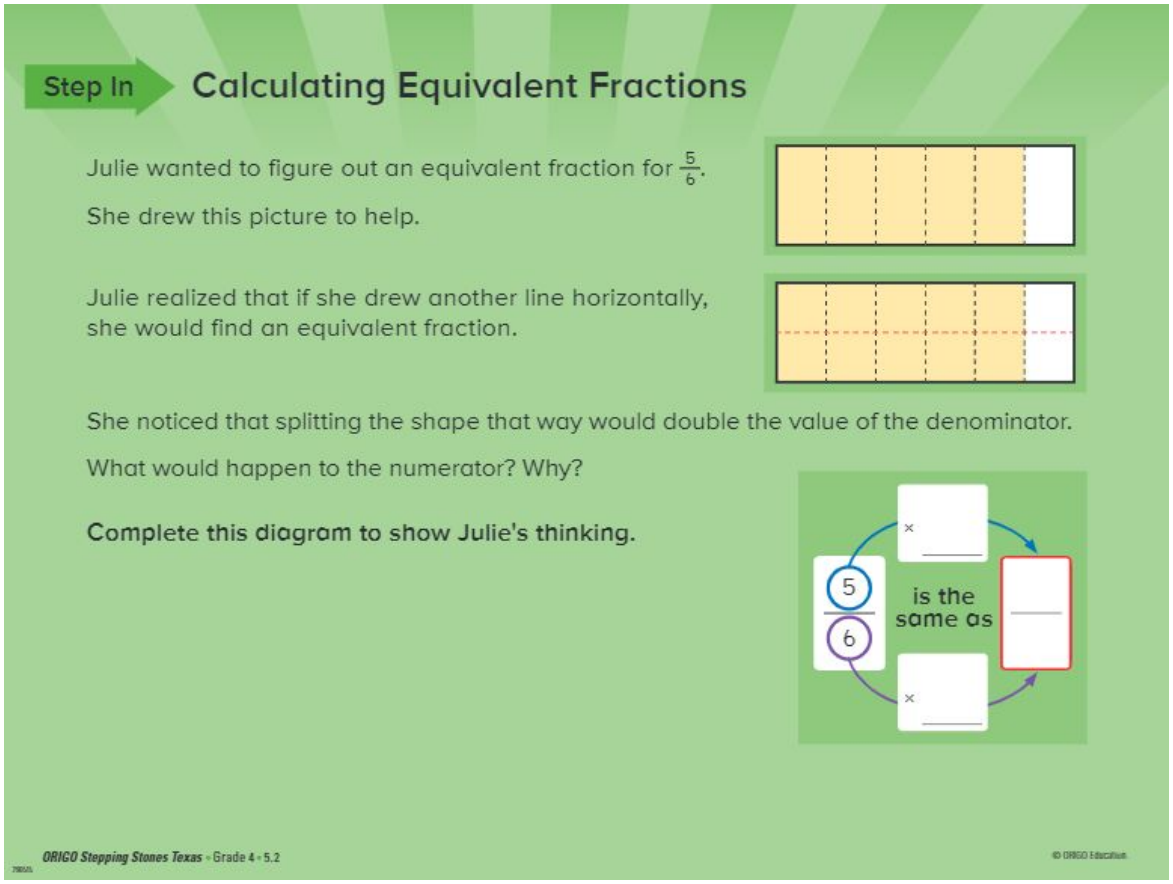
Explore

Using the diagram, ask students *"What do you notice about the relationships between the numerators and denominators?"Highlight that both the numerator and denominator have been doubled.*



Explain

Ung the slide in Origo, you can either use your whiteboard or project this. Taking time to walk through each step. Encourage students to follow along either in their notebooks or on their desks using whiteboard markers.



Step In

Calculating Equivalent Fractions

Julie wanted to figure out an equivalent fraction for $\frac{5}{6}$.

She drew this picture to help.

Julie realized that if she drew another line horizontally, she would find an equivalent fraction.

She noticed that splitting the shape that way would double the value of the denominator.

What would happen to the numerator? Why?

Complete this diagram to show Julie's thinking.

$\frac{5}{6}$ × ___ × ___ is the same as ___

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Elaborate

After walking through the first page with the class, have students complete the back of the student journal. Allow time for independent practice and monitor students who may need extra support.

Evaluate

Review activity with students. Check for understanding and allow time for questions and discussion.

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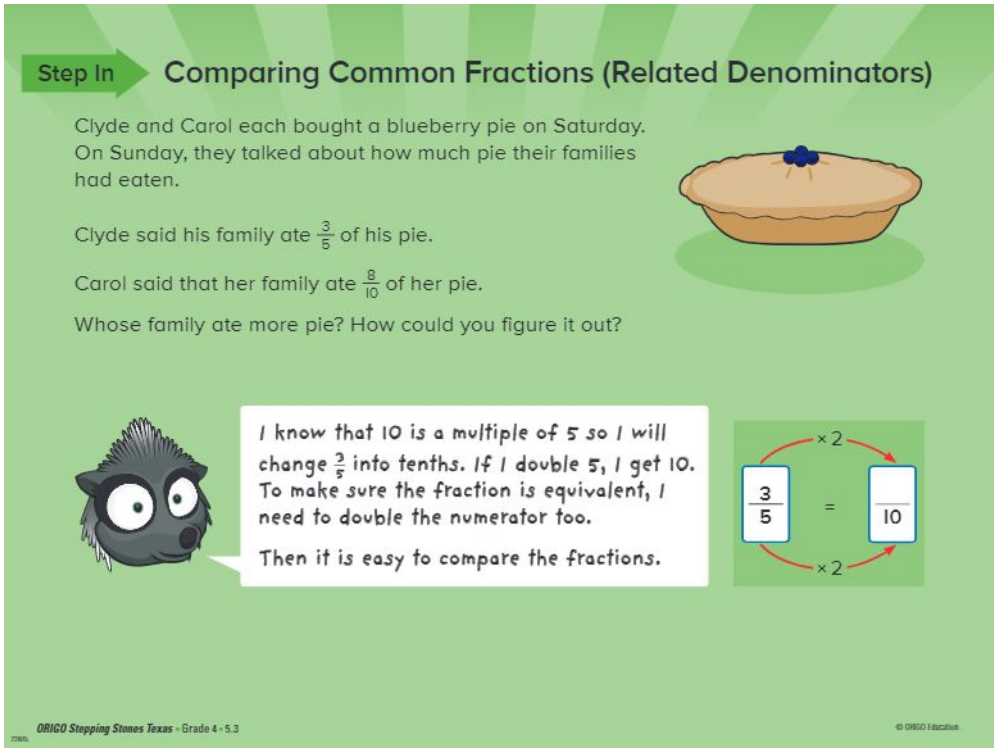
Friday: [Stepping Stones, Module 5, Lesson 3 Comparing Common Fractions (Related Denominators)]

Engage

Use the image below to begin your discussion



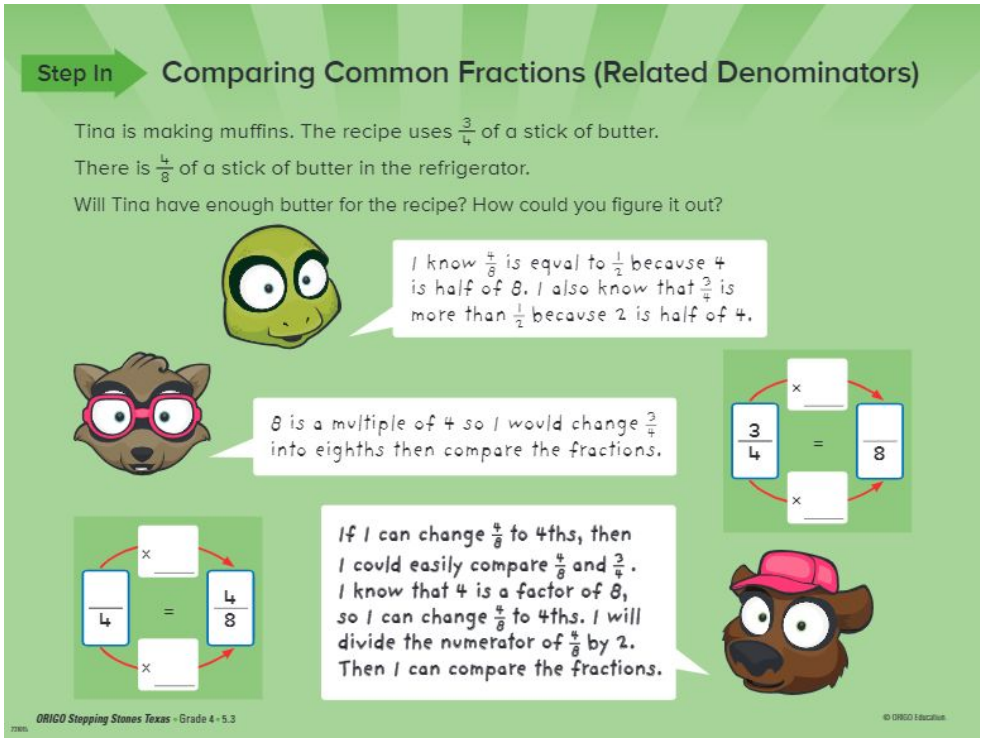
Explore

After the Step In Discussion, have students play a game where they draw a pair of fractions, change one of the fractions so that both have the same denominator, and then write a comparison statement with the original pair of fractions.

- Recording Sheet - One per student (There are 8 pairs of fractions, and each student will record the 4 pairs they drew on their own recording sheet.)
- Fraction Pairs - Each page includes 2 sets of fraction pair cards

Explain

Use the slide as a resource



Elaborate

Create sample problems on the board for students to work through. Encourage partner/pair share. Have students discuss how they compared the fractions.

Evaluate

- As students finish playing the game, project the Step Up problem for them to complete in their Math journal or on the back of their recording sheet.

*Next Week!! Finding Common Denominators

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Differentiation: A variety of activities (application, concrete, and kinesthetic) will be incorporated into both days to engage all learners. Kagan Structures

ARRC Unit 6 Suggested Lesson Plan